Source TMRL

Figure 2.1.20 Bird's-eye View of Turkmenbashi Port

Source: Google

Figure 2.1.21 Location of the Port

ii) Natural conditions

It is reported that fog is not frequent and mostly of short duration.

In general, currents are limited in the bay (inside the spit) and they do not hamper the navigation of vessels in the channel. It should be noted that these currents do not refer to the channel cut through the Turkmenbashi spit. In the area of the cut through the Turkmenbashi spit, currents run parallel to the axis of the channel and can reach values up to 1 – 2.5 knots.

The following tables present the distribution of the wind and wave in Turkmenbashi per sector and per speed class. Although the wind in Turkmenbashi is not so strong, the access channel of the port is closed very frequently due to wind because the width and depth of the channel are not

sufficient under windy condition. Regarding channel closure, details will be described later in this section.

The feasibility study on the modernization of Turkmenbashi Port (MLTM 2009) describes that the maximum wave height in the Caspian Sea outside the spit is 2.6m and wave height may reach 2.0m in the cut through section of the channel. The annual maximum wave height in the area of the port is 0.5m on average and at maximum 0.7m. TMRL explains that even outside the bay, the Sea off the coast of Turkmenistan is exceptionally calm in the Caspian Sea.

Table 2.1.22 Direction and Speed of Wind at Turkmenbashi Port

Direction of the wind (coming from)	N	NE	E	SE	S	SW	W	NW	Total
Speed (m/s)									
Calm									11.1
1-8	14.4	9.5	17.7	7.2	4.8	5.7	7.2	13.4	79.8
9-13	3.3	0.9	0.6	0.0	0.1	0.1	0.3	1.6	6.9
14-20	1.2	0.3	0.1	0.0	0.0	0.1	0.1	0.6	2.3
> 21	0.1	0.0						0.0	0.1
Total	**18.8**	**10.7**	**18.4**	**7.3**	**4.8**	**5.9**	**7.6**	**15.6**	**100**

Source: TACIS 2007

Table 2.1.23 Direction and height of waves in Turkmenbashi

Direction of the waves (coming from)	N	NE	E	SE	S	SW	W	NW	Total
Wave height (m)									
Calm									44.8
0.1-0.5	0.8	3.0	0.6	3.1	5.7	5.1	8.6	8.7	35.6
0.6 – 1.0	0.7	0.4		0.9	0.8	2.6	3.4	5.7	14.6
1.1 – 1.5				0.2	0.5	0.4	0.3	3.0	4.4
> 1.5					0.2	0.2		0.9	1.3
Total	**1.4**	**3.4**	**0.6**	**4.2**	**7.2**	**8.3**	**12.3**	**18.3**	**100**

Source: TACIS 2007

Tides are negligible in the Caspian Sea, but instead, long-term fluctuation of the seawater levels is an important factor in planning and designing port infrastructure. It is recorded that the level increased by over 2.5 m between 1977 and 1995, with annual rises up to approximately 200 mm. Since 1996 the level has stopped rising and has fallen back slightly. The last 10 years the level has remained more or less constant. The monthly lowest level recorded during the last 10 years is BSL (Baltic Sea Level) – 27.42 m (December 2002). In addition to these changes from year-to-year, there is also a small annual variation in sea level of around 300 mm due to evaporation in summer and inflow of water from melting snow in spring. Daily fluctuations usually don't exceed a few centimeters. The table and figure below present the annual average level (in meters) of the Caspian Sea, relative to the Baltic Sea Level.

Design sea level for access channel and basin should be determined considering the historical lowest water level but it should be a realistic value in order to keep economic viability. In this context, the consultant supports following the proposal on design sea level for channel planning by TRACECA's navigation channel study (TACIS 2007).

Design sea level = BSL – 27.4 m

Design sea level for quay structure should be determined carefully in the basic design stage considering longer term prediction of the Caspian Sea level because structural reinforcement to cope with sea level change is very costly. In the determination of design sea level for quay structure, precedent study for ferry terminal (TACIS 1997) would be informative, in which the maximum and minimum water level of -25m and -30m is recommended respectively based on probability theory.

Table 2.1.24 Caspian Sea Level Relative to Baltic Sea Level

(m)

Year	1900	1930	1956	1977	1991	1995	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Level	−25.7	−26.5	−28.5	−29.1	−27.2	−26.6	−27.2	−27.2	−27.3	−27.3	−27.2	−27.1	−26.7	−27.0	−26.9	−27.3

Source: TACIS 2007 and MLTM 2009

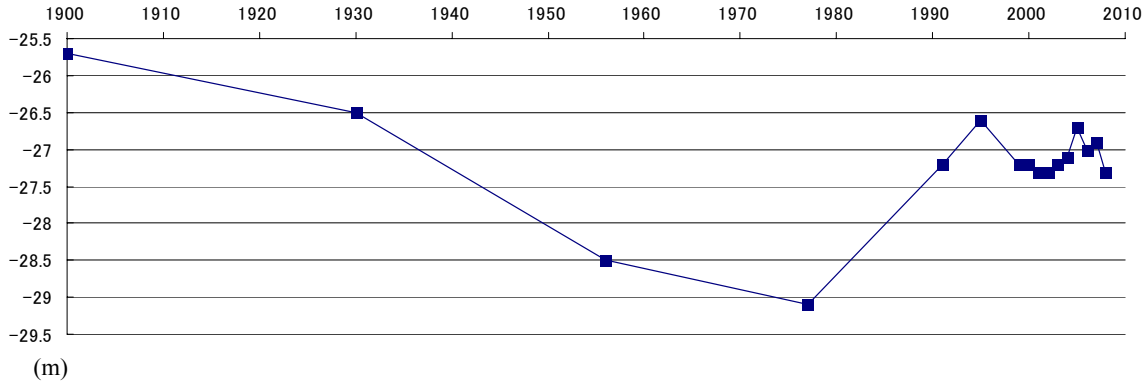


Figure 2.1.22 Historical Change of Caspian Sea Level

iii) Operation and Management

Turkmenbashi Port is owned, managed and operated by the State Turkmen Maritime and River Lines (TMRL). TMRL is a state-owned enterprise with financial autonomy. TMRL is independent from ministries, and it is under the supervision of the Cabinet of Ministers. TMRL manages all major ports in Turkmenistan and it is the sole shipping company in the country. Total number of employees in Turkmenbashi International Sea Port (TISP) which is a department of TMRL is 1,021 which include personnel for vessel operation and maintenance (421), Alaja Port (15) and Okaren Port (9).

The Maritime Code of Turkmenistan prescribes that the function of the administration of commercial seaports shall be:

(Navigation Safety)

1) Organization of safe traffic in the harbor basin, safe moorage and vessel handling
2) Maintenance of hydraulic facilities, means of communication and radar system of the port;
3) Maintenance of navigation aids in the access channel and basin of the port
4) Maintenance of declared channel depths
5) Designation of area of compulsory use of tug boats
6) Relief service to vessels involved in accidents
7) Effective measures for acceptance of contaminated and sewage water (for oil handling port - also oil-contaminated water), garbage and other substance detrimental to the environment and people's health, and their decontamination, deactivation, processing, safe storage or landfill.
8) Law enforcement related to sanitary-and-epidemiologic welfare of population and environment protection.

(Economic Activities)

1) Loading, unloading and servicing of vessels on a first-come-first-served basis in the port, with the exception of emergency situation, when immediate protection of safety of the port or marine environment is required.
2) Servicing of pilotage and moorage in accordance with declared schedule.
3) Forwarding, cargo handling and warehousing.
4) Transshipment from land transport into vessel transport and vice versa
5) Servicing of marine vessel passengers as well as transportation of cargo, passengers, baggage and mail in the port vessels and in other types of transport;
6) Secondary operations required for maintenance of the port;
7) Other type of activity in accordance with status of port.

As prescribed in the Maritime Code, TMRL provides stevedoring service in the port. This means that Turkmenbashi Port is a "public service port". But TMRL doesn't monopolize the service. TMRL provides the stevedoring service in only one out of three terminals. Ministry of Railways, Turkmenbashi Refinery and a foreign company also provide the service.

Stevedoring services provided by TMRL are on 24 hours 365 days basis. The total number of workers of TMRL for cargo handling is 146.

iv) Terminals

Turkmenbashi Port has three terminals, i.e. PPK1 (general cargo and dry bulk), PPK2 (rail ferry) and PPK3 (UFRA, liquid bulk) as shown in Figure 2.1.23. An outline of each terminal is given in Table 2.1.25 and breakdown of cargoes handled at each terminal is shown in Table 2.1.26.

Source: Google

Figure 2.1.23 Terminals in Turkmenbashi Port

Table 2.1.25 Outline of Terminals in Turkmenbashi Port

	Length (m)	Water Depth (m)	maximum ship (DWT)	main cargo	Equipment		Througput (1000 ton) (2008)	Vessels call (2008)
PPK1	General Cargo Terminal						177	124
Quay3	150	6	5000	Polypropylene,	4crane(20ton)			
Quay4	150	6	5000	Construction Material,	1crane(32ton)			
Quay5	130	6	5000	Machinery				
Quay15	60			PETRONAS offshore supply				
Quay7	80	6	3000		3cranes(20ton)	cranes are not used		
Quay17		5.5	3000		2cranes(6ton)	cranes are not used		
PPK2	Rail Ferry Terminal						2051	592
	168*2	7	5000	Polypropylene, Crude Oil, Oil Product				
PPK3	Oil Terminal						3481	768
Pier1	117.7	7	12000	Oil Product				
Pier2	116.8	7	12000	Oil Product				

Source: MLTM 2009 and TMRL

Note: Cargo throughput and ship calls at PETRONAS supply base are excluded.
Number of calling vessels at PPK1 includes only those loading or unloading at berths

Table 2.1.26 Cargo Throughput of Each Terminal (2008)

PPK1								(ton)
	commodities	Russia	Azerbaijan	Iran	Turkey	Domestic	Others	TOTAL
inbound								
	Construction Materials	0	0	0	50,141	0	460	50,601
	Metal	8,150	0	0	8,921	0	0	17,071
	Timber	30	0	0	43	0	0	73
	Machinery	17,952	0	0	1,949	0	1,147	21,048
	Others	1,957	0	0	0	0	0	1,957
	total	28,089	0	0	61,054	0	1,607	90,750
outbound								
	Polypropylene	20,584	0	10,650	0	0	0	31,234
	Construction Materials	23,409	0	0	0	0	0	23,409
	Timber	0	148	0	0	0	0	148
	Machinery	1,137	0	0	0	0	477	1,614
	Others	209	0	0	0	0	0	209
	total	45,339	148	10,650	0	0	477	56,614
unknown	unknown	0	0	0	0	30,000	0	30,000
TOTAL								177,364

PPK2				(ton)
	commodities	Russia	Azerbaijan	TOTAL
inbound				
	Oil Products	656	134,714	135,370
	Chemicals	0	579,493	579,493
	Construction Materials	5,768	179,223	184,991
	Metal	21,603	71,113	92,716
	Timber	6,864	2,670	9,534
	Machinery	231	34,211	34,442
	Food Products	17,472	103,704	121,176
	Agricultural Products	0	419	419
	Others	31,430	101,214	132,644
	total			1,290,785
outbound				
	Polypropylene	3,230	1,387	4,617
	Coke	84	5,120	5,204
	Oil Products	70,000	198,000	268,000
	Chemicals	0	172,602	172,602
	Construction Materials	5,314	29,124	34,438
	Metal	346	31,821	32,167
	Machinery	0	17,992	17,992
	Food Products	0	23,607	23,607
	Agricultural Products	0	1,089	1,089
	Others	3,367	196,947	200,314
	total			760,030
TOTAL				2,050,815

PPK3							(ton)
	commodities	Russia	Azerbaijan	Iran	Kazakhsta	Domestic	TOTAL
inbound	Crude Oil	0	0	0	0	320,000	320,000
outbound	Oil Products	586,931	1,631,962	924,300	17,700		3,160,893
TOTAL							3,480,893

Source: various data provided by TMRL

Note: Cargo throughput at PETRONAS supply base is excluded.

PPK1

PPK1 is a general cargo and bulk cargo terminal where container cargo can also be handled. The terminal is located adjacent to the city center. The layout of PPK1 is shown in Figure 2.1.24.

Source: TMRL

Figure 2.1.24 General Cargo and Bulk Cargo Terminal (PPK1)

Quay no.17, located at the western extremity of the port, used to be connected with the railway, however the connection was cut a few years ago and the quay is currently used for temporary berthing of vessels. Though two cranes still exist on the quay, no cargo is handled there. To the east of Quay no.17, there are several old quays without cranes. They are used for mooring of port service vessels and some very old vessels which seem to be waiting to be scrapped.

Next to the old quays, Quay no. 3, 4 and 5 (from west to east) are located. These quays for general cargo and dry bulk handling are the main facilities in PPK1, which were constructed by the finance of EBRD and seem to have being maintained in good condition. The total quay length is approximately 450 meters. Water depth at quayside is around 6 meters, which enables accommodation of 6000 DWT Caspian vessels. At the quay and behind the yard, direct rail access is available. The rail inside the terminal is operated by TMRL. TMRL possesses its own locomotives. Total cargo throughput in 2008 was 177,000 tons. The main import cargo is construction material and the main export cargo is polypropylene. Considering the quay length and modernized equipment, the terminal seems to have enough remaining capacity.

Quay no.3 is used for export of bagged polypropylene, which is made in Turkmenbashi Refinery and is stored in the specialized warehouse behind the quay. A total of 31,000 tons of polypropylene was shipped from PPK1 in 2008 and almost the same quantity was shipped by rail, some of which was transported in the rail ferry departing from PPK2.

The quay also accommodates a RORO vessel to/from Olya (Russia). When the RORO vessel is berthed there, Quay no.4 is also occupied for the RORO operation. The RORO line is used for the export of textile and vegetables (in refrigerated container) and the import of vehicles and construction equipment. The vessel also carries very small numbers of containers and some general cargoes. The RORO doesn't transport passengers except outbound passengers on very rare occasions. According to the vessel registration, capacity of passenger is 12. Around 85 trailers can be transported by a vessel. The service frequency is three per month. Olya Port has an ice breaker therefore the service is available even in mid winter.

Quay no.4 is dedicated to heavy cargoes such as containers and plant cargoes. The structure of the quay is steel pile jetty and its maximum load is 10 tons per square meter whereas the maximum load of Quay no.3 and no.5, which are made of concrete piles, is 4 tons per square meter. The lifting capacity of the crane is 32 tons; those on other quays are 20 tons. A freight forwarder explains that the capacity of the cranes in the port is not enough for handling heavy plant cargo which is one of the main cargoes in Turkmenbashi, and sometimes he has to mobilize a costly mobile crane for it. Three old cranes left in the yard are not used any more. Behind the quay, a warehouse for transit cargos is located. Its occupancy is reportedly around 50%, though the Consultant did not observe that much cargo. Next to the transit warehouse a container yard was developed as a part of the EBRD project, however container transport doesn't seem active so far. Quay no.5 is used for handling of general cargo and bulk cargo such as salt.

Next to the EBRD funded quays, there remains some vacant space, which is to be developed as a facility for offshore safety by a foreign company, and beyond it there is Quay no.15. The quay and storage area behind it has been leased out to PETRONAS, a Malaysian national oil company, as an offshore supply base since 1998. Although this is a "tentative" facility and its relocation to Kiyanly is planned, PETRONAS explained that this would happen in the far future and the company planned to upgrade Quay no.15 and construct Quay no.16 in the area between Quay no.15 and no.7. An advantage of the facility in Turkmenbashi Port over Kianly supply base is the calmness of the basin. Stevedore service in PETRONAS supply base is provided by itself. In 2008, a total of 276 vessel calls were recorded.

