REGIONAL FRAMEWORK FOR DEVELOPMENT, DESIGN, PLANNING AND OPERATION OF DRY PORTS OF INTERNATIONAL IMPORTANCE
The Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations’ regional hub promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 member States and 9 associate members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed insight into the evolving economic, social and environmental dynamics of the region. The Commission’s strategic focus is to deliver on the 2030 Agenda for Sustainable Development, which it does by reinforcing and deepening regional cooperation and integration to advance connectivity, financial cooperation and market integration. ESCAP’s research and analysis coupled with its policy advisory services, capacity building and technical assistance to governments aims to support countries’ sustainable and inclusive development ambitions.
This document was prepared for discussion at the Expert Group Meeting on the Draft Regional Framework for the Development of Dry Ports of International Importance that was held in Bangkok, 6, 7 June 2017. The views expressed in this report are those of the authors and do not necessarily reflect the views of the United Nations Secretariat. The opinions, figures and estimates set forth in this draft are the responsibility of the authors, and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations.

The designations employed and the presentation of the material in this draft report do not imply the expression of any opinion whatsoever on the part of the United Nations Secretariat concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. Mention of firm names and commercial products does not imply the endorsement of the United Nations. This publication is issued without formal editing.

ACKNOWLEDGEMENT

This study report was prepared by the Transport Division of ESCAP as part of a project funded by the Russian Federation. The study was led by Mr. Pierre Chartier, Transport Infrastructure Section Chief and was managed by Mr. Fedor Kormilitsyn, Economic Affairs Officer and Mr. Ryan Carvalho, Associate Economic Affairs Officer of the Transport Division, with substantive research work performed by Mr. Peter Hodgkinson.
Section A: Executive Summary

Section B: Regional framework for development, design, planning and operation of dry ports of international importance

1. Introduction 15
   1.1 Background to study 15
   1.2 Purpose of study 15

2. Key Concepts Associated with Development of the Regional Dry Port Network 16
   2.1 Service functions of dry ports 17
   2.2 Customs and border control functions of dry ports 17
   2.3 Dry port location and transport mode connection issues 18
      A. Bangladesh 20
      B. Bhutan 20
      C. Indonesia 21
      D. Islamic Republic of Iran 21
      E. Russian Federation 23
      F. Tajikistan 23

3. Seaport, Road and Rail Infrastructure Links to Dry Ports 24
   3.1 Seaport linkages to dry ports 25
   3.2 Removal of missing links in Asian Highway or Trans Asia Railway network 29
   3.3 Required improvements to highway infrastructure connected to dry ports 32
   3.4 Required improvements to railway infrastructure connected to dry ports 34

4. Technical Standards for Dry Ports 36
   4.1 Minimum requirements for services and facilities 36
   4.2 Principles and standards for the design of dry ports 37

5. Coding of Dry Ports of International Importance 42
   5.1 Reasons for coding 42
   5.2 System and scope of coding 42

6. Incorporation of Dry Ports into Transport Documents and Legal Instruments 44
   6.1 Key goal related to international cargo transport 44
   6.2 Recommendations for modification of transport documents and legal instruments 44
7. Proposed Arrangements for Customs Clearance at Dry Ports 46

7.1 Action needed for all dry ports to have full border clearance authority and facilities 46
7.2 Actions to establish the single window, advanced information systems in dry ports 46
7.3 Regulations governing clearance of transit cargoes in destination dry ports 47

8. Policy Measures, Legislation Solutions for Planning Dry Port Development 47

8.1 Need for a coordinated approach to planning and development of dry ports 47
8.2 Measures to assist the viability and sustainability of dry ports 48

9. Practical Options for Financing Development and Operation of Dry Ports 50

9.1 Option 1: Financing by public sector and outsourcing of operation through a management contract with the private sector. 50
9.2 Option 2: Private sector financing and operation. 50
9.3 Option 3: Option 3: Public Private Partnership (PPP) variants 51

10. Conclusions 52

10.1 Key concepts of a regional dry port network 52
10.2 Requirements for interconnection of dry ports in the regional network 53
10.3 Policy measures, legislation and solutions for dry port development 53
10.4 Practical options for financing development of dry ports 54

Section C: Mission reports

Bangladesh 56
Bhutan 73
Indonesia 85
Iran 98
Tajikistan 128
Executive Summary

1. Key concept: regional network of dry ports

The key concept underlying this framework is the idea of a network of inter-connected dry ports in the UNESCAP region. It is envisaged that such a network could be formed from the dry ports nominated for coverage by the Intergovernmental Agreement (IGA) on Dry Ports. Some 150 existing and 86 potential dry ports were nominated by the region’s countries when the IGA was initiated in 2013. It is uncertain whether a majority of these would be suitable for interconnection within a regional network, but this framework provides a means by which their development may be planned such that they may be interconnected in future.

The concept involves the inter-linkage of dry ports within the network to allow international cargo to be consigned and transported between them. This means that cargo may be consigned directly from a dry port in one country to a dry port in another with only a minimum of interruption to the cargo flow at intervening borders, whether maritime (i.e. seaports) or land.

2. Basic requirements of dry ports within the network

To be able to exchange cargo effectively among themselves, dry ports in the network must satisfy certain requirements as to the basic services they provide and the facilities with which they are equipped in order to provide these services. These basic requirements may be summarised as:

- They should have infrastructure and equipment for the handling, consolidation, storage and modal transfer of containers and other types of unitized cargo;  
- They should have the authority, capability and facilities for all border clearance of cargo;  
- They should be located within, or close to, concentrations of industry which generate export/import trade, but can be located remotely from seaports; and  
- They should be connected to railways for long haul transport from seaports, or indeed from other dry ports, and to roads of adequate quality for local pick-up and delivery of cargo.

Not all, and possibly even only a minority, of the dry ports nominated for coverage by the IGA satisfy all of these requirements.

3. Dry port location and transport mode connection issues

The location of dry ports in relation to the ultimate origins or destinations of the cargo they handle and the seaports to which they despatch, and from which they receive, cargo and containers is a determinant of their operational and financial success.

1 It is not practical to combine the handling of containers and bulk cargo within the same facility, mainly because of the excessive land area requirements of the latter, but the handling of containers and other types of unitized cargo, such as coiled or bundled steel is possible within segregated areas within the same facility.
It is also a determinant of their success in minimizing the logistics cost of moving cargo between an origin and a destination, e.g. between a shipper located in one country and a consignee located in another. Proximity to a shipper’s or consignee’s premises will allow breakbulk cargo to be moved economically a relatively short distance (ideally no more than 30-40 km) by small truck to or from a dry port. By contrast, remoteness from a seaport or indeed from another dry port across a land border will ensure that railway transport may be used economically for the long distance transport of containers.

Numerous studies have shown that the unit operating cost for haulage of containers by road is likely to exceed that for haulage by rail for distances exceeding 300 km. For distances shorter than 300 km, road unit costs are likely to be substantially lower than those of rail. As the distance approaches 600 km (i.e. twice the rail breakeven distance), the cost advantage of rail becomes substantial.²

By contrast, the movement by rail of containers only a short distance between a dry port and a seaport is unlikely to be justified unless the lack of haulage distance is compensated by massive container movement volume. The short haul movement by rail of breakbulk cargo is likely to be even more untenable.

Thus, by blending the long-haul economics of rail with the short-haul economics of road, dry ports with optimized locations can achieve minimized logistics costs.

4. Seaport, rail and road linkages to dry ports

An important function of dry ports is to facilitate access to the sea for land-locked countries and regions. This is particularly true for the countries of Central Asia, some of which are located 3,000-4,000 from the nearest seaport. Dry ports facilitate access to the sea for trade to and from these countries by consolidating cargo and providing cost-effective transport linkages to seaports.

4.1 Seaport linkages to dry ports

The throughput and storage capacity of a seaport as well as the capacity and efficiency of its cargo handling systems, can have a critical effect on its ability to support the growth of inland trade.

Many seaports in the region have experienced capacity shortages which have been manifested by chronic cargo congestion in port working areas as well as by excessive truck queuing at the entrances to ports.

Port managements have responded to this problem in different ways, but most involving the relocation of container stuffing and un-stuffing activities outside, and usually only a short distance from, ports. In some cases (e.g. in Bangladesh), such a strategy has involved a transfer of the congestion inside ports to the highway system as the movement of de-consolidated cargo in small break-bulk trucks has replaced the line-haul movement of cargo in containers. In other cases (e.g. in Australia, Indonesia, and Sri Lanka), the strategy has involved the movement of containers to and from ports by rail, usually over too short a distance, and at too low a traffic volume, for rail to recover its high level of fixed cost.

² The logistics cost comprises the costs associated with the handling, storage and transport of cargo.
³ There is a caveat to this observation and it is that rail operating methods are assumed to be efficient.
Problems of capacity shortages in seaports are compounded by a lack of capacity and operating efficiency of road and rail accesses inside seaports. Arguably, there is a need to provide more truck parking capacity inside seaports, but it can be observed that while many seaports have rail connections, almost none can accommodate full length trains inside loading/off-loading areas. This imposes on railway operators the need to break-up trains before placement in port sidings, at substantial additional operating time and cost.

Further, some port management authorities seem almost oblivious to the need to reduce multiple handling by locating rail loading/unloading tracks as close as possible to the container stacks adjacent to berths, despite professing a commitment to an increased use of rail for container transport to and from their ports. Typically, rail sidings are located at least 500 metres, and possibly up to 2 km, distant from the container stacks in ports, meaning containers must be transferred to and from the stacking area by yard prime mover and trailer. Up to 3 lifts per container can be required between the rail loading/discharge area and the stacking area4, as compared with only a single lift for containers brought directly into the stacking area by highway trucks.

4.2 **Road and rail linkages to dry ports**

**Road linkages**

Dry ports need good quality local road linkages to the origins and destinations of the cargo they handle. In the case of some countries which lack a comprehensive rail network, they also need access to seaports via multi-lane highways.

The Asian Highway network appears to provide a good coverage of the dry ports of the region. No missing links in the Asian Highway network which would prevent seamless transport between dry ports and seaports, or between dry ports in the regional network, were identified.

Especially in Central Asia, long haul road transport, rather than railway transport, is used to connect trade generating locations with seaports. The main reason for this is that consignees are prepared to pay a premium of 2.5-3 times the rail haulage charge for the road delivery of their containers from seaports in 25-30 per cent of the time taken for rail delivery.

Upgrading of primary road links between seaports and inland trade generating centres has recently been undertaken in several countries of the region. Such upgrading has usually involved extra lane construction. However, limited road capacity persists in some countries of the region, particularly those located in mountainous areas (e.g. Afghanistan, some countries of Central Asia and southwestern China).

**Rail linkages**

Rail linkages to dry ports exist in most countries of the region. Coverage of the Trans-Asian Railway network is now quite extensive, with several missing links having been eliminated over the past decade, particularly in the Islamic Republic of Iran. Several more have since arisen, owing to the

---

4 Up to 3 lifts will be required when transfer trailers are not immediately available and containers have to be “grounded”.
development of new seaports (e.g. Chabahar in the Islamic Republic of Iran) and the creation of new rail transit corridors, such as that between southwestern China and the Islamic Republic of Iran, via Kyrgyzstan, Tajikistan and northern Afghanistan.

Upgrading of existing TAR links has been undertaken specifically to increase route capacity, through track doubling and signalling improvements, on some major lines connecting seaports with inland trade generating centres. Future track capacity expansion is planned for two key TAR routes connecting Bandar Abbas (Shahid Rajaee Port) in the Islamic Republic of Iran with Tehran and Sarakhs.

5. Principles and standards for dry port design and operation

5.1 Minimum requirements for services and facilities

Adherence to identical design standards is not necessary for dry ports to function effectively as interrelated components of a regional network, but there is a need for some consistency among them as to the basic types of services offered and the design of the infrastructure needed to provide these services.

In order that dry ports within the network can directly consign and transport cargo from one to another, it will be necessary for them to provide facilities for the:

- Handling, consolidation, storage and modal transfer of containers and cargo; and for
- Customs and other border control inspection and clearance of international cargo.

These facilities should comprise, at minimum:

- A fenced, customs secure area with a limited number of entry/exit points and with segregation of working areas and entry points for the handling of different types of traffic;
- A container yard (CY) which can receive and despatch containers by road and rail, as well as store containers;
- A container freight station (CFS) in which cargo can be loaded into and discharged from containers;
- A customs inspection area where cargo may be discharged for inspection;
- A bonded warehouse for storage of under bond cargo;
- An administration building of two or more levels accommodating: dry port management, offices for customs inspectors, offices for freight forwarders and cargo agents, offices for banking or financial service providers, and staff amenities (restaurant, etc.).

The scale of the necessary infrastructure must be planned in accordance with the projected peak level of container and cargo volume to be handled within the planning horizon (of about 20 years). The areas of the CY, the CFS, and the under bond warehouse will in particular depend upon projected handling volume, but the area of the CY will in addition depend upon the type of container handling system to be deployed (which itself will be demand driven) and on the length and number of railway sidings to be incorporated in the design.
In order to satisfy a requirement to promote environmentally sustainable forms of transport, dry ports will have to provide efficient access to rail. Where relevant, they should also be connected to IWT (Inland Waterway Transport) landings, quays, etc.

5.2 **Key principle for CY design: rail access**

The railway infrastructure to be provided inside a dry port should allow the *receipt and despatch of full length unit container trains running between a single origin and a single destination*, without the need to be broken up or re-marshalled outside of the dry port.

Rail entry to the dry port would be via an access line connecting to the mainline, located some distance away from the dry port. Loading and unloading of trains would take place in centrally located sidings comprising at least three tracks, one each for loading and unloading and one for the release and re-positioning of locomotives. The actual number of loading/unloading tracks to be provided would, however, depend on forecast traffic volumes.

The container stacks of the CY would be located either side of the tracks and the paved areas on which the stacks would rest would extend the entire length of the tracks, to allow container handling equipment to discharge and load containers along the length of each train.

The length of the loading/unloading tracks is determined by the number and length of the wagons comprising a train. For example, for a train with 40 wagons pulled by one diesel locomotive, the track length required between the track points or switches may be calculated as 660 metres.\(^5\)

The design axle load in the rail sidings should be compatible with that of the mainline. In the case of metre gauge railways, this is typically 20 tonnes per axle and for wider gauges, it is generally in the range of 22.5 – 25 tonnes. Even at the lower level, the axle load is sufficient to accept heavy locomotives and wagons carrying two fully loaded 20ft containers or a single fully loaded 40ft container.

5.2 **Container yard (CY) layout, capacity, and pavement design**

The layout of the CY depends upon the length of the rail siding tracks as well as the type of handling system to be employed.

Generally, the choice of the latter is between a reach-stacker system and portal crane systems, such as rubber tyred gantry cranes (RTGs) or rail mounted gantry cranes (RMGs). While the former are land intensive (i.e. require more land area to store a given number of containers) and are relatively inexpensive as compared with the latter, the latter systems can accommodate denser stacking of containers and are therefore less land intensive.

The choice of handling system will depend in part on the expected volume of containers to be handled. In general, the reach-stacker system is cost effective for CY throughputs of up to 200,000 TEU per year, beyond which a portal crane system may be justified.

---

\(^5\) The detailed calculation is: 1 diesel electric mainline locomotive of 22 metres + 40 x 2 TEU wagons of 14.45 metres + 10% allowance for braking = 666 metres.
Whether reach-stacker or portal crane systems are used, it will be requirement for container lifting equipment to work along the length of the loading/unloading tracks.

In the case of a portal crane system, the crane will straddle at least the tracks and a roadway, and possibly even the container stack as well. This is because containers may be stacked in dense blocks with very little space in between the blocks.

In the case of a reach-stacker system, at least two reach-stacker units will work simultaneously either side of the loading/unloading tracks, so that the CY will be separated into two paved areas, separated from each other by the tracks. In each section, container stacks will be arranged along the train working length in blocks of about 4 TEU wide, 3 TEU deep and 3-4 TEU high, each separated by a width of 13 metres to allow for the turning circle of a reach-stacker. The actual dimensions of the blocks will depend upon the lifting capacity of the reach-stackers used. The reach-stackers will lift containers directly between wagons and the stacks, thereby avoiding the need to use prime movers and yard trailers, except for re-positioning of containers from the stack or wagons to the CFS or customs inspection area.

The annual container throughput capacity of a dry port is determined by the number of times per year on average that its CY storage volume is turned. If the CY storage volume is 1,400 TEU, then the average dwell time for a container cannot exceed 4.5 days if the annual throughput is to reach 100,000 TEU (assuming an operating year of 330 days).

In order to minimize costs, the CY would be constructed in heavy duty flexible paving materials, such as interlocking paving blocks, but the pavement must be designed to withstand the heavy wheel loadings of container lifting equipment. For example, the wheel loading of a reach-stacker lifting up to 45 tonnes is 25 tonnes per wheel.

6.2 Provision for truck circulation within the dry port

The efficient operation of the dry port will depend in large part on the unimpeded circulation of trucks throughout most of the dry port area, except at the intersection with the rail access line, which would need to be protected by automatic level crossing barriers and warning devices.

The internal roads within the dry port should be constructed with a width of 15 metres, to allow handling equipment and trucks to pass safely.

5.5 Design of other major facilities

The area of the Container Freight Station (CFS), the Bonded Warehouse and even of the Customs Inspection Area will be determined in proportion to the maximum container throughput volume expected to be handled in the dry port. The daily number of containers (TEU) to be handled or processed through these facilities will be calculated as some proportion of the expected TEU throughput volume. The floor area of cargo discharged from these containers will be calculated by applying to the TEU volume an average area per TEU of 30 square metres and a traffic circulation factor of 1.3.

---

6 In this case, it was assumed that reach-stackers can lift near full loads 4 high to and from the third row of containers in a stack.
The CFS should be designed with container bays facing on to a raised loading/unloading platform on one side and truck loading/unloading bays on the other. Containers will be packed and unpacked by forklift trucks while still on their trailers. Similarly, break-bulk trucks will be loaded and unloaded from a raised platform by smaller forklifts.

Detailed requirements for other buildings, such as the Administration Building, the Bonded Warehouse, the Customs Inspection Facility, and the Security Building should be determined through consultations with local Customs staff as well as with freight forwarders and other service providers.

5.6 Terminal management IT system

It will be essential that the entry, exit and placement into storage of containers and cargo be tracked by a real time computer system, such that it will be possible to locate any container or cargo consignment from the time of its departure from a seaport, or from a shipper’s premises, until its arrival in the dry port and placement into storage.

In addition, a computerized yard control system should be used to determine with precision where a container is to be placed in the stack.

6. Coding of dry ports of international significance

The United Nations Code for Trade and Transport Locations, or UN/LOCODE, is a system of codes developed for uniquely identifying locations, such as airports, seaports, and inland freight terminals, which handle international trade.

The codes are of a five character format, the first 2 alpha characters indicating the country in which the place is located, followed by 3 alpha characters indicating the specific location. As an example, the code TH LKR identifies the Lard Krabang Inland Container Depot in Thailand.

Through the adoption of international port codes, electronic links can be established between dry ports in the regional network. This will be of considerable benefit in facilitating trade and the electronic exchange of documents between dry ports located in different countries. Indeed, this is already happening for the exchange of cargo between two dry ports located respectively in Indonesia and Thailand.

UN/LOCODES are managed, maintained and updated by the UNECE Secretariat. The codes are maintained as a relational data base, and may be updated on request from users. It is strongly recommended that all dry ports which have not yet applied for a locode, should do so. There is a procedure for interested parties to register new locations on-line, details of which are available on the UNECE website.

7. Incorporation of dry ports into transport documents and legal instruments

In this instance, the objective will be to ensure that all dry ports covered in the Intergovernmental Agreement are given legal status by being incorporated into transport documents and legal instruments governing transport across international borders.

In practice, Multimodal Transport documents, such as the FIATA Multimodal Bill of Lading, are already used for the consignment of cargo between dry ports located in different countries of the region, e.g. for cargo transported between dry ports located in Indonesia and Thailand. It is likely,
therefore, that the current format of these documents is adequate for international cargo exchanges between dry ports.

International transport conventions are legal instruments which set out the conditions under which cargo consignments are transported across borders, including the obligations and rights of shippers/consignors, carriers and consignees. In essence, they provide the basis for contracts of carriage between shippers (or cargo owners) and carriers (or transport operators).

The legal instrument which sets out the terms and conditions of carriage embodied in the FIATA Multimodal Transport documents is the UNCTAD/ICC Rules for Multimodal Transport Documents (1992). It is possible that this instrument may need modification to specify dry ports as cargo origins and destinations in international trade, despite the related transport documents having already been adapted for this purpose.

8. **Proposed arrangements for customs clearance at dry ports**

By definition, dry ports must be able to offer the full range of functions (customs, quarantine and health) for the border clearance of international cargo. As already observed, effective interoperability of dry ports within a regional network will require that they have the facilities and full authority to clear international cargo and that intermediate border checks be kept to the minimum necessary for border security.

This will mean that desirably border inspection staff should be based permanently at dry ports, or alternatively that staff will be available on demand to undertake inspections there. Recent missions undertaken by UNESCAP staff have revealed that customs inspection staff are permanently based at many existing dry ports in the region.

In order to make fully effective the border clearance functions of dry ports, it will be necessary to integrate the different border control processes (customs, quarantine and health) and documentation under a single authority within each dry port. This is the “single window” concept, the adoption of which will be essential to eliminate duplication of procedures and staff, as well as to reduce the volume of document processing, in dry ports.

The border clearance functions of dry ports will also be enhanced if on-site inspection staff could be provided with the IT systems necessary to carry out risk assessment of import consignments. In some countries of the region, customs authorities have adopted a system of cargo pre-clearance whereby import consignments are risk-assessed 72 hours before vessel arrival in port. Such assessments are carried out with the assistance of on-line information related to customer (or consignee) profiles to determine whether clearance of consignments poses an acceptable level of risk. There are strong benefits to be realized from such assessments being carried out by border control staff based at dry ports, particularly if the latter will in future have ultimate authority for the clearance of cargo consigned to their facility.

Where necessary, the relevant regulations should be amended to eliminate comprehensive checking of cargo at maritime or land borders and to allow full clearance procedures to be carried out at destination dry ports.

9. **Policy measures, legislation and solutions for planning dry port development**
A generally fragmented authority for the coordination and planning of dry port development in the region has limited the effectiveness and delivery of government policies designed to assist this development. Coordination is particularly weak in countries which rely extensively (and sometimes exclusively) on private sector investment in dry port development.

A key recommendation of the framework study is that responsibility for coordination of planning activities for dry port development should be assigned to an inter-agency committee, under the authority of a single transport ministry and with representation from all agencies with a regulatory interest and involvement in dry port development and operation. There is evidence that such an approach is being applied successfully in a few countries of the region.

The activities of a proper coordination agency can be usefully directed at developing and applying the following policy initiatives to assist the development and establishment of dry ports:

(a) Taxation and other financial measures, including tax holidays or waivers, concessional land rent or public utility rates, etc;

(b) Priority development of transport infrastructure connecting to dry ports, including where relevant, provision of investment incentives for private developers of dry ports;

(c) Incorporation of dry ports in export processing or other free trade zones (taking care to ensure that such facilities are capable of generating cargo handling volume for dry ports);

(d) Regulatory measures to encourage sustainable transport connections to dry ports, including the regulation of truck weights and dimensions to discourage the operation of environmentally damaging vehicles

Policy measure (a) does not seem to have been applied widely within the region and where it has, seems not to have been very effective. There is evidence that measure (b) has been applied successfully in at least one country of the region. Measure (c) can be successful in generating sufficient volume to ensure the financial viability of dry ports, but only where the FTZ has a strong manufacturing base. An FTZ located at or near an inland border is unlikely to have this characteristic.

In the case of policy measure (d), there may be a need to reverse the direction of policies previously applied to relax regulations related to truck weights and dimensions.

10. Practical options for financing development and operation of dry ports

There are three main options for development financing and operation of dry ports:

**Option 1:** Financing by public sector and outsourcing of operation through a management contract with the private sector;

**Option 2:** Private sector financing and operation;

**Option 3:** Public Private Partnership (PPP) variants

There are varying levels of investment risk associated with these options. Under Option 1 all of the risk is assumed by the public sector, which may make it unattractive relative to the constraints and
limitations of the public sector budget. Option 2 assigns all of the risk to the private sector, which may make the project unattractive to some potential investors. Variants of Option 3 assume different levels of participation by public and private sector parties, ranging from maximum public sector investment in land and infrastructure to minimal public sector and maximum private sector investment in infrastructure and equipment.

Within the region, PPP is currently the most popular option for financing investment in new dry port development, but there are relatively few existing dry port projects which have been financed in this way. Public Private Partnership (PPP) concepts have recently been applied widely throughout the region to transport infrastructure projects, such as highways and seaports – applications where the level (and stability) of demand is guaranteed. There is a high level of risk associated with dry port investments, due to the uncertain level and stability of demand, particularly in some inland areas, and in some cases the uncertain level of competition.

Nevertheless, PPP is seen to offer an opportunity for governments to reduce the burden on national budgets, by attracting private investments for expensive infrastructure projects and at the same time to introduce private sector expertise to the management and operation of these projects.

Governments can make PPP more appealing to potential private sector investors by shouldering a larger part of the capital cost and associated risk. In the case of the Lat Krabang ICD in Thailand, a PPP scheme was successful because the public sector covered all of the project’s infrastructure costs, in addition to providing the land for the project.
1. Introduction

1.1 Background to study

This study follows the implementation of the Intergovernmental Agreement on Dry Ports. As at 17 April 2017, 17 countries have signed, and 13 countries have become parties to, the Intergovernmental Agreement on Dry Ports. A total of 150 existing and 86 potential dry ports have been identified in Annex 1 for coverage under this agreement.

This is the second of two studies which have addressed issues associated with the development and operation of dry ports of international importance.

The first of these studies was completed for the purpose of assisting the deliberations of the First Working Group on Dry Ports. It focussed on the planning, development and operation of dry ports of international significance. In particular, it canvassed the approaches and policies being applied to specify the functions, location, layouts and transport connections of dry ports in five member countries of the UNESCAP Region: Australia, China, India, Republic of Korea and Thailand and to support the development and successful operation of those dry ports.

1.3 Purpose of study

This study is intended to recommend guidelines and principles for the development of a regional dry port network in UNESCAP region. Based on information collected from fact-finding missions to five countries of the region (Bangladesh, Bhutan, Indonesia, Islamic Republic of Iran and Tajikistan), the study makes an assessment of:

- The capacity and condition of transport infrastructure (seaport, rail and road) linkages to dry ports;
- Actions being taken, or required, to improve the standard, quality and capacity of these infrastructure linkages;
- Desirable technical standards to be met in the design and operation of regional dry ports;
- Application of a coding system which will facilitate trade and transport between dry ports in the network;
- The desirability of incorporating dry ports in transport documents and related legal instruments governing multimodal cargo transport across land and maritime borders;
- Actions taken, or contemplated to provide dry ports with the facilities and capability to undertake the full range of border clearance functions (customs, quarantine and health);
- Policy measures, legislation and solutions already applied, or needed, to assist dry port development;
- Approaches to financing the development of dry ports
2. **Key concepts associated with development of the regional dry port network**

By definition, a network comprises nodes which are interconnected in some way. In this case, the nodes are dry ports and they are potentially interconnected by transport links.

*The main objective of developing a regional dry port network is to expand trade opportunities by facilitating the uninterrupted movement of trade consignments between dry ports located in different countries.* This can be achieved by consigning goods from a dry port in one country to a dry port in another, by minimizing border inspections and delays between the two, and by carrying out customs and other border control formalities and securing the release of goods at the destination dry port. The physical flows of goods and the electronic flows of documentation in such cases are as illustrated in Figure 2.1

![Figure 2.1: Interconnection of dry ports for trade and transport flows](image)

In this way, operational connections will be established between dry ports, and through them, between consignors and consignees, in different countries. In the particular case shown in Figure 2.1 the trade and transport flows between countries are via maritime borders (ports), but the same pattern of movement would apply in the case of transport across land borders, except that a change of transport mode at the border would be unlikely.

The interconnection of dry ports will require that there be some consistency among them in terms of: the services they provide; their location in relation to trade generating industry; and their transport connections. While the Intergovernmental Agreement provides guidelines with respect to all of these factors, it is clear that the facilities identified by countries as dry ports under the agreement fall within...
a wide range of types, infrastructure links and service functions. Some do not have authority or facilities for customs and other border control functions.

