
# Feasibility Study of New Terminal Facilities of the Georgian Ports Plan

## Phase I Report

30 October 1997

## REPORT COVER PAGE

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| Project Number | : | TNREG 9603 | |
| Country: | | Georgia | |
| | | Local operator | EC Consultant |
| Name | : | Ministry of Transport of Georgia<br>Ports of Poti and Batumi | HPTI - Dornier - RMG Consortium |
| Address | : | 12, Kazbegi Ave. Tbilisi<br>Niko Nikoladze Square 1, Poti<br>20, Gogebashvili st., Batumi | Überseezentrum,<br>Schumacherwerder<br>20457 Hamburg, Germany |
| Tel. number | : | 995 - 393 - 206 60 (Poti)<br>995 - 222 - 766 51 (Batumi) | +49 - 40 - 788 78 0 |
| Fax number | : | 995 - 393 - 206 30 (Poti)<br>995 - 222 - 766 51 (Batumi) | +49 - 40 - 788 78 178 |
| e-mail number | : | ina@caucasus.net (Poti) | HPTI@Compuserve.com |
| Contact person | : | Mr Adeishvili (Minister of Transport)<br>Mr. Inaishvili (Port Director Poti)<br>Mr. Ninidze (1. Dep. Port Director Batumi) | Wolfhard H- Arlt |
| Signatures: | (Poti) | _____ | _____ |
| | (Batumi) | _____ | |

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Author of report : HPTI-Dornier-RMG Team Poti and Batumi

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| EC M & E team | _____ | _____ | _____ |
| | [name] | [signature] | [date] |
| EC Delegation | _____ | _____ | _____ |
| | [name] | [signature] | [date] |
| TACIS Bureau | _____ | _____ | _____ |
| [task manager] | [name] | [signature] | [date] |

# Feasibility Study of New Terminal Facilities in the Georgian Ports

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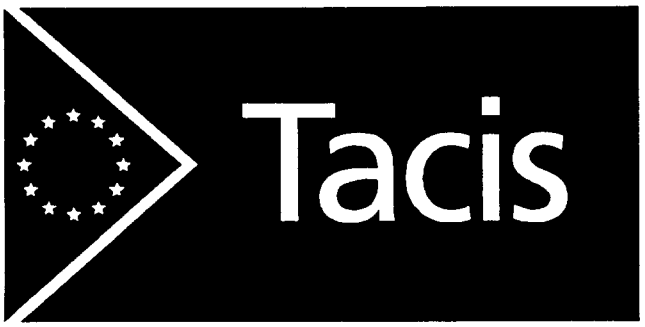


# Feasibility Study of New Terminal Facilities of the Georgian Ports Plan

## Executive Summary

# Phase I Report, Vol I

30 October 1997

# Volume I

# Executive Summary

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# Executive summary

# 1 Volume II - Traffic Forecast

## 1.1 Review of Trade, Shipping and Ports in the Black Sea Area

Various interviews were made with ports, shippers, forwarder, shipping agencies and cargo routing parties. In common , the transport industry not only in the Black Sea Region, is convinced that the Ports of Batumi and Poti will play a major role in the transit traffic to the Caucasian and the Central Asian Republics. Most of the interviewed persons are in favour of Poti as the forthcoming transit port. Almost all of the interviewed persons had combined the future possibilities with requirements, not only in the port areas, to be fulfilled. Improvement required can be found in the fields of port operation, storage capacities, customs procedures, rail cars and rail services, safety and security, tax regulation, communication and bank transfer possibilities.

The ports visited in the Black Sea Ring are better organised and better equipped than the Georgian ports. Transit cargo is handled by all ports but mainly cargo to or via Russia. All ports, except the black sea ports of Turkey are interested in co-operation. The Turkish ports of Samsun and Trabzon are classic transit port which are were loosing their transit business because of the political situation between Turkey and their neighbours Iran and Armenia. As soon as the situation will be back to normal, the ports of Samsun and Trabzon will try to gain their old position back. For the time being, the Georgian Ports having only their strategic position as advantage against the other port. But this is such a great advantage, that all major forwarders and container operators are on the move to Georgia. It is of highest importance, to meet the requirements of the transport industry specified in this report, in order to not lose the advantages.

## 1.2 Traffic Forecast

The basis of the traffic forecast for the ports of Poti and Batumi should have been, in accordance with the working plan for the project, the Traceca project „Regional Traffic Database and Forecasting Model". Because the forecasting data are not available until now and the data for the base year (referring to 1995) are not very reliable, it is not possible to proceed in the originally planned way. Therefore, other existing traffic forecasts for the region (mainly Tacis/TRACECA studies) were examined and used for the estimate of future ports traffic.

The traffic forecast is based on three scenarios. Scenario I may be described in short as the „best case" based on a favourable political and economic development of the TRACECA region. Scenario II may be stated as the „worst case". A retarded economic development and political problems are the underlying assumptions. Between these two scenarios a third scenario (scenario III) describes an economic and political development, that is characterised as the „probable case".

The results of the traffic forecast indicate a total turnover of the ports of Poti and Batumi of 8.1 million tons in the year 2002, 10.7 million tons in 2007 and 13.8 million tons in 2012 in scenario I. In the scenario II the turnover of the year 2012 amounts 7.6 million tons and in scenario III to 11.8 million tons. The share of bulk in total turnover is about 50% (with a slightly decreasing share). Oil products have a share of about 30% in the year 2005, decreasing to a share of 15% in 2012. The general cargo's share (except container) is increasing from 14% (year 2005) to 19% (year 2012). The highest growth rates shows the turnover of containers. In scenario III the turnover in the year 2005 amounts 559,000 tons (share of 8% of total turnover). In the year 2012 the turnover concerning containers is 1,765,800 tons (share of 15% of total turnover).

In scenario III the turnover of the year 2012 for Batumi is 4.4 million tons and for Poti 7.3 million tons. The transport modes of the ports hinterland traffic are to a share of about 80% railroad and 20% road. Bulk and oil products are transported mainly by rail (80% and respectively 98%). General cargo and containers are transported within a range of 30% to 35% by truck. These figures are due to the assumption, that the railroad system will also in future be the backbone of the transport sector.

# 2 Volume III - Present Port Performance and Facilities

## 2.1 Organisational Structure

In accordance with the terms of reference the study "Optimizing and Reorganization Study for the Ports of Poti and Batumi" were studied in adopted. The developed organisational structures for the Ports of Batumi and Poti are based on profound knowledge of the GTZ Team and real port experience. The remarks given in regard to the implementation and the overall implementation problems are reflecting the existing situation in the ports. Remarks given in regard of responsibilities, information and supervision are in line with modern management and organisational structures. Especially the basic principles described in chapter 2.2.3 of the above mentioned study are of very high importance. Remarks to this are only in the field of the capability of staff and the information flow necessary.

During the executed project planning workshops in Batumi and Poti with the managers of the two ports, the changes necessary in future had been discussed. One important issue was the subject "change the attitude towards work " In this respect, the mental barriers to overcome were discussed. We learned from this, that it is not enough to give the persons in charge responsibilities but to make them feel responsible. This is one of the main tasks in the whole process of changes. Even a catalogue, describing the tasks, duties and responsibilities may not be enough. The catalogue itself may make the persons involved believe, that everything not mentioned in this catalogue is not his responsibility. A way out could be, to assist the managers with training on the job.

Another important point is the information flow. Even a management information system (MIS), which is definitely necessary, cannot improve the whole situation alone. Information from a MIS are normally available after a certain period. The up-to-dateness depends on the generation of the figures and the systems behind. The important brand new information are not in a MIS-System. These information also have to be made available, though. In addition to that, the managers involved have to learn, that it is not enough to wait for the arrival of information needed or expected. They have as well to be active to collect the necessary information. In same respect also here an existing barrier is to be overcome.

The last remark in this respect is the capability of the managers to delegate. Within the mentioned study the items and the rules are described. But to delegate is as well to overcome a mental barrier and it seems to be, that also in this field assistance to the management by training on the job is required.

## 2.2 Comments on Financial Reporting Procedures

In this part the existing reports and statistics are described. Special attention are drown on the subjects financial reporting procedures, port statistics, and the general planning data. The requirements for an efficient financial reporting systems are described in general and in sector specific, organisational and individual level. The work of the expert was in both ports done in a close co-operation with the GTZ team, implement-

ing already new structures and procedures. The necessary changes based on a weak point analysis are described in improved procedures and other instruments.

## 2.3 Analysis of the Present Port Performance

In this section an assessment of the present performance as well as a capacity calculation for both ports was made.

Both ports provide 24 hours uninterrupted service 365 days per year with professionally carried out Pilot and tug services.

### Port Operation

The prevailing way of cargo handling is the direct delivery with delivery and receipt of cargo mainly by railway. This way of operation leads to slow performance of the ports, also due to the fact that frequent shunting operations of the railway constitute a substantial hindrance. Also, the condition of the rail cars is generally poor and the rail tracks in the ports are in a disastrous state.

Rail tracks are generally not paved in and cannot be crossed by forkliftrucks or other mobile handling equipment.

In Poti the part of cargo which is either being transported out of the port or being trucked to the port for shipment is increasing steadily. Trucking is a viable solution for cargo , which remains in the country.

Ferry operations are in a developing state. This applies to the traffic volume and to the available facilities. It can be assumed, that once the port provides the appropriate facilities ( ramps & marshalling areas) this kind of traffic will increase rapidly

The trucking business in the port of Batumi has not yet picked up a share comparable with Poti. This can also be attributed to the geographical location and topographical environment of Batumi. The road leading from Batumi requires a lot of skill from truck drivers to manage the road, which zigzags its way up and down through in the mountains. This disadvantage will always have an effect on the pattern of cargo passing through the port of Batumi and its delivery or dispatch. Additionally, the port lacks suitable parking areas for trucks.

### Storage Facilities

For Poti it must be said that number, size and layout of warehouses is insufficient for a port of the size of Poti Port. Despite that, the warehouses are not fully utilised, which has to be attributed to the prevailing system of direct delivery. The requirements for warehousing space is expected to increase rapidly, as it can be seen in the field of cotton exports. As a consequence of the lack of suitable storage facilities for cotton in the port , exporters have taken the initiative and developed their own facilities in the 'Old Tea Warehouse' . Here the port tends to loose a very business apart from loading the stuffed containers on vessels .

The port of Batumi has two warehouses, which are currently being used for storage purposes. The size and layout does not match international standards. Due to the narrow space the buildings have been patched together as in the case of shed No. 1 to the extend to follow a curve of the railway tracks. Nevertheless the sheds are under-utilised. Lack of specialised forklift - attachments and pallets are the main bottlenecks apart from the before mentioned

In both ports the facilities for the indirect delivery mode by paving the open storage areas and providing suitable warehouse space for the prevailing and expected types of cargo have to be improved or built. For

Batumi an additional problem is the limited space of the port. Thus, the port cannot develop as much storage area as might be necessary in future.

### Labour

The ports are working in a 12 hours two shift system with a fixed number of brigades and workers in each shift, which contributes to an inflexibility of port operations.

Due to the entire different mode of operation, the productivity of the dockers cannot be compared with West European standards. Considering the circumstances, the figures are quite good.

## 2.4 Assessment under Railway Engineering and Mechanical Engineering aspects.

The engineering parts are basically self explanatory. The general condition of the visited supra structure is poor. The condition of the railway in the ports is, according to the railway expert, nearly at the end of their life span. The overall situation of the two ports in regard to engineering matters is best explained in the report itself.

# 3 Volume IV - Civil Engineering Assessment

## 3.1 Port of Poti

### Layout

The cargo port of Poti is located at the Inner and Southern Basin and encloses an area of 49 ha (see Drawing 1.1). The main adjacent areas are (see Drawing 1.2):

* Military Marine Base:
* Ship Yard:
* Grain Milling Company:
* City Centre:

The Port of Poti has a port development plan dated 1994 (see Annex 2). The extensions comprise an area of 53 ha. Furthermore, the port has in mind the Rioni River Delta area of 480 ha for further port development. At the moment the tender process for the design and construction of a rail ferry ramp at berth no. 2 has been closed. The construction of this ramp will be completed in 1998.

### Technical Condition of Port Facilities

The condition and characteristics of the berths and storage facilities are presented in Annex 1. The water depths at most of the quays vary between 8,0 and 12,5 m. The lengths of the berths vary between 175 and 220 m. The condition of the port roads in general is satisfactory, with the exception of the road behind berth 7 and the railway crossings. However, if the port cargo volume will increase with a substantial portion of truck traffic the road system will not withstand heavy truck traffic. Except of berth 1,2 and 4, the storage areas at the northern side of the basin are mainly not paved, but consist of sand/gravel. At berth 4 a new storage area made of concrete is presently under construction. The storage area of the container terminal is in a poor condition. The rail tracks on the quays are not provided with pavement between the tracks and therefore other port equipment can not cross the area. There are only two warehouses at the Inner Basin of Poti, since mainly all cargo is directly handled from ship into train. Two breakwaters protect the Port of Poti, a small one at the northern, and the main breakwater on the western and southern side. The condition of the

main breakwater is very poor. A part has been subsided up to 1 meter causing a number of holes in the breakwater block wall. Furthermore, the whole breakwater is under threatened by coastal erosion.

### Navigational Conditions

The Port of Poti suffers of severe siltation, which is caused by the Rioni river outlet 3 km north of the port entrance. The total discharge of sediment is estimated at 4 to 5 mln. ton per year. Before 1939 the river flowed through the city and entered the sea south of the port, resulting in beach formation at this location. After 1939 the flow of the river has been changed to the northern side of the port. By doing so the river sediment outflow was shifted from the southern side of the port to the northern side. As a result, on the southern side of the port coast erosion started and on the northern side the dynamic balance has been disturbed. The delta of the river was growing quickly in western direction, while port operations were hindered as a result of the substantial siltation of approach channel and basins. The erosion on the south side of the port is a serious matter of concern for stabilisation of the breakwater.

## 3.2 Port of Batumi

### Layout

The Port of Batumi (founded in 1878) is located in the bay at the northern side of the city. This bay provides the port with a natural protection to western winds and waves. The port has one basin with 11 berths and one off-shore buoy mooring facility. The total port area encloses 13,7 ha. The layout of the port is presented in Drawing 2.1. The main adjacent areas are (see Drawing 2.2):

* Oil company:
* Fishery Port:
* Furniture factory:
* Railway:
* City:

The undermentioned development plans made by the port exist (see also Annex 2):

1. Development container terminal:
2. New grain elevators:
3. Development of ro/ro ramp:
4. Improve hinterland railway connection:

### Technical Condition of Port Facilities

The condition and characteristics of the berths and storage facilities are presented in Annex 1. The water depths at most of the quays vary between 8,0 and 12,5 m. The lengths of the berths vary between 175 and 220 m. With exception of some potholes, the present condition of the roads is satisfactory for the present traffic volume. However, the roads will not withstand heavy truck traffic. The crossing with the railway line near the railway gate is in a very poor condition. The drainage of the pavement is fairly good, which is necessary because of the severe rainfall. The storage facilities exist mainly of warehouses, of which some are difficult to access. The open storage areas are in general small. In general the roofs of the warehouses are in a good condition. Because of the severe rainfall (approximately 4000 mm/year) in this region, the port of Batumi puts a lot of effort in maintaining the roofs.

### Navigational Conditions

The Port of Batumi is protected from western wave attack by the natural layout of the harbour bay. However, more dangerous is the situation during the south-western storm (locally called Tjagun). It creates an underwater current, which circles anti clockwise inside the port basin. This current makes ship manoeuvres

unsafe even with tug boats. Furthermore, the ships moored at the quays have to leave the port, because of the dangerous ship movements the current can cause.

# 4 Volume V - Environmental Assessment

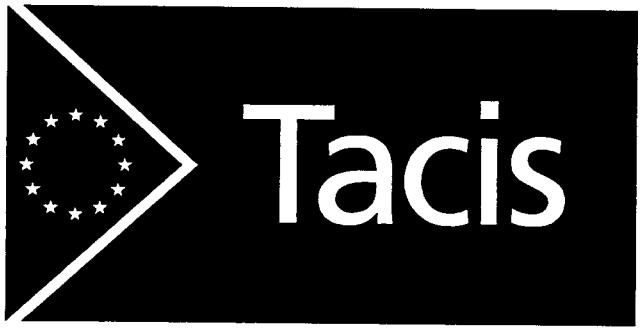
This report as a component of the "Feasibility Study of New Terminal Facilities in the Georgian Ports" provides an overview of the preliminary environmental data collection. These data form the basis for the preparation of an Environmental Impact Assessment, which will be carried out in "phase 2" of the port rehabilitation project in the ports of Poti and Batumi.

After gaining independence, Georgia established a new set of modern Environmental Laws in accordance with *Agenda 21* principles. Since January 1, 1997 the "Law of Georgia on Environmental Permits" and the "Law of Georgia on State Ecological Expertise" are in force, by which the procedure of conducting an Environmental Impact Assessment (EIA) is regulated and defined. From beginning of this year, the preparation of an EIA is required for the implementation of any construction activity on the territory of Georgia.

An analysis of the present environmental situation of the ports of Poti and Batumi, however, shows that there has been only limited success in implementing these new laws. A weak technical basis does not allow to execute the provisions which are laid down in the relevant national laws and international binding conventions as MARPOL 73/78. Due to the lack of adequate treatment facilities for oily waste, sewage and garbage, a proper management of vessel generated or operational wastes is not possible for the time being.

A range of areas of environmental concern has been examined. From these, the oil terminals have been found to be region of highest environmental concern in both ports. Especially in Batumi, the level of oil pollution of the ground filling of the pier is extremely high. This pollution, which is dating back to the 1920ies, generates a permanent flow off of oil to the water body.

Following the requirements of the national Georgian law, two scoping meetings have been conducted, one in Poti and another one in Batumi. Representatives from the ports, from public authorities and Non Governmental Organisations (NGOs) have been invited, in order to be informed about the nature of the project. The scoping meetings have been undertaken to enable the invited parties to raise issues and to propose alternatives which should be addressed in the EIA.




# Feasibility Study of New Terminal Facilities of the Georgian Ports Plan Traffic Forecast

# Phase I Report, Vol II

30 October 1997

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# Section 1

# Review of Trade, Shipping and Ports in the Black Sea

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# 1 Review of Trade, Shipping and Ports in the Black Sea

## 1.1 Interviews with representatives of the maritime industry in the Black Sea Ring

Personal interviews had been carried out in following countries:

**Bulgaria**
**Georgia**
**Rumania**
**Turkey**
**Ukraine**

These interviews were based on standard interview forms attached under Annex1 of this volume.

The interviewed persons were basically helpful and willing to give their comments, figures and estimations to the interviewer. Only in very cases results could not be generated, because the persons in charge had either no information available or was not willing to co-operate.

### 1.1.1 Interviews in Bulgaria

The following companies were visited:

| Company visited | Interview Partner |
|---|---|
| Port of Varna | Mr.Nestorov, Managing Director |
| Bulunion with the associated companies<br>• Trimpex Union., Shipping agenciy<br>• Naviation, Shipping an Trading, Forwarding Company<br>• Union Shipping, Brokerage<br>• Bulunion.,RoRo operating Company for trucks and container<br>• Steel union, Scraping of metal<br>• Transshipunion: Operation of transhipment, in future Stevedoring | Capt. Shtarbakov, Manager |
| Kühne & Nagel., Sofia, Cargo Integrator | Mr.Stoyanov, Sales Manager |
| Somat International Transport Co-operation Sofia, International Transports | Mr. Popov, Deputy Director General |
| Multigroup, Sofia, Financing, Trading | Mr. Valkanov., Director General Transport |
| Albados Shipping Agency., Burgas | Mr. Manolov., General Manager |
| Somat Shipping Department., Burgas RoRo-Line Operator Burgas Poti and Burgas Novorossiisk | Mr.Gendjov, expert P & I<br>Mr.Gospodinov, Shipping agent |

| Company visited | Interview Partner |
|---|---|
| Somat International Road Transport corporation. Burgas International Forwarder and trucking Company | Mr. Valkanov., Director |
| Port of Burgas, Bulgaria | Mr. Dereliev., Executiv Director |
| Deta Maritime Ltd.,Varna Ship's agency | Mr.Bakalov., Managing Director |
| Kühne & Nagel Ltd., Varna Cargo Integrator | Mr. Minchev., Manager Branch Office |
| Bon Marine., Varna Ship owner, Ship management and shipping agency | Mr. Bonin., President |

Chances for the Georgian ports and requirements summarised and listed in the table below:

| Chances for the Georgian ports | Requirements / Proposals |
|---|---|
| • The intermodal traffic (Truck RO/RO and rail ferry) between Varna and Poti should be developed. | Improvement of transit cargo flow by:<br>• Political stabilisation in the Caucasian States . Security of the transit routes (Georgia, Azerbaijan)<br>• Infrastructure developments(roads, rail, rest areas)<br>• Custom regulation harmonised /equalised. |
| • Transit goods through Georgia will increase on a high level because of increase of Iranian cargo. | • Custom service should be improved in regard to working hours and flexibility. |
| • With the development of the transport organisation in Caucasian and the Central Asian Republics the unaccompanied piggy pack will become most competitive. | • Container service should be improved by better service and logistics. |
| • A steady improvement of all aspects hindering transit transports will high transit potentials activate. | • The development of an transport market and transport associations for market transparency. |
| • The raw materials from Caucasian and Central Asia Republics and the sale of manufactured goods give good chances for Georgian ports. | • The planned container and RO/RO Terminal should be constructed as soon as possible. |
| • Minerals, ores (manganese) chemicals (sulfates) and oil will be handled in the port again. | • Better bank transfer on reasonable and reliable condition possibilities to avoid cash money transactions are to be implemented. |
| • Further development of the administration and facilities for RO/RO because there are large potentials in FSU and Russia. | • Signing of international agreements (TIR) |
| • Georgia is the transiting country for cotton from Uzbekistan, non-ferrous-metals and metal-concentrates from Central Asia. | • Easy VISA regulations for drivers. |
| • Based on container services and rail ferry a potential of 700.00 to 1000.000 tons per years in each direction (without cargo from Iran) expected | • Easier berthing in Poti harbour and more space for loading and unloading |
| • Commodities to TRACECA are alcoholics, cigarettes, sanitary ceramics and equipment | • A communication network should be established. |
| • Commodities from the TRACECA are strategic goods as wool, copper and aluminium. | • The cargo handling and the energy supply has to be improved. |

| Chances for the Georgian ports | Requirements / Proposals |
|---|---|
| None chance as long as there is not safe and secure business environment etsablished. | • More political support for the interstate transit cargo transports. |
| | • Improvement the economic situation by eliminating corruption, slow dispatch, bad organisation and communication. |

### 1.1.2 Interviews in Georgia

The Interviews in Georgia have shown, that the Shipping Agencies and the Forwarder have no real influence on the cargo routings. Goods coming into the Ports of Georgia are already routed. Depending on the situation within the ports, the agency can occasionally decide which port should be used to speed up lay times. The forwarders, and nearly all the agencies also acting as forwarders, have in very few cases influence weather the cargo should go by truck or by rail.

Views and imaginations of the interview partners are often very general and therefore not useful.

The following Companies in Georgia had been interviewed

| Companies visited | Interview partner |
|---|---|
| Aquaservice, Batumi.,Forwarding/Agency | Gorgiladze,Besayion., Director |
| G & M Logistic Co .Ltd., Batumi.,Forwarding/Agency | Guram Zagashvili |
| TE-RO., Batumi.,Shipping Agency & Forwarding | Roin Nakashidze.,President |
| Instra ., Poti ., Shipping Agency & Forwarding | Siehinava Envery |
| Orion Shipping Agency., Poti | Kelidenko, Igor., Director |
| TE-RO Poti., Shipping Agency/Forwarding | Kapanadze.,Ilia Director |
| MEGAFLOT., Agency.,Poti | Gvadjaia Fridoni |
| Sumaline., Batumi | Kredenko.,Boris., Sultmava ,David.,Managers |
| CALTREX., Poti Agency | Gemal Topuria., General Manager |
| Barvil Georgia., Poti Agency | Akkaki Lekveishvili., Deputy Manager |
| Tetrans., Poti Agency., Forwarder | Semali Gegidze., General Managers |
| SABA Co. Ltd., Agency, Forwarding and Transport | |

Chances and requirements for Georgian ports summarised and listed below

| Chances for Georgian ports | Requirements / Proposals |
|---|---|
| • To co-operate with Central Asian Republics | • The rates (all) stevedoring/forwarding must be competitive. |
| • Transit cargo is more and more transported via the old silk road to Azerbaijan, Uzbekistan, Kazastan, Turkmenistan, Kirgizstan via Baku | • The Caspian ferry service must be improved |
| • The establishment of new contacts with new countries and companies. | • Road condition in Armenia have to be improved. |
| • The extension of existing port areas will attract new business. | • The customs procedures in the involved countries should be harmonised for all transport (road/rail) |
| • Foreign companies will provide a good future for the town of Poti | • The ports should have free zone |
| • Container Terminal will be build in 2002, the Railway and RO/RO ferry in 2007 (this is probably not | • Improve of equipment situation and speed up of cargo handling. |

| Chances for Georgian ports | Requirements / Proposals |
|---|---|
| a serious remark) | |
| • If the Container terminal will be extended or a new one will be build, approximately 100.000 tons containerised cargo could be generated in additional | • The railway cars in a very bad condition and have to be improved<br>• The trough put of railway have to improve. |
| • High expectation for the future because the containers are the future | • To decrease the prices for services. |
| • In the future are big possibilities but the port is in the moment not in every part arranged. | • To improve quality of railway service. |
| • The volume of cargo handled will increase by 50 to 100 % in case the port of Poti can improve the services. | • Port equipment should be improved. |
| • Poti has reserves to increase the handling of cargo by 70 % if the shift capacity will be fully used. | • Improvement of relationship between agencies and port |
| • Batumi Port could be improved by reconstruction of the Port | • Improve rail car conditions |

### 1.1.3 Interviews in Romania

The requirements the interview partners are mentioning sometimes do not reflect to the Georgian side but also to their own governments.

Interviewed companies and persons involved:

| Companies visited | Interview partner |
|---|---|
| Constanta Port Administration, Constanta | Mrs. Limona , Head of Marketing and Strategy Department<br>Mr. Bucur.,Councilor |
| Romtrans SA .,Constanta | Mr.Visoianu, Deputy Director |
| Histra Shipmanagement SRL.,Constanta | Mr.Rusen., General Manager |
| Seanav Shipping Co.,Constanta | Capt.Laurentiu Brescan, Claims Department |

Chances for Georgian Ports and Requirements:

| Chances for Georgian ports | Requirements / Proposals |
|---|---|
| • The Oil should be increased to 45 Million tons<br>• (eventually Subsa Terminal is meant) | • Safer and reliable business environment in Poti and Batumi should be established |
| • Very positive expectations for the future. | • Initial the financing for shipping lines |
| • Establish a rail ferry link between Romania and Georgia, the changes of gauges will and must be managed in Georgia. | • Organisational of shipping agencies and stevedoring companies |
| • High potential could be developed when a Rail ferry will be operated in a dual mode | |
| • Strategic geographical position of Georgia for transit cargo | |
| • New contracts for oil fields at the Caspian Sea | |

### 1.1.4 Interviews in Turkey

The interview partner in Turkey were not very familiar with the Tacis TRACECA projects. In fact, Turkey is more a competitor than a partner in the transit business. Especially the Black Sea Ports Samsun and Trabzon will play a major rule after reopening the borders to Armenia and Iran.

| Companies visited | Interview partner |
|---|---|
| Trabzon Liman Isletmesi Mud.,Port Trabzon | Celal Yilmaz., General Manager |
| Abdullah Cakir., Shipping Agencies., Trabzon | Yusuf Cakir., General Manager |
| Ulusoy Karadeniz Nakliyat., Trabzon (Transport) | Güngör Boran., General Manager |
| Samsun Denizcilik Acentaligi.,Samsun | Ahmet Özelmas., Manager |
| TCDD Turkish Stae Railways., Port of Samsun | Ali Arif Aytac., General Manager |
| Port of Haydarpasa., Istanbul | Mr.Apaydin., Port Director |
| Turkuaz Ship Agency Trading Ltd., Istanbul | Capt. Doganci.,Deputy General Manager |
| Comptoir Maritime George Besi Shipping Agency.,Istanbul | Mr. Topaloglu., General Manager |
| Advance International Tranport Inc.,Istanbul | Mrs.Sarac |
| Anadolu Shipping Inc.,Istanbul | Mrs.Karaaslan. ,Asst.General; Manager |
| Alyans Chartering and Shipping Co.Inc.,Istanbul | Mr.R.Noyan Soyak.,Mr.Halit Meric |
| Port of Dortyol., Istanbul | Mr. Oguzülgen |

Chances for Georgian Ports and Requirements:

| Chances for Georgian ports | Requirements / Proposals |
|---|---|
| • Trabzon is for Armenian and Iran Cargo a competitor. | • To decrease the taxes for turkey trucks |
| • To allow companies from Turkey to establish branch offices in Georgia esp. Poti and the trucking business | • To improve motivation and mentality of personnel in Georgian ports |
| • As Novorossiisk has lost a high volume of cargo, Poti has good chances to become an important gate for the region | • Better Equipment and better hinterland connection by rail and road |
| • The Transit through Georgian Ports is already an important route. | • Gantry cranes are required |
| • Chances are for food stuff, humanitarian aid | • Security has to be improved |
| • Machinery for industry and manufacturing can be shipped via Georgia | • Reliable agencies in the ports are missing |
| | • The insufficient bank system has to be improved. |
| | • The policy for transit and taxation is not moderate. |
| | • Telecommunication should be improved |

### 1.1.5 Interviews in Ukraine

| Companies visited | Interview partner |
|---|---|
| UKR-Ferry., Ilyichevsk | Roman Morgenstern ,Manager, Olga N. Gar- |

| | |
|---|---|
| | boskaya., Insurance and Marketing Manager |
| Interferry.,Euro-Asia transport company., Odessa Forwarding Company | Mr.Dmitry M.Besradnyy.,Director., Josif Marants.,President |
| Odessa Sea Commercial Port., Odessa | Mr.Nikolay P.Pavluk., General Director |
| Ilyichevskvnestrans., Ilyichevsk | Leonid V.Manko.,General Director's assistant |
| Sea Merchant Port of Ilyichevsk | Booris N.Glavatsky.,Vice President |

Chances for Georgian Ports and Requirements:

| Chances for Georgian ports | Requirements / Proposals |
|---|---|
| • Many clients in the Caucasus region have demands for transports e.g. construction material, food juices<br>• mineral water etc. | • The RoRo ramp in Poti and additional infrastructure is required. |
| • There is an demand for transport capacities from Europe into the Caucasus region | • A legislation foundation and special international agreement between Ukraine and Georgia to set this legislation foundation and regime of the rules and duties. |
| Container trans-shipments and the transportation of cars and vehicle are demanded. | • Safety on Georgian roads are required., controlling, tracing and monitoring of railway wagons |
| The demand for transports from and to Armenia, Georgia and Azerbaijan is substantial. | • Problems with customs and duties have to solved. |
| There is substantial amount of cargo which could be transoported by the ferry link between Poti and Ilyichevsk if the rail ferry ramp is in function. | • Problems with customs inspection have to be solved |
| | • The fees of transit cargo should be lower. |
| | • Container facilities in Georgian ports have to be improved. |
| | • Improvement the storage capacities in the Ports |
| | • More safety on transport routes in Caucasus and Central Asia are required. |
| | • The rails and roads should be rehabilitated |
| | The following is required:<br>• Ro-Ro-ramp in Poti<br>• Better Infrastructure in Ilyichevsk<br>• Passenger facilities<br>• Parking lots for trucks and cars<br>• shunting space for gate and trucks<br>• extension space and office space |
| | • The too costly bribery in the Caucasus should be eliminated |

### 1.1.6 Summary of the Interviews

Quite a number of remarks had the same contents. The "requirements" are to be seen as the prerequisites for the mentioned chances. Without improvement with regard to the main requirements, the corresponding chances will be not realised in full. Below the " requirements " are grouped into tables which are related to functions or responsibilities:

| Requirements to the port and to port operation |
|---|
| • Easier berthing in Poti harbour and more space for loading and unloading. |
| • The cargo handling and the energy supply should be improved. |
| • The port should have a free zone. |
| • Improvement of equipment situation and speed up of cargo handling. |
| • Port equipment should be improved . |
| • Improvement of relationship between agencies and port. |
| • To improve motivation and mentality of personnel in Georgian ports. |
| • Gantry crane should be established |
| • Better equipment |
| • Ro-Ro ramp in Poti and additional infrastructure is required. |
| • Improve of storage capacities in the ports |

| Requirements in regard of railway and rail cars |
|---|
| • The rail way cars are in a very bad condition and have to be repaired or changed. |
| • The trough put of railways have to improve. |
| • To improve quality of railway service. |
| • Improve rail car conditions |
| • Better equipment and better hinterland connection by rail. |
| • Controlling, monitoring and tracing of rail cars |
| • The rails should be rehabilitated. |

| Requirements with regard to road transportation . |
|---|
| • Signing of international agreements (TIR). |
| • Road conditions in Armenia have to be improved |
| • Better equipment and better hinterland connection by truck. |

| Security and safety requirements |
|---|
| • Security on the transit routes in Georgia and Azerbaijan |
| • Safety on Georgian roads are required. |
| • Security has to be improved |
| • More safety on transport routes in Caucasus and Central |

| Asia are required |
|---|
| • The too costly bribery in the Caucasian should be eliminated. |

| Requirements with regard to customs |
|---|
| • Harmonising and equalising of customs regulations |
| • Custom service should be improved in regard to working hours an flexibility |
| • Customs procedures in the involved countries should be harmonised for all transport (road and rail) |
| • Problems with custom and duties have to be solved. |
| • Problems with customs inspection have to be solved |

| Requirements with regard to container operation |
|---|
| • The planned container and RO/RO Terminal should be constructed as soon as possible. |
| • Container facilities in Georgian ports have to be improved. |
| • Container service should be improved by better service and logistic |

| Requirement with regard to taxes, state duties and political support |
|---|
| Easy Visa Regulations for Drivers |
| More political support for the interstate transit cargo transports |
| Political stabilisation in the Caucasus States |
| To decrease the taxes for turkey trucks |
| The fees of transit cargo should be lower. |
| The policy for transit and taxation is not moderate. |

| Other remarkable requirements |
|---|
| • The development of a transport market and transport associations for market transparency |
| • Better bank transfer possibilities on reasonable and reliable conditions to avoid cash money transactions are to be implemented. |
| • A communication network should be established |
| • Improvement of the economical situation by eliminating corruption, slow dispatch, bad organisation and communication. |
| • The rates (all) for stevedoring/forwarding must be competitive. |
| • The Caspian ferry service must be improved. |
| • The insufficient bank system has to be improved. |
| • Telecommunication should be improved. |
| • To decrease the prices for services. |
| • Safer and reliable business environment in Poti and Batumi should be established. |

In principle all remarks are made to regard to the Georgian ports Batumi and Poti. The port of Poti is the much more known Georgian port and very often, interview partner have combined the TRACECA- route with Poti.

## 1.2 Ports on the Black Sea Ring

Following Ports in the Black Sea Ring were visited:

**Constanta**
**Burgas**
**Varna**
**Istanbul**
**Samsun**
**Trabzon**
**Odessa**
**Iljichevsk**

Not in all cases the interview partners had supplied the experts with actual figures. Especially the cargo turnover figures could not received from those ports, which felt to be in a competitor rule. When possible figures from publications were taken and the corresponding year is mentioned.

### 1.2.1 Constanta Romania

The Port of Constanta is the largest of the Black Sea. The strategic geographical position due to the Danube has pushed the development since ancient time. To meet the demands of modern transport and transhipment necessities extensions and new land right at the mouth of the in 1984 inaugurated Danube - Black Sea canal have been made. The latest settlements consider a large free zone with warehouses, transhipment and stocking facilities for general cargoes (mostly steel products and timber) as well as the extension of the intermodal transhipment by a RO/RO-terminal and a railway ferry berth.

The hinterland transport is performed by all modes. Through the Danube - Black Sea canal, vessels have access to the inland water system of the Danube, the Rhine - Maine Canal, the Rhine and its connections up to the ARA-Range. Moreover, the railway network of the port provides direct access to almost all berths. A double electrified railway makes the connection with Bucharest and further the destinations. The connection by road will be improved in the near future by the building of the Bucharest - Constanta motorway. Furthermore, a quick access to all destinations is given by the international airport in Constanta.

The traffic volume have reached more than 60 Mil. tons before 1990. The political, social and economical upheaval of the early 90s has the transhipment volume halved. Since 1993 the stabilisation process persists and the volume has increased again up to 35 Mil. tons in 1996 (maritime traffic). Important cargoes for the growth (considering 1995 to 1996) are solid bulk (+ 7.4 %) of which the cereals increased by 27 %. The general cargo traffic also increased by 6.3 %, due to the significant increase of imports. The total transit is globally up by 51 %, reflecting the increase of the internationalisation level of the port and the river traffic increased by 12.4 % as compared to 1995. The container traffic is dynamic, recording a growth of 20.5 % and a volume of 337.000 TEU. Considering the extension plans in the South port for the new container terminal, the total capacity will be up to 800.000 TEU p.a.

**Overview**

| | | Unit | North Port | South Port | | Total |
|---|---|---|---|---|---|---|
| | | | | existent | final | |
| Total area | | ha | 789 | 2 837 | 2 837 | 3 626 |
| of which | land | ha | 484 | 610 | 1 300 | 1 784 |
| | water | | 305 | 2 227 | 1 537 | 1 842 |
| Breakwater length | | km | 3.5 | 10.5 | 11.5 | 15.0 |
| Quay length | | km | 15.5 | 13.1 | 50.0 | 65.5 |
| Number of berths | | no | 82 | 50 | 200 | 282 |
| Depths in the basins | | m | 7 - 14 | 7 - 19 | 7 - 22.5 | 7 - 22.5 |
| Traffic capacity | | mil.tons/p.a. | 63.5 | 20.0 | 170.0 | 233.5 |
| Max. ship size | | DWT x 1000 | 65 - 80 | 165 | 250 | 250 |

### 1.2.2 Varna, Bulgaria

The port of Varna is separated into two parts. The port Varna - East right at the Black Sea coast and at the city centre and by access via canals and lakes the port of Varna - West. The actual total volume of transhipment is about 10 Mil. tons p.a. The process of privatisation of the port is ongoing. Most major container lines (e.g. Sealand, P & O) have their agents in Varna.

In Varna - East a container terminal can be found as well as the RO/RO-facilities. The lines operated by Bulunion since spring 1997 connect Varna with Novorossiisk, Russia and Batumi, Georgia with the frequency of at least once per week. A second vessel will be set into operation soon. Moreover, a passenger terminal is also available.

On the canals and lakes in the West some industries and manufacturing plants with own sea transhipment facilities e.g. a thermal power plant, timber and stone processing can be found. In this region large possibilities for extensions are offered. The masterplan for the port intends to build a new container terminal at the island between Varna - East and Channel 1. This island is partly already used for storage in building and in barges, shipyards and other maritime services.

At the South end of Varna - West, the railway ferry is settled, which is the only place for changing of boogies from European to Russian gauge at the Western side of the Black Sea. From here a line to Novorossiisk is being operated by the Bulgarian and Russian railway companies.

The hinterland transports are performed mainly by railways and roads. Since the agreement for a lumpsum-price from Western Europe to Varna by the way of the Danube with transhipment to trucks or wagons in Ruse, Bulgaria the port has access to the internal waterways of Europe.

Overview

| | Unit | Varna - East | Varna - West |
|---|---|---|---|
| Quay length | m | 2 072 | 3 432 |
| Number of berths | no | 14 | 17 |
| Depth in the basins | m | 12 | 11 |
| Container terminal | no | 1 | 1 |
| Railway ferry -facilities | no | | 1 |
| RO/RO-facilities | no | 1 | |

### 1.2.3 Burgas Bulgaria

The port of Burgas is the first one for ships entering the Black Sea. This advantage has always been and still is the main reason for the cargoes to be transhipped in Burgas. Due to the considerable high traffic volume (about 16 Mil. tons in 1996), investment for extensions, new warehouses and transhipment facilities could been made by the port's income.
The concept of the master plan intends to extend the land area of the port. The construction for the first project, the Terminal 3 for Container and RO/RO have already started. Terminal 2 for steel products and bulk cargo will be finished in 2005 with a basins depth of 14,5 m.

Construction for a large cold storage are being on work in the 'West Harbour'. The inauguration is planned for the middle of 1998, then it will be the largest cooling facility on the Balkan. About 3 km in the backyard, the free zone and other warehouses equipped for different cargoes even with security systems for hazardous goods are situated.

The hinterland transport is possible by road and railways. The harbour operates all seasons with no restrictions even in winter time, also the hinterland transport is not restricted.

Somat, the largest transport company in Bulgaria, operates since October 1996 a RO/RO-line for trucks to Poti, Georgia. The ship sails on a triangular route Burgas - Poti - Novorossiisk. Since spring 1997 a second vessel started operation on the reverse direction. Before the winter peak starts a third vessel will be set on line. Also by Somat a route from Burgas to Vidim by truck and further up to Passau on RO/RO-vessels on the Danube can be offered for intermodal hinterland transport.

Overview

| | Unit | 'East' Harbour | Bulk Cargo Harbour | 'West' Harbour (Container ) | Oil Harbour | Total |
|---|---|---|---|---|---|---|
| Quay length | m | 1 965 | 750 | 890 | 300 | 3905 |
| Number of Berths | no | 14 | 5 | 6 | 3 | 28 |
| Depths in the basins | m | 8 - 11 | 12 | 12 | 8 - 15 | 8 - 15 |
| Max. ship size | DWT x 1000 | 25 | 60 | 40 | 100 | 25 - 100 |

]

### 1.2.4 The Ports of Istanbul, Turkey

The main port in Istanbul for cargo is the Port of Haydarpasa situated on the Asian side right at entrance from Marmara Sea to the Bosphorus.

The cargo transhipped in the ports is only with destination or source in Turkey. Transit cargoes does not appear in Istanbul ports. The transhipment ports for cargoes to Traceca are Izmir, Trabzon, Thessaloniki, Piraeus (both Greek) or Giao Taura (Sicily).

The cargo traffic in tons (figures from 1992) Dry Bulk 581.726.,General Cargo 1.635.098, Containerised cargo 3.566.361.

The Container handled in 1992 in TEU 180.230

Tenders for 25 Mil. US$ are running for new equipment.

Railways and roads are the modes for hinterland transports.

Furthermore a second port in Istanbul, named the port of Dortyol is situated at the European side of the Bosphorus at the entrance to the Golden Horn. This port has no basins and is mainly used by passenger (all sizes) or small cargo vessels.

Overview

| | Unit | Haydarpasa | Dortyol (estimated figures) |
|---|---|---|---|
| Breakwater length | m | 2 300 | - |
| Quay length | m | 2 970 | 1 500 - 2 000 |
| Number of Berths | no | 16 | 8 - 10 |
| Depths in the basins | m | 10 - 12 | - 14 |
| Port capacities | tons | 2.284.100 | |
| Max. ship size | DWT x 1000 | . | . |

### 1.2.5 The Port of Samsun / Turkey

The Port of Samsun is located on the central part of turkey's Black Sea Cost. It is the only Port with rail connection at the Black Sea Coast. The Port is owned by the Turkish State Railway TCDD .The Port is handling approx. 1.4 million tons. The main commodities are coal from Russia approx. 400 to 500 thousand tons., 500 thousand tons general cargo by RO/RO Vessel to Russia with 26.000 Trailer outbound and 24.000 Trailer inbound but empty., approx. 50.000 tons of tobacco from USA to the local tobacco industry in container (4000 p. year). The produced cigarettes are transported in trucks. Remarkable transit cargo to Georgia or via Georgia are approx. 30.000 sugar and approx. 100.000 tons of flavour.

In the past, Samsun had handled large quantities of transit cargo to Armenia and Iran. But to day the borders to Iran and Armenia are closed by political reasons. Quantities of this transit cargo as well as commodities were not available for the experts. The port manager was convinced, that he will gain back the old position if the political situation had changed. The transit time by rail from Samsun to the Armenian border is 25 hours. The handling of the gauge problems could not be identified.The port has development plans for the building of an container terminal in the so called industrial terminal but the financing of this plans is very difficult as long as the transit cargo can not be expected. To day the Port is already handling containers by a shore crane with 35 tons under hook. The containers are moved by a heavy forklift with a capacity of 42 tons under the spreader into a storage area with a to day storage capacity of 2000 TEU stacked 2 high and 4000 TEU by stacking 4 high. The port has a Rail Ferry Ramp dedicated for a rail ferry ship between Constanta and Samsun. The wide water area of the port allows the operation up to 10 RO/RO vessels simultaneously by doing the Mediterranean Berthing .

Overview

| | Unit | Samsun |
|---|---|---|
| Breakwater length | m | 4.712 |
| Quay length | m | 1430 |
| Number of Berths | no | 10 |
| Depths in the basins * | m | 10,5 to 12 |
| RO/RO facilities | no | 1 |
| Container terminal | no | 1 |
| Port capacities | tons | 2284000 |
| Max. ship size | DWT x 1000 | only draft limits |

### 1.2.6 The Port of Trabzon / Turkey

The Port of Trabzon is protected by two breakwaters , one of 1135 m long and the other 500 m long. Trabzon is the nearest real port to the Georgian border (about 170 km) not counting Hopa what is of not real importance. The port has no rail connection and no hinterland in regard of regional cargo.

Trabzon was the most important transit port for Armenia and Iran in Turkey. By same reasons Samsun has, the transit business is nearly nil. Only occasionally transit cargo is handled via Trabzon. The solely Truck connection to Georgia and the tax policy of Georgia makes the transit position of Trabzon more difficult. The port has sufficient space in very good condition to handle container. The area are paved and even the truck for a container gantry crane are installed . Because of the desolate transit cargo situation the port is using parts of the areas for an duty free shopping centre for shopping tourists ( 500.000 yearly) coming from Russia by all kind of passenger ferries. An other parts is used as storage area for cars coming mainly from Russia. The port manager is convinced, to gain the old transit position back if the political situation between Turkey and Armenia and Turkey and Iran will be back to normal. It has to pointed out, that Trabzon will be in this case a big competitor for the Georgian Ports especially for Batumi. Quantities and commodities handled and destinations are not given to the experts. The Port can handle containers via an fixed gantry crane.