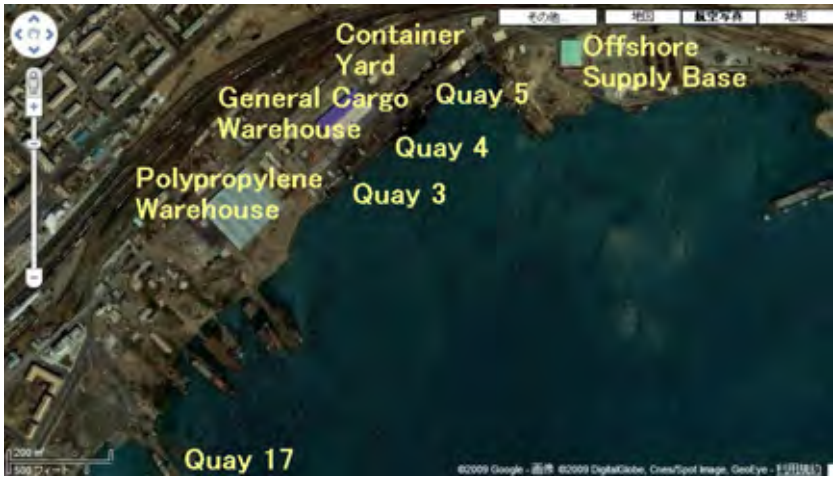
At the eastern end of PPK1, Quay no.7 is located. The quay is used mainly for temporary mooring of offshore supply boats. The cranes on the quay are not used any more.

In PPK1 (except PETRONAS supply base) stevedoring service is provided for 24 hours 365 days by a total of 60 TMRL's workers which consist of 4 gangs. A two-shift per day system is applied. Unlike the situation often observed in developing countries, the number of workers of Turkmenbashi Port is not too excessive though it is not small considering the current handling

volume. A merit system is adopted in the payment of allowance of workers. Crane operators are educated in a vocational school and have certification of their skills. The time required for unloading of 5000 tons of steel pipes is around 24 hours while it is around 60 hours for the same amount of bagged cement.

Two types of cargo handling service are available. One is direct operation in which cargo is unloaded from the vessel directly to a consignee's truck; the other is indirect operation in which cargo is unloaded via the yard to a consignee's truck. Direct operation is preferred by forwarders for its economical tariff. Indirect operation is adopted for the above mentioned pipe handling while direct operation is conducted for cement handling.

The consultant interviewed a foreman and found that he was an experienced and qualified person however his confidence in the skills of his staff members seemed to make him overlook their unsafe work practices. For example some workers didn't wear helmets; a dispatcher checked a container while it was being lifted by the shore crane.



Source: Google

Figure 2.1.25 Layout of PPK1

PPK2

Source: Google

Figure 2.1.26 PPK2 Rail Ferry Terminal

Source: TMRL

Figure 2.1.27 PPK2 Rail Ferry Terminal

PPK2 is located to the east of PPK1. PPK2 is dedicated to rail ferry transport. PPK2 has two rail ferry berths. The right berth was reconstructed in the EBRD-financed project and has been maintained in good condition. TMRL explained that the left berth required major repair or reconstruction due to deterioration.

Rail ferries plying Baku and Makhachkala are operated by Caspar and Makhachkala Shipping respectively. In 2008 there were 544 ship calls from Baku and 48 from Makhachkala. The service frequency to and from Makhachkala has increased to three per week since the deployment of a new vessel in 2009. Baku ferry carries 28 rail wagons at a time whereas Makhachkala ferries carry 52 rail wagons on its two storey decks.

Transit cargoes to/from Central Asia, Afghanistan and China are the main cargoes of the rail ferry. For example, around 50% of inbound cargos on the Makhachkala-Turkmenbashi ferry link are transit cargoes (oil products) to Afghanistan. Current statistics on cargo origin and destination are not available. Table 2.1.27 shows OD data of 6 months in 1996 gathered by the TRACECA study team (TACIS 1997b). Although the data is rather old, it clearly shows a high percentage of transit cargo on both the Turkmenbashi side and the Baku side. For the eastbound flow, in particular, transit ratio exceeds 80% at both sides.

The rail ferry can carry automobiles, however the volume of automobile transport is rather small. In 2008, 30,307 tons of trucks and cars were transported by the rail ferries whereas 2,020,508 tons of rail wagons were transported by them. Thus the volume of automobile transport is less than 2% of the total transport volume. According to the information provided by a forwarding company, the rail ferry prioritized governmental cargo, therefore the available space for trucks which are generally owned by private companies is not sufficient. PPK2 has car parking for automobiles, but it is not used so frequently and it is sometimes used as waiting areas for trucks coming to pick up cargoes unloaded at PPK1.

Container traffic on rail ferry is very small. According to the information from a freight forwarder, although demands of container transport from consignees are not so small, high cost of container transport by Turkmen Railways using foreign wagons leaves the throughput very small. Since PPK2 doesn't have machinery for container unloading, consignees of containers can do nothing but carrying foreign wagons into Turkmen Railways.

The rail ferry to/from Baku is also used for passenger transport. The terminal building has facilities for international passengers such as CIQ offices and a waiting room. According to the original registration, vessels deployed on the Turkmenbashi-Baku link were able to carry 202 passengers, however at present Azeri authority restricts the number of passengers to 36 in maximum due to the deterioration of vessels. When the vessel carries dangerous goods, the number of passengers is restricted to 12. In 2008 a total of 10,500 passengers traveled on the rail ferry. The average number of passengers per voyage was 9.7. The rail ferry is reportedly not suitable for passenger transport due to its poor facilities and unreliable timetable. Sometimes the delay reaches a couple of days due to delay of rail cargo handling by the State Railways and the frequent closure of the access channel caused by strong winds.

Cargo handling in PPK2 is done by the State Railways. TMRL is responsible only for mooring of vessels. The marshaling yard has sufficient length to handle 52 wagons at a time, which enables efficient cargo handling for the largest rail ferry in the Caspian Sea.

Table 2.1.28 shows the record of utilization of PPK2 in 2008. The table indicates that a relatively high berth occupancy rate of 67% was recorded in 2008. In the calculation, the time required from mooring to commencement of customs clearance was neglected because of lack of data therefore the actual occupancy would be higher than the figure shown in Table 2.1.28 to some extent. Since the increase of service frequency of Makhachkala ferry in 2009, the berth occupancy rate would be higher. The high occupancy rate results in a long waiting time for berthing. From the data in Table 2.1.28, average berth waiting time is calculated to be more than 6 hours.

It should be noted that the high occupancy rate results from very long idling time and waiting time. In 2008, average idle/waiting time was 18 hours which accounts for 92% of the total time at berth. Therefore, PPK2 is judged to have remaining capacity to cope with the future increase of rail cargo traffic to some extent in spite of its high berth occupancy rate if it is properly operated and the access channel is improved. Actually in 2003 a total of 980 ship calls at PPK2 was recorded, which is 1.65 times larger than the number recorded in 2008 due to occasional excess supply of oil from Turkmenistan that could not be conveyed by the existing tanker capacity. It is also reported that at peak operations in the mid 1980s this link was served with six or seven sails per day (in 2008 it was served with less than 2 sails per day). (TACIS 1997)

Table 2.1.27 OD data of Turkmenbashi-Baku Ferry in 1996

East bound				West bound			
Origin		Destination		Origin		Destination	
Georgia (port)	79.7%	Uzbekistan	73.5%	Uzbekistan	51.0%	Azerbaijan	73.1%
Azerbaijan	18.9%	Turkmenistan	18.9%	Turkmenistan	43.7%	Georgia(port)	23.4%
Georgia	0.8%	Kazakhstan	4.6%	Kazakhstan	2.6%	Georgia	2.7%
Finland	0.4%	Russia	1.6%	Russia	1.8%	Russia	0.8%
unknown	0.3%	Kyrgyz	1.0%	Ukraine	0.8%		
		Tajikistan	0.1%	China	0.1%		
		unknown	0.3%	Kyrgyz	0.0%		
				Latvia	0.0%		
				Tajikistan	0.0%		

Source: TACIS 1997

Table 2.1.28 Utilization of PPK2 (2008)

[1] Total Hours in Month		**Left**	**Right**	**Total**
[2] Total Calls		265	327	592
- Calls without inbound wagons		1	1	2
- Calls without outbound wagons		21	32	53
[3] Total Time while at Berth	[hours]	4153.6	5029.8	9183.4
- Customs Clearance Inbound	[hours]	66.0	82.1	148.1
- Rolling Off	[hours]	127.8	320.0	447.8
- Customs Clearance Outbound	[hours]	41.8	50.8	92.7
- Rolling On	[hours]	103.3	207.5	310.8
- Total Idle Time, while at Berth	[hours]	3814.6	4369.4	8184.0
Waiting Times				
- Arrival-Rolling Off	[hours]	1736.1	2073.4	3809.5
- Rolling On-Departure	[hours]	821.2	1739.7	2560.9
[4] Utilisation				
- Gross Utilisation		57%	77%	67%
- Net Utilisation		4%	8%	6%

Source: TMRL

PPK3

PPK3, Kenar Port or UFRA terminal, is a liquid bulk terminal where oil products of Turkmenbashi Refinery are loaded and crude oil, raw material used in the Refinery, is off-loaded. Pipelines are installed between PPK3 and the Refinery. PPK3 is used exclusively by Turkmenbashi Refinery. PPK3 is operated 24 hours 365 days like other terminals of Turkmenbashi Port.

Source: Google

Figure 2.1.28 PPK3 UFRA Terminal

Figure 2.1.29 PPK3 UFRA Terminal (South Jetty)

PPK3 has two jetties, each of which has two berths. A total of four 7,000 DWT tankers can be accommodated at the same time. Each berth has loading facilities for all types of oil products and offloading facility for crude oil.

TMRL owns the jetties, controls vessel traffic and provides services for mooring whereas Turkmenbashi Refinery owns loading and offloading facilities on the jetties and all on-shore facilities and it conducts all cargo handling itself. Due to the sedimentation of the UFRA channel, the maximum draft is restricted from 4.5 to 4.6 m, so full-laden 7000DWT tankers cannot enter the channel to PPK3.

According to an interview with an international trade company, it takes no more than 8 hours to load oil products on a 5000DWT tanker at PPK3, however, an additional 16 hours are required for inspection and documentation. Table 2.1.29 shows an example of a timetable for liquid bulk

loading at PPK3. The table indicates that the tanker stayed in the port for 28 hours to load 2700 tons of naphtha. Loading work itself required a relatively short time, 6 hours 25 minutes however, besides eight hours of berth waiting time, the vessel had to wait for inspection, documentation and other preparation for more than eight hours. Each inspection or granting of permission took around one hour probably because the officer had to submit an official report to explain the reason for delay if it would take more than two hours. But the procedure involves many steps and each step requires waiting time resulting in excessive waiting times. Thus, efficiency of cargo handling at PPK3 is assessed to be low.

Assuming average berthing time of 24 hours, the berth occupancy rate of PPK3 in 2008 is calculated to be 53.3%. This figure is not small however it is judged that PPK3 has enough capacity to meet the future increase of traffic demands considering that there is much room for improvement in terms of efficiency.

Table 2.1.29 An Example of Time Table for Liquid Bulk Loading (2,700 tons of naphtha)

From	To	
	5:00	Arrival of Vessel
5:00	13:15	Waiting for Berthing at Anchorage Area
13:15	13:30	Removal of Anchor
13:30	15:00	Navigation from Anchorage Area to Berth
15:00	15:30	Mooring
15:30	16:30	Waiting for Permission
16:30	17:30	Inspection
17:30	19:15	Waiting for Loading
19:15	19:45	Pipe Connection
19:45	2:10	Loading
2:10	2:40	Disconnection of Pipe
2:40	3:30	Waiting for Permission
3:30	5:00	Tally
5:00	6:30	Waiting for Documentation
6:30	7:30	Preparation of Document
7:30	8:30	Permission for Departure
9:00		Departure

Source: TMRL

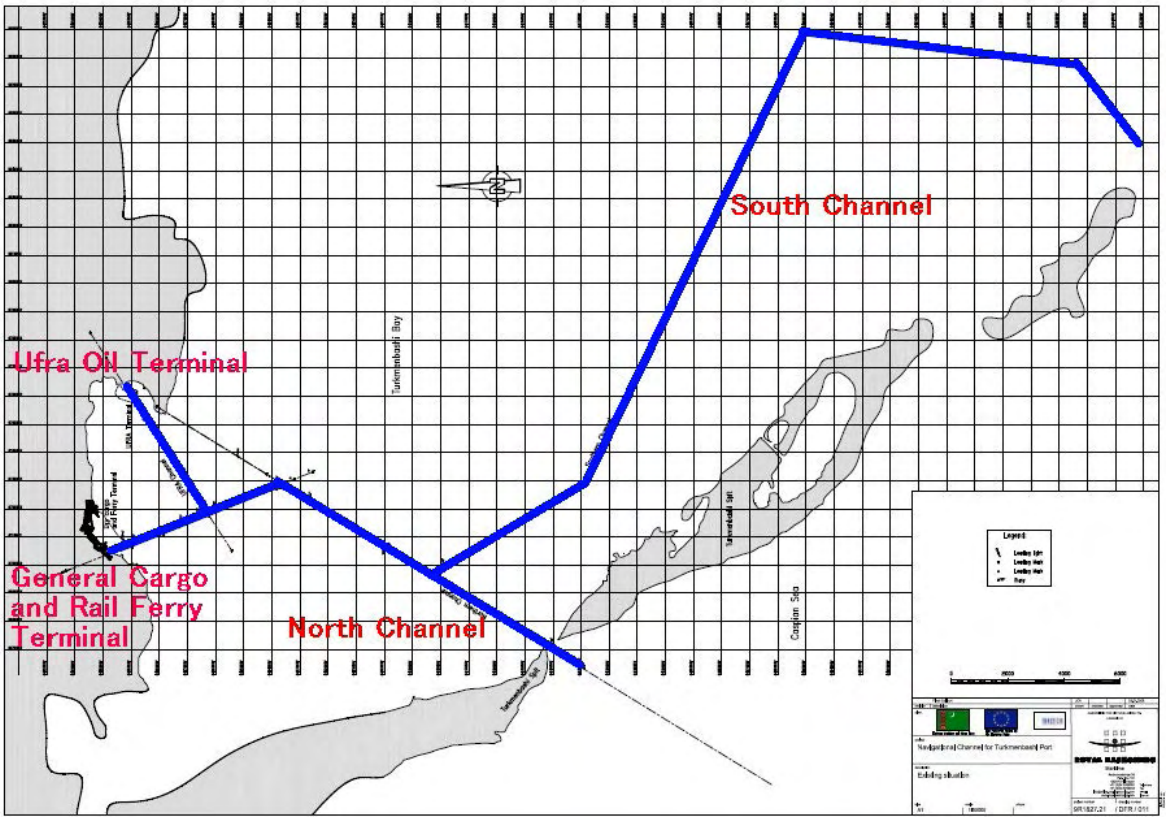
The terminal is equipped with oil fences to prevent an environmental disaster due to an oil spill, however TMRL explains that existing equipment is not sufficient to respond to a large scale oil spill. The necessity of additional equipment such as oil skimming boat has been assessed by a Russian consultant.

To the south of PPK3, a new jetty has been planned however the plan was suspended because the existing facility has enough capacity to cope with immediate cargo increase. (According to the assessment by the Consultant, the capacity will run short before 2020.)

v) Access Channel

Regarding the actual conditions of the access channel, the report on the Turkmenbashi channel by TACIS in 2007 provides detailed information. (TACIS 2007) In an interview with TMRL, the consultant confirmed that the description of TACIS's report was accurate except for some minor issues. In this chapter actual conditions of the access channel of Turkmenbashi Port are described based on the TACIS's report with some corrections by the consultant.

Until 1956-1957, the only access to Turkmenbashi Port was via the so-called "southern channel". In order to shorten the sailing distance, a northern access channel was created. The northern access channel to the port was established by a cut through the Turkmenbashi spit. Since then the dimensions of the canal gradually increased, as shown in Table 2.1.30.



Source: TACIS

Figure 2.1.30 Channel Alignment

Table 2.1.30 History of Channel Improvement

	1956-1957		1958-1959		1959-1961		1970-1971	
	Width	Depth	Width	Depth	Width	Depth	Width	Depth
Outer channel	70	4.6	100	6.4	130	6.9	140	7.0
Cut through the spit	70	4.6	100	5.9	130	6.5	140	6.9
Inner channel	70	4.6	100	6.2	130	6.5	140	6.5

Source: TACIS 2007

Note: Width of UFRA channel is 90 meters.

The alignment of the northern channel basically consists of 3 straight sections:

- The first straight section starts from the open sea and has an orientation from South-West to North-East. The total length of this section is about 13 kilometers. The outer channel (in open sea) is about 1600m long, and the cut through the spit has a length of about 760m. Due to growth of north bank of the spit, the channel is not straight at cut through section as a trace of vessel in Figure 2.1.31 (right) shows.
- The second straight section has a length of about 6 kilometers and moves from south-east to northwest. This second section is connected to the first by a bend. This section is directed to the general cargo/bulk and ferry terminal.
- The third straight section is about 5 kilometers from south-west to north-east. This section branches off halfway into the second straight section and leads to the oil berths.