It is strongly recommended that dry ports should satisfy the following basic requirements:

- They should have facilities for the handling, consolidation, storage and modal transfer of containers and cargo;
- They should have the authority, capability and facilities for all border clearance of cargo;
- They should be located within, or close to, concentrations of industry which generate export/import trade, but can be located remotely from seaports; and
- They should be connected to railways for long haul transport from seaports and to roads for local pick-up and delivery of cargo

2.1 Service functions of dry ports

The Intergovernmental Agreement specifies that dry ports are to provide services for the handling, storage and regulatory inspection of goods moving in international trade. The implication is that dry ports can handle all types of goods and should have suitable infrastructure and equipment to do this.

In practice, however, it is not possible to combine the handling of bulk cargo with unitized cargo within the same facility. There are very large differences between the land area, facilities and equipment required to handle bulk cargo as compared with containers or other unitized cargo. Bulk cargoes, such as coal and mineral ores, require large areas of land for stockpiling and long conveyor systems combined with grab cranes or high speed augers for loading and discharge of transport vehicles. Unitized cargoes, such as container and palletized cargo, as well as bundled or coiled steel, are not nearly as land intensive as bulk cargoes, and require warehousing and specialized lifting equipment.

For these reasons, the dry ports comprising the regional network are likely to be mainly those which specialize in the handling of unitized cargoes and are equipped accordingly.

2.2 Customs and border control functions of dry ports

Having full authority and all facilities for customs and other border control functions is a vital prerequisite for the consignment of international cargo between dry ports in the regional network. In the case of all five countries visited, nearly all dry ports or inland cargo terminals in current operation (as well as all of those proposed for future operation) have the facilities and authority for carrying out on-site customs and other border inspection functions. In most cases, this involves the permanent stationing of Customs Service inspectors at dry port sites, although in some cases inspectors will come to dry port sites “on demand”. One dry port claimed to lack on site customs inspection is the Gedebage Dry Port in Bandung Indonesia, which is managed by PTKAI, the Indonesian Railway. In this case, customs clearance of containers is undertaken within Tanjong Priok Port, before consignments are released for transport by rail.7

2.3 Dry port location and transport mode connection issues

7 Information provided at meeting convened in Jakarta on 28 February 2017 by Ministry of Transportation.
A key benefit to be derived from the operation of dry ports is that they help to minimize the logistics cost of moving cargo between an origin and a destination, e.g. between a dry port located in one country and a dry port located in another. They can only do this, however, if:

(i) They are located in close proximity to concentrations of trade generating industry, such that the distance for local delivery of breakbulk cargo to and from the dry port is as short as possible (ideally no more than 30-40 km) and is suited to the operation of small trucks;

(ii) They are located at distances from seaports or other major cargo consolidation centres which are sufficient to make container haulage to and from the dry port by rail (or where relevant by inland waterway transport) economic. Ideally these distances will be greater than 300 km, but not less than 150 km. If shorter distances are involved, the use of large cost-effective container trucks for line haulage might be justified.

A recent study in Bangladesh indicated that road haulage charges were on average 3 times those of rail (4.5 Taka per tonne-km for road as compared with 1.5 Taka per tonne-km for rail). Operating cost comparisons are likely to show a much larger advantage for rail. In determining the location of dry ports, minimizing the distance of high cost transport (road) and maximizing the distance of low cost transport (rail), will optimize the overall transport cost between cargo origins and destinations.

This principle is set out in the Intergovernmental Agreement and is re-emphasized in Figure 2.1 of this report. However, it has been followed by only a minority of countries visited during this and the earlier dry ports study. The approach to dry port location and modal connections used by the five countries visited during the course of this study is addressed in the following sub-sections and is depicted for 3 out of these five countries in Figure 2.2.

---

8 The logistics cost comprises the costs associated with the handling, storage and transport of cargo.
Figure 2.2: Location and transport mode connection of dry ports (selected countries)
A. Bangladesh

Some 70 per cent of the container cargoes moving through Chittagong Port originate in, or are destined for, the capital, Dhaka. Only 3 per cent of the container throughput volume of Chittagong Port is currently moved inland by rail, as compared with 67 percent by road (in break-bulk form). The rail served Dhaka ICD has been in operation since 1987, but is now capacity restricted by the heavily congested urban development surrounding the terminal.

Several years ago, the Chittagong Port Authority, in an effort to reduce road and cargo congestion in and around the port, encouraged the establishment of “off dock” container terminals in most cases only 5-10 km from the port. There are now 16 such terminals operating close to Chittagong Port, all of them developed and operated by the private sector and in several cases involving substantial investments in infrastructure and handling equipment. The functions of off-dock terminals are identical with those of dry ports, in the sense that they provide the full range of services for the handling, storage, and customs clearance of containers and container cargo.

These terminals now process the vast majority of export consignments of ready-made garments which are transported from Dhaka in small breakbulk trucks having payloads in the range of 7-10 tonnes and are loaded into containers at the off-dock terminals.

While the strategy of encouraging the establishment of off-dock terminals may have had the intended effect of reducing congestion within the port, it also resulted in increased congestion of the main highway between Chittagong and Dhaka (Asian Highway 41) by adding breakbulk trucks to the road. Even at current traffic levels one breakbulk truck passes on average every minute of the day. By 2025, it is estimated that nearly 10,000 breakbulk trucks per day will be running on the Chittagong-Dhaka Highway – double the estimated current number of 5,100.

For some years, a second rail served dry port has been under consideration for Dhirasram near Gazipur to the north of Dhaka. This facility would be well located as it would be in centre of the garment processing industry around Gazipur. The Government of Bangladesh is now planning for it to be constructed under a PPP contract, but it is long overdue.

B. Bhutan

No dry ports yet exist in Bhutan. Most of Bhutan’s trade with the rest of the world enters or exits the country through the main customs border post of Phuentsholing, located on the southwestern border with West Bengal state of India, about 180 km by road from Thimpu, the capital.

Approximately 80% of all trade through the Phuentsholing border crossing is sourced from, or destined for, the Pasakha Industrial Estate, about 14 km by road east of Phuentsholing. It has been proposed that Pasakha will be the site of the county’s first full scale dry port (with a planned capacity of 327,000 TEU by 2035), but its development has been postponed until the next five year planning period, commencing in 2019. In the meantime, a “mini dry port” will be constructed on a 5.4 acre plot in Phuentsholing, with capacity to process a container volume of about 10,500 TEU per year.

Kolkata Port handles all of the international trade originating in, or destined for, Bhutan except that to/from India, Bangladesh and Nepal which is transported by road.
Kolkata Port is about 700 km by road from Phuentsoling, via Indian National Highway 12. Imports from India (representing about 80% of all imports into Bhutan) are treated separately from imports from other countries. All imports from India are transported in breakbulk form (i.e. are non-containerized) and are cleared at the border.

C. Indonesia

Cikarang Dry Port is one of only two dry ports on the island of Java, the other being the Gedebage Dry Port of PTKAI – the Indonesian Railway. Cikarang Dry Port is located only 50 km southeast of Tanjung Priok, the main container handling seaport of Indonesia. The difficulty confronting the transport planners of Indonesia is one of geography. There would be few, if any, trade generating locations located more than 200 km from a port on any of the main islands in the archipelago.

The dry port is a 100 per cent privately owned and developed facility, and despite its proximity to Tanjung Priok Port, has 3 private rail sidings within its boundary. It is connected to Tanjung Priok by rail services provided by PTKAI. It is also connected to Tanjung Priok Port by a multi-lane highway. It is favourably located within an industrial zone which generates 62 per cent of the container trade handled by Tanjung Priok Port, hence is within a short truck haul of several major industries.

The recent throughput volume of Cikarang Dry Port was reported as 70,000 TEU per year, of which it was claimed that 24 per cent, or 16,800 TEU per year, is moved to and from Tanjung Priok by rail. It is questionable how long the railway can sustain its container haul at such a low level of demand, bearing in mind that fixed costs, especially on the Indonesian railway, comprise a very high proportion of overall railway operating costs. It is likely that the operator of Cikarang Dry Port would have negotiated a favourable rail haulage charge which is unlikely to cover the high rail unit operating cost on such a short haul and at such a low haulage volume.

D. Islamic Republic of Iran

The Islamic Republic of Iran occupies a significant strategic position as a conduit for transit trade between Afghanistan, southwestern China, Central Asia and the rest of the world. Approximately 92 per cent of the tonnage of all transit trade moving through Iranian ports moves through Shahid Rajaee (the container port 23 km west of Bandar Abbas). In addition, transit trade is generated within Iran itself and proceeds to Russia and Europe by road and rail, mainly via the Sarakhs border with Turkmenistan and the Razi border with Turkey.

The transit trade handled in the ports does not represent demand for dry ports, except in the receiving or generating countries (i.e. mostly Afghanistan and the countries of Central Asia). Containers account for nearly 88 per cent of all non-oil cargo transiting through Shahid Rajaee, but a high proportion of these transit containers are understood to be stuffed and unstuffed in the port. For example, cotton exported from Uzbekistan is mostly carried in railway covered vans and then loaded into containers at the port, owing to concerns about the prompt return of container wagons which may be deployed on other routes. Containerized transit cargo requires the specialized loading/unloading facilities of dry ports in the receiving or generating countries. Non-containerized transit cargo, on the other hand, may be loaded or unloaded by manual labour in existing railway yards.
Export/import containers moving in bilateral trade between the Islamic Republic of Iran and other countries, through Shahid Rajaee, were estimated in 2015 to account for 1.2 million TEU, or 66% of the total port container throughput in that year of 1.8 million TEU (see Figure 2.3).

![Figure 2.3: Estimated breakdown of Shahid Rajaee container throughput, 2015](image)

Source: Derived from Ports and Maritime Organization statistics 2015

Export/import container trade through the port system plus transit container trade generated in-country constitute the main demand for the establishment of dry ports in Iran. This demand is currently being assessed as part of a consultant study commissioned by the Ministry of Roads and Urban Development in order to determine the justification for establishing dry ports at 9 principal locations, as well for approving applications for dry ports at another 15 secondary locations, throughout the country.

One of the principal locations being advanced for construction of a dry port is Aprin, 21 km southwest of Tehran. This site is located within an industrial zone at the junction of two key Trans-Asian Railway routes (Sarakhs-Mashhad-Razi and Tehran-Bandar Abbas) and two key Asian Highway routes: AH 1 (border with Afghanistan to border with Turkey) and AH 72 (Tehran-Bushehr Port). The site is at the edge of a metropolis (Tehran) estimated to generate and receive 60 per cent of the country’s container volume. The proposed Aprin Dry Port will have an ultimate capacity to handle 360,000 TEU per year.

Aprin is 1,400 km by rail northwest of Bandar Abbas (Shahid Rajaee Port), but is a short truck haul away from potential customers. As such, it satisfies the main requirements for a dry port: it is in close proximity to trade generating industry; it is far enough from the seaport to be able realize very low rail unit operating costs; and it can potentially optimize overall logistics cost, by blending short haul truck and long haul rail operations with efficient handling and storage.
There are doubtless several other dry port development proposals near to other major industrial centres, such as Tabriz and Esfahan, which along with Aprin should be given priority, but there are also one or two proposals, involving development of dry ports in border areas, but without a surrounding industrial base to sustain them with cargo. Examples are Sarakhs on the border with Turkmenistan and Arvand, near the border with Iraq at Khoramshahr. It is unlikely that development of dry ports at these locations will have satisfactory results in terms of minimizing logistics costs.

E. Russian Federation

The Russian Federation’s strategic location makes it a transit point for trade between China and Central Asia and onwards to Europe. Ports in the Russian Federation that handle the bulk of the seaborne traffic include the ports in St. Petersburg area and the Pacific Ocean ports near Vladivostok in the far eastern part of the country. Over 50% of sea borne container traffic is handled by the ports in St Petersburg with the remainder handled by ports in the far east and the ports in the Black Sea.

The dry port located in Novosibirsk at the Kleshchiha station of the Trans-Siberian Railway mainline and is connected by rail to the sea ports in the Baltic Sea and the Russian Far East. In terms of road connectivity, the Kleshchiha station connects to the Asian Highway network via the AH 6 and AH4 routes. The Kleshchiha station is managed by TransContainer group, which is one of main intermodal container operators in the country. TransContainer also handles container traffic from China to Europe via the Trans-Siberian Railway and traffic to and from Central Asia. The dry port is made up of four container yards with rail sidings within the facility. The dry port also has two warehouses for storage with a rail siding. Container traffic at the Kleshchikha station is transported by rail with trucking used for last mile delivery to customers in the region surrounding the dry port. Customs facilities are not available at the site and are located in the vicinity of the dry port. Containers that require processing by customs can be stored in a secure area before they are inspected and processed by customs officials. In addition to serving the ports and the industrial centres of the Russian Federation, the dry port also provides container train services from Novosibirsk to Zabaikalsk located at the border with China. The location of the Kleshchiha station roughly in the middle of the Russian Federation and in close vicinity of the city of Novosibirsk together with its convenient rail link to the rail network of the Russian Federation satisfies the requirement of a dry port that is located close to trade generating centres with rail links to major sea ports. The ports of St. Petersburg area are approximately 3800 kilometres away from the Kleshchiha station while the ports of Vladivostok cluster (e.g. Nakhodka and Vostochny) are around 6000 kilometres away.

F. Tajikistan

There are, as yet, no facilities in Tajikistan which may be described accurately as “dry ports”, in the sense that there are no inland terminals located close to industry or other trade sources which have capacity to handle and customs clear intermodal cargo.

Instead, the priority has been to establish terminals at key border and inland locations for the primary purpose of clearing and transferring (trans-loading) international cargo between foreign and Tajik trucks. Some 10 truck terminals have been, or are being, established at Tajikistan’s borders: 4 on the border with Uzbekistan; 3 on the border with Kyrgyzstan; 2 on the border with Afghanistan; and 1 on
the border with China. The locations of these terminals are shown in Figure 2.4 (see red markers), as are the locations of another 8 intermediate terminals (shown as green markers).

There are proposals by the Association of International Automobile Carriers of Tajikistan (ABBAT) to develop full scale dry ports at two border locations: one on the border with Uzbekistan at Tursunzade, 62 km west of Dushanbe and the other on the border with Afghanistan at Nizhny Pyandzh, 178 km south of Dushanbe. Both will be connected to rail. Although there is a proposal to develop an SEZ (Special Economic Zone) at Pyandzh, there as yet no signs of a supporting industrial base at either dry port site.

The UNESCAP study team was advised of a plan for the Tursunzade Dry Port to receive cargo by road from Uzbekistan and to transfer it to rail for onward delivery throughout Tajikistan.

Source: Association of International Automobile Carriers of Tajikistan (ABBAT), February 2017

Figure 2.4: Truck terminal network of Tajikistan

3. Seaport, road and rail infrastructure links to dry ports

One of the most important functions of dry ports is to facilitate a connection to the sea for land-locked countries and regions. This is achieved through trade consolidation and the use of cost effective land transport linkages to seaports. This function is becoming increasingly important for the countries of Central Asia, some of which are located 3,000-4,000 km from the nearest seaport. This is also true of Bhutan, one of the countries visited during the course of this study, which must transport much of its export and import volume some 700 km to and from Kolkata Port.
3.1 Seaport linkages to dry ports

The throughput and storage capacity of a seaport as well as the capacity and efficiency of its cargo handling systems, can have a critical effect on its ability to support the growth of inland trade.

Of particular importance is the capacity and operating efficiency of road and rail accesses inside seaports. Long truck queues and congestion at the road/port interface are characteristic features of most Asian ports.

Although all seaports reviewed in this study have rail connections, none can accommodate full length trains inside loading/off-loading areas, imposing on railways a commitment to shunt trains at a substantial additional cost and expenditure of time.

Further, some port management authorities seem almost oblivious to the need to reduce multiple handling by locating rail loading/unloading tracks as close as possible to the container stacks adjacent to berths, despite professing a commitment to an increased use of rail for container transport to and from their ports. Typically, rail sidings are located at least 500 metres, and possibly up to 2 km, distant from the container stacks in ports, meaning containers must be transferred to and from the stacking area by yard prime mover and trailer. Up to 3 lifts per container can be required between the rail loading/discharge area and the stacking area, as compared with only a single lift for containers brought directly into the stacking area by highway trucks.

Following are observations related to the four seaports of relevance to this study: Chittagong (Bangladesh), Kolkata (India), Shahid Rajaee (Islamic Republic of Iran), and Tanjung Priok (Indonesia)

(i) Chittagong Port

Chittagong Port is located near the estuary of the Karnaphuli River and has a dredged depth of only 9.2 metres and LOA (Length Overall) restrictions which limit ship size to only 2,500-3,000 TEU (i.e. feeder ship size). The port is operating above its design capacity and this is reflected in extreme landside congestion (see picture below). As part of a strategic development plan for the port, it has been proposed that a new container terminal (the Bay Container Terminal) be constructed on the seacoast, north of the Karnaphuli River, where ships of up to 5,000 TEU may be accommodated. This will increase the container throughput capacity of the port, although the land transport linkages to the new site are not clear as yet.

---

10 Up to 3 lifts will be required when transfer trailers are not immediately available and containers have to be “grounded.”
Truck congestion at the existing port has peaked owing to the policy of the port authority to retain processing of 70 per cent of import containers inside the port, with the remaining 30 per cent going to off-dock terminals which also handle 92 per cent of export containers. In both cases (retained import containers and off-port export containers), the effect has been the same: to transfer cargo to small break-bulk trucks for delivery to/from Dhaka and to massively congest the Chittagong-Dhaka Highway (Asian Highway 41). Currently, on average, 3,000-4,000 trucks per day enter Chittagong Port.

Owing to capacity constraints at the rail served ICD in Dhaka and to protracted delays in developing a new rail served ICD at Dhirasram, north of Dhaka, rail cannot be expected to relieve the inland transport capacity problem at an early date. Thus, rail remains under-utilized at Chittagong Port.

(ii) Kolkata Port

As observed earlier, Kolkata Port handles all of the international trade originating in, or destined for, Bhutan except that to/from India, Bangladesh and Nepal which is transported by road.

In 2015/16 the container throughput of Kolkata Port reached 578,000 TEU, but further expansion of throughput now depends on early resolution of landside congestion problems.

Kolkata Port is experiencing severe internal congestion of its working areas as a result of a ban placed on the movement of heavy trucks in the dock area from 0800 to 2200 daily, as from 24 September 2016. The ban affects the movement of container prime movers and trailers into and out of the CFS (container freight station) areas of the port leading to overnight congestion of the container handling facilities and to compounding delays in the loading and unloading of vessels. The problem arises mainly because the circulation space within the port for trucks is very limited. Currently there are only 240 truck parking spaces in the port, while it is estimated that 600 will be needed to relieve congestion. The delays due to port congestion have the effect of compounding those already experienced in the clearance of transit cargo in the port. At a meeting during the visit of the UNESCAP study team to Thimphu in January 2017, it was claimed that Bhutanese freight forwarders

11 Live Mint: Kolkata Port operations hit by day-time restriction on vehicular movement, 29 September 2016.
were already experiencing a delay of up to 10 days for clearance of their import consignments in Kolkata Port.

Bhutanese traders have the option of moving their cargo through Haldia Port which is 125 km south of Kolkata, is closer to the sea, has more modern facilities, and presumably has far fewer landside congestion problems. In future years when it is possible that the proposed Pasakha Dry Port is in operation and is connected to rail, it may be preferable to direct all Bhutanese trade through Haldia Port.

(iii) Shahid Rajaee Port

As noted above, this is the principal container handling port of the Islamic Republic of Iran, located 23 km west of Bandar Abbas. Shahid Rajaee Port is understood to have an annual throughput capacity of 3.3 million TEU. With a throughput of 2.1 million TEU in 2016, it is still only utilizing about 60 per cent of its design capacity.

The container terminal at Shahid Rajaee Port appears to have adequate internal road space, but rail connections are somewhat limited. As shown in the satellite image in Figure 2.5, the rail access tracks to the container terminal are long, but are located at a distance of about 1.5 km from the container berths, indicating the need for multiple handling of containers between the rail access area and the berths. Information provided by the Iranian Railway (RAI) suggests that only a small volume of containers is moved by rail annually to the Aprin terminal (southwest of Tehran) and almost no transit containers are moved by rail to/from Central Asia. Rail hauled container volumes are small for various reasons, such as the low rate of containerization at source of some transit cargoes, particularly export cotton from Uzbekistan. However, as may be observed from Figure 3.1, rail appears to suffer a logistical disadvantage by comparison with road for the movement of containers to and from Shahid Rajaee Port.

Figure 3.1: Rail access to Shahid Rajaee Container Terminal

---

12 Information provided at meetings in Tehran with the UNESCAP team on 12 February 2017.
Provision of a perpendicular rail access to the berths may be possible in the future, but may require the re-arrangement of existing developed areas to the north of the berths. Ideally, rail access lines should be constructed down the middle of the finger pier, so that trains may be loaded and unloaded under a portal crane or by reach-stackers working on either side of a train.

(iv) **Tanjung Priok**

Tanjung Priok, the principal container handling port of Indonesia, is located on the island of Java, 12.3 km northeast of the city of Jakarta.

In 2015, the recorded container throughput at the port was 5.2 million TEU, representing a drop of 11.8 per cent on the throughput of 5.9 million TEU achieved in 2014.\(^{13}\) Volume is understood to have been depressed again in 2016, but still exceeds the nominal installed capacity of 5 million TEU per annum, so that the port is still considered to be congested.\(^{14}\)

The port is accessed by both road and rail, however is laid out according to a “finger pier” arrangement, with the fingers extending some distance from the shore, so that neither line haul road or rail services can enter the working areas behind the berths. Rail hauled containers are handled at two locations within the port: on the western side at the Pesoso Terminal which is operated by the Indonesian Railway PTKAI, but which is actually outside of the port boundary; and on the eastern side at the Jakarta International Container Terminal (JICT).\(^{15}\)

In the case of the former facility, a rail connection inside the port has not been possible owing to difficulties with land acquisition.

In the case of the latter facility, trains are received in a rail yard which is 500-1,000 metres away for the stacking areas in the port. From this yard, containers are transferred by yard trailer to the stacking areas. Trucks are received in a buffer yard, from which containers are transferred by yard trailer to the stacking area. Thus there are multiple container handlings for both road and rail hauled containers: In the case of import containers, there are 4 lifts from the stacking areas in the port to the rail yard and 3 lifts for trucking. In the case of export containers, 2 lifts per container are required to transfer containers to the stacking areas in the port. Containers to/from Surabaya, Gedebage and Cikarang are handled at JICT. The theoretical capacity for Cikarang containers was given as 180 TEU (3 trains) per day for import and export, or 65,700 TEU per year, which compares with the actual volume of only 17,000 TEU per year for rail, as reported by the management of Cikarang Dry Port.

Container trailers approach the port via a tolled expressway, but the road entrances to the port are now heavily congested at certain times of the day. In addition, there is one level crossing intersection between rail and road within the port area, which can add to the congestion problem.

Initial plans for development of a new terminal complex on reclaimed land were presented at a meeting with JICT management. The project, called New Priok Container Terminal 1, would be developed by a consortium of Pelindo II with 3 other partners at a cost initially estimated at US$ 2.47 billion. It would increase the draft of vessels which can be received in the port to 16 metres (sufficient

---

\(^{13}\) As reported by Containerization International and Lloyd’s List in *The Top 100 Ports in 2015*.

\(^{14}\) As reported in *World Cargo News* for May 2013: **Tanjung Priok super port**.

\(^{15}\) A joint venture between the Indonesian State Port Company Pelindo II and Hutchison Port Holdings Ltd.
for mega container ships) and would eventually deliver a capacity for 18 million TEU annually. The new complex would be arranged longitudinally and would provide for direct access by rail and road.

Rail yard at JICT (Jakarta International Container Terminal), Tanjung Priok, 01 March 2017

3.2 Removal of missing links in Asian Highway or Trans Asia Railway network

(i) Asian Highway

No missing links in the Asian Highway Network which would prevent seamless transport between dry ports and seaports, or between dry ports in the regional network, were identified.

(iii) Trans Asian Railway

During the course of the past decade, substantial progress was made in terms of eliminating gaps in the Southern and North-South Corridors of the Trans Asian Railway in the Islamic Republic of Iran and between Kazakhstan and the Islamic Republic of Iran via Uzbekistan. For example:

- the Kerman-Bam-Zahedan (545 km) railway was constructed to remove a gap which had previously existed in the east-west alignment of the TAR, enabling a rail link between Zahedan and Tehran;
- the completion of a railway connection between Mashhad and Bafq (800 km) removed a missing link which previously prevented transit traffic moving directly between the Sarakhs border and Bandar Abbas; and

• in late 2014 the remaining gaps in a route of 925 km connecting Uzen in Kazakhstan with Gorgon in the Islamic Republic of Iran were eliminated to provide a direct north-south corridor linking Kazakhstan, Turkmenistan and the Islamic Republic of Iran

**On-going (or impending) construction of missing links**

**Chabahar Line**

More recently, with the signature of a trilateral agreement between the Islamic Republic of Iran, India and Afghanistan, the development of a transport and trade corridor linking India and Afghanistan, via the Port of Chabahar in the Gulf of Oman, has become a reality. The agreement signed in May 2016 relates to the construction of two terminals and five berths at Port of Chabahar and the building of a new railway line between Chabahar and Zahedan. Source: ECO

![Figure 3.2: New railway line Gonabad-Chabahar, part of north-south corridor in Islamic Republic of Iran (dotted orange line)](image)

As shown in Figure 3.2, this line will be part of a north-south corridor of 1,350 km linking the port with the Sarakhs border and with a new standard gauge line being constructed into Afghanistan between Khaf (Iran) and Ghurian (Afghanistan).

The southern section of this line, 500 km from Zahedan to Chabahar Port, has started construction with the technical and financial assistance of India. The estimated cost is US$ 1.6 billion, or US$ 3.2 million per km. **Zahedan has been proposed as a priority site for the construction of a dry port and will also be the site of a Special Economic Zone.**
The 850 km northern section of the corridor, which connects with the Kashmar-Bafg line, is currently under study.

Chabahar Port is located in the Strait of Oman, is unaffected by the congestion in the Straits of Hormuz, and is closer to the main east-west sea routes. It will provide a slightly shorter route for transit traffic through Sarakhs than the existing Sarakhs-Bandar Abbas route. India is interested in transporting containers by sea to this port and then rail hauling them through Central Asia to Moscow, in order to avoid rail haulage through Pakistan. For the same reason, it will provide an alternative for the transport of cargo between India and Afghanistan.

**Border crossing railway, Islamic Republic of Iran - Afghanistan**

The route of this new standard gauge connection to Afghanistan is shown in Figure 3.3. The 70 km section from Khaf to the border is already in place and work on the 62 km section from the border to Ghurian will soon commence.

Construction of the next section of 82 km from Ghurian to Herat is a commitment of the Afghanistan government.

*This cross-border railway will be of importance for two reasons: it will be a component of an eventual standard gauge rail corridor linking southwestern China, Kyrgyzstan and Tajikistan via northern Afghanistan and Iran to Europe, and it will enable the large scale extraction of mineral ores from Hafq, Afghanistan and their export by rail through Bandar Abbas.*

![Border crossing railway, Torbat-e-Heydariyeh (Islamic Republic of Iran) to Herat (Afghanistan), via Khaf and Ghurian](image)

Source: ECO

**Figure 3.3:** Border crossing railway, Torbat-e-Heydariyeh (Islamic Republic of Iran) to Herat (Afghanistan), via Khaf and Ghurian

Herat has been nominated as the site of 2 dry ports under the Intergovernmental Agreement (Islam Qala and Turghundi), while Mazar-e-Sharif (located on the proposed standard gauge line across northern Afghanistan) has been nominate as the site of another, at Heratan).

Another priority site nominated for the construction of a dry port in the Islamic Republic of Iran, Motohari (south of Mashhad) can be expected to generate cargo volume to/from Afghanistan via the new border crossing line.
3.3 Required improvements to highway infrastructure connected to dry ports

**Tajikistan**

The Asian Highway network is connected to the dry ports of all five countries reviewed in this study, however is possibly of greatest relevance to Tajikistan which owing to its under-developed railway network, relies heavily on trucking for the movement of its international trade. Indeed, Tajikistan does not yet have any full-scale dry ports, although these are under planning, but its 5 of its 10 border trucking terminals (see sub-section 2.3 E above) are, or will be, connected to the Asian Highway network, which is shown in Figure 3.4.