Overview

| | Unit | Trabzon |
|---|---|---|
| Breakwater length | m | 1635 |
| Quay length | m | 1525 |
| Number of Berths | no | 15 |
| Depths in the basins * | m | 11.5 |
| RO/RO facilities<br>Heck and Quarter ramps | no | 1 |
| Container terminal<br>approx. 200.000 sq.<br>approx. 50.000 TEU | no | 1 |
| Covered storage area | sq | 20000 |
| Open storage area | sq | 280000 |
| Port capacities | tons | |
| Max. ship size | DWT x 1000 | only draft limits |
| | | |
| | | |

### 1.2.7 The Ports of Odessa and Ilyichevsk

The Ports of Odessa and Ilyichevsk are neighbour ports not to say one Port. Ilyichevsk is the modern part and designed for the container handling and ferry services.

Overview

| Terminal facilities | Unit | Odessa | Ilyichevsk |
|---|---|---|---|
| container berths | no | 2 | 2 |
| storage capacity of container | TEU | 4-5000 | no answer |
| permissible dimension for container vessels length<br>berth 1<br>berth 2 | <br>m<br>m | <br>86<br>279 | <br>approx.360 |
| maximum length of vessels | m | 200 | 260 |
| maximum draft of vessels | m | 12 | 11.5 |
| air draft of deck cargo | m | no restriction | no restriction |
| container cargo in-and outbound | TEU | 50-52.000 | about 300.000 t of cargo 1995 |
| container handling equipment<br>Gantry cranes<br>Cranes | units | <br>2<br>5 | <br>3<br>different electrical portal cranes up to 45 tons |
| system for lateral movements<br>reach stacker<br>fork lift trucks | units | <br>4<br>6 | <br>both |
| CSF | | yes | yes |
| storage capacity | TEU | 4000 | enough |
| reefer points | | not available | not available |
| IMDG | | yes | yes |
| future development | | additional equipment if necessary will be in- | no answer |

| Terminal facilities Unit | Odessa | Ilyichevsk |
|---|---|---|
| | stalled | |
| main stremgth | 25 containers per hour each line | good hinterland connection |
| Number of dedicated Ro-Ro facilities | no | 3 |
| trucks and trailers | | |
| railway | | yes |
| multipurpose | | yes |
| | | no |
| ramps fixed or adjust-able | | 2 adjustable ramps one fixed ramp |
| permissible dimension for vessels (others than container) | no restriction | only draft restric-tion to 9.6 m |
| plans for expansion | no | various plans |

### 1.2.8 Threats and opportunities of the Georgian ports

The excellent strategic position of the Georgian Ports as the entrance to a traffic corridor is in it self already a huge opportunity. But the other ports in the Black Sea will remain as tough competitors for those cargoes not routed via the TRACECA Route. This means, that the Georgian Ports have to concentrate to increase own capability to offer modern, reliable services to international customers in the world. The strategic position, to be an entrance point to the TRACECA corridor and an entrance point via other ports in the Black Sea to the Trans-European-Networks (TEN) shows very clearly, that the chances of the Georgian Ports not only related to their own services and performance but also to the hinterland performances.

From the interviews made, several requirements made by interview partners in regard of port services and port related services. To solve these problems is of the same importance than solving the port problems. Demands are in the fields of

- Railway services and the condition of the rail cars
- Road transportation's
- Security and safety
- Customs services
- Container operation
- Port operation
- Tax and transit regulations
- Other remarks in regard of tariffs, banking and communication

If the Ports of Georgia can not solve this problems the future opportunities are very limited. If the necessary improvement can be done in very short time the opportunities are very high. The whole transport industry is talking about TRACECA and especially Poti Port. There is no major carrier or cargo integrator who is not on

the way to Georgia at least to make fact findings or studies about the possibilities. This is an enormous credit which should be used.

But the other ports in the Black Sea Ring are not only spectators in the big game of transport. As long as they can participate as another point in the transport chain they will co-operate. But whenever they see a chance to get additional cargo for other transit routes they will act accordingly. Not all of the Black Sea Ports are possible co-operation partner and entry point to the Trans-European-Network. The Turkish Ports of Trabzon and Samsun are classical transport gates to Armenia, Azerbaijan and Iran. The facilities available are well developed. Connection via Rail (Samsun) or Roads is in reasonable condition. The reason, that nearly no cargo is moved via this ports is a political one. The borders between Turkey and Iran and Turkey and Armenia are closed. By reopening of the borders, Turkey will definitely gain old territory back.

Russia will try not to lose transports of cargo and try to get a part of the future growing in transport.

The decision makers about transport routes, otherwise called cargo routing parties, like cargo integrators or big forwarding companies, followed by container operators and shipping lines, will, if not satisfied with services provided by Georgian Ports, start to reopen or open the old Russian connections via Novorossiisk and using the Ports of Bourgas and Varna or Constanta as trans-shipment Port.

The Ports of Georgia have a great opportunity to reach a high level of cargo turnover and to be one of the most important transit ports of the Black Sea. Problem areas are identified, shortcomings described and cargo potential, identified.

# Section 2

# Preliminary Traffic Forecast

# 1 Preliminary Traffic Forecast

### 1.1.1 Analysis of historical data

Traffic forecasts in e.g. European countries start with an analysis of historical data. In general, economic development and the resulting freight volume could be assumed to change in the future with structural continuity. For the Ports of Poti and Batumi historical data indicate a serious structural change with respect to volume and structure of cargo.

Like many ports in the former Soviet Union the turnover for the port of Poti declined seriously. In the year 1989 the turnover was 4.5 million tons. In 1992 the turnover was only 1.1 million tons. The increase in the years following 1993 up to 1.6 million tons in the year 1995 was mainly due to imports by the World Food Programme.
The container traffic in the port of Poti is characterised by remarkable growth rates. The turnover rose from 23,000 tons in 1992 to 90,000 tons in 1995.
The structure of goods transhipped through the port of Poti consisted in the year 1995 of 47% of bulk cargo, 35% of oil products and 12% of general cargo. The share of container turnover was about 5%.

The total turnover of the Port of Batumi declined from 3 million tons turnover in the year 1990 to 1.4 million tons in 1995. Containers are handled only sporadically in Batumi. The structure of goods transhipped through the port of Batumi consisted in the year 1995 of 40% of bulk cargo, 46% of oil products and 14% of general cargo.

In detail the following cargoes with respect to the kind of commodity are transhipped through the ports of Poti and Batumi in the year 1995 (Source: Tacis „Forwarding - Multimodal Transports Systems" Draft Final Report February 1997):

**1995 Port of Poti**

| commodity | inbound cargo | outbound cargo | turnover | turnover |
|---|---|---|---|---|
| | tons | tons | tons | % |
| bulk | **697,000** | **145,000** | **842,000** | 47% |
| coal | 4,000 | | 4,000 | |
| grain | 641,000 | | 641,000 | |
| ore, metal raw material | 52,000 | 89,000 | 141,000 | |
| ferrous metals | | 36,000 | 36,000 | |
| others | | 20,000 | 20,000 | |
| oil products | **476,000** | **146,000** | **622,000** | 35% |
| general cargo | **138,000** | **81,000** | **219,000** | 12% |
| foodstuff | 120,000 | | 120,000 | |
| fertilizers/chemicals | | 23,000 | 23,000 | |
| build. mat./equipment | 9,000 | 5,000 | 14,000 | |
| ferrous metals | | 48,000 | 48,000 | |
| others | 9,000 | 5,000 | 14,000 | |
| containers | **78,000** | **17,000** | **95,000** | 5% |
| total | 1,389,000 | 389,000 | 1,778,000 | 100% |

**1995 Port of Batumi**

| commodity | inbound cargo | outbound cargo | turnover | turnover |
|---|---|---|---|---|
| | tons | tons | tons | % |
| bulk | **533,000** | **18,000** | **551,000** | 40% |
| coal | 4,000 | | 4,000 | |
| grain | 529,000 | | 529,000 | |
| ore, metal raw material | | 18,000 | 18,000 | |
| ferrous metals | | | | |
| other | | | | |
| oil products | **238,000** | **404,000** | **642,000** | 46% |
| general cargo | **122,000** | **68,000** | **190,000** | 14% |
| foodstuff | 115,000 | 20,000 | 135,000 | |
| fertilizers/chemicals | | | | |
| build. mat./equipment | 1,000 | | 1,000 | |
| ferrous metals | | 46,000 | 46,000 | |
| others | 6,000 | 2,000 | 8,000 | |
| containers | | | | |
| total | 893,000 | 490,000 | 1,383,000 | 100% |

To verify these data the port management of Poti and Batumi was contacted. The data received by the project team differ in some points from the table above.

For the port of Batumi the import of 39 containers (in TEU) and 1 TEU in export was recorded. In an interview at the port of Varna it was mentioned that a ro-ro-ship since April 1997 and a second ship at end of the year 1997 is and respectively will go to Batumi. The transport of containers is possible. For the future, the container transport to and from Batumi has to be taken into account.

Other differences in data for the ports are due to the missing systematic collection of data and the establishment of a standardised data base. For every request of information separate calculations have to be executed in the ports. Therefore differences may occur.

In summary, the historical development of the ports of Poti and Batumi shows a sharp decline in turnover but also signs of recovery. It is an achievement of the port managements who kept the port running even in the in the days of low turnover and an unknown future. With the development of the economies of the TRACECA-

countries the ports will regain their former importance. However the structure of transhipped cargo will differ significantly in comparison to FSU times.

### 1.1.2 Update of existing traffic forecast

The basis of the traffic forecast for the ports of Poti and Batumi should have been, in accordance with the working plan for the project, the Traceca project „Regional Traffic Database and Forecasting Model". Unfortunately, the available reports show that the model for the traffic forecast is acceptable, but the used database referring to the year 1995 does not correspond with data in other reliable sources. Therefore, it is not possible to use the data of the mentioned project to execute and respectively update a traffic forecast for Poti and Batumi.

Within the feasibility study for the Georgian ports it was planned to make an up-date of existing traffic forecast. Therefore, other existing traffic forecasts for the region had to be examined with respect to the usefulness for the estimate of future ports traffic. The following studies with traffic forecasts are of major importance:

- Tacis/TRACECA „Joint venture(s) for the Caucasian Railways" Interim Report April 1997
- Tacis/TRACECA „Trans Caucasian Railway, Railways Pre-Investment study and Pilot train Baku - Tiblisi - Batumi/Poti" , Draft Final Report May 1997
- HPC Hamburg Port Consulting GmbH „Optimising and Reorganisation of the Georgian Ports Poti and Batumi" (GTZ financed) April 1996
- Tacis „Forwarding - Multimodal Transports Systems" Draft Final Report February 1997
- Tacis „Development of the Port of Baku, Port Master Plan, Traffic Forecast and Economic Assessment" Phase III Report March 1997
- Tacis „Port Network Plan and Improvement Programme" Phase 3, Economic and Financial Evaluation Report - Baku April 1997

The first three of the mentioned studies (esp. the HPC study) perform a sound traffic forecast based on the future development of the GDP, the development of the main branches of the national economies and foreign trade of Armenia, Azerbaijan and Georgia. The main goal of the Tacis/TRACECA studies is the forecast of railway traffic, though. Therefore, additional effort is necessary to integrate the road freight traffic and to estimate the turnover of the ports.

The studies concerning forwarding - multimodal transport systems and the port of Baku give additional information and data with respect to the relevant transport corridors. The data will be used to prove plausibility and supplement the data set.

Considering of the available reports and data the approach for the elaboration of the traffic forecast for the ports of Poti and Batumi is as follows:

- Analysis of the mentioned studies with respect to the underlying assumptions and scenarios
- Evaluation of the data concerning the ports of Poti and Batumi, compilation of data for the traffic forecast
- Setting the assumptions for the road haulage sector and definition of scenarios for road transport from and to the Georgian ports
- Execution of traffic forecast for the years 2002, 2007 and 2012
- Evaluation of the results with respect to plausibility
- Discussion of the sensitivity of the results with respect to political aspects and competitive transport routes

## 1.2 Preparation of Traffic Forecast

The political and economic development of the Caucasus region in the future depends on many governing factors leading to different consequences for the traffic of the ports of Poti and Batumi. In addition, the devel-

opment of the competitive transport corridors influence the turnover of the ports. Therefore it is helpful to base the traffic forecast on different paths of the possible development of the region. The traffic forecast is calculated on three scenarios.

Scenario I is based on assumptions characterising a positive development for the Caucasus region and a strong competitive position with respect to alternative transport corridors. Scenario I may be described in short as the „best case" development.

On the other hand, scenario II is based on a retarded development of the region. The rehabilitation of the national economies and the transport sector is slowed down by several set-backs and the competition of other transport corridors is strong. The political situation will be in this scenario far from normalisation in the interstate relations of the region. Scenario II may be stated as the „worst case" of the development.

Between these two extreme scenarios a third scenario (scenario III) describes an economic and political development, that is characterised as the „probable case". A moderate growth of the economies and a political development led by the common understanding that agreements to the benefit of all countries of the region will be the best way to proceed, are the main assumptions of scenario III.

In general the scenarios are based on the railway traffic forecast of the study Tacis/TRACECA „Joint venture(s) for the Caucasian Railways" Interim Report April 1997. However, several assumptions of the scenarios of this study are varied, especially concerning the modal split and the economic development of the region in the pessimistic scenario.

In detail the scenarios are based on the following assumptions:

The scenarios refer to the countries of Georgia, Azerbaijan and Armenia.

### 1.2.1 Scenario I

**Transport sector**

- Steady growth in transport volume due to the progress in economic development of the countries (rehabilitation of industries, exploitation of natural resources)
- Modernisation of railway infrastructure and rolling stock, organisation of railway traffic according to modern standards
- Development of forwarding companies and offer of efficient truck services
- Changes in modal split: transport of bulk mainly by the railways, significant share of road transport in general cargo

**Transport of exports**

- Growth of freight traffic in accordance with the entire freight volume, higher growth rate for Armenia due to the normalisation of the political situation, high growth rates for the export of oil products for Azerbaijan (volume produced above national consumption will be exported: about 5 to 7 million t per year)
- Transport of bulk and oil products in main by railway

**Transport of imports**

- Decrease in imports of cereals (reduction of food aid), increase of imports of general cargo with similar growth rates to exports
- Increase in the import of equipment for oil production and several development projects for Azerbaijan
- Increase in the import of foodstuff and other goods of higher value (general cargo)

**Transport of transit cargo**

- Transit traffic via Yalta to Russia and via Dshulfa to Iran will be possible by the year 2000
- Cotton and oil products from Central Asia, investment goods and foodstuff to Central Asia will increase

**Commodities**

## Bulk

Imports of grain via the ports of Poti and Batumi for the destination in Armenia, Georgia and Azerbaijan are organised by the World Food Programme (WFP). It is assumed that imports due to this program will decline with the rising degree of self-sustainability of the countries. Nevertheless, it has to bee taken into account that the use of arable land for grain production is limited and that cereals are a basic foodstuff for meals and to feed livestock. The expectation of rising demand for grain will also in the future result in an import demand. Import countries for grain via the Georgian ports are mainly Georgia, Azerbaijan, Armenia and Turkmenistan.

Before the dissolution of the SU the Georgian ports transhiped bauxite and aluminium oxide for an aluminium plant in Azerbaijan. The product (aluminium oxide) was despatched to Magnetogorsk in Russia. Because the processing plants in Magnetogorsk could be served cheaper by Russian ports, the transport connection via the Georgian ports is not of interest for the future. The Caucasian countries will have a future demand for aluminium that could be delivered by the plant in Azerbaijan. Therefore, imports of bauxite or aluminium oxide via the Georgian ports are assumed with a rising volume according to the expansion of capacity of the plant in Azerbaijan until 2002.

The deposits of manganese ore in Georgia will lead to exports via the Georgian ports, when the mining industry is recovered and modernised. It is assumed that this process is completed until 2002. In addition, copper concentrate and chrome will be exported in future.

Ferrous metal and scrap iron are assumed to have an important share in outbound cargo of the Georgian ports. Scrap exports are a consequence of the restructuring of the Caucasian region. Obsolete industrial equipment, outdated rolling stock of railway and unnecessary military material will be the sources of scrap exports. It is assumed that the process of restructuring will last over the year 2012.

The development of Caucasian countries will lead to import demand of building materials. A limited inbound cargo volume esp. for cement is assumed for the Georgian ports.

## Oil products

The turnover of oil products in the Georgian ports is one of the items with a high degree of uncertainty with respect to the traffic forecast. The governing factors influencing the turnover of oil products in Poti and Batumi are:

- The exploitation of the oil fields in the Caspian Sea and respectively the major transport routes of oil products depend on the answer to the question if the Caspian Sea is a sea or a lake. The classification as a sea makes it possible to apply international legal rules (Law of the Sea Convention). The surface area is then divided according to this convention into national zones belonging to the property of the five countries. If the Caspian Sea has the status of a lake no international treaty is applicable and it is the joint property of the five countries. Depending on the result of the status of the Caspian Sea the transport routes for oil products underlay the political influence of the involved countries. Russia is interested in transport through its territory. Alternative routes through e.g. Georgia guarantee economic and political independence.
- Georgia has limited oil reserves at the Black Sea and east of Tiblisi. The exploitation of a remarkable amount within the time span of the traffic forecast is uncertain. The refinery in Batumi doesn't fit modern standards and needs complete reconstruction. According to patterns in international oil trade crude oil is transported as close as possible to the regions of consumption. Therefore, it has to be questioned which capacity in the Batumi refinery is needed to fulfil market demands.
- Azerbaijan has proven oil deposits and refinery capacity. Crude oil will be transported in pipelines. Oil products will be consumed in the region. The surplus could be exported to a large extend via the Georgian ports.

With respect to the last mentioned point figures for the turnover of oil products in the Georgian ports in the future differ in the existing traffic forecasts very much. The study of GTZ „Reorganization of the Georgian Ports Poti and Batumi" expects that about 1.5 million tons of oil products p.a. up to the year 2010 are handled in the Georgian ports (maximum variant). The study Tacis/TRACECA „Joint venture(s) for the Caucasian Railways" Interim Report April 1997, seems to indicate a volume of about 5 to 7 million tons of westbound traffic of petrochemical products to the Georgian ports up to the year 2015 (optimistic scenario). The GTZ estimate seems to be rather conservative whereas the Tacis/TRACECA estimate is very optimistic. Therefore a sound estimate for the turnover of oil products in the Georgian ports is in the range of about 2 to 2.5 million tons turnover in scenario I and about 0.8 million tons in scenario II.

### General Cargo

The import of general cargo via the Georgian ports will increase with a growth rate higher than the GDP growth rate. The structure of the goods is determined by metal products, mineral building materials, equipment for the industries, foodstuff that is not produced within the countries and high-value consumer goods. With the recovery of the agricultural production and the industries exports of general cargo will increase.

### Container

With respect to the container traffic in the Georgian ports it is assumed that in the future a growing share of the general cargo is transported in containers. Existing traffic forecasts show different results for the container traffic in the Georgian ports. The forecast made by Sea-Land Service Inc. „Georgian Intermodal Terminal Network - Feasibility Study and Business Plan" April 1997 estimates the container turnover for the port of Poti between 130,000 TEU (container + ro-ro-traffic, loaded containers, scenario I) and 62,000 TEU (scenario II) for the year 2001. The forecast in the study Tacis/TRACECA „Joint venture(s) for the Caucasian Railways" Interim Report April 1997 estimates a TEU turnover volume of about 20,000 TEU (pessimistic scenario) up to 44,000 TEU (optimistic scenario) for the year 2012. The Sea-Land estimate is based on a doubtful model and the figures seem to be very optimistic. The estimate of the Tacis/TRACECA study seems on the other hand more realistic and well founded on a plausible development of container usage.

An important volume in container traffic will in future result from the export of cotton from Uzbekistan and Turkmenistan (see Tacis „Port Network Plan and Improvement Programme" Phase 3, Economic and Financial Evaluation Report - Baku April 1997, p. 100). In 1995 about 300,000 tons of cotton was exported from Turkmenistan. The governments of Uzbekistan, Turkmenistan, Azerbaijan and Georgia have reached an agreement for the transport of one million tons of cotton via the TRACECA route (and the ports of Poti and Batumi) to Europe. Experts have doubts about the realisation of the mentioned volume for economic reasons, in addition the volume would cause capacity problems in transport. Nevertheless, a significant part of container transport in the east-west direction will result of cotton exports from Turkmenistan and Uzbekistan.

## 1.2.2 Scenario II

**Transport sector**

- Retarded growth in transport volume for the reason of delays in the rehabilitation of industries and the exploitation of natural resources
- Insufficient modernisation of railway infrastructure and rolling stock, suboptimal organisation of railway traffic
- Development of forwarding companies with truck fleets
- Changes in modal split: in comparison to scenario I higher share of road transport for bulk and general cargo

**Transport of exports**

- Growth of freight traffic in accordance with the retarded growth in the entire freight volume, lower growth rates for Armenia for the reason of continuing political problems with neighbouring countries, lower production level for oil products of Azerbaijan and therefore reduced exports
- Transport of bulk and general cargo to a larger extend by road in comparison to scenario I

**Transport of imports**

- The assumed lower growth rates of the national economies of Georgia, Azerbaijan and Armenia lead to smaller traffic volumes in comparison to scenario I

**Transport of transit cargo**

- The transit traffic via Yalma to Russia is, compared to scenario I much smaller, transit traffic via Dshulfa to Iran is not possible

With respect to the commodities it is assumed, that structure of goods is not different to scenario I, however the volume is, due to the retarded development, much lower in comparison to scenario I.

### 1.2.3 Scenario III

**Transport sector**

- Growth in transport volume due to the progress in economic development (rehabilitation of industries, exploitation of natural resources), but due to a not humanised development of the different economic sectors (e.g. rehabilitation of industry neglecting the increasing demand for energy) lower growth rates in comparison to scenario I
- Modernisation of railway infrastructure and rolling stock, but organisation of railway traffic being one step behind modern standards
- Development of forwarding companies with truck fleets
- Changes in modal split: in comparison to scenario I better chances for road haulage sector to gain market shares of transport volume due to suboptimal organisation of railway service

**Transport of exports**

- Growth of freight traffic in accordance with the entire freight volume, relatively high growth rates for the export of oil products for Azerbaijan

**Transport of imports**

- Similar assumptions like scenario I, however lower growth rates in import volume

**Transport of transit cargo**

- Cotton and oil products from Central Asia, investment goods and foodstuff to Central Asia will increase, but with lower growth rate in comparison to scenario I

With respect to the commodities it is assumed, that the structure of goods is not different to scenario I, however, the volume is, due to the development, lower in comparison to scenario I.

The results of the traffic forecast are compiled in the following tables.

Traffic forecast for the ports of Poti and Batumi (main commodity groups) scenario I, II,

| Port of Poti | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 697,000 | 50% | 662,200 | 34,900 | 95% | 5% | 145,000 | 37% | 117,500 | 27,600 | 81% | 19% |
| oil products | 476,000 | 34% | 466,500 | 9,500 | 98% | 2% | 146,000 | 38% | 141,600 | 4,400 | 97% | 3% |
| general cargo | 138,000 | 10% | 117,300 | 20,700 | 85% | 15% | 81,000 | 21% | 72,100 | 8,900 | 89% | 11% |
| container | 78,000 | 6% | 49,100 | 28,900 | 63% | 37% | 17,000 | 4% | 6,000 | 11,100 | 35% | 65% |
| total | 1,389,000 | 100% | 1,295,100 | 94,000 | 93% | 7% | 389,000 | 100% | 337,200 | 52,000 | 87% | 13% |

***scenario I***

| Port of Poti | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,407,800 | 64% | 1,126,200 | 281,600 | 80% | 20% | 1,313,800 | 56% | 1,051,100 | 262,800 | 80% | 20% |
| oil products | 151,700 | 7% | 148,600 | 3,000 | 98% | 2% | 365,900 | 16% | 358,600 | 7,300 | 98% | 2% |
| general cargo | 287,000 | 13% | 200,900 | 86,100 | 70% | 30% | 393,400 | 17% | 275,400 | 118,000 | 70% | 30% |
| container | 360,700 | 16% | 270,500 | 90,200 | 75% | 25% | 274,400 | 12% | 205,800 | 68,600 | 75% | 25% |
| total | 2,207,200 | 100% | 1,746,200 | 460,900 | 79% | 21% | 2,347,500 | 100% | 1,890,900 | 456,700 | 81% | 19% |

***scenario I***

| Port of Poti | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,749,100 | 59% | 1,486,700 | 262,400 | 85% | 15% | 2,070,800 | 63% | 1,760,200 | 310,600 | 85% | 15% |
| oil products | 134,800 | 5% | 132,100 | 2,700 | 98% | 2% | 250,400 | 8% | 245,400 | 5,000 | 98% | 2% |
| general cargo | 381,300 | 13% | 286,000 | 95,300 | 75% | 25% | 437,200 | 13% | 327,900 | 109,300 | 75% | 25% |
| container | 689,100 | 23% | 516,800 | 172,300 | 75% | 25% | 530,700 | 16% | 398,000 | 132,700 | 75% | 25% |
| total | 2,954,300 | 100% | 2,421,600 | 532,700 | 82% | 18% | 3,289,100 | 100% | 2,731,500 | 557,600 | 83% | 17% |

***scenario I***

| Port of Poti | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 2,132,900 | 53% | 1,813,000 | 319,900 | 85% | 15% | 2,811,500 | 61% | 2,389,800 | 421,700 | 85% | 15% |
| oil products | 116,500 | 3% | 114,200 | 2,300 | 98% | 2% | 236,600 | 5% | 231,900 | 4,700 | 98% | 2% |
| general cargo | 635,800 | 16% | 476,900 | 159,000 | 75% | 25% | 679,900 | 15% | 510,000 | 170,000 | 75% | 25% |
| container | 1,112,900 | 28% | 834,700 | 278,200 | 75% | 25% | 860,700 | 19% | 645,500 | 215,200 | 75% | 25% |
| total | 3,998,100 | 100% | 3,238,800 | 759,400 | 81% | 19% | 4,588,700 | 100% | 3,777,200 | 811,600 | 82% | 18% |

| Port of Poti | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 697,000 | 50% | 662,200 | 34,900 | 95% | 5% | 145,000 | 37% | 117,500 | 27,600 | 81% | 19% |
| oil products | 476,000 | 34% | 466,500 | 9,500 | 98% | 2% | 146,000 | 38% | 141,600 | 4,400 | 97% | 3% |
| general cargo | 138,000 | 10% | 117,300 | 20,700 | 85% | 15% | 81,000 | 21% | 72,100 | 8,900 | 89% | 11% |
| container | 78,000 | 6% | 49,100 | 28,900 | 63% | 37% | 17,000 | 4% | 6,000 | 11,100 | 35% | 65% |
| total | 1,389,000 | 100% | 1,295,100 | 94,000 | 93% | 7% | 389,000 | 100% | 337,200 | 52,000 | 87% | 13% |

***scenario II***

| Port of Poti | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 774,300 | 64% | 542,000 | 232,300 | 70% | 30% | 722,600 | 56% | 505,800 | 216,800 | 70% | 30% |
| oil products | 83,400 | 7% | 81,800 | 1,700 | 98% | 2% | 201,300 | 16% | 195,200 | 6,000 | 97% | 3% |
| general cargo | 157,800 | 13% | 94,700 | 63,100 | 60% | 40% | 216,400 | 17% | 129,800 | 86,500 | 60% | 40% |
| container | 198,400 | 16% | 117,000 | 81,300 | 59% | 41% | 150,900 | 12% | 89,000 | 61,900 | 59% | 41% |
| total | 1,213,900 | 100% | 835,500 | 378,400 | 69% | 31% | 1,291,200 | 100% | 919,800 | 371,200 | 71% | 29% |

***scenario II***

| Port of Poti | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 962,000 | 59% | 673,400 | 288,600 | 70% | 30% | 1,139,000 | 63% | 797,300 | 341,700 | 70% | 30% |
| oil products | 74,100 | 5% | 72,600 | 1,500 | 98% | 2% | 137,700 | 8% | 135,000 | 2,800 | 98% | 2% |
| general cargo | 209,700 | 13% | 125,800 | 83,900 | 60% | 40% | 240,500 | 13% | 144,300 | 96,200 | 60% | 40% |
| container | 379,000 | 23% | 223,600 | 155,400 | 59% | 41% | 291,900 | 16% | 172,200 | 119,700 | 59% | 41% |
| total | 1,624,800 | 100% | 1,095,400 | 529,400 | 67% | 33% | 1,809,100 | 100% | 1,248,800 | 560,400 | 69% | 31% |

***scenario II***

| Port of Poti | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,173,100 | 53% | 821,200 | 351,900 | 70% | 30% | 1,546,300 | 61% | 1,082,400 | 463,900 | 70% | 30% |
| oil products | 64,100 | 3% | 62,800 | 1,300 | 98% | 2% | 130,200 | 5% | 127,600 | 2,600 | 98% | 2% |
| general cargo | 349,700 | 16% | 209,800 | 139,900 | 60% | 40% | 374,000 | 15% | 224,400 | 149,600 | 60% | 40% |
| container | 612,100 | 28% | 361,100 | 251,000 | 59% | 41% | 473,400 | 19% | 279,300 | 194,100 | 59% | 41% |
| total | 2,199,000 | 100% | 1,454,900 | 744,100 | 66% | 34% | 2,523,900 | 100% | 1,713,700 | 810,200 | 68% | 32% |

| Port of Poti | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 697,000 | 50% | 662,200 | 34,900 | 95% | 5% | 145,000 | 37% | 117,500 | 27,600 | 81% | 19% |
| oil products | 476,000 | 34% | 466,500 | 9,500 | 98% | 2% | 146,000 | 38% | 141,600 | 4,400 | 97% | 3% |
| general cargo | 138,000 | 10% | 117,300 | 20,700 | 85% | 15% | 81,000 | 21% | 72,100 | 8,900 | 89% | 11% |
| container | 78,000 | 6% | 49,100 | 28,900 | 63% | 37% | 17,000 | 4% | 6,000 | 11,100 | 35% | 65% |
| total | 1,389,000 | 100% | 1,295,100 | 94,000 | 93% | 7% | 389,000 | 100% | 337,200 | 52,000 | 87% | 13% |

***scenario III***

| Port of Poti | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,196,600 | 64% | 897,400 | 299,100 | 75% | 25% | 1,116,800 | 56% | 837,600 | 279,200 | 75% | 25% |
| oil products | 128,900 | 7% | 126,300 | 2,600 | 98% | 2% | 311,000 | 16% | 301,700 | 9,300 | 97% | 3% |
| general cargo | 243,900 | 13% | 158,600 | 85,400 | 65% | 35% | 334,400 | 17% | 217,400 | 117,000 | 65% | 35% |
| container | 306,600 | 16% | 199,300 | 107,300 | 65% | 35% | 233,200 | 12% | 151,600 | 81,600 | 65% | 35% |
| total | 1,876,000 | 100% | 1,381,600 | 494,400 | 74% | 26% | 1,995,400 | 100% | 1,508,300 | 487,100 | 76% | 24% |

***scenario III***

| Port of Poti | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,486,700 | 59% | 1,189,400 | 297,300 | 80% | 20% | 1,760,200 | 63% | 1,408,200 | 352,000 | 80% | 20% |
| oil products | 114,500 | 5% | 112,300 | 2,300 | 98% | 2% | 212,900 | 8% | 208,600 | 4,300 | 98% | 2% |
| general cargo | 324,100 | 13% | 210,700 | 113,500 | 65% | 35% | 371,600 | 13% | 241,600 | 130,100 | 65% | 35% |
| container | 585,700 | 23% | 410,000 | 175,700 | 70% | 30% | 451,100 | 16% | 315,800 | 135,300 | 70% | 30% |
| total | 2,511,000 | 100% | 1,922,400 | 588,800 | 77% | 23% | 2,795,800 | 100% | 2,174,200 | 621,700 | 78% | 22% |

***scenario III***

| Port of Poti | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,813,000 | 53% | 1,450,400 | 362,600 | 80% | 20% | 2,389,800 | 61% | 1,911,800 | 478,000 | 80% | 20% |
| oil products | 99,100 | 3% | 97,100 | 2,000 | 98% | 2% | 201,100 | 5% | 197,100 | 4,000 | 98% | 2% |
| general cargo | 540,400 | 16% | 378,300 | 162,100 | 70% | 30% | 577,900 | 15% | 404,600 | 173,400 | 70% | 30% |
| container | 946,000 | 28% | 662,200 | 283,800 | 70% | 30% | 731,600 | 19% | 512,100 | 219,500 | 70% | 30% |
| total | 3,398,500 | 100% | 2,588,000 | 810,500 | 76% | 24% | 3,900,400 | 100% | 3,025,600 | 874,900 | 78% | 22% |

| Port of Batumi | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 533,000 | 60% | 533,000 | 0 | 100% | 0% | 18,000 | 4% | 18,000 | 0 | 100% | 0% |
| oil products | 238,000 | 27% | 226,100 | 11,900 | 95% | 5% | 404,000 | 82% | 400,000 | 4,000 | 99% | 1% |
| general cargo | 122,000 | 14% | 113,500 | 8,500 | 93% | 7% | 68,000 | 14% | 64,600 | 3,400 | 95% | 5% |
| container | 0 | 0% | 0 | 0 | 0% | 100% | 0 | 0% | 0 | 0 | 100% | 0% |
| total | 893,000 | 100% | 872,600 | 20,400 | 98% | 2% | 490,000 | 100% | 482,600 | 7,400 | 98% | 2% |

***scenario I***

| Port of Batumi | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 767,300 | 79% | 613,900 | 153,500 | 80% | 20% | 399,100 | 15% | 319,200 | 79,800 | 80% | 20% |
| oil products | 91,400 | 9% | 89,500 | 1,800 | 98% | 2% | 1,821,100 | 71% | 1,784,600 | 36,400 | 98% | 2% |
| general cargo | 106,700 | 11% | 74,700 | 32,000 | 70% | 30% | 346,900 | 13% | 242,900 | 104,100 | 70% | 30% |
| container | 600 | 0% | 0 | 600 | 0% | 100% | 12,300 | 0% | 0 | 12,300 | 0% | 100% |
| total | 966,000 | 100% | 778,100 | 187,900 | 81% | 19% | 2,579,400 | 100% | 2,346,700 | 232,600 | 91% | 9% |

***scenario I***

| Port of Batumi | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 978,900 | 79% | 832,100 | 146,800 | 85% | 15% | 658,200 | 20% | 559,400 | 98,700 | 85% | 15% |
| oil products | 67,700 | 5% | 66,300 | 1,400 | 98% | 2% | 1,687,100 | 52% | 1,653,400 | 33,700 | 98% | 2% |
| general cargo | 188,600 | 15% | 141,500 | 47,200 | 75% | 25% | 811,800 | 25% | 608,900 | 203,000 | 75% | 25% |
| container | 6,400 | 1% | 0 | 6,400 | 0% | 100% | 57,800 | 2% | 0 | 57,800 | 0% | 100% |
| total | 1,241,600 | 100% | 1,039,900 | 201,800 | 91% | 9% | 3,214,900 | 100% | 2,821,700 | 393,200 | 88% | 12% |

***scenario I***

| Port of Batumi | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,547,300 | 83% | 1,315,200 | 232,100 | 85% | 15% | 571,800 | 17% | 486,000 | 85,800 | 85% | 15% |
| oil products | 59,700 | 3% | 58,500 | 1,200 | 98% | 2% | 1,664,600 | 49% | 1,631,300 | 33,300 | 98% | 2% |
| general cargo | 231,300 | 12% | 173,400 | 57,800 | 75% | 25% | 1,084,500 | 32% | 813,400 | 271,100 | 75% | 25% |
| container | 15,600 | 1% | 0 | 15,600 | 0% | 100% | 88,300 | 3% | 0 | 88,300 | 0% | 100% |
| total | 1,853,900 | 100% | 1,547,100 | 306,700 | 83% | 17% | 3,409,200 | 100% | 2,930,700 | 478,500 | 86% | 14% |

| Port of Batumi | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 533,000 | 60% | 533,000 | 0 | 100% | 0% | 18,000 | 4% | 18,000 | 0 | 100% | 0% |
| oil products | 238,000 | 27% | 226,100 | 11,900 | 95% | 5% | 404,000 | 82% | 400,000 | 4,000 | 99% | 1% |
| general cargo | 122,000 | 14% | 113,500 | 8,540 | 93% | 7% | 68,000 | 14% | 64,600 | 3,400 | 95% | 5% |
| container | 0 | 0% | 0 | 0 | 0% | 100% | 0 | 0% | 0 | 0 | 100% | 0% |
| total | 893,000 | 100% | 872,600 | 20,440 | 98% | 2% | 490,000 | 100% | 482,600 | 7,400 | 98% | 2% |

***scenario II***

| Port of Batumi | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 422,000 | 79% | 295,400 | 126,600 | 70% | 30% | 219,500 | 15% | 153,600 | 65,800 | 70% | 30% |
| oil products | 50,200 | 9% | 49,200 | 1,000 | 98% | 2% | 1,001,600 | 71% | 971,500 | 30,000 | 97% | 3% |
| general cargo | 58,700 | 11% | 35,200 | 23,500 | 60% | 40% | 190,800 | 13% | 114,500 | 76,300 | 60% | 40% |
| container | 400 | 0% | 0 | 400 | 0% | 100% | 6,800 | 0% | 0 | 6,800 | 0% | 100% |
| total | 531,300 | 100% | 379,800 | 151,500 | 71% | 29% | 1,418,700 | 100% | 1,239,600 | 178,900 | 87% | 13% |

***scenario II***

| Port of Batumi | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 538,400 | 79% | 376,900 | 161,500 | 70% | 30% | 362,000 | 20% | 253,400 | 108,600 | 70% | 30% |
| oil products | 37,200 | 5% | 36,500 | 700 | 98% | 2% | 927,900 | 52% | 909,400 | 18,600 | 98% | 2% |
| general cargo | 103,700 | 15% | 62,200 | 41,500 | 60% | 40% | 446,500 | 25% | 267,900 | 178,600 | 60% | 40% |
| container | 3,500 | 1% | 0 | 3,500 | 0% | 100% | 31,800 | 2% | 0 | 31,800 | 0% | 100% |
| total | 682,800 | 100% | 475,600 | 207,200 | 70% | 30% | 1,768,200 | 100% | 1,430,700 | 337,600 | 81% | 19% |

***scenario II***

| Port of Batumi | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 851,000 | 83% | 595,700 | 255,300 | 70% | 30% | 314,500 | 17% | 220,100 | 94,300 | 70% | 30% |
| oil products | 32,800 | 3% | 32,200 | 700 | 98% | 2% | 915,500 | 49% | 897,200 | 18,300 | 98% | 2% |
| general cargo | 127,200 | 12% | 76,300 | 50,900 | 60% | 40% | 596,500 | 32% | 357,900 | 238,600 | 60% | 40% |
| container | 8,600 | 1% | 0 | 8,600 | 0% | 100% | 48,600 | 3% | 0 | 48,600 | 0% | 100% |
| total | 1,019,600 | 100% | 704,200 | 315,500 | 69% | 31% | 1,875,100 | 100% | 1,475,200 | 399,800 | 79% | 21% |

| Port of Batumi | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 533,000 | 60% | 533,000 | 0 | 100% | 0% | 18,000 | 4% | 18,000 | 0 | 100% | 0% |
| oil products | 238,000 | 27% | 226,100 | 11,900 | 95% | 5% | 404,000 | 82% | 400,000 | 4,000 | 99% | 1% |
| general cargo | 122,000 | 14% | 113,500 | 8,500 | 93% | 7% | 68,000 | 14% | 64,600 | 3,400 | 95% | 5% |
| container | 0 | 0% | 0 | 0 | 0% | 100% | 0 | 0% | 0 | 0 | 100% | 0% |
| total | 893,000 | 100% | 872,600 | 20,400 | 98% | 2% | 490,000 | 100% | 482,600 | 7,400 | 98% | 2% |

***scenario III***

| Port of Batumi | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 652,200 | 79% | 489,200 | 163,100 | 75% | 25% | 339,200 | 15% | 254,400 | 84,800 | 75% | 25% |
| oil products | 77,700 | 9% | 76,100 | 1,600 | 98% | 2% | 1,547,900 | 71% | 1,501,500 | 46,400 | 97% | 3% |
| general cargo | 90,700 | 11% | 58,900 | 31,700 | 65% | 35% | 294,900 | 13% | 191,700 | 103,200 | 65% | 35% |
| container | 600 | 0% | 0 | 600 | 0% | 100% | 10,500 | 0% | 0 | 10,500 | 0% | 100% |
| total | 821,200 | 100% | 624,200 | 197,000 | 76% | 24% | 2,192,500 | 100% | 1,947,600 | 244,900 | 89% | 11% |

***scenario III***

| Port of Batumi | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 832,100 | 79% | 665,700 | 166,400 | 80% | 20% | 559,400 | 20% | 447,500 | 111,900 | 80% | 20% |
| oil products | 57,500 | 5% | 56,400 | 1,200 | 98% | 2% | 1,434,100 | 52% | 1,405,400 | 28,700 | 98% | 2% |
| general cargo | 160,300 | 15% | 104,200 | 56,100 | 65% | 35% | 690,100 | 25% | 448,500 | 241,500 | 65% | 35% |
| container | 5,500 | 1% | 0 | 5,500 | 0% | 100% | 49,100 | 2% | 0 | 49,100 | 0% | 100% |
| total | 1,055,400 | 100% | 826,300 | 229,200 | 78% | 22% | 2,732,700 | 100% | 2,301,400 | 431,200 | 84% | 16% |

***scenario III***

| Port of Batumi | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,315,200 | 83% | 1,052,100 | 263,000 | 80% | 20% | 486,000 | 17% | 388,800 | 97,200 | 80% | 20% |
| oil products | 50,800 | 3% | 49,700 | 1,000 | 98% | 2% | 1,414,900 | 49% | 1,386,600 | 28,300 | 98% | 2% |
| general cargo | 196,600 | 12% | 137,600 | 59,000 | 70% | 30% | 921,800 | 32% | 645,300 | 276,500 | 70% | 30% |
| container | 13,200 | 1% | 0 | 13,200 | 0% | 100% | 75,000 | 3% | 0 | 75,000 | 0% | 100% |
| total | 1,575,800 | 100% | 1,239,400 | 336,200 | 79% | 21% | 2,897,700 | 100% | 2,420,700 | 477,000 | 84% | 16% |

| Poti/Batumi | 1995 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 1,393,000 | 44% | 96% | 4% |
| oil products | 1,264,000 | 40% | 98% | 2% |
| general cargo | 409,000 | 13% | 90% | 10% |
| container | 95,000 | 3% | 58% | 42% |
| total | 3,161,000 | 100% | 95% | 5% |

***scenario I***

| Poti/Batumi | 2007 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 5,457,000 | 51% | 85% | 15% |
| oil products | 2,140,000 | 20% | 98% | 2% |
| general cargo | 1,818,900 | 17% | 75% | 25% |
| container | 1,284,000 | 12% | 71% | 29% |
| total | 10,699,900 | 100% | 84% | 16% |

| Poti/Batumi | 1995 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 1,393,000 | 44% | 96% | 4% |
| oil products | 1,264,000 | 40% | 98% | 2% |
| general cargo | 409,000 | 13% | 90% | 10% |
| container | 95,000 | 3% | 58% | 42% |
| total | 3,161,000 | 100% | 95% | 5% |

***scenario II***

| Poti/Batumi | 2007 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 3,001,400 | 51% | 70% | 30% |
| oil products | 1,176,900 | 20% | 98% | 2% |
| general cargo | 1,000,400 | 17% | 60% | 40% |
| container | 706,200 | 12% | 56% | 44% |
| total | 5,884,900 | 100% | 72% | 28% |

| Poti/Batumi | 2002 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 3,888,000 | 48% | 80% | 20% |
| oil products | 2,430,100 | 30% | 98% | 2% |
| general cargo | 1,134,000 | 14% | 70% | 30% |
| container | 648,000 | 8% | 74% | 26% |
| total | 8,100,100 | 100% | 83% | 17% |

***scenario I***

| Poti/Batumi | 2012 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 7,063,500 | 51% | 85% | 15% |
| oil products | 2,077,400 | 15% | 98% | 2% |
| general cargo | 2,631,500 | 19% | 75% | 25% |
| container | 2,077,500 | 15% | 71% | 29% |
| total | 13,849,900 | 100% | 83% | 17% |

***scenario II***

| Poti/Batumi | 2005 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 2,138,400 | 48% | 70% | 30% |
| oil products | 1,336,500 | 30% | 97% | 3% |
| general cargo | 623,700 | 14% | 60% | 40% |
| container | 356,500 | 8% | 58% | 42% |
| total | 4,455,100 | 100% | 76% | 24% |

***scenario II***

| Poti/Batumi | 2012 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 3,884,900 | 51% | 70% | 30% |
| oil products | 1,142,600 | 15% | 98% | 2% |
| general cargo | 1,447,400 | 19% | 60% | 40% |
| container | 1,142,700 | 15% | 56% | 44% |
| total | 7,617,600 | 100% | 70% | 30% |

| Poti/Batumi | 1995 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 1,393,000 | 44% | 96% | 4% |
| oil products | 1,264,000 | 40% | 98% | 2% |
| general cargo | 409,000 | 13% | 90% | 10% |
| container | 95,000 | 3% | 58% | 42% |
| total | 3,161,000 | 100% | 95% | 5% |

| Poti/Batumi | 2005 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 3,304,800 | 48% | 75% | 25% |
| oil products | 2,065,500 | 30% | 97% | 3% |
| general cargo | 963,900 | 14% | 65% | 35% |
| container | 550,900 | 8% | 64% | 36% |
| total | 6,885,100 | 100% | 79% | 21% |

***scenario III***

| Poti/Batumi | 2007 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 4,638,400 | 51% | 80% | 20% |
| oil products | 1,819,000 | 20% | 98% | 2% |
| general cargo | 1,546,100 | 17% | 65% | 35% |
| container | 1,091,400 | 12% | 67% | 33% |
| total | 9,094,900 | 100% | 79% | 21% |

***scenario III***

| Poti/Batumi | 2012 | | modal split | |
|---|---|---|---|---|
| Commodity | turnover | % | % rail | % road |
| bulk | 6,004,000 | 51% | 80% | 20% |
| oil products | 1,765,900 | 15% | 98% | 2% |
| general cargo | 2,236,700 | 19% | 70% | 30% |
| container | 1,765,800 | 15% | 67% | 33% |
| total | 11,772,400 | 100% | 79% | 21% |