The total transit time for the channel is reported to be 1.5 hours for the ferries and 2 hours for oil tankers. With the total length of the approach channel being 10.6 Nm and 11.7 Nm respectively for ferries and oil tankers, average vessel speed is 6-7 knots. The channel is one-way for the largest part, except for the section between the bend and buoy 16 (see Figure 2.1.32). Use of pilots is compulsory.

Although the design depth is 7 m and the width is 140m, due to accumulation for about 20 years without major dredging the current available depth is much shallower as shown in Table 2.1.31. The maximum depth just inside and outside the cut through section is 5.5m where available width is around 100m.

There are some vessels that were deliberately sunken a few hundred meters north-west of the channel entrance. This was done in an attempt to prevent sediment from entering the channel. Although this measure may have reduced the rate of sedimentation in the channel, it was not sufficient to prevent the sedimentation of the north-western side of the channel.

The port has a radar system for following vessels. The alignment of the channel is indicated by buoys. Recently plastic buoys were provided by a TACIS project. Originally the total number of buoys was 26, but as shown in Figure 2.1.32, three of them, including newly installed ones, are

not in the proper location, and some were damaged by very unusual freeze of the sea in 2008. TMRL plans to replace or repair them by their own budget. A leading light tower has also collapsed. The port plans to introduce an AIS system.

From interviews by the TACIS study team it became clear that navigation problems are particularly present in the area of the channel around the cut through the Turkmenbashi Spit. The reasons for this are reported to be:

- The reduced channel width at the cut through the spit
- Strong longitudinal currents (direction depends on the wind, but mostly sea-ward) in the section of the cut. Their speed varies with the wind and can reach values up to 1 – 2.5 m/s.
- Presence of shallower banks in the channel at a distance of about 200m – 400m at both sides of the spit.

Though no serious accidents have been reported, minor accidents occasionally occur. For example, two vessels grounding in the cut through section are recorded in 2006.

Figure 2.1.31 North Bank of the Spit (left) and Cut Through Section (right)

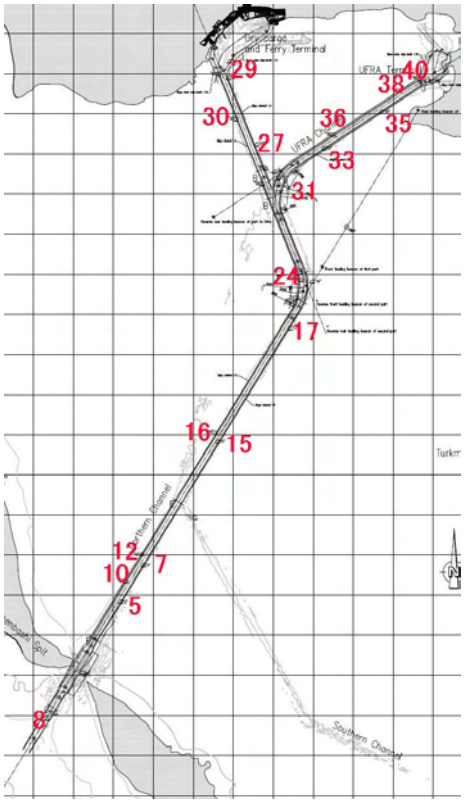
Table 2.1.33 shows records of channel closure for oil tanker in 2009. Though the weather of this year was a little rougher than usual, the data indicates that the ratio of channel closure is extremely high. The channel was closed every three days, and the average duration of the closure was 10.1 hours. The cause of channel closure is wind. TMRL explains that they never close the channel due to waves. TMRL closes the channel when wind speed exceeds 15 to 20 m/sec. Particularly when the wind direction is Northwest or Northeast, steep mountains behind the port create whirlpool, and this hampers navigation safety. The duration of channel closure for ferries is a little longer due to their larger windage. In 2009, closure ratio in July and August is high, but it is rather exceptional. TMRL explained that normally closure ratio in the spring and autumn is high due to strong seasonal wind.

When the access channel is improved, TMRL plans to raise the threshold of wind speed for channel closure and to increase the port productivity dramatically. Another factor of closure due to wind is the insufficient numbers of tugboats. At present only one tugboat out of five can function properly. TMRL plans to equip 1200 hp tugboats. (Current maximum power is 600 hp)

Table 2.1.31 Recorded Depths in the Channel

Location / Navigation Buoy No.	Width of Channel (m) With 7m Depth	Width of Channel (m) With 6.5m Depth	Width of Channel (m) With 6m Depth
Main Channel with original design width 140m and depth 7m			
8	None	None	None – max depth 5.5m for 110m width
Through Spit	140		
5	None	None	None – max depth 5.5m for 90m width
10	None	None	None – max depth 5.5m for 100m width
7 & 12	None	None	110
15 & 16	70	110	140
17	80	120	150
24	110	130	170
23	105	130	170
25	50	120	140
27	115	130	140
30	80	120	140
29	100	130	140
Ufra Channel with original design width 90m and depth 7m			
31 & 34	60	80	100
33	None	50	90
36	None	60	95
35	None	65	100
38	None	80	105
40	40	70	100

Source: TACIS 2007



Source:TACIS 2007

Note: This figure is only for reference of locations indicated in Table 2.1.31. Some buoys are missing.

Figure 2.1.32 Location of Buoys

Table 2.1.32 Conditions of Buoys

№	Item	Colour	Light sector, location, additional	Description of buoy	Remarks
1	Lighted buoy №3	green	right side	plastic buoy	in standard location
2	Lighted buoy №8	red	left side		in standard location
3	Lighted buoy №3A	green	right side		in standard location
4	Lighted buoy №5	green	right side		in standard location
5	Lighted buoy №10	red	left side	has been lost in ice condition and other buoy was installed in in due place /standard location	in standard location
6	Lighted buoy №7	green	right side		in standard location
7	Lighted buoy №15	green	right side	plastic buoy	in standard location
8	Lighted buoy №16	red	left side	plastic buoy	in standard location
9	Lighted buoy №17	green	right side	plastic buoy	in standard location
10	Lighted buoy №22	red	left side	plastic buoy	in standard location
11	Lighted buoy №19	green	right side	plastic buoy	in standard location
12	Lighted buoy №24	red	left side	plastic buoy	in standard location
13	№23	green	right side	plastic buoy	in standard location
14	Lighted buoy №28	red	left side	plastic buoy	in standard location
15	Lighted buoy №25	green	right side	plastic buoy has been damaged in ice condition and is beyond repair	preparation for writing-off/disposal
16	Lighted buoy №30	red	left side		in standard location
17	Lighted buoy №29	green	right side		in standard location
18	Lighted buoy №32	red	left side	plastic buoy	in standard location
UFRA channel					
20	Lighted buoy №31	green	right side	plastic buoy	in standard location
21	Buoy №34		left side		in standard location
22	Lighted buoy №33	green	right side		in standard location
23	Buoy №36	red	left side		in standard location
24	Lighted buoy №35	green	right side	sunken by vessel on November 27, 2008 года	under repair
25	№35A	green	right side		in standard location
26	№40	red	left side	plastic buoy	in standard location

		including,	
Buoys		plastic buoy	16 pieces
in standard location	23 pcs	of which, in standard location	13 pieces
under repair	1 piece	under repair	1 piece
preparation to writing-off /disposal	2 pcs	preparation for writing-off /disposal	2 pieces

Note: “plastic buoy” denotes newly installed buoy by TACIS project

Source: TMRL

Table 2.1.33 Records of Channel Closure (2009)

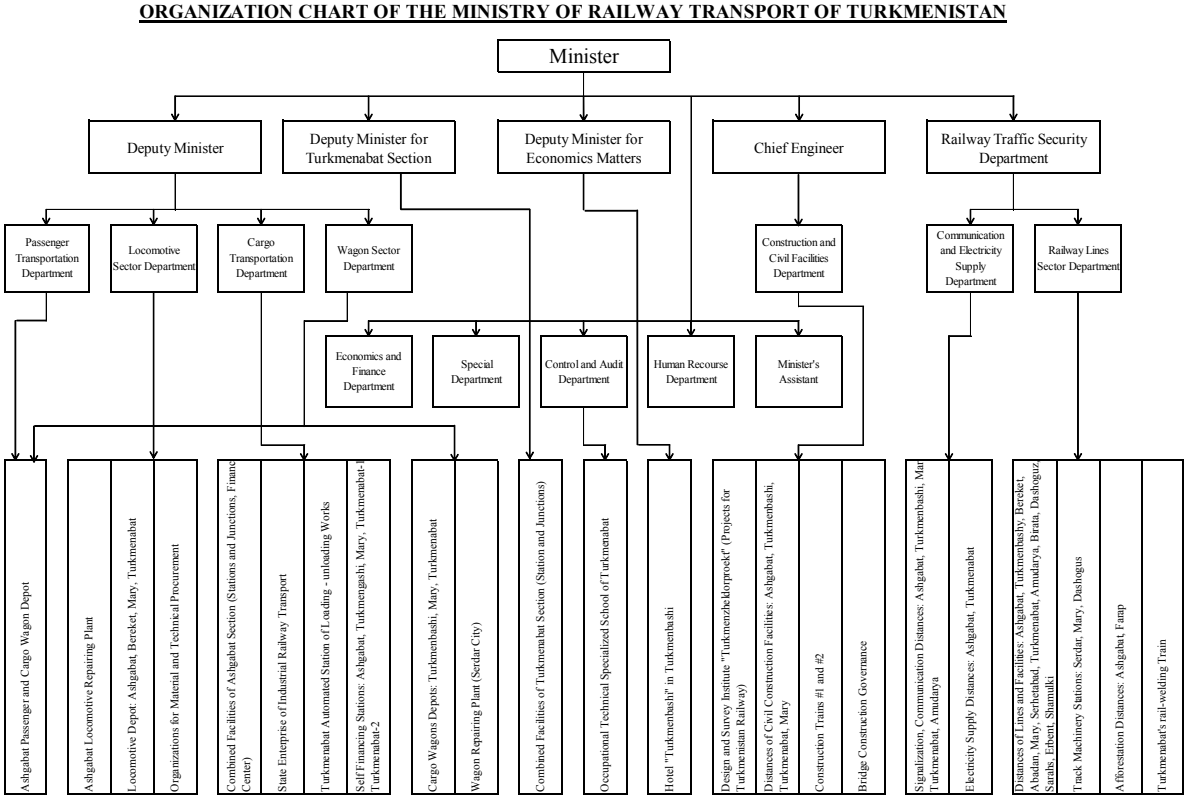
	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Total Closure Time (hrs.)	55.4	56.5	159.7	132.0	119.0	91.8	189.3	236.2	67.1	62.2	58.0	63.9	1291.1
Closure Ratio	7.4%	8.4%	21.5%	18.3%	16.0%	12.8%	25.4%	31.7%	9.3%	8.4%	8.1%	8.6%	14.7%
Numbers of Closure	8	10	14	13	12	8	18	20	9	4	6	6	128
Average Duration of Closure (hrs.)	6.9	5.7	11.4	10.2	9.9	11.5	10.5	11.8	7.5	15.6	9.7	10.7	10.1

Source: TMRL

(2) Railway Sector

1) Organization of Ministry of Railway in Turkmenistan

Now more than 20,000 persons are employed by the Ministry of Railway and approximately 90 persons work at the head office. 56 ministry enterprises are subordinated under the Ministry of Railway and current organization chart of the Ministry of Railway is shown in Figure 2.1.33.



Source: The Ministry of Railway Transport of Turkmenistan

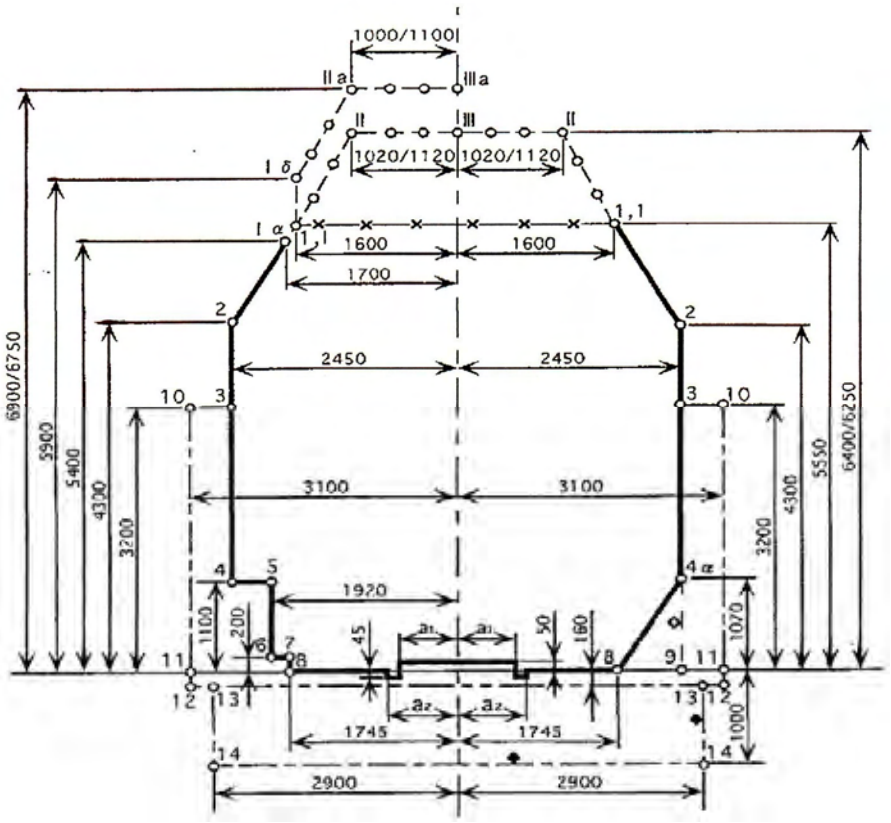
Figure 2.1.33 Organization Chart of the Ministry of Railway Transport of Turkmenistan

2) Railway Facilities

i) Design Criteria

GOST (design standard) used in CIS (Commonwealth of Independent States) and Russia is applied to design of railway facilities such as track, station and bridge in Turkmenistan. Broad gauge 1,520mm in width is used for railway track in former Soviet Union including Mongolia and the gauge is used in Turkmenistan as well, but standard gauge 1,435mm in width is used in Iran which is neighboring country to Turkmenistan. The difference of gauge between Turkmenistan and Iran is a serious hindrance in passing trains at border between two countries.

There is no electrified section in Turkmenistan and structure gauge applied in Turkmenistan is shown in Figure 2.1.34.



Source: The Ministry of Railway Transport of Turkmenistan

Figure 2.1.34 Structure Gauge

ii) Change of Railway Network in Turkmenistan

Railway in Turkmenistan was started from the shores of the Caspian in 1879 in order to secure Russian control over the region and provide a rapid military route to the Afghan border as Transcaspian Railway. The line was extended to around Ashgabat in 1885 and it reached Turkmenabat whose former name is Chardzhou in 1886. The railway bridge across Amu Darya river was built in 1901 and the Transcaspian Railway was connected to Uzbekistan. Central-Asia Railway Bureau of the Soviet Union was established in Tashkent of Uzbekistan in 1964 and the Turkmenistan Railway was placed under the umbrella of the railway bureau. Railway network in Turkmenistan had been expanded to approximately 2,000 km long in total until December 1991 when the Soviet Union was collapsed. Since railway network in the former Soviet Union had been expanded to connect Moscow radially and for rational transport in the former Soviet Union, the railway network was not convenient for independent countries.

Since the independence railway network in Turkmenistan has been gradually expanded and became 3,115.8 km long in total in 2009.

The change of railway network in Turkmenistan after collapse of the Soviet Union is shown in the Figure 2.1.35.

Year	Change of Railway Network in Turkmenistan
1991	
	Framework of railway network in Turkmenistan was built during the Soviet Union time and the railway network was expanded regardless of borders. Total length of railway in Turkmenistan was approximately 2,000km when Turkmenistan became independent of the Soviet Union in 1991.
1996	
	The construction of the line 132 km long between Tedzhen and Serahs which is borderd by Iran and bogie exchange facilities at Serahs were completed in May 1996. The brach line has five new railway stations and actually revived the Great Silk Way.