![Asian Highway Routes in Tajikistan](image)

**Figure 3.4: Asian Highway network in Tajikistan**

As shown in Figure 3.4, three Asian Highway routes pass through Tajikistan, these being AH 7, 65 and 66. The map clearly shows that Tajikistan’s central location gives it potential importance as a conduit for transit trade. AH 65 and AH 66 form part of a road corridor connecting Kyrgyzstan and China with the Port of Bandar Abbas in the Islamic Republic of Iran, while AH 7 connects Kazakhstan and Uzbekistan with Afghanistan through Tajikistan. However, continuing disputes, especially with Uzbekistan, have effectively restricted Tajikistan’s transit role.

The condition of the Asian Highway in Tajikistan varies considerably from route to route. Owing to the extremes of climate and topography, truck operators encounter most difficulty with AH 66. The border crossing to China at Kulma Pass lies at an altitude of 4,363 metres (14,313 feet) and in winter experiences temperatures down to –40 degrees C. Although China and Tajikistan have reached agreement on the year round opening of the border crossing, in practice it is only open for six months between May and November and then only on a limited number of days. A Chinese company is currently rebuilding the highway from the border to Murghab over the Kulma Pass. In the Dushanbe-
Kulyab section of AH 66, a new highway with long tunnels was recently constructed to shorten truck journeys through the Pamir mountains.

Major works have been completed on AH 7 between Dushanbe and Khujand, including the construction of two tunnels through the Shakhristan Pass, to keep the road open year round.

The condition of the AH 65 between Dushanbe and the Tursunzade border with Uzbekistan has recently been improved with the progressive construction along much of the route of a dual carriageway of 4 lanes.

Reconstruction of a 75 km stretch of Asian Highway 7 between Kurgon-Tyube and the Nizhny Pyandzh border crossing with Afghanistan was completed in 2013 with grant aid from Japan at a cost of US$ 53.4 million. The two-lane highway in this section is now of a high standard, with wide shoulders. Between Dushanbe and Kurgon Tyube (113 km), the highway surface shows signs of substantial damage and is understood to have priority for reconstruction under the ADB CAREC program, starting in 2018.

The distance between Bandar Abbas and Dushanbe, via the Asian Highway network through
Iran, Afghanistan and Tajikistan, was reported as 2,580 km. By comparison, the shortest rail distance via Turkmenistan and Uzbekistan is approximately 2,800.

Road delivery times are only 25-30 per cent of rail delivery time (road 4-5 days and rail 15-20 days from Bandar Abbas), but consignees pay something of a premium for road delivery of their consignments, with road haulage charges being about 2.5-3 times those of rail, as shown in Table 3.1.

### Table 3.1: Road and rail distances and charges for container haulage, Bandar Abbas-Dushanbe

<table>
<thead>
<tr>
<th>Mode</th>
<th>Distance (Km)</th>
<th>Charge per TEU (US$)</th>
<th>Rate per TEU-km (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road (via Turkmenistan and Uzbekistan)</td>
<td>3,500</td>
<td>6,500-7,000</td>
<td>1.86-2.00</td>
</tr>
<tr>
<td>Rail</td>
<td>2,800</td>
<td>2,000</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Source: Information provided at a meeting with Tajikvnestrans (TVT) in Dushanbe, 31 January 2017

3.4 Required improvements to railway infrastructure connected to dry ports

Railway connections to dry ports are of particular relevance Bangladesh and the Islamic Republic of Iran. In Bangladesh, a rail-served ICD in Dhaka is connected to Chittagong Port by rail and in the Islamic Republic of Iran 9 priority locations for the construction of dry ports, all of them rail connected, have been identified and are under review.

(i) Bangladesh

Only 3 per cent of the container throughput volume of Chittagong Port, or about 69,000 TEU per year, is currently moved inland by rail, as compared with 67 percent by road (in break-bulk form). As observed earlier, the past policy of the port authority to relieve congestion inside the port by outsourcing container stuffing and unstuffing to off-dock terminals in the near vicinity was responsible for congesting the Chittagong to Dhaka Highway (Asian Highway 41) with breakbulk truck traffic. Although an increase to 10% in the rail share of land traffic entering and leaving the port is an objective of the port’s Strategic Master Plan, it seems unlikely that this can be achieved in the short term.

An increase in the daily train capacity of the metre gauge Dhaka-Chittagong line (part of the Trans Asian Railway) is being achieved through its progressive double tracking. Double tracking of all line sections from Dhaka to Chittagong is now complete, with the exception of the 72 km section between Akhaura and Laksam. Work on this section is underway and is expected to be complete by December 2018. Apart from the construction of a new metre gauge line beside the existing line, the project involves upgrading of the existing line, construction of 46 bridges and 11 stations and installation of computerized signalling. The total capital cost is estimated at US$ 680 million, 75 per cent of which is being financed by the ADB and 25 per cent by the European Investment Bank.  

Track doubling will effectively double the number of trains per day which can be run in this section from 26 to 52 pairs. Significantly, track doubling will increase the number of container trains which can be run in the section, from 3 pairs per day currently to 5-6 in future. However, the container haulage volume which is possible even at the current capacity level of 3 pairs of trains per day will

---

exceed the annual container handling capacity of the rail served Dhaka ICD (116,000 TEU vs. 100,000 TEU). Resolution of the problem of terminal capacity shortage in Dhaka is therefore a matter of priority and is becoming increasingly urgent.

The annual handling capacity of the Kalamapur ICD in Dhaka cannot be increased much beyond 100,000 TEU, owing to the inability to expand this facility within the heavily congested urban environment in which it is located. A new rail served ICD proposed for construction at Dhirasram, north of Dhaka, will have an initial capacity of 354,000 TEU which will be increased progressively to an ultimate capacity of 860,000 TEU.18

Unfortunately, there has recently been little progress towards implementation of the Dhirasram ICD project and World Bank funding for this project has now been withdrawn.

(ii) Islamic Republic of Iran

Upgrading of route capacity on two Trans Asian Railway links will have a major impact on container haulage by rail between Shahid Rajaee Port and proposed dry ports to the south and west of Tehran, and between this port and Central Asia.

The two links are:

- Bandar Abbas (Shahid Rajaee Port) – Aprin Terminal (southwest of Tehran); and
- Bandar Abbas (Shahid Rajaee Port) – Sarakhs (border with Turkmenistan)

The route distance from Bandar Abbas (Shahid Rajaee Port) to Aprin Terminal is approximately 1,400 km. The route runs through Qom and Yadz (please refer to the railway route map in Figure 3.5). The running time for freight trains on this route is 3 days, reflecting an average speed of only 19.4 km per hour. Operational priority given to passenger trains and the fact that 645 km of the overall route distance is still single tracked largely explains why freight train speeds are so low.

*It is expected that the single track between Qom and Bafq (564 km) will be double tracked within 2 years, while double tracking work is in progress on the last 81 km section, between Fin and Bandar Abbas.*

The route distance from Bandar Abbas (Shahid Rajaee Port) to Sarakhs Station is about 1,550 km, of which 783 km (i.e. more than half) is single track. The running time of freight trains on this route is about 53 hours, suggesting that freight train speeds average about 31 km per hour.

An improved train running performance will in part depend on the double tracking of the existing 783 single track section north of Bafq (between Kashmar on the double tracked Mashhad-Tehran mainline and Bafq).

RAI has plans to double track this section with private financing and also to transfer responsibility for maintenance of the first line to a private concessionaire. The impending completion of a rail link to

---

Afghanistan might be expected to attract mineral ore traffic from Hafq in Afghanistan to run to Bandar Abbas which could easily saturate the capacity of the single track section.

![Map of Iran](image)

**Figure 3.5: Upgrading of single track TAR links, Islamic Republic of Iran**

4. **Technical standards for dry ports**

4.1 **Minimum requirements for services and facilities**

It is not necessary for dry ports to have identical design standards in order for them to function effectively as inter-connected components of a regional network, but it is essential that they satisfy certain minimum requirements as to the basic types of facilities and services they provide.

The basic services to be provided by dry ports can be identified as:

- Handling, consolidation, storage and modal transfer of containers and cargo;
- Customs and other border control inspection and clearance of international cargo.

Effective provision of these services will require the following infrastructure:

- A fenced, customs secure area with a limited number of entry/exit points;
- A container yard (CY) which can receive and despatch containers by road and rail, as well as store containers;
- A container freight station (CFS) in which containers can be loaded and discharged
- A customs inspection area where cargo may be discharged for inspection
- A bonded warehouse for storage of under bond cargo
- A two or more level administration building accommodating dry port management, offices for customs inspectors, offices for freight forwarders and cargo agents, offices for banking or financial service providers, and staff amenities (restaurant, etc.)
4.2 Principles and standards for the design of dry ports

The area of the dry port will largely be determined by the type and volume of cargo expected to be handled in future, as well as by the type of handling system to be employed. It will also be determined by the length and number of railway tracks to be accommodated within its boundaries.

It is envisaged that the dry ports forming the regional network will primarily be designed to handle containers. However, in some cases it may be considered necessary for them also to handle other forms of unitized cargo, such as coiled or bundled steel, in which case separate handling facilities must be provided. The following principles and standards are recommended for design of each of the dry port components.

(i) Road and rail accesses

The road connection to the dry port will be via slip roads off the local or national highway system.

The railway connection will be via a short access line (single or double track) linking the dry port to the nearest mainline.

In most cases these connections will be provided by the responsible infrastructure authorities (highway agencies or railway organizations), either independently or as part of a contract governing the financing of the dry port development project.

(ii) Customs security

The whole of the dry port will be a customs secure area and will need to be fenced in accordance with local Customs Agency regulations. Where there is to be provision for handling other types of cargo in addition to containers, the working areas and security accesses or gates for each need to be segregated.

(iii) Railway loading/unloading facilities

Dry ports must be provided with a centrally located railway yard which would allow the receipt and dispatch of full length unit trains running between a single origin and a single destination, without being broken up or re-marshalled.

The railway yard would comprise a minimum of two tracks in which full length trains would be loaded and unloaded, plus a third track to allow for the release and re-positioning of locomotives. The actual number of loading/unloading tracks to be provided would depend on forecast traffic volumes.

The layout of the railway yard and its position in relation to the CY could be as shown in Figure 4.1. This figure illustrates the layout which would apply to a diesel hauled train. In a limited number of cases where electric traction is employed, it will be necessary to construct reversing tracks outside of the dry port boundary to allow electric locomotives to re-position to the end of the train and push it into the loading/unloading sidings inside the dry port. This is necessary to avoid interference of the electrical catenary with high-rise container handling equipment operating inside the terminal.

The design of the yard should be such that containers can be loaded/unloaded to/from wagons and extracted from or placed in stacks arranged along the length of the train by reach-stackers working on
both sides of the tracks. If a portal crane system is used for container handling, cranes will need to run up and down the length of the train on rails or rubber tyres as the case may be.

The length of the loading/unloading tracks should be sufficient to accommodate at least one locomotive and the maximum number of wagons comprising a container train.

In the case illustrated, the train length was calculated as follows:

- Composition of longest trains to be expected is: 1 x 3,500 HP diesel-electric locomotive plus 40 container flat wagons
- Length (over coupler faces) of individual vehicles is: 3,500 HP locomotive, 22 metres; container flat wagon, 14.45 metres.
- Total length of longest train is calculated at: 1 x 22 metres + 40 x 14.45 metres = 600 metres. With a 10% allowance for braking distance, the total length required in loading/unloading tracks is 660 metres.

Except for two lengths of track containing points and crossings (or track switches) at either end of the yard, which will be blasted, loading/unloading tracks should be embedded in the pavement to allow for ease of reach-stacker working.

The design axle load in the rail yard should be compatible with that of the mainline. In the case of metre gauge railways, this is typically 20 tonnes per axle and for wider gauges, it is generally in the range of 22.5 – 25 tonnes. Even at the lower level, the axle load is sufficient to accept heavy locomotives and wagons carrying two fully loaded 20ft containers or a single fully loaded 40 ft container.

(iv) Container yard (CY) layout, capacity, and pavement design

The layout of the CY will depend to a large extent on the type of handling system employed, which in turn will depend on the expected volume of containers to be handled. Generally, the choice is between a reach-stacker system which of necessity is more area intensive and a portal crane system, such as a rail mounted gantry (RMG) or a rubber tyred gantry (RTG), system which can accomodate denser stacking of containers and is therefore less area intensive. Three different types of container handling equipment are pictured below.

Rubber-tyred gantry crane

Reach-stacker
In general, the reach-stacker system can cope economically with CY throughputs of up to about 200,000 TEU per year, beyond which application of the portal crane system may be economically justified. It was noted that the design of the dry port being planned for Aprin, southwest of Tehran, incorporates an RMG system, with a projected throughput of 360,000 TEU. By contrast, the Lard Krabang ICD east of Bangkok employs a reach-stacker system and was achieving a throughput of nearly 465,000 rail-hauled TEU in 2014, but is considered to be struggling at this level. The capital costs of the two systems are widely different: in Asia, the most expensive reach-stackers cost in the vicinity of US$ 800,000 each, while it has been estimated that the cost of RTGs and RMGs are respectively about US$ 1.6 million and US$ 2.6 million per unit.

Figure 4.1 illustrates the case of a rail-served CY equipped with reach-stackers. In this case reach-stackers will work simultaneously on both sides of the tracks, so that the CY will be separated into two paved areas, one each on either side of the tracks. In each section, container stacks will be arranged along the train working length in blocks of 4 TEU wide and 3 TEU deep each separated by a width of 13 metres to allow for the turning circle of a reach-stacker.

The paved area requirement of the CY may be calculated as shown in Table 4.1.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Length worked by reachstackers (metres)</td>
<td>600</td>
<td>Train length</td>
</tr>
<tr>
<td>2</td>
<td>Width of cont. stack - 4 TEU (metres)</td>
<td>24.4</td>
<td>4 TEU x 6.1 m</td>
</tr>
<tr>
<td>3</td>
<td>Depth of cont. stack - 3 TEU+3 (metres)</td>
<td>14.628</td>
<td>3 TEU plus allowance of 3 x 2.438 m</td>
</tr>
<tr>
<td>4</td>
<td>Reachstacker lane width (metres)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>No. stacks available along railway track</td>
<td>17</td>
<td>$(1) / ((2) + (4))$</td>
</tr>
<tr>
<td>6</td>
<td>Area of CY each side of tracks (Sq. metres)</td>
<td>8,777</td>
<td>$(1) \times (3)$</td>
</tr>
<tr>
<td>7</td>
<td>Paved area (total), Sq. metres</td>
<td>17,554</td>
<td>$(8) \times 2$</td>
</tr>
<tr>
<td>8</td>
<td>Groundslot capacity of CY (TEU)</td>
<td>406</td>
<td>$(5) \times 4 \times 3 \times 2$</td>
</tr>
<tr>
<td>9</td>
<td>Stacking height average (No.)</td>
<td>3.50</td>
<td>Assumed loaded 3 and empty 5 high</td>
</tr>
<tr>
<td>10</td>
<td>CY storage capacity (TEU)</td>
<td>1,428</td>
<td>$(8) \times (9)$</td>
</tr>
</tbody>
</table>

---

19 Information provided during visit of UNESCAP team to Aprin on 13 February 2017.
Railway Yard (Tracks 1 and 3 for loading/unloading; Track 2 for engine escape)

Standing length between points = 660 metres (1 DE loco+40 flat wagons)

Figure 4.1: Broad layout plan for a dry port (reach-stacker equipped)
For reasons of cost, the CY pavement may be of flexible construction (e.g. interlocking paving blocks), but must be designed to withstand the maximum axle load of a reach-stacker lifting up to 45 tonnes, i.e. about 100 tonnes, or 25 tonnes per wheel.

Based on the calculation of storage capacity in Table 4.1, the annual throughput of the dry port will range from 103,000 to 171,000 TEU, depending on the average container dwell time which can be expected in the CY (possibly ranging from 3-5 days). If the target is 100,000 TEU per year, then the dwell time can be no more than 5 days. By comparison, 2 trains in and 2 trains out per day would be required to support a throughput of 100,000 TEU per year, assuming 360 operating days per year. For a throughput of 171,000 TEU per year, the number of trains would have to increase to 3 in and 3 out per day.

If an RTG or RMG lifting system is adopted in the CY, then the container stacks may be arranged more densely along the loading/unloading length. In this case however, the cranes would need to straddle the container stack, the road and the railway tracks.

The CY should be equipped with empty handlers or top-lifters which can lift empty containers more economically than can reach-stackers, as well as with prime-movers and yard trailers to transfer containers to or from the CFS and customs inspection area.

(v) **Provision for truck circulation within the dry port**

The width of internal roads within the dry port should be about 15 metres to allow for reach-stackers and trucks to pass safely. It should be possible for trucks to circulate unimpeded throughout most of the dry port area, except at the intersection with the rail access line, which would need to be protected by automatic level crossing barriers and warning devices.

Internal road pavements should be designed for the axle loads applicable to the local highway system, since the permissible axle load limits for trucks delivering break-bulk cargo between shippers’ or consignees’ premises and the dry port would have to meet these requirements.

(vi) **Design principles for the Container Freight Station (CFS)**

The CFS will undertake the packing and un-packing of containers moved to and from the CY. This will not include all containers handled in the CY, however, as some containers will be moved outside of the dry port for packing and un-packing at shipper/consignee premises.

The area required for the CFS may be calculated on the basis of some proportion of the loaded import and loaded export containers in the CY moving through the CFS. If it is assumed that: this proportion is 40%, the throughput of loaded containers is 75,000 TEU per year, the traffic peaking factor is 1.12, the average floor area occupied by one TEU is 30 square metres and the allowance for circulation of forklifts, etc. is 30%, then the area requirement for the CFS will be:

- Estimate of daily cargo volume for packing/unpacking = \((75,000 \text{ TEU} \times 40\%)/360\) days \(\times 1.12 = 233\) TEU
- Estimate of CFS area requirement = \(233\) TEU \(\times 30\) sq.metres \(\times\) circulation allowance \(1.3 = 9,100\) sq. metres

---

The CFS should be designed with container bays facing on to a raised loading/unloading platform on one side and truck loading/unloading bays on the other. Containers will be packed and unpacked by forklift trucks while still on their trailers. Similarly, break-bulk trucks will be loaded and unloaded from a raised platform by smaller forklifts.

The CFS will need to be equipped with various combinations of 2.5, 3.0 and 5.0 tonne forklifts.

(vii) Other building area requirements

Determination of requirements for other buildings such as the Administration, the Bonded Warehouse and the Customs Inspection facility will require consultation with local Customs staff as well as with freight forwarders and other service providers.

(viii) Terminal management IT system

It will be essential that the entry, exit and placement into storage of containers and cargo be tracked by a real time computer system, such that it will be possible to locate any container or cargo consignment from the time of its departure from a seaport, or from a shipper’s premises, until its arrival in the dry port and placement into storage.

In addition, a computerized yard control system should be used to determine with precision where a container is to be placed in the stack.

5. Coding of dry ports of international importance

5.1 Reasons for coding

The United Nations Code for Trade and Transport Locations, or UN/LOCODE, was developed as a collaborative effort by several United Nations organizations in the 1980s to provide a method for uniquely identifying locations, such as airports, seaports, and inland freight terminals, which handle international trade.

As set out in UNECE Trade Facilitation Recommendation No. 16:

The identification of a particular location is frequently required in information interchange in international trade and transport, to direct the movement of goods e.g. in addresses, in shipping marks and in data elements identifying ports of call, ports or places of loading and unloading, ports or places of transhipment and destination, etc. 21

Through the adoption of international port codes, electronic links can be established between dry ports in the regional network. This will be of considerable benefit in facilitating trade and the electronic exchange of documents between dry ports located in different countries.

5.2 System and scope of coding

The need to remove ambiguity in the identification of such locations, particularly in the electronic exchange of trade and transport information, was answered with the development of a five character location code. The first 2 alpha characters of this code, indicating the country in which the place is located, are followed by 3 alpha characters to indicate the specific location. As an example, the code TH LKR identifies the Lard Krabang Inland Container Depot in Thailand.

UN/LOCODES are managed, maintained and updated by the UNECE Secretariat. The codes are maintained as a relational database, and may be updated on request from users. The codes are available to all interested users on the website www.unece.org/cefact/locode.

In addition to the five character code, the website provides additional coded information relating to the:

- administrative sub-division of the country in which the place is located;
- function of the location (e.g. port terminal, rail terminal, road terminal, airport, etc.), as shown in the list in Table 5.1 below;
- status of the code entry (e.g. whether and by whom approved, under consideration, etc.);
- last date when the code was entered or updated; and
- geographical co-ordinates (latitude and longitude) of the location.

The code listed for a road terminal located in Thimpu, Bhutan is as follows:

<table>
<thead>
<tr>
<th>UN/LOCODE</th>
<th>Admin. Sub-division</th>
<th>Function</th>
<th>Status RL</th>
<th>Geographical Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT THI</td>
<td>Thimpu 15</td>
<td>R</td>
<td>3 = Recognized</td>
<td>2728N 08938E</td>
</tr>
</tbody>
</table>

**Table 5.1: Codes indicating a location’s function**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>A value &quot;0&quot; in the first position specifies that the functional use of a location is not known and is to be specified.</td>
</tr>
<tr>
<td>1</td>
<td>Specifies that the location is a Port, as defined in UN/ECE Recommendation 16.</td>
</tr>
<tr>
<td>2</td>
<td>Specifies that the location is a Rail terminal.</td>
</tr>
<tr>
<td>3</td>
<td>Specifies that the location is a Road terminal.</td>
</tr>
<tr>
<td>4</td>
<td>Specifies that the location is an Airport.</td>
</tr>
<tr>
<td>5</td>
<td>Specifies that the location is a Postal exchange office.</td>
</tr>
<tr>
<td>6</td>
<td>Value reserved for multimodal functions, ICDs etc.</td>
</tr>
<tr>
<td>7</td>
<td>Value reserved for fixed transport functions (e.g. oil platform).</td>
</tr>
<tr>
<td>B</td>
<td>Specifies that the location is Border crossing.</td>
</tr>
</tbody>
</table>

Source: Contents and layout of UN/LOCODE: Codes and abbreviations used.

It appears that very few dry ports in the UNESCAP region have applied for a UN/LOCODE.

Two exceptions discovered during the missions of the UNESCAP team are the Cikarang Dry Port at Jababeka, Indonesia and the Lat Krabang ICD, Thailand. Both locations are identified by locodes. Cargo is moving between these locations via Laem Chabang and Tanjung Priok ports, but with
minimal formalities applied in the ports. Every consignment moving between these locations is accompanied by a Multimodal Transport document which specifies delivery to the relevant location, identified by its UN/Locode.

It is strongly recommended that all dry ports which have not yet applied for a locode, should do so. There is a procedure for interested parties to register new locations on-line, details of which are available on the UNECE website (see above).

6. **Incorporation of dry ports into transport documents and legal instruments**

The objective in this instance will be to ensure that all dry ports covered in the Intergovernmental Agreement are given legal status by being incorporated into transport documents and legal instruments governing transport across international borders.

6.1 **Key goal related to international cargo transport**

This goal is to permit uninterrupted cross-border movement between dry ports of cargo carried by land and multimodal transport modes. Achievement of the goal will mean that cargo can be consigned from a dry port in one country to a dry port in another without significant interruption to its passage through maritime or land borders.

Realism dictates that some basic security procedures need to be undertaken when cargo crosses borders, but these procedures should be limited to a quick cross-check of transport documents against the cargo manifest, with all border formalities being completed within the dry ports themselves. It is considered that providing dry ports with coverage under the relevant international transport agreements and conventions (as is already the case with sea, road and rail modes) will provide international transport between dry ports with legal status.

6.2 **Recommendations for modification of transport documents and legal instruments**

Modification of transport documents and related legal instruments may be needed to allow for dry ports to be specified as cargo origins and destinations in international trade.

In some cases, transport documents may not require modification. For example, Multimodal documents, such as the FIATA (Federation of International Freight Forwarder Associations) Multimodal Transport Bill of Lading, already allow for dry ports to be specified as cargo origins and destinations. The UNESCAP study team were advised, during a visit to the Cikarang Dry Port in Indonesia, that a Multimodal Transport Bill of Lading is used for all cargo consignments to and from that dry port.
As shown in Figure 6.1, the Cikarang Dry Port is shown on the Multimodal Bill of Lading as the place of delivery in the case of imports and as the place of receipt in the case of exports. In both cases, the dry port is identified by its UN/LOCODE.

International transport conventions are legal instruments which set out the conditions under which cargo consignments are transported across borders, including the obligations and rights of shippers/consignors, carriers and consignees. In essence, they provide the basis for contracts of carriage between shippers (or cargo owners) and carriers (or transport operators).

Transport documents which are associated with, or are specified by, these conventions indicate that cargo consignments are being transported in compliance with the conditions set out in the conventions. In some cases, conditions of carriage are repeated on the reverse side of the document.

The legal instrument which sets out the terms and conditions of carriage embodied in the FIATA Multimodal Transport documents is the *UNCTAD/ICC Rules for Multimodal Transport Documents (1992).* It is possible that this instrument may need modification to specify dry ports as cargo origins and destinations in international trade, despite the related transport documents having already been adapted for this purpose.

UNESCAP is proposing to commence within the Northeast and Central Asia a pilot test of a new single multimodal transport document, incorporating the information requirements of all transport modes, including those of rail which have so far not been covered in existing multimodal transport documents.
documents. It will be desirable to ensure that the document to be used for the pilot test is suitably adapted for the inclusion of dry ports.

7. Proposed arrangements for customs clearance at dry ports

7.1 Action needed for all dry ports to have full border clearance authority and facilities

By definition, dry ports must be able to offer the full range of functions (customs, quarantine and health) for the border clearance of international cargo. As observed in Section 6, effective interoperability of dry ports within a regional network will require that they have the facilities and full authority to clear international cargo and that intermediate border checks be kept to the minimum necessary for border security.

This will mean that desirably border inspection staff should be based permanently at dry ports, or alternatively that staff will be available on demand to undertake inspections there. In the case of most countries visited by the UNESCAP study team, dry ports which are in operation are permanently staffed by customs inspectors.

In Bangladesh, for example, customs inspectors are permanently assigned to the rail-served Dhaka ICD, as well as to the IWT-served Pangaon ICD near Dhaka, and individually to no fewer than 16 “off dock” terminals operating in close proximity to Chittagong Port. Similarly, in Indonesia, the Cikarang Dry Port has its own customs inspection staff to supervise clearance of import cargo at the dry port, while all truck terminals in operation in Tajikistan have their own customs inspectors. By contrast, while the Pheuntsholing border post in Bhutan is fully staffed by customs inspectors to supervise clearance of import cargo arriving by road from India, clearance of most import cargo arriving by sea is undertaken in Kolkata Port.

In the Islamic Republic of Iran, no dry ports are yet in operation and all cargo, whether import or transit, is cleared either in the main Shahid Rajaee Port or at the land border posts, of which Sarakhs is the major one. A senior official of the Iranian Customs Administration whom the UNESCAP team met in Mashhad, indicated that local customs staff do undertake inspections on demand at the larger factories in the area, provided they have facilities meeting Customs Administration requirements.

7.2 Actions to establish the single window and advanced information systems in dry ports

The single window concept involves the integration of all border control activities (customs, quarantine, health) and documentation in a single office within each seaport, airport, border post or dry port. Adoption of the single window concept is considered essential to eliminate duplication of procedures and staff, as well as to reduce the volume of document processing, in dry ports.

Of the five countries visited by the UNESCAP team, only one, Indonesia, appears to have made significant progress with the introduction of the single window concept, having introduced it in 2008. This concept has been adopted in Tanjung Priok Port, as well as in the Cikarang Dry Port. Although different government agencies are responsible for different border control functions (e.g. Customs for customs control, Agriculture and Fisheries for quarantine, etc.), they have simplified and integrated their functions and documentation within a single office at each cargo clearance site. The UNESCAP study team was advised that 18 separate ministries in Indonesia are involved in export-import related activities, so that the introduction of a well-functioning single window system was a substantial achievement.

Indonesian Customs have adopted a system of cargo pre-clearance (72 hours before vessel arrival in port), together with a risk assessment system backed up by on-line customer profile information on all
shippers and consignees. At Cikarang Dry Port only 5 per cent of import consignments are inspected by Customs, because consignees (mostly manufacturers and logistics suppliers who are regular users) are determined to be low risk.

Risk assessment is also understood to be applied in Bangladesh and the Islamic Republic of Iran.

7.3 **Regulations governing clearance of transit cargoes in destination dry ports**

As observed earlier, efficient movement of international cargo between dry ports of different countries will require that delays at intermediate borders (whether maritime or land) be minimized. To ensure this result, border checks of transit cargo should be limited to a quick cross-check of transport documents against the cargo manifest and all clearance procedures should be undertaken at the destination dry port. Where necessary, customs regulations should be amended accordingly.