**Traffic forecast for the ports of Poti and Batumi (detailed commodity groups) scenario III**

| Port of Poti | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 697,000 | 50.2% | 662,200 | 34,900 | 95% | 5% | 145,000 | 37.3% | 117,500 | 27,600 | 81% | 19% |
| coal | 4,000 | 0.6% | | | | | 0 | 0.0% | | | | |
| ore | 52,000 | 7.5% | | | | | 89,000 | 61.4% | | | | |
| ferrous metal | 0 | 0.0% | | | | | 36,000 | 24.8% | | | | |
| cement | 0 | 0.0% | | | | | 20,000 | 13.8% | | | | |
| mineral fertilizer | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| grain | 641,000 | 92.0% | | | | | 0 | 0.0% | | | | |
| oil products | 476,000 | 34.3% | 466,500 | 9,500 | 98% | 2% | 146,000 | 37.5% | 141,600 | 4,400 | 97% | 3% |
| general cargo | 138,000 | 9.9% | 117,300 | 20,700 | 85% | 15% | 81,000 | 20.8% | 72,100 | 8,900 | 89% | 11% |
| metal products | 0 | 0.0% | | | | | 48,000 | 59.3% | | | | |
| timber | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| min. build. materials | 9,000 | 6.5% | | | | | 5,000 | 6.2% | | | | |
| foodstuff, others | 129,000 | 93.5% | | | | | 28,000 | 34.6% | | | | |
| container | 78,000 | 5.6% | 49,100 | 28,900 | 63% | 37% | 17,000 | 4.4% | 6,000 | 11,100 | 35% | 65% |
| total | 1,389,000 | 100.0% | 1,295,100 | 93,900 | 93% | 7% | 389,000 | 100.0% | 337,100 | 51,900 | 87% | 13% |

***scenario III***

| Port of Poti | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,196,600 | 63.8% | 897,400 | 299,100 | 75% | 25% | 1,116,800 | 56.0% | 837,600 | 279,200 | 75% | 25% |
| coal | 3,900 | 0.5% | | | | | 0 | 0.0% | | | | |
| ore | 116,100 | 15.0% | | | | | 505,800 | 70.0% | | | | |
| ferrous metal | 0 | 0.0% | | | | | 216,800 | 30.0% | | | | |
| cement | 19,400 | 2.5% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 7,700 | 1.0% | | | | | 0 | 0.0% | | | | |
| grain | 627,200 | 81.0% | | | | | 0 | 0.0% | | | | |
| oil products | 128,900 | 6.9% | 126,300 | 2,600 | 98% | 2% | 311,000 | 15.6% | 301,700 | 9,300 | 97% | 3% |
| general cargo | 243,900 | 13.0% | 158,600 | 85,400 | 65% | 35% | 334,400 | 16.8% | 217,400 | 117,000 | 65% | 35% |
| metal products | 800 | 0.5% | | | | | 140,600 | 65.0% | | | | |
| timber | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| min. build. materials | 14,200 | 9.0% | | | | | 6,500 | 3.0% | | | | |
| foodstuff, others | 142,900 | 90.5% | | | | | 69,200 | 32.0% | | | | |
| container | 306,600 | 16.3% | 199,300 | 107,300 | 65% | 35% | 233,200 | 11.7% | 151,600 | 81,600 | 65% | 35% |
| total | 1,876,000 | 100.0% | 1,381,600 | 494,400 | 74% | 26% | 1,995,400 | 100.0% | 1,508,200 | 487,200 | 76% | 24% |

***scenario III***

| Port of Poti | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,486,700 | 59.2% | 1,189,400 | 297,300 | 80% | 20% | 1,760,200 | 63.0% | 1,408,200 | 352,000 | 80% | 20% |
| coal | 4,800 | 0.5% | | | | | 0 | 0.0% | | | | |
| ore | 163,500 | 17.0% | | | | | 797,300 | 70.0% | | | | |
| ferrous metal | 0 | 0.0% | | | | | 341,700 | 30.0% | | | | |
| cement | 28,900 | 3.0% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 14,400 | 1.5% | | | | | 0 | 0.0% | | | | |
| grain | 750,300 | 78.0% | | | | | 0 | 0.0% | | | | |
| oil products | 114,500 | 4.6% | 112,300 | 2,300 | 98% | 2% | 212,900 | 7.6% | 208,600 | 4,300 | 98% | 2% |
| general cargo | 324,100 | 12.9% | 210,700 | 113,500 | 65% | 35% | 371,600 | 13.3% | 241,600 | 130,100 | 65% | 35% |
| metal products | 600 | 0.3% | | | | | 156,300 | 65.0% | | | | |
| timber | 0 | 0.0% | | | | | 2,400 | 1.0% | | | | |
| min. build. materials | 19,100 | 9.1% | | | | | 7,200 | 3.0% | | | | |
| foodstuff, others | 190,000 | 90.6% | | | | | 74,500 | 31.0% | | | | |
| container | 585,700 | 23.3% | 410,000 | 175,700 | 70% | 30% | 451,100 | 16.1% | 315,800 | 135,300 | 70% | 30% |
| total | 2,511,100 | 100.0% | 1,922,300 | 588,800 | 77% | 23% | 2,795,800 | 100.0% | 2,174,100 | 621,700 | 78% | 22% |

***scenario III***

| Port of Poti | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,813,000 | 53.3% | 1,450,400 | 362,600 | 80% | 20% | 2,389,800 | 61.3% | 1,911,800 | 478,000 | 80% | 20% |
| coal | 5,900 | 0.5% | | | | | 0 | 0.0% | | | | |
| ore | 176,000 | 15.0% | | | | | 1,051,500 | 68.0% | | | | |
| ferrous metal | 0 | 0.0% | | | | | 494,800 | 32.0% | | | | |
| cement | 46,900 | 4.0% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 17,600 | 1.5% | | | | | 0 | 0.0% | | | | |
| grain | 926,800 | 79.0% | | | | | 0 | 0.0% | | | | |
| oil products | 99,100 | 2.9% | 97,100 | 2,000 | 98% | 2% | 201,100 | 5.2% | 197,100 | 4,000 | 98% | 2% |
| general cargo | 540,400 | 15.9% | 378,300 | 162,100 | 70% | 30% | 577,900 | 14.8% | 404,600 | 173,400 | 70% | 30% |
| metal products | 2,100 | 0.6% | | | | | 246,800 | 66.0% | | | | |
| timber | 0 | 0.0% | | | | | 3,700 | 1.0% | | | | |
| min. build. materials | 30,800 | 8.8% | | | | | 11,200 | 3.0% | | | | |
| foodstuff, others | 316,800 | 90.6% | | | | | 112,200 | 30.0% | | | | |
| container | 946,000 | 27.8% | 662,200 | 283,800 | 70% | 30% | 731,600 | 18.8% | 512,100 | 219,500 | 70% | 30% |
| total | 3,398,500 | 100.0% | 2,588,000 | 810,500 | 76% | 24% | 3,900,500 | 100.0% | 3,025,600 | 874,800 | 78% | 22% |

| Port of Batumi | 1995 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 533,000 | 59.7% | 533,000 | 0 | 100% | 0% | 18,000 | 3.7% | 18,000 | 0 | 100% | 0% |
| coal | 4,000 | 0.8% | | | | | 0 | 0.0% | | | 0% | 0% |
| ore | 0 | 0.0% | | | | | 18,000 | 100.0% | | | | |
| ferrous metal | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| cement | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| grain | 528,700 | 99.2% | | | | | 0 | 0.0% | | | | |
| oil products | 238,000 | 26.7% | 226,100 | 11,900 | 95% | 5% | 404,000 | 82.4% | 400,000 | 4,000 | 99% | 1% |
| general cargo | 122,000 | 13.7% | 113,500 | 8,500 | 93% | 7% | 68,000 | 13.9% | 64,600 | 3,400 | 95% | 5% |
| metal products | 0 | 0.0% | | | | | 46,000 | 67.6% | | | 0% | 0% |
| timber | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| min. build. materials | 1,000 | 0.8% | | | | | 0 | 0.0% | | | | |
| foodstuff, others | 121,000 | 99.2% | | | | | 22,000 | 32.4% | | | | |
| container | 0 | 0.0% | 0 | 0 | 0% | 100% | 0 | 0.0% | 0 | 0 | 100% | 0% |
| total | 893,000 | 100.0% | 872,600 | 20,400 | 98% | 2% | 490,000 | 100.0% | 482,600 | 7,400 | 98% | 2% |

***scenario III***

| Port of Batumi | 2002 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 652,200 | 79.4% | 489,200 | 163,100 | 75% | 25% | 339,200 | 15.5% | 254,400 | 84,800 | 75% | 25% |
| coal | 8,400 | 2.0% | | | | | 0 | 0.0% | | | | |
| ore | 0 | 0.0% | | | | | 219,500 | 100.0% | | | | |
| ferrous metal | 12,700 | 3.0% | | | | | 0 | 0.0% | | | | |
| cement | 8,400 | 2.0% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 4,200 | 1.0% | | | | | 0 | 0.0% | | | | |
| grain | 388,300 | 92.0% | | | | | 0 | 0.0% | | | | |
| oil products | 77,700 | 9.5% | 76,100 | 1,600 | 98% | 2% | 1,547,900 | 70.6% | 1,501,500 | 46,400 | 97% | 3% |
| general cargo | 90,700 | 11.0% | 58,900 | 31,700 | 65% | 35% | 294,900 | 13.5% | 191,700 | 103,200 | 65% | 35% |
| metal products | 600 | 1.0% | | | | | 137,400 | 72.0% | | | | |
| timber | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| min. build. materials | 1,200 | 2.0% | | | | | 0 | 0.0% | | | | |
| foodstuff, others | 56,900 | 97.0% | | | | | 53,400 | 28.0% | | | | |
| container | 600 | 0.1% | 0 | 600 | 0% | 100% | 10,500 | 0.5% | 0 | 10,500 | 0% | 100% |
| total | 821,100 | 100.0% | 624,200 | 196,900 | 76% | 24% | 2,192,500 | 100.0% | 1,947,500 | 244,900 | 89% | 11% |

***scenario III***

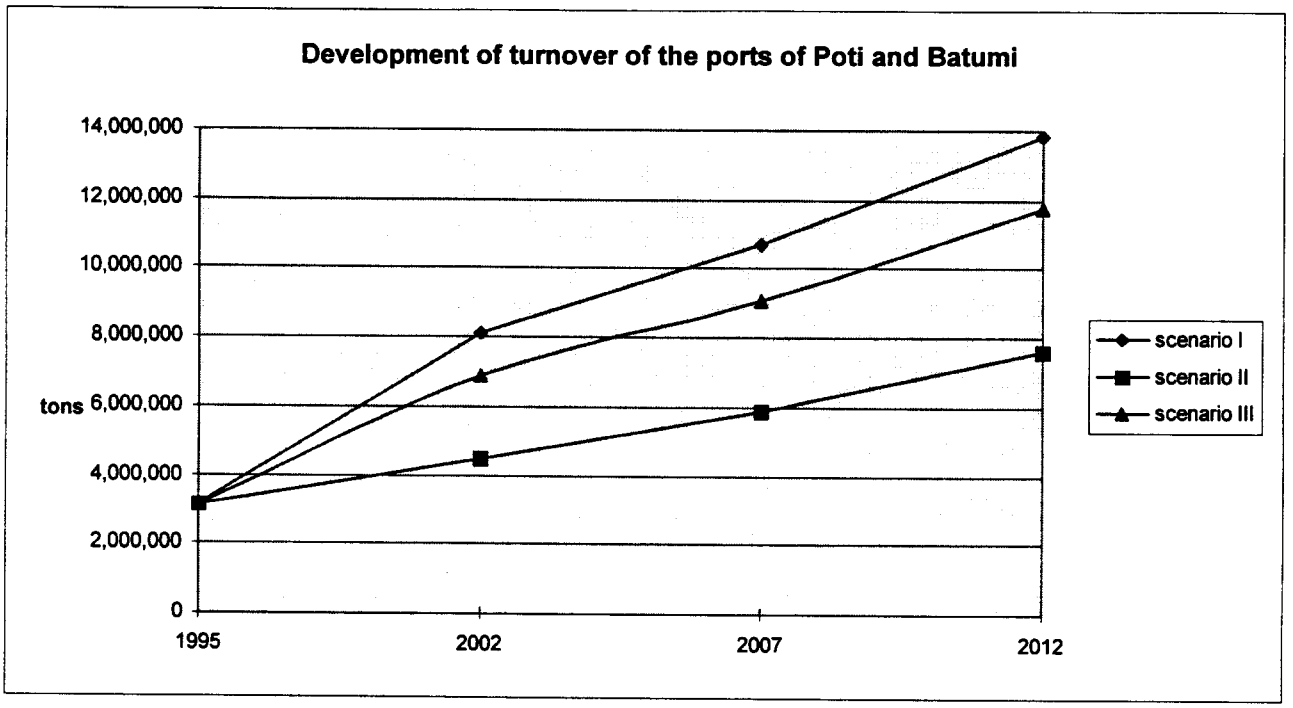
| Port of Batumi | 2007 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 832,100 | 78.8% | 665,700 | 166,400 | 80% | 20% | 559,400 | 20.5% | 447,500 | 111,900 | 80% | 20% |
| coal | 10,800 | 2.0% | | | | | 0 | 0.0% | | | | |
| ore | 0 | 0.0% | | | | | 362,000 | 100.0% | | | | |
| ferrous metal | 16,200 | 3.0% | | | | | 0 | 0.0% | | | | |
| cement | 16,200 | 3.0% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 10,800 | 2.0% | | | | | 0 | 0.0% | | | | |
| grain | 484,600 | 90.0% | | | | | 0 | 0.0% | | | | |
| oil products | 57,500 | 5.4% | 56,400 | 1,200 | 98% | 2% | 1,434,100 | 52.5% | 1,405,400 | 28,700 | 98% | 2% |
| general cargo | 160,300 | 15.2% | 104,200 | 56,100 | 65% | 35% | 690,100 | 25.3% | 448,500 | 241,500 | 65% | 35% |
| metal products | 500 | 0.5% | | | | | 321,500 | 72.0% | | | | |
| timber | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| min. build. materials | 2,100 | 2.0% | | | | | 0 | 0.0% | | | | |
| foodstuff, others | 101,100 | 97.5% | | | | | 125,000 | 28.0% | | | | |
| container | 5,500 | 0.5% | 0 | 5,500 | 0% | 100% | 49,100 | 1.8% | 0 | 49,100 | 0% | 100% |
| total | 1,055,400 | 100.0% | 826,200 | 229,100 | 78% | 22% | 2,732,700 | 100.0% | 2,301,500 | 431,200 | 84% | 16% |

***scenario III***

| Port of Batumi | 2012 | | modi | | modi % | | | | modi | | modi % | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commodity | inbound | % | rail | road | rail | road | outbound | % | rail | road | rail | road |
| bulk | 1,315,200 | 83.5% | 1,052,100 | 263,000 | 80% | 20% | 486,000 | 16.8% | 388,800 | 97,200 | 80% | 20% |
| coal | 17,000 | 2.0% | | | | | 0 | 0.0% | | | | |
| ore | 0 | 0.0% | | | | | 314,500 | 100.0% | | | | |
| ferrous metal | 25,500 | 3.0% | | | | | 0 | 0.0% | | | | |
| cement | 34,000 | 4.0% | | | | | 0 | 0.0% | | | | |
| mineral fertilizer | 17,000 | 2.0% | | | | | 0 | 0.0% | | | | |
| grain | 757,400 | 89.0% | | | | | 0 | 0.0% | | | | |
| oil products | 50,800 | 3.2% | 49,700 | 1,000 | 98% | 2% | 1,414,900 | 48.8% | 1,386,600 | 28,300 | 98% | 2% |
| general cargo | 196,600 | 12.5% | 137,600 | 59,000 | 70% | 30% | 921,800 | 31.8% | 645,300 | 276,500 | 70% | 30% |
| metal products | 1,300 | 1.0% | | | | | 423,500 | 71.0% | | | | |
| timber | 0 | 0.0% | | | | | 0 | 0.0% | | | | |
| min. build. materials | 3,800 | 3.0% | | | | | 0 | 0.0% | | | | |
| foodstuff, others | 122,100 | 96.0% | | | | | 173,000 | 29.0% | | | | |
| container | 13,200 | 0.8% | 0 | 13,200 | 0% | 100% | 75,000 | 2.6% | 0 | 75,000 | 0% | 100% |
| total | 1,575,800 | 100.0% | 1,239,500 | 336,300 | 79% | 21% | 2,897,800 | 100.0% | 2,420,700 | 477,100 | 84% | 16% |

**Results of the traffic forecast**

The results of the traffic forecast indicate a relatively high growth rate for the total turnover of the ports of Poti and Batumi in the period of the years 1997 until 2002. In scenario I („best case") the total turnover increases by a rate of 26% per year. The „worst case scenario" (scenario II) indicates an annual growth rate of 7%. Scenario III („probable case") results in an annual growth rate of 20%. In the following years of the forecast an annual growth rate of 6% for all scenarios is indicated. A comparison of the development of turnover of the ports is shown in the following diagram.




These results are due to the assumption, that in the first period of the forecast (year 1995 until 2002) the economic development of the regions is very dynamic and the rehabilitation of industries and the exploitation of the natural resources records remarkable progress. Additionally, the starting point of the development of ports turnover (actual use of capacity in comparison to FSU times) has to be taken into account. In the following periods a moderate growth of turnover according to economic development is assumed.

With respect to the commodities the traffic forecast results in different paths of development. For bulk a steady growth is recorded. The share of total turnover increases from 44% (year 1995) to about 50% (achieved in the year 2007). Oil products (exports of Azerbaijan and imports of Georgia and Armenia) have a diminishing importance for the ports in the forecast period considering the share of turnover. The capacity for the processing of crude oil in Azerbaijan will increase over the next years so that for regional demand imports are needed to a decreasing extend. General cargo will in the future have an increasing share of total turnover. The share of general cargo will increase from 13% in the year 1995 to 15% in the year 2012. The share of container transhipment is rising in the forecast period from about 3% of the total turnover in the year 1995 to 15% in the year 2012. These figures reflect the growing demand for investment goods (technical equipment, spare parts etc.) and consumer goods of higher value. According to the international trend these godds are transported in containers. In contrast to other forecasts for the container traffic of the ports (esp. Sea-Land Service Inc. „Georgian Intermodal Terminal Network - Feasibility Study and Business Plan" April 1997) the growth in container traffic is in the period 1995 until 2002 about 97% (scenario I) and 80% per year (scenario III). In the period 2003 until 2007 the growth rate is 20% per year. It is assumed, that in the next years up to 2002 the container transport is characterised by a high degree of dynamic.

The modal split for the ports hinterland traffic in the year 1995 was a share of 95% for rail transport and 5% for road transport. These data indicate prevailing structures of the FSU and the lack of a road haulage sector. To put the future in concrete forms two different paths of development are possible:

- rehabilitation and extension of road network with first priority, promotion of private trucking companies
- first priority for the rehabilitation and modernisation of the railroad network, rolling stock and organisation of railroad traffic

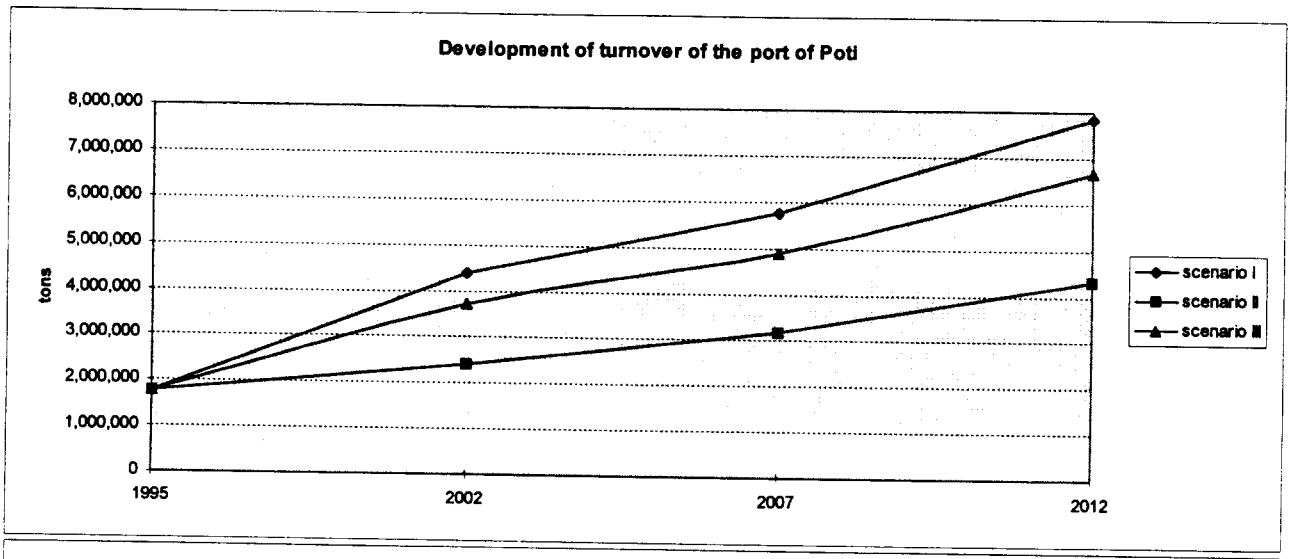
It is assumed, that the railway is also in the future considered the backbone of the transport system of the TRACECA countries. It may be the more easy way to rely mainly on road transport, because the investment in trucks and transhipment facilities is the task of private companies. But a well working railway system is an indispensable component of the economy of a developing country. First steps are the planning of a Trans-Caucasian-Logistic-Express and different studies for the improvement of the railways in the TRACECA region (i.e. Tacis/TRACECA „Trans Caucasian Railway, Railways Pre-Investment study and Pilot train Baku - Tiblisi - Batumi/Poti" , Draft Final Report May 1997, Tacis/TRACECA „Joint venture(s) for the Caucasian Railways" Interim Report April 1997).

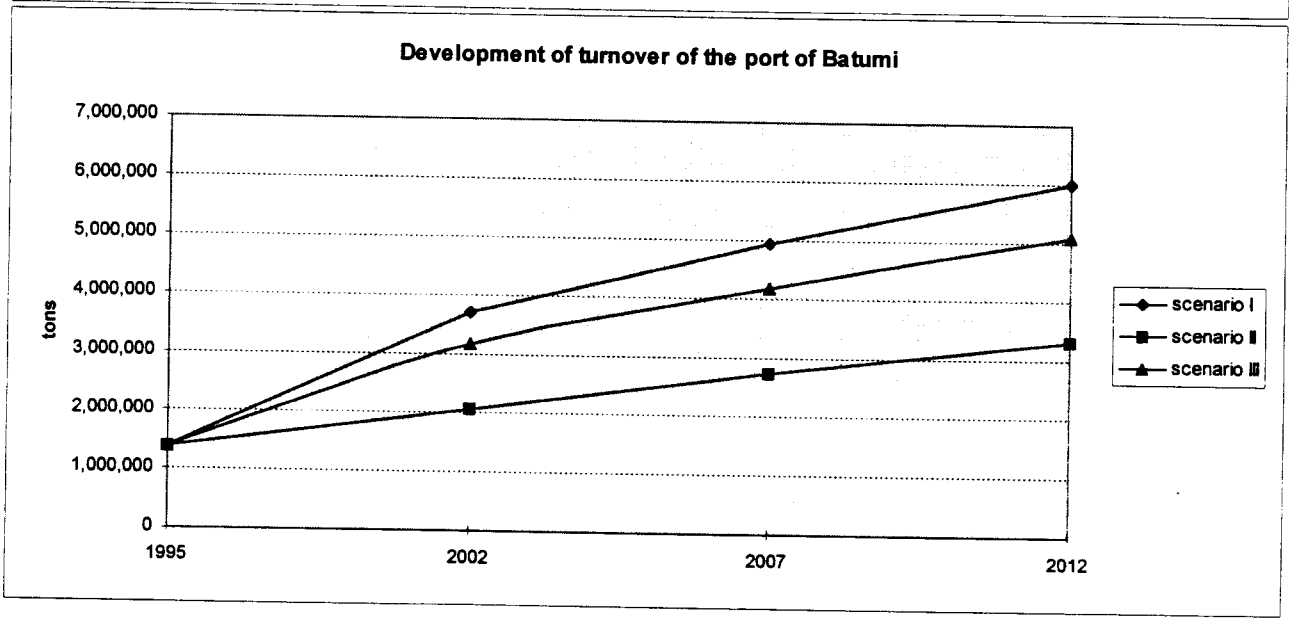
Therefore, a considerable share of the ports hinterland traffic is assumed to be carried out by rail. In scenario I about 83% of the transport volume (in- and outbound traffic of the ports) is transported by rail. In scenario II it is assumed, that the railway system is not developed with high priority. Therefore the railway transport has a share of about 70%. In the „probable" scenario III the railway share is about 80%.

Considering the different commodities, it is obvious, that bulk is mainly predestined for rail transport (about 80%). Oil products are almost completely transported by rail (98%). General cargo indicates by the nature of the commodities a higher share of road transport. The share of road transport for general cargo is in scenario I about 25%, in scenario II 40% and in scenario III 30%. The transport of container is by 70% carried out by rail in scenario I. Scenario II assumes a share of 56% for rail transport and in scenario III 34% of containers are transported by road.

The shares of railway transport for general cargo and containers seem to be, compared with statistical data of Western Europe, relatively optimistic. Considering the transport structure within the TRACECA region it is obvious, that Tbilisi is even today and to a much higher degree in future a hub (within a interregional/international hub and spoke system) for national and international freight traffic flows. Tbilisi has the important function of the consolidation and distribution of goods in north-east direction and east-west direction. In addition Tbilisi is the industrial centre of Georgia. Therefore, the use of block trains between the Georgian sea ports and Tbilisi is an economic solution for the transport of general cargo and container.

The detailed tables for the ports of Poti and Batumi indicate the following results. The turnover of the port of Poti increases in scenario I from 1995 with 1,778,000 tons per year up to 7,839,000 tons in the year 2012. In scenario II the turnover in 2012 is 4,311,600 tons and in scenario III 6,663,300 tons. The port of Batumi starts in the year 1995 with a turnover of 1,383,000 tons, the turnover increases up to the year 2012 to 6,010,900 tons in scenario I, 3,305,900 tons in scenario II and 5,109,200 tons in scenario III.




For the port of Poti the in- and outbound cargoes show a relation of about: 1.0 : 1.2 in the average. For the port of Batumi the in-/outbound relation is up to the year 2007 about 1.0 : 2.8, for the year 2012 1 : 2,1. The reason for the imbalance for Batumi is the large quantity of export of oil products.

It is assumed, that container are mainly transhipped by the port of Poti. For Batumi a small amount of container is forecasted. It is necessary to concentrate container traffic in one port for economic reasons (economies of scale for the transhipment and utilisation of facilities).

Considering the commodities transhipped by the ports, a certain kind of „division of labour" is visible. The main branch of Poti is the handling of bulk and container, Batumi has its main branch in export of oil products. With respect to general cargo both ports have shares of about 20 - 30% of in- and respectively outbound goods.

The tables with the detailed groups of commodities reflect the above assumptions made with respect to the future development of the different sectors of the economy.

The sensitivity of the results of the traffic forecast depend on the following governing factors:

- political development of the region
- economic development of the countries

- political priorities set for the rehabilitation of infrastructure
- competition of alternative transport corridors

The first three items are already discussed above. Unfavourable political and economic developments enforce the tendency, that scenario II („worst case") is the most likely reality of the future. The last item will be discussed in detail later when evaluating the route connections between TRACECA and the TEN. The TRACECA corridor has the obvious disadvantage, that the Caspian Sea and the Black Sea have to be crossed. Frequent transhipments within a transport chain result in longer transport times, risks of damage of the cargoes and additional costs. The transport of i.e. cotton from Uzbekistan could be transported via the railroad network directly to Europe or the TRACECA route. The requirements of the customer responsible for the transport order play the major role for the decision of the transport route. Therefore the comparison of competing transport corridors with respect to the relevant requirements make an evaluation of the TRACECA corridor possible.

# 2 Recommendation of the Most Viable Route Connections between TRACECA and the TEN

Basic data for simulation of flow of goods via the TEN
Scenario I (best case scenario)

| | | | |
|---|---|---|---|
| Selected kind of good: | technical equipment for oil industry in Azerbaijan (Baku) | | |
| Origin of good: | central Germany | | |
| Destination of good: | region of Baku/Azerbaijan | | |
| Transport: | in container | | |
| Volume: | 2002: | 10,000 t | 1,000 TEU |
| | 2007: | 20,000 t | 2,000 TEU |
| | 2012: | 25,000 t | 2,500 TEU |

**Transport chain**

Alternative I:
- railway transport via Russia to Baku

Alternative II:
- railway transport to Constanza (Romania)
- transport with container ship to Poti
- railway transport to Baku

| | | |
|---|---|---|
| Selected kind of good: | cotton | |
| Origin of good: | Uzbekistan | |
| Destination of good: | South America | |
| Transport: | bulk, alternative: transport with container | |
| Volume: | 2002: | 15,000 t |
| | 2007: | 20,000 t t |
| | 2012: | 25,000 t |

**Transport chain**

Alternative I:
- railway transport Tashkent port of St. Petersburg
- transport by sea ship to South America

Alternative II:
- railway transport to Turkmenbashi
- roro-ferry to Baku
- rail transport (or road transport) to the port of Batumi (via Tiblisi)
- transport by sea ship to South America

Alternative III:
- railway transport to Turkmenbashi
- ferry transport to Baku
- road transport via Tiblisi to the port of Mersin/Turkey
- transport by sea ship to South America

| | |
|---|---|
| Selected kind of good: | oil products |
| Origin of good: | Baku |
| Destination of good: | Spain (region of Madrid) |
| Transport: | liquid bulk |

Volume:

| | |
|---|---|
| 2002: | 10,0000 t |
| 2007: | 150,000 t |
| 2012: | 120,000 t |

**Transport chain**

Alternative I:
- railway transport via Ukrain to Madrid

Alternative II:
- railway transport Baku to Batumi
- transport by sea ship to Valencia (oil port ?),
- rail transport to the region of Madrid
- transport by sea ship to South America

Alternative III:
- road transport from Baku to Poti
- roro-ferry to Constanza
- road transport to Madrid

Alternative IV
- road transport from Baku via Tiblisi to the port of Mersin/Turkey
- transport by sea ship to Valencia (oil port ?),

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Tacis „Port Network Plan and Improvement Programme" Phase 3, Economic and Financial Evaluation Report - Baku April 1997

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# Volume II, Part 2

# Study on the Traffic Potential for the Rail Ferry Service between Poti (Georgia) and Iljichevsk (Ukraine)

## Report on a Potentiality Investigation

# Contents

# 1 Introduction and Executive Summary

Since some time there are urgent requests for ferry services on the Black Sea between the Ukraine and Georgia. These are voiced by international forwarders but also by transport and trade organisations from the Caucasian as well as from the Central Asian states.

As a consequence, last year the Ukrainian state shipping company UKRFERRY started a ferry service between Poti (Georgia) and Illiychevsk (Ukraine), although the superstructure for this service in both ports was either incomplete (Illiychevsk) or even non existent (Poti). The Port of Poti needs urgently a rail ramp and some connecting rail lines, while the Port of Illiychevsk needs to rehabilitate some of the superstructure for a safe and efficient ferry services on this traffic relation. Both ports need certain cargo handling equipment and facilities to handle road trucks and trailers.

In order to prove the economic profitability of the investment needed in both ports, all available data and information were collected and summarised in this report. This report is mainly based on the findings and traffic forecasts of a large number of Tacis and TRACECA reports, backed up by literature search and on-site interviews. The main findings of this report prove that investments in the superstructure that is needed for a rail/road ferry service between the two Black Sea ports is useful. The ferry connection will close a gap in the traffic infrastructure system of the TRACECA-States and link the TRACECA Corridor with the Trans European Networks. The investment of 15 million ECU is expected to have a high rate of return to the economies, which make use of the ferry connection.

The main findings of this report are as follows:

- The ports of Poti and Illiychevsk used to play an important role in the ports system of Soviet Union. In 1990, the total cargo turnover in Poti was nearly 4 million tonnes and in Illiychevsk the throughput was about 13 million tonnes.
- The port infrastructure of Poti is mainly dedicated to bulk cargo, such as ore, coal, metal, cotton, grain etc.. Since 1992, there is a rapid containerisation process in progress.
- In 1995, total cargo turnover in Poti reached about 1.8 million tonnes.
- Main destinations for cargo from Poti were ports at the Black Sea; cargo for Poti came mainly from Black Sea and other European countries.
- In the future, Poti will increasingly take on the role of a main gateway for Caucasian and Central Asian countries.
- Poti's traffic connections with the hinterland consist mainly of the Caucasian Railway line, which connects Baku at the Caspian Sea with the Georgian Ports of Batumi and Poti at the Black Sea. The principal road in Georgia, the „Magisterial", is connected with Poti by an access road. The main road is connected with Baku, too.
- A rail ferry service in the Caspian Sea between Baku and Turkmenistan connects the Caucasian transport network with the Central Asian network.
- The hinterland of Poti can be identified as the states of the TRACECA-community in the Caucasus and in Central Asia.
- The facilities in the port of Illiychevsk are dedicated for the handling of bulk, general cargo, containers and ro-ro cargo, both road and rail.

- In the year 1994, total cargo turnover was 8.7 million tonnes. The percentage of port infra- and suprastructure, that is presently unoccupied, is relatively high.
- Nearly 44% of the total cargo turnover of Illiychevsk is transit cargo for Moldavia, Belarussia and Russia.
- The maritime connections of the port of Illiychevsk are spread world wide.
- The transport network in the Ukraine is dominated by the railway system; Illiychevsk is well connected with this system.
- The highways in the Ukraine often run parallel to the railway tracks; the road density is less than the density of the railway system; Illiychevsk is well connected with the highway system, too.
- The hinterland of Illiychevsk can be described as the Ukraine, Moldavia, Belarussia and parts of South-West-Russia, Moscow included.
- Total cargo movements between the hinterlands of both ports concerned reached a volume of about 15 million tonnes in the years 1995/96.
- About 25% of total trade between the Caucasian/Central Asian states and Ukraine/Moldavia consist of bulk cargo, which is not normally transported by ferries. The trade of Belarussia and parts of Russia with the hinterland of Poti contains more than 61% bulk. The remainder - about 6 million tonnes - can be considered as potential cargo for the ferry line.
- The potential cargo for the ferry line is nowadays mainly transported by rail (more than 90%); between 2% and 7% is carried by truck. The remainder goes by sea and other modes. It is mainly the railway and truck load that is assumed to be potential ferry cargo.
- The cargo potential for ferries will grow from about 6 million tonnes in 1995 to about 10 million tonnes in 2010. As a consequence of structural change and the move to market economies the truck load potential will grow much faster than the railway load potential
- In order to prove the economic viability of the investment in port suprastructure in Poti and Illiychevsk, the potential transport costs savings, that could be attained, were calculated on the basis of the 1995 cargo flows. The main findings of this calculation are as follows:

  If 5% of the total cargo potential for truck and railway transport between the hinterlands of both ports were transported via the ferry connection, the total transport costs savings for one year would be

  **2,8 million ECU**

  That means that the initial investment would be repaid in just over 6 years.

For alternative exploitation quotas, the total annual transportation savings would be:

| |
|---|
| 10% = 5,6 million ECU |
| 15% = 8,4 million ECU |
| 20% = 11,2 million ECU |
| 30% = 16,8 million ECU |
| 40% = 22,4 million ECU |
| 50% = 28,0 million ECU |
| 100% = 56,0 million ECU |

These figures show that the investment of 15 million ECU for rail/road ferry superstructure in Poti and Illiychevsk will be amortised by transportation cost savings within one year, when 27% of the total potential cargo volume would be transported by ferry instead of by railways and trucks without the use of a shipping link.

# 2. The Ports of Poti and Illiychevsk in the TRACECA Transport Network

There were about 70 recognised ports in the former Soviet Union, of which 26 ports were classed as major ports. The ports of Poti and Iliychevsk played an important role in the liege of the major ports, which all together handled over half of the former USSRs foreign trade. In 1990, the total cargo turnover in Poti was 3.9 million tonnes and inIliychevsk 12.9 million tonnes, i.e. nearly 5% of total cargo of all FSU ports.

Riga at the Baltic Sea and Iliychevsk at the Black Sea used to be the only ports in the USSR with modern container facilities. In the year 1990, more than 1 million containers were handled in the port of Illiychevsk. Poti, in contrast, used to be a port for oil and dry bulk. In the meantime, however, there is a rapid containerisation process in progress in Poti: import and export containers increased from 230 TEU in 1992 to about 18,000 TEU in 1996.

The following maps show the ferry connection between both ports (Map 1) and the main Ukrainian and Georgian ports and their cargo turnover in 1993/95 (Map 2).

## 2.1 Main Characteristics of the Port of Poti

### 2.1.1 Infrastructure and Turnover

The characteristics of the Port of Poti are described in Table 1:

Table 1: Facilities in the Seaport of Poti

Source:

TRACECA: Regional Traffic Database and Forecasting Model

Table 2 shows the performance of the Port of Poti in 1995:

| | Depth (m) | Square (m²) | Length (m) | Amount | Capacity p.a. 1.000 t |
|---|---|---|---|---|---|
| Access canal | 13,00 | | 1.910 | | |
| Port water area | | 536.000 | | | |
| General cargo pier: | | | | 4 | |
| for: Ore | 12,20 | 15.000 | 183 | | 1.500 |
| metal | 8,50 | 17.000 | 215 | | 510 |
| coal | 8,50 | 5.290 | 173 | | 1.530 |
| coal | 8,50 | 5.290 | 173 | | 1.530 |
| Berth for liquid bulks: | 12,50 | 15.100 | 200 | 1 | 1.700 |
| Multiputpose terminals | | | | 4 | |
| for: chemical goods | 9,75 | 1.600 | 220 | | 240 |
| cotton | 8,00 | 2.600 | 130 | | 220 |
| grain | 9,75 | 13.400 | 220 | | 3.000 |
| grain | 8,00 | 13.400 | 180 | | 3.000 |
| Specialised piers: | | | | 5 | |
| for containers | 8,25 | 22.100 | 170 | | 300 |
| for feet of port | 8,00 | 5.000 | 180 | | 300 |

for: Progress Report II; Appendices March 1997
WS Atkins International Ltd.

Table 2: Cargo turnover in Poti 1995

| | Cargo appelation | Export | Import |
|---|---|---|---|
| 1. | Total cargo turnover (1.000 tons) | 389,3 | 1387,7 |
| | of which | | |
| 1.1 | Bulk cargo | 170,0 | 185,8 |
| | sugar | | 18,5 |
| | differentores, fluxes | 132,6 | 50,2 |
| | coal, coke | | 4,0 |
| | cement | 0,6 | |
| | construction cargo | 1,7 | 6,4 |
| | chemical cargo | | 1,5 |
| | flour | | 75,7 |
| | others | 35,1 | 29,5 |
| 1.2 | Grain cargo in bulk | | 625,0 |
| 1.3 | Timber cargo | 1,1 | |
| 1.4 | General cargo | 2,6 | 18,7 |
| 1.5 | Other piece cargo of which | 52,7 | 5,2 |
| | machinery, equipment | 4,4 | 3,1 |
| | different metals | 48,3 | 2,1 |
| 1.6 | Petroleum products | 145,9 | 474,4 |
| 2. | Amount of large tonnage container 20 & 40 foot units | 1760/630 | 2817/945 |

Source: Forwarding-Multimodal Transport Systems on the TRACECA Route Final Report: May 1997

Information about the maritime traffic connections with other ports can be seen from the following figures:
In the third quarter of 1995, 18 vessels were loaded in Poti, mainly with metal, scrap metal, containers, pipes and gasoline. The ports of destination of these vessels were located in

1 x Rumania
1 x Ukraine
2 x Greece
6 x Bulgaria
8 x Turkey

In the same period 83 vessels were unloaded. They carried mainly gasoline, sugar, general cargo, containers, motor equipment and grain; their ports of departure were located in:

20 x Rumania
11 x Greece
25 x Bulgaria
23 x Turkey
1 x USA
2 x Italy
1 x Belgium.

These figures show that in the observation period no main traffic relations were served with the Ukraine. In Batumi, the other important port of Georgia, three vessels unloaded and 9 ships loaded cargo from/to Ukrainian ports; they brought mineral water, tea and laurel leaf from Ukraine and loaded mainly barley, sugar and flower for Ukrainian needs.

### 2.1.2 Traffic Connections with the Hinterland:

#### Railway:

The port of Poti is located at the East Coast of the Black Sea. There are two main traffic links with the hinterland of the port.

The seaport of Poti is connected with its hinterland in the east mainly by the Trans-Caucasian Railway line from Baku at the Caspian Sea, via Tbilisi to Poti and Batumi. This railway line is by far the most important axis for Poti at the moment. The Georgian Railways conduct about 75% of their transports in the corridor Batumi/Poti-Tbilisi. The significance of this line has even increased because of the blocking of other important international links, due to political tensions in the region.

The main line linking Baku with Poti is of particular interest for freight movements between Central Asia and Europe. The line starts at the Caspian sea port of Baku and goes via Beyuk Kyacik (border station) to Samtredia (250 km) and to Tbilisi. From there it carries on to Samtredia, were two branch lines connect with Batumi and Poti. The entire link is electrified and double track to Samtredia and then single track to Poti (65 km)

The Trans-Caucasian Railway line is connected to the Russian rail system on the Black Sea, to the ports of Sotchi and Tuapse and further to the Russian rail system via Krasnodar. From Tbilisi via Armenia the system is also connected to the Turkish rail system.

The Baku port rail terminal is connected with the Turkmenbashi rail terminal by ferry, crossing the Caspian Sea. The port rail terminal at the Eastern Coast in Turkmenbashi is linked to the Central Asian republics. The system is also linked to the Russian rail system via Kazakhstan, providing connections to the Russian Far East and also to the People's Republic of China.

Road:

The principal road in Georgia, the „Magisterial" runs from the Azeri border through Tbilisi to the Black Sea (Sukhumi). There is a trifurcating system at Samtredia, close to the Black Sea, where two roads provide access to Poti and Batumi. The road runs along the valley between the two ranges of the Caucasus. The pavement is acceptable. The secondary roads appear to be in poor condition. In Azerbaijan, there is a main connection between Baku and Georgia, passing Evlakh and Gandja to the Magisterial.

The port of Turkmenbashi is connected with is hinterland by different roads to Kazakhstan, Uzbekistan, Tadjikistan and Kirghistan.

The major Inter-Central-Asian Highways are:

- H34 Tashkent - Dushanbe
- H37 Turkmenbashi - Ashgabat - Mary -Cardzaev - Bukhara - Samarkand
- H39 Almaty - Bishkek - Shikment - Tashkent -Samarkand - Termez
- H41 Bishkek - Djalai - Abad - Uzbekistan - Osh the Pamir - Dushanbe - Termez

Via the ferry connection between Turkmenbashi and Baku and via the Caucasian route, the port of Poti is, thus, well connected with the Central Asian transport system.

## 2.2 Main Characteristics of the Port of Illiychevsk

### 2.2.1 Infrastructure and Turnover

The infrastructural characteristics of the seaport of Illiychevsk are listed in Table 3:

Table 3: Facilities in the port of Ilyichevsk

Source: Improvement To Port/Land Transport interfaces In The Ports Of The Black Sea; A-Port/ Land Transport Interface Action; A,2-Simulation of good Flows Final Report; November 1995 - Sogelerg Ingenierie

| Facilities in the Seaport Ilyichesvk | | | |
|---|---|---|---|
| Quay No. | Dedication | Draught (m) | Capacity p.a. 1.000 t |
| 2 | Matal products | 11,5 | 400 |
| 3,4 | Miscellaneous | 11,5 | only Quay 3 400 |
| 5,6 | Container | 11,5 | 250 |
| 7,8,9 | Metal products | 11,5 | 800 |
| 10 | Cereals | 11,5 | |
| 11,12,14,15,16 | Miscellaneous | 11,5 | 220 |
| 17 | Liquid bulk | 11,5 | 700 |
| 19 | Bulk fertilizer | 11,5 | 500 |
| 20,21,22 | Miscellaneous | 11,5 | 220 |
| 26,27 | Ro-Ro in wagon | 9,6 | 2.400 |
| 28 | Ro-Ro | 9,6 | 100 |

The amount of cargo turnover in the years 1993/94 is shown in table 4.

Table 4: Cargo turnover in Ilyichevsk 1993/94

| Type of cargo | | Turnover (1.000 t) |
|---|---|---|
| Container | | 292,9 |
| Grain | | 75,2 |
| Chlorinated Potassium | | 765,4 |
| Vegetable Oil | | 246,6 |
| Ro-Ro-Cargo (railroad) | | 1648,9 |
| Sand | | 366,9 |
| General Cargo | | 5145,0 |
| Total 1994 | | 8564,7 |
| Total 1993 | | 8661,1 |
| of which: | Ukrainian imports | 1234,0 |
| | Ukrainian exports | 3189,0 |
| | CIS Exports | 3656,0 |
| | CIS Imports | 109,0 |
| | local Exports | 431,0 |

Source: Compare Table 3

As Table 4 shows, nearly 44% of total turnover was transit cargo, i.e. mainly CIS-Exports. In 1993, this land transit cargo came mainly from or went to the Russia Central Region, Belarussia, Russia Urals, Russia Northwest, Russia Volga Region, Russia East-Siberia and Russia Volgo-Vyatka.

The maritime connections in the same year (1993) ware dominated by countries like Bulgaria, Vietnam, Cuba, Egypt, Japan, Algeria, Angola, Yemen, Libya, et al.

### 2.2.2 Traffic Connections with the Hinterland:

Railway:

The network includes the following main trunk lines:

- Odessa-Lvov line, providing access to the cities Ternopil and Khmelnitsky, parallel to the Moldavian border;
- Odessa-Kiev line, western branch, running along the preceding line as far as Jmernika and then branching off to Vinnista, Kiev and the Russian border;
- Odessa-Kiev line, eastern branch, providing access to Kirovograd;

- Odessa, Nikolayev, Kherson, Feodosia, Kerch line;
- The especially densely meshed network around Dniepropetrovsk and Donetsk, which branches into the lines mentioned above and provides access to the ports in the Sea of Azov;
- Access to Reni via Moldavia;
- The coastal line Yuzhny, Odessa, Illiychevsk extending towards Belgorod-Dnievstrosky and Izmail.