Year	Change of Railway Network in Turkmenistan
1999	
	The line 203 km long between Turkmenabat and Atamyrat (Kerki) was opnened in 1999. The branch line, having connected five regional centers of Lebap area with the city of Turkmenabat, and also with capital Ashgabat, passes on the left coast of Amu Darya river.
2006	
	The constructio of the line of 540 km between Ashgabad and Dashoguz was compledted at the end of 2006. There are big three bridges across Karakum river and water collectors Mal – Yab and Dostluk.

Year	Change of Railway Network in Turkmenistan
2009	
	Construciton of the bridge 1,414 m long which has 14 girders and cross Amu Darya river was completed in August, 2009. The bridge was constructed by Ukranian company and the constraction cost is USD 123 million. As a result of the completion, the line Turkmenabat - Atamurat connected the line connecting with Dusanbe in Tajikistan.

Source: Study Team

Figure 2.1.35 Change of Railway Network in Turkmenistan

iii) Major Bridges

a) Turkmenabat – Farap Bridge across Amy Darya river

The bridge across Am Darya river which is located between Turkmenabat and Farap was constructed in 1901 and more than one hundred years has already passed. The total length of the bridge is 1,700m and the bridge comprises 25 truss girders 66 m in length and two simple girders 11.4 m in length. Since the bridge has become too old for use, train speed is restricted on the bridge and immediate rehabilitation is required.

Turkmenabat – Farap Bridge across Am Darya River

b) Atamurat (Kerki) – Kerkichi Bridge across Amy Darya river

Construction of the bridge 1,414 km long which has 14 girders and cross Amu Darya river between Atamurat and Kerkichi was completed in August, 2009. The bridge was constructed by Ukrainian company and the construction cost is USD 123 million. As a result of the completion, the line Turkmenabat – Atamurat has been connected to the unconnected line which is located at the east part of Turkmenistan and it has been possible for Turkmenistan railway to operate their trains on the unconnected line not through Uzbekistan territory.

Source: Study Team

Figure 2.1.36 Location Map of Bridges

iv) Level Crossing

There are 146 level crossings in Turkmenistan. There are some grade-separations in large cities, but almost all out of crossings are level crossings. Since the number of trains operated in Turkmenistan is not so many, traffic congestion is not caused by the revel crossings.

v) Passenger Station

There are 175 passenger stations in Turkmenistan and main stations out of them are as follows;

a) Ashgabat
b) Turkmenabat
c) Turkmenbashi
d) Mary
e) Tejen
f) Balkanabat
g) Dashogus

Ashgabat Station

vi) Container Station

There are the following 8 container stations in Turkmenistan.

a) Balkanabat Container Station
b) Serdar Container Station
c) Gypjak Container Station
d) Dashogus Container Station
e) Altyn Asyr Container Station
f) Zerger Container Station
g) Turkmenabat 2 Container Station
h) Serahs Container Station

The Gypjak Container Station is most important among them and located in approximately 7 km from Ashgabat. In general it specializes in following services:

- Packed and piece goods possible to store on open yards
- Heavy cargoes on open racks
- Bulk cargoes, coal possible to store on open yards of station

Gypjak Container Station

vii) Rolling Stock

Some diesel locomotives and passenger coaches made in China have been purchased since 2005 and the number of rolling stocks which the Ministry of Railway in Turkmenistan owns is shown in Table 2.1.34.

Table 2.1.34 The Number of Rolling Stock

Passenger Coaches	525
Freight wagons	12,361
Locomotives	351

Source: The Ministry of Railway Transport

viii)Repairing Plant and Depot

There are the following five repairing plants and depots except locomotive depot in Turkmenistan.

a) Passenger and Cargo Wagon Depot – Ashgabat
b) Cargo Wagon Repairing Plant – Serdar
c) Cargo Wagon Depot – Turkmenbashi
d) Cargo Wagon Depot – Mary
e) Cargo Wagon Depot – Turkmenbat

Passenger and Cargo Wagon Depot – Ashgabat

ix) Locomotive Repairing Plant

There is one locomotive repairing plant in Turkmenistan and it is located in Ashgabat. The locomotive repairing plant was rehabilitated by Japanese Yean Loan project of former JBIC. Main contents carried out under the project are as follows;

a) Supply of new machineries
b) Construction of new foundry shop
c) Repairing of buildings

The rehabilitation of the locomotive repairing plant made possible almost all maintenance except heavy work.

Locomotive Repairing Plant, Ashgabat

x) Locomotive Depot

There are the following four locomotive depots.

a) Bereket Locomotive Depot
b) Mary Locomotive Depot
c) Ashgabat Locomotive Depot
d) Turkmenabat Locomotive Depot

xi) PC Sleeper Factory

There is a PC sleeper factory in Turkmenistan.

xii) Bogie Exchange Facilities

The new rail line 300 km in length, Tedjen – Serakhs – Mashad, which is connected between Turkmenistan and Iran was completed in May, 1996 (Turkmenistan territory 132 km in length) and bogie exchange facilities was also opened in Serakhs at the same time. As mentioned above, since the gauge of Turkmenistan (1,520 mm) is different from that of Iran (1,435 mm), bogie exchange facilities is required to pass through at the border between Turkmenistan and Iran. It takes two and half hours to exchange bogies of 16 wagons and it costs USD 180 to exchange one wagon at the Serakhs facilities.

Bogie Exchange Facilities, Serakhs

xiii)Railway Facilities at Turkmenbashi

a) Railway Ferry Terminal at Turkmenbashi

The following railway ferries are operated at Turkmenbashi port.

- Between Turkmenbashi and Baku : 3 to 4 ferries per week
- Between Turkmenbashi and Makhachkala : 1 ferry per week

Utilization of railway ferry terminal at Turkmenbashi is shown in Table 2.1.35.

Table 2.1.35 Utilization of Rail Ferry Terminal at Turkmenbashi

Total Hours in Month	Left	Right	Total
Total Calls	265	327	592
Calls without inbound wagons	1	1	2
Calls without outbound wagons	21	32	53
Total Time while at Berth [hours]	4153.6	5029.8	9183.4
Customs Clearance Inbound [hours]	66.0	82.1	148.1
Rolling Off [hours]	127.8	320.0	447.8
Customs Clearance Outbound [hours]	41.8	50.8	92.7
Rolling On [hours]	103.3	207.5	310.8
Total Idle Time, while at Berth [hours]	3814.6	4369.4	8184.0
Waiting Times			
Arrival-Rolling Off [hours]	1736.1	2073.4	3809.5
Rolling On-Departure [hours]	821.2	1739.7	2560.9
Utilisation			
Gross Utilisation	57%	77%	67%
Net Utilisation	4%	8%	6%

Source: TMRL (Turkmen Maritime and River Transport Lines)

Railway Ferry Terminal, Turkmenbashi

b) Dry Port at Turkmenbashi

The dry port is used for various purposes and operated by not the Ministry of Railway Transport but Turkmen Maritime and River Transport Lines. Refer to (1) Port Sector of 2.1.6 for details.

Dry Port at Turkmenbashi

c) Transshipment Facilities between Railway and Truck at Turkmenbashi

The transshipment facilities between railway and truck are located behind the above mentioned dry port. Polypropylene etc. produced at Turkmenbashi are transported by truck up to the transshipment facilities and transshipped to railway.

Transshipment Facilities between Railway and Truck at Turkmenbashi

3) Financial Status

It is expected that annual income and expenditures of the Ministry of Railways Transport in Turkmenistan for the year 2010 will be 930,000 thousands manat (326,316 thousand US dollars)

and 618,660 thousands manat (217,074 thousand US dollars) respectively. No data on past financial status was given from the Ministry of Railway Transport in Turkmenistan because it is confidential information.

4) Situation of Train Operation

Volume of train movements for the Year 2009 is shown in Table 2.1.36. The most passenger trains are operated between Ashgabat and Dushak and the number is 6 trains per 24 hours. The other hand, the most cargo trains are operated between Farap and Mary and 7 trains are operated per direction per 24 hours. 18 trains in total for both passenger and cargo are operated between Farap and Mary per 24 hours and the section is most congested in Turkmenistan. As shown in Table 2.1.37 passenger trains are operated between Ashgabat station and seven stations, and in case between Ashgabat and Turkmenbashi it takes about 15 hours to operate passenger train.

Table 2.1.36 Volume of Train Movements for the Year 2009

Name of the area and the direction		Volume of train movements per 24 hours		
		Cargo train to…	Cargo train back from…	Passenger
1.	Farap – Mary	7	7	4
2.	Zerger – Atamyrat	1	1	2
3.	Mary – Dushak	6	6	4
4.	S. Turkmenbashy – Sarahs	3	3	2
5.	Dushak – Ashgabat	5	5	6
6.	Ashgabat – Bami	4	4	4
7.	Bami – Turkmenbashy	4	4	2
8.	Gypchak – Ichoguz – Dashoguz	2	2	1
9.	161 – Talimardzhan	5	5	1 (4 international)
10.	Tahiatazh – Dashoguz	2	2	1

Source : Ministry of Railway Transport

Source : Study Team

Figure 2.1.37 Location Map of Train Operation Sections

Table 2.1.37 Time Table for Passenger Trains at Ashgabat Station

Train No.	From - To	Arrival	Departure
04	Turkemnabat - Ashgabat	05:35	
605	Turkmenbashi - Ashgabat	06:15	
607	Dasogus - Ashgabat	07:00	
602	Serhetabat – Ashgabat	07:40	
604	Ashgabat – Balkanabat		08:10
96	Atamurat - Ashgabat	09:10	
615	Ashgabat – Serahs		10:50
608	Ashgabat – Dasogus		13:30
95	Ashgabat – Atamurat		16:55
603	Balkanabat - Ashgabat	17:15	
616	Serahs – Ashgabat	17:35	
601	Ashgabat - Serhetabat		18:20
606	Ashgabat – Turkmenbashi		19:00
03	Ashgabat - Turkemnabat		19:40

Source: Ashgabat Station

Table 2.1.38 Time Table for Passenger Trains at Turkmenbashi Station

Train No.	From - To	Arrival	Departure
605	Turkmenbashi - Ashgabat		15:35
606	Ashgabat - Turkmenbashi	09:25	

Source: Turkmenbashi Station

5) Transportation Volume

Transportation volume of both passenger and cargo by railway is increasing year by year and the increase of cargo transportation is higher than one of passenger transportation. It is expected that the tendency of the increase of transportation volume continues and the volume for next three years is as shown in Table 2.1.40. Increase of passenger transportation has been promoted by acquisition of new rolling stocks (diesel locomotive and passenger coach) and improvement of quality of service for passengers.

Table 2.1.39 Transportation Volume for the Period of 2004 – 2008

Activities	Unit	2004	2005	2006	2007	2008
Cargo transported	Thousand ton	18,229	19,800	22,374	23,586	25,407
Passenger transported	Thousand people	4,440	4,940	5,349	5,845	6,235
Freight traffic	Mill. ton/km	8,670	9,668	10,441	10,973	11,547
Passenger traffic	Mill. passenger/km	1,286	1,326	1,435	1,570	1,685

Source: the Ministry of Railway Transport

Table 2.1.40 Expected Transportation Volume for the Period of 2009 – 2011

Activities	Unit	2009	2010	2011
Cargo transported	Thousand ton	25,880	26,339	26,925
Passenger transported	Thousand people	6,300	6,420	6,510
Freight traffic	Mill. ton/km	11,720	11,950	12,180
Passenger traffic	Mill. passenger/km	1,660	1,690	1,720

Source: the Ministry of Railway Transport

The breakdown of cargo transportation for the period of 2000 to 2008 is shown in Table 2.1.41. The transportation volume for oil products and construction accounts for more than thirty five percent of total cargo volume every year. While volume of some items varies from year to year, total volume is increasing since 2001.

Table 2.1.41 Cargo Transportation for the Period 2000 – 2009

(Unit: Thousand Ton)

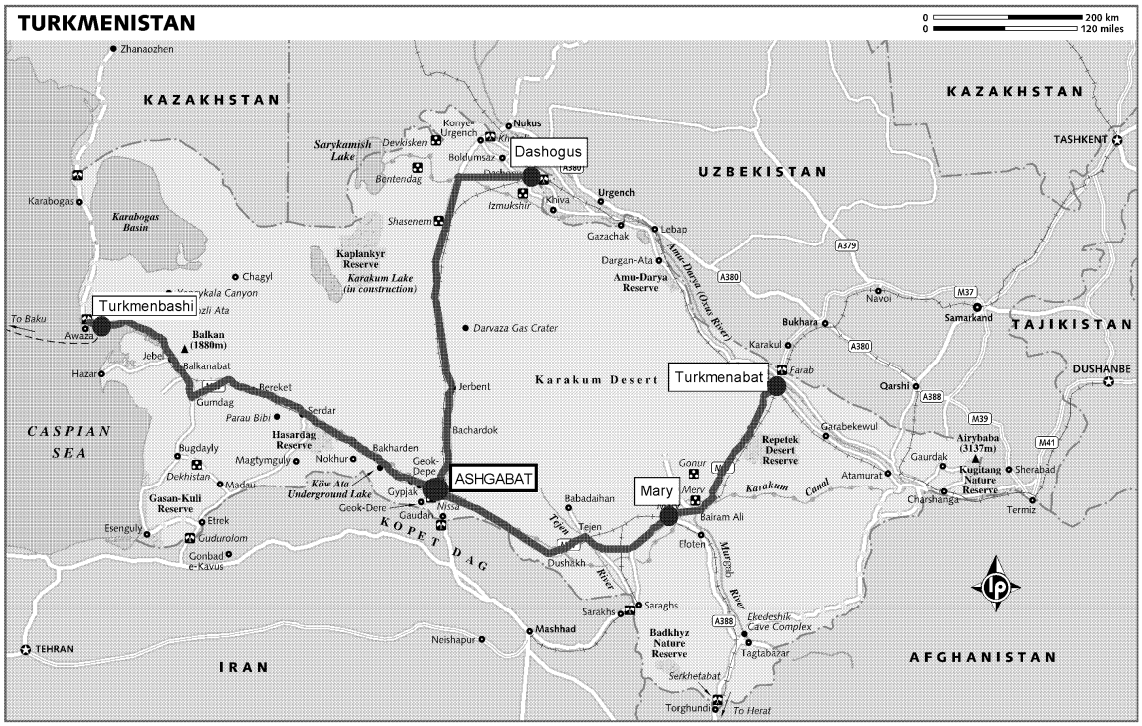
Year	2000	2001	2002	2003	2004
Oil products	4025	3612	4887	6628	5586
Grain and flour	1979	1551	1905	1117	1236
Construction	4850	4405	3767	3267	3248
Cement	650	625	652	923	1228
Ferrous metal	915	649	514	789	782
Chemical and mineral fertilizers	751	337	437	1073	1219
Cotton	660	496	539	619	708
Coke	96	126	107	120	83
Others	4065	3109	3123	3360	4039
Total	**17991**	**14910**	**15931**	**17896**	**18229**
Year	**2005**	**2006**	**2007**	**2008**	**2009**
Oil products	5512	6019	6130	4751	5093
Grain and flour	1375	1461	1780	1674	2115
Construction	4505	4250	4733	4359	5017
Cement	1028	924	677	371	665
Ferrous metal	760	790	913	749	825
Chemical and mineral fertilizers	949	1091	1074	848	1093
Cotton	908	827	949	760	735
Coke	153	180	173	308	266
Others	4610	6831	7157	11587	10116
Total	**19800**	**22374**	**23586**	**25407**	**25925**

Source: Ministry of Railway Transport in Turkmenistan

(3) Road Sector

1) Road Network

The roads of the "Turkmenistan" have an important role to carry domestic logistics, and the network has two roads as linchpins which connect a basic point from east to west direction and toward north from Ashgabat. The present condition of the road network shows many medium and small-sized branch roads from the main road. The road passing major cities (Turkmenbashi - Ashgabat-Mary-Turkmenabat) to the east and west is a main highway of Turkmenistan, and is the east and west corridor of Central Asia. In addition, the highway from Ashgabat to Dashogus connecting north and south was completed in 2009, hereby north, south, east and west arterial roads (Figure 2.1.38) started from Ashgabat becomes strong. For these routes, improvements and updates are top priorities of Turkmenistan policy. And roads are connected to bordering Kazakhstan, Uzbekistan, Afghanistan, and Iran through the customs.