8. **Policy measures, legislation and solutions for planning dry port development**

8.1 **Need for a coordinated approach to planning and development of dry ports**

In most of the five countries visited by the ESCAP study team, as well as in several others visited during the course of other studies, an absence of coordination of the activities of various government agencies involved in planning and development of dry ports was apparent.

In Bangladesh, co-ordinating authority in theory resides in a single agency, the Ministry of Shipping, which supervises other agencies involved in the development of inland ports, such as the Chittagong Port Authority, Bangladesh Inland Ports Authority and the Bangladesh Inland Waterway Transport Authority. Despite this centralization of coordinating authority, uncoordinated decisions by the Chittagong Port Authority with the aim of easing congestion in the port resulted in the establishment of numerous container terminals just outside the port and the saturation of the Chittagong-Dhaka Highway with breakbulk truck traffic. At the same time, plans by the Ministry to supplement the capacity of the one rail-served dry port in Bangladesh with another larger rail-served facility to the north of Dhaka have, after several years, failed to come to fruition and, after the withdrawal of World Bank support for the project, now lack a funding commitment.

In the Islamic Republic of Iran, there are encouraging signs that planning permissions for dry port development as well as for the development of infrastructure connections to dry ports are being effectively co-ordinated by a multi-agency committee set up under the Ministry of Roads and Urban Development. The committee was established to coordinate the development of a network of dry ports in Iran. There is representation on the committee from the following organizations:

- Iranian Port and Maritime Organization
- Railways of the Islamic Republic of Iran (RAI)
- Islamic Republic of Iran Customs Administration
- Civil Aviation Organization of the Islamic Republic of Iran
- Management and Planning Organization of Iran
- Iran Chamber of Commerce, Industries, Mines and Agriculture

The chairperson of the committee is the President of RAI who is also Vice-President of the Ministry of Roads and Urban Development.
This committee has been commissioning consultant studies of proposals for dry port development at some 9 priority locations as well as at 15 other locations of lesser priority.

A similar approach, involving an inter-ministerial committee, was found to be achieving some success in India, which was visited during the course of an earlier study.

In Tajikistan, the Ministry of Transport appears to have an overview of planning for the development of dry ports, but the country lacks a comprehensive master plan focused on dry ports, of which none so far exists. Instead trucking terminals are being established with purely private investment along the Tajikistan borders.

Private sector investment also dominates dry port development in Indonesia and in Australia, which was visited in the course of an earlier study. In neither country does there appear to be any effective overall coordinating authority, nor any evidence of a comprehensive planning effort on the part of the relevant government agencies.

It is a recommendation of this study that responsibility for coordination of planning activities for dry port development should be assigned to an inter-agency committee, under the authority of a single transport ministry and with representation from all agencies with a regulatory interest and involvement in dry port development and operation.

8.2 Measures to assist the viability and sustainability of dry ports

Dry port planning committees of the type described above can usefully identify and assess several measures to assist the establishment, financial viability and long term sustainability of dry port projects, including:

(i) Taxation and other financial incentives

There was little evidence in the countries visited that financial incentives, such as tax holidays or waivers, land rent concessions or concessional public utility charges, were widely applied, in order to ensure the financial viability of dry ports, especially during the establishment period.

(ii) Priority development of transport infrastructure connecting to dry ports

The Ministry of Roads and Urban Development of the Islamic Republic of Iran has specified that all new dry port developments are to be rail connected and will provide financial incentives to encourage construction of new access lines. The government will contribute, depending on distance, 20-80% of the cost of constructing new access lines to connect private factories, warehouses and other logistics facilities. In the case of state owned companies, the government will cover 100% of the cost of new line construction.

(iii) Incorporation of dry ports in export processing or other free trade zones

Special Economic Zones (or export processing zones) have been established in some of the border areas of the Islamic Republic of Iran, such as Sarakhs, and there are plans to develop SEZs in the border areas of Tajikistan, especially at Nizhny Pyandzh on the border with Afghanistan. To the
extent that they can generate substantial trade volumes to be handled in a dry port, SEZs represent a worthwhile economic investment. Indeed, they very often provide the only justification for constructing dry ports in border areas.

(iv) Regulatory measures to encourage sustainable transport connections to dry ports

It is the stated objective of the governments of many member states to encourage through their transport policies a modal shift towards environmentally sustainable transport. In line with this objective, it is desirable that governments should take measures to encourage sustainable transport connections to dry ports. To the extent that the economics of rail transport will favour its use for the long haul transport of containers and cargo between seaports and dry ports, this will be something of a natural progression. However, there are cases throughout the region where the diversion of cargo from road to rail may require the application of regulatory measures, such as the enforcement of more stringent restrictions on truck weights and dimensions.

In a sense, application of a sustainable transport policy will need to move in an opposite direction to the transport policies introduced in some countries of the region. For example, in Australia truck length and weight restrictions were relaxed some years ago to allow high capacity “B-Double” and “Super B-Double” units\(^\text{22}\) to enter the Ports of Melbourne and Sydney. Their dramatically reduced unit operating costs enabled them to replace rail for line-haul transport of containers between the seaports and some inland terminals, but their use rapidly proliferated to the Sydney-Melbourne highway. They now dominate inter-capital freight traffic between these two cities and are likely to have been responsible for the diversion of cargo from rail served inland terminals along this highway. There is now recognition that this major shift in transport policy may not have been in the public interest (owing to the increased rate of road accidents and increased road congestion in the vicinity of the ports). As a result, the present Victorian State Government has authorized the resumption of planning for rail container shuttle services to be accommodated within the Port of Melbourne.

In Tajikistan, the study team was informed that Chinese made trailer trucks with a maximum length of 24 metres are now permitted to operate on Asian Highway 66 through Kulma Pass on the border with China. One such truck was seen in the TVT terminal in Dushanbe (see picture below). It was claimed that such vehicles are subjected to rigorous safety inspections, but it must be questioned whether their continued operation on mountain roads is consistent with good road safety standards.

\(^\text{22}\) “B-Doubles” are of two main types: a B-Double with a maximum trailing length of 18 metres and a container carrying capacity of 3 TEU and a “Super B-Double” with a maximum trailing length of 24 metres and a container carrying capacity of 4 TEU
9. **Practical options for financing development and operation of dry ports**

This section contains an assessment of the advantages and disadvantages of all practical options for financing the development and operation of dry ports, with reference as applicable to the experience of countries in the region.

9.1 **Option 1**: Financing by public sector and outsourcing of operation through a management contract with the private sector.

Under this option, all of the risk associated with the construction and operation of the dry port is assumed by the public sector, which provides finance for the purchase of land, the infrastructure of the dry port and for the purchase of all handling equipment. Its advantage is that it would be attractive to highly skilled potential private operators whose participation would be risk free. Its disadvantage is that the public sector would have to raise capital for the project (which might be difficult in a tight credit situation), cover any debt, and assume all of the associated risk.

It is understood that this option is being assessed for application to the “Mini Dry Port” project in Phuentsholing, Bhutan. As the capital cost for this project is likely to be relatively small (US$ 2.5 million) and the demand for the dry port’s services practically guaranteed, the Bhutanese government’s risk exposure is likely to be manageable.

9.2 **Option 2**: Private sector financing and operation

Under this option, all capital costs associated with the purchase of land, construction of a dry port’s infrastructure and with the purchase of its container and cargo handling equipment will be financed by a private sector developer who will also manage the operation. The Cikarang Dry Port is an example
of a wholly private sector financed and operated facility. As with Option 1, all of the risk under this option would be assumed by the developer. Depending upon the magnitude of the investment and the strength of demand for the dry port’s services, a project may be considered too risky by potential private developers.

9.3 **Option 3: Public Private Partnership (PPP) variants**

Public Private Partnership (PPP) concepts have recently been applied widely throughout the region to transport infrastructure projects, such as highways and seaports – applications where the level (and stability) of demand is guaranteed. PPP is seen to offer an opportunity for governments to reduce the burden on national budgets, by attracting private investments for expensive infrastructure projects and at the same time to introduce private sector expertise to the management and operation of these projects.

There are at present no examples within the region of existing dry ports which have been developed under a PPP scheme, with the possible exception of the Lat Krabang ICD in Thailand. There may be several different reasons for this, but the principal one is that potential private participants may assess an investment in dry port projects to be too risky, given uncertainty about the level and stability of demand in certain localities and, in some cases, even uncertainty about the strength of competition from other dry ports.

Nevertheless, PPP schemes are currently being assessed for application to new dry port development projects throughout the region.

There are several variants of a Public Private Partnership (PPP). No existing dry ports in the region have been financed through PPP schemes, although some in planning are proposed for delivery under PPP contracts. Two of the more commonly encountered PPP variants are considered here.

**(i) Public ownership of land/private financing of infrastructure and operating assets/private management and operation of dry port**

This option involves minimal risk exposure of the private sector partner, but heavy exposure of the private sector partner.

The expansive **Moorebank Intermodal Terminal project in southwestern Sydney, Australia** is an example of a project being developed under this option. This terminal which will have an ultimate throughput capacity of 1.7 million TEU, is estimated to cost A$ 1.83 million of which the public sector contribution will be A$ 320 million (17.5%). The land package for the project will be delivered by the public sector partner and all other investments will be covered by the private sector partners (two major logistics service providers).

The **Aprin Dry Port project in the Islamic Republic of Iran** is another example of a dry port project which will be developed under this option. This facility, with an initial capacity of 360,000 TEU, will be developed and operated under a BOT contact between RAI and a Swiss company, at an estimated cost of € 42 million (US$ 44.4 million). Under this contract the land for the project is railway owned land which will be transferred to the private developer during the tenure of the BOT contract (25 years). Construction is estimated to take 2.5 years.

The **Uiwang ICD in the Republic of Korea** is a further example of a dry port developed under a PPP scheme in which the private sector partners finance all of the infrastructure investment inside the
terminals, in addition to financing the provision of all container and cargo handling equipment and managing the terminal operation.

Ownership of the land under the terminals is vested in the public sector partner (Korean National Railroad Network Authority), which then leases the land at less than commercial rates to the private partners who operate the terminals. The private partners are logistics companies and road hauliers. The public and private shareholdings are 25% and 75% respectively.

The public sector partner is responsible for investing in the road and rail accesses to the terminals, while investment in infrastructure and handling equipment within the boundaries of the terminals (including CY paving, rail sidings and internal roadways) is the responsibility of the private partners. The latter investment is provided under a 30 year Build-Operate-Transfer (BOT) concession.

(ii) public ownership of land/public financing of infrastructure/private financing and ownership of operating assets/private management and operation of dry port

Under this option, the private sector partner’s risk exposure is reduced, because the public sector partner agrees to provide land for the project and to cover the cost of investing in the dry port infrastructure which includes construction of the CY, all internal roads, rail loading/unloading tracks and all buildings. The private sector partner covers the purchase cost of all container and cargo handling equipment.

The Lat Krabang ICD in Thailand is an example of a dry port which was developed under this option. In this case, the public sector partner is the State Railway of Thailand and the private sector partners are 5 shipping lines and one freight forwarding organization. The Lard Krabang ICD comprises six modules each with its own CY and warehousing, but with a common access to three rail sidings, each with a length of 1,000 meters (one each for container loading and unloading, and one for release of the locomotive). The facility has not been developed beyond its Phase 1 plan and a planned second phase has been suspended owing to the non-availability of a sufficient contiguous land area. The total infrastructure investment cost of Phase 1 was US$ 73.9 million, the project being funded jointly by a World Bank loan, the Thai Government and institutional investors.

The ICD is financed and managed as a type of PPP (Public Private Partnership) scheme in which the government provides the land and finances the infrastructure, and the private sector operators finance, provide and operate the container and cargo handling equipment under an operating concession. The operators pay concession fees to the State Railway of Thailand which manages the ICD on behalf of the Thai Government. The term of the operating concessions is 15 years.

10. Conclusions

10.1 Key concepts of a regional dry port network

The introduction in 2013, and the subsequent signing by 17 countries of (and accession by 13 to) the Intergovernmental Agreement on Dry Ports has created within the region a potential network of dry ports, which may be interconnected for the benefit of increased international trade.

The main objective of creating a regional network of dry ports is to expand trade opportunities by facilitating the uninterrupted movement of trade consignments between dry ports located in different countries. This can be achieved by consigning goods from a dry port in one country to a dry port in
another, by minimizing border inspections and delays between the two, and by carrying out customs and other border control formalities, and securing the release of goods, at the destination dry port.

The interconnection of dry ports will require that there be some consistency among them in terms of: the services they provide; their location in relation to trade generating industry; and their transport connections.

10.2 Requirements for interconnection of dry ports in the regional network

Effective interconnection of dry ports comprising the network will require:

(i) Specification of dry ports as cargo origins and destinations in international trade and transport documents and related legal instruments;
(ii) Electronic linking of dry ports through adoption of international port codes;
(iii) Reform (as necessary) of border control procedures to minimize security checks and related delays at borders and to allow cargo clearance at destination dry ports;
(iv) Location of dry ports in close proximity to cargo generating sources, such as manufacturing industry, warehouses, etc;
(v) Linkage of dry ports to seaports, and wherever possible to one another, by rail.

It will also be desirable, although not essential, for dry ports to conform to common principles and technical standards in the layout and design of their component facilities.

Information collected during fact finding missions to five countries of the region was used to assess the progress made in meeting the above requirements in the development of dry ports in their respective country.

Evidence of trade and transport links between dry ports located in different countries of the region was discovered during the mission to Indonesia. There, the Cikarang Dry Port has established a trade and transport link with the Lat Krabang ICD in Thailand, with cargo being consigned directly between the two dry ports using Multimodal Transport documents, both dry ports being identified with international port codes.

It is recommended that all countries of the region should endorse the above requirements and develop an action plan to satisfy them progressively.

10.3 Policy measures, legislation and solutions for dry port development

Responsibility for the planning and development of dry ports in a majority of the countries of the region appears to be dispersed among several government agencies, with no single agency having a coordinating role.

It is recommended that responsibility for coordination of planning activities for dry port development should be assigned to an inter-agency committee, under the authority of a single transport ministry and with representation from all agencies with a regulatory interest and involvement in dry port development and operation.
Among the measures available to governments to assist the establishment and sustained operation of dry ports, are:

(i) Taxation and other financial incentives, including tax holidays or waivers, land rent concessions, and concessional public utility charges;
(ii) Priority development of transport infrastructure connecting to dry ports;
(iii) Incorporation of dry ports in export processing or other free trade zones; and
(iv) Regulatory measures to encourage sustainable transport connections to dry ports

Of the above listed measures, only (ii) and (iii) appear to have been applied consistently within the countries visited.

In the Islamic Republic of Iran, the government contributes to offsetting the capital cost of constructing new railway lines to access factories and logistics centres.

Several countries are developing, or have approved the development of, Special Economic Zones, Export Processing Zones, Industrial Zones, and the like. Most are located in border areas, but appear to have had limited success in generating base cargo for dry ports.

In the case of regulatory measures to encourage sustainable transport, there is evidence that in a few countries measures have been applied to relax restrictions on road vehicle weights and dimensions. These measures may therefore have had the reverse effect, i.e. discouraging, rather than encouraging the growth of sustainable transport. Evidence of this can be seen in Australia with the adoption of the “B-Double” and “Super B-Double” trailer units, as well as in Tajikistan with the acceptance of over-length trailer trucks for operation on that country’s highways.

It would be desirable for all member countries to re-assess the potential benefits of implementing measures to assist the establishment and sustained operation of dry ports.

10.4 Practical options for financing development of dry ports

There are possibly just three practical options for financing the development and for the management of dry ports:

(i) Financing by the public sector and outsourcing of the operation through a management contract with the private sector;
(ii) Private sector financing and operation; and
(iii) Public Private Sector Partnerships (2 main variants)

All involve the application of private sector expertise for the management and operation of dry ports.

The least preferred option from the perspective of governments would be option (i) which requires that the public sector raise 100% of the capital and assume 100% of the risk of dry port development.

Option (ii), which has been applied in some countries of the region, such as Australia and Indonesia, would be favoured by governments, but would not generally find favour with the private sector which would have to raise all the capital investment and assume all risk.
Option (iii) involves the sharing by the public and private partners of the costs and risks, and is therefore the most acceptable option to both parties. However, the PPP concept has rarely been applied to dry port projects in the region, the two main applications to date being the Uiwang ICD in the Republic of Korea and the Lat Krabang ICD in Thailand. By contrast, PPP has met with wide acceptance for highway, airport and seaport projects, for which there is almost a guaranteed level of demand. There is a high level of risk associated with dry port investments, due to the uncertain level and stability of demand, particularly in some inland areas, and in some cases the uncertain level of competition.

Governments can make PPP more appealing to potential private sector investors by shouldering a larger part of the capital cost and associated risk. In the case of the Lat Krabang ICD, a PPP scheme was successful because the public sector covered all of the project’s infrastructure costs, in addition to providing the land for the project.

It is recommended that the countries of the region should critically assess the advantages and disadvantages of all practical methods of financing the development of dry ports.
SECTIONS B: MISSION REPORTS

Report of mission to Bangladesh 11-12 January 2017

1. Meeting at Kamalapur (Dhaka) with Deputy Traffic Manager Dhaka ICD

Date and Time: 1030 hours 11 January 2017

Participants: Mashiur Rahman Beg, Deputy Traffic Manager, Dhaka ICD, Kamalapur; Tusar Uddin Ahamed, Ship Planner, and one other representative, Saif Powertec Ltd (outsourced operator of Dhaka ICD).

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

Discussion:

Dhaka ICD

(i) The Dhaka ICD has been in operation since 1987 at a site adjacent to the Kamalapur Passenger Railway Station in Central Dhaka. It is operated jointly by the Bangladesh Railway and the Chittagong Port Authority.

(ii) The operation of the ICD has been contracted out to a private company which provides the container handling equipment.

(iii) The site is surrounded by dense urban development (including heavily congested roads) and has a rail access which at certain times is restricted by passenger train operations to/from the adjacent Kamalapur Station (see Figure 1)

![Figure 1: Satellite image of Dhaka ICD, located adjacent to Kamalapur Railway Station](source: Google Earth)
The Deputy Traffic Manager claimed that the ICD has a capacity to handle a container volume of 100,000 TEU annually (and is currently working at about 70% of this capacity). However, congested urban development and activity around the ICD suggests that it has already reached its practical capacity.

This seems to have been recognized by the government which is committed to the construction of a new rail served ICD near Gazipur, north of Dhaka.

**Chittagong Port - inland distribution of containers by mode**

(i) Chittagong is currently the main port of entry/exit for the trade of Bangladesh, handling about 98% of the country’s maritime container volume. In line with Bangladesh’s buoyant economic growth (more than 7% per annum in recent years), the container throughput of the port has been growing at a rate averaging 9.2% over the past 6 years, as may be observed from Figure 2.

![Figure 2: Chittagong Port, container throughput trend](source)

(ii) By contrast, the throughput of the Dhaka ICD was almost static at around 67,000 TEU over the same period (2009-10 to 2015-16), as is shown in Figure 3.

![Figure 3: Dhaka ICD, container throughput trend](source)
Nearly 97% of the container volume arriving at, or departing from, Chittagong Port is handled within the port or at any of the 16 licensed “off-dock” terminals located within a short distance of the port. The remaining 3% is handled in the Dhaka ICD and is transported by rail between Chittagong and Dhaka. During the past six years, Dhaka ICD’s share of the CPA container throughput has declined from 5% (in 2009/10) to 3% (in 2015/16), as shown in Figure 4. It should be noted that this figure also indicates the shares of rail and road transport in the inland distribution of the port container volume, since other than the volume transported by rail to/from Dhaka and a negligible volume transported by IWT, all container volume moves inland by road.  

Of the total TEU volume handled in and around Chittagong, approximately 30% is estimated to be consumed within the Chittagong area. The balance (70%) is handled in off-dock terminals and transported by road to/from Dhaka in small breakbulk trucks with an average payload capacity of 7-10 tonnes. While this may suit user requirements for convenient and (relatively) fast transport between Chittagong and Dhaka, it creates massive congestion on the main Chittagong – Dhaka Highway (Asian Highway 41) and causes heavy costs to the community. More analysis of this issue is given in Section 4 (v).

Operational problems at Dhaka ICD and their resolution

(i) The static container volume trend through the Dhaka ICD was explained by:

23 A negligible container volume is handled in the new Pangaon inland terminal near Naryanganj (157 nautical miles, or 291 km, north of Chittagong) which is served by barge transport.
• Poor management of container handling by GETCO (the operating concessionaire prior to 2015), who deployed old equipment which suffered frequent breakdowns;
• A persistent shortage of container wagons, which by 2011-12, had resulted in frequent failure to maintain operating schedules.

These problems were resolved through the appointment of a new operating concessionaire, SAIF Powertec Ltd, in mid-2015 and new investments in container flat wagons by the Bangladesh Railway, resulting in an available fleet of 450 by 2015.

(ii) Currently, two trains per day, each hauling 31 BFCT\textsuperscript{24} wagons (see picture below), operate in each direction between Chittagong and Dhaka. These trains can carry up to 62 TEU, but on average carry about 47 TEU per trip. Running times between Chittagong and Dhaka (346 km) are at least 18 hours and often as long as 24 hours per trip. The reason for these excessive running times is that freight trains running between Chittagong and Dhaka are often displaced from the mainline by passenger trains which have operational priority.

![Photo 1: Rake of BFCT container wagons, Chittagong Port, 12 January 2017](image)

(iii) Unloading and re-loading of container trains in Dhaka is estimated to take 6 hours for each activity (12 hours in total).\textsuperscript{25} On this basis, after allowing for an average journey time of 24 hours, for unloading and reloading in 12 hours and for 3 hours of maintenance, a wagon would be turned around in 39 hours and capable of making 192 single trips per year. In 2016, the total rail container haulage volume (68,668 TEU) would have fully utilized a fleet of about 280 wagons. Clearly, the actual BR fleet of 450 container flat wagons would have been more than sufficient to transport the actual volume of containers rail-hauled between Chittagong and Dhaka in 2016.

(iv) The Dhaka ICD handles only very small volumes of import and export containers for the garment industry. Currently, total garment export containers shipped from Bangladesh amount to 2,000 TEU per day (730,000 TEU per year), of which the Dhaka ICD handles only 50-60 TEU per day. The great majority of export garment containers are handled in the 16 off-dock terminals which offer a faster handling and transport service than the Dhaka ICD, as well as value added services, such as labelling, which are unavailable in the latter. Most

\textsuperscript{24} A BCFT (Bogie Container Flat Truck) is a lightweight skeletal container wagon with an axle load of 13 tonnes and a maximum payload of 41 tonnes.
\textsuperscript{25} USDA Foreign Agricultural Service: Chittagong Port Overview and other Inland Transportation, 22 January 2016.
import containers for the garment industry (carrying raw cotton, textiles and other inputs for garment production) are discharged within Chittagong Port and the contents transported in small break-bulk trucks to Dhaka. The advantages for garment manufacturers are faster transport and cheaper freight rates than are available from rail. Road hauliers can offer cheaper rates due to the relative balance between garment industry import and export volumes and the consequent potential for back-loading.

(v) Commodities moved in containers through Dhaka ICD include: imports - consumer products; exports – some garments (those not requiring labelling), foodstuffs and fruit juices. Carrefour, the supermarket operator, is making extensive use of the ICD and stations a shipping representative on the premises. However, the lack of warehousing space restricts the ability of the ICD to serve other retailer or wholesaler customers.

(vi) Operation of the Dhaka ICD is affected by truck bans on the urban roads in the vicinity of the terminal. Truck movements on these roads are prohibited between 0600 and 2000 hours, meaning that trucks delivering or taking delivery of cargo to/from the ICD must operate within the 10 hour window available at night. Similarly, between 0800 and 1200 hours, railway operations into and out of the ICD are restricted by the potential conflict with Naryanganj commuter trains.

(vii) According to the Deputy Traffic Manager, customs procedures do allow for cargo to be consigned from an ICD in another country to ICD Dhaka via Chittagong Port without the need for border clearance in Chittagong.

2. **Meeting at Ministry of Shipping**

**Date and Time:** 1220 hours 11 January 2017

**Participants:** Ms Sirat Mahmuda, Senior Assistant Chief, Ministry of Shipping, Government of the People’s Republic of Bangladesh

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Upgrading of transport infrastructure**

Significant developments were discussed, as follows:

- Dhaka-Chittagong Highway (Asian Highway 41) now 4-laned;
- Double tracking of Dhaka-Chittagong railway nearly complete (with exception of final section Akhaura-Laksham);
- Starting in July 2016, upgrading of 53 river routes under a World Bank supported Regional Waterway Project (includes development of a dry port at Ashuganj, on the Meghna River opposite Bhairab Bazar, from which it is expected that containers will move to India)
- Construction of Padma River Bridge (now underway) will be completed by 2018 – now being financed by Government of Bangladesh (previously WB and ADB)

(ii) **Seaport development**
Issues associated with the development of seaports in Bangladesh were discussed during the meeting. A more detailed analysis of these issues is presented below.

(a) Deficiencies of existing container handling ports

Bangladesh’s two existing seaports, Chittagong and Mongla, are both shallow water ports located on river estuaries. As such, they cannot handle vessels with a capacity of more than about 2,500 TEU and are dependent on container feeder services to and from major transhipment ports, such as Singapore and Colombo.

Both ports are highly silted and many vessels can move only by taking advantage of incoming and outgoing tides. While Chittagong is linked by rail and road to Dhaka, Mongla faces inadequate connectivity by road and rail.  

(b) Sonardia project

Development of a deep sea container port and regional hub has long been an objective of the Government of Bangladesh. Following a feasibility study in 2005 by Pacific Consultants International, a deep sea port was proposed for construction at Sonardia, about 90 km southeast of Chittagong. This site had the advantage of being well located to attract container flows by rail to and from the 7 states of Northeast India.

26 The Opinion Pages, Port Development in Bangladesh, 04 June 2016
More recently, the Chinese Government expressed interest in financing and developing this port, notwithstanding a pre-existing Chinese commitment to the development of a deep sea port at a nearby site in Myanmar, at Kyaukphyu. The capital cost of the Sonadia project was estimated at US$ 8 billion.

(c) Matarbari Port development

Subsequently, in 2015, the Government of Bangladesh approved a proposal by the Japan International Cooperation Agency (JICA) to finance the development of a deep sea coal handling port and power generating complex at Matarbari, just 25 km from Sonadia. This complex comprises coal handling berths, four 600 MW coal fired power plants and a Liquified Natural Gas (LNG) terminal. JICA is willing to finance 80% of the total cost of this project (US$ 3.7 billion) with a soft loan having an interest rate of 0.1 per cent, a payback period of 30 years and a 10 year grace period.

(d) Cancellation of Sonardia project

In February 2016, the Government of Bangladesh cancelled the proposal for Sonardia, without signing an agreement with the Chinese Government. The non-viability of the project was cited as the reason for its cancellation, although it is possible that geopolitical considerations may also have been a factor in this decision.27

(e) Payra Port development

A project to develop a container handling port on the Meghna River in Patuakhali District (about 240 km south of Dhaka) was launched by the Government of Bangladesh in May 2013.

It is proposed that the port will have the capability of accommodating vessels with a draft of 16 metres, suggesting that it will be able to handle the largest container vessels in current operation (e.g. Maersk Triple E Class, 18,000 TEU). This will not be achieved easily. As shown in Figure 7, the port will be located a significant distance up the Rabnabad Channel of the Meghna River and will require substantial capital and maintenance dredging (to maintain depths). An early estimate is that 9.4 million cubic metres of dredging will be required to sustain navigability of the port.28 No firm estimate of the project’s capital costs was available at the time of writing.

As shown in Figure 6, the port will be connected by rail to Dhaka and to the new Dhirasram ICD near Gazipur, a major garment manufacturing centre, some 30 km north of Dhaka.

---

27 The terms offered for Chinese participation in the financing of the project could be described as “tight”, with a rate of interest of 2 per cent and a requirement for compulsory procurement of goods, services and equipment from China. [Op cit, Opinion Pages] By contrast, the terms offered for a Japanese soft loan for the Matarbari project could considered as highly beneficial for Bangladesh.