Road:

The road network includes the following main trunk lines:

- North-South trunk line, E93-R20, linking Odessa, Kiev, Chernigov and Belarus;
- North-South trunk line, 593-R2, linking Simferopol, Melitopol, Zaporozhye, Dniepropetrovsk and Kharkov from Russia (Kursk, etc.);
- East-West cross trunk road, E40-R19, taken from Kiev, connecting Kharkov, the northern outskirts of Donetsk city and the Russian border;
- East-West cross trunk road, R267, between Uman and Lvov;
- The R23, East-West cross trunk connecting Odessa, Nikolayev, Mariupol, Melitopol and Berdiansk;
- The Odessa-Kichinev link via the E581-R1.

The existing road and railway networks connect these ports very well with their hinterlands.

## 2.3 The Hinterlands of Poti and Illiychevsk

The hinterland of a port can normally be defined by the region, where the cargo, which is handled in the port, comes from or where it goes to. As normally many kinds of cargo are transferred in ports, the hinterland cannot be marked off precisely; the hinterland for cargo, which is transported by truck, can differ from the hinterland for railway cargo due to different infrastructure equipment for road and railway transportation, for instance. A port, for example, in which only oil is loaded/unloaded, has a precisely delineated hinterland. Multi-purpose ports, however, have differentiated hinterlands in relation to the various kinds of cargo, which they handle. That is why the hinterlands of Poti and Illiychevsk can only roughly be defined.

In Illiychevsk, cargo mainly comes from or goes to the Ukraine, Moldavia, Belarussia, Russia Central Region, Russia Northwest, Russia Volga Region, Russia Volga-Vyarka and Russia Urals. The main hinterland of the port is shown in Map 3. In Poti, cargo is loaded and unloaded, which comes mainly from or goes to states, which are connected by the TRACECA-Corridor; i.e. Georgia, Armenia, Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Tadjikistan and Kirghistan. The hinterland of Poti roughly can be identified by these eight states, which are shown in Map 4.

# 3 Freight Movements between the Hinterland of Poti and the Hinterland of Illiychevsk

## 3.1 Total Cargo

The hinterlands of the ports Poti and Iliychevsk were described in the previous chapter. In the following chapter, total freight movements between both regions will be shown, in order to estimate the freight potential for a ferry link between the two ports.

Table 5 shows that in the year 1995 about 1.8 million tonnes of cargo were traded between the hinterland of Poti and Ukraine and Moldavia. About 38 million tonnes were transported between the Caucasian and the Central Asian states and UkraineMoldavia as well as RussiaBelarussia.

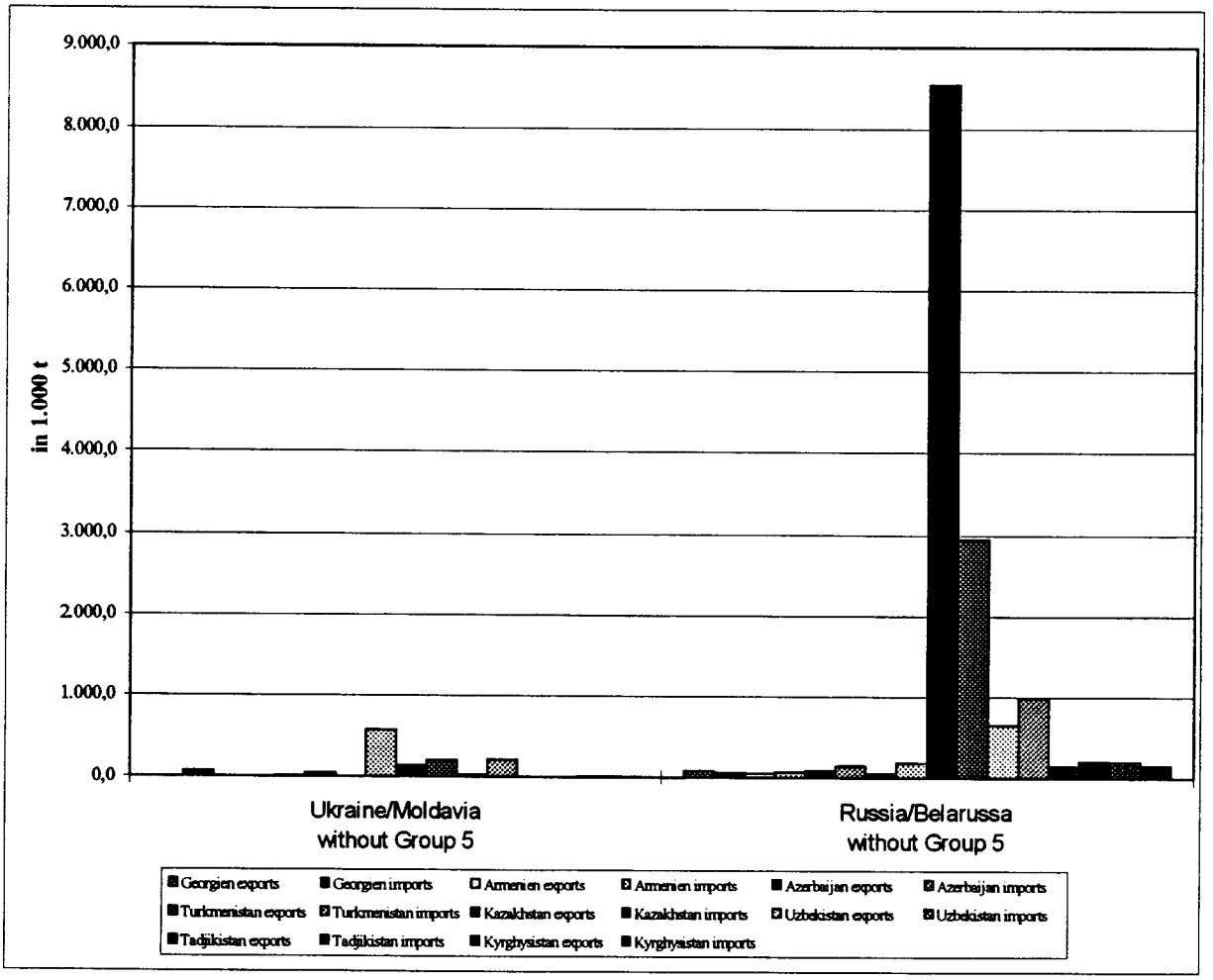
These last figures describe total trade between both regions. The hinterland of Iliychevsk however, covers only parts of Russia, mainly the South West of Russia, as it was shown in Map 3. That is why only a part of the total of 38 million tonnes came from or went to the hinterland ofIiychevsk.

The available statistical data does not allow a precise separation of Russian cargo flows from /to the hinterland of Iliychevsk and other Russian regions, not covered by the hinterland of the Ukrainian port. That is why the part of the total traffic, which comes from/goes to the hinterland dfiychevsk has to be estimated.

Regional economic activity in Russia is partly concentrated around Moscow and Rostov. Both centres of economic activity belong to the hinterland of the port of Illiychevsk. Therefore, at least one third of the Russian and Belarussian trade with the Caucasus and Central Asia is estimated to originate from or can be dedicated to the hinterland ofIlliychevsk, which was defined above. This estimation is cautious, it should not be too high.

## Table 5: Cargo movements between the hinterlands of the ports of Poti and Ilyic

| Hinterland Poti | | Ukraine/Moldavia | | | Russia/Belarussa | | |
|---|---|---|---|---|---|---|---|
| | | Total | Groupe 5 | Ukraine/Moldavia without Group 5 | Total | Groupe 5 | Russia/Belarussa without Group 5 |
| Georgien | exports | 4,3 | 0,9 | 3,4 | 101,1 | 12,3 | 88,8 |
| Georgien | imports | 91,6 | 20,4 | 71,2 | 97,4 | 35,8 | 61,6 |
| Armenien | exports | 8,3 | 0,0 | 8,3 | 66,6 | 10,1 | 56,5 |
| Armenien | imports | 8,2 | 1,6 | 6,6 | 90,5 | 13,8 | 76,7 |
| Azerbaijan | exports | 133,9 | 121,6 | 12,3 | 263,8 | 172,5 | 91,3 |
| Azerbaijan | imports | 57,9 | 3,5 | 54,4 | 170,3 | 20,7 | 149,6 |
| Turkmenistan | exports | 13,2 | 11,0 | 2,3 | 395,8 | 336,1 | 59,7 |
| Turkmenistan | imports | 577,4 | 1,5 | 575,9 | 198,7 | 14,0 | 184,7 |
| Kazakhstan | exports | 352,7 | 216,0 | 136,7 | 26.754,8 | 18.215,7 | 8.539,1 |
| Kazakhstan | imports | 228,7 | 14,7 | 214,0 | 6.871,3 | 3.919,8 | 2.951,5 |
| Uzbekistan | exports | 74,6 | 48,8 | 25,8 | 700,1 | 46,8 | 653,3 |
| Uzbekistan | imports | 222,7 | 3,4 | 219,3 | 1.101,0 | 114,4 | 986,6 |
| Tadjikistan | exports | 7,7 | 0,0 | 7,7 | 150,6 | 1,0 | 149,6 |
| Tadjikistan | imports | 6,5 | 0,4 | 6,1 | 524,9 | 311,2 | 213,7 |
| Kyrghysistan | exports | 10,0 | 0,0 | 10,0 | 217,8 | 15,4 | 202,4 |
| Kyrghysistan | imports | 14,0 | 0,0 | 14,0 | 256,8 | 99,0 | 157,8 |
| | | **1.811,7** | **443,7** | **1.368,0** | **37.961,5** | **23.338,6** | **14.622,9** |




Source: TRACECA Programme: Regional traffic database and forecasting model, Progress Report: Phase 1A (Revised), December 1996

## 3.2 Cargo Potential for a Rail Ferry Link between Poti and Illiychevsk

Table 5 shows the total export/import cargo between the regions concerned. All figures include bulk cargoes, such as coal, coke, oil and ore commodities, which are normally not transported by ferries. Total cargo movement, thus, has to be calculated without bulk cargo. Available statistical traffic data are differentiated into 21 commodity groups. Commodity group 5 contains coal, coke, oil, ore, oil products, diesel fuel, gasoline, petroleum, petroleum products, salt and water. Figures of Table 5 show that about 25% of the total trade between the Caucasian /Central Asian States and Ukraine /Moldavia consists of Group 5 cargo; the trade with Russia/Belarussia contains even more, over 61% of these commodities are bulk cargoes. The rest, about 6.2 million tonnes [i.e. 14,622 x 0.3 + 1,368 thousand tonnes] can be regarded as the 1995/96 cargo potential for a rail ferry link betweenIliychevsk and Poti.

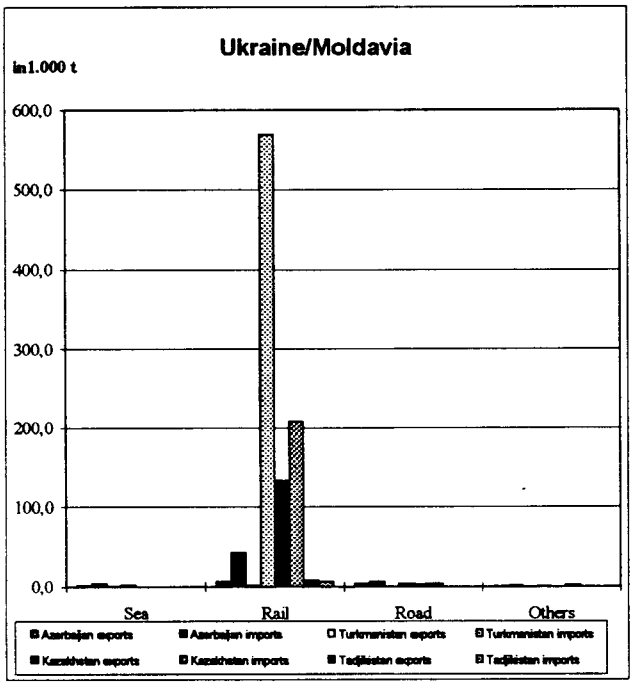
## 3.3 Current Modal Split of Cargo Potential

The statistical data concerning the modal split of cargo movements between the hinterland of the ports of Poti and Iliychevsk are unfortunately fragmentary. Only for Azerbaijan, Turkmenistan, Kazakhstan and Tadjikistan is information available (see Table 6). The available data show, that more than 90% of the total cargo movements are transported by rail; less than 2% are transported by sea, between 2% and 7% are moved by trucks and the rest is transported by other modes.

Assuming similar modal splits for the remaining countries Georgia, Armenia, Uzbekistan and Kirghistan, a total of about 450,000 tonnes are transported by truck, while 5.4 million tonnes are moved by railways between the hinterlands of both ports. That means that in the year 1995/96, nearly six million tonnes of cargo can be identified as potential cargo load for a rail/road ferry link between Poti and Iliychevsk.

## Table 6: Modal split of cargo potential for the ferry link

| Hinterland Poti | | Ukraine/Moldavia Sea | Rail | Road | Others | Russia/Belarussa Sea | Rail | Road | Others |
|---|---|---|---|---|---|---|---|---|---|
| **Azerbaijan** | exports | 1,3 | 6,2 | 4,1 | 0,7 | 0,6 | 69,3 | 20,0 | 1,4 |
| **Azerbaijan** | imports | 4,1 | 42,9 | 6,2 | 1,2 | 41,8 | 88,8 | 16,9 | 2,1 |
| **Turkmenistan** | exports | 1,1 | 1,2 | 0,0 | 0,0 | 10,0 | 47,2 | 2,5 | 0,0 |
| **Turkmenistan** | imports | 2,5 | 568,5 | 3,8 | 1,1 | 3,4 | 141,5 | 39,4 | 0,4 |
| **Kazakhstan** | exports | 0,0 | 133,4 | 3,2 | 0,1 | 6,2 | 7.837,3 | 541,7 | 153,5 |
| **Kazakhstan** | imports | 0,0 | 208,1 | 3,5 | 2,4 | 0,8 | 2.730,7 | 174,1 | 45,9 |
| **Tadjikistan** | exports | 0,0 | 7,7 | 0,0 | 0,0 | 0,0 | 149,2 | 0,0 | 0,4 |
| **Tadjikistan** | imports | 0,0 | 6,1 | 0,0 | 0,0 | 0,0 | 213,0 | 0,3 | 0,4 |
| | | **9,0** | **974,1** | **20,8** | **5,5** | **62,8** | **11.277,0** | **794,9** | **204,1** |





Source: See Table 5

It is assumed that truck load tends to switch easier to a new ferry connection than railway load. Nevertheless, main forwarders from the hinterland of both ports already asked for information about rail transport facilities of the ferry connection; e.g. for cotton, grain, sugar, alcohol et al.

# 4 Development of Transport Demand in the Hinterlands of Poti and Iliychevsk

Until 1990, both hinterlands were integrated into the global transport system of the Soviet Union, which was geared to move huge volumes of bulk commodities among centralised production facilities over long distances, according to centralised and fairly rigid annual plans. Given the long distances within the Soviet Union, long and medium distance freight transport relied primarily on the railways, and, to a far lesser extent, on inland waterways. Road transport was used primarily for short trips, as a feeder to the railway and for distribution of goods within urban areas.

The data introduced in Chapter 3 for the hinterlands of the ports show that the dominant position of the railway in long distance traffic did not change till now.

When looking to the future, several major trends will change dramatically the pattern of freight transport in the hinterlands of the ports:

Structural change and the move to market economies will eliminate uneconomic, obsolete, and ecologically harmful industrial plants. A move from state owned industrial giants to smaller consumer-oriented firms will increase the shift from rail to road. The assumption is that the change to a market-based economy will cause a shift towards lighter industrial and consumer goods.

In a privatised, deregulated, market-oriented environment, road transport increasingly will become the mode of choice for shippers of high value or time-sensitive commodities, since road transport offers faster and more flexible service than railways.

Several factors affect the pace and size of the shift of freight traffic from the rail system to road transport:

- the speed at which the economies recover and become more market-oriented,
- the rate of growth of new business that require time and service-sensitive transports for goods that never will be shipped by rail,
- the speed at which road transport services are privatised and pushed by the drive for self sufficiency to provide flexible, fast and reliable services.

The dynamics of the shift from rail to road, than, depend on the onset and vigour of the economic growth of the states concerned. Several forecasts for different Eastern European States assume the ratio of transport demand to GDP will be 1 to 1 for rail and road transport until the economy begins to grow; thereafter, it is expected that transport demand will grow at a 1.25 to 1 ratio, with a general shift to road. That means, the elasticity is about 1.25.

For the purpose of this study, these general trends are used to estimate the future development for cargo potentials of the rail ferry link on the Black Sea between Poti and Iliychevsk.

For forecast purposes, in this study the thesis is, that the economic future of the states in the hinterland of the ports concerned is already indicated to a large extent by how far they have progressed in the process of transition, i.e. the creation of general conditions that allow for private-sector activities.

The categorising of the countries is based to a large extent on studies and work carried out by EBRD[1]. It assessed the countries according to different criteria on a scale of 1= very poor to 4= very good. Recent experience and updated knowledge about single countries was used to correct the EBRD estimates. The results are shown in Table 7. The good positions of Azerbaijan and Turkmenistan in the ranking list are a result of the good prospects of the oil and gas industries in these countries.

The expected growth rates, which are listed in Table 7, are deduced from research work from Prognos[2]. Based on the global elasticity of transport demand (1.25) in relation to GDP, the annual growth rate of transport demand for each country is calculated. These figures are listed in Table 7, too.

Table 7: Assessment of the position in the transition process and expected average growth rates of GDP and transport demand in % p.a. 1995 - 2010

7: Assessment of the position in the transition process and expected average growth rates of GDP in % p.a. 1995 - 2010

| Country | GDP1993 (Billion US$) | Average position | Expected growth rates (% p.a.) till 2010 | | total growth of transport demand in % 1995-2010 |
|---|---|---|---|---|---|
| 1. Hinterland of Poti | | | GDP | transport demand | |
| Armenien | 2,5 | 1,6 | 1,0 | 1,25 | 20,5 |
| Azerbaijan | 4,4 | 3,5 | 3,5 | 4,40 | 90,0 |
| Georgien | 2,8 | 1,3 | 0,5 | 0,60 | 10,0 |
| Kazakhstan | 24,9 | 1,5 | 1,0 | 1,25 | 20,5 |
| Kyrghysistan | 3,1 | 2,4 | 4,0 | 5,00 | 108,0 |
| Tadjikistan | 2,3 | 1,5 | 1,0 | 1,25 | 20,5 |
| Turkmenistan | 5,3 | 3,5 | 2,5 | 3,10 | 56,0 |
| Uzbekistan | 17,8 | 1,8 | 2,5 | 3,10 | 56,0 |
| Average | | | 1,9 | 2,40 | ./. |
| 2. Hinterland of Ilyichevsk | | | | | |
| Ukraine | 81,4 | 1,3 | 0,5 | 0,60 | 10,0 |
| Moldavia | 5,4 | 1,9 | 2,5 | 3,10 | 56,0 |
| Russia | 329,1 | 2,3 | 3,5 | 4,40 | 90,0 |
| Belarussia | 27,3 | 1,5 | 1,0 | 1,25 | 20,5 |
| Average | | | 2,8 | 3,50 | ./. |

Source: Prognos: Strukturdatenprognose 2015 für den Bundesminister für Verkehr, Bas
EBRD: Transition report 1996; Infrastructure and savings; London 1996
Own calculations

The calculations show that overall transport demand in the countries in the hinterland of the ports will grow with an annual rate between 0.6% and 5% p.a.. The weighted average (the GDP was used as weighing factor) was calculated as 2.4 for the hinterland of Poti and as 3.5 for the hinterland dfliychevsk.

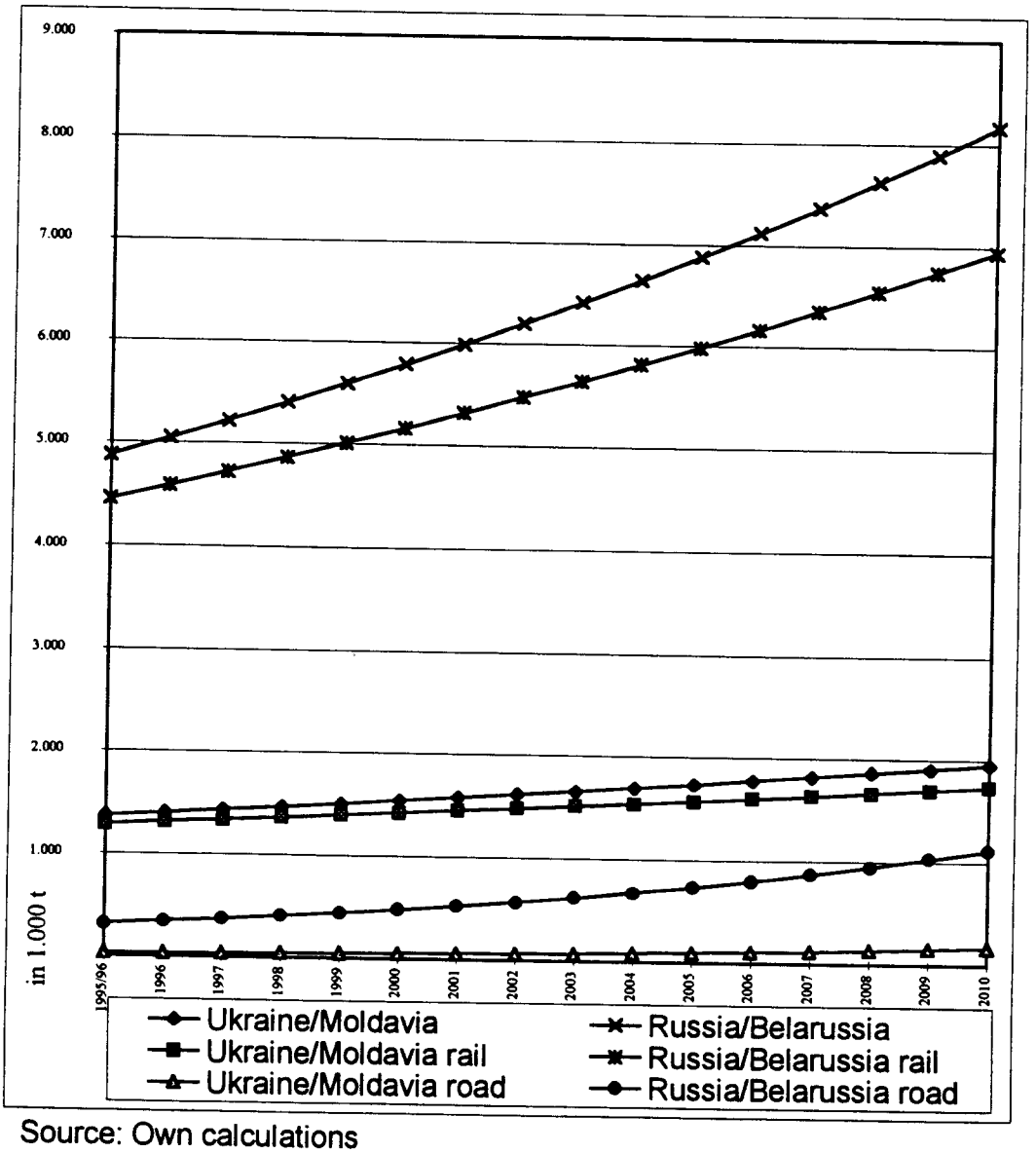
These growth rates were used to calculate the development of cargo potential for the ferry connection concerned.

[1] EBRD: Transition report 1996

[2] Prognos: Strukturdatenprognose

## Table 8: Development of cargo potential for ferry-transportation between Ilyichevsk and Poti

| | Cargo potential (1.000 t) | | | |
|---|---|---|---|---|
| | 1995/96 | 2000 | 2010 | annual growth rate 1995-2010 |
| Ukraine/Moldavia | 1.368 | 1.540 | 1.952 | 2,4% |
| of which: | | | | |
| rail | 1.286 | 1.420 | 1.731 | 2,0% |
| road | 27 | 50 | 167 | 12,8% |
| Russia/Belarussia | 4.874 | 5.789 | 8.166 | 3,5% |
| of which: | | | | |
| rail | 4.454 | 5.163 | 6.939 | 3,0% |
| road | 312 | 478 | 1.118 | 8,9% |




Source: Own calculations

The figures are calculated by overall annual growth rates, which were worked out above. The modal distribution, however, was found by calculating a slightly lower growth rate for rail cargo and a corresponding higher rate for truck cargo.

The results of these forecasts show a truck load potential which grows from nearly 350.000 tonnes in 1995 to about 1.2 million tonnes in 2010; the railway load potential will reach a volume of nearly 8.8 million tonnes in the year 2010.

# 5 Economics of a Rail/Road Ferry Link between Iliychevsk and Poti

The rail distance between Poti in Georgia and Illiychevsk (Ukraine) through the Russian Federation crossing Krasnodar and Rostov-on-Don is about 1,900 km. Trucks have to run about 1,800 km to get from Poti through the Russian Federation to Illiychevsk. Both, railways as well as trucks, must choose the routes lying north of the Azov Sea, because the ferry connecting the Crimea Peninsular with the Russian Federation at Kerc is not in operation.

The shipping distance, however, between Poti and Illiychevsk is only about 1,050 km. The distance difference, thus, for railways is about 850 km, for trucks about 750 km (see Map 5). The cargo, however, from the hinterland of Illiychevsk is not the cargo from/to Illiychevsk. Assuming Kiev as a node, there is another distance difference of about 450 km to take into account in favour of the ferry relation, which raises the distance difference for rail transport to about 1,300 km; for road transport to about 1,200 km.

In order to calculate a monetary value for the savings, which can be realised by superstructure investment in the ports of Poti andIlliychevsk, the following data have to be taken into account:
The main findings of these calculations are given in Table 9 (overleaf).

| | | |
|---|---|---|
| ferry distance: | Poti - Ilyichevsk | 1.050 km |
| road distance: | Ilyichevsk - Kiev | 500 km |
| railway distance: | Ilyichevsk - Kiev | 500 km |
| truck distance: | Rostov - Kiev | 960 km |
| railway distance: | Rostov - Kiev | 1.000 km |
| | | |
| distance by road only: | Poti - Kiev | 1.840 km |
| distance by railway only: | Poti - Kiev | 1.900 km |
| distance by road and ferry: | Poti - Kiev | 1.550 km |
| distance by railway and ferr | Poti - Kiev | 1.600 km |
| | | |
| cost of transportation by truck | | 0,050 ECU/tkm |
| cost of transportation by railway | | 0,015 ECU/tkm |
| cost of transportation by ferry: (incl.handling) | | 0,013 ECU/tkm |
| cargo potential for road-ferry transportation | | 350.000 tons |
| cargo potential for railway transportation | | 5.740.000 tons |

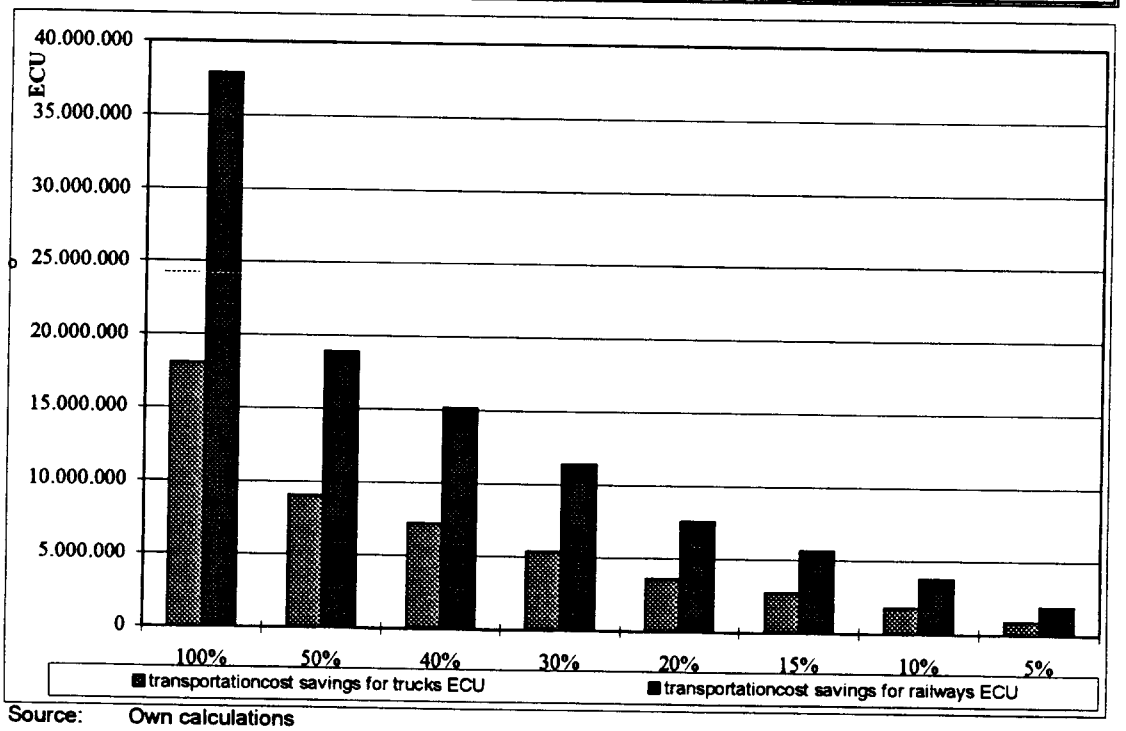
These figures show, that, because of lower transportation costs per tkm considerable savings can be realised when a ferry link between Poti andIlliychevsk is in operation.

For an investment of 15 million ECU in harbour related superstructure for a combined rail and road ferry service in both ports, about 27% of the total cargo potential has to be transported by the ferry service, for the savings to equal the costs of the new superstructure within one year.

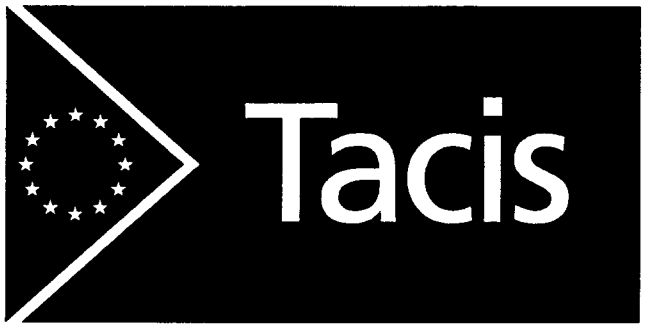
**Table 9: Calculation of transportcost savings (ECU)**

| cargo volume in 1.000 t for trucks | Exploitation quota | total transportation costs ECU | transportation costs ferry ECU | transportation costs road ECU | total transportation costs ECU | transportation cost savings for trucks ECU |
|---|---|---|---|---|---|---|
| 339,0 | 100% | 31.188.000 | 4.627.350 | 8.475.000 | 13.102.350 | 18.085.650 |
| 169,5 | 50% | 15.594.000 | 2.313.675 | 4.237.500 | 6.551.175 | 9.042.825 |
| 135,6 | 40% | 12.475.200 | 1.850.940 | 3.390.000 | 5.240.940 | 7.234.260 |
| 101,7 | 30% | 9.356.400 | 1.388.205 | 2.542.500 | 3.930.705 | 5.425.695 |
| 67,8 | 20% | 6.237.600 | 925.470 | 1.695.000 | 2.620.470 | 3.617.130 |
| 50,9 | 15% | 4.678.200 | 694.103 | 1.271.250 | 1.965.353 | 2.712.848 |
| 33,9 | 10% | 3.120.495 | 462.735 | 847.500 | 1.310.235 | 1.810.260 |
| 17,0 | 5% | 1.559.400 | 231.368 | 423.750 | 655.118 | 904.283 |

| cargo volume in 1.000 t for railways | Exploitation quota | total transportation costs ECU | transportation costs ferry ECU | transportation costs railway ECU | total transportation costs ECU | transportation cost savings for railways ECU | transportation cost saving for total cargo ECU |
|---|---|---|---|---|---|---|---|
| 5.740,0 | 100% | 163.590.000 | 78.351.000 | 47.355.000 | 125.706.000 | 37.884.000 | 55.969.650 |
| 2.870,0 | 50% | 81.795.000 | 39.175.500 | 23.677.500 | 62.853.000 | 18.942.000 | 27.984.825 |
| 2.296,0 | 40% | 65.436.000 | 31.340.400 | 18.942.000 | 50.282.400 | 15.153.600 | 22.387.860 |
| 1.722,0 | 30% | 49.077.000 | 23.505.300 | 14.206.500 | 37.711.800 | 11.365.200 | 16.790.895 |
| 1.148,0 | 20% | 32.718.000 | 15.670.200 | 9.471.000 | 25.141.200 | 7.576.800 | 11.193.930 |
| 861,0 | 15% | 24.538.500 | 11.752.650 | 7.103.250 | 18.855.900 | 5.682.600 | 8.395.448 |
| 574,0 | 10% | 16.367.610 | 7.835.100 | 4.735.500 | 12.570.600 | 3.797.010 | 5.607.270 |
| 287,0 | 5% | 8.179.500 | 3.917.550 | 2.367.750 | 6.285.300 | 1.894.200 | 2.798.483 |




Source: Own calculations




# Feasibility Study of New Terminal Facilities of the Georgian Ports Plan Port Master Planning - Analysis of the Present Situation of the Ports

# Phase I Report, Vol. III

30 October 1997

# Volume III

# Analysis of the Present Facilities in the Ports of Poti and Batumi

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# Introduction

The Phase 1 Report of the "Feasibility Study for New Terminal Facilities in the Georgian Ports is mainly concerned with presenting an evaluation of the present situation in the ports of Poti and Batumi. In the present volume the results of a comprehensive analysis of the existing facilities in the two ports are compiled.

Section 1 deals with the present organisational structures in the ports and with the proposed structures for the future

Section 2 gives comments on the present financial reporting procedures

Section 3 analyses the present port performance as well as calculating the cargo handling capacity of the ports under the present conditions. Furthermore, comments on the possibilities of cotton storage facilities are given.

Section 4 makes an assessment of the cargo handling equipment of the ports and gives recommendations concerning repairs of presents facilities and purchase of new equipment. The full equipment assessment with a photo documentation as well as cost calculations are attached in Annex 7 and 8 of this volume.

In Section 5 an evaluation of the existing railway facilities in the two ports is presented and recommendations on measures to improve the present conditions are given. The full railway survey with a photo documentation is attached in Annex 9 and 10 of this volume.

# Section 1

# Organisational Structure

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# 1 Organisational Structures of the Ports of Poti and Batumi

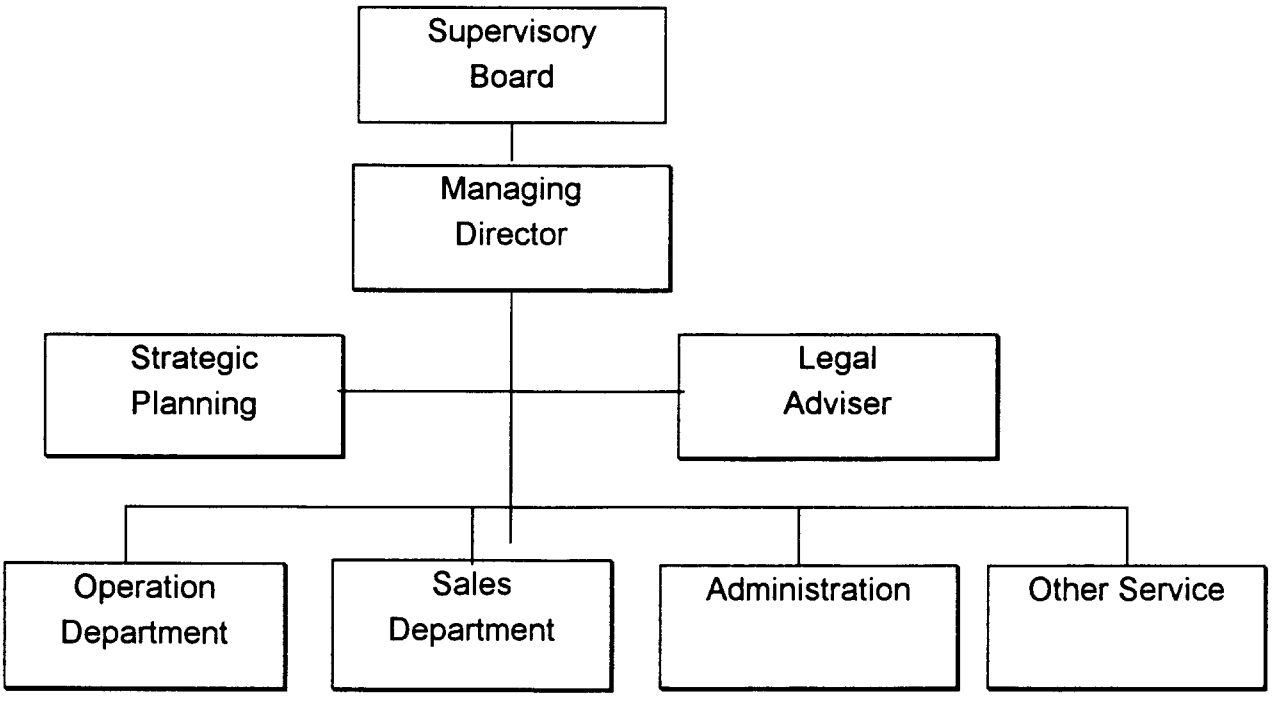
## 1.1 Review of Previous and Ongoing Studies

The organisational structure of the two Ports are in detail described in the GTZ Project "Optimizing and Reorganization Study for the Ports of Ports of Poti and Batumi" elaborated by HPC Hamburg Port Consulting GmbH., Hamburg, dated 4 April ,1996
The part "Internal organisation of the two ports" is attached hereto in Annex 1. The evaluation of the organisational structure was basically done in 1995 .

In August, 1997 a new project was set up in both ports by the GTZ. In fact, in this new project, "Restrukturierung des georgischen Hafensektors", aimed to restructure the Georgian Ports, it is planned to implement the results from the above mentioned study. Within this implementation project comments to the changes in the organisational structure between the years 1995 and 1997 are given and now a new organisational structure, on which the both ports have agreed upon, shall be implemented. This organisational structure should be the same for both ports.

In addition, USAID started in September, 1997 in a project "Privatisation of the Port of Poti" carried out by The Cornell Group, Inc., consultants from the United States. In accordance with their terms of reference, the consultants have to focus on major categories which are likely to provide a basis of independent and, where possible, competing business, organisation and legal entities. It seems to be, that the outcome of the USAID project does not refer to an all over structure of the port rather than to a split of the port into several companies.

The below stated commentaries are based on the above mentioned studies and the implementation projects. To avoid duplication of work new diagrams or detailed functional description are not made.
The report concentrates on changes already made and commentaries especially for the first levels of the ports.



## 1.2 Batumi

Since 1995 the Port had partly changed the organisational structure. The function of the Harbour Master is has been transferred to the jurisdiction of the new established Georgian Maritime Administration.

A Supervisory Board is not established and directly underneath the Managing Director a First Deputy Manager is acting on behalf of the Managing Director, taking care of the day to day business.

The second line of the hierarchy includes the following functions:

- Deputy manager of operation
- Chief engineer
- Deputy manager of construction
- Deputy manager of port guarding system
- Deputy manager of commercial and foreign affairs

and as staff function (non line functions)

- assistant on general questions
- assistant on administrative and social questions
- assistant on technique security

The responsibilities of the deputy managers respectively the chief engineer are in a process of changes. Presently, the responsibilities are defined as follows:

The Deputy Manager of Commercial and Foreign affairs (Economics) is or will be in short responsible for:
•the Economic and Planning Department
•Organisational Department
•Accounting and Salaries.

The Deputy Manager of Operations is responsible for
•the Operation Department
•Dispatchers,
•Port Fleet and the Commercial Department.

The other responsibilities are the same as evaluated in 1995.(attached hereto in Annex 2).
The final organisational structure of the Port of Batumi will be available when the GTZ implementation project is finalised. The Tacis team will take over these results and report on them in the forthcoming Phase Reports.

## 1.3 Poti

The proposed organisational structure of the Port is similar to the proposed organisational structure of the Port of Batumi. Changes in Poti since 1995 are in the field of the Harbour Master function. The newly established Georgian Maritime Administration situated in Batumi takes over this function.

In the present Organisational Structure of the Port the Supervisory Board is not yet established.

Underneath the Managing Director the second line are including the following functions:

- First Deputy Manager of the Port
- Deputy Managers by Economics
- Deputy Manager for Intereconomical and commercial activities
- Deputy Manager for Development and Reconstruction
- Deputy Manager for Maintenance

and as staff function (non line function)

- Legal department
- Assistance for general questions
- Assistance for security
- Press service
- Personnel department
- Social maintenance units of port
- Assistance for technology

As a result of the implementation project of the GTZ team, but also as a result of the change of the Managing Director of the port effected 1 September, 1997, the organisational structure and the related responsibilities are in a change process.

The proposed sales department is under discussion. The other departments are still unchanged and are not reflecting the real situation to same extent.
The heads of the operational divisions like Oil terminal, 2.Terminal with the berths 2, 3, 4, 5, and 6, the Container terminal (berth 7), the 1.Terminal with the berths 8, 9 and 10., the Passengers, ferry and Roro - Terminal berths 12, 13 and (14) and Grain terminal berth 15 are below the first Deputy Manager, but in the hierarchy above of the dispatcher. But the daily work is carried out according to the instructions received from the dispatcher. This is just an example, that the present organisational structure is sometimes not in line with the real flow of information and instructions .

In Poti, as already described under 1.1 , three teams of consultants are working in the port. The targets of the teams are different. GTZ-Team is implementing the results out of their study from Aril, 1996. The USAID team is working on a privatisation project which will divide the Port into various independent Enterprises with a state owned share of less than 50 %. This implies, that the new shareholders, probably foreign companies, will set up their own organisational structures.

The Tacis team is working on a feasibility study and is in the evaluation phase. This is a scenario where double working and overlapping can be generated by lack of information between the teams involved. To minimise this, the Tacis Team will take the results of the previous studies and the implementation project of the GTZ and include this in the Phase reports.

## 1.4 Principle Remarks

The developed organisational structures for the Ports of Batumi and Poti are based on profound knowledge of the GTZ Team and real port experience. The remarks given in regard to the implementation and the overall implementation problems are reflecting the real situation in the ports. Remarks regarding responsi-

bilities, information and supervision are in line with modern management and organisational structures. Especially the basic principles described in chapter 2.2.3 (Optimizing and Reorganization Study for the Ports of Poti and Batumi) are of very high importance.

In this respect, remarks are only in the field of the capability of staff and the information flow necessary. During the executed project planning workshops in Batumi and Poti with the managers of the two ports the necessary future changes have been discussed.

One important point was the subject "change the attitude towards work". Here, the mental barriers to overcome were discussed. We learned from this, that it is not enough to give the persons in charge responsibilities but to make them feel responsible. This is one of the main tasks in the whole process of changes. Even a catalogue, describing the tasks, duties and responsibilities may not be enough. The catalogue itself may make the persons involved to believe, that everything not mentioned in this catalogue is not his responsibility. A way out could be, to assist the managers with training on the job.

Another important point is the information flow. Even a management information system (MIS), which is definitely necessary, can not alone improve the whole situation. Information from a MIS are normally available after a certain period. The up-to-dateness depends on the generation of the figures and the systems behind. The important brand new information are not delivered by a MIS. Though, these information also have to be given to the management. In addition to that, the managers involved have to learn, that it is not enough to wait for the arrival of information needed or expected. They have as well to be active to collect information necessary. The existing barrier in this respect has to be overcome.

Finally, the capability of the managers to delegate has to be dealt with, too. Within the mentioned study the items and the rules concerning delegation of responsibilities and tasks are described. But to delegate means mainly to overcome a psychological barrier and it seems, that also here assistance to the management by training on the job is required.

## 1.5 Organisational Structure of the two Ports and the relation to the Port Authorities

Within the study "Reorganisation of the Georgian Ports of Batumi and Poti" the future port structure is described as a model including the various interests and functions. These interests and functions are divided into two parts, a public part including the government in general, the marine department and local corporate bodies and a private sector including the first port operating company, further port operating companies, service companies, clients and other companies. Within the privatisation processes of the ports this part of the GTZ study might by helpful .

The ongoing discussion on this subject also includes the duties and tasks of the port authorities. An elaboration of the tasks of a modern Port Authority, including the single tasks of the individual divisions in the Port Authority have been worked out in detail and attached in annex 3 of this volume.

# Section 2

# Comments on financial reporting procedures

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# 1 Overview of Existing Reports and Statistics

## 1.1 Organisational Conditions

The port organisations are involved in a process of change from the former Soviet Union (FSU) system into a modern business- and market-oriented system.

This change process is based on a model, as discussed in a meeting of

- Chancellery of State
- Marine Department
- Port of Batumi management
- Port of Poti management

on 20 January 1997 at the Chancellery of State of Georgia.

The headlines of the discussed model can be summarised as follows[1]:

- Port is and will remain under state ownership;
- A port operations company leases territory and aquatory from the state; from the legal point of view the operations will be organised as a joint-stock company, a construction usual in Georgia, comparable with a public company in the western economy.
- Tug boat, pilotage and similar services are rendered by a non-profit port service company
- A new organisation, the National Marine Administration (NMA), will be responsible for supervision on safety and environmental aspects.

As a consequence, the examination prior to give "Commentaries on financial reporting procedures" in the Feasibility Study should be understood in the context of a process in which considerable progress to modern ports has already been effected and is still going on.

## 1.2 Financial Reporting Procedures

### 1.2.1 General conditions

The present procedures in financial reporting find their origin in the system as developed under the FSU system.

The general regulations regarding financial accounting for companies are laid down in a nation-wide valid accounting plan. This plan describes:

1. The specific lines of the balance sheet and income statement
2. The statement of use of profit
3. The chart of accounts
4. The journal types

[1] Reference is made to the report of HPC Hamburg Port Consultants GmbH to GTZ Gesellschaft für Technologische Zusammenarbeit mbH, dated 13 February 1997.