Source: Study Team

Figure 2.1.38 Main Existing Road Network

2) Highway Condition

As for the roads in Turkmenistan, most are paved, but width is not great (2 traffic lanes; around 8m total width) and the pavement is damaged by heavy traffic in some places, and there are many places patched and repaired points. Currently it is not prudent to run at high speed on these road surfaces, because there are many vehicles driving nearly 100 km/h. But some parts have been made comfortable by the widening.

Surface has been damaged (near Tejen)

3) Overview of each site

i) Ashgabat

Most roads in the Turkmen capital, Ashgabat city, have more than 6 traffic lanes and often there is adequate shoulder width even if it has only 2 traffic lanes. Basic city planning was implemented carefully. Large trucks have limited ability to pass on some roads. Traffic control and signal control are generally adequate. There are few traffic jams at this time.

Road in Ashgabat

ii) Mary and Turkmenabat

In Mary, and Turkmenabat which are the major cities on the East-West corridor, the main roads are wide, but basically large trucks are prohibited. It was reported that a base of the promotion of logistic efficiency in cities were established at the time of city highway construction and the inflow of large trucks was regulated by the policy of the city.

Road in Turkmenabat

Amu-Darya River is shown below. When we went from Turkmenabat to the border with Uzbekistan, over the river was a pontoon bridge which was installed in the Soviet Union times, and it has a weight limit (to 20t) and a prior passport check. The toll was 1.2 Manat for a compact car and a full-size vehicle was 4.8 Manat. It was reported that construction of a new land bridge will start soon.

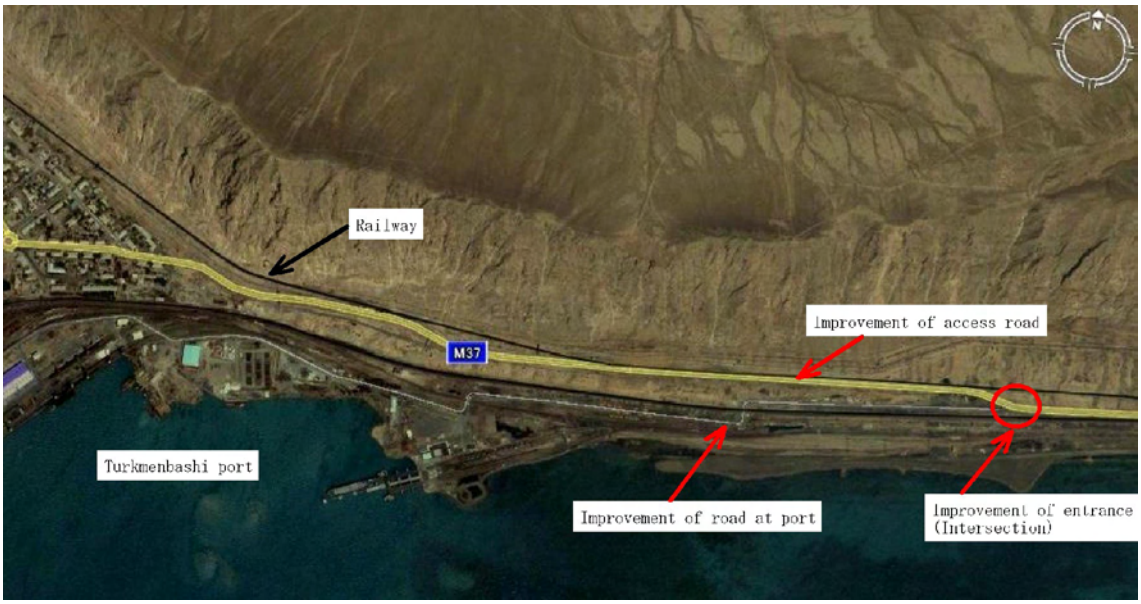
Pontoon bridge over Amu-Darya River (Turkmenabat suburb)

iii) Turkmenbashi

The roads in Turkmenbashi, the entrance of the East-West corridor in this study, were entirely complete and fatigued at some places. The road along the shore accessing the port, has only 2 traffic lanes and terrible ruts as it has a lot of heavy traffic.

It is a concern for the future whether it can carry out the role as the main logistic line sufficiently, if large-sized vehicles increase in number.

Access road for Turkmenbashi port



Source：Google

Figure 2.1.39 Roads at Turkmenbashi port

The running ratio of the track is high though the photograph under the former page which shows that the access road has two traffic lanes. If the traffic demand of the port increases, large-sized car increases is obviously. The possibility that the entrance to harbors shown at the right of Figure 2.1.39 becomes a bottleneck is assumed.

It is preferable to strengthen the road in this improvement of this intersection and access road and port together. However, it is difficult for the position of the access road to widen the road simply in the topographical constraint because the railway and the pipeline are established the cliff.

2.1.7 Progress of National Projects Related to Turkmenbashi Port, Railways and Road Developments by Own Finance, Bilateral and Donor Assistant, and Anticipated Cargo Flow upon the Completion of Current On-going National Projects

(1) Projects in Port Sector

In this section development projects in the port sector are described. The Government of Korea financed a feasibility study on the modernization project of Turkmenbashi Port in 2009 (MLTM 2009). Based on the result of the FS, the Korean Government is ready to extend an ODA loan for port development, but the Government has not received any response from the Government of Turkmenistan.

In 2007 the European Union carried out a feasibility study on the improvement of the navigation channel in Turkmenbashi Port as a part of the TRACECA project (TACIS 2007). Basically, EBRD has a positive intention to finance development projects in Turkmenbashi Port, though it has no plan to cooperate in the implementation of channel improvement project.

The details of above mentioned FSs will be described in Chapter 3. Their forecasts of cargo flow will be included in the description in Chapter 3 together with the Consultant's assessments.

In addition to the above mentioned studies, currently two TRACECA study projects directly relating to Turkmenbashi Port are on going. One is "International Logistic Centers for the Central Asian countries" and the other is "Motorways of the Sea for the Black Sea and the Caspian Sea".

The former aims to develop an efficient network of modern logistics centers which will facilitate intermodal transfer of goods in Central Asia where transport costs are some of the highest in the world, due, in part, to inefficiencies in the transport network and reliance on road transport for long distances as intermodal transfer facilities and equipment are generally lacking. The study selected one "logistics center" in each country and Turkmenbashi Port was selected as "the logistics center in Turkmenistan" considering its importance in the TRACECA corridor. The study will end in 2011.

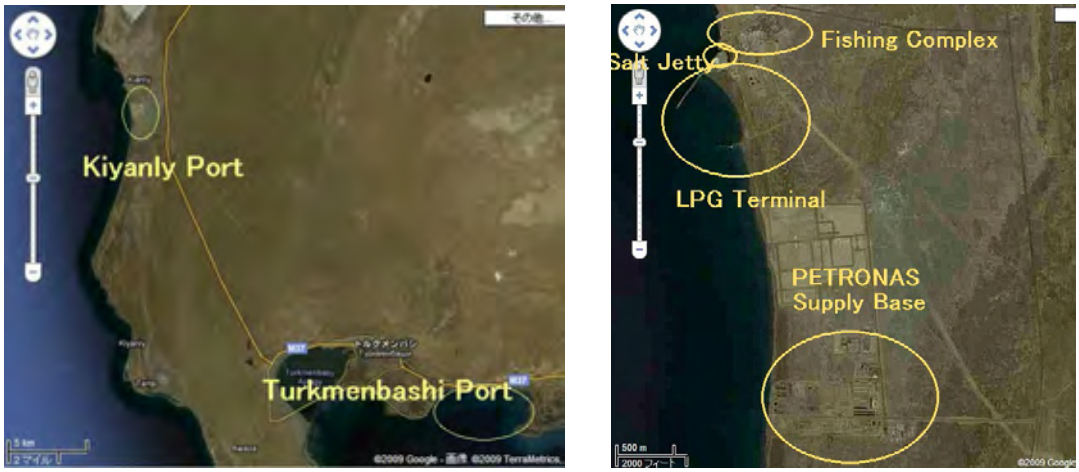
The latter aims to promote and support the efficient intermodal freight transport through the concept of "Motorways of the Sea" connecting the Black and Caspian Seas' neighboring countries with the enlarged EU territory. As a Motorway of the Sea (MoS) is the maritime segment of door to door intermodal freight transport chain, the project will specifically deal with sea-land (rail, road and possibly inland waterway) interfaces. Since Turkmenbashi Port is the most important sea-land node in Turkmenistan and the ferry link between Turkmenbashi and Baku is the busiest link in the Black and Caspian Seas' ferry network, efficiency improvement of Turkmenbashi Port will be discussed in detail in the study. The study is scheduled to be terminated in 2011.

Other than international organizations, Polimex, a Turkish construction company and a major player in the Turkmen market, reportedly proposed a development plan of Turkmenbashi Port including Ro-PAX ferry terminal and made a presentation of their plan to the President of Turkmenistan in January 2010.

Outside of Turkmenbashi Port, there is no plan to develop a public commercial port in Turkmenistan, but there are some development plans for specialized ports for oil and gas transportation. The largest project among them is Kiyanly Port project. Kiyanly is located around 30 km to the north-west of Turkmenbashi Port, facing to the open sea. Unlike Turkmenbashi Port, Kiyanly Port is specialized for gas exploitation and shipment.

The port has two terminals; LPG loading facility and supply base for offshore gas field. The LPG loading terminal, the first built on the Caspian, has an annual throughput capacity of 200,000 tons. The facilities of the sea terminal include the 150-meter double pier equipped with pipelines and liquefied gas loading platform. The pier is designed for gas carriers with a capacity up to 3,100 tons. The terminal was constructed by an Iranian company. The Turkmenbashi oil refinery will supply the LPG via pipelines to the facility. Furthermore PETRONAS will install an LPG plant in Kiyanly. By the completion of the facility, maritime transport of LPG is expected to increase, as

previously all Turkmen LPG was shipped by railways and roads, some of which were transported via rail ferry, to the domestic market as well as Afghanistan, Iran, Pakistan, Armenia and , Georgia. The loading terminal started its operation in December 2009.



Source Google

Figure 2.1.40 Location of Kiyanly Port (left) and allocation of facilities in the Port (right)

Another function of Kiyanly Port is as an offshore supply base. PETRONAS has constructed the supply base to the south of the LPG terminal based on the BOT agreement with the State Agency for Hydrocarbon Management. PETRONAS has another supply base in Turkmenbashi Port. According to the basic plan, the supply base in Turkmenbashi Port is a tentative facility and will be relocated to Kiyanly, however PETRONAS explains that the relocation is still in a very initial stage of planning and its implementation will be in the far future. PETRONAS plans quay infrastructure development of its "tentative" facility in Turkmenbashi Port. Currently the facility in Turkmenbashi Port is used as the main supply base whereas the facility in Kiyanly is used as the auxiliary supply base for assembling and transporting large maritime structures. The most outstanding advantage of Turkmenbashi Port over Kiyanly supply base is the calmness of the basin.

Adjacent to the north of Kiyanli Port, a salt loading facility operated by a state-owned salt factory is located. And next to the salt jetty, a fishing complex is under construction to which the fish processing factory in Turkmenbashi Port will be relocated. Though the complex will be completed soon according to TMRL, the construction work of the fishing jetty and cultivation facility seem to have been suspended. The current factory site in Turkmenbashi will be available for port development.

According to the information from Turkmenbashi municipality, railway connection from Turkmenbashi to Kiyanly is planned, though its implementation schedule is unknown. The railway will be constructed through the reclaimed land of Saymonona Bay in Turkmenbashi.

TMRL explains that the Government of Turkmenistan doesn't plan to develop any commercial port in Kiyanly.


Figure 2.1.41 LPG Terminal (left) and Fishing Jetty (right, under construction) in Kiyanly Port

(2) Projects in Railway Sector

The project which has been completed last year and ongoing project are as follows;

i) Atamurat (Kerki) — Kerkichi Bridge across Amu Darya River

As mentioned in 2.1.6 (2), the bridge construction was completed in August, 2009. It was constructed by Ukrainian company and the construction cost is USD 123 million. The line Turkmenabat – Atamurat has been connected to the unconnected line which is located at the east part of Turkmenistan and it has been possible for Turkmenistan railway to operate their trains on the unconnected line not through Uzbekistan territory. This project is not ongoing project, but since statistical data of the year 2009 is not greatly included by the completion of the bridge is not greatly included in, this project is listed as ongoing project.

ii) North-South Corridor (Uzen – Kyzylkaya – Bereket – Etrek - Gorgan)

The purpose of construction of new railway line Uzen – Kyzylkaya – Bereket – Etrek – Gorgan is to form a new railway route as a part of a North-South transport corridor for acceleration of physical distribution and essential increase of transit potential of the state, the resolution of strategic problems of the state on development of railway network in Turkmenistan.

The opening of the new railway line Uzen – Kyzylkaya – Bereket – Etrek – Gorgan creates additional routs connecting Kazakhstan and the central areas of Russia with Turkmenistan, Iran, Gulf countries, South and South-West Asia. The main target of the project is to increase the cargo and passenger transport, to reduce the cost of transport within the country, to same travel time and to generate economic growth in regions through which the road will cut across by increased transport movement and accessibility to rural areas. It is planned to build seven stations, two level crossings, as well as access and support ways with the total length of 69km. In addition, the project provides for construction of a locomotive transfer depot center for maintenance of wagons, as well as depot to replace the bogie wagons in the border zone.

The total length from Uzen in Kazakhstan to Gorgan in Iran is approximately 930 km and north of Bereket 250 km in length has been constructed as of January, 2010. It is expected that the railway line would be ready for service by December, 2011. The detailed description of the new line is given in Table 2.1.42. It is expected that the initial load capacity of the line would be 5 million tons of cargo annually and expanded up to 12 million tons by 2012. In addition to cargo, the railway link is expected to handle passengers. On 18th of February, 2010 the ADB and Turkmenistan Government made a memorandum that the ADB would finance USD 225 million for the section 200 km long from the border of Kazakhstan to Bereket. And in January, 2010 the IDB agreed to finance USD 371 million for the section 256 km from Bereket to Etrek. The total cost of the project is USD 1,400 million.

Table 2.1.42 North-South Corridor (Uzen – Kyzylkaya – Bereket – Etrek - Gorgan)

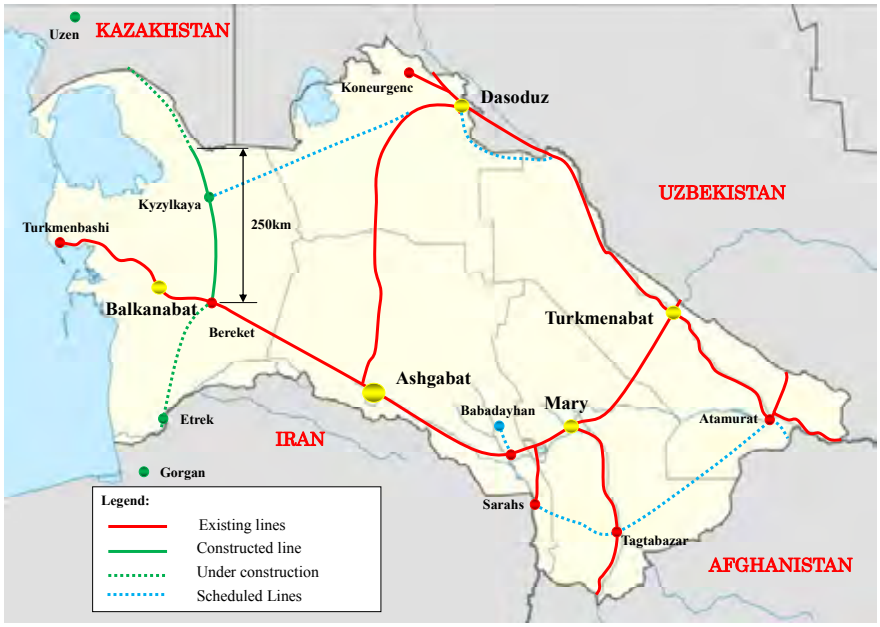
Country	Section	Length (km)	Description
Kazakhstan	Uzen – the border	140	-
Turkmenistan	the border – Bereket	440	The fund USD 80 million from IDB (Islamic Development Bank) is allotted for the construction of devices of the signal system, centralization blocking communication and energy supply. The fund USD 225 million from ADB is allotted for section 200km long.
	Bereket – the border (Etrek)	257	The fund USD 461.2 million in total (USD 189.9 million, USD 181.3 million and USD 90 million) from IDB is allotted for the construction of this section.
Iran	the border (Etrek) - Gorgan	90	-
Total		927	

Source: Study Team

Current status of railway network in Turkmenistan is shown in Figure 2.1.42. Existing and ongoing project lines are shown in red and green respectively. The completion of the above two projects must make railway network in Turkmenistan more strong and railway transport volume will be increased remarkably.