It is expected that the port will be operational by 2024. The port will have capacity to store a container volume of 75,000 TEU and to handle a throughput of 4 million TEU per year by 2030.\textsuperscript{29}

(f) \textit{Proposal for a new container terminal for Chittagong Port}

With a dredged depth of only 9.2 metres and with LOA (Length Overall) restrictions due to its location on a river estuary, Chittagong Port is only capable of receiving container vessels of feeder size (2,500 – 3,000 TEU). In order to provide the port with the capability of handling vessels of more economic size, it has been proposed that a new port container terminal (known as the \textit{Bay Terminal}) should be constructed on the sea coast about 13 km north of the Karnaphuli River estuary.

\textsuperscript{29} \textit{Bangladesh joins UK’s DP Rail to build Dhaka-Payra port rail freight link: News report on Memorandum of Understanding between Government of Bangladesh, Bangladesh Railways and British company DP Rail, January 2017.}
While the draft restriction at the new location would only be slightly better than at the existing port, the LOA restriction imposed by navigation in the river would no longer apply, allowing vessels with a capacity of up to 5,000 TEU to navigate to and from the new terminal. While this would permit a significant expansion of the port’s container throughput capacity, it would not reduce its reliance on feeder shipping as the new terminal would not be able to accommodate vessels of current mainline size (up to 18,000 TEU).

(iii) Land port development

Ten (10) land ports under administration of Bangladesh Land Port Authority (BLPA) and 22 Land Customs Stations under the administration of Bangladesh Customs are located at, or near, the border with India. An exception is Teknaf, which is on Naf River opposite Myanmar.

The main function of land ports is customs clearance and transfer of cargo from trucks of neighbouring countries to Bangladeshi trucks. Land ports have no container handling facilities, only warehouses where trucks are loaded and unloaded. Most cargo handling is done by contracted manual labour.

Land Customs Stations have only very limited facilities for cargo handling. As cargo volumes grow at such facilities, they are usually converted into land ports.

Benapole (Jessore District, southwest Bangladesh, bordering West Bengal, India) is the busiest land port, with a handling capacity of 2 million tonnes p.a., of which 1.2 million is manual, and throughput (in 2011-12) of 1.68 million tonnes p.a.

Roads in and around Benapole are heavily congested, and tailbacks into Bangladesh of trucks awaiting customs clearance on the Indian side are frequently encountered. Road capacity improvements are being planned by the Land Port Authority in cooperation with the highway authority and the SASEC program of ADB.

The development and operation of five land ports has been contracted out on a BOT basis, these being: Sonamosjid (Shibganj of Nawabganj District), Hili (Dinajpur District), Banglabanda (Tetulia of Panchagarh District), Teknaf (Cox’s Bazar District), and Birbazar (Comilla District).

(iv) Dry Port development

Apart from the Dhaka ICD at Kamalapur, one other ICD is in operation in Bangladesh. This is the Pangaon Inland Container Terminal located on the Buriganga River at South Keranigonj to the south of Dhaka.

This terminal was developed jointly by the Bangladesh Inland Water Transport Authority and the Chittagong Port Authority at a cost of Taka 1.54 billion (US$ 19.2 million). It was opened for service in November 2013. The terminal is served by 3 privately owned river vessels each with capacity to

---

31 Website of Bangladesh Land Port Authority (BLPA).
carry up to 128 TEU. It has capacity to store up to 3,500 TEU at any one time and an annual handling capacity of 116,000 TEU.

Thus far, the terminal has handled only a small volume of containers owing to initial problems with high transport and terminal charges. It is believed that recent rate revisions have made the facility more competitive.

Two other dry port development projects are being assessed for Public Private Participation (PPP) financing and operation. These are the rail served Dhirasram ICD north of Dhaka and another IWT based ICD at Khanpur on the Shitalakhya River south of Dhaka in Narayanganj district. Price Waterhouse has been appointed as Transaction Adviser for both projects and is undertaking a feasibility study for the Khanpur project. Further details of the Dhirasram project are given in Section 4 (vi) below.32

3. Meeting at Kamalapur with Bangladesh Railway Divisional Manager

Date and Time: 1530 hours 11 January 2017

Participants: Mohammed Arifuzzaman, Divisional Railway Manager and four other railway staff; Mashiur Rahman Beg, Deputy Traffic Manager, Dhaka ICD, Kamalapur

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

Discussion:

(i) Dhaka-Chittagong double tracking progress

The Dhaka-Chittagong line is part of the Trans Asian Railway.

Double tracking of all line sections from Dhaka to Chittagong is now complete, with the exception of the 72 km section between Akhaura and Laksam. Work on this section is underway and is expected to be complete by December 2018.

Apart from the construction of a new metre gauge line beside the existing line, the project involves upgrading of the existing line, construction of 46 bridges and 11 stations and installation of computerized signalling. The total capital cost is estimated at US$ 680 million, 75 per cent of which is being financed by the ADB and 25 per cent by the European Investment Bank.33

Track doubling will effectively double the number of trains per day which can be run in this section from 26 to 52 pairs. Significantly, track doubling will increase the number of container trains which can be run in the section, from 3 pairs per day currently to 5-6 in future.

32 Information on both projects is available on the website of the Public Private Partnership Authority of Bangladesh, www.pppo.gov.bd .
33 Daily Observer: Construction of Laksham-Akhaura double rail line to begin July, 20 June 2016
Positive impacts expected to result from a diversion of traffic from road to this rail section by 2023 include a net fuel saving of 54 million litres per year and reduced CO2 emissions amounting to 145,000 tonnes per year.\(^{34}\)

A feasibility study of the addition of a 3\(^{rd}\) and 4\(^{th}\) running track to the Dhaka-Tongi section is now underway. This section has already been dual gauged.

A 25 tonne axle load has been used for all new construction (as compared with 11-13 tonnes on existing metre gauge lines).

(ii) **Other railway projects of relevance to dry port development**

Construction of a railway line between Khulna and Mongla Port is now underway, with financing from India. This project, which is expected to contribute to an expansion of the cargo volume of cargo handled by Mongla Port, will be complete in about 2 years.

Construction of the Padma River Bridge rail link is now underway. This link, which will provide connectivity for Mongla Port through to Dhaka, is being financed by China.

A new rail served ICD is “under active consideration” for construction near Dhirasram, about 30 km north of Dhaka. The World Bank has withdrawn from the financing of this project. A consultant has been appointed to advise on the development of the ICD.

4. **Meeting at Chittagong Port Authority, CPA office in Chittagong**

**Date and Time:** 1500 hours 12 January 2017

**Participants:** Mohammed Zafar Alam, Member (Administration and Planning) Chittagong Port Authority; Mohammed Omar Faruk, Secretary, Chittagong Port Authority; Enamul Karim, Deputy Traffic Manager, Chittagong Port; Lt Col Mohammed Abdul Gaffar, Director Security, Chittagong Port; Mohammed Ruhul Amin Sikder, Secretary Bangladesh Inland Container Depots Association (BICDA)

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Projection of container volume growth, Chittagong Port**

As observed in Section 1, the annual container throughput of Chittagong Port exceeded 2 million TEU for the first time in 2015/16 and attained an average annual rate of growth of 9.2 per cent between 2009/10 and 2015/16.

Forecasts of container volume growth suggest that the port container throughput will more than double from 2.3 million TEU in 2016 to 5.4 million in 2040, reflecting an annual average

\(^{34}\) ADB: BAN: SASEC Railway Connectivity: Akhaura-Laksam Double Track Project, Initial Environmental Examination, June 2014

67
rate of growth of 3.6 per cent (see Figure 8). Key to the achievement of the 2040 forecast will be the development of the Bay Container Terminal (described in Section 2 (ii) above), which will handle container vessels of up to 5,000 TEU capacity.

![Figure 8: Container volume forecast, Chittagong Port](chart.png)

(iii) Inland distribution of Chittagong Port container volume

Estimates of the inland distribution of the port’s total container volume were given as shown in Table 1 below.

<table>
<thead>
<tr>
<th></th>
<th>Remaining (consumed) in Chittagong area</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Transported by rail or IWT</td>
<td>3.2%*</td>
</tr>
<tr>
<td>3</td>
<td>Handled in off-dock terminals/transported in break-bulk trucks to/from Dhaka</td>
<td>66.8%</td>
</tr>
</tbody>
</table>

These estimates were applied to the port container volume for 2015/16 to derive estimates of the tonnage of container cargo moving to and from Dhaka in small break-bulk trucks (see Table 2 below).

(iii) Off-Dock Container Terminals

A total of 16 off-dock terminals were established to handle containers and container cargo outside the port, in order to relieve traffic congestion inside the port. Most of these terminals are located only 5-10 km from the port, but the Ministry of Shipping issued a regulation in 2016 requiring all new off-dock facilities to be located at least 20 km from the port. In addition, all off-dock terminals are required to have security managers.
The functions of off-dock terminals are identical with those of dry ports, in the sense that they provide the full range of services for the handling, storage, and customs clearance of containers and container cargo.

It was reported by the Port Authority that the 16 off-dock terminals OD terminals handle about 92 per cent of Chittagong Port’s export container volume and about 27 per cent of its import container volume. It is understood that nearly all of the container cargo handled in the off-dock terminals originates or is destined for Dhaka.

All off-dock terminals are owned (or leased) and operated by private companies. They vary in size, with the largest handling more than 200,000 TEU per year. About 70% of all off-dock volume is handled by 7 companies and 30% by the remaining 9 companies. The largest companies appear to have invested heavily in handling equipment such as reach-stackers and top-lifters.

(iv) Port congestion

Some 70 per cent of loaded import containers are unstuffed within the port and their cargo is moved in break-bulk trucks directly outside of the port (most to Dhaka). The balance (about 30 per cent) of loaded import containers is moved to off-dock terminals, for un-stuffing.

Despite removal of the handling of more than 90 per cent of export containers to off-dock terminals, the retention of the majority of import container handling inside the port has worsened congestion inside the port. On average 3,000-4,000 trucks per day enter the port.

(v) Highway congestion

Moreover, the policies of the port authority, which have encouraged the establishment of off-dock terminals in close proximity to the port, have worsened the congestion of the Chittagong-Dhaka highway (AH 41). This is because nearly all of the container cargo processed in these off-dock terminals is transported to and from Dhaka in small break-bulk trucks. Even after completion of the 4-laning of AH 41, it is struggling to cope with the strain of accommodating more than a truck per minute per lane, most of which are break-bulk trucks carrying cargo to and from the off-dock terminals.

Following lane expansion on AH 41, the capacity of this highway has been estimated at 38,000 vehicles per day. Trucks are estimated to account for 40 per cent of this number and port related traffic for 60 per cent of all trucks. On this basis, the proportion of the overall vehicle capacity attributable to trucks is 15,000 vehicles per day and of this number, 9,100 might be attributable to port related traffic.

From Table 2, the estimate of the current port related break-bulk truck traffic on AH 41 is 5,070 vehicles per day. If this traffic grows at the same rate as that forecast for the port container throughput (7.5 per cent per year between 2016 and 2025), it will reach 9,700 vehicles by 2025, clearly in excess of the highway capacity figure.

However, as shown in Table 2, breakbulk truck traffic will start to put pressure on the lane capacity of AH 41 well before 2025. Currently, on average, a break-bulk truck will pass every minute of the day!

Table 2: Calculation of daily and hourly breakbulk truck movements, Asian Highway 41

<table>
<thead>
<tr>
<th>Trade segments</th>
<th>Chittagong Port TEU throughput, 2015/16</th>
<th>less 30% remaining in Chittagong (TEU)</th>
<th>less Dhaka ICD TEU (by rail)</th>
<th>less Pangaon ICD TEU (IWT)</th>
<th>Equals net vol (TEU) by road to Dhaka</th>
<th>Average Tonnes/TEU*</th>
<th>Tonnes by road to Dhaka</th>
<th>Av. Truck payload - tonnes</th>
<th>No.trucks per year in 2015/16</th>
<th>No.trucks per day</th>
<th>No.trucks per hour</th>
<th>No.trucks per hour per lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td>1087362</td>
<td>326209</td>
<td>34587</td>
<td>500</td>
<td>726066</td>
<td>6.22</td>
<td>4518011</td>
<td>8</td>
<td>564751</td>
<td>1547</td>
<td>64</td>
<td>32</td>
</tr>
<tr>
<td>Import</td>
<td>1098914</td>
<td>329674</td>
<td>34081</td>
<td>500</td>
<td>734659</td>
<td>14.02</td>
<td>10296414</td>
<td>8</td>
<td>1287052</td>
<td>3526</td>
<td>147</td>
<td>73</td>
</tr>
<tr>
<td>Total</td>
<td>2186276</td>
<td>655883</td>
<td>68668</td>
<td>1000</td>
<td>1460725</td>
<td>14814425</td>
<td>8</td>
<td>1851803</td>
<td>5073</td>
<td>211</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Chittagong Port Authority; Dhaka ICD; ADB, Strategic Master Plan for Chittagong Port, September 2015

* Derived from TEU and tonnage data for 2010/11-2014/15 from Chittagong Port Overview January 2016

(vi) Prospects of diverting port container traffic from road to rail

Only 3 per cent of the container throughput volume of Chittagong Port is currently moved inland by rail, as compared with 67 percent by road (in break-bulk form). The Port Master Plan prepared by ADB consultants in 2015 proposes actions aimed at increasing the rail share to 10 per cent by 2025, including the re-organization of rail loading/unloading facilities inside the Chittagong Container Terminal to complement the construction of a new rail served ICD at Dhirasram, north of Dhaka.

Railway capacity for container transport is limited by:

- Route capacity on the Chittagong-Dhaka mainline and the related issue of the operating priority given to passenger traffic;
- Capacity of rail served inland container terminals;
- Locomotive and wagon supply

Route capacity shortages are being eliminated with the progressive double tracking of the Chittagong-Dhaka line, which will lift the number of container trains which can be run from 3 to 6 pairs per day. At the current limit of 3 trains per day, the annual container haulage volume would be about 116,000 TEU per year, which exceeds the estimated capacity of the Dhaka ICD (100,000 TEU per year). However, achievement by 2025 of the 10% rail share target of the Chittagong Port Master Plan would require a container haulage volume of about 308,000 TEU per year, or about 7 pairs of container trains per day. If it is desired to increase this target to 20% by 203036, the volume and train requirement would more than double to 714,000 TEU per year or 16 pairs of trains per day. Other capacity optimization measures would then have to be considered, such as an increase in train size (by increasing siding and

36 Although the Master Plan for Chittagong Port does not propose an increase in the rail share target beyond 10%, achievement of this target will do little to alleviate the congestion on AH 41
passing loop lengths) or a by a re-ordering of operating priorities to provide more paths for container trains.

Most importantly, route capacity must be matched by adequate handling capacity in rail served inland terminals. The limited handling capacity of rail served terminals, of which there is currently only one, is the most pressing problem facing Bangladesh transport planners and administrators.

The annual handling capacity of the Kalamapur terminal cannot be increased much beyond 100,000 TEU, owing to the inability to expand this facility within the heavily congested urban environment in which it is located. The new rail served ICD proposed for construction at Dhirasram will have an initial capacity of 354,000 TEU which will be increased progressively to an ultimate capacity of 860,000 TEU. In addition, the capacity of the IWT served Pangaon Inland Container Terminal, already in operation south of Dhaka, will be increased progressively from 116,000 TEU currently to 160,000 TEU.

Thus, it might be expected that, at most, the equivalent of 614,000 TEU would be removed from the highway, which would represent only 14 per cent of the total container throughput of Chittagong Port (or 20 per cent of the Dhaka container volume) in 2025.

Unfortunately, there has recently been little progress towards implementation of the Dhirasram ICD project and World Bank funding for this project has now been withdrawn. As has already been observed, realization of a 20% rail share of port container volume by 2030 will require that at minimum the Dhirasram facility should be in operation at something close to its ultimate capacity of 860,000 TEU per year. To proceed beyond this point would probably suggest that another terminal of similar capacity should be provided in the vicinity of Dhaka. This poses something of a dilemma for the transport planners and others involved in developing a trade logistics strategy for Bangladesh.

The recent creation by Bangladesh Railways of a Container Transport Company which can purchase rolling stock, coupled with recent investments in the fleet of container wagons (now standing at 450 wagons), has eliminated the problem of wagon shortages. However, the railway may need to expand its fleet in order to achieve the targeted increase in the rail share of port container traffic.

(vii) Service standards and performance of rail versus other modes

It was emphasized in the meeting that the railway fails to offer a service which is competitive with road transport for the haulage of containers, or container cargoes in the case of road. Trains frequently take 24 hours for the 325 km between Chittagong and Dhaka, equivalent to a commercial speed of only 13.5 km per hour. Much of this time is spent in passing loops awaiting the passage of passenger trains. In addition, up to 6 hours per trip is frequently lost owing to the need to adjust train loading (to balance out wagon axle loadings) before departure from Chittagong.

By contrast, the average time taken for trucks to complete a 264 km journey between Chittagong and Dhaka is 10-12 hours, equivalent to a commercial speed of 22-26.4 km per hour.

The imminent completion of the double tracking project between Chittagong and Dhaka will allow faster speeds, as well as additional operating paths, for container trains, but the result will be only a small diversion of traffic from road to rail, owing to the constrained handling capacity of the Dhaka ICD.

The comparative haulage charges given at the meeting indicate an advantage of rail over road but a disadvantage for rail as compared with IWT.

Table 3 below indicates the approximate cargo charges for all three modes.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Distance (Km)</th>
<th>Typical cargo haulage charge, Dhaka - Chittagong, Taka per</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWT</td>
<td>291 (157 km)</td>
<td>550</td>
</tr>
<tr>
<td>Rail</td>
<td>325</td>
<td>9,000*</td>
</tr>
<tr>
<td>Road</td>
<td>264</td>
<td>1,200</td>
</tr>
</tbody>
</table>

* Converted to per tonne at rate of 10.13 tonnes per TEU (CPA Port Overview 2015/16)

(viii) Border control procedures

The single window principle has not yet been adopted in Bangladesh. A single window project is being run by the World Bank. The National Board of Revenue, Ministry of Shipping and Bangladesh Inland Waterway Transport Authority are members of the working group.

In the case of import containers, border clearance will be carried out at the port nominated by the consignor or consignor’s agent. It is possible that an import container could be consigned from a terminal in Los Angeles (for example) to the Dhaka ICD and the container would then be transported under-bond by rail to the Dhaka ICD, where it would be cleared.

In the case of containers to be shifted to off-dock terminals for processing, there is a requirement for such containers to be X-ray scanned in the port. It is thus possible that the despatch of such containers could be delayed as a result of this requirement.

Table 3: Comparative cargo haulage charges (3 modes), Dhaka-Chittagong
Import containers consigned by rail to the Dhaka ICD are not subject to this requirement and may be moved directly to the rail yard for despatch to Dhaka.
5. **Visit to rail yard in Chittagong Container Terminal**

**Date and Time:** 1700 hours 12 January 2017

**Participants:** Rajib Chowdhury, Terminal Officer, Chittagong Port Authority; Mohammed Ruhul Amin Sikder, Secretary Bangladesh Inland Container Depots Association (BICDA)

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) The rail yard comprises three tracks (one each for loading and unloading and one for engine release) and a container stack, about 200 metres from the tracks. Full length trains of about 500 metres may accommodated in these tracks, although it appeared likely that short rakes of wagons are placed in the loading/unloading tracks and are marshalled into trains in the railway marshalling yard outside the port.

(ii) Loading and unloading of wagons from/to the container stack is done by straddle-carriers. These are Kalmar machines manufactured in Finland. They can carry up to three containers at a time and require about three minutes to transport a container from the stack and load it on a wagon (minimum of 3 hours for an entire train).

(iii) The rail yard is located about 500 metres – 1 km from container stacks behind the berths. Thus, it appeared that the rail loading/unloading system in use would not avoid the problem of multiple handling, since containers must be transported to and from the berths on yard trailers.

*Photos taken in rail yard, Chittagong Container Terminal 12 January 2017*
Report of mission to Bhutan 08-09 January 2017

1. **Meeting in Timphu with Senior Trade Officer, Department of Trade, Ministry of Economic Affairs**

   **Date and Time:** 0930 hours 09 January 2017

   **Participants:** Mr Pema, Khandu Senior Trade Officer, Department of Trade, Ministry of Economic Affairs, Royal Government of Bhutan; Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

   **Discussion:**
   
   (i) Department of Trade is lead agency for development of dry ports in Bhutan

   (ii) All trade other than that sourced in India, Bangladesh and Nepal comes through Kolkata Port.

   (iii) Bhutan has a trade agreement with Bangladesh, but since goods must transit through India, realization of maximum trade benefits depends on Trilateral Transit Agreement (yet to be adopted and enforced);

   (iv) Phuentsholing is the main border crossing post for Bhutan, being located on the southwestern border with West Bengal State of India, about 180 km by road from the capital, Thimphu.

   (v) Approximately 80% of all trade through the main Phuentsholing border crossing is sourced or destined for the Pasakha Industrial Estate (about 14 km by road from Phuentsholing – see Figure 1).

   (vi) Some 35 industries are currently located in PIE, including steel forming (coil, rods), cement and beer production.

   (vii) Pasakha will be the location of a major dry port to be constructed by Bhutan. It is proposed that initially it will be accessed directly from India via a road connecting with the existing Hasimara-Phuentsholing road (Indian National Highway 317A/Asian Highway 48). A smaller dry port for Phuentsholing to be built on approximately 5.4 acres of land, is in advanced stages of planning. The project is referred to as a Mini Dry Port as plans are underway to build a bigger Dry Port at Pasakha.

   (viii) The Pasakha Dry Port project was recently deferred to the next 5 year planning period (commencing in 2019). No reason was given for this deferral. There have been re-settlement issues at Pasakha, but these have now all been resolved.

   (ix) Peripheral infrastructure for the dry port projects is being constructed with financial assistance from the ADB SASEC (South Asia Subregion Economic Cooperation) program. For details, please see Item 5.
Source: Tourism Council of Bhutan

Figure 1: Road map of Bhutan with distances in km shown
2. **Meeting in Thimphu with Chief Planning Officer, Ministry of Information and Communications**

**Date and time:** 1000 hours 09 January 2017

**Participants:** Mr Bhimial Suberi, Chief Planning Officer, Policy and Planning Division, Ministry of Information and Communications, Royal Government of Bhutan; Mr Pema Khandu, Senior Trade Officer, Department of Trade, Ministry of Economic Affairs, Royal Government of Bhutan; Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Linkage of Bhutan dry ports to rail.**

The Government of India has studied five potential rail linkages to Bhutan from the Northeast Frontier Railway, as shown in Table 1. These projects will be costly and the future of this proposal is unknown, *but it is believed that the initiative still exists.*

<table>
<thead>
<tr>
<th>Project</th>
<th>Length (Km)</th>
<th>Cost Estimate (INR billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banarhat-Samtse</td>
<td>23.2</td>
<td>2.05</td>
</tr>
<tr>
<td>Hasimara-Phuentsholing</td>
<td>17.5</td>
<td>1.68</td>
</tr>
<tr>
<td>Kokrajhar-Gelephu</td>
<td>58</td>
<td>2.94</td>
</tr>
<tr>
<td>Pathsala-Nanglam</td>
<td>51.2</td>
<td>6.69</td>
</tr>
<tr>
<td>Rangia-Sandrupjongkhar, via Darranga</td>
<td>41</td>
<td>6.07</td>
</tr>
</tbody>
</table>

Source: India Transport Report Moving India to 2032^38

(ii) **Hasimara railway station**

Hasimara (West Bengal) is the nearest IR railhead to Phuentsholing, being located about 17.5 km south by road along Indian Highway 317A (Asian Highway 48). This road passes through the environmentally sensitive area of the Tea Gardens in the northern part of West Bengal.

Hasimara is a small station located on the New Jalpaiguri-Alipurduar-Samuktala Road Line (see Figure 3). This line, which was broad gauged in 2002, runs in parallel to, and to the north of, the Trans Asian Railway designated regional rail link. Hasimara is a passenger station receiving 20 trains per day and has very limited freight handling facilities.

---

(iii) Potential rail link to Pasakha vs. Phuentsholing

A rail link between Hasimara and Phuentsholing will be prevented by hilly terrain and by the lack of an available area for rail terminal development within the town boundaries. A rail link between Hasimara and Pasakha is possible (due to near level gradient), but will be environmentally difficult (due to passage through Tea Gardens). There is limited available space within Pasakha for full length trains.

(iv) Alternative connections to Indian railheads by road transport

The justification for rail links between Bhutanese border posts and IR stations will depend crucially on the generation of substantial transport volumes by the dry ports. In the case of the Pasakha Dry Port, container throughput volume is forecast to reach 327,000 TEU by the end of the 20 year planning horizon (2035). At this level, volume is likely to be sufficient to justify rail haulage of containers to the seaports especially when the haulage distance (700 km) will guarantee substantial rail operating economy.

At the lower end of the throughput forecast for Pasakha (64,000 TEU in the first year of operation), volume would only be sufficient to justify road haulage of containers for the entire trip to the seaport.

There is, however, an intermediate throughput volume which could justify the transfer of containers from the dry port to the nearest Indian railhead by road, provided transfers could be organized as “shuttle” moves using modern prime mover/trailer combinations.

(v) Pasakha-Hasimara road connection

It is understood that Pasakha will be linked directly to Hasimara by a road which will by-pass Phuentsholing. This road will be constructed with finance to be provided under the ADB SASEC program. After its construction, Pasakha will be roughly the same distance from Hasimara as is Phuentsholing (17.5 km).

39 Presentation of Bhutan to Workshop On Development of Dry Ports through Public Private Partnership, Bangkok, May 2016.
Currently Pasakha is linked by road with Phuentsholing via the Phuentsholing-Timphu Highway and a local access road. (see map in Figure 3) The distance is 13.6 km.

![Figure 3: Road connections, Hasimara-Phuentsoling-Pasakha](source: Google Maps)

(vi) **Kolkata Seaport**

Kolkata Port handles all of the international trade originating in, or destined for, Bhutan except that to/from India, Bangladesh and Nepal which is transported by road.

Kolkata Port is about 700 km by road from Phuentsoling, via Indian National Highway 12 (see Figure 4).

![Figure 4: Road connection Phuentsoling-Kolkata Port](source: Google Maps)
There is a major problem of customs clearance in Kolkata Port. It was estimated that an average delay of between 5 and 10 days is experienced for customs clearance in Kolkata Port. Bhutanese freight forwarders must make contact with customs agents based in Kolkata for clearance of their import consignments.

There are several points at which border clearance of imports (all processes) occurs within Kolkata Port. Movement between locations can require more than one day. These issues were subsequently raised in a meeting with Bhutan Customs. Apart from customs processing delays, the Kolkata port is a city based port, which has been facing severe traffic congestion. In September 2016, a ban on movement of heavy vehicles during the day by local authorities led to severe congestion at the port.

(vii) Intergovernmental Agreement on Dry Ports

Ratification by the Bhutanese Government of the Intergovernmental Agreement requires approval by Parliament. The Trade Minister is the key person to pursue the approval process. The matter is currently under review by the Ministry of Trade and Economy

(viii) Development of Mini Dry Port at Phuentsoling

Tendering for this project is currently in progress. It will take at best 3-4 months to conclude, but is likely to extend until June 2017. Initially the infrastructure for the project is being wholly financed by the government with support from the ADB SASEC program, but management will be outsourced through a Management Contract.

3. Meeting in Thimphu with Deputy Commissioner Department of Revenue & Customs, Ministry of Finance (1100 hours 09 January 2017)

Date and Time: 1100 hours 09 January 2017

Participants: Mr Phuntsho Doirji, Deputy Commissioner, Department, Department of Revenue & Customs, Ministry of Finance, Royal Government of Bhutan and one other officer; Mr Pema, Khandu Senior Trade Officer, Department of Trade, Ministry of Economic Affairs, Royal Government of Bhutan; Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

Discussion:

(i) Border clearance procedures and performance in Kolkata Port

No specific comments were made, but it was suggested that a report recently prepared jointly by ADB and UN ESCAP (Trade and Investment Division) would reveal the major problems being encountered with the clearance of import cargoes in the Port of Kolkata.

Imports from India (representing about 80% of all imports into Bhutan) are treated separately from imports from other countries. All imports from India are transported in breakbulk form (i.e. are non-containerized) and are cleared at the border. Some clearance of other country imports is done in Kolkata Port by Bhutan Customs, but this amounts to only 4-5 containers per week or 200 containers per year. The vast majority of import container trade is handled in Kolkata Port by private agents.

The Letter of Credit (LC) is the main document which ensures that containers go to Bhutan. The LC is the document which is recognized within the Transit Agreement with India.
“Other country” container imports were reported as undergoing “multiple processing” in Kolkata Port, as well as a final border check within India. It was estimated that all border control processes take on average 5-10 days per consignment. The travel time by road from Kolkata Port to the Phuentsholing border was estimated at 2 days.