5. The depreciation rates

In July 1997, a new law regarding accounting in Georgia came into force. An increase of depreciation rates is one of the changes, necessitated by very low rates under the FSU system.

The organisation of the balance sheet shows clear similarities with the western European type whereas the standard profit and loss-account is very summarily. An additional requirement for the Georgian ports is the reporting procedure on quarterly basis for income and expenses by type of activity, laid down by the (former) Marine Administration.

A difference to the western economical situation is that the amount of company profit is reflected before corporation tax, both in the balance sheet and in the profit and loss account. The ports are, however, tax-paying bodies in the sense of corporation tax. The corporation tax is presented as part of the profit distribution. Another difference is the profit distribution as such: this item is further described under the heading: "profit and privatisation considerations".

A specific problem will arise when it is necessary to analyse figures of previous years, because the Georgian currency changed twice in the last few years: on 1 August 1993, the Rouble was converted into Coupon. On 1 October 1995, the Coupon was converted into Lari. It is self-explanatory, that such conversions impose risks for errors in accounting, both in data-collection and processing, as well as in reporting and in the interpretation of figures. On top of that, the frequency of the conversion-operations and the fact that these conversions were implemented during the respective calendar years increase the specified risks.

### 1.2.2 Port Services

#### General

The financial reports are defined in the context of the accounting plan; additional requirements are laid down by the (former) Marine Administration. (Reference is made to 1.2.1 "General conditions".) The additional report reflects, in table layout:

**Table 1: Analysis of financial result (before taxes)**

| Pos | Description | Reference | INCOME | EXPENSE |
|---|---|---|---|---|
| 1 | Loading and discharging operations | 030 | | |
| 2 | Auxiliary & local fleet | 040 | | |
| 3 | Motor transport | 050 | | |
| 4 | Outport works | 060 | | |
| 5 | Port and other dues | 070 | | |
| 7 | Hydrotechnical facilities | 090 | | |
| 8 | Territory and aquatory of the port | 100 | | |
| 9 | Electro department | 110 | | |
| 10 | Sea (passengers) stations | 120 | | |
| 11 | Lifting and underwater works | 130 | | |
| 12 | Inspection of port control | 140 | | |
| 13 | Other operations | 150 | | |
| Sub-totals | | | | |
| | Auxiliary production | 170 | | |
| | Unplanned revenues and expenses | 180 | | |
| Totals | | | | |
| | Financial result | | | |

**Table 2: Analysis of total expenses incl. analysis of expenses of main activities**

| Description | Reference | Total expenses | Loading and discharging | Auxiliary and local fleet |
|---|---|---|---|---|
| Salaries and wages | | | | |
| Social insurance | | | | |
| Ration | | | | |
| Fuel & electric power | | | | |
| Materials and depreciation of low value items | | | | |
| Depreciation of fixed assets | | | | |
| Repair | | | | |
| Administration expenses | | | | |
| Operating expenses | | | | |
| Other expenses | | | | |
| Totals | | | | |

The frequency of these reports is quarterly.

The prescribed external distribution of these reports is as follows:

- Ministry of Transport (with additional copy to the Marine Department, resp. NMA)
- Inspector of Taxes

#### 1.2.2.1 Poti

Not all lines in the tables shown are applied in Poti, e.g. administration expenses.

#### 1.2.2.2 Batumi

The financial reports in the Port of Batumi follow the standard accounting plan but provide internal information as well. A report regarding income and expense by department is produced monthly.

In this report the income is not specified further than department level; whereas the expenses are specified by department and by category. This report is provided to the Planning and Prognostics Department which performs analyses in behalf of the Deputy Manager for Marketing, Economy and Finance.

To other managers no standard reports are provided. Although information about financial data is provided on specific request, there is no structured use of the generated data as management information in the sense that all managers receive a report on a periodic basis.

### 1.2.3 Processing System

#### General

The way of processing of data is partially determined by the standard chart of accounts and the standard definition of the journals. A definition of the journals was found in a Russian manual of the year 1981. It was claimed that this definition is standard and is not explicitly overruled by new Georgian law.

#### 1.2.3.1 Poti

The main ledger is the source for the completion of the financial reports. The entries in the main ledger are prepared by means of hand-written journals. The preparation of the journals is a labour-intensive job, but once when the entries are made, the balance sheet and profit & loss account can be produced, partly computerised by means of the spreadsheet programme Microsoft-Excel for the costs aspect.

#### 1.2.3.2 Batumi

The production of reports is supported by EDP to a considerable extent. The computer is a stand-alone modern PC (pentium processor) with a tailor-made software for the Port of Batumi. Data in PC's of other organisational units are used to update the data in the computer of the accounting department on a monthly basis by means of download, transported from one computer to the other on diskette.

### 1.2.4 Input

#### General

The input for the financial reporting procedure is the general ledger system. The way of processing the accounts can be deducted from the standard balance sheet form, where the account numbers to use are given. The chart of accounts lacks a clear top-down approach and is structured poorly.

#### 1.2.4.1 Poti

The input of data in the financial reporting system is a monthly recapitulation of the transaction journals. Monthly only one entry per account is made in the main ledger. The prior steps are regroupings from individual transactions to journals and the combination of journals to entries in the main ledger.

### 1.2.5 Controls

In general, the value of the controls applied is doubtful.

- An example in this respect is the control of the invoicing procedures regarding port dues in the ports. In Batumi the information was given, that no confirmation regarding the completeness of the follow-up of disbursement accounts (for especially port dues) after departure of the ship existed other than the data the forwarding agent provides the invoicing department with. In Poti, the Head of the Planning Department explained that a monthly check of the full follow-up and assessment of disbursement accounts is done and signed off by himself together with the manager of the Financial Accounting Department.
- Another aspect of control is the definition and rate of tariffs. The tariffs for cargo handling are issued by the Marine Department. The tariffs are not based on costs of the companies. The tariffs for port dues are applied on the basis of a USSR list of the year 1988. In such a situation it is evident, that an analysis of the tariffs with regard to the real costs of the organisations is not possible.

### 1.2.6 Profit and Privatisation Considerations

The financial accounting figures are subject to the risk of being insufficiently realistic, since the profit distribution is a type of transaction about which only insufficient information is available. The yearly profits of the ports are remitted, partly for tax (20%) and the rest to funds. It was explained that a part of these funds are supplied to employees of the ports. Any cost accounting system on the basis of such financial accounting figures bears the risk of being incomplete.

The specific background of this situation is the freedom of management to distribute the profit, which is unusual in the western economy.

## 1.3 Port Traffic Statistics

### 1.3.1 General Conditions

In the same sense as described in 1.1 "Organisational Conditions", and further described 1.2.3 "Processing System", the scope of the port traffic statistics is very limited as a consequence of the origin of the present procedures in the FSU system.

### 1.3.2 Port Services

The scope of statistics is limited to the handling of cargo volumes, on the basis of which negotiations with governmental authorities take place. The information available concerning the movements of ships (size, types, frequency) and the occupation of the berths and other facilities (tug boats, etc.) is insufficient

On a quarterly basis the cargo volumes are reported to the Ministry of Transport and the national Marine Administration (formerly the Marine Department).

### 1.3.3 Processing and Input System

The production of statistics is performed manually in both ports. The basis of the statistics is the registration of ships handled by the dispatcher's department.

The collection of data takes place within 10 days after the end of the month.

#### 1.3.3.1 Poti

The planning department prepares the statistics on the basis of data, that the commercial department receives from the dispatcher's department for invoicing purposes. Subsequently, the transaction data are sent to the foreign currency and account management department for settlement with the client. The accounting department is the next station for registration purposes. The data wait in the accounting department until the closure of the month and are sent all together to the planning department. A re-routing may be an adequate (temporary) solution for this bottleneck.

### 1.3.4 Profit and Privatisation Considerations

The poor information regarding statistics has mainly its basis in the history. One of the major features of a modern management information system is the relationship between income, costs and the relevant quantitative criteria. Reliable data-collection regarding the income and cost per unit depends on both sound procedures regarding financial accounting and the count of the operations, causing these incomes and costs. These data need to be collected on a continuous, day-to-day basis. A well-functioning sales system produces both invoices and traffic statistics as well. In this respect the situation in the ports is out of date.

## 1.4 General Planning Data

General

The planning sequence under the former SU system was a 5-year cycle. This cycle is not valid any more after the dissolution of the Soviet Union, but the way of thinking in terms of planning and operating did not change.

### 1.4.1 Poti

In Poti a yearly planning cycle is in use. It was explained to the Consultant that the central government and the port management negotiate with each other about the volumes to handle. This negotiation is a subject, where the differences in volumes required by government and the ones feasible in the view of the port are considerable.

In case of lower cargo volume handled than agreed between Government and the port, financial penalties are imposed on the port. It is not yet clear if these penalties (in 1996 Lari 970.000, approx. ECU 750.000) are taken into the profit & loss account or if this charge is one of the items of the use of profit. In this respect reference is made to the paragraph "Financial Reporting Procedures", in 1.2.6 "Profit and Privatisation Considerations".

### 1.4.2 Batumi

A discussion with the responsible deputy manager resulted in the view, that general planning is no longer applicable since the end of the Soviet Union. Reference was made to an organisation's business plan a copy of which is not yet submitted to the Consultant.

In Batumi no indications of difficulties in the negotiations with the government were indicated. The perspectives for 1997 in this respect are positive.

# 2 Planning and Control Requirements

In order to create an effective planning and control environment for the ports, general items for all enterprises, sector-specific items, organisation-specific items and individual items are relevant.

It is planned, that the port organisations are organised as public (joint-stock) companies under supervision of an independent board of directors. It is further planned, that directors and management will have a personal liability to exercise their tasks and duties, similar to the legal requirements in the western economy. In the same sense, the appointment of top-management will be the decision of directors.

Proceeding from general to specific items, the requirements can be specified as follows:

## 2.1 General Requirements

In order to create an effective planning and control environment for the ports the following general requirements have to be fulfilled:

- Harmonisation of the requirements for annual accounts to the standards, valid in the European Union. This is especially relevant for the organisation of the balance sheet and the profit and loss account.
- Harmonisation of the method of profit distribution to the standards, usual in the European Union. Especially, the principle of a proposal by top-management, that is subject to approval by independent directors deviates from the present practice.
- Review by external auditors of the functioning of the internal control measures as part of their audit of the annual accounts. Supplementary assignments are to be considered if a poor functioning of internal control is indicated by the audit.
- It should be free to organise the chart of accounts such that it is optimal for the specific organisation.

## 2.2 Sector-specific requirements

Sector-specific requirements are considered not to be necessary for external financial reporting procedures. But some specific requirements should be fulfilled:

- Statistic reporting procedures should be in accordance with guidelines of the (new) National Maritime Administration (formerly Marine Department). Safety and environment aspects are the main aspects of their responsibility.
- The National Marine Administration should in future not exercise tariff autonomy.

## 2.3 Organisation-specific requirements

- Clear identification of decision-making functions and the names of managers, who are accountable for the results of their respective operations. This includes the name, size and functional specification of the organisational units which they are responsible for.
- Top-management formulates the conditions on the basis of which the plans of managers of organisational units are developed and gives power to a central controlling function in order to exercise supervision on the financial aspects of the responsibilities of the accountable managers.
- The supervisory board authorises the combined plans and receives sufficient information about ерушк realisation in order to exercise its legal duties.
- Budgeting, realisation and analysis of deviations (hereafter: budget discipline) are performed on such a basis, that the respective managers have sufficient tools to make and update their plans. This means, that they have sufficient capacity available within their organisational units to generate information for their own use and for the central controlling function as well. It may be necessary to appoint financial officials within the operational units, especially in the big units.
- The budget discipline works for periods of 5 years (revolving), yearly, quarterly and monthly.
- The use of statistics is both for external use and for internal use. The external use of statistics is for supervision purposes on the safety and environment aspects and for that reason limited in comparison with the statistics necessary for the budget discipline. The statistics for budget discipline require information about port traffic, but also about the occupation of all resources (fleet, berths, cranes, labour; where applicable additionally distinctive by gang, shift, etc.). Proper management of productivity of individual organisational units is possible only with sufficient detail and relevant grouping on the level of the individual managers.
- The tariffs are calculated and contracted by the organisations themselves; the verification of the adequacy of the tariffs is the responsibility of the organisation as part of the budget discipline.
- Recording of operations and transactions is integrated in order to avoid double and (eventually) contradictory records. Statistical data are an automatic additional product of this recording system.

## 2.4 Requirements on the Individual Level

- Supervisory board and top management are experienced to execute their duties as mentioned above and are aware of the (eventual) necessity of engagement of additional know-how.
- Controllers are experienced with monitoring of the budget discipline both as a system and with respect to the results; with the compliance to this discipline by accountable managers; and with the monitoring and support of the financial officials, attached to the accountable managers.

- Accountable managers are experienced with the application of budgeting in their operational environment and are able to convert the budget discipline in terms of occupation, productivity and other relevant data as the situation requires.
- Financial officials in the organisational units are able to cope with the dualism of service of both to the accountable manager and to the central controller.
- Individual employees are used to instructions from the managers of the organisational units and are no longer influenced by the detailed operational regulations of the former Soviet Union.

# 3 Necessary changes

## 3.1 Weak Point Analysis

To a considerable extent the weak points have a basis in the fact, that the history of the ports is based on the FSU structures and systems. Although a revision of the legal framework is going on, an effective change of the present situation in the financial reporting procedures, (port traffic) statistics and general planning will not be possible without long-term intensive external support.

On the basis of the previous information, the following aspects are important to consider:

1. The information, available to management in order to control operations is very limited. Even if there is information available, there is no periodic basis on which the managers discuss and communicate about the results and characteristic figures for their departments.
2. Management is not used to the principles of delegation of responsibilities and, consequently, not trained in using the information necessary to exercise their responsibilities in this sense.
3. The chart of accounts, laid down by government, does not support an efficient analysis of results, either by type of income or costs, or by department.
4. The manual character of many data-processing causes delays and results in insufficient depth of the registration of data and separate (again manual) data-collection and data-processing procedures for financial accounting and statistics.
5. The registration of basic quantitative data for control purposes is very limited. Only the external quantitative data (mainly regarding cargo volume) are recorded on a regular basis. However, daily collection of data for the purpose of information about ship-movements (frequency, type) and about occupation of facilities are not self-explanatory in the present context.
6. Data-forms in Poti have waiting times in the accounting department but strong peaks in the planning department to process these forms for statistic purposes.
7. One of the aspects of the use of management information is the budget discipline, which is currently lacking. There is no structure to collect the expectations of management about future operations, to combine these statements under responsibility of top-management and to compare the realisation with the expectations, including analysis of deviations. The budget in the present sense is meant for and suitable for external purposes only.
8. The accounting for fixed assets is very limited. A sub-ledger with the details about internal and external events (e.g. currency conversion) on the level of individual assets is not available.
9. The profit and loss account does not reflect the total view on incomes and especially expenses: in the profit distribution cost elements should be expected.

## 3.2 Improved Procedures and other Instruments

Against the background of the planning and control requirements and the weak points analysis, the following improvements should be considered:

1. A management information system is necessary in order to control the operations. This system supports financial, statistical and other quantitative information needs on an integrated basis. Result-analyses on the level of individual ship, type of operation, type of commodity, and other specifications need to be developed. In this sense also a cost-accounting system should be developed, e.g. for the control of the cost of the use of equipment.
2. Management needs opportunity to learn how to work in an environment, where the performance of managers is visible and appraised under the application of criteria, quite different from their experiences under the former Soviet Union system.
3. Separation of the present functions of the chart of accounts in a chart, specifying the income and expenses in categories, and a separate system, specifying the organisation in profit- and cost-centres, in order to have a more efficient access to the analysis of results. The chart of accounts in the new set-up also provides grouping-totals on meaningful aggregation levels.
4. Automation of data-collection and processing-functions is necessary to contribute both to more speed in the process and to more depth in the financial accounting. Where possible, integration of automated processes should be realised in order to avoid double registration and to support integrity of data.
5. Also an important feature of electronic data processing is the generation of quantitative data as an automatic product of data-processing. In that sense, traffic statistics can be produced as an extra product of an automated invoicing procedure.
6. The registration of data for statistics should be revised and extended in the sense, that more basic data are collected and evaluated, like ship-movements by type of ship, occupation of all facilities (berths, fleet, labour), etc.
7. The present routing of data-forms for statistics should be reorganised in such way, that strong peaks are avoided.
8. A budget discipline should be adopted. The present reports are based on the principle that external parties exercise control over the operation. The privatisation background means, that in the fist place the management has to exercise control over the operations. More detailed statements about budgeting are included in point 2. "Planning and Control Requirements".
9. The accounting for fixed assets needs to be extended. A detailed record of all fixed assets including purchase price and reference to the original purchase documents, the depreciation, revaluation, consequences of currency conversions, verification of existence and regular periodic reconciliation of the fixed assets register to the central financial accounting is recommended.
10. The basis of cost accounting should be a complete profit and loss statement, that reflects all expenses. Expenses, belonging to the result but presently part of the profit distribution should be accounted for in the way as usual in the western economies.

Final discussions with the management about an implementation of the proposed changes can only be held after the final agreement on the future organisational structure of the ports.

# Section 3

# Estimation of the Present Ports' Productivity

# Calculation of Capacity

# Recommendations for Cotton Handling Facilities

# Table of Contents

# Annexes to Section 3

# 1 PORT OF POTI

## 1.1 Analysis of Port Performance

### 1.1.1 Ship Handling

The approach to Poti anchorage and entering the port does not pose any major obstacles. The detailed description has been carried out under the civil engineering part of this report (compare Vol. IV).

The Port of Poti provides 24 hours uninterrupted service .General restrictions for night navigation do not exist.

The pilots are well trained and acting professionally. The port of Poti, its pilots and tugboats are expected to handle about 1,100 vessels in 1997 .

The port of Poti is equipped with three tugboats. Details as per below table.

**Tugs Poti Port**

| Number of Tug-boats | Age (years) | Horsepowers | Bollardpull |
|---|---|---|---|
| **Rekvava** | 17 | 2500 ( 2 x 1250 ) | 28 mt |
| **Khibikov** | 20 | 1200 ( 2 x 600 ) | 18 mt |
| **Bukia** | 20 | 1200 ( 2 x 600 ) | 18 mt |

source : port fleet dpt.

The tugboat fleet of the port of Poti isoveraged and will have to be renewed in the medium term.

### 1.1.2 Typical Stevedoring operations in relations to berths

The rail tracks are not paved, and not in level with the pier or apron, which forbids crossing by means of any mobile handling equipment. All piers are served by cranes of different reach and capacity.

#### Pier No. 1

This pier is exclusively used for oil transfer purposes. Hoses from vessel are being handled by crane and tankers' gear to lift hoses from or to wagons. New oil handling facilities are under construction since some time at Pier No. 1. Completion is uncertain. This will change the pattern of oil transfer. Oil will then be delivered to external storage facilities and pumped into rail wagons from there or vice versa .

#### Pier No. 2

This pier is mainly handling general cargo, project cargo and containers . The general and the project cargo is mainly directly landed onrailwagons for ontransport to the final point of destination.
Work is severely hampered by shunting operations of therailwaytank - wagons for Pier No. 1.

The area behind this pier is used for the storage of containers .

### Pier No. 3

This pier is used for handling of general and project cargo and for containers in limited numbers, for ores in bulk as well as for scrap. The area behind is not useable for the storage of goods as it not paved in any way. Once laid out properly paved, it could be a useful area for open storage of project cargo.

### Pier No. 4

This pier is used for the handling for similar goods as at pier No. 3. The stacking area behind is just being rehabilitated by cementing the area. Once finished, this will be the first open storage area, which from its construction would meet international standards.

### Pier No. 5

Pier No. 5 is used for the handling of similar goods, as Pier Nos . 3 & 4. The area behind Pier No. 5 is in a bad state and in no way fit for storage of any cargo .Despite that, a considerable load of pipes was stored in the area within crane range. The pier, and the rail tracks are covered with lots of scrap , remnants of former loading operations .

### Pier No. 6

The quay wall of Pier No. 5 to 6 is not in line. Pier No. 6 is built further into the harbour basin with about 60 cm .This constitutes a hindrance for vessels overlapping from Pier No 5 to 6 , and is thus decreasing the berthing flexibility in that particular area.

The condition of the area behind the quay wall is identical to that of Pier No 5. The space alongside berth No. 6 cannot be used for berthing, when one of the RoRo ferries is moored alongside with her ramp laid out on berth No. 7. If frequency of RoRo Ferry calls are increasing this pier cannot be used for handling of cargo any more, unless for lifting off containers from the deck of those ferries. At present Dockerill and the Port of Poti are operating there under a joint venture and a lease agreement.

The area behind Pier No. 6 is presently used for stacking, stripping and stuffing of containers, partly from and into rail wagons .

### Pier No. 7

The Pier and the area behind it is currently being used as a designated Container and Roro Terminal for conventional RoRo ferries. At the southern end of the 'Container Terminal', and not separated from it by any means, a small workshop is located, which is currently repairing boats, small tugs and fast wave piercing passenger vessels.

### Pier No. 8

This pier is designed for bulk cargo handling by grabs and general cargo in the direct mode. It is mainly used for bulk cargo. The pier could by its technical outfit and, this applies for all piers up to pier No. 11, handle a variety of cargoes like bulk - and general cargo .

Quay, railtracks and aprons are in an apparently better condition than on the northern side.
The junction of pier No 8 and 9 is not in line similar to Piers No. 5 and 6 with anticipated similar effects. Pier No 6, 7 & 9 have obviously been built later, than pier No. 8 and 5 respectively .

Pier No. 9

Cargo handling pattern are similar to that of No 8 . Pier is equipped with hoppers, which can be moved by being pushed by cranes. However, pushing points at hoppers are not constructed strong enough, to resist the pushing forces, which becomes evident when viewing the affected constructional parts of the hoppers. In the back reach of the cranes there is a ramp, which matches the height of the rail wagon floor. The ramp is being used for loading and unloading of rail wagons with the assistance of Forklifttrucks .

Pier No. 10

Similar cargo handling pattern as Nos 8 & 9 but with a fairly wide apron in the back area which is used for open storage purposes. However, this potential cannot be used fully due to the prevailing problem at all piers - the lack of crossing facilities of rails. In the extended back area the construction of a shed had been started, which had reached the skeletal stage some time ago. Presently, no construction works are in progress.

Pier No. 11

Similar cargo handling pattern as Pier No 8 - 10. The rail track for cranes and hoppers are subject to subsidence which complicates the shifting of both cranes and hoppers in the vicinity of pier 11. This pier can at the western end only be used for direct delivery, because there is no space behind the cranes and hoppers, where trucks or FLTs could operate .

Piers No 12

This pier had been designed to accommodate passenger vessels. At the present it is utilised for the operation of RoRo services by side - or quarterramps.

Pier No 13

This pier is used for small RoRo vessels and also serves as commercial lay up berth for small vessels.

Pier No. 14

This pier also belongs to the former Passenger Terminal. It is now blocked completely by laid up fishery vessels, which are double and triple banked. The fate of these vessels is rather uncertain.

Pier No. 15

This is the former grain discharging pier. The modernisation of that pier had been stopped some years ago. The berth is now used for small ship repair activities .

### 1.1.3 Organisation of stevedoring and cargo handling activities

The operational and administrative distribution of responsibilities are as follows :

| | |
|---|---|
| OILTERMINAL | Berth No. 1 |
| TERMINAL NO. 2 | Berth No. 2 - 6 |
| CONTAINERTERMINAL | Berth No. 7 |
| TERMINAL 1 | Berth No. 8 - 11 |
| PASSENGER- , FERRY AND RORO TERMINAL | Berth No. 12 -14 |

GRAINTERMINAL Berth No. 15

Each of these terminals is headed by an Area Manager, who controls all the activities and the assigned personnel in 'his ' area. He is assisted by a Deputy Area Manager, who at the same time manages and oversees the stevedoring activities on the respective terminal.

The Area Managers are organising all operations on the terminal and are responsible for:

- distribution of gangs
- attendance's of personnel
- safety
- posting of mobile handling equipment
- disposition of railway activities
- cleaning operations
- decisionmaking about start of loading or discharging operations

All these activities are carried out in close co-operation with the Dispatch Department which is plays a very dominant role in this respect. The Area Manager will not make decisions of important nature influencing the daily operations without informing the Dispatch Office beforehand of his intentions.

According to those managing the operation, the size of Terminal 1 & 2 is complicating the effective control mainly due to two factors

- the still existing old norms and regulations
- the non existence of modern management structures with clear defined responsibilities, rights and accountability which leads to the art of delegating responsibilities upwards .

### 1.1.4 Stevedoring Operations

As a general rule all the information gathered and laid down in the following does also apply to Batumi Trading Port with the exception of manpower which is related to the size of the terminal.

Stevedoring operations are carried out in the two shift system

First shift : 08 : 00 to 20 : 00 hours
Second shift : 20 : 00 to 22 : 00 hours

These shifts are interrupted by breaks.

Breaks first shift : 12 : 00 to 13 : 00 hours
16 : 30 to 17 : 00 hours
Breaks second shift 01 : 00 to 02 : 00 hours

Why the more difficult shift, the night shift, is only interrupted by one break, cannot be comprehended. As a matter of fact , the physical appearance of the workers in the morning is rather exhausted .

The total number of dockers (including the Stevedore Foremen and the Brigadiers) is presently given with 888. This workforce is divided into 4 brigades for each terminal with different numbers of workers considering the size of the terminal and the typical challenges of the workloads .

To Terminal 1 for example 4 brigades with 62 dockers each are being assigned.
To Terminal 2 4 brigades with 106 dockers each are being assigned.

The brigades are working in a rotating system. One of the brigades is always at the terminal. The basic principle is that one brigade works 12 hours and is then 24 hours off. Then the brigade works again 12 hours and is then 48 hours off. This system applies to all brigades on all terminals regardless of the daily workload.

The brigades with their permanent sizes have to cover all cargo handling activities on the terminal regardless of the actual volume. Should this not be possible because of the extraordinary workload, workers of other terminals are being shifted, if their workload so permits. If this cannot be arranged, the brigades will have to perform overtimes. On the other hand will the brigades are in the port and keep their turn even if the volume of available work does not justify their presence. In this case they are being paid a kind of stand - by compensation, albeit small sums only .

A dedicated planning system , which takes into account e.g. the workload of the current shift and the next ones and adjusts the number and composition of the workforce accordingly does not exist. The two shift system and the lack of flexible operational planning procedures are part of the reasons leading to the current problems in the port.

### 1.1.5 Gang Sizes

The brigades are divided, in what in international terms would be gangs .
The manpower and composition of these gangs are still in line with former rules of the Workers Technological Charta' deriving like other rules and regulations from the FSU and are still beingobserved .

Examples :

**Steel products:**

| | |
|---|---|
| crane operator | 1 |
| signalman | 1 |
| docker in ship's hold | 2 |
| docker at the pier | 2 |
| **Total number** | **6** |

Flour in bags

| | |
|---|---|
| crane operator | 1 |
| signalman | 1 |
| dockers in ship's hold | 6 |
| dockers in railwagon or on truck | 4 |
| 2 forklifts with driversif required | 2 |
| **Total number** | **14** |

**Palletized goods**

| | |
|---|---|
| crane operator | 1 |
| signalman | 1 |
| dockers in ship's hold | 2 |
| dockers at the pier | 2 |
| forklift with driver if required | 1 |
| **Total number** | **7** |

**Grain in bulk discharged by grabs**

| | |
|---|---|
| crane operator | 1 |
| signalman | 1 |
| hopper operators | 2 |
| wagon attendance | 2 |
| **Total number** | **6** |

**Containers**

| | |
|---|---|
| foreman | 1 |
| crane operator | 1 |
| signalman | 1 |
| dockers on ship | 2 |
| dockers at pier | 2 |
| **total numbers** | **7** |

Due to lack of space and equipment, horizontal movements of containers are not performed .

The individual gang sizes in relation to the cargoes which are supposed to be handled are in line with western European standards.

The number of gangs which are assigned to a particular vessel are still governed by ' Norms for the loading and discharging operations for the port of Poti '. There are however developments, where deviations from these rules by applying a more flexible attitude in posting the number of gangs and their sizes whilst considering the size of the vessel and the type of cargo.

### 1.1.6 Remuneration of Stevedores

The remuneration of the workforce is based on the production of that particular shift. The payment is calculated according to a fixed system which considers the category and nature of the cargo combined with parameters for the tonnage handled, and the qualifications of the individual employee. The calculated total sum for the brigade is then divided between all members of the concerned brigade. If one gang has been idling for whatever reason this will not be considered. At the same time, an excellent production of another gang will also not be rewarded. Individual production of the single gangs are not considered. This means, that incentives for the individual gang to reach better output are not existing.

Endeavours to replace the current system of remuneration under the aspect of inventing incentives for the individual gang , which could lead to increased production and which would honor the efforts made by the gang working on a vessel, are not yet under consideration.

### 1.1.7 Main bottlenecks in the field of stevedoring

- outdated oil transfer procedures
- the prevailing system of direct deliveries
- the work in the two shift system
- the work interruptions caused by shunting operations
- the lack of a properly sized and equippedContainerTerminal
- lack of suitable buffer zones
- outdated stevedoring handling gear
- inappropriate pallets
- the inflexible shift and manpower distribution schemes
- lack of rolltrailers and tugmasters
- age and technical condition of forklifts
- age and technical condition of cranes
- missing effective management tools to control the different terminals
- non achievement of higher output figures when cargo is mechanised or unitised.
- lack of incentives for workers

### 1.1.8 Working in storage areas

Size, technical condition and layout of existing and potential storage areas have been covered in depth in the civil engineering part of this report.

The port, its layout, the construction and the design of its technical outfit have been carried out with the objective to focus on the direct delivery of goods to rail wagons or vice versa. Consequently, the development of storage areas have been considered to be of no importance. This reflects in the general condition of these areas.

Brief description of open storage areas under operational aspects:

#### Behind Pier No. 1

8,000 m2 concrete slabs
Presently occupied by iron ore pellets. These have been stored there for a long period due to an uncertain legal status.

#### Behind Pier No.2

7,200 m2 concrete slabs but partly not paved .
Used as container stacking area for predominantly empty containers originating from berths 2 to 5 .

#### Behind Pier No. 3

5,250 m2 unpaved area
Presently in use for the storage of a consignment of iron tubes .

#### Behind Pier No. 4

5,950 m2 concrete pavement under construction
Perfect area for open storage purposes once construction works completed .

Behind Pier No. 5
6,000 m2 gravel and normal soil. Earmarked for construction of concrete pavement.
Presently used for scrap .

Behind Pier No. 6
7,200 m2 poor condition of soil and part concrete pavement.
Backarea used as 'makeshift' stripping as stuffing area of containers.

Behind Pier No. 7 ( Containerterminal )
12,500 m2 paved by concrete slabs and used for stacking of containers .

Behind Pier No. 8
2,000 m2 partly paved.
Area used in the 'makeshift' mode for the stuffing, stripping of containers .

Behind Pier No. 9
9,000 m2 asphalted
presently not used for storage purposes but for cargo handling operations.

Behind Pier No. 10
9,000 m2 asphalted
used as operational area only

Behind Pier No. 11
No open storage areas

The available open storage areas or such areas which could be used for such purposes are not being used in a preplanned matter. This may also be due to the lack of interests of customers to store cargo there .
This however might change, once the port is in position to offer areas , which are meeting the quality standards usually requested by customers .
At the present time, with the exception of the Container Terminal, where the area has a clear purpose, the other areas are mainly used to overcome the extreme bottleneck situation in the field of container handling. The operations taking place are in line with the difficult environment and would to a great extend not withstand a screening under existing safety rules and regulations .

Bottlenecks :

- The prevailing procedure of direct delivery or receipt of cargo mainly from and tailwagons.
- The undeveloped state of the potential open storage areas
- The partition of areas byrailtracks, which could otherwise be used in full for storage purposes
- The lack of areas where damaged and probably leaking dangerous goods according to the
- could be stored and repaired/refilled without endangering the environment.

### 1.1.9 Storing in warehouses

The port of Poti comprises of two warehouses which are operated by the port, with a total area of 11,700 m2 and a volume of 82,700 m3.

These two warehouses are :

#### Warehouse No. 4

This warehouse is located behind berth No. 10 and 11 . It is being used for the storage of various kinds of general cargo and chemicals.

#### Warehouse No. 22

This warehouse is located far behind pier No. 10 and is exclusively used for the storage of cotton.

#### Grain silo

The grain silo is located at Pier No. 15
It is out of operation since a couple of years. The capacity is 24,000mt .

Further there are some unused capacities behind warehouse No. 4 . Some are in a state which forbids storage of any cargo. Small units are also leased to private parties, which are also carrying out the storage , loading and unloading capacities of the goods under their own control .

For a port of the size of Poti the number and size of warehouses is insufficient. This goes also for the specialisation of warehouses.
Storage facilities are not available for reefer goods, chilled goods, grain silo facilities.
A grain silo which can accommodate 24,000 mt is not in operation and does not have direct cargo transfer facilities from the quay to the silo. A new pier for the grain silo which would also have provided direct transfer facilities to the grain silo had been under construction . This activity has been stalled some time ago and it is uncertain, when this activity will be resumed .

Bottlenecks :

- Lack of warehouse space for reefer, chilled goods and controlled temperature
- Lack of suitable pallets to affect mechanised storage of goods in warehouses
- Lack of silo space
- Lack of specialized covered storage facilities for
    - cotton
    - tea
    - citrus fruits

It is obvious, that at the present time there is not a great demand for warehouse capacity with the exception of cotton. This however may change rapidly and the port has to be prepared not to loose customers .

### 1.1.10 Dispatch and delivery

Georgian ports have been designed for the sole purpose of direct delivery from and to railwagons. This procedure is still prevailing and shapestodays operation.
The total throughput from January to September 1997 was 1,151,000mt .

**Distribution of on/pretransport**
**01-09.1997**

| IN / OUTBOUND | Transport by train | Transport by truck |
|---|---|---|
| **Inbound** | 70 % | 30 % |
| **Outbound** | 90 % | 10 % |

The figure reveals , that the trucking activities have already reached a volume of 30 % of the inbound cargo. The cargo which is being trucked will predominantly be Georgian imports. This would be in line with the rule of the thumb that up to distance of 400 km transport by truck is more economic, than transport by train.

The direct delivery mode is a procedure , which is familiar to all dockers and other employees of the port . Despite of their experience in this field some obstacles which are going along with this kind of operation remain. Those are the interruptions of the operations by shunting operations. The quality of these operations are directly linked to the performance of the dispatch office provided that the railway technically performs. The performance of the railway is another important link in the chain .

The average production in this field cannot be compared with figures achieved in west European ports , where the indirect delivery mode is the preferred way of cargo handling , and by its nature is not subject to the negative impacts of direct delivery.
In this context it has to be mentioned , that changes in the performance cannot be achieved , unless the system of direct delivery is being phased out.

### 1.1.11 Railway operations

The port has been designed on the basis of the philosophy, that all operations should be on the direct delivery mode strictly bound to railway operations.

This way of operation inevitably leads to a certain degree of inflexibility. In many cases the operation on a number of vessels has to be interrupted, if shunting operations for one of them have to be carried out. A vessel recently discharging project cargo at berth No. 2 lost about 37 % of the operational time by shunting operations. At one instance the whole train with unlashed heavy lifts on the wagons disappeared for a couple of hours.
On top of the problems which are going along with this kind of operation the railway operations were also in the previous year severely hampered by lack of electricity or fuel. This grave situation, which was beyond the control of the railway system has meanwhile improved. A further problem is the technical condition of the tracks in the port. The railway tracks on terminal are apparently in a much better condition than those on Terminal 2. The rails on Terminal 2 side are partly lower, than the ground .

During a survey it was noticed, that a rail wagon had been dragged derailed unnoticed on a distance of about 200 meters. Loose scrap parts are a further potential danger, which is not taken care of. The physical condition had been described in detail by a railway expert in this report (compare section 5 in this volume).

### 1.1.12 Truck operations

The delivery and receipt of cargo by truck has to date not played a significant role considering the throughput figures of Poti Port. The trucking business has however captured a considerable slice of the transport cake of the imported goods. (See also table under 1.1.10). This can be attributed to the flexibility of the trucking operation on one hand and presumably also to the current weaknesses of the Georgian railway system.

The port of Poti, being much bigger than Batumi, has more space to accommodate waiting trucks. There are no dedicated waiting areas where the trucks could be called up, as their turn of loading or discharging would come up, though .

If the trend to carry more cargo on trucks would continue, especially in the indirect mode, which means receiving cargo from warehouses or open storage areas, the current fleet of forkliftrucks will not suffice to cover the operational needs. To date the impact of truck transport on the overall performance of the port is still not of big relevance.

### 1.1.13 Ferry Operations

The ferry operations are presently concentrated on two piers, which is Pier No. 6/7 and Pier No. 12 .

***FERRY OPERATION - RORO***
***обработка парома - RORO***

| Year Quarter<br>*Год Квартал* | Total No of units handled<br>*Общее кол-во обработ-ых единиц* | Total Time at berth<br>*Общее время у причала* | Total hours worked<br>*общее число рабочих часов* | Idle time in %<br>*Не работающее время в %* | Units per hour of operation<br>*Обработка одной единицы за час* | Units handled per hour at berth<br>*Единица обработанная за час у причала* |
|---|---|---|---|---|---|---|
| 1995 3 | 376 | 283 | 238 | 16% | 1,4 | 1,2 |
| 4 | 960 | 252 | 211 | 16% | 4,5 | 3,8 |
| 1996 1 | 909 | 199 | 190 | 5% | 4,8 | 4,6 |
| 2 | 578 | 173 | 146 | 16% | 4,0 | 3,3 |
| 3 | 805 | 206 | 182 | 12% | 4,4 | 3,9 |
| 4 | 1155 | 564 | 358 | 36% | 3,2 | 2 |
| 1997 1 | 962 | 799 | 288 | 64% | 3,3 | 1,2 |
| 2 | 1079 | - | - | -" | | |

source: dispatch office poti / ИНФОРМАТОР: Диспетчер порта Поти

### Ferry Operation Pier No. 6/7

One location is Pier No. 7 which is the the Container Terminal . This pier is called by the ferry ' EIT ' which is trading between Sredets- Poti - Novorosiisk - Bourgas- Burgas -Poti. A further ferry calling at this pier is the ' Preslav' which is trading betweenBourgas - Novorosiisk - Poti .

The ferries (one at the time) are moored alongside Pier No. 6 usually with their stern moored to Pier No. 7. They are then lowering their stern - ramp on the northern end of the Container Terminal. At this pier the conventional type of ferry is being handled there, which is carrying trucks, trailers , cars and roll trailers.

The combination of RoRo services and container handling does usually not pose any operational, organisational and administrative problems. These services are in many ports merged in one organisational unit. The problem at the Poti Container Terminal is the present dramatic lack of space. The Container Terminal which is already facing grave problems to accommodate the containers cannot provide the necessary marshalling areas for incoming and outgoing rolling units. This however is an indispensable precondition for any fast and efficient RoRo operation. These problems are also reflecting in the speed of the operation, which is very slow .

### Ferry Operation at Pier No. 12

Pier No. 12 is the former passenger pier. This pier is now used predominantly for ferry services. The ferries are moored alongside the pier and the side ramp is lowered on the pier. This pier is called on a regular basis by the 'Geroi Shipski ' of UKRFERRY, which is trading betweenIlichovsk and Poti.

The terminal provides sufficient space for the marshalling of trucks and other rolling units. Due to the low volume of cargo the space is never utilised near to capacity.

The way the operation is performed, is partly not matching the common understanding of RoRo operations.
In fact roll trailers, cars, trucks are rolled in and out over the side ramp. The rail wagons located inside the ferry are being stripped whilst still being in the ship. The cargo is being shifted to trucks or other means of transport. This operation is carried out, because there are not facilities for direct transfer of the rail wagons from the ship to the national railway system.

The ferries are not self-sustaining as far as the loading and discharging of containers is concerned. This deficiency is overcome by placing a floating crane between ship and pier. This however is a very time consuming and complicated procedure .

### General Remarks

An average between 3 and 4 Units are loaded or discharged by hour of operation.
An average of 3 units per hour are handled per hour at berth.
Summarising the above, it can be said, that the current ferry operations at the Port of Poti lack most of the ingredients, which would make a RoRo shipping link between Poti and another port in the Black Sea a viable undertaking

## 1.1.14 Ship's time in Port

As already mentioned before, the duration of the total turn-round time in port in correlation to the type of cargo and the times lost the various defined periods are very important factors, when a judgement about the port's performance as a whole is being made. The total turnaround time is one of the determining decision making tools for shippers, charterers and shipowners, when they are contemplating which port to call to deliver or receive their cargo for shipment.
Substantial non operational times are generating losses to theshipowners or the charterers.

The table ' Ship's time in port ' in Annex 4 of this volume, which is based on representative samples drawn over a period of 5 months delivers an impression about the general performance of the port in this respect .

Analysis :

The total time lost by a variety of detentions varies from 27 % to 75 % in relation to the time from dropping the anchor until sailing time. The corresponding average time lost amounted to 56 % .

The total time , which was lost whilst the ship was ready to deliver or receive her cargo alongside the berth varies between 38 % and 86 % .

The total time lost at the anchorage accounted for 17 % of the total time spent at the port. In this it has to be said, that the waiting times at the anchorage are not always due to reasons, which the port can be blamed for. There are also many reasons, like pending documentation, payment of dues etc, which are beyond the control of the port. By comparing the figures it becomes nevertheless clear, that the main problems leading to the majority of detentions have to a large extend be attributed to the port and the prevailing direct delivery mode .

The situation which is documented, has already lead to regrettable consequences, insofar as a number of shipping companies are already demanding substantial congestion surcharges for cargoes they are accepting for shipment to Georgian ports.

### 1.1.15 Throughput figures Poti Port

**PORT OF POTI - DEVELOPMENT OF TOTAL CARGO THROUGHPUT**

| YEAR | Throughput in mt | change in % to previous year |
|---|---|---|
| **1993** | 1,221,271 | n.a. |
| **1994** | 1,104,756 | - 10 |
| **1995** | 1,657,571 | + 50 |
| **1996** | 1,778,056 | + 7 |
| **1997 ( 1 - 8 )** | 1,341,000 | n.a. |
| **1997 expected** | 2,011,500 | + 13 |

Source : Port of Poti Statistics Dept.

Above table shows a continuous upward trend of the total cargo throughput, which was dramatic in the course of 1995 .

**PRODUCTIVITY CONTAINER TERMINAL POTI**
**ACCORDING TO TIMESHEET**
**10/97**

| Vessel | Containers per hour at berth | Containers per hour of operation | Remarks |
|---|---|---|---|
| Gevo Victory | 1.6 | 3.8 | |
| Mint Arrow | 1.8 | 8.1 | |
| Opimep | 0.9 | 6.2 | 279 hrs waiting at anchorage |
| Gevo Victory | 2.7 | 4.4 | |
| STK 1011 | 2 | 5 | |
| Mint Action | 4,4 | 5,9 | |
| Aksoy Gelibolu | 2,7 | 1,3 | |

The above table does not confirm the official port figures, which had been given with 150 containers per ship and day .

The average for *container per hour at berth* taken from these 7 vessels is 2.3 containers . Calculated on 24 hours this amounts to 55 containers ,

The average for *container per hour of operation* based on above table is calculated with 5 containers. This amounts to 120 containers per day of operation .

These figures may of course vary a bit. But as the obvious main obstacles, the lack of space and appropriate equipment remains, the production is unlikely to improve before the removal of these hindrances.

**PORT OF POTI - DEVELOPMENT OF CONTAINER TRAFFIC**

| YEAR | CONTAINERS | TEUS | change in % to previous year |
|---|---|---|---|
| 1994 | 3,720 | 3,852 | |
| 1995 | 7,153 | 8,840 | 229 |
| 1996 | 14,975 | 20,099 | 227 |
| 1997 ( 1 - ) | 15,969 | 25,344 | n.a. |
| 1997 projection | 21,000 | 34,000 | |

Source: Port of Poti Statistics Dept.

The table shows the dramatic increase of the container traffic since 1994 . A trend which is supposed to continue and which will have to considered when establishing priorities in the development of the port.

### Cotton Trade

The shipment of cotton coming from the central and western Asian states witnessed a substantial upsurge. According to port statistics the first shipments appeared in 1996 with a total of 28,044 mt. In the first 6 months of 1997 a steep upsurge took place, which reflected in the shipment of 42,910 mt of cotton. Assuming, that the development continues during the remainders of the year, these shipments would reach about 85,000mt .

## 1.1.16 Port productivity and handling rates

The compulsory productivity indicators of the port have been investigated. The problem which appeared during this exercise was, that the ports have so far never kept statistics of that kind. The only parameter was the norm, which is still the parameter applied, when judging the productivity.

Cross-checking the figures, which were revealed by the port, it became obvious that they were based on the norms and did not reflect the real productivity, as it appeared during the daily stevedoring and cargo handling activities .To arrive at more realistic figures time sheets, and other statistics provided by the port have been screened, the findings of other consultants and verbal information have been merged.

It has been assumed, that an average of two gangs had been working with the exception of container handling and the services provided on ferry services.

**PORT OF POTI - PRODUCTIVITY INDICATORS IN MT**

| INDICATORS | | | | | | |
|---|---|---|---|---|---|---|
| **COMMODITY** | **packed** | **per vessel per day** | **per vessel per hour** | **per gang per vessel per hour** | **per man per vessel per hour** | **remarks** |
| grain | in bulk | 6,000 | 250 | 125 | 10.4 | by grab |
| grain in | in bulk | n.a. | - | - | - | by elevator |
| flour in | bags | 900 | 37.5 | 18.8 | 1.3 | |
| sugar | bags | 900 | 37.5 | 18.8 | 1.3 | |
| fertiliser | bags | 900 | 37.5 | 18.8 | 1.3 | |
| bauxite | bulk | - | | - | - | |
| coal | bulk | - | | - | - | |
| other foodstuff | miscell. | 600 | 25 | 12.5 | 0.9 | |
| silico manganese | bulk | 2000 | 83 | 41.7 | 7 | |
| metal products | unpacked | 1000 | 42 | 21 | 3.5 | |
| caustic soda | drums | 600 | 25 | 12 | 2 | |
| cotton | bales | 500 | 21 | 10.5 | 1.5 | |
| ferry operations | units | 69 | 2.8 | 2.8 | 0.5 | |
| containers | units | 55 | 2,3 | 1.1 | 0.2 | time sheet |
| containers | units | 105 | 4.3 | 2.1 | 0.3 | port info |

(productivity indicator poti )
Information based on port documents, verbal verification, and own observations.
Figures related to *hours at berth* .
Times lost are fully incorporated regardless the reason .