Figure 2.1.43 shows import and export volume at each border on railway lines in 2000 and the import volume at Farap which is a border with Uzbekistan is the most. Construction materials and oil products from Uzbekistan have a majority in the import volume. Second one is at Tahiatash which is another border with Uzbekistan and construction materials and oil products from Ukraine and chemicals & grain from Kazakhstan have a majority in the import volume.

Transport volume between Turkmenistan and Iran has not been much, however, it is expected that transport volume between Turkmenistan and Iran including transit cargo will be increased rapidly. Transport volume between Turkmenistan and Tajikistan also will be increased. Import and export volume expected for the future is shown using arrows in relative quality in Figure 2.1.44.

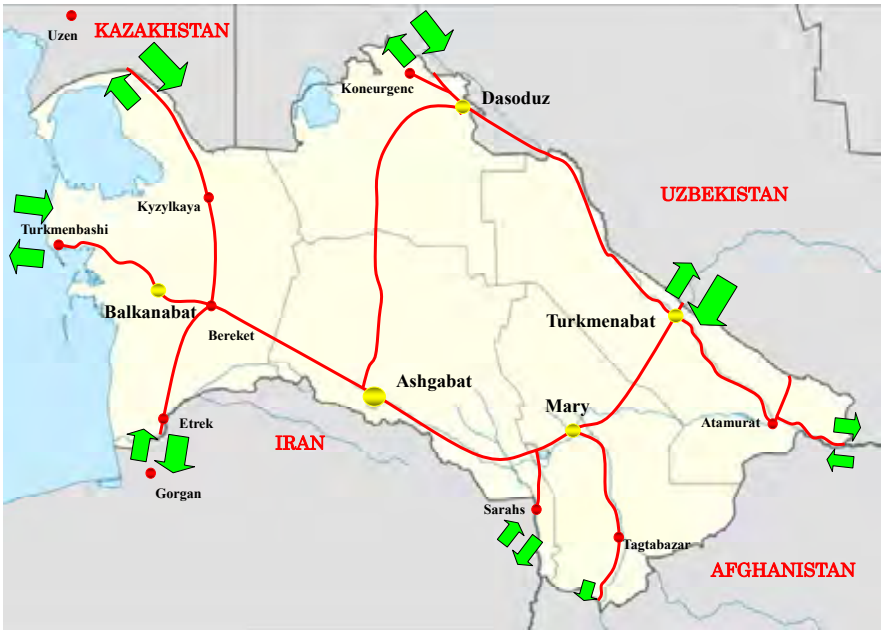


Source: Study Team

Figure 2.1.42 Railway Network in Turkmenistan

Source: State Custom Office

Figure 2.1.43 Import and Export Volume at Each Border (the year 2000)



Source: Study Team

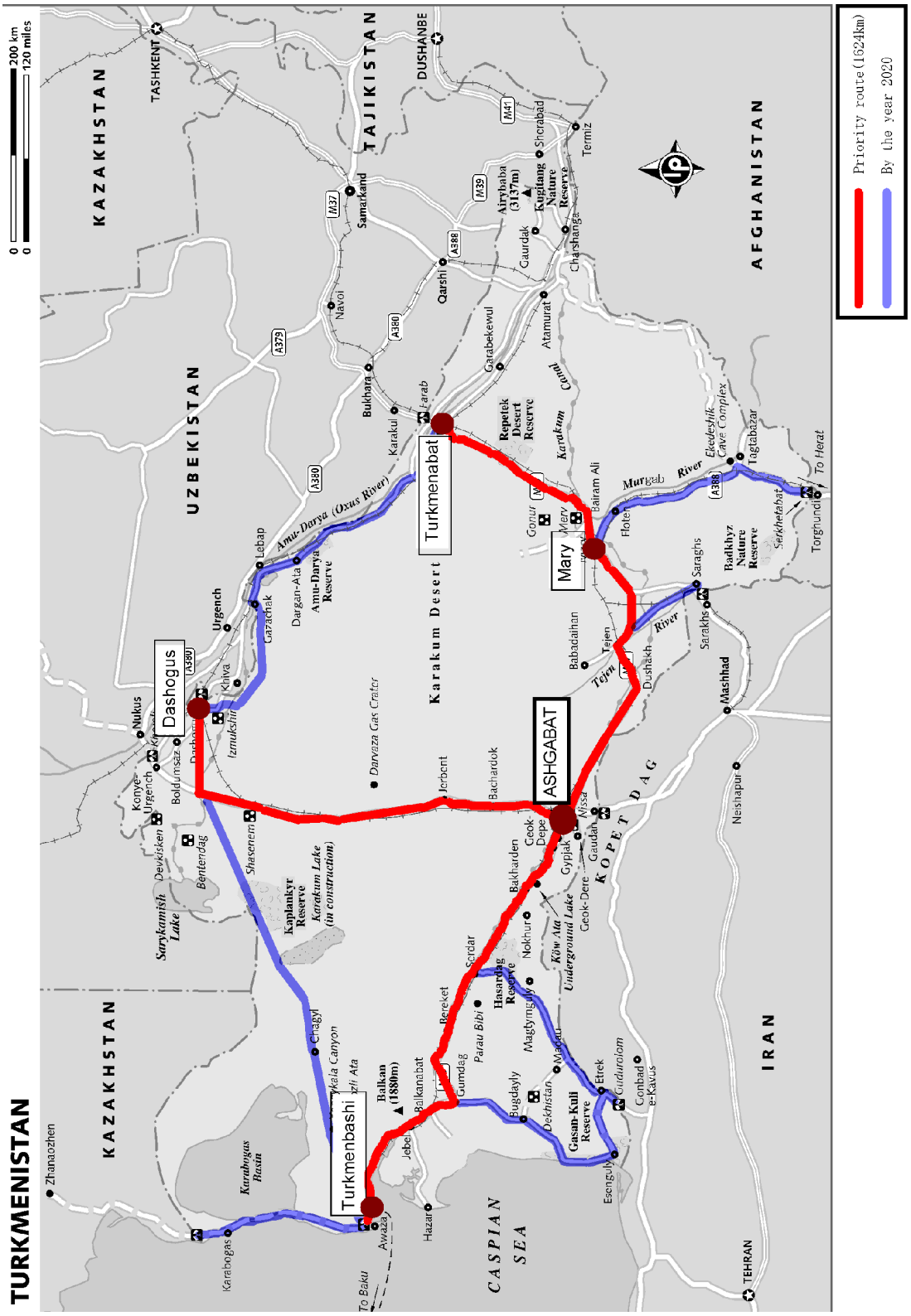
Figure 2.1.44 Expected Import and Export Volume after Completion of the North –South Corridor

(3) Projects in Road Sector

The national project is a plan (Figure 2.1.45) to update and construct the main highways forming the framework of this land by 2020, and it started construction in 2005. The works of this program are "Widening roads to 6 traffic lanes (Figure 2.1.46)" –"Reinforcement of pavement (Figure 2.1.47)", for development of a road network and road service which can support heavy trucks of the international standard and the increase of traffic density in the future. "Turkmen Highway State Concern" is working on design, construction, and maintenance of roads with self-funding. The 2 routes started from Ashgabat and ran to Dashogus which is the main axis north to south, and Turkmenbashi -Ashgabat-Mary-Turkmenabat which is the East-West corridor (1,624 km in total). It has achieved approximately 1,000km as new construction and widening (Ashgabat-Dashogus was completed), and target of construction is 500km in a year. The goal for the 2 routes was completion by the end of 2010 at first, but it has been delayed under present conditions, and changed contents of the aim. It is anticipated that widening one side of the East-West corridor will finish by the end of 2010. Bridges are started construction along the other routes, but the government has not made a decision regarding the order of priority about this program after these 2 routes. However, it set the axis of east, west, north and south first, then other routes will be completed and extend the framework steadily, and finally, a highway network which is equal and robust will be spread across the nation. These roads are assumed to be all toll-free. In addition according to the Islamic Development Bank (IDB), IDB has Highway reconstruction from Turkmenbashi to Kazakhstan as a candidate financing project (Total project cost 338MillionUS$, IDB loans 200 Million US$).

Completed Highway (Suburb Ashgabat)

One side complete, left side unfinished (near Mary)



Source: Study Team

Figure 2.1.45 Highway Network (As of 2020)

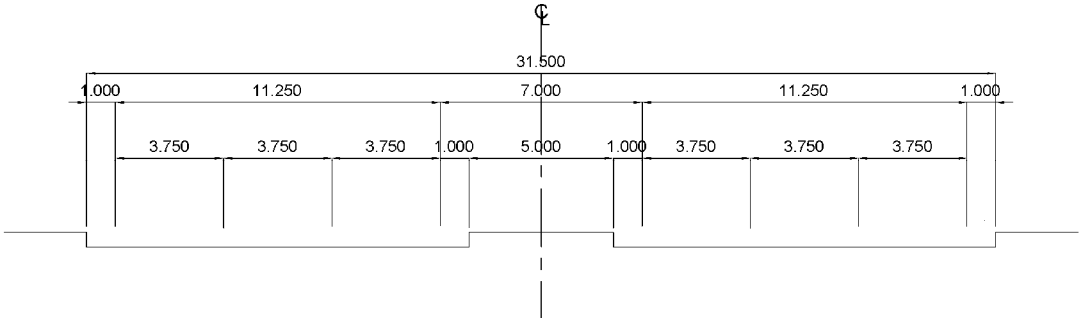


Figure 2.1.46 Typical cross section (After improvement)

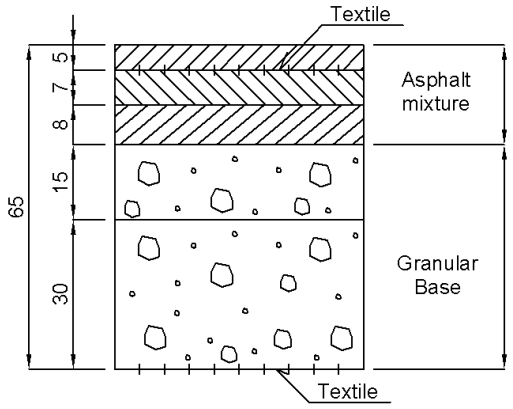
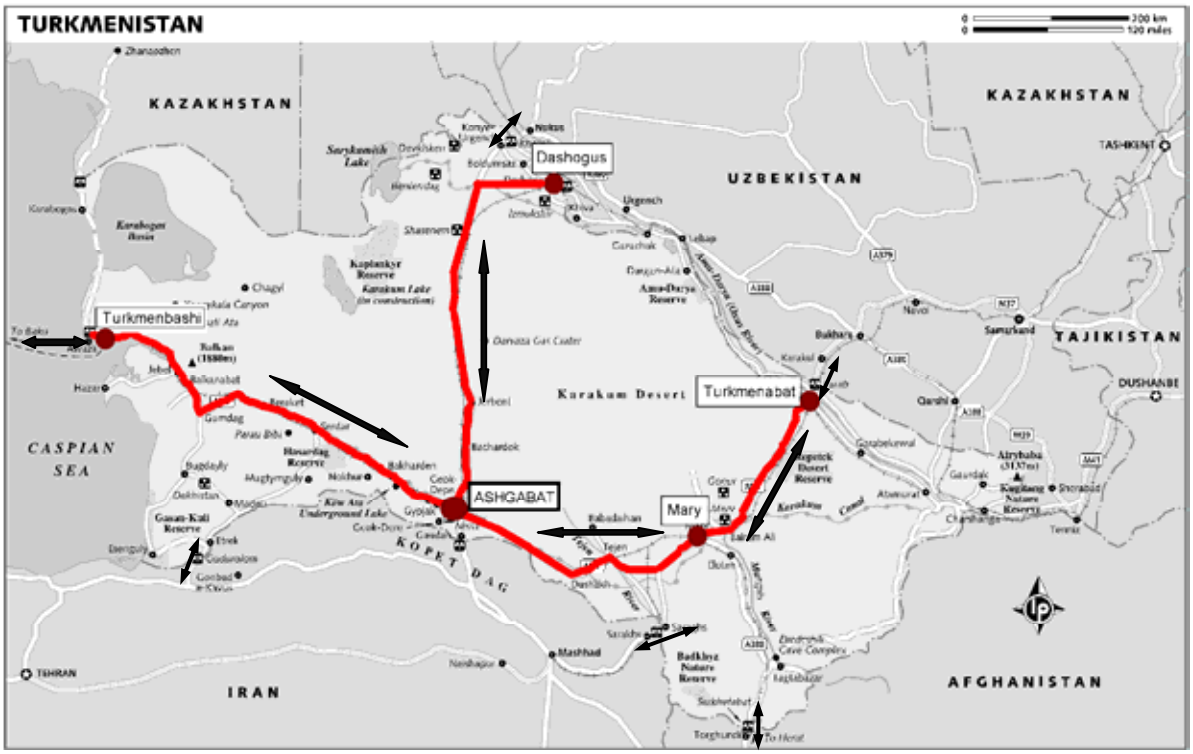


Figure 2.1.47 Typical pavement configuration (After improvement)

"Turkmen highways"offer a high service level. Observations suggest that their width of traffic lanes and thickness of pavement is equal to or higher than the Japanese expressways.

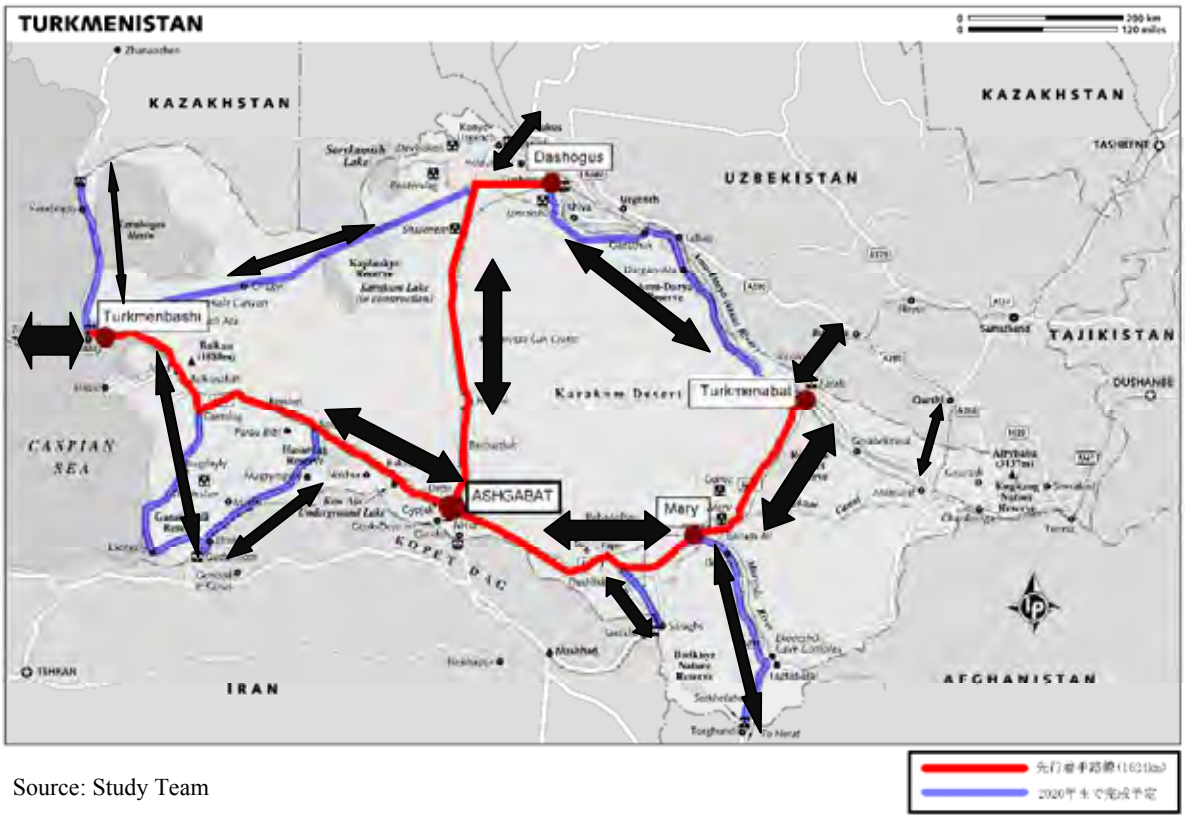
Therefore, the highway network assumed for 2020 will be adequate for the vehicles, and it can promote new logistic centers, and help development for presently disadvantaged areas. Then it will contribute to expansion in the range of business activity and diversification.