The single window for border control processes will be introduced in Bhutan only in the longer term.

(ii) Customs IT system

Bhutan has introduced a new IT system for processing of customs clearance documents and electronic transmission of customs data. This is called RAMUS. It corresponds with and “talks” to other systems, such as the ASYCUDA system which is used by several countries.

(iii) Coordination of SASEC project in Bhutan

The National Trade and Transport Committee co-ordinates the development of SASEC (South Asia Subregion Economic Cooperation) projects within Bhutan.

4. Meeting in Thimphu with Director Trade Department, Ministry of Economic Affairs (1430 hours 09 January 2017)

Date and Time: 1430 hours 09 January 2017

Participants: Mr Sonam Tenzin, Director Trade Department, Ministry of Economic Affairs, Royal Government of Bhutan; Mr Zecko, Chief of Export Promotion Division, Department of Trade, Ministry of Economic Affairs, Royal Government of Bhutan; Mr Pema, Khandu, Senior Trade Officer, Department of Trade, Ministry of Economic Affairs, Royal Government of Bhutan; Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

Discussion:

(i) Government policies to assist development of industry in border areas

Industries have been encouraged to locate within industrial estates established by the government in border areas. The largest such development is the Pasakha Industrial Estate. Private enterprise leases land within these estates, and purchases electricity, from the government at heavily subsidized rates.

Special Economic Zones (SEZ’s) have not yet been established in the border areas, but a policy for the development of SEZ’s has been incorporated in the National Economic Development Policy of 2010. The Ministry of Finance is responsible for SEZ development.

(ii) Development of dry ports and related transport infrastructure

The Paskha Dry Port project, which will have financial support from the World Bank, was evaluated in 2013 and found to have acceptable EIRR results. However, development of this dry port has now been deferred until the 12th Five Year Plan (2019-2024).

40 This claim is to be checked against joint ADB/UNESCAP document when this is available.
Construction of the Mini Dry Port project proposed for Phuentsholing is expected to commence within 2017. It will have capacity to handle a container throughput of approximately 10,500 TEU per year and will have a capital cost which is estimated at US$ 2.5 million. The government will finance the development of infrastructure and the provision of X-ray scanning equipment, but the provision of handling equipment will be the responsibility of the Management Contractor. The project will receive financial support under the SASEC program of the ADB.

Under the SASEC program, construction of a 4 lane by-pass road which will divert traffic away from Phuentsholing City is almost complete. The Mini Dry Port will be located on this road.

A second border gate is being constructed at Phuentsholing to allow the separation of passenger and cargo traffic. The new gate will be allocated to cargo being transported to the MDP, allowing it to bypass Phuentsholing City.

A major limitation for border crossing traffic is that the border closes around 2100-2200 hours and opens around 0500-0600. It is understood that this limitation is imposed by the working hours of customs staff on the Indian side of the border.

The Director requested country level technical support from ESCAP for the formulation of a PPP scheme for development of the Pasakha Dry Port as well as advice on the harmonised technical standards to be met in designing and operating the new dry port.

5. **Meeting in Timphu with personnel of the Ministry of Works & Human Settlement**

**Date and Time:** 1550 hours 09 January 2017

**Participants:** Mr Rinchen Khandu, Executive Engineer, Bridge Division, Department of Roads, Ministry of Works and Human Settlement, Royal Government of Bhutan; three other staff of the Ministry of Works and Human Settlements; Economic Affairs, Royal Government of Bhutan; Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Logistics improvement projects in border areas of Bhutan**

The SASEC program of the ADB is providing financial support for six projects which are intended to improve trade logistics within Bhutan.

Four of these are being delivered as sub-projects of the “SASEC Road Connectivity” project, at an estimated cost of US$ 69 million. They include:

- Construction of the Mini Dry Port (MDP) at Phuentsholing;
- Construction of a 68.3 Km highway between the border post of Nganglam and the town of Deothang in the southeast of Bhutan;

---

41 Presentation of Bhutan to Workshop On Development of Dry Ports through Public Private Partnership, Bangkok, May 2016.
• Improvement of a 1.2 km section of the Pasakha Access Road (PAR) including a Land Custom Station (LCS), or second border post, at Alay; and
• Construction of the 2.66 km Phuentsholing By-pass Road (PBR), connecting Jaigaon and the Phuentsholing-Thimphu Highway, which will divert traffic away from Phuentsholing City and towards the MDP.

A further two projects, involving the construction of a “missing” 3.3 km section of the national highway between Phuentsholing and Chamkuna, and the provision of truck X-ray scanners and other equipment for the MDP, are being undertaken as part of a SASEC loan and grant project.42

The cost of the foregoing two projects has been estimated at US$ 23.07 million (US$ 17.60 million for the Phuentsholing – Chamkuna road and US$ 5.47 million for MDP equipment procurement). The ADB will finance US$ 19.61 (85%) of the total cost and the Government of Bhutan the balance of US$ 3.46 million (15%).

Four of the above listed projects (the MDP, the Phuentsholing by-pass road, the Land Customs Station and equipment procurement for the MDP) are being undertaken jointly by the Phuentsholing Municipality, or “Thromde”, and the Roads Department. The remainder are being undertaken solely by the Roads Department.

(ii) Road improvement project in India (AH 48)

The SASEC program of the ADB is financing the upgrading of Asian Highway 48 running from the border with Bhutan at Phuentsholing to the Bangladesh border at Changrabandha and comprising Indian National Highways 317A, 31 and 31C. The project involves improvement of the entire length (90.7 km) of Asian Highway 48, including: geometric improvements; junction improvements; construction of drains and footpaths; and construction of the Hasimara town and Pasakha by-passes. The latter is a two lane access road of 6.558 km, which branches off Asian Highway 48 and ends at the Pasakha border crossing. This will allow traffic to and from Pasakha to by-pass Phuentsholing and proceed directly to Jaigaon and Hasimara in West Bengal.

The cost of the total project is INR 666 crore, or US$ 97.77 million. The geographic scope of the project is given in Figure 5, below.

---

42 Project Number: 47284-002: SASEC Trade Facilitation and Logistics Project
(iii) Progress with road and logistics improvement projects supported by SASEC

Construction work on the Pasakha Access Road (PAR) has been suspended due to the slow progress achieved to date. The work involves widening and reconstruction of a 1.2km section of the existing access road to Pasakha coming from Phuentsholing; reconstruction of the bridge over the Bhalujhora River (120m); and construction of the multi-cellular culverts over Bhawanijhora landslide debris flow. Only 10% of the work has been completed to date and it will be necessary to re-tender, which will add another 7 months to the project. A lot of flash flooding occurs around the worksite, contributing to the delay. The road will serve important industrial areas and is therefore accorded high priority.

Construction of the Pasakha access road on the Indian side, involving a diversion of the Indian national highway (317A) through the Tea Gardens, is almost complete. This road has a rigid pavement and in future will allow rapid transport of cargo and containers between Pasakha and the Hasimara railhead.

The three sub-projects which have been packaged under the SASEC Road Connectivity Investment Program are:

- The Mini Dry Port (MDP);
- The northern by-pass of Phuentsholing City; and
- The Land Customs Station (border post) at Pasakha

As observed in Section 2, tendering for the design and construction of the MDP is currently in progress and may require another six months for completion.

A contract for the design of the Land Customs Station was recently awarded to SMEC (Snowy Mountains Engineering Consultants) of Australia.
The bypass is a difficult project, requiring the construction of two bridges across the Omchhu River. One of these will be a 120 meter, 2 lane curvilinear bridge, the first of its type in Bhutan. This bridge will connect the by-pass road to the Phuentsholing-Thimphu Highway in the RBA camp area. Delays in this project have arisen because of the difficulties of the terrain and the need to re-specify and re-design the critical structures.

(iv) Condition of the existing Phuentsholing-Thimphu Highway

The ESCAP study team travelled along the final section of the highway, between its intersection with the Paro-Thimphu Highway and Thimpu City. The road, which has 2 lanes for its entire length except for a short 4 lane section within Thimphu City, was found to be in generally good condition and with no traffic congestion (see photographs below). Due to the mountainous terrain, the highway follows a tortuous alignment, essentially following the valleys, which does restrict truck speeds. For example, the typical travel time between Phuentsholing and Thimphu, a distance of 180 km, is estimated at 6 hours, giving an average speed of only 30 km per hour.

The Executive Engineer of the Roads Department, with whom the study team met, indicated that many landslides occur in summer time. Extensive heavy duty concrete slope protection was noted along the route, presumably to prevent serious landslides.

---

43 Photographs taken on Phuentsholing – Thimphu Highway, between intersection with Paro-Thimphu Highway and Thimphu City, on 10 January 2017.
6. **Preliminary meeting with staff of Ministry of Transportation, Jakarta**

**Date and Time:** 0900 hours 27 February 2017  

**Participants:**  
Ms Sindhu Rahayu, Deputy Director for Multilateral Cooperation, Ms Monica Ajeng Oktaviany, Official Multilateral Cooperation, and Ms Balkis Kusumawati, Head of United Nations Organization Cooperation Subdivision, Multilateral Cooperation Division, Ministry of Transportation Indonesia  
Ryan Carvalho and Peter Hodgkinson representing UNESCAP  

**Discussion:**  
The difficulty confronting the transport planners of Indonesia is one of geography. Most centres of export/import trade in Indonesia are located within a short distance of seaports. There would be few, if any, trade generating locations situated more than 200 km from a seaport on any of the main islands in the archipelago.  

Notwithstanding this, a presentation by the Directorate General of Sea Transportation indicates that five (5) dry ports are currently in operation throughout the country, at the locations shown in Table 1. However, it is understood that, among these facilities, only the Cikarang and Gedebage Dry Ports, are active in a commercial sense.

**Table 1: Existing dry ports in Indonesia**  

<table>
<thead>
<tr>
<th>Name of dry port</th>
<th>Location</th>
<th>Industries served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gedebage Dry Port</td>
<td>Bandung, West Java</td>
<td>Textiles</td>
</tr>
<tr>
<td>Solo Jebres Dry Port</td>
<td>Solo, Jawa Tengah (Central Java)</td>
<td>Textiles, furniture, woodcrafts, and foodstuffs</td>
</tr>
<tr>
<td>Rambipuji Dry Port</td>
<td>Jember, East Java</td>
<td>Timber, sulphate mining and petroleum</td>
</tr>
<tr>
<td>Kertapati Dry Port</td>
<td>Kertapati, South Sumatra</td>
<td>Coal mining, crude palm oil</td>
</tr>
<tr>
<td>Tebing Tinggi Dry Port</td>
<td>Tebing Tinggi, North Sumatra</td>
<td>Crude palm oil</td>
</tr>
<tr>
<td>Cikarang Dry Port</td>
<td>Jababeka Industrial Park, West Java</td>
<td>Manufacturing and logistics industries in Jababeka Industrial Park</td>
</tr>
</tbody>
</table>

Source: Ministry of Transportation, Directorate of Sea Transportation, February 2017  

All of the dry ports in Table 1, with the exception of the Gedebage Dry Port, are operated by the private sector. The Gedebage Dry Port is owned and operated by the Indonesian Railway (PTKAI).
Arrangements were made by the Ministry of Transportation for the UNESCAP study team to visit the newest and nearest of these dry ports, at Cikarang.

7. **Meeting with dry port, customs and quarantine personnel at Jababeka Golf Club near Cikarang Dry Port**

**Date and Time:** 1120 hours 27 February 2017

**Participants:**

Benny Woenardi, Managing Director, Imam Wahyudi, GM Commercial, and Rio Rivai, Marketing Executive, P.T. Cikarang Inland Port; various senior staff of the Indonesian Customs and Quarantine agencies (the latter coming under the administration of the Fisheries and Agriculture Ministry).

Ryan Carvalho and Peter Hodgkinson representing UNESCAP

**Discussion:**

(i) **Background to the dry port development**

P.T. Cikarang Inland Port is a subsidiary of the JABABEK Group Holding Company which developed the JABABEKA Industrial Estate now served by the dry port.

CDP management outlined the history and background of the dry port development. Plans for the dry port were finalized after extensive discussions first with the responsible government regulatory authorities and subsequently with the UNESCAP Transport Division.

A licence to operate was issued by the Ministry of Transportation in 2009. The law was amended to allow the private sector to enter the dry port business. Decrees were issued to allow the establishment of the dry port as an extension of the Port of Tanjung Priok in Cikarang, Bekasi District, West Java Province and a business licence was issued to PT Cikarang Inland Port to allow it to operate at that site as a port business entity.

(ii) **Dry Port location and facilities**

Cikarang Dry Port is one of only two dry ports in commercial operation on the island of Java, the other being the Gedebage Dry Port of PTKAI – the Indonesian Railway. Cikarang Dry Port is located only 50 km southeast of Tanjung Priok, the main container handling seaport of Indonesia (please see Figure 1 below).

The dry port is a 100 per cent privately owned and developed facility, and despite its proximity to Tanjung Priok Port, has 3 private rail sidings within its boundary. It is connected to Tanjung Priok by rail services provided by PTKAI along the Bandung-Tanjung Priok mainline. It is also connected to Tanjung Priok Port by a multi-lane highway. *It is favourably located within an industrial zone which generates 62 per cent of the container trade handled by Tanjung Priok Port,* hence is within a short truck haul of several major industries.
The dry port occupies an area of 70 hectares, comprising:

- A container yard (CY) with four high stacking of containers for storage of loaded containers;
- An Empty Depot for storage of empty containers;
- A Reefer Yard for the storage of refrigerated containers;
- A rail handling yard to receive and despatch containers carried by rail;
- A Bonded Logistics Centre (warehouse);
- A Container Freight Station (CFS) for container stuffing/ unstuffing;
- An administrative office, accommodating CDP management, as well as customs and quarantine officials;
- A customs inspection area where containers and their contents may be physically checked.

Overall, an area of 200 hectares is available for development of the dry port.

Four reach-stackers are used to handle containers in the CY and the rail handling yard.

The recent throughput volume of Cikarang Dry Port was reported as 70,000 TEU per year, of which it was claimed that 24 per cent, or 16,800 TEU per year, is moved to and from Tanjung Priok Seaport.
Priok by rail. This would be equivalent to only a single train per day (assuming 46-50 TEU per train), with alternate day operation of inbound and outbound trains.

(iii) Issues related to rail servicing of the dry port

It is questionable how long the railway can sustain its container haul to/from Cikarang Dry Port at such a low level of demand, bearing in mind that fixed costs, especially on the Indonesian railway, comprise a very high proportion of overall railway operating costs. It is likely that P.T. Cikarang Dry Port would have negotiated a favourable rail haulage charge which is unlikely to cover the high rail unit operating cost on such a short haul and at such a low haulage volume.44

Poor rail accesses both at Tanjung Priok Port (further details of which are given in Section ) and at CDP also contribute to the poor economics of container haulage by rail. At CDP, the rail handling yard is quite distant from the CY of the dry port, with the result that containers must first be grounded before being transported by road trailer about 1 km to the CY. Railed containers therefore incur a penalty of two lifts by comparison with containers which are directly road hauled to the dry port from Tanjung Priok.

Rail access is provided in the form of three sidings which exit the Bandung-Tanjung Priok mainline of PTKAI. Two of these sidings are ballasted and one is embedded in the concrete pavement of the rail handling yard. While it was claimed that the sidings each have a length of 750 metres, i.e. at least the length of an entire train, it is likely that the placement of wagons in the CDP sidings requires a lot of shunting since small numbers of wagons originating, or destined for, CDP need to be added to or cut out of passing container trains.

Pictures (below) were taken during the visit of the UNESCAP Study Team to Cikarang Dry Port on 27 February 2017. The picture at left shows the junction of the CDP sidings to the Bandung-Tanjung Priok mainline, while the picture at right shows empty container wagons awaiting re-loading in the CDP siding.

44 Indeed, it was claimed by the CEO that rail only needs to recover the capital costs of its locomotives in addition to its direct operating costs in the haulage charges it levies on CDP, so presumably this is the basis of its agreed charges with CDP. This would deny PTKAI the ability to recover any part of its heavy fixed costs (including infrastructure maintenance) from the dry port.
(iv) **Issues related to shipping and customs clearance procedures**

Unlike most dry ports visited during the course of this project, CDP has established trading relationships with dry ports located in other countries. Agreements have been signed with the Lard Krabang Dry Port located in Thailand and with three dry ports located in the Netherlands and agreements are currently being negotiated with dry ports in Australia and Viet Nam. A strong trading link has already been established with the Lard Krabang Dry Port in cooperation with SITC Thailand, a subsidiary of an international shipping logistics company (Shandong International Transportation Corporation). Containers are consigned directly between CDP and Lard Krabang, using a Multimodal Transport Bill of Lading, understood to be based on the FIATA multi-modal transport document, and UN-LOCODES, which uniquely identify each dry port. The typical transit time, door to door, is 6 days, of which 3 days is the sailing time.

Figure 2 below shows the flow processes related to exports and imports of containers between CDP and seaports or dry ports located in other countries.

![Flow Chart](image)

**Source:** Cikarang Dry Port: Intermodal Connectivity through Hub & Spoke - Expanding Seaport’s Reach to Hinterland, updated April 2016.

**Figure 2:** Cikarang Dry Port export and import procedures
The key factor for the successful operation of these procedures is the nomination by shippers of CDP as the *place of delivery of import containers* and as the *place of receipt of export containers*, in the Multimodal Bill of Lading. If this is done, containers will pass through seaports with minimal security checks and will be customs cleared in the specified dry ports.

Some 200 Customs and other border inspection staff are permanently based at CDP, but are also available for inspection activities at other premises in the industrial zone.

The usual procedure is for Customs staff at CDP to receive advance information related to import containers (usually 72 hours before arrival of the vessel in Tanjung Priok Port). Indonesian Customs apply risk management techniques to on-line customer profile data in order to select containers for detailed physical inspection. Typically, less than 5% of all import containers received at CDP are subjected to physical inspection, since import containers are mostly consigned to low risk industries operating in the industrial zone.

A single window system, which integrates the procedures and documentation of all border inspection authorities, has been operating throughout Indonesia since 2008. Adoption of the single window system resulted from the 18 ministries involved in import/export regulation getting together to simplify procedures and documents.

(v) **Financing issues**

The Cikarang Dry Port is an example of a wholly private sector financed and operated facility. Under this option, all capital costs associated with the purchase of land, construction of the dry port’s infrastructure and with the purchase of its container and cargo handling equipment are financed by the private sector developer (PT Cikarang Inland Port) who also manages the operation. All of the risk under this option is assumed by the developer. The CEO claimed that there would be little interest by other potential investors in developing other dry port projects, owing to the excessive level of risk. Unlike highway and seaport projects which have so far attracted interest from private financiers, dry port projects lack the stable demand needed to attract private finance.

8. **Meeting at Ministry of Transportation, Jakarta with representatives of transport agencies and Indonesian Customs**

**Date and Time:** 1000 hours 28 February 2017

**Participants:**

Various officers of: Ministry of Transportation Indonesia; Indonesian Railway (PTKAI); Indonesia Port Corporation or PT Pelabuhan Indonesia 2 (Persero); Indonesian Customs; Quarantine Division of Ministry of Fisheries and Agriculture.

Ryan Carvalho and Peter Hodgkinson representing UNESCAP
Discussion:

This meeting was held to discuss the progress with, and policies for, the development of seaports and dry ports in Indonesia.

(i) Seaport development

Apart from the five dry port facilities reported to be in operation (see Section 1 above), there are no immediate plans to develop other dry port facilities in Indonesia. Instead, the focus of government plans is to develop new seaports, upgrade existing ports and improve rail accesses to ports throughout Indonesia. A representative of the PT Pelabuhan Indonesia 2 (Pelindo 2) corporate planning group outlined the strategic plan for development of seaports throughout Indonesia.

Many new ports are planned for development, not only in Java and Sumatra, but throughout the Indonesian archipelago.

The largest such development is an international container hub port being planned for Kuala Tanjung, southeast of Medan in North Sumatra (see Figure 3 below). The port site is opposite Port Klang, Malaysia and will have an ultimate design capacity to handle 25 million TEU. It is proposed to develop the port in four phases at a total cost of 34 trillion rupiah (about US$ 2.5 billion). Development of an industrial zone of 3,000 hectares will be part of this project. The new port will be served by a dry port currently under development at Tebing Tinggi and by a nearby palm oil manufacturing complex planned at Sei Mangkei. The latter will be connected to the railway which will ultimately be extended to Kuala Tanjung.

There is considerable doubt about the ability of the new port to compete effectively with other container hub ports in the region, especially Singapore and Tanjung Pelepas.

![Site of Kuala Tanjung seaport](source: www.worldportsource.com World Map)

**Figure 3:** Site of planned Kuala Tanjung Port
Indonesia has a total of 3,262 existing and planned seaports, of which only 111 are commercial ports operated by Pelindo. The presence of ports dotted around almost the entire coastline of the archipelago, means that most sources of cargo within the interior are within easy reach of a seaport.

In addition to Kuala Tanjung Port, Pelindo is planning to construct a major port, with a container handling capacity of about 2 million TEU per annum, at Patimban, West Java (east of Tanjung Priok). A PPP scheme is to be developed for this project.

There are plans to upgrade another three international container ports at: Sorong, East Papua; Tanjung Perak, Surabaya, East Java; and Belawan, North Sumatra, and to provide a Multi-Purpose Terminal in Kalimantan (with a capacity for 2 million TEU).

(ii) **Railway – seaport and dry port connections**

Less than 10 seaports, but all five dry ports in current operation, are connected to the national rail system.

In South Sumatra, rail connections will be constructed to two ports, Tanjung Api Api and Tanjung Cherak, by 2020, after 10 years of planning. Slow progress has been due to a lack of funding.

Construction of a railway link to Patimban Port, West Java, will commence this year.

Railway connections to Tanjung Priok Port, 11 km from Jakarta, have been a perennial problem. Direct railway access has not been possible owing to problems of land acquisition. For further discussion, see Section 4 of this report.

(iii) **Excessive dwell time at Tanjung Priok Port**

Port congestion, as well as customs and port clearance have contributed to excessive container dwell times at Tanjung Priok Port. The average dwell time is 3.4 days (as compared with only 1.2 days in the Cikarang Dry Port). The target is 2.5 days.

Improvement of the dwell time is expected to be possible as a result of changes in customs procedures which now require documents to be submitted before the arrival of vessels. Now, owing to pre-clearance 95% of import containers are taking only 0.06 days to clear.

Congestion at Tanjung Priok Port is also being combatted by removal of containers to dry ports for clearance. The imminent opening of Patimban Port will also relieve congestion at Tanjung Priok.
(iv) Gedebage Dry Port

Information related to Gedebage Dry Port was not provided at the meeting but was available from a JICA Master Plan Study on Port Development and Logistics in the Greater Jakarta Metropolitan Area.\textsuperscript{45}

The Gedebage Dry Port, operated by the Indonesian Railway PTKAI since the early 1990s, is located 187 km southeast of Tanjung Priok Port and about 10 km east of Bandung Station.

The facilities at this dry port are of limited capacity, as is indicated in Table 2 below.

**Table 2: Gedebage dry port facilities**

<table>
<thead>
<tr>
<th>Infrastructure/facility</th>
<th>Dimension/quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land area</td>
<td>3.5 hectares</td>
</tr>
<tr>
<td>Container loading and unloading siding</td>
<td>1 x 240 metres</td>
</tr>
<tr>
<td>CFS for export and import</td>
<td>2 buildings</td>
</tr>
<tr>
<td>Warehouse</td>
<td>1, 20m x 15m x 5 m</td>
</tr>
<tr>
<td>Tractors/prime movers</td>
<td>3</td>
</tr>
<tr>
<td>Top lifters</td>
<td>11</td>
</tr>
<tr>
<td>Transtainer (RMG)</td>
<td>1</td>
</tr>
<tr>
<td>Forklifts</td>
<td>5</td>
</tr>
</tbody>
</table>


The container throughput of Gedebage Dry Port was estimated at 16,000 TEU in 2009 and may be even less now.

The limited length of the single loading/unloading siding can accommodate only 17 container wagons, carrying 34 TEU. Thus, container trains operating on the Bandung line are short as is shown in the picture below.

The transit time for container trains operating between Gedebage and Tanjung Priok is about 6 hours (4 hours running time and 2 hours for transferring containers by road trailer from the rail sidings at the port to the berth stacking area).\textsuperscript{46} *The average running speed of 47

\textsuperscript{45} JICA Final Report c 2010.
\textsuperscript{46} JICA (2010).
km/hour is therefore reduced to an average transit speed of 31 km/hour due to the inefficient handling within the port.

9. **Meetings at Tanjung Priok Port**

**Date and Time:** 1025 hours 01 March 2017

**Participants:**

Mr Tu Budiananta, Head, Mr Andrew K Edward, officer, and other staff of Sea Traffic and Transport Division, Port Authority of Tanjung Priok. Mr Al Amin, Manager Business Development of PT Jakarta International Container Terminal.

Ryan Carvalho and Peter Hodgkinson representing UNESCAP

**Discussion:**

Tanjung Priok, the principal container handling port of Indonesia, is located on the island of Java, 12.3 km northeast of the city of Jakarta.

In 2015, the recorded container throughput at the port was 5.2 million TEU, representing a drop of 11.8 per cent on the throughput of 5.9 million TEU achieved in 2014. Volume is understood to have been depressed again in 2016, but still exceeds the nominal installed capacity of 5 million TEU per annum, so that the port is still considered to be congested.

The port is accessed by both road and rail, however is laid out according to a “finger pier” arrangement, with the fingers extending some distance from the shore, so that neither line haul road or rail services can enter the working areas behind the berths. Rail hauled containers are handled at two locations within the port: on the western side at the Pesoso Terminal which is operated by the Indonesian Railway PTKAI, but which is actually outside of the port boundary; and on the eastern side at the Jakarta International Container Terminal (JICT).

In the case of the former facility, a rail connection inside the port has not been possible owing to difficulties with land acquisition.

In the case of the latter facility, trains are received in a rail yard which is 500-1,000 metres away from the stacking areas in the port. From this yard, containers are transferred by yard trailer to the stacking areas. Trucks are received in a buffer yard, from which containers are transferred by yard trailer to the stacking area. Thus, **there are multiple container handlings for both road and rail hauled containers:** In the case of import containers, there are 4 lifts from the stacking areas in the port to the rail yard and 3 lifts for trucking. In the case of export containers, 2 lifts per container are required to transfer containers to the stacking areas in the port. The handling procedures for Export and Import containers are as shown respectively in Figures 4 and 5 below.

---

47 As reported by Containerization International and Lloyd's List in *The Top 100 Ports in 2015.*
48 As reported in World Cargo News for May 2013: *Tanjung Priok super port.*
49 A joint venture between the Indonesian State Port Company Pelindo II and Hutchison Port Holdings Ltd.
Figure 4: Handling procedures for export containers at JICT

Figure 5: Handling procedures for import containers at JICT
Containers to/from Surabaya, Gedebage and Cikarang are handled at JICT. The theoretical capacity for Cikarang containers was given as 180 TEU (3 trains) per day for import and export, or 65,700 TEU per year, which compares with the actual volume of only 17,000 TEU per year for rail, as reported by the management of Cikarang Dry Port.

Container trailers approach the port via a tolled expressway, but the road entrances to the port are now heavily congested at certain times of the day. In addition, there is one level crossing intersection between rail and road within the port area, which can add to the congestion problem.

Initial plans for development of a new terminal complex on reclaimed land were presented at a meeting with JICT management. The project, called New Priok Container Terminal 1, would be developed by a consortium of Pelindo II with 3 other partners at a cost initially estimated at US$ 2.47 billion. It would increase the draft of vessels which can be received in the port to 16 metres (sufficient for mega container ships) and would eventually deliver a capacity for 18 million TEU annually.\[^{50}\] The new complex would be arranged longitudinally and would provide for direct access by rail and road.

\[^{50}\] World Maritime News 18 August 2016.
Report of mission to Islamic Republic of Iran 12-15 February 2017

1. Meeting with Iranian Railway senior personnel

Date and Time: 0935 hours 12 February 2017

Participants:

Hossein Ashoori, Member of the Board and Head of International Transportation, Chief of Transit Committee of Railways of the Islamic Republic of Iran (RAI); Ebrahim Mohammadi, Vice President for Operation and Traffic, Railways of the Islamic Republic of Iran (RAI); Majid Amini, Systems and Processes Analyst, “Railway Think Tank”, RAI; Mohammad Saeed Mahboubi, Adviser on Dry Ports to RAI President and Project Manager, Aprin Dry Port Project; Esmaeel Babaei, Secretary of Dry Port Committee; S Hedati, Adviser to Transit Committee of RAI; Ms Mozhgan Kordbacheh, Deputy Director General of International Affairs Department RAI; Ali Abdollahi, Expert of International Affairs Department RAI; Mehdi Torabi, Senior Expert of International Affairs Department RAI; Mojtaba Soleimani Sedehi, Logistics Group Manager of Ministry of Road and Urban Development; and Babak Baghaei, Expert of the Bureau for the Transport Master Plan of Ministry of Road and Urban Development.