*Assumption :*

Two gangs working except for containers, where one gang is compulsory due to lack of space .
Oil cargo not considered .

### 1.1.17 Dwell time of cargo in port

The Port of Poti has been designed and is still operating in the direct delivery and receiving mode. As a result of such procedure the volume of cargo , which is dwelling *( being stored)* in the port is not representing a substantial volume of the total throughput. hence the available warehouse capacity , which is very small compared with the normal capacities of ports of similar size in Europe are nottilized to full capacity.

***PORT OF POTI - AVERAGE DWELL TIME OF CARGO IN PORT***

| Type of cargo | Mode of delivery | Dwell time in days | Remarks |
|---|---|---|---|
| oil in bulk | direct rail wagon | nil | |
| Silicomanganese | direct rail wagon | nil | |
| scrap | direct rail wagon | nil | |
| wheat in bulk | direct rail wagon | nil | |
| chemicals in bags | direct rail wagon / truck | nil | |
| flour in bags | direct rail wagon | nil | |
| sugar in bags | direct rail wagon | nil | |
| cotton | direct rail wagon/truck | nil | |
| cotton | through warehouse | 40 - 60 | |
| containers | through container yard | 60 | import by vessel |
| containers | through container yard | 20 | export delivery by truck |

### 1.1.18 Work interruptions

In the port of Poti the main factors interrupting the general cargo operation during the time at berth are caused by reasons, which can be attributed to the direct delivery operation and to the Georgian Railways. In particular these interruptions are caused by the frequent shunting operations, the lack of rail wagons and the poor technical condition of the rail wagons which are being supplied.

In the field of the container operations it is the limited space for the stacking of the containers, which can only be stacked within the reach of the cranes. This deficiency is further boosted by the lack of alternatives by e.g. by moving the containers to another location.

Interruptions in the ferry services can to a great extend be attributed to the slow and partly awkward operation and partly simply to the slow accumulation of the cargo. The volume of outbound cargo still leaves a lot of room for improvement.

The table 3.1 ' PORT PERFORMANCE - WORK INTERRUPTIONS' (Annex 5 of this volume) indicates the volume of times lost during the time at berth also referenced against the operational time and in set in relation to the total time spent in port. The figures are speaking for themselves . Also it delivers a clear indication that there is a lot room for improvement of the performance, once some of the main obstacles are successfully tackled.

The table 3.2 ' WORK INTERRUPTIONS BY REASON' (Annex 5 to this volume) is based on information rendered by the port. They are indicating with all reservations where the reason may lay. According to the port many of the detentions are caused by failure of presenting shipping documents and paying the dues and charges.

### 1.1.19 Berth utilisation

The berth utilisation has been portrayed by showing the figures in relation to the pier and the prevailing activities at that particular pier. The figures provided by the port in 1997 do not reflect the general upward trend in the cargo throughput and also do not bear any relevance to the congestion situation the port is facing. The figures released for 1996 are however showing, that there were capacity problems in some areas, where the utilisation of Pier No 9 reached 52.2 % . This figure combined with a degree of inflexibility due to the previous and still existing dedication of the pier, may well lead to a bottleneck situation .

On the other hand the berth utilisation figures show, that a measure aimed at erasing the specialisation of piers and the type of cargo supposed to be handled there, combined with reconstruction and rehabilitation measures considering the future changed cargo pattern and modern cargo handling techniques will have an equalising effect on the berth occupancy. This would also contribute to the effectiveness of berth utilisation and weed out the queuing of vessels for certain piers, whilst others are free.

# 2 PORT OF BATUMI

## 2.1 Analysis of Port Performance

### 2.1.1 Ship Handling

The approach to Batumi Port is rather short (1.5 nautical miles ) and uncomplicated. It has been described in detail in the civil engineering par(compare Vol. IV).

Under strong windy conditions it may come to the development of extremely strong currents and heavy swell inside the port. This phenomenon can lead to the evacuation of the port, because the ships cannot be held in their moorings without being endangered. According to the Harbour Master this can happen up to 15 days per year.

The Batumi Port provides 24 hours uninterrupted pilotage and berthing service.

The pilots are familiar with the challenges of the local maritime environment and experienced in handling the biggest ships, which are in the vicinity of 35,000 tdw and which can be accommodated in the inner port area, with its limited turning circle and draft limitations. The Harbour Master and the Pilots have recently been assigned to the Marine Administration. The pilots are as in the past reporting to the Harbour Master .

The port is furnished with two tugboats of differing power which are under the control of the port management.

**Tugs Batumi Port**

| Name of tug-boat | Age (years) | hp | bp | Remarks |
|---|---|---|---|---|
| Komissar Kvachantiradze | 1979 | 1,200 ( 2 x 600 ) | 8 mt | |
| Uchba | 1973 | 2,250 ( 2 x 1,125 ) | 12 mt | |
| R.B.T. Garedji | 1963 | 300 (2 x 150 ) | 2.5 mt | Used mainly for linesmen |
| Metehi | 1968 | 2,230 ( 2 x 1,115 ) | 12 mt | under repair |

Provision of sufficient spare parts provided and efficient maintenance and repair procedures carried out, it is possible to keep these tugs in service for some time .In the medium term these tugs will have to beplaced.

The pilot boat is rather big and of outdated design , but if properly fendered, it is in position to maintain its service even under difficult sea conditions.

### 2.1.2 Typical stevedoring operations in relation to berths

#### Pier No. 1, 2, 3

Those piers are built specially for handling of oil cargoes and their derivatives. No other cargo is being handled there. The real estate belongs to the port, but the piers are operated by the oil refinery. The port does not have any influence or control on the cargo handling operations there .

#### Pier No. 4 , 5

Pier No. 4 is equipped with devices to load or discharge small tankers. These facilities have not been used for a long time and will due to their technical condition definitely never be used again. The pier is blocked by laid up and sunken vessels.
Pier No. 5 is completely blocked by laid up and in parts by sunken vessels.

#### Pier No. 6

This pier is used for direct delivery services only .The area cannot be reached by trucks or FLTs as no pavement is between the rails .

#### Pier No. 7

This area is designed for the direct delivery of bulk goods by cranes equipped with grabs.
The rail wagons can be served by three rail mounted mobile hoppers (can be pushed by cranes) on the shore side, and by three fixed installed hoppers on the shore side.
The area is not paved and cannot be reached by trucks orFLTs .

#### Pier No. 8

This pier is foreseen for the operation of the two ' Hartmann ' rail-mounted elevators . When those are not in operation, they can be driven out of the way and the pier can be used for other cargo handling activities. The operational range of the elevators can also be extended to pier No 7. They are using the rail track of the cranes which are having the same gauge.
The area cannot be crossed by trucks orFLTs due to the unpaved status .

#### Pier No. 9

This berth is used for the handling of a variety of cargoes in the prevailing direct delivery mode to or from rail wagons. The warehouse No. 1 is located very near , about 20 m from the quay side.
The apron is paved by a low quality pavement between the rails, which allows the crossing of trucks, but not the crossing of FLT carrying cargo .

#### Pier No. 10

This pier is not located within the port boundaries. It had been built to accommodate passenger vessels. It is also used by small passenger vessels sailing on a regular basis between Batumi and Sukhumi .
The pier is furthermore used for loading and unloading of cargo of small coasters by means of mobile cranes .The stevedoring operation there is carried out on a private basis.
The area is not very suitable for this kind of operation because it is freely accessible for the public.

#### Pier No. 11

The intended use of this pier had been for the dispatch of big passenger vessels anRoRo vessels.

Whilst the pier is suitable for the handling of passenger vessels, which is also underlined by the existence of a big passenger reception facility, the pier is not suitable for the handling of RoRo vessels , as there are no marshalling areas for arriving or departing vehicles.

### 2.1.3 Organisation of Stevedoring

Stevedoring services are being provided in two shifts for seven days a week .

1rst shift from 08:00hrs - 20:00 hrs
2nd shift from 20:00hrs - 08:00 hrs

The work in the shifts is interrupted by breaks

1rst shift 12:00hrs - 13:00 hrs, 16:30 hrs - 17:00 hrs
2nd shift 01:00hrs - 02:00 hrs
Work on Saturdays and Sundays is compulsory.

In the understanding of the Georgian ports, the total number of workers, which are being assigned to one shift is called a Brigade. The total number of dockers at Batumi is approximately 349, which would make up for 5 Brigades including one Brigade for the elevators which are numbered between 28 and 32 men ( 4 Brigades of 7- 8 men ).This Brigade is rotating in the similar way as the other Brigades, when the elevators are working.

The number of dockers working in each shift is about 80, varying slightly .In fact the number exceeds the official number needed to man the gangs but this is meant to compensate for ' no shows '.

The Brigades are then separated into working units, which come near to the commonly used port term 'gang'. As a general rule the normal brigade is split into 5 standard gangs composed of 12 workers each. Plus two gangs which consist of 7 - 8 workers which will be assigned to the ' Hartmann' elevators when in operation. When the elevators are not in operation , the dockers assigned to the elevators are called up for the day shift and distributed among the other gangs as and where it may be useful.

The gang size in the common international understanding would be as follows :
- 1 x crane
- 1 x deck (signalman )
- 4 x ship's hold
- 6 xrailwagon ( 2 at outside platform )

Information was given that the number of dockworkers is presently 349 men, but within a short period of time the total number of dockers will be increased by a number of 60 workers, which are presently under training for the job. According to the port this is done to increase the flexibility of the operations. The port will then be in position to provide more gangs on the vessels, if required.

The dockers are not working every day. The port has invented a revolving system under which the existing work is distributed to more workers. Under this system the dockers are working 12 to 15 days per month . The rest of the days they will stay home. This system has been set up and maintained under social aspects and is taking into account the current difficult economic situation of the country. Any employee now working in the port will be deprived of his income once his services would be terminated. There is no relevant social net like unemployment benefits, which would render a substantial part for the sustainment of jobless persons and their families. The system does not consider any commercial aspects. The operational planning should consider the workload of the following shifts and arrange the posting of the personnel accordingly. The aim has to be that each vessel is served with the optimum number of gangs and equipment . A further aim in the commercial sense is, that nobody should be called up for a shift, if he is not needed .

According to the Deputy Manager Operations the norms are abolished as far as the payment of the workers is concerned, and dockworkers are paid by tonnage. The system which is being applied, is that the total salary of the dockers is based on the shift production of the entire port (except of the oil terminal) and is distributed equally between the dockers . The norms are used only as a guideline , when rendering information to customers. However, this means, that a change from the outdated system of norms had been implemented, but a component which would reflect the individual productivity of the gangs has not been implemented. If the mutually achieved earnings are distributed between all dockers the chance to invent an incentive momentum in respect of increased productivity has been missed.

The main bottlenecks hampering the stevedoring operation are

- Lack of modern stevedoring equipment
  - non availability of 40 ' spreader for lifting of containers
  - lack of modern special stevedore handling equipment
  - no stevedore handling equipment to handle unitised cargo in a productive way
- The lack of container handling facilities
- The prevailing system of direct delivery of goods to or from rail wagon
- The lack of modern mobile cargo handling equipment
- The insufficient number of forklift trucks
- Non-availability of special attachments for forklift trucks
- Railway tracks cannot be crossed by forklift trucks. At quay N° 9 the apron, the quay, the tracks and the gaps in between are not paved in by bricks or other suitable pavement means.
- Shunting operations of the railway very frequently interrupt stevedoring operations
- Discharging of heavy containers is a very dangerous undertaking. Two cranes have to be combined to lift containers exceeding a gross weight of 20mt .
- The lack of stevedoring gear to lift unit loads and highly mechanised cargo by utilising the available lifting capacity of the cranes .
- The lack of adequate mobile cargo handling equipment to facilitate lateral movements like roll trailers operated by tugmasters .
- The prevailing system which assigns a fixed number of workers to the shifts without considering the current or anticipated workload.

### 2.1.4 Open Storage Areas

Whilst designing the general layout of the port of Batumi the need for open storage areas has never been seriously contemplated. A typical example is the erection of a 4 story high building for administrative purposes in the centre of a very valuable location for open storage facilities.

Location and size of the various open storage areas is described in detail under the review of the ports under civil engineering aspects (Vol. IV).

In brief, the open storage areas are :

In way of Pier No. 6
A 3,750 $m^2$ area paved with concrete, which is partly used for the storage of logs for export

In way of Pier No. 7
An area of 4,100 $m^2$ asphalt, used for the storage of small lots of cargo and mainly for grabs.

Due to the dominating procedure which is favouring the system of direct loading from or to rail wagons, the available comparatively small open storage areas of a total of 9,150 $m^2$ are still heavily under-utilised for the storage of cargo. They are used for the standby of equipment like grabs. Apart from that, the open storage area in way of Pier No. 8 is listed as open storage area. Although, from the operational point of view this area could only under extreme bottleneck situations be used for the storage of goods, because otherwise the access to the area of Pier No. 9 would be difficult.

The volume of incoming and outgoing goods which are being stored in the open storage areas are of negligible volume.

Bottlenecks :

- Some areas earmarked for the open storage of goods are not wide enough. Big consignments cannot be stored in way of the related pier .
- The storage areas are too small in their size , despite of being presently under-utilised
- Incoming stored goods would in most of the events necessitate the use of cranes for loading the means of transport for forwarding the cargo.
- Lack of proper lateral mobile handling equipment

### 2.1.5 Storage in Warehouses

The port of Batumi comprises seven warehouses with a total area of 9,255 $m^2$. Of these only warehouse No. 1 and 7 are in use for the storage of cargo with a total 3,844 $m^2$. The total storage capacity of the port for homogenous bagged cargo is 3,200mt .

A typical example for the under-utilisation of sheds is shed No. 1. This shed could under normal circumstances, depending on the type of cargo, accommodate 2100 mt of a mix of general cargo or 2,500 mt of homogeneous bagged cargo. However, this shed is presently blocked by about 300 mt of vodka . As a consequence the shed is custom sealed and cannot be used for any other purposes .

Shed No. 7 had recently been used for the storage of approximately 440 mt of Azeri cotton, which led to an occupation of about 60 % of that particular warehouse .

Warehouses and silos represent a very important buffer function, thus laying the ground for smooth and uninterrupted cargo handling operations with excellent productivity figures. As a consequence of the aforesaid, it can be said ,that due to the lack of figures, which would render indications, the performance in the field of storage in warehouses cannot be assessed.

There are, however, some obvious bottlenecks which are visible even without an intensive warehouse operation.

- Lack of suitable pallets. Those pallets, which are available, are in a very bad state and in a desperate need of repair and have actually reached the end of their life span.
- Lack of s which could be used to cover cargo, which needs special care. Also tarpaulin is a must, when vulnerable cargo is touching the apron.
- Valuable space in warehouses is used as magazines for stores. Viewing the contents e.g. in building No 15 (warehouse No 6) and building No. 13 it remains rather doubtful , whether any of the goods stored there, will ever be used inside the port.
- The location and the layout of most of the warehouses render the impression that they have been chosen under civil engineering aspects rather than under operational ones
- The majority of the doors are too small for unhindered cargo operations .
- The warehouses do not match international standards as it may be required by customers of the port .

- Lack of adequate equipment for lateral movements. The cargo has to be transported virtually sling by sling by FLTs from or to the warehouse. This is a very inefficient procedure, having a very negative effect on the productivity.

In view of the anticipated change in the cargo pattern and under the objective to increase the productivity of the ports, the port will in the future have to provide warehouses for a wide variety of goods as general cargo, all kinds of bagged goods, chilled and frozen cargo and facilities for bulk cargo like grain silos .

### 2.1.6 Dispatch and Delivery

The typical mode of cargo transfer in both directions ship/shore and v.v. is the direct receiving of discharged cargo, or delivery of cargo by rail wagon and direct loading on the ship. The volumes of cargo, which are stored either in warehouses or in open storage areas are negligible. The principle, which is being applied in all well organised and efficient ports of the world, that the cargo should, in order to increase the productivity of the ports, not be received or loaded by a direct mode, has still to be implemented in the Georgian ports. The recent exceptions, where the indirect mode had been applied was the outgoing shipments of cotton and logs.

The direct cargo transfer mode as a general rule is very inefficient because of frequent interruptions due to lack of rail wagons or trucks supposed to deliver or to receive cargo, which are bringing the operations to a complete standstill .Whereas cargo being discharged in the indirect mode, e.g. via silo of warehouse or open storage areas, would not be subject to such delays. In European ports losses incurred to the party concerned and caused by standby periods are charged with substantial amounts to the party being responsible for these delays .

Reduce the direct transfer mode in favour of the use of buffers will be one of the measures to be taken in order to reach the objective to improve the performance and productivity of the Georgian ports to the level of the best organised ports of the world.

The productivity which can be achieved with the direct cargo transfer mode, and which is governing the productivity of the port is dealt with below .

### 2.1.7 Railway operations

Railway operations are the factor dominating the layout and the operation of the Georgian ports. The operation is solely focusing on direct delivery to and from rail wagons. As already stated before, this constitutes a very unfavourable environment for a good productivity.

The operation is frequently interrupted by shunting operations. These shunting operations cannot always be undertaken in the shift breaks. During the last years the performance of the railway was very poor, and mainly caused by lack of fuel and electric power. Many of the rail wagons are in a very poor technical condition, which adds to the other complications.

The shunting operations in Batumi port are carried out by two locomotives of the railway company which are permanently stationed in the port. They are equipped with 2,700 hp engines, which can be considered to be more than sufficient to cover needs of shunting.
In order to cope with the bottlenecks which are inherited from the system of direct cargo transfer to and from rail wagons and the poor state of the Georgian Railways, the port has rented one additional similar locomotive from the railways to improve the operations. This locomotive is on permanent standby and has proofed to be very helpful. If that locomotive breaks down, it will be substituted by the railway on return. Fuel and maintenance and repair are included.

One of the main bottlenecks of the Batumi Port railway system is, that only one railway track is leading out of the port.

**Port of Batumi** - Railway influenced operations

Average actual performance

| Commodity | Package | Handling equipment | mt per day |
|---|---|---|---|
| **Sugar** | bags | crane | 900 |
| **Flour** | bags | crane | 900 |
| **Grain** | bulk | cane /grabs | 5,900 |
| **Grain** | elevator | elevator | 1,700 |
| **Ammonium Nitrate** | bags loading | crane | 800 |

Considering the circumstances, the direct delivery of goods functions fairly good and seems to have improved also due to the improved performance of the Georgian Railways. A good example is, that recently a vessel carrying 34,500 mt of grain in bulk achieved a discharging rate of 361.5 mt/hour or 8,676 /day. This figure was based on the operational time at berth working time including time for shunting operations but excluding periods of rain. This discharging rate could only be achieved by maintaining a well organised and functioning railway operation throughout the discharging operation.

### 2.1.8 Truck operations

Truck operations do not play a significant role in Batumi port. The port layout does not provide sufficient parking space for trucks waiting to receive or deliver cargo. If the volume of cargo which received or delivered by trucks increases, the port would face serious problems to accommodate these waiting trucks. Trucks waiting to be served are often lined up in a bus stop area, and are thus representing a dangerous obstacle for the traffic and the public transport. As a general rule trucks are being loaded or unloaded in the open storage areas by the cranes in a direct cargo transfer mode.

Due to the very small cargo volumes handled there are no relevant statistics, which render information about the performance achieved. The impact on the overall performance of the port is minor

### 2.1.9 Ferry Operations

At the present time no ferry services call the port of Batumi.

### 2.1.10 Ships' Time in Port

The duration of the total turn-round time in the port in correlation to the type of cargo, and the times lost within the various defined periods, are very important factors, when an assessment about the port's performance as a whole is being made. The total turn-round time is the determining decision making tool for shippers, charterers and ship owners, when they are contemplating which port to call to deliver or receive their cargo for shipment. Substantial non operational times generate losses for the owner (if on liner terms) and for the charterer, who would then have to pay demurrage to the ship owner as compulsory stipulated in the charter party.

The table 3.6 *'Ship's time in port of Batumi'* in Annex 6 of this volume shows the main port performance data from January 1997 to September 97.

Analysing the table it becomes quite evident, that the overall performance of the port is negatively influenced by detentions in the operation. The reasons are varying from factors beyond the control of the port, like lack of documentation, missing instructions by shippers or receivers, delays due to the direct delivery mode and last not least by the typical climatic conditions at Batumi. According to the meteorological office Batumi is witnessing about 160 -170 rain days annually, a factor which cannot be altered .

The summary of the pre-berthing waiting time makes up for 32 % of the total turn-round time.
The average of the total time lost in port is 61 % of the total turnaround time.
The average of the total time lost between the operational time and the time at berth is 37 % .

### 2.1.11 Throughput figures

**PORT OF BATUMI**
**DEVELOPMENT OF YEARLY THROUGHPUT**

| Year | Total Throughput | Change in % to previous year | Dry cargo throughput | Change in % to previous year |
|---|---|---|---|---|
| **1993** | 1,757,200 | n.a . | 974,700 | n.a. |
| **1994** | 1,147,400 | - 35 % | 664,400 | - 32 % |
| **1995** | 1,383,900 | + 20 % | 741,600 | + 12 % |
| **1996** | 1,350,200 | - 3 % | 602,600 | - 19 % |
| **1997 ( 1 - 9 )** | 2,170,000 | n.a. | 728,300 | n.a. |
| **1997 ( projected )** | 2,500,000 | + 85 % (projected) | 971,00 (projected) | + 61 % (projected) |

### 2.1.12 Port productivity and handling rates

What had been said about Poti port in respect of the productivity and the typical hindrances going along with the prevailing direct delivery and receiving procedure to and from the railwagons, does also apply for the Port of Batumi albeit on a somewhat smaller scale.

The port is smaller and can be controlled easier. The dispatcher office is manned by qualified staff and located in a position which allows also visual observance of the railway operations.
The differences in the productivity are only marginal.

**PORT OF BATUMI**
**PRODUCTIVITY INDICATORS IN MT**

| INDICATORS | | | | | | |
|---|---|---|---|---|---|---|
| **COMMODITY** | **packed** | **per vessel per day** | **per vessel per hour** | **per gang per vessel per hour** | **per man per vessel per hour** | **remarks** |
| grain | in bulk | 6,800 | 283 | 94 | 12 | by grab , 3 gangs |
| grain in | in bulk | 1,700 | 850 | 425 | 53 | by 2 elevators |
| flour in | bags | 950 | 40 | 20 | 1.2 | |
| sugar | bags | 950 | 40 | 20 | 1.2 | |
| fertilizer | bags | 900 | 37.5 | 18.8 | 1.6 | |
| wooden logs | loose | 650 | 27.1 | 13.4 | 2.3 | |
| Aluminum powder | bulk | 6,450 | 300 | 150 | 18.7 | |
| scrap handy size | loose | 270 | 11.3 | 5.7 | 0.5 | |
| other foodstuff | miscell. | 900 | 37.5 | 18.8 | 1.6 | |
| silico manganese | bulk | 2,000 | 83 | 41.7 | 7 | |
| metal products | unpacked | 1,000 | 42 | 21 | 3.5 | |
| caustic soda | drums | 600 | 25 | 12 | 2 | |
| cotton | bales | 300 | 12.5 | 6.3 | 0.5 | |
| ferry operations | units | not existing | | | | |
| containers | units | no container services calling Batumi | | | | |

Information based on port documents, verbal verification, and own observations.
Figures related to *hours at berth.*
Times lost are fully incorporated regardless the reason .

*Assumption:*
Two gangs working except for containers, where one gang is compulsory due to lack of space .
Oil cargo not considered .

**PUMPING RATES FOR OIL CARGO**

| TYPE OF OILPRODUCT | PUMPING RATE PER HOUR IN MT |
|---|---|
| Fuel oil | 800 |
| Diesel Oil | 1,000 |
| Naphta | 450 |
| Gasoline | 370 |

### 2.1.13 Dwell time of cargo in port

In this area, the remarks to Poti are also valid for Batumi. Here, the direct cargo delivery and receiving mode determines the dwell time of the cargo in the port. In the field of incoming cargo the figures are negligible when set in relation to the total throughput.

## ***PORT OF BATUMI***

## AVERAGE DWELL TIME OF CARGO IN PORT

| Type of cargo | Mode of delivery | Dwell time in days | Remarks |
|---|---|---|---|
| oil in bulk | direct railwagon | nil | |
| scrap | by truck | 90 -120 | Accumulation for shipment |
| grain in bulk | direct railwagon | nil | |
| chemicals in bags | direct railwagon / truck | nil | |
| flour in bags | direct railwagon | nil | |
| sugar in bags | direct railwagon | nil | |
| cotton | direct railwagon/truck | nil | |
| cotton | through warehouse | 40 - 60 | |
| wooden logs | by truck - open storage | 30 | |
| spirits | ex ship - warehouse | 120 | |

### 2.1.14 Work interruptions

Viewing the contents of table 3.1 in annex 6 of this volume, which is showing a representative cross section of interruptions. The figures shown under the heading *' time lost by interruptions in % to total time in port '* are fairly stable. The average time lost under this category amounts to 99% .

The figures shown under the heading *' time lost by interruptions in % to operational time at berth '*, Table 3.2 in annex 6 of this volume, are subject to substantial variations. The average time lost in this category amounts to 38 %.

Analysing this table it is surprisingly revealed, that the influence of the current problematic situation on the electric power supply has not been of big relevance for the operation of the port. The data shown in the table furthermore underline, that the main bottleneck hampering the operation is the performance of the Georgian Railways .

Batumi suffers - and this cannot be altered - by the extremely high rainfall, which brings the dry cargo area to a complete standstill sometimes for days. As a consequence of this unchangeable reality any future development activities will have to take this meteorological environment into account, and should thrive to lessen the dependency on rainy intervals

# 3 Port of Poti and Batumi - theoretical capacity calculation

The theoretical capacity of the port of Poti and Batumi have been calculated by assigning the predominantly handled types of cargo to the berths which have been designed for these types of cargo or are being mainly used for the latter. Only a calculation, which is based on this principle will lead to realistic results. The typical cargoes handled at the berths have been described under the 'Stevedoring' part of this report.

Further basic principles which have been incorporated are

- Pump capacity of cranes in relation to type of cargo
  grab capacity for grain 6 m3 corresponding to about 5mt and for other bulk cargo with 9mt per grab .
- 20 working hours per day . Deriving from 21.5 working hours minus time for berthing/unberthing etc.
- A general efficiency factor of 66 % ( deductions for shifting operations of gangs and cleaning 1.5 hours).
- It has been assumed, that the two cranes , which are located at each pier are the only ones working, despite of the fact, that the system of crane posting is being handled flexible as far as the railtracks are permitting changes of position.
- It has been assumed, that the cranes are in a good working condition, without substantial breakdown times .
- The port has been considered ' full' as far as the berth occupancy of the operational berths is concerned.
- 365 working days per year are applied .
- 80 days deductions for rain effecting the handling of vulnerable cargoes.
- Deductions for existing bottlenecks which cannot be changed considering the present layout of the port have been considered in relation to the type of delivery/receipt and commodity.
- The calculated best case scenario had been set in relation with the approximate actual figures.
- The state of the open storage behind the berths and the possibility to serve as buffer has been observed as well, as the availability of warehouse space for such purpose.

The numbers of working days have been calculated with 365 , because the ports are working throughout the year also on Sundays and National Holidays .
The cargo pattern has changed during the last years, which also reflects on the type of cargo handled on the berths. The former special designation each of the piers and the way of operation has undergone some changes, which applies especially to Poti Port. In particular the changed cargo pattern at Terminal No. II has in turn also altered vital elements of the capacity calculation.
The somewhat exorbitant deductions for bottlenecks will be found confirmed in the 'Productivity' part and the table ' Ship's time in port '. Deductions for losses caused by rain have been integrated on a very moderate level and may well be higher in fact. There are seasonal and annual changes, which may influence the throughput in a negative or positive way.

Changes in the cargo pattern have not been witnessed in Batumi Port on the same scale as in Poti Port. Advantages in the field of bottlenecks in Batumi, like a more effective railway operation are more than offset by the number of rain days (between 150 - 170 per year) and sometimes boisterous weather conditions, which at times are forcing vessels to leave the port.

## *PORT OF POTI*

## *APPROXIMATE ACTUAL CAPACITY CALCULATION*

| Berth No | Cargo | Crane type | Lifting cap. mt | Theoretical handling capacity per working day and crane | No of cranes per berth | Estimated daily production in mt | Working days per year (no deductions for rain ) | Calculated anual capacity for berths in mt | Deductions for unchangeable bottlenecks (civil engin. Constraints, direct delivery mode) | Estimated capacity after deductions for bottlenecks | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | oil | none | --- | 5,000 mt | n.a. | 5,000 | 365 | 1,825,000 | 50 % | 912,500 | |
| 2 | general cargo Project cargo, containers | Sokol | 16 | 6 mt-20cycles - 20 hrs | 2 | 4,800 | 365 | 1,752,000 | 80 % | 350,400 | |
| 3 | general cargo, project cargo | Sokol | 16 | 6 mt-20 cycles-20 hrs | 2 | 4,800 | 365 | 1,752,000 | 80 % | 350,400 | |
| 4 | bulk | Sokol | 16 | 9 mt 40 cycles -20 hrs | 2 | 14,400 | 365 | 5,256,000 | 70 % | 1,576,800 | |
| 5 | scrap | Sokol | 16 | 3 mt- 30 cycles- 20 hrs | 2 | 3,600 | 365 | 1,314,000 | 60 % | 525,600 | loading |
| 6 | bulk , projects | Sokol | 16 | 5 mt -20 cycles -20 hrs | 2 | 4,000 | 365 | 1,460,000 | 90 % | 146,000 | RoRo berth |
| 6 | RoRo | -- | -- | 15mt-50trailers-20hrs | -- | 15,000 | 365 | 5,475,000 | 95 % | 273,750 | via No. 7 |
| 7 | containers | Kondor | 40 | 10mt-10 moves-20 hrs | 2 | 4,000 | 365 | 1,460,000 | 80 % | 292,000 | |
| 8 | grain | Sokol | 16 | 5 mt - 40 cycles-20 hrs | 2 | 8,000 | 365 | 2,920,000 | 80 % | 584,000 | 10 % rain |
| 9 | grain, gen. cgo | Ganz | 6 | 2,5 mt-25 cycles-20 hrs | 2 | 2,500 | 365 | 912,500 | 80 % | 182,500 | 10 % rain |
| 10 | grain, gen. cgo | Albatros | 10 | 2.5 mt-25 cycles-20 hrs | 2 | 2,500 | 365 | 912,500 | 80 % | 182,500 | 10 % rain |
| 11 | no activities | | | | | | | | | | |
| 12 | RoRo | n.a. | -- | 15mt-50 trailers-20 hrs | - | 15,000 | 365 | 5,475,000 | 95 % | 273,750 | no rails |
| 13 | no handling | | | | | | | | | | |
| 14 | lay up berth | | | | | | | | | | |
| 15 | no activities | | | | | | | | | | |
| **TOTAL CAPACITY** | | | | | | | | **30,514,000** | | **5,650,200** | |

## *PORT OF BATUMI*

## *APPROXIMATE ACTUAL CAPACITY CALCULATION*

| Berth No | Cargo | Crane type | Lifting cap. mt | Theoretical handling capacity per working day and crane | No of cranes per berth | Estimated daily production in mt | Working days per year (no deductions for rain ) | Calculated annual capacity for berths in mt | Deductions for unchangeable bottlenecks (civil engin. constraints, direct deliv. ary mode) | Estimated capacity after deductions for bottlenecks | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,3 | Oil | pumps | 700/ hour | 20 x 700 | n.a. | 14,000 | 365 | 5,110,000 | 66% | 1,737,400 | mix of oil & derivatives |
| 4 | lay-up berth | no operation | | | | | | | | | |
| 5 | lay-up berth | no operation | | | | | | | | | |
| 6 | Scrap, logs, bagged cargo | Ganz | 6 | 2 mt - 30 cycles 20 hrs | 2 | 2,400 | 365 | 876,000 | 80 % | 175,200 | 20 % rain |
| 7 | grain | Albatros | 2 | 5 mt - 40 cycles 20 hrs | 2 | 8,000 | 365 | 2,920,000 | 80 % | 584,000 | 20 % rain |
| 8 | grain | Hartmann elevator | n.a. | 100 mt - 20 hrs | 2 | 4,000 | 365 | 1,460,000 | 80 % | 292,000 | 20 % rain |
| 9 | gen. cargo & bagged cargo | Ganz | 6 | 2mt -30 cycles 20 hrs | 2 | 2,400 | 365 | 876,000 | 80 % | 175,200 | 20 % rain |
| 10 | private operation | priv. mobile cranes | -- | outside port control | | | | | | | |
| 11 | passenger & RoRo facilities | none | -- | 15mt- 50 trailers 20 hours | n.a. | 15,000 | 365 | 5,475,000 | 80 % | 1,095,000 | no marshalling |
| TOTAL CAPACITY | | | | | | | | **16,717,000** | | **4,058,400** | |

# 4 Proposals for the Development of new Cotton Storage Facilities

## 4.1 Identification and Specification of storage requirements for cotton

### 4.1.1 Size and weight of bales

The size and the weight of the cotton bales are varying slightly by their country of origin.

At the time of drafting this report a lot of 440 mt of cotton originated from Azerbaijan had been stored at Batumi Port in Warehouse No. 4 and loading was under progress.

The size of these bales was
L x W x H = 100 x 750 x 500 mm
The average weight was calculated 200 kg.

Cotton bales originated from Uzbekistan are usually measuring
L x W x H = 100 x 700 x 600
The average weight was given with 220 kg

### 4.1.2 Maximum stacking height

The criteria determining the maximum permissible stacking height of cotton are

- The permissible stack loads of the warehouse floor
- Stacking safety and accident prevention
- Fire prevention and fighting aspects
- General mode of stacking (e.g. on pallets or conventional)

Cotton bales from the Central Asian area are usually not stacked more than five and at times maximum six high.

### 4.1.3 Numbers of different consignments to be stored simultaneously

It is compulsory to stack the consignments separately by incoming rail wagon. Each stack is marked with the number of the rail wagon and the date of receipt.

Considering the above said, the need for further separation under commercial aspects is not evident. The lots cannot be mistaken unless on purpose. Here the quality of the concerned warehouse managements will be the governing factor. Major traders, moving big volumes, will however thrive to have their exclusive storage facilities.

Separation because of fire protection will be dealt with later .

### 4.1.4 Ventilation requirements

Ventilation is only required to avoid the development of mould .

### 4.1.5 Construction measures to protect against moisture and dirt

The warehouses dedicated for cotton for whichever period have to be kept very clean and free of oily substances. The cleaning has to be an ongoing process in particular with focus on oily substances, which will be found on the warehouse floor caused by the use of FLTs during the stacking and unstacking process .

Ingress of humidity has to be avoided under all circumstances. Selfignition of damp cotton is a constant danger. Damp cotton by its nature tends to generate an exothermic reaction which leads to selfignition. In a port environment, which produces a wide variety of chemical and non chemical dusts, it will be necessary to seal off cotton warehouses against the influx of such substances and humidity whenever applicable.

As a general rule, it is recommended, if natural or electrical ventilation systems are installed, that they should be constructed or rebuilt, considering the natural characteristics of cotton and the possible impacts by the transport from the ginnery to the port of shipment. Ventilation is necessary, when the cotton which is being delivered for storage is already damp or humid. In this case a ventilation system would serve to avoid the development of mould. It is however imperative, that such ventilation pits can be effectively, and rapidly closed in the event of outbreak of fire.

### 4.1.6 Equipment used for the handling of cotton

**Stevedoring**
The loading of cotton in Poti and Batumi is being carried out as described below.

In **Batumi** the bales are taken from the stack inside the warehouse by FLT. They are then lowered into a custom made steel pallet. The loaded steel pallet is transported into the loading area.
The alternative mode is direct transfer from rail wagon to the loading location. In this operation a FLT is also used to unstack the bales inside the rail wagon, and to put them on a similar pallet which is located on a loading platform. The pallet is taken to the loading area, where the bales are being lifted by hooks. Each lift consists of 4 bales. Precautions to protect bales, which might and in fact do fall from the pallet during that procedure by e.g. spreading tarpaulins on the ground, are not taken.

The achieved loading rate per ship per day lies between 300 - 400 mt .

At **Poti** the procedure is different .
The cotton is transported from the warehouse to the loading point by means of trailers. The cotton bales are loaded by hooks which are fitted to a spreader. By this way each lift carries 10 bales of cotton. Hence the average daily productivity per ship and day is about 500 mt, compared with 300 - 400 mt at Batumi.

**Shore handling & storing**
The cotton bales are arriving at the prospective port of loading by rail wagons. The unstacking of the rail wagons is then performed by means of FLTs and mobile or fixed loading ramps. The stacking in the warehouses is carried out by FLTs .

### 4.1.7 Constructional requirements for dedicated warehouses for the storage of cotton in bales

When constructing a warehouse dedicated to the storage of cotton certain facts have to be observed. Cotton is considered a dangerous good under the IMDG Code. It is listed under class 4.1 (flammable solid) when dry and under class 4.2 ( spontaneously combustible ) when wet. As a result, the volume which can be stored in one compartment is limited by the need to avoid the spreading of any fire. For the calculation of the size of the shed and the fire protected compartments the following data have been considered :

- size of one bale 1000 x 700 x 600 mm
- weight of one bale 220 kg
- proposed size of warehouse 120 x 60 m
- maximum size of fireprotected compartment 2,400 m2 gross
- usable for storage after deduction for driveways 60 % or 1,440 m2
- size of warehouse 120 x 60 m ( 3 fireprotected sections of 40 x 60 m )
- Cotton stacked five high

It has however to be mentioned, that under existing rules (safety regulation PD 31.82.03 -87) cotton may be stacked 9 high, but under no circumstances higher than 1.5 m under the roof of the warehouse

### 4.1.8 Calculation of Storage Capacity

| | |
|---|---|
| 1 bale - 100 x 700 x 600 cm | = 0.42 m2 |
| per m2 | = 2.38 bales |
| 2.38 bales x 220 kg | = 0.5236 mt/m2 ( one layer ) |
| 1,440 m2 | = 2,618 mt/m2 ( 5 layers ) |
| | =3.770 mt ( one fireprotected compartment ) |
| **3 x 1,440 m2** | **= 11.310 mt ( one complete shed )** |

A shed utilisation of 60 % might be the maximum achievable under block stowage conditions. Any deviation from that principle may well bring the utilisation factor down to 50 %. Provision for space for 'grading ' has not been made, due to uncertain extend and temporary nature.

Considering the possibility, that Poti might reach a throughput of 100,000 mt of cotton at the end of 1997, three of these warehouses would have to be in place within a short time period. For economic and security reasons, these warehouses should be located within the port area.

In a meeting with the representative of 'Uzneshtrans' Mr. Anvar Samigdzhanov in the office of 'Orion Maritime Agency' he stated, that his organisation would like to have storage facilities at Batumi to accommodate 15 - 20,000 mt of cotton .

### 4.1.9 Important general factors to be incorporated in the design

The entire warehouse has to be built of solid material of fireproof material. This applies also for all technical instalments and appliances .

The loadcapacity of the surface should allow for the use of FLTs and under no circumstances be less, than 10 mt/m2.

Each compartment should be fitted with one door, which should also allow for the passage of forklifts .

The warehouses should at one side be equipped with a ramp for the unloading of rail wagons. The surface level of this ramp should match the floor of the rail wagons for easy unloading by FLTs . For this purpose the ramp will have to have a width of not less, than 6 m.

Considering the prevailing climatic conditions and the vulnerability of the cotton ,it is recommended to cover the entire ramp by a roof, reaching also over the first rail track. This will foster the uninterrupted unloading of rail cars also under unfavourable weather conditions and save standby payments for rail wagons.

Ventilation as a general rule is required on a very limited basis only. The only purpose of ventilation is the avoidance of development of mould.

### 4.1.10 Fire protection measures to be incorporated in the design

The fire protection walls have to be minimum 1 m higher than the roof .

- If electrical operated ventilation is installed , ventilator cowls leading into the warehouse have to be fitted with spark preventing screens.
- Emphasis has to be laid on the accessibility of the closing devices for the ventilation outlets.
- In case of fire it is significant how fast these outlets can and will be closed.
- Smoke detection systems combined with alarm systems , which are supported by a backup power supply in case of power cuts have to be installed.
- Sprinkler systems are considered to be a must for fast and efficient fire fighting and hence have to be installed.
- Smoking and the use of open fire to be strictly forbidden , corresponding warning tables to be fitted, and guards to be posted on 24 hours basis .
-

### 4.1.11 Cotton Storage Facilities Outside the Port

Considering the possibilities to construct cotton storage facilities in the port of Poti, it is interesting to know, that the cotton traders did not wait for the port to develop its facilities but have taken the initiative into their own hands. In order to overcome the present lack of appropriate facilities the State Transport Company of Uzbekistan (UZV) has appointed the Georgian Trans Expedition Ltd (GTE) as their agents. GTE has meanwhile actively promoted the rehabilitation of the "Old Tea Warehouse" for storage of cotton.

At present four warehouses have been rehabilitated and another one will be completed soon. The four warehouses provid approximately 20,000 mt of suitable storage space for cotton. The fifth shed, when completed will add about another 10,000mt to this capacity.

The completed warehouses are working to capacity. The cotton bales in the sheds are stacked up to 9 high. The stacking and unstacking operations are performed by new "Linde" forklifts which are equipped with the necessary special clamps for easy mechanical handling of the bales.

GTE can handle fifty rail cars with forty to forty-five tons each per day. Packing of containers on the premises as well as from rail car directly into the container is in full swing. After stuffing the containers are trucked to the port for shipment.

# Section 4

# Assessment of the Present Port Facilities under Mechanical Engineering Aspects

# Table of Contents

# 1 Poti

The inspection in the port of Poti took place in the period from August 5 to 10, 1997. During this time, the following equipment was inspected:

## 1.1 Ship-to-Shore Cranes

A total number of 31 cranes were included in the port's asset list, namely:

| Maker/Type | Number |
|---|---|
| SOKOL | 19 |
| KONDOR | 3 |
| ALBATROS | 4 |
| GANZ | 5 |
| **Total** | **31** |

In addition, eight cranes and two pneumatic unloaders are still standing inside the port area. However, they are not functional due to damages and/or cannibalising of major components. For this reason, these ten items were not inspected in detail.

## 1.2 Spreaders

As the tare weight of the existing 20' and 40' frame spreaders is more than five times as much as that of modern light-weight spreaders, it is not recommended to have them repaired but to buy new spreaders.

In addition, it is recommended to purchase either rotating units for the new spreaders or new spreaders with integrated rotator and flippers shall be procured for container handling. This will considerably increase productivity.

## 1.3 Grabs

The existing number of grabs is sufficient and can be maintained by local resources. There is no need for replacement.

## 1.4 Forklift Trucks

The following forklift trucks were inspected:

| Maker/Type | Number | Capacity |
|---|---|---|
| SHINCO (electro) | 6 | 900 kg |
| JUNGHEINRICH | 14 | 1.5 t |
| TOYOTA | 9 | 1.5 t |
| HYSTER | 2 | 2 t |
| TOYOTA | 1 | 2.5 t |
| NISSAN | 3 | 4 t |
| TOYOTA | 1 | 10 t |
| KALMAR | 2 | 10 t |
| KALMAR | 2 | 25 t |
| **Total** | **40** | |

Some more forklift trucks and attachments are stored in and around the workshop area. However, these units are cannibalised and beyond economical repair.

## 1.5 Wheel Loaders

The following wheel loaders were inspected:

| Maker/Type | Number |
|---|---|
| KOMATSU/WA 200 | 6 |
| BOBCAT/843 | 5 |
| **Total** | **11** |

## 1.6 Tractors

There are seven tractors working within the port:

| Maker/Type | Number |
|---|---|
| XING-TAI/180 | 5 |
| SISU/TR 160 | 2 |
| **Total** | **7** |

As the XING-TAI tractors are very small and can handle draw-bar trailers with a maximum payload of two to three tons only, they are not used for cargo handling but for transport of spares and consumables within the port's area.

## 1.7 Trailers

The asset list below shows the number of Ro/Ro trailers which were handed over from the shipping line to the port.

As the roads - with railway tracks crossing - do not allow smooth running, the trailers cannot be used for transportation within the port. Furthermore, wheels, axles and twist locks of most trailers need to be replaced.

In addition, there is no heavy equipment/forklift trucks available to unload the cargo beyond the outreach of the cranes. Thus, container transportation with these trailers is not possible inside the port at this moment

| Capacity | Number |
|---|---|
| 20'/25 t | 78 |
| 40'/40 t | 10 |
| **Total** | **7** |

## 1.8 Locomotives

One locomotive was inspected. The Port Authority has leased two additional locomotives for the shunting within the port area.

## 1.9 Marine Equipment

While the floating equipment was not inspected during this visit, the required asset list was established. The port owns the following equipment:

### 1.9.1 Tug Boats

| Name | Capacity | Year of construction |
|---|---|---|
| REKVAVA | 2 x 1250 Hp | 1980 |
| KHIBIKOV | 2 x 600 Hp | 1977 |
| BUKIA | 2 x 600 Hp | 1977 |

The three tugboats have fire fighting equipment, however the condition is very poor (only one of three is operational).

### 1.9.2 Pilot Boat

| Name | Capacity | Year of construction |
|---|---|---|
| BUREVESTNIK | 2 x 300 Hp | 1984 |

### 1.9.3 Water Barge

| Name | Capacity | Year of Construction |
|---|---|---|
| KHIBULA | 800 t | 1983 |

### 1.9.4 Oil Barge

| Name | Capacity | Year of Construction |
|---|---|---|
| T - 8 | 500 t | 1960 |

### 1.9.5 Lighter Boats

| Name | Capacity | Year of Construction |
|---|---|---|
| 147 | 100 t - pwt | 1980 |
| 148 | 100 t - pwt | 1980 |

### 1.9.6 Floating Cranes

| Name | Capacity | Year of construction |
|---|---|---|
| VANO KHOKHOBAIA | 35 t/32 m | 1990 |
| PK-28 | 100 t/32 m | 1957 |

## 1.10 Workshop

The inspection comprised the mechanical workshop with the incorporated stores. The workshop has enough space to offer maintenance and repair to the existing port equipment. However, it is in urgent need of modern tools and workshop machinery. If possible, the mechanical and the electrical workshop should be reallocated according to the new terminal layout and rebuilt to future requirements, i.e. including modern installations.