"Figure2.1.48" shows assumed logistic flows (after 2020). Turkmenistan has highly efficient logistic routes because the topography is generally flat, and it has a stable climate.



Source: Study Team

Figure 2.1.48 Current logistics of Road Sector



Source: Study Team

Figure 2.1.49 Expected logistics of Road Sector (after 2020)

2.2 Identifications of Issues to Improve Function of Present Physical Distribution System Based on Findings by Analysis and Assessment of Basic Data

2.2.1 Analysis of Present Activities of Companies involved in Physical Distribution

(1) The Haulers in Turkmenistan

In Turkmenistan, the licensed forwarders over 100 and the licensed transportation companies over 1,200 are engaged in the physical distribution activities. These haulers are categorized into 3 groups. The first is a foreign-affiliated hauler group such as; Globalink Logistics Group, Bertling Logistics, Panalphina, Militcer & Munch, Kuene & Nagel,Deugro, Anatoliya logistics, Interedean, TransEuraAsia Holding, Murphy Shipping, etc. and so many truck companies of Iran and Turkey. They make a large contribution to the physical ditribution of Turkmenistan with their experiences and international network.

The second is a local hauler group such as; Chartarap, AK Yol Trans, Asman Garlavach, and Dash Yoly Company, etc. of which 90% is the subcontractor of the first group and is engaged in the transportation within the local area of Ashgabat, Mary and Balkanabat, etc. and the transportation with the neighboring countries such as Iran, Turkey and Russia. 80% of local haulers are engaged in the transportation within the limited local city and belongs to the third group, in which the drivers get cheaper salary and engaged in unstable transportation activities, compared with the second group.

The local hauler group has no cooperative union and their capacity is so week that the privatization of this field is so much delayed compared with the other sector of private entrepreneurs established since the market economy started in 1992.

These haulers are sometimes suffering from the following issues and problems in their physical distribution activities.

- The revised decree on the custom procedures was suddenly issued several years ago without any prior notice and the hauler suffered from the custom clearance of diplomat's cargo for the violation of rules. That cargo was left in the bonded area for several months.
- As some cross-boarding offices don't have departments to put visa into passport, the visa issuance takes more time than transportation. It requires large set of documents for getting Visa and the multiple transit visa is not issued in some countries. The movements to Iran made by Turkmen haulers decreased and that's caused by the validity of transit visa just 10 days, so that the haulers have no enough time to make delivery and return during that visa time.
- The haulers are sometimes forced to wait for a long time at Turkmenbashi Port due to the insufficient port terminal facilities and at the railway terminal due to the lack of locomotives and insufficient loading / unloading equipments. These issues increase the overall transport lead time and cost.

- Turkmenistan ratifies FTA with 7 CIS and neighboring countries on the bilateral basis, but haulers sometimes are forced to transship the cargo into the Russian trucks at the cross-border, due to the technical problems of road facility or the truck vehicle issues. This kind of problem is expected to be solved as soon as possible.
- The inspection procedures could be implemented by the private sector in the past, but at present, TDS (Trukmenstandardlary) only is the authorized organization for providing "Certificate of Compliance". As a result, traders feel inefficient for it and its improvement system is expected.

(2) Trading Company

1) Foreign Trade Company

In Turkmenistan, 80% of trade sector is already privatized, and the foreign and local trading companies make trading activities with surrounding countries. Among the Japanese trading companies, only Itochu Corporation keeps a office at Ashgabat and makes trading activities. Another trade companies such as Mitsubishi, Sumitomo, Mitsui and Marubeni, etc. put a branch in Moscow which covers the Central Asia and visit Ashgabat several times a month if necessary. Japan is so far from Turkmenistan to make a business together, and the major trading partners of Turkmenistan will be neighboring countries such as CIS countries, Turkey, and Iran, etc.

In Turkmenistan, Itochu produces 90, 000 tons of polypropylene and chemical products from the crude oil per annum. And Itochu exports 80,000~85,000 tons of them from Turkmenbashi and transports the remaining to the domestic regions. The cargo is transported to Russia (Astrakan) by trucks and Ro-Ro Ferry, and to Iranian port by cargo ship as there is no Ro-Ro ferry terminal, to CIS countries, China and Turkey, by trucks, railway and railway ferry (Baku).

Turkmen Oil Refinery Plant has a production capacity of 90,000 tons per annum and plans to increase the production to 210,000 tons in future and to produce 300,000 tons in total. In the modernization project of oil refinery, 10 modernization projects are planned, and one of them is the increase of polypropylene production. Moreover the government has a plan to increase the supply of oil to 10 million tons, but it's not decided when it will be realized.

As Turkmenistan is an inland country, they have to cross two or three borders in order to export the products. Even though Japanese companies come to Turkmenistan, they have no clear idea for the export countries. However, they can export the products to Asia and Africa through the route of Baku - Black Sea - Mediterranean Sea or Iran, and also export by railway to the surrounding countries through the route of Turkmenbashi – Ashgabat - Turkmenabat – Uzbekistan - Kazakhstan.

2) Local Trading Company

There is one local trading company mainly in charge of export and import of agricultural crops in Turkmenistan and surrounding countries. The identification of issues and problems for the

transportation and the analysis of trade environment were attempted through the interview of the transportation activities of this local company.

When the oranges are imported from Pakistan via Afghanistan, the truck cargo from Afghanistan is transshipped to the truck or railway wagon of Turkmenistan at the point of 1 km from the Turkmenistan cross-border for the security reason. This cargo is transshipped three times from Pakistan and transported to Uzbekistan and Kazakhstan. The imported cargo from Pakistan is 100 tons per day and 3000 tons per month on average, of which 90% is transported to Uzbekistan and Kazakhstan by railway and the remaining 10% is transported to Kazakhstan by truck, and this company imports 50~60 tons of wheat per day from Kazakhstan by railway. At the end of 2009, this company transported the cargo from Pakistan using 65 railroad wagons and 25 trucks. One truck loaded 30 tons of cargo and it took 5~6 days from Pakistan to Afghanistan, and 7 days from Afghanistan to Kazakhstan. And the customs clearance at each border took 1 day.

In case to transport the goods from Afghanistan to Uzbekistan and Kazakhstan, the goods are transported to Sarakhs by truck, at the cross-border of Turkmenistan and Iran, as there is no railway transport facilities in Afghanistan, and transshipped there to the railway. The goods are declared as a transit cargo at the custom point and so the customs procedure is very simple. This company also imports the same crops from Iran. It takes 24 hours from Iran to Turkmenistan by truck. In case of the railway transport, as the railway gauge is different between Turkmenistan and Iran, it takes 2~3 hours to change the axle of one cargo wagon and takes 20~30 hours to change the axle of 10 cargo wagons at the transshipment facility in Sarakhs. And It takes 2~3 hours to go through the customs procedures at the cross-border custom office.

The railway ferry can load 32 railway wagons at once and if there is a space, the trucks can embark on the rail ferry. In that case, the priority is given to the state-owned truck company and then, the private truck can embark on the ferry even though the private truck arrives at the terminal earlier than the state-owned truck. There is no guarantee for the truck to embark on the railway ferry every day. It accepts only 2 or 3trucks on average. There is a strong demand to construct the exclusive ferry terminal for the trucks. In winter season, there isn't so much cargo demand from Russia and it's possible to accept 4 or 5 trucks on the rail ferry and the truck can transport the goods to Moscow through Makhachkala Port or Baku Port.

As a space for the trucks is so small in the bonded area of Turkmenbashi Port, there is a strong need to make the yard larger and then, the cargo loading and unloading, and carrying in and out becomes smooth and speedy in the bonded area. From the spring to summer season, there is so large transportation demand of vegetable, fruits and agricultural crops from Pakistan and Afghanistan to Moscow in Russia and it's difficult to satisfy this demand by the present transport means and system. So, the development of exclusive ferry terminal for the truck is so much expected.

At present, the Ro-Ro ferry is coming from Astrakan to Turkmenbashi Port. The embarkation yard of Ro-Ro ferry in this port is so narrow that it takes much time for trucks to turn and to

embark and disembark. The Ro-Ro terminals of Baku Port and Makhachkala Port are also so small that trucks can't turn smoothly and it takes much time for trucks to embark and disembark.

Turkmenistan trucks could go to Russia freely few years ago but the trucks aren't allowed to run in Russia at present, so that the haulers have to transship the cargo from their truck and to Russian trucks at Makhachkala Port or Baku Port. This kind of problems may be caused by the technical issues such as the road structure or the overloaded cargo. If it takes a long time to transport the vegetables by truck and ferry, the quality of vegetables is worsened. It's important to ratify the free transportation agreement through the improvement of technical issues for trucks in order to deliver the fresh vegetables and fruits to customers before the commercial values reduce.

After the free transportation agreement for the truck between Turkmenistan and Iran was ratified, the both country's trucks can go to the destination freely with the payment of 2% for the cargo price. In Turkmenistan the truck driver must get permission but In Afghanistan, any permission and payment is not required.

In the winter of 2008, due to the lack of locomotives, Turkmenistan faced serious problems for railway cargo transport. The railway cargo was left at the cross-border for more than 1 month. In 2009, Turkmen government bought the locomotives and the transportation was improved.

In Central Asia, they have a large demand of TV, home electric equipment and furniture, etc. made in Japan. The goods will be imported by trucks trough Dubai Port or Bandar-Abbas Port of Iran to Turkmenistan. As this company got the approval to open L/C account in the commercial bank, the payment for this trade can be made between Turkmenistan bank and Japanese bank.

This company also plans to construct the cement plant in Turkmenistan and to export the cement to Afghanistan, Turkey, Iran, Russia, Kazakhstan, Uzbekistan and so on. Especially the demand of Russia is so strong.

(3) Private International Inspection Company

Turkmenstandardlary (State Standard Services) is legally authorized to inspect the export and import goods and issue "Certificate of Compliance" for the customs clearance. However, in case of large quantity of export or import goods by the foreign manufacturers and traders in Turkmenistan, they ask the international inspection companies to inspect the quality and quantity of goods again, after the inspection of State Standard Services finished. This is for complementing the functions of State Standard Services. There are four international inspection companies in Turkmenistan, such as SGS, BSI, Saybolt and Intertec. SGS is mainly in charge of the inspection of oil and gas for the export and covers 75% of inspections business of oil and gas. BSI inspects the cottons mainly and Saybolt and Intertec inspects the oil and gas.

These private inspection companies hold a seminar for State Standard Services and cooperate for its capacity development. These companies issue the certificate of inspection for clients. Even though the troubles are found in goods in terms of quantity, quality, the loss and damage during

the transportation, these companies aren't involved in the conflict. At this moment, there is no big problem.

2.2.2 Analysis of Investment Policies and Environment to Port, Railway and Road Developments

(1) Analysis of Overall Investment Policy and Environment in Turkmenistan

The investment policy of Turkmenistan is implemented based on the goal decided in "National Program of Strategies for Economic, political and Cultural Development for the Period through 2020". In those strategies, the rearing and development of chemical, textile, tourism, construction, and agricultural industry, etc. are targeted in addition to the existing oil and gas development, and Turkmenistan aims the diversification of industry sector.

Turkmenistan issued "The Law of Turkmenistan about Foreign Investment" on 3rd, May 2008, and the foreign investment environment is improving. The chapter 2 of this law prescribes the policy of foreign investment, and the chapter 3 prescribes the legal framework for the foreign investors and the enterprise activities such as the exemption of customs tariff, income tax, license and land lease fee, etc. and the chapter 4 prescribes the national guarantee for the protection of foreign investors.

As for the oil development, the foreign companies aren't allowed to make an inland oil development but for the off-shore oil development which needs the advanced excavation technique, PETRONAS (Malaysia), Dragon Oil(UAE/UK), ITERA(Russia), Barren Energy(UK/Italy), RWE(Germany), and CNPC(China), etc. are making investments. The gas development in Turkmenistan isn't allowed for the foreign companies but the development of gas and gas pipeline was exceptionally approved for China and it has completed on Dec. 2009 between Turkmenistan and China through Uzbekistan and Kazakhstan. Then the export of gas to China has been started.

"Law about Hydro-Carbon Investment" is issued for the oil and gas industrial sector which the government of Turkmenistan regards as the most important and so many supporting policies such as subsidies are prescribed by law. As for Awaza project designated as FEZ, the various good treatment systems are provided for the foreign investors such as free lease of land, tax exemption of VAT, subsides and so on. Only Awaza project can enjoy a special treatment of free lease of land. In Turkmenistan, the land is owned by state, but the building which will be built on the leased land can be registered as one's own in Municipal Government. The foreign direct investment from 2008 to 2009 increased by 1.9 fold, as an effect of these policies. Turkmenistan gets to convince that they can increase the exports, enjoying the mutual benefit with foreign investors with the development of infrastructure and the reorganization of legal framework internationally standardized.

The investors are obliged to register at Ministry of Economy and Development. If the investment is approved as a technical cooperation service by Cabinet of Ministers, Ministry of Finance will be in charge of coordination with Main State Tax Service and State Custom Service, and the exemption or reduction of income tax and customs tariff will be determined in compliance of the level of technical cooperation service.

As for the promotion and support policy for the privatization of state-owned company and the private entrepreneur, which is important together with the good treatment system for foreign investment, the contribution of private sector to GDP is 40% at present, and the government targets to increase it to 70% by 2020. From 1994 to 1997, the government privatized the social sector, trade sector and food sector, etc. and succeeded to some extent. However, the attempt of following privatization in the construction sector, textile sector and light industry sector, etc. has failed. Referring to the previous experiences of success and failure, the development of legal system to accelerate the privatization is required in order to achieve 70% of GDP by private sector until 2020.

The two laws; "Law about Privatization of State-own Assets" and "Law about State Support of Small and Middle Private Business" were enforced, to support the privatization and private entrepreneur, and the legal basis was provided for the privatization of state-owned companies and for the support of the private entrepreneur by the provision of loan and subsidies.

Now the government is in charge of the legal development of social and economy related laws and launched the legal project. The government is now preparing to pass the following three laws at the parliament until October in 2010, which is conceptualized as "equality". These laws are still insufficient for the privatization and the government is trying to develop the laws to promote the privatization by 2014.

1. Law about State Order
   The law aims at the equality in the framework between state and private, and between foreign and domestic.

2. Law about Loan Given Union
   The law aims to enable the loan by "Mutual Aid Union" comprised of private companies and individuals.

3. Micro Finance Law
   The law aims to enable the loan without mortgage for supporting the individuals and the private entrepreneurs.

The investment policy for Turkmenbashi Port, the railway sector and road sector is studied in relation to the national program of strategies and developments but the practical use of private sector for the infrastructure development is not concretely specified in the law. It'll be required in near future to verify the appropriateness of the investment policies and environment for each

infrastructure in the middle term national program until 2020 and explore the ideal methodology for the infrastructure development by the public and private partnership.

(2) Analysis of investment policy and environment of Turkmenbashi Port

According to the Article 66 of the Maritime Code of Turkmenistan, international commercial seaports shall be owned and operated by the government enterprise, therefore all infrastructure in commercial ports including Turkmenbashi Port should be basically constructed by the State owned Turkmen Maritime River Lines which is the sole government enterprise in the port sector. But at the same time, the article guarantees that physical persons and legal entities can carry out economical activity in the territory of commercial seaport corresponding to its functional purpose. Therefore it is legally possible that private companies invest in ports as far as it is necessary for their authorized activities.

Petronas, Malaysian national oil company, has developed a (tentative) offshore supply base in the territory of the commercial seaport. Another foreign company plans to develop a facility for safety and environmental protection regarding offshore operation.

Thus, limited range of private investment in commercial seaports is permitted and already exists, however large scale infrastructure investment in commercial seaports by private sector is less likely to occur considering relatively small amount of cargo throughput. The main investor in commercial seaport will continue to be TMRL. And some investments by other related state agencies such as Refinery and the Ministry of Railways can be expected.

On the other hand, ports specifically dedicated to offshore oil and gas exploration and production are opened for foreign investors. In Kiyanli Port which is under developing as a large scale port for offshore gas exploration and shipment, a supply base is being developed based on BOT agreement between the Government of Turkmenistan and Petronas, and an Iranian company is constructing an LPG loading facility. Such kind of specialized ports will be a prospective field of foreign investment.