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

Discussion:

(i) Adoption of Intergovernmental Agreement on Dry Ports

During 2016, the Iranian Parliament approved the signing of this agreement which has yet to be ratified.

The Ministry of Roads and Urban Development has been assigned to co-ordinate the ratification process.

(ii) High level Committee on Dry Ports

The committee was established to coordinate the development of a network of dry ports in Iran. There is representation on the committee from the following organizations:

- Iranian Port and Maritime Organization
- Railways of the Islamic Republic of Iran (RAI)
- Islamic Republic of Iran Customs Administration
- Civil Aviation Organization of the Islamic Republic of Iran
- Management and Planning Organization of Iran
- Iran Chamber of Commerce, Industries, Mines and Agriculture

The chairperson of the committee is the President of RAI who is also Vice-President of the Ministry of Roads and Urban Development.
During the last 2 years the committee has had many meetings to consider the regions and locations which warrant the establishment of dry ports.

Proposals for dry port development must be submitted for review by the committee. The committee may commission consultant studies of such proposals.

(iii) Status of dry port development in the Islamic Republic of Iran

Although the study team was advised of the existence of several privately owned and operated inland terminals throughout Iran, none of these is connected to the railway network and although active, none has official status as a dry port. It is also believed that a major share of the throughput of the Shahid Rajaee Container Port (which handles about 90 per cent of all container volume handled in Iran) is cleared within the port and transported inland by road.

The committee has already approved dry ports for construction at 9 locations throughout the Islamic Republic of Iran. These are the locations which were included in Appendix 1 of the Intergovernmental Agreement and are shown in green in Figure 1. To these must be added the Aprin Dry Port located about 21 km southwest of Tehran and shown in blue in the figure. This facility will be located on railway owned land, and was mistakenly excluded from the list advised to UNESCAP when the Intergovernmental Agreement was being drafted.

In addition to the approved locations, another 15 locations have been proposed as sites for dry port construction. These are currently under consideration by the committee and will be the subject of a Master Plan being prepared by a consultant (and made available in May). They are shown in orange in Figure 1.

In accordance with a resolution of the High Council of Transport (which is chaired by the Minister of Roads and Urban Development and is representative of all transport modes), all approved dry ports are, and all proposed dry ports must be, connected to rail. The one exception to this rule is the dry port approved for the Imam Khomeini International Airport, which in any case will be rail connected within one year.

With few exceptions, all approved locations are those which have a concentration of trade generating industry and have therefore been accorded priority for the construction of dry ports.

It could be questioned whether the market is large enough to support 9 or more dry ports. The container volume moving into and out of Iran was less than 2.5 million TEU in 2016, of which 2.1 million TEU (about 85 per cent) was handled in the main container port of Shahid Rajaee near Bandar Abbas. Although Shahid Rajaee Port is connected to rail, very few containers are moved to/from the port by rail. Since the throughput volumes of the port have been low it is likely that its capacity has been underutilized and therefore that a majority of its container volume has been customs cleared within the port and despatched by road to destination, either in Iran or in neighbouring countries. These issues are considered in greater depth in Section 2 (iii) below.

---

51 As advised to the study team during meetings in Tehran on 12 February 2017.
Figure 1: Approved and proposed locations for dry port development

(iv) Targeted increase in rail share of the national transport task

Trucks handle almost 90 per cent of cargo transport within Iran, leaving rail with only a 10 per cent share.

In recent years, efforts have been made to increase the rail share to 12 per cent. The longer term planning goal, to be achieved by 2022, albeit ambitious, is a rail share of 30 per cent of all domestic and international cargo movement.

The development of rail-served dry ports will be one of the strategies employed to achieve this goal, as will the expedited connection of ports and neighbouring countries by rail. Inter-modal transport is being promoted through a closer connection between the railway and the Ports and Maritime Organization of Iran, whose president was formerly president of RAI.

(v) Progress with rail connections to ports and neighbouring countries

Turkmenistan is now connected by rail through 3 border locations: two stations, at Sarakhs and Incheh Borun, and a RORO (Roll on/Roll off) terminal at Bandar Anzali.

A rail connection through Khaf to the border with Afghanistan was recently constructed. Within a year it is expected that construction will reach the first station in Afghanistan.
Zahedan is connected with Pakistan via a broad gauge railway, but it is expected that in future it will be connected by rail to the Port of Chabahar.

There is a border station with Iraq, but a railway connection to Basra, 37 km from the border has yet to be constructed.

Bandar Khomeini, Bandar Abbas and Amir Abad (Caspian Sea) ports are all rail connected.

Construction of a rail connection to the new Chabahar Port has recently commenced. This port is located on the Gulf of Oman, southeast of Bandar Abbas. It has the advantage of being located well away from the congested Strait of Hormuz and closer to the main sea routes from Asia to Europe. It is also closer to the sources of trade in Afghanistan and Central Asia.

(vi) **Other strategies to increase railway share of cargo transport**

**Rail capacity expansion**

RAI is progressively removing capacity bottlenecks, by double tracking mainlines and increasing the speeds of freight trains, on selected routes. For example, priority is being given to the double tracking of the last 181 km of the Bafq-Bandar Abbas Line and the maximum speeds of freight trains on key routes will be increased from 60 to 90 km per hour.

**Financial incentives for new rail connections**

The government will contribute, depending on distance, 20-80% of the cost of constructing new access lines to connect private factories and warehouses. In the case of state owned companies, RAI will cover 100% of the cost of new line construction.

**Rail cargo capacity in ports**

Initiatives are being taken to increase the capacity of key ports to receive cargo transported by rail and to reduce rail handling costs in ports. Although the perennial problem of multiple rail handling in ports was not discussed at the meeting, a review of satellite imagery for Shahid Rajaee Port indicated that the main rail loading/unloading sidings for containers are located about 1.5 km from the berths, suggesting the possibility of multiple container lifts from rail to shipside. See Figure 2 below.
**Figure 2:** Rail access to Shahid Rajaee Container Terminal (Source: Google Earth)

**Tariff incentives**

RAI provides a 30% discount for the transport of certain important cargo commodities, such as cotton and fertilizer. Tariff rates have been unchanged for several years and it is proposed to hold them unchanged for the next 5 years.

**Allocation of oil revenues**

It is proposed to allocate 1% of oil revenues to rail for future development. This is expected to help recovery of rail costs and assist new construction.

**International cargo trains**

There have been discussions with neighbouring countries concerning the launching of international cargo trains, which is expected to have the possibility of a considerable increase in rail share.

**Government policies to divert cargo traffic to rail**

Policies are needed to combat the high social costs imposed by road transport on the community, including:

- The high road death toll (every year 18,000 people on average are killed in accidents on Iranian roads and trucks feature prominently in these accidents); and
- Worsening pollution of urban environments (especially that of Tehran) due to rising vehicle exhaust emissions, of which trucks are major contributors.
Iran has among the lowest fuel prices of any country in the world and thus an implicit subsidy has been paid to road transport operators through low fuel prices. It was the plan of the government to increase fuel prices in accordance with global oil prices, but the recent dramatic falls in global oil prices meant that this plan had to be abandoned.

The objective of government policies should be to limit cargo transport by rail to distances above 150 km. In practice the average cargo haul distance for rail in Iran is 600 km and rail hauls to the southern ports from Tehran are typically more than 1,000 km. For example, the haul distance from Bandar Abbas (Shahid Rajaee Port) to Aprin is 1,400 km.

(vii) Railway privatization in Iran

Eleven years ago, Parliament approved the privatization of the Iranian railway. This involved separation of operations from infrastructure, with the state retaining ownership of, and responsibility for maintenance of, the infrastructure, and operations being assigned to the private sector. Ten private passenger companies and 22 private cargo transport companies have been established to supply rolling stock and 30% of the locomotive fleet, as well as to operate trains on the state-owned infrastructure.

(viii) Choice of dry port locations

It was stated that dry ports should be located where they can most effectively contribute to minimizing the total logistics cost from a seaport to the point of consumption, or conversely from the point of production to a seaport. They must also have the promise of satisfying an adequate level of demand. The committee is not yet satisfied that the proposals for new dry port locations meet these requirements and hence, pending the results of a comprehensive consultant’s study, has not yet approved them.

It was emphasized that both the approved and the proposed locations could be re-examined depending upon the results of the consultant’s study.

However, it is expected that the development of a dry port at Aprin will satisfy a strong need for a facility located on the perimeter of Tehran which can receive a high volume of cargo by rail from Bandar Abbas, and process this cargo for distribution by truck throughout the metropolitan area.

(ix) New intermodal opportunities

Recently, the government has been in consultation with the Indian government concerning a desire of Indian trading companies to move containers from Mumbai to Moscow, via Bandar Abbas, using sea cum rail services. In this way, a rail transit route through Pakistan could be avoided.
2. **Meeting with personnel of Ministry of Roads and Urban Development**

**Date and Time:** 1530 hours 12 February 2017

**Participants:**

Mehdi Ashrafi, Adviser of the Vice-Minister for Transportation; Mojtabahed Soleimani, Adviser of the Vice-Minister Office for Transportation; Mehdi Safari Moghadam, Director General of the Bureau for the Transport Master Plan; Mojtaba Soleimani Sedehi, Logistics Group Manager; Ms. Mahdis Nejatnia, Expert of Corridors and International Conventions Group; Ms. Shafagh Alaei, Expert of Corridors and International Conventions Group; Babak Baghæi, Expert of the Bureau for the Transport Master Plan; Bahram Amir Ahmadian, Expert of the Transport Master Plan; Esmaeiel Babaie, Secretary of Dry Port Committee; Mr. Shedati, Advisor of the Transit Committee of Iranian Railways; Ali Abdollahi, International Affairs Department of Iranian Railways.

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Presentation on “Iran Logistics Road Map” (Mr Babak Baghe)**

New department with a focus on logistics

A new department, the Department of Transportation, was established within the Ministry of Roads and Urban Development as from November 2016 to be responsible for the development of a logistics system in Iran. *A particular objective of this department will be the development of Iran as a logistics hub for the region.*

The new department will focus on multi-modal transport and the integration of transport modes. It will support the work of the inter-agency Dry Ports Committee which is responsible for reviewing and approving proposals for dry port development in Iran.

**Hub and spoke concept**

The presentation emphasized the need to develop dry ports as hubs within a hub and spoke system, utilizing rail for long distance, or linehaul, transport and road for short distance transport, along the “spokes”, as shown in Figure 3, which was excerpted, and slightly modified, from the presentation.
Figure 3: Optimized freight transportation systems

In this diagram, “A” represents the traditional trucking solution. In some cases, it can be justified as trucks (even the larger ones) have the flexibility of door-to-door delivery, but it is unlikely to optimize logistics costs if the distance between origin and destination is longer than about 300 km. “B” represents the hub and spoke case where cargo is moved by rail from a logistics centre, usually a seaport, to an inland logistics centre, or dry port, where it is processed (or stored) and then distributed to the customer by short distance trucking. In the latter case, distances between the logistics centre and customers’ premises are likely to be very short, of the order of 20-30 km at most. In this case, the lower unit costs of long haul rail are blended with the lower unit costs of short distance trucking to optimize the overall logistics cost.

The same principle applies whether this is a domestic cargo, or a transit cargo, movement. In the latter case a border would be inserted between the origin and destination in the diagram, but the essential requirement for movement between the two is that border delays must be kept to an absolute minimum.

The presentation did stress that the optimal location for “logistics” hubs would be in trade and industry centres. This is an important requirement, which would preclude such hubs from being established at borders, unless supported by trade generating industry in the vicinity.

Despite this, however, three each of the approved and proposed dry ports appear to be located at, or near, borders. One of these, at Sarakhs on the border with Turkmenistan, while located near a Special Economic Zone, showed little evidence of supporting economic activity around the dry port site when this was visited by the UNESCAP study team.
Dry port development priorities

The map in Figure 4 was excerpted from the presentation. It appears to indicate the priorities for selection of dry port locations, as suggested by an analysis of the principal origins and destinations of domestic and transit freight flows. In both cases, the principal freight origin/destination is Bandar Abbas (Shahid Rajaee Port) which handles just under 50 percent of all inbound and outbound cargo, and nearly 85 per cent of all inbound and outbound container volume handled in Iranian ports (source: Ports and Maritime Organization statistics for 2014 and 2015).

Figure 4: Logistics hubs site selection

The tonnage of all non-oil cargo shipped through Shahid Rajaee Port in 2015 was just over 42 million tonnes. It was indicated at the meeting that 15-20 million tonnes of cargo per year is transported by rail between Aprin and Bandar Abbas. With the addition of cargo hauled by road, it is therefore possible that Tehran could account for more than 50 per cent of all non-oil tonnage shipped through Bandar Abbas.

In terms of non-oil transit cargoes which are handled through Iranian ports, PMO data indicated a total of only 4.7 million tonnes in 2015, of which 4.33 million tonnes, or 92% of all transit tonnage handled in Iranian ports, was handled at Shahid Rajaee Port. These numbers of course exclude the tonnage of transit cargo generated within Iran. Estimates prepared by logistics experts from the Ministry of Roads and Urban Development show that 1.4 million tonnes of transit cargo were moved by rail and 10.3 million tonnes was moved by road in 2015. From this it might be concluded that 60% of all transit tonnage is generated within Iran.

Other than the transit cargo originating in, or destined for Iran, the major portion of transit cargo moves between Shahid Rajaee Port and Afghanistan or Central Asia. Some 20 % of this cargo

---

52 Ports and Maritime Organization Statistics Report 2015
53 Presentation: Iran Logistics Road Map, slide 18, 12 February 2017.
54 (11.7 million tonnes-4.7 million tonnes)/11.7 million tonnes x 100
comprises containers, of which rail appears to carry very few, although it is possible that rail carries a large share of the non-containerized cargo. During the return from the site visit to Sarakhs, the UNESCAP study team noted numerous road trailers loaded with 40 ft. containers moving northbound. No containers were in evidence at Sarakhs during the team’s visit. A preliminary assessment of the volume of transit containers moving in the corridor between Bandar Abbas and Afghanistan or Central Asia is featured in Section 2 (iii).

It will be essential to measure the OD characteristics of the demand attributable to domestically sourced transit cargo as a basis for determining dry port location. Similarly, it will be essential to determine the OD characteristics of export/import trade which should also be a determinant of dry port location. It is presumed that these matters will be covered in the consultant study which will guide the committee’s decisions in the approval of new dry port locations.

(ii) Other issues discussed

Measures needed to achieve modal shift from road to rail

- Eliminate the implicit fuel subsidy for road and increase road access charges (tolls)
- Strictly enforce truck weight limits to eliminate overloading (present limit is a gross vehicle weight of 40 tonnes, but trailers are limited to a maximum payload of 22.5 tonnes)\(^{55}\)
- Enforce/extend limits on truck circulation within urban areas (current ban in Tehran applies between 2200 and 0600 hours)

Estimates of container volume carried by rail between Bandar Abbas and Aprin

In 2015, only 13,403 TEU were carried on trains between Bandar Abbas (Shahid Rajaee Port) and the Aprin rail terminal. The breakdown of this number by container size was as follows:

- 5,625 x 20 ft
- 3,889 x 40 ft
- 9,514 total

While container wagons were observed at the Aprin station, they were loaded with domestic containers.

(iii) Current demand for haulage of containers by all modes to/from Bandar Abbas

An analysis was made of the port container statistics available from the Ports and Maritime Organization over the period 2009-2016, in order to assess the level of demand for inland haulage of containers to/from Shahid Rajaee Port.

Shahid Rajaee Port container throughput trend

Shahid Rajaee Port, located 23 km west of Bandar Abbas, handles about 85 per cent of the annual container volume arriving at, and departing from, the ports of Iran. As shown in Figure 5, the

---

\(^{55}\) Three axle trucks employed in transit traffic have a tare weight of 16 tonnes.
The container throughput of the port fell from its peak of 2.75 million TEU in 2011 to a low of 1.77 million TEU in 2014. Between 2010 and 2014, the port fell more than 40 places in the ranking of the world’s top container ports, from 44 to 87. With the relaxation of trade sanctions, it has since recovered to reach 2.11 million TEU in 2016.

![Annual container throughput, Shahid Rajaee vs. other ports of Iran](image)

Source: Ports and Maritime Organization of Iran, Statistical Reports 2009-2016

**Figure 5: Annual container throughput, Shahid Rajaee vs. other ports of Iran**

Iranian ports are estimated to have the capacity to handle an annual container volume of 5.34 million TEU. With an overall throughput of 2.46 million TEU in 2016, they are utilizing only 46 per cent of their capacity on average.

Shahid Rajaee Port is understood to have an annual throughput capacity of 3.3 million TEU. With a throughput of 2.1 million TEU in 2016, it is still only utilizing about 60 per cent of its design capacity.

As indicated to the study team during its visit to the Aprin terminal (see Section 3 below), it appears that a high proportion of the container throughput of Shahid Rajaee Port, is being customs cleared within the port and despatched by road direct to factories and other consignee premises, either in Iran or in neighbouring countries. The presence of significant unused capacity and an absence of congestion in the port will tend to perpetuate this situation, unless shippers can be convinced to specify clearance and release of their cargo at dry ports in the interior.

**Measurement of demand for container haulage to and from Shahid Rajaee Port**

This demand comes from two sources:

---

56 Iran Chamber of Commerce, Industries, Mines and Agriculture, Newsroom 10 September 2016
The volume of transit containers to be moved between the port and origins or destinations in Afghanistan, Central Asia, or beyond, in Russia and Europe;

The volume of export and import containers to be moved between the port and origins or destinations in the interior of Iran

- Transit containers

PMO statistics indicate for a short period the tonnage of transit container cargo loaded and unloaded at Shahid Rajaee and other Iranian ports. These data were combined with other data on container volume (TEU) and tonnage throughputs, as shown in Table 1, to provide an estimate of the transit container TEU volume to and from Shahid Rajaee.

<table>
<thead>
<tr>
<th>No.</th>
<th>Cargo category</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total oil and non-oil throughput tonnes</td>
<td>69,559,866</td>
<td>73,394,184</td>
<td>74,351,894</td>
<td>65,616,696</td>
</tr>
<tr>
<td>2</td>
<td>Total non-oil cargo tonnes</td>
<td>47,022,456</td>
<td>48,748,352</td>
<td>50,480,281</td>
<td>42,051,623</td>
</tr>
<tr>
<td>3</td>
<td>Total container throughput tonnes</td>
<td>25,470,942</td>
<td>20,094,612</td>
<td>20,777,352</td>
<td>18,279,035</td>
</tr>
<tr>
<td>4</td>
<td>Total non-oil transit cargo tonnes</td>
<td>790,838</td>
<td>1,312,809</td>
<td>5,331,336</td>
<td>4,330,256</td>
</tr>
<tr>
<td>5</td>
<td>Transit container tonnes</td>
<td>755,984</td>
<td>1,246,268</td>
<td>5,120,609</td>
<td>3,802,023</td>
</tr>
<tr>
<td>6</td>
<td>Total container TEU volume</td>
<td>2,261,333</td>
<td>1,796,862</td>
<td>1,766,645</td>
<td>1,824,369</td>
</tr>
<tr>
<td>7</td>
<td>Export throughput tonnes</td>
<td>26,486,543</td>
<td>33,574,818</td>
<td>33,858,139</td>
<td>30,402,334</td>
</tr>
<tr>
<td>8</td>
<td>Import throughput tonnes</td>
<td>20,233,186</td>
<td>16,423,950</td>
<td>14,170,494</td>
<td>12,364,863</td>
</tr>
<tr>
<td>9</td>
<td>Total export plus import tonnes</td>
<td>46,719,729</td>
<td>49,998,768</td>
<td>48,028,633</td>
<td>42,767,197</td>
</tr>
<tr>
<td>10</td>
<td>Total export plus import tonnes as % of total throughput tonnes</td>
<td>67.2%</td>
<td>68.1%</td>
<td>64.6%</td>
<td>65.2%</td>
</tr>
<tr>
<td>11</td>
<td>Non-oil transit as % of total non-oil tonnes</td>
<td>1.7%</td>
<td>2.7%</td>
<td>10.6%</td>
<td>10.3%</td>
</tr>
<tr>
<td>12</td>
<td>Container transit as % of total container tonnes</td>
<td>3.0%</td>
<td>6.2%</td>
<td>24.6%</td>
<td>20.8%</td>
</tr>
<tr>
<td>13</td>
<td>Container tonnes per TEU (average) [3 ÷ 6]</td>
<td>11.26</td>
<td>11.18</td>
<td>11.16</td>
<td>10.02</td>
</tr>
<tr>
<td>14</td>
<td>Transit container TEU (estimate) [5 ÷ 13]</td>
<td>67,117</td>
<td>111,441</td>
<td>435,392</td>
<td>379,467</td>
</tr>
<tr>
<td>15</td>
<td>Export/import container flows (TEU) to/from inland [6 x 10]</td>
<td>1,518,819</td>
<td>1,224,087</td>
<td>1,141,189</td>
<td>1,189,075</td>
</tr>
</tbody>
</table>

Source: PMO statistics, 2012-2015

Table 1: Calculation of transit and import/export container volume, Shahid Rajaee Port

If PMO statistics can be trusted, transit container tonnage increased by a factor of nearly six over the 3 year period from 2012 to 2015. The volume of transit containers transported to and from Shahid Rajaee Port appears to have reached about 400,000 TEU per year.

As observed elsewhere in this report, very few transit containers are moved by rail across the Sarakhs border, but road movements of transit containers across this border are believed to be substantial, especially to/from Central Asia.

- Export/import containers

The volume of export/import containers moved through Shahid Rajaee Port was calculated by applying the export/import share of the port’s overall throughput to the overall volume of containers handled in the port. This resulted in a volume of 1.2 million TEU in 2015. As indicated during the second meeting in Tehran, only 13,500 TEU was transported by rail between Bandar Abbas and Aprin.
in 2015. No information was provided on the volume of export/import containers moved between the port and other inland origins or destinations, but it appears that the rail mode has yet to make a significant push into the container haulage market in Iran.

Actual data, rather than estimates, indicate that the tonnage of transit containers has been increasing while that of export/import containers has been declining over the 3 year period reviewed.

3. **Visit to Aprin dry port site**

**Date and Time:** 1030 hours 13 February 2017

**Participants:**

Mohammad Saeed Mahboubi, Adviser on Dry Ports to RAI President and Project Manager, Aprin Dry Port Project; S.S. Ebrahimnejad, Technical Deputy of Director General and Head of Aprin Terminal; Babak Baghaei, Expert of the Bureau for the Transport Master Plan of Ministry of Road and Urban Development; one staff member of International Affairs Department RAI.

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Briefing on Bandar Abbas to Aprin traffic**

The route distance from Bandar Abbas (Shahid Rajaee Port) to Aprin Terminal is approximately 1,400 km. The route runs through Qom and Yadz (please refer to the railway route map in Figure 6). The running time for freight trains on this route is 3 days, reflecting an average speed of only 19.4 km per hour. Operational priority given to passenger trains and the fact that 645 km of the overall route distance is still single tracked largely explains why freight train speeds are so low.
Currently, Aprin handles 15 trains in and 15 trains out per day, of which 3 per day in each direction are to and from Bandar Abbas.

It is expected that the single track between Qom and Bafq (581 km) will be double tracked within 2 years, while double tracking work is in progress on the last 81 km section between Fin and Bandar Abbas.

Container trains are operated on this route in a 30 x 24 metre wagon configuration, carrying up to 120 TEU.

Three types of container wagon are in regular use: a 14 metre long wagon carrying up to 2 TEU, an 18 metre long wagon carrying up to 3 TEU and a 24 metre long wagon carrying up to 4 TEU. RAI is investigating the introduction of double stacked wagons on the route, but will have to overcome the problem of the height restriction (1.3 metres) in tunnels, of which there are 25 on the 360 km section between Sirjan and Bandar Abbas. This may involve the introduction of low profile “well type” wagons, but these are often articulated with an axle loading of 30 tonnes or more. The current axle load limit on mainlines in Iran is 22.5 tonnes.
Container wagons were observed in the Aprin marshalling yard, as shown in the pictures below, but these are likely to have been assigned to domestic traffic.

1. Overall view of Aprin yard
2. Four slot wagon
3. Two slot wagon

Pictures taken in Aprin Marshalling Yard 13 February 2017

(ii) **Aprin dry port project**

Aprin is located about 21 km southwest of Tehran at the intersection of the east-west line from Mashhad to the border with Turkey at Razi, and the north-south line from Bandar Abbas to Tehran. As such, it is in a strategic position to handle cargo from the southern ports, 60-70 per cent of which originates in, or is destined for, Tehran and in addition to handle cargo to and from major industrial centres, such as Tabriz (automobiles, clothing and foodstuffs) and Esfahan (steel). Aprin is also well connected to the Asian Highway network, standing at the intersection of AH 1 (border with Afghanistan to border with Turkey) and AH 72 (Tehran-Bushehr Port).

Aprin is situated within an industrial zone and will serve many factories within a 60 km radius.

A land area of 700 hectares is available for development at Aprin, all under the title of the Ministry of Transport and Urban Development. Last year (2016) a tender was awarded for the initial development of the dry port on 35 hectares. The facility will be developed and operated under a BOT contact between RAI and a Swiss company, at an estimated cost of € 42 million (US$ 44.4 million). Construction is estimated to take 2.5 years. Tenure of the BOT contract will be 25 years.
The proposed layout of the dry port is shown in Figure 7. It will comprise:

- A container yard with an area of 3.7 hectares and a capacity for storing about 10,400 TEU at any one time\(^5\);  
- Five loading/unloading tracks within the dry port boundary, with an average length 940 metres each, more than adequate to receive entire trains comprised of 30 x 24 metre wagons and up to 3 locomotives;  
- A container freight station;  
- A cargo consolidation warehouse;  
- Two transit warehouses;  
- A container repair workshop; and  
- An administration building accommodating the dry port administration, customs inspectors, freight forwarding agents and banking facilities.

Loading/unloading of containers in the rail area and in the CY will be undertaken by rail mounted gantry cranes (RMGs). More than 5 RMGs will be required to work the CY alone. Each RMG is estimated to cost about US$ 2.5 million, suggesting an investment in heavy lifting equipment of some US$ 25 million.

The CY will comprise 5 individual container blocks or stacks with 5 high stacking. It was estimated that an annual throughput of 72,000 TEU could be achieved for each stack, giving a total throughput for the dry port of 360,000 TEU per year.

*No indication was given as to phasing of the project, but it is likely that, in the initial stages, it will provide much more capacity than can realistically be absorbed by the available demand.*

---

\(^5\) The CY capacity figure of 30,600 TEU shown in the layout drawing is believed to be incorrect, as such a figure would be inconsistent with the CY area, derived from the drawing, of 3.7 hectares.
Figure 7: Proposed layout – Aprin Dry Port (Source: Aprin Dry Port Project Manager, RAI)
(iii) **Customs and other border control issues**

It was confirmed that nearly all customs clearance is undertaken within Shahid Rajaee Port. Performance of customs inspection was claimed to be poor, with import consignments requiring 10-15 days to clear. Cleared import containers are then despatched by truck for direct delivery to inland customers. As observed in Section 2 (ii), very few maritime containers are carried by rail to/from Bandar Abbas. The containers observed in the Aprin yard were understood to be mostly domestic containers.

Provision of customs inspection facilities in the new dry port is considered essential not only in terms of accelerating the turnaround of cargo in the facility itself, but also in terms of making the operation at Shahid Rajaee Port more efficient and cost effective.

It is understood that the single window principle is now applied to border control in all active Iranian ports.

(iv) **Existing warehouse facility**

An existing warehouse is located close to the dry port site. It is accessed on one side by road and on the other by rail. Currently it is used to store coiled steel transported by rail from Esfahan and re-delivered by road and rail to users, the principal destination being the automotive manufacturing plants in Tabriz. The turnover in the warehouse is about 22,000 tonnes of coiled steel per month, or 264,000 tonnes per year.