The mechanical store lacks spare parts and consumables.

While the electrical workshop is equipped with basic machinery, it lacks spare parts for the repair of electric motors and switch boards.

# 2 Batumi

The inspection in the port of Batumi took place in the period from August 10 to 19, 1997. During this time, the following equipment was inspected:

## 2.1 Ship-to-Shore Cranes

A total number of 12 cranes were inspected:

| Maker/Type | Number |
|---|---|
| ALBATROS | 4 |
| ABUS | 1 |
| GANZ | 7 |
| **Total** | **31** |

In addition, two pneumatic unloaders (HARTMANN, 150 t/h) were checked.

The port has bought electrical spare parts to repair one of the GANZ cranes.

## 2.2 Spreader

The port owns one 20' frame spreader financed under the World Food Programme. The spreader requires some smaller repair works which can be carried out locally.

However, at present, the port does not handle any containers.

## 2.3 Grabs

The existing number of grabs is sufficient and can be maintained by local resources. There is no need for replacement.

## 2.4 Forklift Trucks

The following 23 forklift trucks were inspected:

| Maker/Type | Number | Capacity |
|---|---|---|
| TOYOTA | 15 | 1.5 t |
| STILL | 2 | 3.6 t |
| TOYOTA | 3 | 4 t |
| HYSTER | 1 | 5 t |
| MITSUBISHI | 1 | 10 t |
| TOYOTA | 1 | 10 t |
| **Total** | **23** | |

## 2.5 Wheel Loaders

The following wheel loaders were inspected:

| Maker/Type | Number |
|---|---|
| BOBCAT/843 | 4 |
| KOMATSU/WA 200 | 3 |
| DRESSER/515 | 1 |
| **Total** | **8** |

## 2.6 Tractor

One tractor for draw-bar trailers, type BELARUS, is available in the port. However, as trailers are missing and as operation in the port is generally not based on truck/trailer operation, it is not used for cargo handling but only for transport within the port, such as pulling the air compressor.

## 2.7 Air Compressor

The workshop installed one ATLAS COPCO air compressor, type XA 320, on a draw bar.

## 2.8 Marine Equipment

The following 16 boats stationed in the port were inspected during this visit:

### 2.8.1 Tug Boats

| Name | Capacity | Year of construction |
|---|---|---|
| USHHA | 2 x 1115 Hp | 1973 |
| MEREKHI | 2 x 1115 Hp | 1968 |
| KOM. KVACHANTINADZE | 2 x 600 Hp | 1979 |

### 2.8.2 Pilot Boats

| Name | Capacity | Year of construction |
|---|---|---|
| GAREGI | 2 x 150 Hp | 1963 |
| LK-93 | 2 x 300 Hp | 1988 |

### 2.8.3 Passenger Boats

| Name | Capacity | Year of construction |
|---|---|---|
| SKHALTA | 1 x 150 Hp | 1972 |
| OPIZARI | 1 x 300 Hp | 1982 |
| BATUMI | 2 x 300 Hp | 1978 |
| IVARIA | 2 x 150 Hp | 1990 |

### 2.8.4 Sewage Boats

| Name | Capacity | Year of construction |
|---|---|---|
| TSISKAZA | 1 x 225 Hp | 1982 |
| AISI | 1 x 225 Hp | 1989 |

### 2.8.5 Oil Pollution Boat

| Name | Capacity | Year of construction |
|---|---|---|
| FAUNA | 1 x 135 Hp | 1988 |
| ARAQUI | 1 x 135 Hp | 1989 |

### 2.8.6 Water Barge

| Name | Capacity | Year of construction |
|---|---|---|
| CHAROKHI | 800 t | 1985 |

### 2.8.7 Petrol Barge

| Name | Capacity | Year of construction |
|---|---|---|
| KINTRISHI | 2 x 150 Hp, 250 t | 1956 |

### 2.8.8 Mooring Boat

| Name | Capacity | Year of construction |
|---|---|---|
| TSITSKNA | n.a. | n.a. |

## 2.9 Power Station

The port has its own power station with two generators and a mobile power station for the pneumatic grain unloaders. It was purchased by the World Food Programme.

## 2.10 Workshop

The port of Batumi has good mechanical and electrical workshop facilities, enabling the port to maintain and rehabilitate the existing equipment. Nevertheless, the port is lacking funds for required spare parts and a modern stock-keeping system.

Inspection details of all equipment can be found in Annex 5.

# Section 5

# Review of Present Facilities under Railway Engineering Aspects

# Contents

# 1 Port of Poti

## 1.1 Railway Connections to the Port of Poti

The Port of Poti is situated at the Eastcoast of the Black Sea. The Trans-Caucasian Railway Line connects it after passing Senaki, Abasa, Samtredia, Kutaisi, Zestaponi, Tbilisi and crossing the border of Azerbaijan finally to Baku at the Caspian Sea.

At the railway from Poti to Abasa there are single-tracks. Further on in direction of Tbilisi there is a double-track railway.

The distances are:

| | |
|---|---|
| Poti - Abasa | 57 km |
| Poti - the border of Azerbaijan | appr. 400 km |

The total distance is electrified. The voltage is 3500 V D.C.. The engines can continue the traction up to a voltage drop to 3300 V, then the traffic gets shut down. Due to the bad supply with electrical energy this happens often. At the single-track railway between Poti and Abasa the signalling system and the block apparatus are out of work. The trains are announced per phone. There are four crossing stations where trains can meet at the distance. At the double-track railway there is a signalling system and a block apparatus.

During a period of 24 hours 12 trains can run the distance Poti - Abasa in each direction. The maximal gross weight of a train is 2,700 t. A higher weight is impossible because of the slopes of the mountains in the area between Zestaponi and Tbilisi. The driving time from Poti up to the border of Azerbaijan is almost 15 hours. The average speed of the trains is 25 km/h.

At the railroad junction Samtredia where also the branch for the railroad to Batumi is, the wagons for the ports of Poti and Batumi are pre-lead respectively collected.
The district station of Poti is situated at the western ending of the railroad. It is owned by a national railroad company. Trains coming from or leaving the city of Poti in eastern direction end up and start from here. At the district station of Poti the trains are dissolved, lead directly to the port or parked intermediate in the railroad area. The deposit capacity of the district station is 1200 wagons.

## 1.2 Track Equipment

The general condition of the track equipment is very poor. The main reason for this is the humid cohesive foundation soil which is impermeable for water. Due to this the railroad tracks can not be installed according to the technical requirements. To achieve an unwatering of the track area drainages must be installed. The drainages must have short connections to the flood beginning. At the same time the tracks must be lifted up on a higher level. First after these steps far-reaching repair work or renewals can be done.

The repair work and renewal of the track equipment should be conducted by a railway expert with the respective know-how.

The first steps to be done are the execution of the following repair works:

- Draining of the stagnant water in the track areas.
- Removal of soil and cabbage/grass in the tracks and lifting of the sleepers.
- Protection against water running off into the tracks.
- Protection of the most moving rail joints by insertion of sleepers and coupled sleepers due to avoid derailments.
- Preparation of the rail joints by screwings attached with a minimum of four screws (the position of the rail joints should be subtend opposite).
- Exchange of destroyed sleepers.
- Tightening of the screwings for all fastenings of tracks and switches.
- Beat in all loose nail fastenings of tracks and switches or preferable exchange with spring bars (enclosures 1-3).

An intermediate planning should provide for repair work of the supply tracks, for the loading berths in the port and the main switching tracks including the respective switches. Moreover the tracks for dispatching of the railroad ferry (and the new build tracks, see 2.5 Railway Ferry) have to be repaired or new-built in the above mentioned way.

A long-term planning should take into consideration that the new planning of the single quay areas and their track equipment have to include a plan for traffic by cars and carts (e.g. fork-lifts) in these areas. The new plans must be according to the above mentioned principles and the technical rules. Moreover a third switching track for the quay is needed as addition (see 2.3 Management).

Management

The operations in the port are carried out by three engines, owned by the national railway company. The port operator arranges all manoeuvring with the district station of Poti. The dispatcher and the head of manoeuvring are then assigned by the district station of Poti.

An improvement would be made if the port operator had direct access to the switch engines for operations in the port. Arrangements with the station dispatcher would then only be concerned with junction lines to the station. For this purpose engines from the station and personnel and maintenance must be hired.

All old wagons should be removed from the tracks in the port area. The tracks must be at disposal for switching, deposit, loading and discharging work.

The order of the wagons is done early by the customer himself. The order goes to the transport-order through the railway department in Tbilisi. Then the wagons are collected in Samtredia or in Poti. The port orders the wagons 2 - 3 days before the loading date.

The return of not-working wagons delivered by the station should be paid by the station. The separation and parking of these wagons causes much manoeuvring and pre-leading of tracks in the port.

### 1.2.1 Track Equipment Port of Poti

#### General Conditions

| | |
|---|---|
| Normal tide | appr. 0,2 m |
| Storm tide | appr. 0,4 m |
| Quay Level | appr. 1,5 m above Sea Level |
| Ground Water | appr. 0,8 m - 1 m under top edge of the ground |

The gauge of the railway is 1520 mm -4/+30 mm (wide gauge)

The administrative area of the port of Poti includes:

- 36 tracks and track sections with
- 16.000 m total length
- 38 switches
- 8 level crossings, additionally: several passable track areas.

### 1.2.2 Condition of the Track Equipment in the Port

#### Bedding

The bedding mostly consists of impermeable soil mixed up with little rubble (tends to formation of silt). Due to the high ground water level (almost 80 cm under the top edge of the ground) and much rain the foundation soil is very humid. Because of the not elaborated draining of surface water and the arrangement of artificial barriers e.g. walls and dams (heaps of soil are left after work) there are many areas with stagnant water. As a consequence some of the tracks lie in water with a silted foundation. In many cases the tracks are very overgrown with cabbage/grass.

#### Recommendation:

By repair of tracks and switches the present bedding should be taken off as much as possible and replaced with sand. A drainage placed parallel to the railroad bedding and connected lateral to the flood beginning would be an advantage. For separation of the single layers a geo-textile should be placed on the prepared ground surface. The bedding on top of this should not content water absorbent materials. A bedding consisting of ballast would be the best solution. A 20 - 30 cm thick layer of ballast should be placed under the tracks and switches. The bays of the sleepers should be filled up to the top of the sleepers. After their installation the tracks and switches should be packed up to an at least 5 cm higher level. The width of the bedding at the head of the sleepers should be 25 cm at tracks with rail joint gaps.

### 1.2.3 Sleepers (wooden or concrete)

In many cases the condition of the wooden sleepers is poor due to the humid installation place. The concrete sleepers are partly torn from the bearing of the sleepers in parallel longitude direction to the outside in direction of the head of the sleepers. Due to the pending rail joints and the not proper screwing of the lugs at the rail joints, almost all joints are heavily moving up and down during a pass over. As a consequence the screwings of the sleepers are pulled out and the sleepers are therewith destroyed.

#### Recommendation:

Concrete sleepers should be installed in the tracks because of their ability to resist water. To avoid formation of cracks there must be made efforts in an improvement in quality. Wooden sleepers can be used for

tracks where the drainage has been improved. Long continuos wooden sleepers should be used for the switches.

### 1.2.4 Fastenings of the Rails

#### Fastening of wooden sleepers:

The fastening of the rails with nails is not working well. The nails do not support the rails in a flexible way. They are loose because of the heavily up and down moving track.

#### Fastening of concrete sleepers:

The condition of the fastenings is good.

#### Recommendations:

For wooden sleepers:
At straight tracks or at curves with a radius larger then 300 m, spring bars should be installed e.g. double-stretching nails/spring nails (enclosure 1 - 3). At curves with a smaller radius then 300 m or at switches, fastenings of clamping plates with ribbed plates should be installed.

For concrete sleepers:
At straight tracks or at curves with a radius larger then 300 m spring bars should be installed e.g. strainers (enclosure 4). At curves with a smaller radius then 300 m fastenings of clamping plates should be installed.

### 1.2.5 Rails

The condition of the rails is quite good, only a few of them are worn out. The form of the rails is R50 or R65. In some cases the endings of the rails are broken out.

#### Recommendation:

There should be paid attention to a better treatment of the rails during their installation. If possible, rail-cuts should be done with a separator and not be burnt with an autogenous cutting machine. Anyway, to avoid a hardening of the high-temperated zones the rail-cuts should be reworked with heat. Also the screw holes of the rail webs should not be burnt but drilled and deburred with machines.

### 1.2.6 Switches

There are only used switches with a gradient of 1:9 and 1:11. At switch connections between two tracks the total-length of the connection is extended. To shorten the total-length the centre rails are installed in a way which is not fitting to the radius of the switch. Instead, the connection of the centre rails bends strongly behind the respective frog part of the switch.

In general the switches are equipped with normal sleepers (length: appr. 2,7 m) at each railroad track. In most cases there are wooden sleepers in the blade and the frog part areas and concrete sleepers in the central part. The sleepers lie very close to each other due to the doubling of the sleepers in the central and frog part areas. As a consequence the bays of the sleepers contain only little bedding and the switch packing is poor.

The fastenings of the single switch parts are mainly loose. Not only the fastenings of the rails are loose but also the rail-fittings in the areas of the stock rails, frog parts and guard rails. The screwings are mostly attached without protecting spring rings.

Recommendation:

Long continuos sleepers should be installed at the switches to improve the stability. They should be packed by their installation. The fastenings of the switches should be installed regular and a permanent maintenance is necessary.

### 1.2.7 Rail Joints

The screwings of the rail-endings to the lugs are insufficient. In many cases one screw only is attached per rail-ending, sometimes even one screw only per joint. Moreover, these screws are loose. Due to this fact the lug connections can not support the rail joints. The rail joints are mostly arranged in an order that the position of the joint is central to the threshold field. Also, the joints of the two rails of one track do not lie in the same threshold field. As a consequence of the conditions mentioned above and also because of the poor foundation soil almost all rail joints are heavily moving up and down during a pass over. Due to the same reasons the rail joints are acute angled in the curve area or at the radius of the switches.

The rail-endings are in many cases burnt with an autogenous cutting machine (see 2.2.4 Rails). The rail endings break out because of the hardening resulting from the above mentioned treatment. The joint gaps have a length between 100 - 150 mm. At larger outbreaks the rail-endings are burnt off and 20 - 30 cm long rail adapters are installed. Long lugs bridge across the adapters, partly without any screwings.

Recommendation:

Due to the poor maintenance at the present time one of the first steps should be the installation of supporting sleepers under or close to the rail joints to get an intercepting effect. The screwing of the lug joints should be done in a proper way with four screws. At the same time an effort in improvement of the foundation soil should be made.

### 1.2.8 Others

At the quay areas with a continuos concrete plate (e.g. Berth 8) the sleepers of the tracks and switches lie almost directly up on the concrete plate. The bedding of these sleepers is only 5 cm thick. At the head of the sleepers the bedding is missing. The bedding in the threshold fields of the sleepers consists of lean concrete. Due to this the condition of the track is poor. The intervals of the sleepers are irregular between 40 cm and 110 cm.

On the quay areas and most of the berths the railroad tracks and the crane tracks are on different high levels. Their levels are also different towards the lateral areas. Due to the different levels traffic by cars and carts is impossible in these areas.

Recommendation:

The new planning of the single quay areas and their track equipment has to include plans for traffic by cars and carts (e.g. fork-lifts). The plans must be according to the technical rules and principles.

## 1.3 Organisation of Work

The electrical traction engines are owned by the railroad station Samtredia. The Diesel-switch engines belong to the district station of Poti. The Diesel-engines are used for operations in the port. They are managed by the station. Operating orders must be co-ordinated with the port operator by phone. At the district station of Poti the wagons are parked or delivered directly to the port.

At the port itself there are only few possibilities for the parking of wagons. The only and very limited possibilities for parking are at the district station north of berth 3 - 6 and in the southern area outside of the port walls. As a consequence of the lacking parking possibilities extensive manoeuvring is necessary. Although only few tracks are available for the parking of wagons the tracks no. 18, 22 and 23 are used as deposit place for wagons which are out of order (due to derailments etc.).

At the time being, the direct trans-shipment ship-railroad takes place on the single berths at two tracks which are located at the waterside and under the cranes. A switching track for the single berths with switching connections to the two loading tracks is missing. As a consequence, the loading and discharging at some berths can only be done when the work at the other berths is stopped and the wagons of the other berths can be switched too.

| **Cost Examples** | **Standard Price** (appr. ECU) |
|---|---|
| Delivery of single sleepers: | |
| Wooden sleepers | 30 |
| Wooden sleepers, incl. double shaft spring nails | 45 |
| Wooden sleepers, incl. rail-fittings for the fastening of the clamping plates | 60 |
| Concrete sleepers, incl. strainers or clamping plates | 45 |
| Exchange of single sleepers (per m): | |
| Removal of single sleepers and the necessary bedding and storage of the bedding in the parallel area, removal of screwing and nails from the sleepers, storage of the sleepers for loading, insertion and fastening of the substitute sleepers and refilling with the stored bedding | 50 |
| Delivery of sand: | |
| 100 kg sand to the building site | 10 |
| Delivery of ballast: | |
| 1000 kg ballast to the building site | 25 |
| Removal of tracks (per m): | |
| Lifting and removal of tracks at sleepers with bedding of ballast and gravel, storage of the separated material in the parallel area, removal of screwings and nails, loosening of the plates, removal and loading of bedding | 25 |
| (soil and gravel), removal and loading of the subsoil appr. 80 cm deep, 3 m wide | 55 |
| Installation of tracks, incl. delivery without rails (per m): | |
| Discharge, refill and back-filling (=compression) of subsoil (gravel), installation of the geo-textil, construction of the ballast ground surface and backfilling of 20 cm. Paying out the sleepers, put on the rails, assembly and fastening of the tracks, filling of the ballast bedding up to the top of the | |
| sleepers, packing and lifting of the tracks on a higher level by hand, establishing side ways | 250 |

## 1.4 The Railroad Ferry

A report on the traffic potential of the new railroad ferry connection between Poti and Illyichewsk has already been elaborated by the HPTI-Domier-RMG consortium (STUDY ON THE TRAFFIC POTENTIAL FOR THE RAIL FERRY SERVICE BETEEN POTI AND ILLICHEWSK).

The railroad ferry "Geroi Shipki" of the shipping company UKR-FERRY in- and outgoing from and to the port of Poti has a track-length of usable 1.606 m (appr. 108 wagons) at its disposal. By a total utilisation of the railroad wagons, the length of the tracks must be doubled in order to achieve a quick dispatching of the ferry for import and export. The extension is possible in the track area of the tracks 17 to 20 including an additional new building of two tracks in-between the tracks 18 and 19. Moreover a by-pass track for all tracks should be at disposal. Track 21 could be used for this purpose.

The captain and the first officer of the ship state, that the loading of the ferry only can take place when respectively the internal or the external tracks of the main deck are loaded and discharged at the same time. The different burdening of the outside track may in total not be higher then 400 - 500 t. The weight of the loading difference of the internal tracks can be higher due to the leaning over of the ship. The upper and the lower deck are used through a lift and a ship-owned two-way car by the central track of the main deck. To avoid limitations the external and the central tracks could only be used when two engines work at the same time.

Then there are supposed to be 5 tracks at the ferry bridge at the country side, and 3 tracks in front of the bridge area and the connection on the countryside should include 2 tracks with a minimum length according to the length of the main deck tracks plus the length of the engine.

If the loading of the ship was done with only one track countryside and one bridge track than the external and internal tracks could not be loaded (minus 38 wagons). The loading of the upper and the lower deck would be same procedure as before. The free space on the main deck could be used for trucks (30-32 trucks).

Should the loading take place through five bridge tracks and the track on the countryside then the wagons must be moved in small groups from and to the external and the internal tracks with an exact co-ordination and attention to the loading-limits. This procedure would cause an enormous switching effort and take very long time.

# 2 Port of Batumi

## 2.1 Railway Connections to the Port of Batumi

The Port of Batumi is situated at the East coast of the Black Sea, close to the border of Turkey. The Trans-Caucasian Railway Line connects it after passing Samtredia, Zestaponi, Tbilissi and crossing the border of Azerbaijan finally to Baku at the Caspian Sea. At the railway from Batumi to Samtredia there are single-tracks. Further on in direction of Tbilissi there is a double-track railway.

The distances are:

| | |
|---|---|
| Batumi - Samtredia | appr. 110 km |
| Batumi - the border of Azerbaijan | appr. 450 km |

The total distance is electrified. The voltage is 3500 V, D.C.. The engines can continue the traction up to a voltage drop to 3300 V, then the traffic gets shut down. Due to the bad supply with electrical energy this happens often. At the single-track railway between Batumi and Samtredia the signalling system and the block apparatus are out of work. The trains are announced per phone. There are 15 crossing stations where trains can meet at the distance. At the double-track railway there is a signalling system and a block apparatus.

During a period of 24 hours 10 trains can run the distance Batumi - Samtredia in each direction. The maximal gross weight of a train is 2700 t. A higher weight is impossible because of the slopes of the mountains in the area between Zestaponi and Tbilissi. The driving time from Batumi up to the border of Azerbaijan is almost 17 hours.

At the railroad junction Samtredia where also the branch for the railroad to Poti is, the wagons for the ports of Poti and Batumi are pre-lead respectively collected.
The district station of Batumi is situated at the south-western ending of the railroad. It is owned by the national railroad company. Trains coming from or leaving the city of Batumi in eastern direction end up and start from here. At the district station of Batumi the trains are dissolved, lead directly to the port or parked intermediate in the railroad area.

## 2.2 Track Equipment

The general condition of the track equipment is very poor. The main reason for this is the humid cohesive foundation soil which is impermeable for water. Due to this the top of the roadbed can not be installed according to the technical requirements. To achieve an unwatering of the track area drainages must be installed. The drainages must have short connections to the flood beginning. At the same time the tracks must be lifted up on a higher level. First after these steps far-reaching repair work or renewals can be done.

The repair work and renewal of the track equipment should be conducted by a railway expert with the respective know-how.

The first steps to be done are the execution of the following repair works:

- Draining of the stagnant water in the track areas.
- Removal of soil and cabbage/grass in the tracks and lifting of the sleepers.
- Protection against water running off into the tracks.
- Protection of the most moving rail joints by insertion of sleepers and coupled sleepers due to avoid derailments.
- Preparation of the rail joints by screwings attached with a minimum of four screws (the position of the rail joints should be subtend opposite).
- Exchange of destroyed sleepers.
- Tightening of the screwings for all fastenings of tracks and switches.
- Beat in all loose nail fastenings of tracks and switches or preferable exchange with spring bars

An intermediate planning should provide for repair work of the supply tracks, for the loading berths in the port and the main switching tracks including the respective switches.

A long-term planning should take into consideration that the new planning of the single quay areas and their track equipment have to include a plan for traffic by cars and carts (e.g. fork-lifts) in these areas. Moreover a third switching track for the quay is needed additionally (see 2.3 Management).

In the port area there are only few tracks (tracks 24- 27) available for the disposition of wagons. An enlargement of the capacity is necessary. Through a restructuring of and changes in the track connections in the area of the switches 68 to 64, which are placed in the access area of the port, there would be a possibility for two additionally tracks. These tracks could be used as air scoop. In order to achieve an improved location of the tracks it is possible that the road crossing must be enlarged. The road crossing also need to be renewed.

All old wagons should be removed from the tracks in the port area. The tracks must be at disposal for switching, deposit, loading and discharging operations.
The return of not-working wagons delivered by the station should be paid by the station. The separation and parking of these tracks causes much manoeuvring and pre-leading of tracks in the port.

The order of the wagons is done early by the customer himself. The order goes to the transport-order through the railway department of Tbilissi. Then the wagons are collected in Samtredia or in Batumi. The port orders the wagons 2 - 3 days before the loading date.

The operations in the port are carried out by two engines, owned by the station of Batumi, which belongs to the national railway company. The engines are hired by the port. The dispatcher and the head of manoeuvring are directly assigned by the port operator.

### 2.2.1 General Conditions

Normal tide appr. 0,2 m

Storm tide appr. 0,4 m

Quay Level appr. 2,5 m above Sea Level

Ground Water appr. 1,5 m - 2 m under top edge of the ground

The gauge of the railway is 1520 mm -4/+30 mm (wide gauge)

The administrative area of the port of Poti includes:

13 tracks and track sections with

4.500 m total length

14 switches

2 level crossings, additionally: several passable track areas.

### 2.2.2 Bedding

The bedding mostly consists of impermeable soil mixed up with little rubble (tends to formation of silt). Due to the cohesive ground and much rain the foundation soil is very humid. Because of the not elaborated draining of surface water and the arrangement of artificial barriers e.g. walls and dams (heaps of soil are left after work) there are many areas with stagnant water. As a consequence some of the tracks lie in water with a silted foundation. In many cases the tracks are very overgrown with cabbage/grass.

#### Recommendation:

By repair of tracks and switches the present bedding should be taken off as much as possible and replaced with sand. A drainage placed parallel to the railroad bedding and connected lateral to the flood beginning would be an advantage. For separation of the single layers a geo-textile should be placed on the prepared ground surface. The bedding on top of this should not content water absorbent materials. A bedding consisting of ballast would be the best solution. A 20 - 30 cm thick layer of ballast should be placed under the

tracks and switches. The bays of the sleepers should be filled up to the top of the sleepers. After their installation the tracks and switches should be packed up to an at least 5 cm higher level. The width of the bedding at the head of the sleepers should be 25 cm at tracks with rail joint gaps.

### 2.2.3 Sleepers (wooden or concrete)

In many cases the condition of the wooden sleepers is poor due to the humid installation place. The concrete sleepers are partly torn from the bearing of the sleepers in parallel longitude direction to the outside in direction of the head of the sleepers. Due to the pending rail joints and the not proper screwing of the lugs at the rail joints, almost all joints are heavily moving up and down during a pass over. As a consequence the screwings of the sleepers are pulled out and the sleepers are therewith destroyed.

#### Recommendation:

Concrete sleepers should be installed in the tracks because of their ability to resist water. To avoid formation of cracks there must be made efforts in an improvement in quality. Wooden sleepers can be used for tracks where the drainage has been improved.

### 2.2.4 Fastenings of the Rails

Fastening of wooden sleepers:
The fastening of the rails with nails is not working well. The nails do not support the rails in a flexible way. They are loose because of the heavily up and down moving track.

Fastening of concrete sleepers: The condition of the fastenings is good.

#### Recommendations:

For wooden sleepers:
At straight tracks or at curves with a radius larger then 300 m, spring bars should be installed e.g. double-stretching nails/spring nails (enclosure 1 - 3). At curves with a smaller radius then 300 m or at switches, fastenings of clamping plates with ribbed plates should be installed.

For concrete sleepers:
At straight tracks or at curves with a radius larger then 300 m spring bars should be installed e.g. strainers (enclosure 4). At curves with a smaller radius then 300 m fastenings of clamping plates should be installed.

### 2.2.5 Rails

The condition of the rails is quite good, only a few of them are worn out. The form of the rails is R50 or R65. In some cases the endings of the rails are broken out.
Recommendation:

There should be paid attention to a better treatment of the rails during their installation. If possible rail-cuts should be done with a separator and not be burnt with an autogenous cutting machine. Anyway to avoid a hardening of the high-temperated zones the rail-cuts should be reworked with heat. Also the screw holes of the rail webs should not be burnt but drilled and deburred with machines.

### 2.2.6 Switches

There are only used switches with a gradient of 1:9. At switch connections between two tracks the total-length of the connection is extended. To shorten the total-length the centre rails are installed in a way which is not fitting to the radius of the switch. Instead the connection of the centre rails bends strongly behind the respective frog part of the switch.

The fastenings of the single switch parts are mainly loose. Not only the fastenings of the rails are loose but also the rail-fittings in the areas of the stock rails, frog parts and guard rails. The screwings are mostly attached without protecting spring rings.

#### Recommendation:

There should be installed a ballast bedding for the switches and they should be packed during the installation. The fastenings of the switches should be installed regular and a permanent maintenance is necessary.

### 2.2.7 Rail Joints

The screwings of the rail-endings to the lugs are insufficient. In many cases one screw only is attached per rail-ending, sometimes even one screw only per joint. Moreover are these screws loose. Due to this the lug connections can not support the rail joints. The rail joints are mostly arranged in an order that the position of the joint is central to the threshold field. Moreover the joints of the two rails of one track do not lie in the same threshold field. As a consequence of the conditions mentioned above and also because of the poor foundation soil almost all rail joints are heavily moving up and down during a pass over. Due to the same reasons the rail joints lie acute in the curve area or at the radius of the switches.

The rail-endings are in many cases burnt with an autogenous cutting machine (see 2.2.4 Rails). The rail endings break out because of the hardenings resulting from the above mentioned treatment. The joint gaps have a length between 100 - 150 mm. At larger outbreaks the rail-endings are burnt off and 20 - 30 cm long rail adapters are installed. Long lugs bridge across the adapters, partly without any screwings.

#### Recommendation:

Due to the poor maintenance at the present time one of the first steps should be the installation of supporting sleepers under or close to the rail joints to get an intercepting effect. The screwing of the lug joints should be done in a proper way with four screws. At the same time an effort in improvement of the foundation soil should be made.

### 2.2.8 Others

At the head of the sleepers the bedding is missing. Due to this the condition of the track is poor. The intervals of the sleepers are irregular between 40 cm and 110 cm.
On the quay areas and most of the berths the railroad tracks and the crane tracks are on different high levels. Their levels are also different towards the lateral areas. Due to the different levels traffic by cars and carts is impossible in these areas.

Recommendation:

The new planning of the single quay areas and their track equipment has to include plans for traffic by cars and carts (e.g. fork-lifts). The plans must be according to the technical rules and principles.

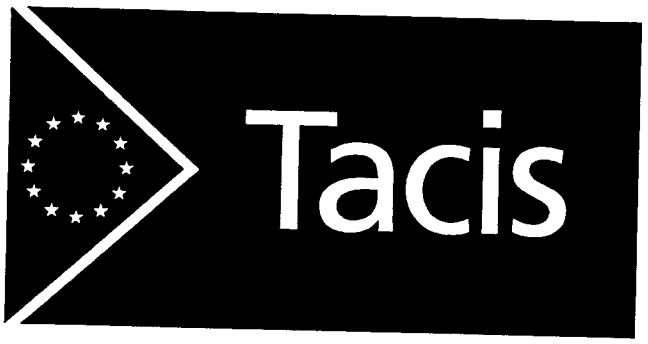
## 2.3 Organisation of Work

The electrical traction engines are owned by the railroad station of Samtredia. The Diesel-switch engines belong to the district station of Batumi. The Diesel-engines are used for operations in the port. They are hired by the port from the station. The port operator has direct access on the engines. Only orders concerned with transfer operations must be coordinated with the station of Batumi. At the district station of Batumi the wagons are parked or delivered directly to the port.

At the port itself there are only few possibilities for the parking of wagons. The only and very limited parking possibilities are at the area countryside (tracks 24 - 27) As a consequence of the lacking parking possibilities extensive manoeuvring is necessary. Especially in the area Berth 8 and 9 only 6 wagons and 2 engines can be switched alternate. Although only few tracks are available for the parking of wagons tracks (e.g. track 31) are used as deposit place for wagons which then get repaired.

At the time being the direct trans-shipment ship-railroad takes place on the single berths at two tracks which are located at the waterside and under the cranes. A switching track for the single berths with switching connections to the two loading tracks is missing. As a consequence the loading and discharging at some berths can only be done when the work at the other berths is stopped and the wagons of the other berths can be switched too.

Cost Examples for repair materials
The same prices as shown in 1.3 can be applied




# Feasibility Study of New Terminal Facilities of the Georgian Ports Plan Civil Engineering Assessment

# Phase I Report, Vol IV

31 October 1997

# Volume IV Civil Engineering Assessment of Present Port Facilities

# Table of Contents

## Drawings



## Annexes

# 1 Civil Engineering Aspects Port of Poti

## 1.1 Port Layout

### 1.1.1 Outline of the port and adjacent areas

The Port of Poti exists of 3 basins (see Drawing 1.1):

- Northern Basin:
  The North-East side of the northern basin is occupied by the military marine base, while on the south side of this basin a shipyard is located. The area around the northern basin is not port owned territory
- The Inner Basin:
  The inner basin is the main part of the cargo port. At the northern side of this basin mainly bulk cargo is handled, while at the southern side general cargo is handled. Containers are handled at the end of the basin. This basin has 12 berths, which are all in operation.
- The Southern Basin:
  Three berths (no. 13 up to 15) are located in this basin. Berth no 13 is between the southern and inner basin and is used as ferry terminal. The remaining part of the basin is mainly used for laying up and temporarily mooring of vessels. At this basin a grain milling company is located, area of which is not port property.

The cargo port of Poti is located at the Inner and Southern Basin and encloses an area of 49 ha.

The main adjacent areas are (see Drawing 1.2):

- Military Marine Base:
  The military marine base is not used as such anymore. The basin is silted as a result of the sediment outflow by the Rioni River. Especially the north-western part, where the soil is already above water level (see Photo P7; Annex 3). At the moment only small coast guard patrol boats are using the berths on the East side
- Ship Yard:
  The ship yard is operational on a very low level. It used to employ 2500 people, which declined to 350 people nowadays. The shipyard used to produce small high speed vessels. The production of these vessels has stopped. Nowadays, only ship repairing activities are carried out. The total area is 12 ha, of which approximately 48000 m2 is in use by warehouses and workshops. The depth near the existing quay is 5 m.
- Grain Milling Company:
  At the southern part of the port a grain milling company is located (berth no 15), which is operational except of the grain silo. The storage capacity of the silo is 24000 ton. Construction of a new quay 340 m long has been cancelled after driving the first concrete piles. At the moment, (fishing)vessels use the quay for mooring.
- City Centre:
  The city centre is located on the south-eastern side of the port.

### 1.1.2 Dimensions of quay-walls, basins and storage areas

The water depths at most of the quays vary between 8,0 and 12,5 m. The lengths of the berths vary between 175 and 220 m. The dimensions of the quay-walls, basins and storage areas are presented in Annex 7.1.

### 1.1.3 Port Extension Areas

In southern direction it is difficult to extend the port, since the city is located at this area. At the southern basin the grain factory is occupying a large area. This factory is not operational and is owned by the Ministry of Industry. However, to use this area for other purposes than handling of grain will result in the demolition of this immense grain silo (24.000 ton storage). It is possible to extend berth no. 15 at the southern basin, but this berth will only be useful for grain handling.
At the northern side there are three extension possibilities:

- Shipyard Area:
  This 12 ha area is presently used on a very low level. Actually, the berths are being used for cargo handling on a small scale. For the present shipyard operations, this area is far too large. In this respect the ship yard could be willing to cede a part of their property.
- Military Marine Base:
  The marine base at the northern basin has not its traditional function as during the period of the former Soviet Union anymore. At the moment it is being used for coast guarding purposes and for housing refugees. Therefore, it might partly be used for port activities.
- Rioni River Delta:
  Farther to the North an impressive area of approximately 480 ha is available for development. This area is owned by the port. It has a high potential for far future port development, it will necessitate immense investments for all infrastructure to be constructed, though.

The areas are indicated in Drawing 1.2.

### 1.1.4 Rail and Road Connections

There is one principal inner port road. It leads from the southern port gate behind berth 11 along the port boundary to the workshops in the eastern port part. From there it proceeds behind the container terminal to a second port gate and leads at the port boundary to berth 2 and 3.

The main vehicle gate for the Port of Poti is located behind berth 11. It is a two lane gate. Outside this gate there is a parking area for approximately 40 trucks. Another vehicle gate is located in the north-eastern corner of the port.

Rail and road connections are indicated in Drawing 1.2. An impression of the railway condition is shown on photo P10 and P11 (see Annex 3 and Vol. III - Section 5, Annex 5).

### 1.1.5 Existing Development Plans

At the moment the tender process for the design and construction of a rail ferry ramp at berth no. 2 has been closed. The construction of this ramp will be completed in 1998.

The Port of Poti has a port development plan dated 1994. The main items of this plan are (see also Annex 2):

- Development of a container terminal at berth no. 12
- Development of a general cargo berth including a refrigerated warehouse at berth no. 14

- Construction of new quay for grain terminal at berth no. 15 including handling equipment (conveyor belt) and renovation of grain silo and factory.
- Development of an oil terminal at the inside of the northern breakwater (berth no. 16).
- Development of new terminals (container, general cargo, ro/ro and ferry) at military area (berth no. 17 up to 21).
- Passenger terminal at the south side of the southern breakwater (berth no. 22).

The above mentioned extensions comprise an area of 53 ha. Furthermore, the port has in mind the Rioni River Delta area of 480 ha for further port development.

### 1.1.6 Urban Development Plans

The economic effects of port operations is of major importance for the city and the welfare of the citizens, because currently the port is the only major employer in the Poti area. Therefore, city development plans are made in compliance with the port development plans.

## 1.2 Technical Condition of Port Facilities

### 1.2.1 Description of the Basins

The main characteristics of the 3 main basins are:

- Northern Basin:
  At the shipyard area a lot of buildings are located. These buildings have been used for warehousing and different parts of ship construction and repair. At the moment they are partly used and are in a bad condition. The quay is unsatisfactory, the water draught is limited (up to 5 m), the pavement is in a poor condition and many concrete slabs at the quay apron are broken (see Photo P8; Annex 3). A floating dock is located at the shipyard basin, but is not operational. Further, approximately 6 ship wrecks are waiting for demolition in this basin, of which some already sunk. The road at the shipyard is in a poor condition.
- Inner Basin:
  The main part of the port, the inner basin, has been constructed in the period 1900 - 1910. The Inner Basin encloses 12 berths with water depths varying between 8 and 12,5 m. The quays have been designed for direct ship/train handling. Most of the cargo is directly handled from ship into train and vice versa. Therefore, the quay aprons are provided with rail tracks, which are located under the cranes. Between the tracks there is no pavement. This makes it impossible to cross the rail tracks with rolling equipment.
  The port has been designed for especially bulk and general cargo handling, transported by train from and to the hinterland. However, container cargo constitutes a substantial part of nowadays cargo throughput.
  The original quay construction consists of concrete block walls with water depth of approximately 8 m. The condition of those walls is still reasonably acceptable, considering the condition of other infrastructure inside and outside the port. The blocks themselves are quite eroded over the years and the edges are substantially damaged. However, the lining and elevation are straight.
- Southern Basin:
  The southern part of the port is mainly used for laying up of old vessels, which are ready for demolition. Some years ago the port started with the construction of a new berth (berth no. 15). A few concrete piles have been driven into the ground. At the moment the area is used for laying up of (fishing) ships. The area behind the quay is not port property, but belongs to the grain company.

### 1.2.2 Condition of the Berths

The berths are numbered from 1 to 15, which are located at the inner and southern basin. The condition and characteristics are described in this section. A summary is presented in Annex 1. The cross-sections of the quay constructions are presented in Drawing 1.3.

#### Berth 1 and 2:

In 1978 berths no. 1 and 2 have been deepened up to 12.5 m and therefore enforced by sheet piles in front of the block wall. The top part of the quay consists of a concrete beam construction. This beam in particular is in a poor condition. Especially the alignment of quay no 2 is not straight and damaged (see Photo P1; Annex 3). The fenders are in good condition. Overall the condition of these berths is satisfactory. Berth 1 is used for oil handling and berth 2 for bauxite and containers.

#### Berth 3, 4, 5:

The construction of these berths consists of the original concrete block walls built in 1910 (see Drawing 1.3). Considering the age the condition of the quay itself is satisfactory. The blocks are eroded over the years and the edges are substantially damaged. However, the lining and level are straight. The fenders are old and too small, while the chains connecting the fenders to the quay are very corroded and should be replaced. These berths are mainly used for dry bulk cargo handling.

#### Berth 6:

The berth is constructed on concrete piles (L 22,5 m; 450 x 450 mm) and were built in 1968. On top of these piles a concrete construction supports the pavement and rail tracks. The condition of the concrete slabs at the quay side is very poor (see Photo P9; Annex 3). The fenders are old and too small, while the chains connecting the fenders to the quay are very corroded (see Photo P2; Annex 3). Berth 6 is mainly used for container handling and ro-ro, using berth 7 as ro-ro ramp.
In 1996 a Greek consulting company has investigated the underwater construction using scuba divers. The condition of the prefab concrete piles and deck is satisfactory given their long period in service. Only few of the pile caps appear to be fractured. These are mainly concentrated along the 3rd row counting from the water front. This row is apparently the most critical due to the static geometry of the structure in combination with the directly overlaid railway loading.

#### Berth 7:

This berth is the newest of the port and consists of a concrete construction on piles (L 22,5 m; 450 x 450 mm), built in 1984. The condition of the construction is satisfactory. However, some concrete damage at the waterside is noticeable. The fenders are very small. This berth is used for container handling.

#### Berth 8:

Same as Berth 6. It is used for container and general cargo handling.

#### Berth 9, 10 and 11:

Same as Berth 3, 4 and 5. These berths are used for general cargo and grain handling.

#### Berth 12:

The construction of these berths consists of concrete block walls built in 1940. The water depth is 6,5 m. The berth is used for the handling of the rail ferry. However, there is no rail ferry ramp existing. The rail wagons are discharged on the ship itself and loaded on trucks. By lack of a ro/ro ramp, the side ramp is used. Therefore, a temporary ramp construction has been made on the quay. The remaining of the quay consists of grass and footpath pavement, since this area has been developed as a passenger terminal with a touristic

look. Near berth 13 a ferry terminal building is located. The top edge of the quay is substantially damaged at one location. Large rubber fender roles are used of which one is broken.

Berth 13:

The construction of these berths consists of concrete block walls built in 1910. The water depth is 6,5 m. This berth is used by the car ferry. Special facilities (ramps, dolphins) do not exist. Instead the ferry uses its anchor (Mediterranean berthing).

Berth 14 and 15:

Same as Berth 3,4 and 5. These berths are presently used for laying up of old vessels and as mooring facility for fishing vessels.

### 1.2.3 Condition of Pavement

The pavement at the port consists of concrete, asphalt or gravel. The condition of the roads in general is satisfactory, with the exception of the road behind berth 7 and the railway crossings. However, if the port cargo volume will increase with a substantial portion of truck traffic the road system will not withstand heavy truck traffic. The condition of the concrete slabs at the open storage area of berth 7 is very poor. A substantial number of concrete slabs are subsided and there are a few holes up to 0,5 $m^2$ (see Photo P4; Annex 3). It is important to have good pavement in this area to make ro/ro and container handling operations faster and more efficient at this location (corner berth 6 and 7). The asphalt pavement of the storage / operations area at the general cargo berths (no. 9 and 10) is in good condition.

Except of berth 1,2 and 4, the storage areas at the northern side of the basin are mainly not paved, but consist of sand/gravel. The storage areas of berth no 1 and 2 are paved with concrete slabs. Berth 1 is used for iron ore storage. At berth 4 a new storage area made of concrete is presently under construction (see Photo P6; Annex 3).

The rail tracks on the quays are not provided with pavement between the tracks and therefore the area can not be crossed by other port equipment.

At the north side of the basin is an access road to berth 1 and 2, which is in a good condition. The asphalt road at the south side of the inner basin is in good condition.

### 1.2.4 Warehouses

There are only two warehouses at the Inner Basin of Poti, since most of the cargo is directly handled from ship into train. One warehouse (WH no. 4) is located at berth 10/11. This warehouse is very old, has small gates (4 x 4 m) and most of the glass is broken. The roof is not leaking. A second small warehouse (WH no. 22) is located at berth 10, which is in a unsatisfactory condition. Furthermore, the location of the access is not very suitable for operation.

### 1.2.5 Breakwater

The Port of Poti is protected by 2 breakwaters, a small one (250 m) at the north and the main breakwater (1800 m) on the western and southern side. The first part of this breakwater was constructed at the end of the 19th century. At that time the port entrance was on the western side. At a later stage this entrance has been closed and replaced to the northern side. At the same time the breakwater has been extended farther to the north.

It is made of a blockwall construction protected by concrete blocks up to 40 tonnes (slope 1:1.5) at the sea side. The condition of the breakwater is unsatisfactory. At the location of the old port entrance (a section of approximately 100 meter) the breakwater has been subsided up to 1 meter (see Photo P3; Annex 3). The cause of the subsidence is not clear. A number of reasons could have had an effect:

- Consolidation
  To close the port entrance, the approach channel had to be filled up with approximately 8 m of sand. Consolidation of this sand could have caused the subsidence.
- Toe construction
  It is very important to construct a proper filter construction at the toe of the breakwater to prevent erosion. Erosion of the toe construction will finally result in subsidence of the breakwater. It is not clear how this part of the breakwater has been built exactly (design or as built drawings are not available).
- Seismological effects
  Seismological events have had negative effect on the condition of the breakwater. The exact damage due to seismological effects is not clear.

A number of holes in the breakwater were caused by the subsidence. This has been confirmed by an underwater investigation made in 1990. These holes cause further erosion of the breakwater. A number of times, new concrete blocks have enforced the breakwater. However this will not prevent further erosion.

To define the exact reason for the erosion and to evaluate the present condition it is required to fulfill a comprehensive underwater survey and frequent control of the elevation.

### 1.2.6 Soil Condition

The soil of the port consists of a thick layer of alluvial sediments of sand and silt. The top layer is mainly fine sand. The thickness of this layer ranges between 5 to 10 m. Underneath are mainly layers of silt mixed with and clay.

Boreholes of some locations in the port are available. CPT (Cone Penetration Tests) are not available.

## 1.3 Topographical Survey

A topographical survey (scale 1:500) of the port area exists. This survey was updated in 1996. The layout of the port area is presented in Drawing 1.1 (scale 1:2500).

## 1.4 Port Utilities

### 1.4.1 Electrical Supply

Normally electric power is provided from the city network. The capacity of this network is 5 to 10 MW for the whole city area (40.000 inhabitants). In the past the capacity used to be 25 MW. This results in frequent power cuts, specifically in winter time. To overcome the problems of power cuts the port uses diesel generators with a total capacity of 3.5 MW. Currently 60% to 70% of the power is supplied by the city network and 30% to 40% by the port's own generators. The switch over from city network power supply to the emergency power generator takes approximately 20 minutes.