(3) Analysis of investment policy and environment for Railway sector

There is no problem to start railway business by private funds according to laws in Turkmenistan. However, considering that demand in Turkmenistan is not so high, existing railway network of Turkmenistan already covers the almost whole of Turkmenistan and it is not practical to start another railway business by private funds. Plan of urban transports such as LRT, monorail and subway may be materialized by private funds, however, it is not mentioned in this report as urban transport is not related to physical distribution in Turkmenistan. Some projects for constructions of new bridges and lines are carried out by barter trade of natural gas and funds of development bank such as ADB, IDB. The Turkmenistan Modernization Project which consists of rehabilitation of diesel locomotive depot and introduction of computer system was carried out as Japanese Yen Loan project and succeeded. The Ministry of Railway Transport in Turkmenistan

has some plans for new line construction and electrification, while funds have not been allocated for these projects.

(4) Analysis of investment policy and environment for Road sector

The road works are implemented by the national enterprise for design, construction, operation and maintenance in Turkmenistan. Foreign capital is not needed though help from foreign country, if high technology such as for a long bridge is required. It is assumed there are not many instances where advanced techniques to build a road are required judging from the geographical features in Turkmenistan, (Even sections where a large cut or fill is done are rare). Therefore, it is assumed that this country does not have big obstacles if it continues the road making by self-sponsored funds.

2.2.3 Analysis of Capacities (Existing Legislate System, Organization, Personnel) Related to Transport and Customs Procedure

(1) Analysis of Capacities (Existing Legislative system, organization, Personnel) Related to Transport

1) Analysis of Capacities Related to Maritime and River Transport

The basic law on the maritime transport is already developed as “Merchant Shipping Code” in Turkmenistan. Turkmenistan doesn’t ratify “UN Marine Law Convention” but this domestic law follows the basic contents of marine law convention, and the certain level of international consistency is insured.

In Turkmenistan, there is no administrative body in charge of the maritime transport and port, and “Maritime and River Transport Lines(TMRL)”, which is the state-owned company in charge of maritime transport and port projects, plays a role as “Maritime Transport and Port Authority” by the resolution of Presidential Decree. This is extremely exceptional case, but if the present political system is premised, this system would be partially the most suitable in terms of the effective use of human resources. It’s expected to be studied for the establishment of administrative body in concert with the achieved level of the overall market economy and also in terms of the efficient and effective administration.

In Turkmenistan, the management of international port, except the exclusive port for gas and oil, etc. is implemented by TMRL. The port management is usually implemented by the port authority in the local government but the present state management system can’t be denied, taking the capacity of local government and the importance of port in the economic development into the consideration.

The loading and unloading activities are also implemented by TMRL in principle, but this type of activity has to be privatized positively. The private activities within the port area are approved by “Law on Licensing of Certain types of Activities” and the supply base etc. is promoted by using the private vitality.

2) Analysis of Capacities Related to Railway Transport

There is "Law of Turkmenistan on Railway Transport" dated on 15th September, 1998 as law on railway in Turkmenistan and business of Turkmenistan railway is operated based on it. More than ten year has passed since the law was issued and nobody points out issue for it. The Ministry of Railway Transport has 11 departments and 56 subordinated enterprises, and more than 20,000 persons are employed. Comparing index of productivity which is given by the formula (cargo transport volume/all employees), the value for Turkmenistan is 1.5 to 2.5 times higher than values for Mongolia, Tajikistan and Iran and less than values for Kazakhstan and Uzbekistan. While the detail for each subordinated enterprises was not obtained and it is difficult to analyze organization of the Ministry in detail, no serious issue is found considering proportion of the organization. However, it is heard that there is an issue of no sufficient special engineers and aging of engineers.

3) Analysis of Capacities Related to Road Transport

Currently, trucking is the main form of transportation. The maintenance of highways is ongoing. Therefore, there is no matter that is an obstacle to transportation generally if the time lost in customs clearance is excluded.

(2) Analysis of Capacities (Existing Legislative system, organization, Personnel) Related to Customs Procedure

The legal system of customs is comprised of "Customs Code of Turkmenistan", and "Civil Code of Turkmenistan". Specifications of custom procedures and their precise contents are prescribed in the decrees and regulations such as Presidential Decree No. 9925, in which "Custom Tariff Schedules of Turkmenistan" is shown.

State Custom Services in charge of jurisdiction of customs system, reviewed the "Custom Code of Turkmenistan" in terms of the international standardization and is now waiting for the approval of Cabinets of Ministers. And also State Custom Services tries to introduce the EDI system within the organization by October in 2010, for making the operation of legal and institutional system smooth.

As described in the section of 2.1.2 3), the headquarters is comprised of 11 departments and 48 customs offices in 6 provinces, and 1,000 staffs are working. The staffs from the military, drug and immigration office also come to the cross-border customs offices. State Custom Services established the training center for the vocational training and internship courses for its employees to keep abreast of the times and reforms, and make efforts to improve the quality of staffs.

As far as we interviewed the forwarders and transportation companies engaged in the international physical distribution activities, the customs system in Turkmenistan is well-functioning and has no problem. But we also interviewed the relevant Ministries / Agencies and the related physical distribution companies and found there still remain the following

problems and issues. It's expected to improve the capacities in order to lead the customs system in better direction.

- The information transmission system to the traders and physical distributors is not so good, in case that the law, decree and other regulation on customs clearance system was revised or changed.
- The information on the license and permission system required for the specific goods, and the registration system in addition to the ordinary customs clearance system, is not disclosed to the traders and the physical distributors in the plain format by documents or internet web system and they may have a risk to be involved in the troubles for the custom clearance.
- The policy for the simplification of the customs clearance is so much limited as mentioned in the section 2.1.3 (4))
- It takes so much time for truck drivers to obtain Visa, and some country doesn't issue a Multi-Visa. These Visa issues are regarded as one of the large obstacles for the smooth transportation and trading activities.
- The private international inspection companies aren't legally allowed to issue "Certificate of Compliance" for the custom clearance. In the past, it had been admitted for the private companies. As a result, the private inspection companies inspect the goods again after the inspection of State Standard Services and it's so much inefficient.
- There is only one State Insurance Organization in Turkmenistan and the insurance functions are so week. It's difficult for foreign insurance companies to find a market in Turkmenistan due to the regulation.
- The content of bilateral FTA is not well developed for the smooth custom clearance and in some cross-border custom points, the truck is forced to transship the cargo to the truck of adjacent country due to some technical issues.

2.2.4 Identification of Issues to Improve Strategic Function and Networks of Present Integrat Integrated Physical Distribution System by Turkmenbashi Port, Railway and Road Sectors

(1) Identification of Issues to Improve Strategic Functions and Networks of Present Physical Distribution System by Turkmenbashi Port

Issues to be improved in Turkmenbashi Port are summarized below. The detailed discussion will be made in Chapter 3.

1) Reinforcement of the hub function for unit load transport

Unit loads such as RORO cargos and containers are the most important cargo for sea links which comprise transport corridors. But currently the function of Turkmenbashi Port is far from sufficient for the transport of unit loads.

Although rail ferry service is available, the quality of service cannot satisfy shippers or consignees who expect modern logistics. And the spaces for trucks in rail ferry are very limited. Some RORO truck services are available, but their capacity is also very limited and demands overrun the supply. And the lack of specialized facility in the port spoils the efficiency of RORO transport. Therefore it is necessary to strengthen RORO track links by increasing the capacity of the port together with the efficiency improvement of existing rail ferry link.

Container transport in the Caspian Sea has not been so active so far, however the wind of containerization will soon arrive there. As mentioned in 2.1.6, almost all major Caspian ports are planning or implementing large scale development enabling to accommodate container vessels. Turkmenbashi Port should be ready for full-dress container handling.

It is noted that the present conditions of the access channel are extremely bad and the channel is closed frequently. Without improving the channel, the hub function in Turkmenbashi Port would not be realized.

2) Improvement of safety and environmental sustainability

Safety and environmental sustainability are the fundamental requirements for ports. In this context, present unsafe access channel should be completely improved considering future increase of passenger traffic and transport of hazardous cargo. Navigation aids should be also repaired and improved. For the same reason, improvement of seafarers training is required with internationally standardized equipment.

Environmental management of port activity is very important since Turkmenbashi Port is located in Turkmenbashi bay which is environmentally vulnerable due to its shallowness and sheltered topography. The existence of a nature reserve, where important species live, in the vicinity of the port makes the environmental consideration of port activity crucial. Improvement of safety in port operation is also required.

Port security of Turkmenbashi is basically in a good condition. In order to make further improvement in port security in internationally accountable manner, full compliance with ISPS is required.

3) Diversification of port function

Although logistics is the principal function of ports, diversification of the function of the ports is also important for the development of socio-economy of Turkmenistan. Passenger transport should be another important function of Turkmenbashi Port. Currently only deteriorated rail ferry service with unreliable time schedule is available for passenger transport at Turkmenbashi Port. In order to strengthen the port function in passenger transport, completely new link should be developed. Ro-PAX ferry is very prospective link, which is expected to contribute greatly in tourism development of Turkmenistan. For this purpose, specialized terminal for Ro-PAX ferry should be constructed.

(2) Identification of Issues to Improve Strategic Functions and Networks of Present Physical Distribution System by Railway Sector

Issues to improve strategic function and networks of preset integrated physical distribution system by railway are as follows;

1) Construction of new line from Atamurat to Sarakhs through Tagtabazar
   Since construction of the bridge across Amu Darya river between Atamurat and Kerkichi was completed in 2009 and the line Turkmenabat – Atamurat has been connected to the unconnected line which is located at the east part of Turkmenistan, it has been possible for Turkmenistan railway to operate their trains on the unconnected line not through Uzbekistan territory. As the result, it is expected that transport volume between Tajikistan and Iran by railway will be increased and it is important to construct short-cut line, Atamurat – Sarakhs.

2) Lack of rolling stocks
   66 diesel locomotives were purchased from China from 2005 to 2009. It is heard that tender for purchase of rolling stocks is in progress, however it seems rolling stock is still shortage.

3) Rehabilitation of superannuated bridge
   The bridge across Amu Darya river between Turkmenabat and Farap was constructed in 1901 and one hundred year already passed. Since the bridge becomes too old for use and trains are restricted to low speed on the bridge, it is required to rehabilitate the bridge.

4) Improvement of bogie exchange facilities at Serakhs
   It takes one to two days to exchange bogies for one train at Serakhs and the loss time is causing a bottleneck for transport between Turkmenistan and Iran. Since the bogie exchange system is not automatic and almost all is un-efficient handwork, it is required to improve the facilities.

5) Improvement of transshipment facilities
   While the Transshipment facilities at Gypjak is one of the most important transshipment facilities in Turkmenistan, almost all gantry cranes have become too old and only one crane is working at present. Car crane is used for transshipment instead of gantry crane and transshipment facility has already fallen down.

6) Introduction of machineries required for maintenance of diesel locomotives made in China
   Since the specification of diesel locomotives made in China is different from the specification of the locomotives which Turkmenistan Railway has used for a long time, some additional equipments and machineries are required to maintain the diesel locomotives made in China. The diesel locomotives made in China are not well

maintained due to lack of maintenance equipments and machineries and it is important to procure the required equipments and machineries.

7) To cope with the issue of un-sufficient special engineers and aging of engineers
The Ministry of Railway Transport is short of special engineers such as casting specialists who work at foundry shop and many engineers who work at diesel locomotive depot and others are getting old. It is required to cope with this matter before it becomes more serious. It is important to make a program on training for engineers as electric engineers are also required for electrification of future plan.

8) Construction of new line Atamuarat to Afghanistan
There is only one line connecting between Turkmenistan and Afghanistan. Since at present study on railway line between Mazar-e sharif and Herat in Afghanistan is in progress and it is expected to increase demand for physical distribution between Afghanistan and Turkmenistan and others, it will be required to construct a line from Atamurat to the line between Mazar-e sharif and Heart.

(3) Identification of Issues to Improve Strategic Functions and Networks of Present Physical Distribution System by Road Sector

It is thought that the rate of expansion of the highway network will correspond to the rate of increase of the future traffic density. However, experience indicates that the following points will aid road function improvement.

1) Enhancement of the road maintenance management system
System to execute the repair, and to set repair standards.

2) Fiscal resources for the running cost of the road when the amount of through traffic increases When the highway network in Turkmenistan is enhanced, it is expected that it will increase of the amount of through traffic because of the improved road condition and position of this country though they are not scheduled to be toll roads. Who and how will source revenue such a case?

3) The support system for troubled vehicles
Provision must be made for a vehicle that breaks down alone in a section where distance between cities is great so that does not obstruct traffic flow for a long time.

2.2.5 Potential International Cooperation Projects

(1) Trade Facilitation Aspects

The problems and issues of private activities engaged in the physical distribution, investment policies and environment, and capacities (existing legislative system, organization, personnel) related to customs procedure has been analyzed in the former sections. Among these problems

and issues, the following items are considered important as potential international cooperation needs for improving the international trade environment.

- Privatization of state-owned company in the infrastructure sector
- Supporting system of private entrepreneur
- Policy Framework to introduce the foreign direct investment
- Diversification of industrial structure
- Simplification of customs procedure and computerization
- Improvement of international legal framework with CIS countries and adjacent countries in terms of physical distribution
- Improvement of information technology system
- Transparency of Social, Economic and financial indicators

(2) Port and Maritime Sector

Considering current situation of port and maritime sector, items described below can be potential international cooperation projects.

1) Financial Cooperation

- Improvement of access channel in Turkmenbashi Port
- Repair and improvement of navigation aid in Turkmenbashi Port
- Construction of port control tower in Turkmenbashi Port
- Construction of Ro-PAX ferry terminal in Turkmenbashi Port
- Construction of Container terminal in Turkmenbashi Port
- Construction of general and dry bulk cargo terminal in Turkmenbashi Port
- Expansion of general cargo berth for polypropylene loading in Turkmenbashi Port
- Port road construction in Turkmenbashi
- Construction of shipyard in Turkmenbashi
- Reconstruction of the left ramp of the rail ferry terminal
- Development of offshore supply base
- Development of EDI system for port management and customs clearance
- Development of automated gate system
- Procurement of equipment for seafarers training
- Procurement of Ro-PAX ferry vessels
- Procurement of equipment to respond oil spill, such as a skimmer boat
- Procurement of dredger
- Procurement of tugboats
- Procurement of AIS system
- Procurement of equipment for heavy cargo handling in Turkmenbashi Port
- Procurement of equipment for container handling at rail ferry terminal

2) Technical Cooperation

- Improvement of seafarers training
- Planning of Turkmenbashi Port
- Efficiency improvement of port and maritime transport
- Maintenance dredging plan including operation of dredger
- Container operation
- Environmental management
- Safety and security management
- Ship inspection

(3) Railway Sector

The following matters which are suitable as international cooperation projects out of issues mentioned in 2.2.4 (2) are picked up and listed below considering respects of great urgency and increase of railway transport.

- To cope with the issue of un-sufficient special engineers and aging of engineers
- Construction of new line from Atamurat to Sarakhs through Tagtabazar
- Construction of new line Atamurat to Afghanistan

(4) Road Sector

The road sector works with its own funds and performs construction and maintenance of roads as a national enterprise. This is basic policy and it will continue in the future, therefore there is no matter that is an obstacle in Road Sector. However, it supposed that social capital is filled up in future and assumes that traffic density increases, we have to propose some cooperation and necessity as follows.

- Service Area , Parking Area for driver's rest and vehicle check.
  To provide relief from the monotonous alignment and scenery and restore attention; (The existing program focuses only on road network extension, in next stage, to build facilities and control them are very important.)

- Capacity building for road and bridge maintenance
  Because the country currently concentrates on construction, road lengths to be managed will increases rapidly.

- Establish and operate a road information system
  These highways are similar to expressways of other countries, so it is preferable to establish road information facilities regarding weather, traffic regulations, the road surface condition, etc.

The field of ITS is not necessary, because it is assumed that there will be no traffic jams in the future.

The access road for the port at Turkmenbashi appears to be incomplete. It is necessary to plan improvements for the port at Turkmenbashi (Road has only 2 traffic lanes and deep rutting presently). It will be difficult to widen the road due to the topography. The railway, pipelines and the road coexist in a narrow area under a high cliff. If and when it is improved it should conform to the Awaza district and Turkmenbashi new capital plan.