### 1.4.2 Fresh Water Supply

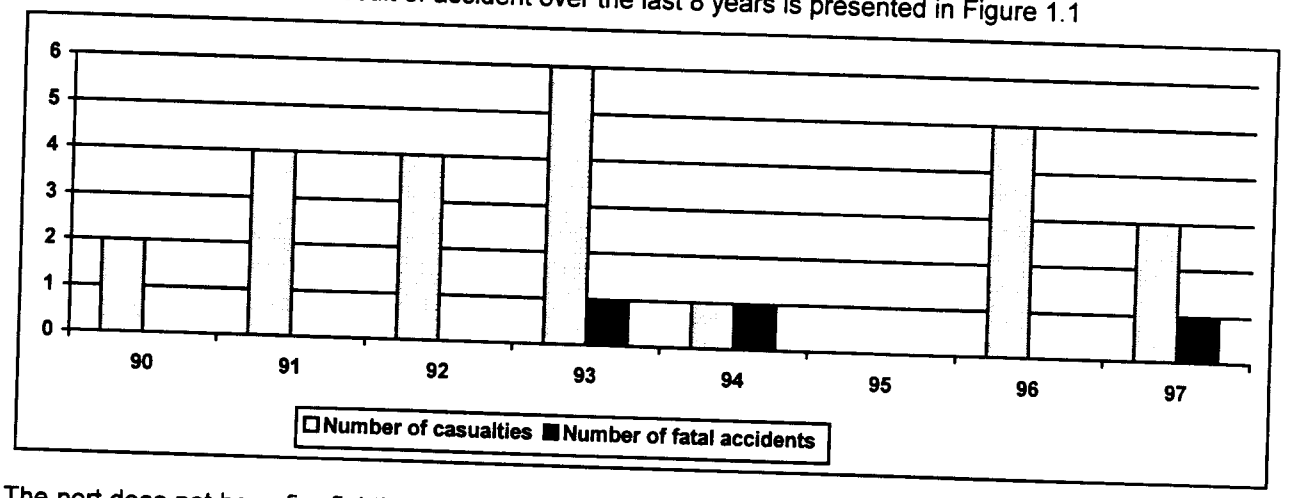
Fresh water supply is directly connected to the city network. The port has an own water storage facility with a storage capacity of 300 $m^3$, however a capacity of 2000 $m^3$ is required.

### 1.4.3 Sewage Water Treatment

The port sewage system is connected to the city network, which is connected to a sewage treatment plant. This plant provides physical treatment and has a capacity of 15000 $m^3$ per day, though it is presently not operational. The drainage system is partly connected to the sewage system and part of the rain flows straight in the sea.

### 1.4.4 Safety Installations

Number of casualties as a result of accident over the last 8 years is presented in Figure 1.1




The port does not have fire fighting vessels. The three tugboats do have fire fighting equipment, however the condition is very poor (only one of the three is operational). Inside the port area 3 fire fighting cars are available, while five cars from the city can be used in case of emergency. This fire control station is located at a distance of 2 km. The oil terminal is provided with a fire fighting system, which is in a good condition. Furthermore, a floating oil shield of 200 m and a oil waste skimmer is available to prevent dispersion of oil. Facilities for chemical rescue are available.

## 1.5 Navigational Conditions

### 1.5.1 Wave Conditions and Water Levels

The characteristic wave heights are presented in Table 1.1.

*Table.1.1 Wave conditions*

| Wind Direction | S | SW | W | NW |
|---|---|---|---|---|
| H-sign. | 2.0 | 4.0 | 4.1 | 2.2 |
| H-max | | | 7.0 | |

In general, above mentioned waves occur during spring and autumn. Hydrologic calculations indicate that a wave height of 4 m occurs during a 12 hour storm of 6 Bft (11 - 14 m/s). The maximum wave height is limited by the water depth in front of the breakwater, which is 10 to 15 m. The 7.0 m maximum wave height occurs during a 12 hour storm of 8 Bft )17 - 21 m/s.

The Black Sea has no tidal variation. The water level can rise by 0.2 m caused by wind set-up. The water level rise is very limited, due to the deep water conditions of the Black Sea.

### 1.5.2 Siltation and Water Depths

The Port of Poti suffers from severe siltation, which is caused by the Rioni river outlet 3 km north of the port entrance. The total discharge of sediment is estimated at 4 to 5 mln. ton per year. Before 1939 the river flowed through the city and entered the sea south of the port, resulting in beach formation at this location. After 1939 the flow of the river has been changed to the northern side of the port. By doing so the river sediment outflow was shifted from the southern side of the port to the northern side. As a result, on the southern side of the port coast erosion started and on the northern side the dynamic balance has been disturbed. The delta of the river was growing quickly in western direction, while port operations were hindered as a result of the substantial siltation of approach channel and basins.

Over the last 6 years an average of 700.000 $m^3$ of silt has been dredged at the port basins and approach channel. However, the yearly amount of maintenance dredging should be approximately 1 million $m^3$. The silt is dumped just south-west of the breakwater to reduce erosion. This amount is not enough to prevent further erosion, though.

*Table 1.2 Maintenance Dredging of Basins and Approach Channel at Port of Poti*

| Year | Amount (m3) |
|---|---|
| 1992 | 1.188.260 |
| 1993 | 618.650 |
| 1994 | 0 |
| 1995 | 1.005.700 |
| 1996 | 0 |
| 1997 | 700.000 (up to Sep.) |

The erosion on the south side of the port is a serious matter of concern for stabilisation of the breakwater. Only 400 m of the breakwater the water depth is up to 60 m, which means an average slope of only 1:7.

The water depths of port basins are presented in Drawing 1.1. These water depths have been measured by echo soundings in May - June 1997.

The design depth of the approach channel is 13,0 m, the actual depth is 12,0 m. The width of the channel varies between 80m and 100 m. The depth at the quays varies between 6,5 up to 10,0 m.

### 1.5.3 Navigational Aids

The entrance of the port is provided with navigation lights. 2,5 km south of the port there is a lighthouse constructed in 1864. Further, the centre line of the approach channel is indicated by leading lights on the land side. The condition of the lights is satisfactory.

A governmental department (Hydrologic Services) is responsible for maintenance and operation of the lights. Maintenance of the lights is financed out of port call dues.

The port is not provided with a radar system.

# 2 Civil Engineering Aspects Port Batumi

## 2.1 Port Layout

### 2.1.1 Outline of the port and adjacent areas

The Port of Batumi (founded in 1878) is located in the bay at the northern side of the city. This bay provides the port with a natural protection to western winds and waves. The port has one basin with 11 berths and one off-shore buoy mooring facility. The total port area encloses 13,7 ha. The layout of the port is presented in Drawing 2.1.

The main adjacent areas are (see Drawing 2.2):

- The oil company is located at various places around the port. The main area is South of the railway shunting yard. Furthermore, on the Eastern side of the port a number of tanks are located. The total area comprises approximately 40 ha.
- Fishery Port:
  At the Eastern side of the port is the fishery Port. This area encloses 3 ha.
- Furniture factory:
  East of the port at the other side of the road is a furniture factory. This factory is operational. This area encloses 7 ha. On this area are large production halls and warehouses. The factory is facilitated with a railway connection.
- Railway:
  A large shunting yard of the railways is located South of the port, between the city and the port.
- City:
  The city of Batumi is situated on the southern and western side of the port.

### 2.1.2 Dimensions of quay-walls, basins and storage areas

The water depths at most of the quays vary between 8,0 and 12,5 m. The lengths of the berths vary between 175 and 220 m. The dimensions of the quay-walls, basins and storage areas are presented in Annex 1.

### 2.1.3 Port Extension Areas

The directions the port could be extended to are:

- To the North-East:
  Extension of sea fronted areas is only possible in this direction. Nevertheless, at this area the water treatment plant and fishery port are situated.
- Off-shore:
  The other option is to construct berthing facilities in north-eastern direction. However, this will involve immense investments.

### 2.1.4 Rail and Road Connections

There is one inner port road leading from berth 1 to berth 8. This road is mainly designed for port vehicles. Berth 10 and 11 are directly connected to the city roads.

The only road gate is an electrically driven one-lane gate located at the southern side of the port. Special waiting lanes outside the gate are not available. As a result incoming trucks may block the main road. The

gate keeper stands inside the gate and is forced to look through small inspection openings in the steel sheet gate to see vehicles waiting outside.

Rail and road connections are indicated in Drawing 2.2.

### 2.1.5 Existing Development Plans

Development plans made by the port are indicated below (see also Annex 4):

1. Development container terminal:
   The port of Batumi wants to develop a container terminal at berth no. 4 and 5. Therefore, a new quay has to be constructed and furthermore the area of the former ship yard has to be prepared for open storage of the containers. The existing buildings are not really being used at the moment and therefore can be demolished. However, development of this area will involve cleaning of the soil which is oil polluted.
2. New grain elevators:
   Installation of 2 new grain elevators to replace the existing two Hartmann elevators
3. Development of ro/ro ramp:
   Plans are made to construct a ro/ro ramp in the corner of berth no. 5 and 6. This ramp should be able to handle rail ferries. The ramp is located near the railway gate. However, the capacity of this gate (presently one line) has to be extended.
4. Improve hinterland railway connection:
   The port of Batumi has only one railway track connection on the eastern side of the port. Plans are made to extent this connection with two tracks and a new shunting yard. In order to realise this plan it is required to use almost the whole area of the furniture factory. An alternative is to extent only the rail tracks, which requires only a small part of that area. Another shunting yard is planned farther to the North.
   The railway extension will be combined with the construction of a new road bridge crossing the railway.

## 2.2 Technical Condition of Port Facilities

### 2.2.1 Description of the Basins

The port has one basin with 9 berths (no. 1 - 9). Berth 1 - 5 are dedicated for oil handling. However berth 4 and 5 are not operational anymore. Berth 6 - 9 are used for mainly general cargo and dry bulk cargo handling. Outside the basin the passenger terminal is located with 2 berths (no 10 and 11) for ferry and ro/ro vessels. An offshore mooring facility for tankers is located outside the basin.

### 2.2.2 Condition of the Berths

In this section the technical condition of the berths is described. A summary is presented in Annex 1. The cross-sections of the quay constructions are presented in Drawing 2.3.

#### Berth 1:

Berth 1 is located at the end of the breakwater. This berth is used for oil handling. The construction exists of concrete block walls built in 1892. In 1972 the berth was reconstructed to enable mooring of tankers up to 25.000 DWT. Therefore in front of the existing blockwall sheet piles were driven up to 20 m depth. On top a monolith concrete beam has been constructed. The fenders consists of round rubber fenders diameter 1 m connected with chains to the quay. The fenders and the quay construction are in a good condition (see Photo B1; Annex 3).

### Berths 2 and 3:

Berths 2 and 3 are constructed simultaneously with berth 1 and the breakwater. Originally they consisted of a block wall quay with 6 m water depth. In 1928 the berth was reconstructed to enable mooring of larger vessels. Therefore two small pier constructions with a length of 30 m each has been constructed in front of the existing quay. This construction consists of a concrete block wall with concrete superstructure. The condition of the superstructure in particular is very poor. The concrete edges are damaged and the steel bridge construction between the 2 piers is severely corroded. The timber on this bridge construction is in a very poor condition (see Photo B2; Annex 3).

### Berths 4 and 5:

Berth 4 and 5 were built for oil handling like berth 2 and 3. However, these berths are not operational anymore. The condition is very poor and the water depth has not been maintained.

### Berths 6 and 7:

The original construction of berth 6 and 7 consists of concrete block wall built in 1892. These berths have been used for dry bulk cargo and general cargo. In 1902 the quay wall of berth 6 broke and was replaced by a block wall with a wider base (6,0 m instead of 4,0 m). In 1958 the berths were reconstructed by driving concrete piles (450 x 450 mm) in front of the existing quay. The superstructure consisted of a monolith concrete constructing. The condition of the quay is satisfactory with exception of the water side of the superstructure. At many locations the concrete has been damaged severely. The fenders are small and in a very poor condition (see Photo B4; Annex 3). The first rail track has been renewed last year and is in good condition. However, the rail track level is not on the same level as the pavement. Therefore it is not possible to cross the railway lines with other port equipment.

### Berths 8 and 9:

The original construction of these berths consists of concrete block wall built in 1892. These berths have been used for handling of dry bulk cargo and general cargo. In 1962 the berths were reconstructed by driving sheet piles in front of the existing quay. The condition of the quay is satisfactory. However, the pavement on the quay apron is in very bad condition. The fenders are in good condition.

### Berth 10:

This berth is located at the western side of the port and therefore not directly connected with the other port areas. The berth is freely accessible by public. It is constructed on concrete piles (450 x 450 mm) and built in 1978. This berth is used for passenger and tourist boats. In addition, it is used for handling of small cargo vessels. The quay apron is used as parking lane for the ferry terminal of the adjacent berth 11. Berth 10 is not provided with a ro-ro ramp. The condition is satisfactory.

### Berth 11:

The passenger berth was built in two stages. The first part (127 m long) consists of 2 rows of concrete piles (Ø 1.60 m) at a distance of 8 m. The surface is constructed of concrete with asphalt pavement. The maximum load is only 1 ton/m2. In 1967 the berth has been enlarged by 68 m. The berth and fenders are in a poor condition.

### Off shore mooring facility:

Outside the breakwater is a buoy mooring facility for off shore loading of oil tankers with draughts more then 11,0 m. It is operational since 1966. It consists of mooring equipment, underwater pipeline and navigational

devices. The depth of this anchorage is 15 to 30 m. The mooring equipment exists of two 25 m3 buoys and one of 16 m3.

### 2.2.3 Condition of Pavement

The pavement at the port consists mainly of asphalt and some parts are constructed of concrete. With exception of some potholes, the present condition of the roads is satisfactory for the present traffic volume. However, the roads will not withstand heavy truck traffic. The crossing with the railway line near the railway gate is in a very poor condition (see Photo B6; Annex 3). The drainage of the pavement is fairly good, which is necessary because of the severe rainfall.

The rail tracks on the berth 6, 7 and 9 are provided with pavement between the tracks . However the level is below track level, which makes railway crossing at the quay apron impossible for other port equipment. The waterside rail track of berth 6 and 7 has been renewed last year. Between the tracks the pavement consists of concrete (see Photo B5; annex 3), which is in a good condition.

### 2.2.4 Warehouses

In general the roofs of the warehouses are in a good condition. Because of the severe rainfall (approximately 4000 mm/year) in this region, the port of Batumi puts a lot of effort in maintaining the roofs. During the raining periods the warehouses are checked at the inside. Leakages are registered to be repaired. Every two years all warehouses are fully inspected and repaired during the summer period.

*Warehouse 1 (Port Building Number 3):*
This warehouse is located at berth 9 and is presently used for general cargo storage. It is the largest of the port. The construction consists of stone walls, concrete floor and asphalt roof covered by iron plates. The outside of the building looks very poor, however the roof is in good condition. The warehouse is located closely to the quay and the railway tracks and cranes are just in front of the warehouse. Cargo handling operations are hampered because of the lack of free operational area in front of the warehouse. The doors are in a very poor condition (see Photo B3; Annex 3). On the back side doors are provided to load trains. A small roof cover above the doors at the back protects cargo handling from the rain.

*Warehouse 2 (Port Building Number 4):*
This warehouse is located adjacent to warehouse 1 and is in the same condition. It is very small and therefore not suitable for cargo storage. Also, the doors are very small (3 x 4 m)

*Warehouse 3 (Port Building Number 5):*
Same as Warehouse 2. The roof is older.

*Warehouse 4 (Port Building Number 13):*
Warehouse 4 is constructed of aluminium plate walls and roof and concrete floor. It has separated areas. This warehouse is presently used for equipment and spare parts. The condition is satisfactory.

*Warehouse 5 (Port Building Number 6):*
This warehouse is in use by the shipyard as storage facility, although the shipyard is not operational anymore. It is constructed of aluminium plate walls and roof and concrete floor. It is located behind warehouse 1 and therefore not accessible from the quay. The condition is good and it could be used as storage facility for materials which have not to be stored near the quays (e.g. spare parts) or as workshop.

*Warehouse 6 (Port Building Number 15):*
Warehouse 6 is the second largest warehouse of the port. It is constructed of stone walls and a steel plate roof, which has been renewed in 1996. The condition is satisfactory. It is presently used for storage of spare parts and equipment. It can be used for storage of general cargo, but the doors are small (3 x 4 m).

*Warehouse 7 (Port Building Number 14):*
This warehouse is located adjacent to warehouse 6 and is used for general cargo. It is constructed of steel plate walls, the concrete floor is 30 cm higher than terminal area. The condition is satisfactory.

### 2.2.5 Breakwater

The breakwater is constructed simultaneously with berth 1 to 3 during 1889 - 1892. It consists of a concrete block wall construction. The superstructure consists of limestone blocks. On the port basin side berth 1 - 3 were constructed. In 1927 - 1930 the head part of the breakwater was prolonged and widened in order to enable mooring of larger vessels at berth 1. The condition of the berth is satisfactory. No relevant subsidence has been noticed.

### 2.2.6 Soil Condition

At the location of the breakwater boreholes up to 17 m have been taken, which indicates silted sand with layers of gravel and sand. At the location of berth 6 the soil beneath 5 - 6 m consists of sand with layers of gravel.

## 2.3 Topographical Survey

A detailed map of the port area (scale 1:2500) is presented in Drawing 2.1. This map is derived from a topographical survey (scale 1:500), which has been updated in 1996.

## 2.4 Port Utilities

### 2.4.1 Electrical Supply

Electric power for the port is normally provided from the city network. To overcome the problems of power cuts the port has three diesel generator sets available with a total capacity of 4 MW. After a power cut it takes 40 minutes to start the power generators.

Connection boxes for the cranes are installed every 40 m roughly between crane rail and quay wall edge. Each connection box can serve two cranes. The electric cable system is generally very old and in poor condition.

### 2.4.2 Fresh Water Supply

The port's water supply system is connected to the city system. Sometimes there is a cut in water supply. This is a problem for toilets and washing rooms, but does not significantly affect port operations. At part of the berths a water line for ship supply is installed.

### 2.4.3 Sewage Water Treatment

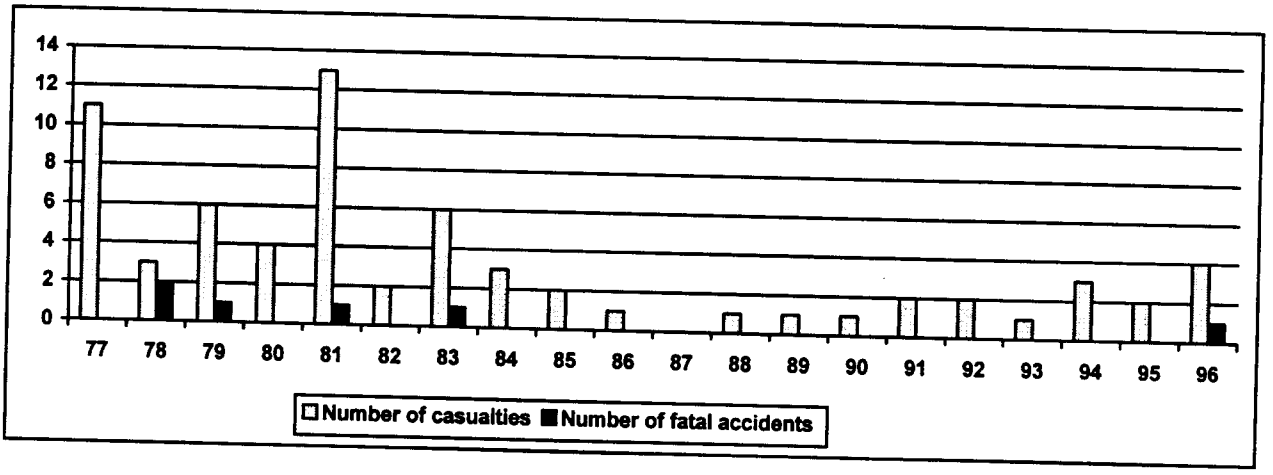
The waste water system is connected to the town system.

### 2.4.4 Safety Installations

The safety of the port is under control of the fire fighting officers. 24 hours a day at least one officer is on duty. They are responsible for fire control and the handling and storage of hazardous cargo.

The port has an emergency plan, which is not set up according to IMO standards. The foremen, fire fighting officers and the safety manager have yearly a safety examination. However, no port representative attends the yearly IMO conference. Number of casualties as a result of accident over the last 20 years is presented in Figure 2.1.

*Figure 2.1 Number of casualties and fatal accidents*




The port has the following safety facilities:

- 1 Fire fighting vessel.
- 3 Tugboats with fire fighting equipment.
- Fire fighting equipment on each oil berth.

All fire fighting equipment is very old (most equipment more then 20 years) and in a very poor condition. This equipment should be replaced. The port has no own fire fighting cars. However, in case of fire the city fire fighting cars can be used. The nearest city fire fighting station is 300 m outside the port. This station has 2 fire fighting cars.

Further, the warehouses have no smoke detectors. There are no special facilities and locations for handling and storage of hazardous cargo, with exception of the oil handling.

To prevent oil pollution, the port has two oil waste skimmers and a floating oil shield, but the floating oil shield is in such a poor condition that it is not operational.

## 2.5 Navigational Conditions

### 2.5.1 Wave Conditions and Water Levels

The Port of Batumi is protected from western wave attack by the natural layout of the harbour bay. The outside berths of the port (berth 10 to 12) are not protected from waves from the North. However, this is vary rarely and the length for wave set up is limited. Therefore the port is well protected from wave attack.

More dangerous is the situation during the south-western storm (locally called Tjagun). It creates an under-water current, which circles anti clockwise inside the port basin. This current makes ship manoeuvres unsafe even with tug boats. Furthermore, the ships moored at the quays (especially berth 9 and 8) have to leave the port, because of the dangerous ship movements (up to 10 m) the current can cause. This storm occurs mainly in the period February - March and has a wind velocity up to 20 m/s. The frequency of appearance is normally 2 to 3 times a year up to 15 times in extreme situations.

The Black Sea has no tidal variation. The water level can rise by 0.2 m caused by wind set-up.

### 2.5.2 Siltation and Water Depths

The Port of Batumi has in general no substantial problems with siltation. The last maintenance dredging was 6 years ago. It consisted of dredging works along the quays. The last update of the water depth chart was in 1993, which showed some siltation up to 1,0 m above the design depth of the berths. At berth 4 and 5 siltation is more severe, but these berths are not used as such anymore. Nowadays, it is used for mooring of small fishing vessels. These water depths are presented in Drawing 2.1.

The depth of approach channel to the port basin is far enough, because of the natural geography. The depth at the quays varies between 6,5 up to 10,0 m.

### 2.5.3 Navigational Aids

The port of Batumi is indicated from the sea by the below mentioned lights:

- Two flashing lights at the northern side of the city.
- Three sets of leading lights indicating the approach channel.
- One section light at the head of the breakwater.
- A buoy flash light indicating the off shore oil mooring.

Maintenance of the lights is financed from port call dues. Maintenance of the lights is under responsibility of the Hydrologic Service. The condition of the lights is satisfactory.

The port is not provided with a radar system, because of financial reasons. The communication facilities are poor. There is an urgent need for portable VHF radio stations. The port is facilitated with a mist horn.

Tacis

# Feasibility Study of New Terminal Facilities of the Georgian Ports Plan Environmental Assessment

# Phase I Report, Vol V

31 October 1997

# Volume V:

# Preparation of an Environmental Assessment

# Table of Contents

# 1 Introduction

The purpose of Phase 1 of this feasibility study as defined in the project Terms of Reference and in the Activity Sheets of the Technical Proposal is focused on information and data collection for the preparation of an outline for an Environmental Assessment of the planned terminal facilities. To obtain this information several meetings and interviews with local experts and authorities as well as site-visits to different parts of the ports were conducted. This was done during a field research at Poti, Batumi and Tbilisi from August 13, to September 11, 1997. A list of meetings is enclosed as Annex A of this report.

As one of the first activities the Consultant has studied the following publications

- 1996 IMO Mission Report: "Needs Assessment and Programming Mission within the Framework of the Integrated Technical Co-operation Programme CIS/Eastern Europe Region" - Ukraine and Georgia
- 1997 Tacis "Feasibility Study for Reception Facilities in Black Sea Ports of Georgia, Ukraine and the Russian Federation"
- 1993 Rogge Marine Report "Port of Poti Development and Freight Traffic Reorganisation in Georgia",

which delivered useful background information and formed the basis for the further investigations.

In this very early stage of the project no engineering or constructional decisions have been made or implemented so far. Nevertheless, the Consultant organised and held scoping meetings within this phase in order to meet the national requirements of public participation and to obtain as much information as possible. Meetings took place on September 4, 1997 in Poti and September 9, 1997 in Batumi.

# 2 Legal and Administrative Framework

## 2.1 National Legislation

### National Environmental Law

The Ministry of Environment and Natural Resource Protection in Tbilisi, with departments in the Autonomous Republics Abkhazia and Adjaria, is the main authority responsible for governing and implementing decisions on environmental policy and management. In the two ports Poti and Batumi it is represented by its subdivisions, the Marine Inspection.

In 1995 the new Constitution of Georgia was adopted. Article 37 of this Constitution provides for a right of citizens to a healthy environment.

Besides the new Constitution, a number of new laws of relevance to the protection of the environment have been adopted:

- 1996 Environmental Protection Act (EPA; framework law)
- 1996 Mining Act
- 1996 Law on the Wild Fauna Protection

- 1996 Law on Protected Areas System
- 1996 Law on Environmental Permission
- 1996 Law on State Ecological Examination (SEE)
- 1995 Law on Transition and Import of Waste to the Territory of the Republic of Georgia
- 1995 Law on Tourism
- 1994 Law on Soil Protection
- 1994 Law on Plant Protection
- 1994 Law on Basic Taxation

Since the beginning of 1997 four new Laws for Protection of the Environment and Natural Resources are in force:

- Law of Georgia on Environmental Permits
- Law of Georgia on State Ecological Examination
- Law of Georgia on Protected Areas
- Law of Georgia on Mineral Resources

of which the first two are of high importance and have to be taken into consideration during the Environmental Impact Assessment (EIA).

## EIA-Regulations

The EIA-regulation and procedure is defined in Article 14 of the Law of Georgia on Environmental Permits. The procedure is divided into several steps (see figure 1):

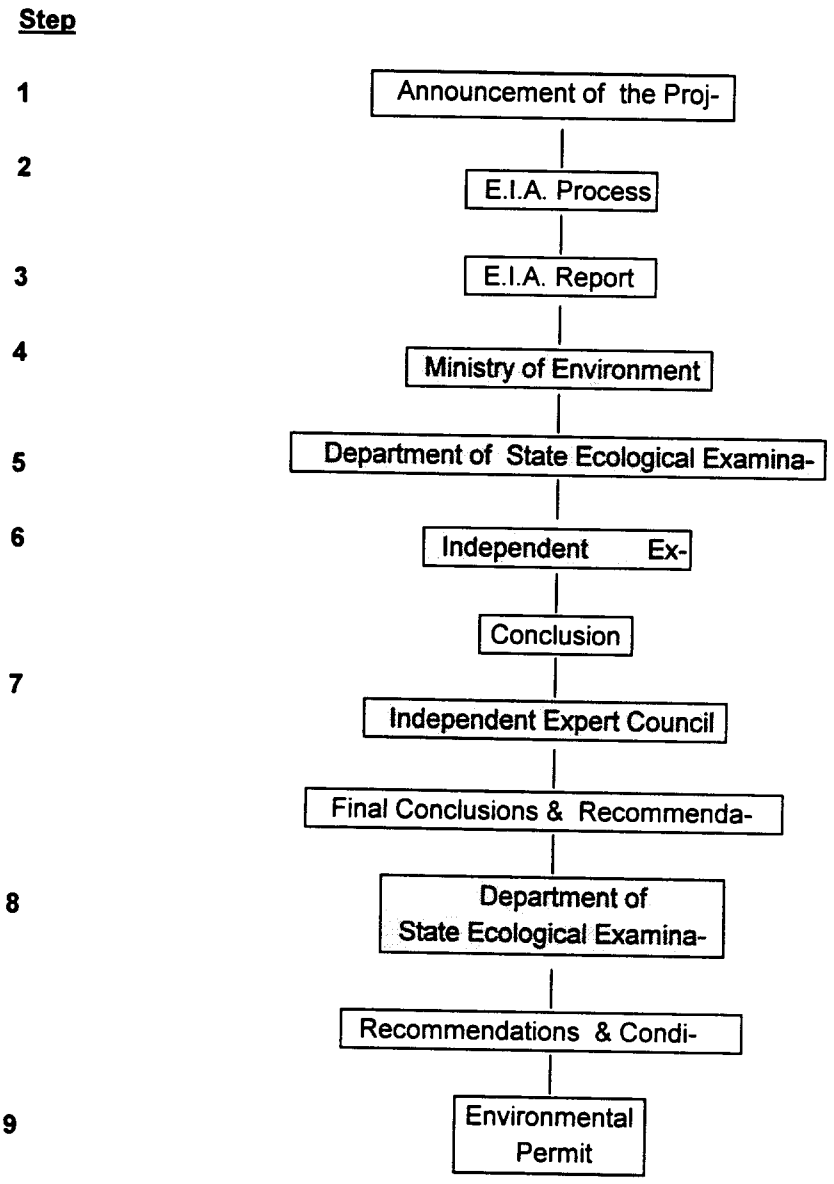



Figure 1: Procedure for Environmental Impact Assessment
Source: The Law of Georgia on Environmental Permits, Chapter III, Article 14

The consultancy firm / the developer bears the responsibility for carrying out the EIA in an unbiased manner (step one to three).

The Ministry of Environment of Georgia, represented by its regional or local bodies is responsible for the compliance of the results of the EIA with environmental given standards (steps four to nine).

The results of the Environmental Impact Assessment shall be taken into consideration during the decision-making process.

The period it takes to give the Environmental Permit should not exceed three months.

## Requirement for Public Participation

The **Environmental Protection Act (EPA)** contains a set of rights and duties of citizens, including the right of citizens to obtain timely information and the right to participate in decisions related to the environment.

Article 14 and Article 15 of the **Law of Georgia on Environmental Permits**, as well as Article 3 of the **Law of Georgia on State Ecological Expertise** state that public participation in the Environmental Impact Assessment procedure shall be obligatory. The public opinion has to be taken into consideration.

## Pollution Control Standards

The standards for water control are still the same as during Soviet times. A new water control law is under preparation and will be ready to be in force by end of September.

Some port relevant air control standards are given below:

| Substance | Maximum single permissible concentration [mg/m³] |
|---|---|
| Nitrogen dioxide | 0.085 |
| carbon monoxide | 5.000 |
| Sulfide anhydride | 0.500 |
| Soot | 0.150 |
| Hydrocarbons | 5.000 |
| Inorganic dust | 0.500 |
| Coal dust | 0.500 |
| Wood dust | 0.100 |
| Grain dust | 0.500 |
| Cement dust | 0.300 |
| Ash | 0.150 |
| Abrasive dust | 0.150 |
| Ammonia | 0.200 |
| Alkali | 0.100 |
| Hydrogen fluoride | 0.020 |
| Fluorides | 0.030 |
| Silicon dioxide | 0.020 |
| Manganese dioxide | 0.010 |
| Iron monoxide | 0.400 |

Table 1: Pollution control standards, Poti
Source: Commercial Sea Port of Poti Reconstruction Project, Designing Institute Geoproject, Tbilisi 1994

### Guidelines on Emission Limits

Air emission requirements are based on the 1981 Air Protection Law, and water quality standards date back to the 1974 Water Code.

The emission limits used in Georgia under the former Soviet regime were based on so-called Maximum Allowable Concentrations (MACs). Such MACs, set by several departments of the Ministry of Environment, exist in relation to discharge of waste, quality of water, and emission into air. Implementation of standards has not been successful: the standards were unrealistically strict, economy and technical equipment did not allow implementation of such strict limits. At present, new types of standards are under development, based on the Environmental Protection Act (EPA) provisions. The principle progress in this field depends on new water and air laws replacing the 1974 and 1981 Codes.

## 2.2 International and Regional Binding Conventions

The Republic of Georgia is party to several international conventions, among which the most relevant are:

- 1992 Convention on the Protection of the Black Sea against Pollution
- 1969 Convention on Civil Liability for Oil Pollution Damage
- 1992 United Nations Framework Convention on Climate Change
- 1985 Vienna Convention for the Protection of the Ozone Layer
- 1987 Montreal Protocol on Substances that Deplete the Ozone Layer
- 1996 Strategic Action Plan for the Rehabilitation and Protection of the Black Sea
- 1973/78 Convention on the Prevention of the Pollution from Ships (MARPOL 73/78)

Of these above mentioned conventions the last two are of special importance because they directly influence construction and operation of ports and port facilities.

# 3 Present Environmental Situation in the Area of the Two Ports

## 3.1 Summary of Key Environmental Regulations and Environmental Policy in the Ports

The ports have to follow the general national Georgian Environmental Legislation.

Like all economic enterprises the ports are obliged to present an **Ecological Passport** issued by an independent institute which has been selected by the Ministry of Environment. In these passports the ecological situation as well as all sources of pollution, are described annually, including the characteristics of cargo residuals, of sewage, and the characteristics of the emission of harmful substances into the atmosphere.

For the implementation of any new activity on the territory of Georgia, the issuance of an **Environmental Protection Permit** is required. The same procedures are also required for the modification or expansion of

port facilities. This is issued by the Ministry of Environment, after the procedure of the EIA has been followed (see chapter 2.1, EIA-Regulations).

The most important international Convention for the protection of the marine environment in port and shipping industry is **MARPOL 73/78**.

In Poti as well as in Batumi, the main organisations responsible for the environmental and ecological issues of the ports are the **Conventional Black Sea Marine Inspection** and the **Ecological Department** of the Port (Ecological Engineer).

**Conventional Black Sea Marine Inspection:**
The Conventional Black Sea Marine Inspection (Marine Inspection) is directly subordinated to the Ministry of Environment. In its present existence it was founded in July 1997, its head office is located in Batumi. One subdivision is working in Poti, another subdivision, which was supposed to be stationed in Sukhumi, is at present located in Anaklia, since the port of Sukhumi, the capital of the Autonomous Republic of Abkhasia, is for the time being not under the governmental control.

In total, the staffing of the Marine Inspection consists of 11 people. Its main duties are:

- pollution control in territorial waters
- vessel inspection (MARPOL)
- control of cargo handling activities (dangerous cargo)
- control of fishing vessels / illegal fishing
- control of reception of sewage and garbage from vessels
- preparation of paper to declare all demands and incidents

**Ecological Department:**
In both ports the Ecological Departments consist of one Ecological Engineer. In Poti this department belongs to the Engineering Department, in Batumi it is subordinated to the Department of Construction.

The duties of the Ecological Engineers are:

- control of discharge of sewage and wastewater from vessels
- reporting of air and water pollution
- control of water management in the port
- control of ecological conditions in the port
- co-operation with the Marine Inspection in case of pollution

## 3.2 Description of the Marine Environment

As described above, Georgia has a modern legal framework for the regulation of port activities and the control of the marine environment. But despite the fact that theoretically all environmental concerns are covered by legislation, there has only been limited success in implementing environmental policy within the ports. Consequently, the ports and the areas around suffer severe environmental problems. One reason for this is, of course, the lack of implementation authority.

The activities of the Marine Inspection in both ports are limited. In Poti the control of territorial waters is nearly impossible because there is no survey vessel available. In Batumi there is a boat, however, surveys and con-

trols cannot take place as scheduled, since they depended on the availability of fuel. In both locations the analytical and laboratory equipment of the Marine Inspection is insufficient and needs upgrading. For the time being the surveys can only be done in a superficial way, often merely by "visual control", which makes it impossible to identify and fine polluters.

The Ecological Departments in Poti as well as in Batumi have no practical means to stop a polluter. Being subordinated to the Department of Construction it is hardly possible for the Environmental Engineer in Batumi to control constructional works with regard to environmental concerns.

### 3.2.1 Waste Management

Marine waste is defined under the International Convention for the Prevention of Pollution from Ships (MARPOL). Having signed **MARPOL** the Georgian ports are required to provide reception facilities for all kinds of vessel generated wastes, as oily wastes (ballast water, bilge, sludge), chemical waste, garbage and sewage.

#### MARPOL Annex I - Oily Waste

**Poti**
On request of the vessels, oily wastes are collected in a barge with a capacity of 400 t. As soon as the tanks of this barge are full (which is said to be every one to three months) the waste is transported to Batumi. Upon delivery of oily waste the master of the collecting barge issues a receipt about the delivered quantity and documents it to the vessels' Oil Record Book.

**Batumi**
In Batumi, ballast water from tankers and other vessel generated oily wastes are pumped directly into 3 storage tanks with a capacity of about 1,500 t each. Without further treatment, oil and water are separated by gravity. The oil at the surface is skimmed off by mechanical means and is said to be reused for heating purposes. The heavy, incombustible parts ("sludge") remain at the bottom of the tanks. The separated water is drained and pumped directly to the sea via a pipeline. The effluent is said to be controlled and to have a maximum oil content of 20 ppm. In order to avoid concentration of oil on the water surface, the outlet of the discharging pipe has originally been installed in a considerable distance from the shore at a water depth of about 130 m. This pipe, however, broke right at the water surface during a storm. Therefore, the separated water is discharged directly at the breakwater side of the pier and a silver sheen of oil could be observed indicating an oil concentration of more than 20 ppm.

The present way of treating wastes according to MARPOL Annex I is absolutely insufficient in Batumi. The plant and adjacent area are in a very poor condition. Ground and soil are partly polluted by oil. Next to the storage tanks there is an open basin of approximately 20 by 30 m in size which has been filled with oily sludge for decades. At present, there is no possibility of environmentally safe final deposit of this oil sludge.

Considering the increase of vessel traffic, a new installation of a treatment facility for MARPOL Annex I wastes according to international standards should be of the highest priority in Batumi as well as in Poti.

#### MARPOL Annex II - Noxious Liquid Substances in Bulk

According to the information received, there is no import of noxious liquid substances (chemicals) for the time being in both ports. Consequently, there is no need for MARPOL Annex II reception facilities at present.

### MARPOL Annex IV - Sewage

**Poti**
On request, sewage is collected from the vessels by a barge and discharged into the city's sewage system. There is no treatment plant operating at present, the sewage from the vessel as well as the town's sewage is discharged untreated to the sea.

**Batumi**
As in the port of Poti, sewage is collected by barges (two barges, capacity 300 to 400 tons) and pumped into the municipal canal system. According to the information received, about 25 per cent of the sewage in Batumi are treated mechanically, the rest is discharged untreated into the Black Sea.

### MARPOL Annex V - Garbage

In both ports, garbage is collected on vessels' request and added to the cities' household waste which is brought to landfills. According to information obtained from the city council in Poti, the landfill there is at the limit of its capacity. Therefore, a considerable amount of garbage is illegally dumped in the port extension area north of Poti. Regular burning of waste in the street could be observed.

## 3.2.2 Areas / Activities of Highest Environmental Concern

- In both ports, water pollution is mainly attributed to oil handling operations.

**Poti**
In Poti, the oil is unloaded directly from the tank vessels to rail tank wagons via temporary loading facilities, which have been constructed in December 1993. A fire extinguishing system is installed along the whole oil terminal and a fire truck is on stand-by during loading and unloading operations.

Since there is no drainage system and no retention basins for rain water or fire extinguishing water on the terminal, accidental spills and overflows are washed directly into the sea.

**Batumi**
The oil loading and unloading facilities on the first oil pier are approximately 25 years old. Rubber hoses, connections and manifolds are worn out and far from being according to the standard.

The facilities at the second oil berth have been constructed about 70 years ago. The wooden pier is severely damaged and partly rotten. Most of the rubber hoses for loading and unloading are old, the connections are not according to the standard.

Underneath the oil piers there are reception bowls installed to collect spilled oil. These bowls are emptied by electric pumps. In case of electrical shortage they can not be emptied, and especially during rain there is a permanent overflow of oil to the sea water.

The old subterranean oil-pipeline poses the main environmental problem at the oil terminal in the Port of Batumi. This pipeline has been built in the 1920ies, it is severely damaged and permanently leaking oil (see Annex C, Figures 1, 2 and 3). On a length of at least 800m (appr. length of the oil pier) soil and sub-

soil are heavily polluted by oil. How far the groundwater is impacted, should be subject to further investigations.

- In both ports areas could be seen, where the rail tank wagons have been cleaned in the past (see Annex C, Figures 4 and 5). Environmental precautions (as sealing of the ground, oil-water separator) have not been taken neither in Poti nor in Batumi. The oily washing water is collected in open basins, which is an extremely hazardous malpractice. The areas around these basins are heavily polluted by oil.

- The lack of adequate reception facilities for marine wastes, as described in 3.2.1, has to be considered a serious problem and a permanent source of pollution in both ports, even though no quantitative data can be given.

- Untreated waste water is the main land-based source of water pollution. The need for better sewage treatment facilities is evident.

### 3.2.3 Casualty Statistics

No records of accidental or illegal oil pollution at the Georgian coast are kept, since there is only insufficient equipment for detection available. Within the ports, a tanker accident has not occurred during the last years, oil pollution is mainly attributed to cargo handling operations as described above. The quantities of oil and oil products discharged to the sea are uncertain.

### 3.2.4 Survey and Inspection According to MARPOL and SOLAS

In both ports, vessels are said to be controlled according to the MARPOL requirements. Inspections and surveys regarding the safety aspects of shipping (SOLAS) do not take place. A co-ordinated system for exercising Port State Control does not exist yet.

### 3.2.5 Maintenance Dredging and Disposal of Dredged Material

**Poti**

The Port of Poti needs regular dredging operations to remove blown in river sediments. The amounts which have been dredged within the last years are:

| Year | Amount [m³] |
|---|---|
| 1992 | 1.189.250 |
| 1993 | 618.650 |
| 1995 | 1.005.700 |
| 1997 | 700.000 |

According to information from the Ministry of Environment the quality of the dredged material is in compliance with the standards. Therefore it is allowed to dispose at sea, about 3 km south of the port, to support the breakwater.

**Batumi**

No dredging operations have taken place within the last five years for financial reasons. Between 100.000 and 120.000 t of sediment need to be dredged from the harbour at a cost of 1.2 million US$. If a further 1 million t could be dredged from the harbour the port would be able to accommodate vessels up to 12 m draft and 260 m length.

### 3.2.6 Emergency Plans / Emergency Response Equipment

There are no special emergency plans in existence at local or national level. The guidelines in case of an oil spill in both ports are the "Rules for Management of Cleaning Works in Polluted Ports", edited by the Ministry of Marine Fleet of the USSR, 1991.

Neither in Poti nor in Batumi effective oil spill response is possible at present due to the lack of adequate equipment. The emergency response equipment in both ports needs complete upgrading. In Poti as in Batumi, there is at present no possibility to handle oil pollution situations.

**Poti**

Except for one small oil skimming vessel which is under repair at present (see Annex C, Figure 6), there is no oil spill combating equipment at Poti. The ecological department of the port handed over a list of the equipment which is most urgently needed. This list will be included in the Environmental Impact Assessment.

**Batumi**

In Soviet times an ocean going tug with high sea oil spill fighting devices was stationed in Batumi (SVEDLOMOR IV), which is now stationed in Odessa. The high sea equipment is still in Batumi and is said to be in a good condition, but due to the lack of an adequate boat there is no possibility to handle it.
No harbour booms or any equipment to clean spills in the port exist. One small oil skimming vessel was found to be of very limited operational condition since the bow flaps are missing. At present it is used to clean the water surface from garbage.

## 3.3 Socio-Economic Impacts

In Poti as well as in Batumi the port is located close to urban areas, forming a part of the city. Port development and expansion may therefore create socio-economic problems, as noise impacts, dust generation, traffic increase with its consequences, visual impacts and land loss. These impacts have to be considered in the port master plan and special attention for mitigating measures will have to be taken.

Both ports, however, are the substantial employer in their region. Considering the present economic crisis and the high unemployment rate, the possibility of short-term or long-term employment must be considered a beneficial impact.

The area north of Batumi up to Kobuleti is used intensively as a tourist and recreation area. Since the deterioration of the coastal zone will lead to a decline in tourism, special care has to be taken that port development and increasing vessel traffic will not impact this area of economic and ecological value.

# 4 Scoping Meetings

In order to meet the national requirements of public participation and to identify the key issues which need to be addressed by the Environmental Impact Assessment, two scoping meetings have been conducted, one in Poti and one in Batumi. With the assistance of the Port Management and local authorities a target list of participants selected to attend the meeting has been arranged. Invitation letters and information sheets on the project have been prepared before in Russian language.

Representatives from the port, from public authorities and Non Governmental Organisations (NGOs) have been invited. A list of participants is attached to this report as Annex B.

The scoping meetings took place on September 4, 1997 in Poti in the Commercial Sea Port and on September 9, 1997 in Batumi in the conference room of the Black Sea Ecology and Fishery Institute.

The meetings were conducted according to the "Metaplan" visualisation method, which facilitates the objective-oriented discussion and ensures that all ideas and contributions of the participants are considered since they are given in a written form.

During the meetings a list of major concerns has been provided which should be incorporated in the guidelines for the preparation of the Environmental Impact Assessment. The key impacts of concern regarding construction and operational phase as well as the future vessel traffic are mentioned overleaf:

| Category of possible impacts | Scoping Meeting in Poti | Scoping Meeting in Batumi |
|---|---|---|
| Aquatic Impacts | The pollution of the sea by oil was regarded as a considerable problem. It was recommended that special attention should be paid to the collection of waste oil. | Oil pollution and pollution by untreated sewage were considered to be the main impacts.<br>A monitoring before, during and after construction period was considered to be of high importance. |
| Terrestrial Impacts | The final disposal of waste as well as contaminated dredged material was considered to be a matter of concern. | Cargo residues and spilled oil were considered to be the main sources for soil pollution. |
| Waste Management | The problem of waste handling was considered to be solved only in co-operation with the city municipality in a joint system of waste management. | The increasing amount of oily waste and sewage were matter of concern regarding the future vessel traffic. |
| Air Quality | No concerns were expressed regarding possible air pollution. | Concerns were expressed regarding increase of dust generating cargo, oil, oil products and chemicals which are considered to impact the air quality |
| General Health and Safety Issues | The protection of the workers with regard to future handling of dangerous cargo was mentioned. | The idea was that a new system of labourer protection and new standards will have to be established |
| Other Issues | It was considered a problem to control the increasing amount of cargo. | Some concerns were expressed in the relation to the construction period and the supply of construction materials. |