1. Coiled steel stored in warehouse
2. Heavy duty forklift for coil handling
3. Truck loading platform
(v) Comparative rail and road haulage charges

The rail charge for container haulage from Bandar Abbas to Aprin is the equivalent of approximately US$ 800 per TEU (57 cents per TEU-km or 5 cents per tonne-km). Road transport charges are 10-20 cheaper, depending on container weight. Thus, road haulage charges could be as little as US$ 640 per TEU (43 cents per TEU km or 3.9 cents per tonne-km).

It is difficult to understand why road rates should be less than those of rail, given that haulage by rail is in trainloads of up to 120 TEU as compared with road haulage of only 2 TEU per trailer. It should be possible for rail to reflect much lower unit costs in its charges.

4. Visit to Mashhad and Sarakhs

4.1 Meeting at Mashhad Railway Station

Date and Time: 14 February 2017, 0810 hours

Participants:

Mohammad Hadi ZiaeiMehr, Director General Khorashan Railway, RAI; Mahdi Abdolkarim Zadeh, Deputy of Manager, Khorashan Railway, RAI; Esmaeiel Babaei, Secretary of Dry Port Committee, RAI; Md Mazmouli, a senior official of the Islamic Republic of Iran Customs Administration; Ali Abdollahi, Expert of International Affairs Department RAI.

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

Discussion:

(i) Introduction to Khorashan Railway

- Khorashan is one of 19 railway districts in Iran
- Total railway route km within the district is 1,500, representing 12 per cent of the total route-km of the Iranian railway
- The district has 45 out of the 470 railway stations in Iran, including 2 major freight handling stations (Shahid Motahari and Sarakhs)
- Mashhad is a culturally important city which attracts high numbers of domestic and foreign tourists. In 2015, 13 million passengers arrived at, and departed from, Mashhad Railway Station, up from 1.6 million in 1978. Passenger traffic through Mashhad Station exceeds that of Tehran
- In 2016, 26 cities were connected by direct passenger train to Mashhad (a six fold increase by comparison with 2005)
- Korashan Railway handles about 10 per cent of all goods tonnage transported by rail in Iran. In 2015, 6 million tonnes of goods were transported on the Korashan Railway network (domestic 3.4 million tonnes = 57% and international 2.6 million tonnes = 43%)
- Sarakhs Railway Station handled 85 per cent of the total transit cargo traffic of the Iranian Railways. 1.18 million tonnes of transit cargo was handled through the Sarakhs rail border in
2015, an increase of 256% over 2014. Altogether, the Sarakhs-Bandar Abbas Port corridor transported 92% of all rail transit cargo moved in Iran.

- Sarakhs handled 50% of all non-oil exports and 98% of all non-oil imports moved by rail in Iran

(ii) Shahid Motahari Station

Shahid Motahari is one of 9 sites throughout Iran approved for the development of a dry port. This station is 32 km by rail south of Mashhad and 153 km by rail southwest of Sarakhs. It is connected to the Asian Highway network: it lies at the intersection of AH 1 (border with Afghanistan at Dogharun to border with Turkey at Bazargan) and AH 75 (Sarakhs to Chabahar). The station is about 320 km from the new rail border with Afghanistan, east of Khaf, and is also close to the road border with Afghanistan at Dogharun. The road route through Afghanistan provides the shortest trip time between Bandar Abbas and the countries of Central Asia.

The station is a major freight handling facility, with 98 per cent of all the rail cargo received in Korashan district being discharged there. It covers a land area of 190 hectares and has the following facilities:

- a large marshalling yard, with capacity to assemble long trains
- customs warehouses with an overall area of 9 hectares
- a fuel storage depot with a capacity of 90 million litres (supplied by fuel trains from Turkmenistan, storing fuel for power station)
- four private sidings, used for fuel storage, grain storage and wagon loading/unloading

The total investment in the provision of private siding facilities is some US$ 58.7 million, of which the private sector contribution is US$ 41.5 million and the balance (US$ 17.2 million) is provided by the public sector.

Customs inspection is available at the station.

Within the past five years, the cargo volume handled at Shahid Motahari reached a peak of nearly 1.5 million tonnes in 2014, but dropped dramatically in the subsequent two years.

(iii) Sarakhs Station

Sarakhs is the largest border rail station of Iran. It does not originate or terminate traffic of its own, or at the least very little. Rather, its role is to process bilateral and transit traffic across the border with Turkmenistan, including exchange of bogies between the gauges of each country.

Sarakhs Station is located 153 km by rail northeast of Shahid Motahari station (and 185 km by rail northeast of Mashhad Station). The station is connected to the Asian Highway network (AH 75) and is 7 km from Sarakhs Airport. A Special Economic Zone has been established about 14 km south of the station, close to the border customs control office. The international border at the Tajan Bridge is 5 km north of Sarakhs Station (please see map in Figure 8).
The station occupies a land area of 310 hectares. Within the station area, there are 49 standard gauge lines and 15 broad gauge lines.

The station has two bogie exchanges each served by two standard gauge lines and two broad gauge lines. On the Turkmenistan side there is only a single bogie exchange. The layout of the bogie exchanges on both sides of the border is given in Figure 9 below.

The capacity of the exchanges on the Iranian side is 400 wagons per 24 hours, or approximately 16 wagons per hour. On the Turkmenistan side the capacity of the single exchange is only 100 wagons per 24 hours, or 4 wagons per hour. The agreement between the railway organizations of both sides is that they should each exchange 50% of the wagons, but directional imbalances in the traffic and the mismatch of capacities might make it practically difficult to apply this rule.

The Director General maintains that there are no delays due to the bogie exchanging of wagons because a stock of 5000 standard gauge bogies is kept on the Iranian side to cover for traffic imbalances. On the Turkmenistan side, the stock is only 2,000 broad gauge bogies, but this is not considered to have presented any problem so far.

It is probable that both sets of exchanges are operating well below capacity because traffic has recently been depressed. In 2014, 3.4 million tonnes of transit cargo was handled at Sarakhs. Thereafter, traffic declined dramatically but is now beginning to recover. During the visit of the study team to Sarakhs, it appeared that there was very little movement of wagons through the exchanges.
Operating performance between Sarakhs and Bandar Abbas

The rail distance from Sarakhs Station to Shahid Rajaee Port (Bandar Abbas) is about 1,600 km. The running time of scheduled trains on this route is about 53 hours, suggesting that freight train speeds average about 31 km per hour.

An improved train running performance will in part depend on the double tracking of the existing 783 single track section north of Bafq (between Kashmar on the double tracked Mashhad-Tehran mainline and Bafq).

RAI has plans to double track this section with private financing and also to transfer responsibility for maintenance of the first line to a private concessionaire. The impending completion of a rail link to Afghanistan might be expected to attract mineral ore traffic from Hafq in Afghanistan to run to Bandar Abbas which could easily saturate the capacity of the single-track section.

New line construction projects

As may be observed in Figure 10, several new line construction projects are either in an advanced state of planning or are in progress in the vicinity of the Korashan Railway, the major ones being:

- Construction of a single track cross border standard gauge railway to connect Khaf in Iran with Ghurian in Afghanistan. The 70 km section from Khaf to the border is already in place and work on the 62 km section from the border to Ghurian will soon commence. Construction of the next section of 82 km from Ghurian to Herat is a commitment of the Afghanistan government. This cross border railway will be of importance for two reasons: it will be a component of an eventual standard gauge rail corridor linking southwestern China, Kyrgyzstan and Tajikistan via northern Afghanistan and Iran to Europe, and it will enable the
large scale extraction of mineral ores from Hafq, Afghanistan and their export by rail through Bandar Abbas.

- **Construction of a single-track railway to connect northeastern Iran with Chabahar Port.** This line will have a length of 1,350 km. The southern section of 500 km from Zahedan to Chabahar Port\(^59\) is currently under construction with the technical and financial assistance of India. The estimated cost is US$ 1.6 billion, or US$ 3.2 million per km. The northern section of 850 km which connects with the Kashmar-Bafq line is currently under study. Chabahar Port is located in the Strait of Oman, is unaffected by the congestion in the Straits of Hormuz, and is closer to the main east-west sea routes. It will provide a slightly shorter route for transit traffic through Sarakhs than the existing Sarakhs-Bandar Abbas route.

- **Construction of a second running line between Kashmar and Bafq.** As previously mentioned this project is currently in the advanced stages of planning. It will relieve the capacity shortage on the route between Sarakhs and Bandar Abbas, particularly with the future prospect of mineral traffic from Afghanistan joining this line.

- **Construction of a new 650 km line connecting Mashhad with Gorgan in north-central Iran.** This project is designed to attract tourist traffic to Mashhad from northern Iran and Central Asia which is now connected with Gorgan through the rail border at Incheh Borun. It is currently under study.

(vi) **Customs and other border control issues**

According to the Customs Administration representative at the meeting, 24 hour coverage is provided at all permanent customs posts. Customs have a permanent presence at Shahid Motahari and Sarakhs stations.

The policy of Customs is to be ready to send inspectors to any station where transit is being done and where adequate facilities are provided. It is not necessary for companies involved in transit to go to established customs offices.

The Dogharun road border post is the second busiest customs office in Iran for imports into the country.

Within Korashan Province, there are 4 border posts where customs have a permanent presence: 3 on the border with Turkmenistan and 1 on the border with Afghanistan. Within the province, there are also 20 factories which are authorized for customs inspection of import consignments.

\(^59\) India is interested in transporting containers by sea to this port and then rail hauling them through Central Asia to Moscow, in order to avoid rail haulage through Pakistan.
Customs will cooperate with any realistic plan for dry ports. If Customs are provided with facilities in dry ports, they will not inspect at borders, *unless customers specify a border station as the destination*. Thus, if a dry port is established at Motahari, cargo despatched to Motahari from Bandar Abbas will be customs inspected in Motahari.

There are two approaches to customs inspection:

- Transit cargo is considered safe. There is no detailed inspection (although consignments can be X-rayed at the border if needed) and cargo is permitted to go through;
- If the cargo destination is Iran, a more detailed inspection will be ordered depending on a risk assessment.

In the case of the Special Economic Zone in Sarakhs, goods are not required to go through Customs.

The Customs representative questioned whether Motahari was a suitable site for a dry port, given that it does not have an industry support base. It merely serves en-route transport needs.

Sarakhs Station accounts for 92 per cent of the export transit cargo through Iran, i.e. CIS-Sarakhs-Bandar Abbas-export to third country. The railway has offered a 30-40% discount on haulage charges to encourage this traffic and a detailed record is kept of all transit bottlenecks (whether related to railway operations or border control).

In the case of *road transport*, for example, Turkmenistan trucks can carry transit cargoes from CIS countries, but there are some restrictions on re-loading those trucks with cargo in Iran. Whether or not cargo is transloaded at the border depends on customer requirements. Some 90 per cent of trucks going to Turkmenistan are Iranian.
(vii) **Government approach to financing development of rail infrastructure**

The general position is that the government will finance the infrastructure and contract out the operation, but there is also a desire to encourage private investment in infrastructure also.

### 4.2 Visit (by section car) to Motahari and Sarakhs Stations

**Date and Time:** 14 February 2017, 1040-1700 hours

**Participants:**

Mohammad Hadi ZiaeiMehr, Director General Khorashan Railway, Mr. Merajifar, Public Relations Manager, Khorashan Railway; Esmaeiel Babaei, Secretary of Dry Port Committee, RAI; Ali Abdollahi, Expert of International Affairs Department RAI.

Ryan Carvalho and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **Observations, Mashhad-Shahid Motahari**

Three running lines in Mashhad Station: 2 to Tehran; 1 to Sarakhs. Signalling/safe-working system between Mashhad and Tehran is CTC and Auto Block.

(ii) **Observations, Shahid Motahari Station**

Marshalling yard consists of 10 shunting lines and 5 signalling lines (for despatching of trains). Bandar Abbas-Sarakhs freight trains by-pass the yard but all other freight trains are assembled or dis-assembled there.

The station occupies an area of 190 hectares, not including 5 private sidings which are connected to the marshalling yard, but are considered to be outside of the station area.

**There are no facilities for handling containers at Shahid Motahari Station.** *Maritime containers were observed in the despatch tracks of the marshalling yard (see picture below), but it is understood that these are consigned from Bandar Abbas to Mashhad. A container crane is located in Mashhad and other cranes which can lift containers are also available there.*

Fuel dominates the cargo mix at Motahari. The throughput of fuel, mostly for consumption by a power station, is about 1 million tonnes per year.

Another major commodity handled at Motahari is bulk grain, mostly transported from Kazakhstan in covered wagons, or boxcars. The grain is discharged from the open doors of wagons shunted over a ground receiving pit (see picture below). Grain is stored in large silos located on a private siding.

A new loading/unloading platform, as well as new offices for customs inspectors, freight forwarders and financial services, was observed to be under construction. These will be ready for occupation next year (2018).
Pictures taken at Motahari Station 14 February 2017

(iii) Observations, Shahid Motahari to Sarakhs

Track comprises 60 kg UIC rail laid on closely spaced pre-stressed concrete sleepers. The maximum axle load is 22.5 tonnes and the minimum curvature 800 metres. Much of the line passes through mountainous terrain, where tight curves prevail and construction of 3 tunnels and one long bridge has been necessary (see pictures below). The three tunnels have lengths respectively of 2,600 metres, 2,400 metres and 1,000 metres. The bridge is 168 metres long and 30 metres high.

Movements on the line are controlled by local signalling, which it is expected will be linked eventually to the CTC centre on the Mashhad-Tehran mainline.

Freight trains on the line typically comprise 3 high horsepower diesel-electric locomotives and 40-50 bogie wagons with a trailing length of 750 metres and a gross tonnage of 3,500-4,000.

About 25 km south of Sarakhs, there is a junction with a 18 km line which connects to the Khangiran gas refinery. The refinery extracts from natural gas about 400,000 tonnes of sulphur per year, all of which is moved out by rail.
The Sarakhs Special Economic Zone (SEZ) was observed, just south of the station. It occupies a large land area (about 800 hectares, more than twice that of the station), but there were few signs of activity there. It is doubtful whether the SEZ will have a sufficient industrial base to support a dry port at Sarakhs and calls into question the wisdom of developing dry ports at borders, which are remote from trade sources.

(iv) Observations at Sarakhs Station

Operation of the twin bogie exchanges at Sarakhs has been contracted out, but RAI owns all of the infrastructure and equipment.

The Tajan River, about 5 km north of the station forms the border with Turkmenistan. After proceeding through the bogie exchange, rakes of wagons are hauled north on the broad gauge (1520 mm) line. RAI has converted 3 standard gauge locomotives to run on the broad gauge. On the Turkmenistan side one broad gauge has been converted to run on the standard gauge.

Within the station area, track length is 80 km, 55 km of standard gauge and 25 km of broad gauge.

The entire area of the station (310 hectares) has been designated as a secure zone by Customs.
The station operates 24 hours per day, 365 days per year. Cargo throughput capacity is 7 million tonnes per year, but due to an economic downturn in Central Asia and the effect of sanctions on Iran, only 1.2 million tonnes of transit cargo was handled in 2015. In prior years, volume handled by the station had reached 3.5 million tonnes.

The twin bogie exchange at Sarakhs can accommodate up to 49 wagons at a time, roughly equal to an entire freight train. The throughput capacity of the exchange was given as 400 wagons per day. Thus it is possible to bogie exchange a train in about 3 hours (i.e. 49/400*24=2.94). At the time of the study team’s visit, it appeared that the level of activity in the exchange was significantly lower than the capacity level. This is likely to be explained by the relatively depressed traffic volume.

Customers are charged for bogie exchange at the rate of 180 Swiss Francs (about US$ 178) per wagon.

Customs procedures depend upon the category of the international traffic. In the case of transit traffic, a quick inspection of documentation is carried out before Customs give permission for the wagon to go out. In the case of import traffic, the owner of the cargo decides whether to release the cargo in Sarakhs or have it cleared at the final destination. In the former case, Customs may inspect the cargo, depending upon an assessment of risk. In the case of export traffic, initial formalities are undertaken at the point of loading, after which the wagon comes to Sarakhs and is released the same day.

Normally, wagons are bogie exchanged first, after which Customs will check wagon documents and then release the wagon. Usually, the document check involves a cross-check of the wagon manifest against the waybill or consignment note. Customs do not detain cargo, especially transit cargo. All processes (including bogie exchange, border control and operational functions) are done within a day.

There was no evidence of container traffic at the time of the study team’s visit to Sarakhs. It was claimed that much of the cargo is carried in covered vans, rather than containers, owing to the relative ease in securing back-loading for these types of wagons. There are concerns that container wagons may not be returned, or at least may be deployed on other routes, due to the lack of return cargo on the CIS to Bandar Abbas route.

It is probable that a high proportion of transit containers move by road between Bandar Abbas and the CIS countries. On the study team’s return trip to Mashhad, several semi-trailer trucks conveying 40 ft containers were observed to be heading northbound.
1. Two bogie exchanges operate at Sarakhs

2. Twenty-four sets of jacks lift wagons in each exchange

3. Wheelsets awaiting maintenance

4. Overhead cranes transfer bogies to/from the exchanges

Pictures taken of bogie exchange at Sarakhs Station 14 February 2017
1. Converted Iranian locomotive hauling train northbound on the broad gauge

2. Freight train crossing the border over the Tajan River

3. Border security bridge (broad gauge on right, standard gauge on left)

4. Another view of border crossing train

5. Sarakhs Passenger Station (Siemens locomotive at head of a two carriage double decker train)

Pictures of border crossing freight trains and passenger station, taken at Sarakhs 14 February 2017
8.1 Visit to TVT terminal, Dushanbe

Date and Time: 0900 hours 31 January 2017

Participants: Halilov Navruz Sadridinovich, Deputy Director of Joint Stock Company Tajikvneshtrans (TVT); Abdulhakov Dilshod Izzatulloevich, Head, Department of International Automobile Terminals, TVT; three other staff of TVT; Faizullo Haitov, Director of the Association of International Automobile Transport of Tajikistan (AIATT).

Fedor Kormilityns and Peter Hodgkinson representing UN ESCAP

Discussion:

(x) Regional connectivity and the Tajik trucking industry

All but a small portion of the international container trade of Tajikistan is estimated to be transported by road across its national borders. Tajikistan’s small and fragmented railway carries a negligible share of this trade.

Since it has a vibrant, un-regulated trucking industry, Tajikistan is well equipped to transport both bilateral and international transit trade across and through its borders. However, despite its central location which gives it a strong potential advantage as a conduit for international transit trade between Central and South Asia and between China and the Islamic Republic of Iran, Tajikistan receives very little transit trade.

Both bilateral and transit trade have been adversely affected by the imposition of restrictions on foreign registered trucks at three major border crossings. These restrictions have been necessary as a result of recent political problems and security concerns.

The general rule is that foreign registered trucks have free access to Tajikistan, except at the following borders:

(a) Border with Uzbekistan

Trucks registered in Uzbekistan are not permitted to enter the territory of Tajikistan further than the trans-loading terminal at the border. In this case, the major border crossing is Tursunzade, 62 km due west of Dushanbe, and a large truck terminal exists at this border for the clearance and transfer of all cargo from Uzbek to Tajik trucks. Presumably, identical restrictions apply to Tajik trucks entering Uzbek territory at this border.

(b) Border with China

---

60 Information provided in telephone communication with Farrukh Nematzoda, Head of Road Transport Division, Ministry of Transport Tajikistan 28 March, 2017.
In accordance with the agreement between China and Tajikistan, trucks registered in China can proceed no further than Khorogin Tajikistan (409 km west of the border), while Tajik trucks may enter the territory of China as far as Kashi (220 km east of the border). Cargo trans-loading from Chinese to Tajik trucks occurs at the Tang terminal near Khorog. In particular cases where cargo is likely to be damaged during trans-loading, special permits may be issued to enable Chinese trucks to carry cargo to the final destination (e.g. Dushanbe)

(c) Border with Afghanistan

Trucks registered in Afghanistan are permitted to proceed no further than Kurgan- Tube (113 km north of the Nizhny Panj border) where their cargo is discharged at a truck terminal. It is understood that Tajik trucks are permitted to operate into Afghanistan as far as a truck terminal in Shirkhan Bander. Following the opening of a new truck terminal at Nizhny Panj it is anticipated that Afghan carriers will be encouraged to unload and re-load their trucks there, in which case they would not need to go to Kurgan- Tube.

In addition, it appears that containers do not feature prominently in the international trade of Tajikistan. Some of the reasons, which have been given for this, include:

- A lack of agreed conventions with neighbouring countries to use foreign containers;
- The country’s freight terminals are poorly equipped to handle containers;
- Low back-load volumes; and
- A small proportion of high value and perishable cargoes.

Despite the restrictions enforced on the transit of some foreign trucks through Tajik territory, in some cases, foreign trucks have been purchased for cross border operation by Tajik companies. Vehicle inspection facilities have been established at the larger terminals to ensure that all vehicles, both foreign and domestic, comply with the technical and safety standards specified in Tajik regulations.

The photo below shows a Chinese trailer truck (with a flexible coupling) in the cargo transfer yard at the TVT Dushanbe terminal on 31 January 2017.

(xii) Truck terminal network of Tajikistan

---

61 Asian Development Bank, Developing Tajikistan’s Transport Sector- Transport Sector Master Plan, 2011. Despite the last mentioned factor, Tajikistan does generate a high volume of fruit exports which require refrigerated transport.
There are no dry ports as such in Tajikistan, in the sense that there are no inland terminals located close to industry or other trade sources which have capacity to handle and customs clear intermodal cargo.

Instead, the priority has been to establish terminals at key border and inland locations for the primary purpose of clearing and transferring (trans-loading) international cargo between foreign and Tajik trucks. Some 10 truck terminals have been, or are being, established at Tajikistan’s borders: 4 on the border with Uzbekistan; 3 on the border with Kyrgyzstan; 2 on the border with Afghanistan; and 1 on the border with China. The locations of these terminals are shown in Figure 1 (see red markers), as are the locations of another 8 intermediate terminals (shown as green markers).

Some of the active border terminals shown in Figure 1 are operated by TVT, while others are operated by the Association of International Automobile Carriers (ABBAT). In some cases, both companies have plans to locate terminals in the same area (e.g. Tursunzade, Nizhniy Panj).

The border terminals provide a full range of services for truck operators including:

- Border clearance (including customs, health, phytosanitary and quarantine)
- Cargo handling and storage
- Cargo consolidation/de-consolidation
- Freight forwarding
- Finance and banking
- Driver accommodation
- Food service (restaurants)
- Mechanical repairs (workshop)

Intermediate terminals in general serve the need to consolidate or de-consolidate domestic cargo at the larger commercial centres throughout the country and therefore do not have the extensive facilities for customs inspection found in the border terminals.

Examples of the more significant intermediate terminals are Khujand and Kurgan-Tube, respectively in the north and south of Tajikistan.

---

62 Drivers are required to stay at the terminal until their cargo is cleared
Figure 1: Truck terminals, Tajikistan

Source: ADB Transport Sector Master Plan 2011 and ABBAT
Among the border terminals expected to be opened this year are:

- A 5 hectare terminal on the border with China (supplementing the Murghab terminal which is inland from the border);
- Nizhniy Panj on the border with Afghanistan;
- A 5.5 hectare terminal at Fotekhobod on the north-western border with Uzbekistan, from which the principal export commodity will be fruit to Russia. This terminal will be rail connected and there are plans to build a major reefer yard there;
- Isfara on the border with Kyrgyzstan (also to be provided with reefer capacity for export of fruit);
- Pandjikent on the mid-western border with Uzbekistan, 30 km from Samarkand (requires establishment of border crossing with Uzbekistan).

(iii) Commodity composition of Tajikistan’s trade

Major commodity export are of coal and cement to Afghanistan, as well as of fruit to Russia. About 400,000 tonnes per year of cement is transported in bags by road to Afghanistan. Consumer goods are understood to dominate imports, mainly from China.

(iv) TVT terminal, Dushanbe

This terminal is located about 12 km to the south of Dushanbe. Although a railway line passes close to the terminal, it is not rail connected. The area of the terminal, comprising an open cargo transfer yard, offices, warehouses and other buildings (e.g. driver accommodation, food service, vehicle inspection), is about 5 hectares. No data on cargo throughput were provided, although the company was requested to complete an operator questionnaire (not received at the time of writing).

The terminal is equipped with a 45 tonne mobile crane for container lifting and with several 3 tonne and 5 tonne forklifts to work in the warehouses.

The founder and principal shareholder of TVT has extensive interests in the trade and tourism business. Apart from truck terminals, the company is investing in bus companies and terminals. It owns a fleet of 80 trucks and since 2011 has been involved in the transit of goods from Kashi, China to Afghanistan via Tajikistan.

TVT has a memorandum of understanding with the Ministry of Transport to provide facilities for vehicle inspection in the Dushanbe terminal. Inspections of all vehicles are carried out to ensure compliance with Tajik truck technical and safety standards. It is proposed in future to extend this activity to all other terminals run by the company.

---

63 Vehicle inspections are carried out in accordance with standards set by the Centre for Road Transport Service and Logistics which was established within the Ministry of Transport to certify trucking firms and enforce safety standards.
(ii) Asian Highway connections to truck terminals

As shown in Figure 2, three Asian Highway routes pass through Tajikistan: these being AH 7, 65 and 66. The map clearly shows that Tajikistan’s central location gives it potential importance as a conduit for transit trade. AH 65 and AH 66 form part of a road corridor connecting Kyrgyzstan and China with the Port of Bandar Abbas in the Islamic Republic of Iran, while AH 7 connects Kazakhstan and Uzbekistan with Afghanistan through Tajikistan. However, political factors have significantly restricted Tajikistan’s transit role.

Five of the 10 border terminals are, or will be, located on the Asian Highway network.

The condition of the Asian Highway in Tajikistan varies considerably from route to route. Owing to the extremes of climate and topography, truck operators encounter most difficulties with AH 66. The border crossing to China at Kulma Pass lies at an altitude of 4,363 metres (14,313 feet) and in winter experiences temperatures down to −40 degrees C. Although
China and Tajikistan have reached agreement on the year round opening of the border crossing, in practice it is only open for six months between May and November and then only on a limited number of days. A Chinese company is currently rebuilding the highway from the border to Murghab over the Kulma Pass. In the Dushanbe-Kulyab section of AH 66, a new highway with long tunnels was recently constructed to shorten truck journeys through the Pamir Mountains.

Major works have been completed on AH 7 between Dushanbe and Khudjand, including the construction of two tunnels through the Shakhristan Pass, to keep the road open year round.

The condition of the AH 65 route section between Dushanbe and the Tursunzade border with Uzbekistan has recently been improved with the progressive construction along much of the route of a dual carriageway of 4 lanes.
Reconstruction of a 75 km stretch of Asian Highway 7 between Kurgan-Tube and the Nizhniy Panj border crossing with Afghanistan was completed in 2013 with the grant aid from Japan at a cost of US$ 53.4 million. The two-lane highway in this section is now of a high standard, with wide shoulders. Between Dushanbe and Kurgan-Tube (113 km), the highway surface shows signs of substantial damage and is understood to have priority for reconstruction under the ADB CAREC program, starting in 2018.

While the official gross vehicle weight limit (prime mover plus trailer) is 24 tonnes, in practice a 40 tonne limit is allowed on most major highways and much higher limits are permitted on an exceptional basis. For example, in the eastern Pamirs, Chinese-made trucks regularly operate at a gross weight of 60 tonnes as far as truck terminals in Murghab or in Tang (30 km before Khorog), where loads are transferred to trucks of 24-40 tonnes. Within these limits, payloads are 24 tonnes maximum and 20-22 tonnes on average.

The maximum vehicle length has been set at 24 metres and height at 4.5 metres.

Comparative distances and charges for road and rail provided at the meeting are shown in Table 1, below. Road haulage charges are very expensive, with unit rates 2.5-3 times those of rail. Road.
delivery times, however, are only 25-30 per cent of rail delivery time (road 4-5 days and rail 15-20 days from Bandar Abbas).

**Table 1: Road and rail distances and charges for container haulage, Bandar Abbas-Dushanbe**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Distance (Km)</th>
<th>Charge per TEU (US$)</th>
<th>Rate per TEU-km (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td>3,500</td>
<td>6,500-7,000</td>
<td>1.86-2.00</td>
</tr>
<tr>
<td>Rail</td>
<td>2,800</td>
<td>2,000</td>
<td>0.71</td>
</tr>
</tbody>
</table>

(xiv) Current railway development status

The railway network in Tajikistan and in neighbouring countries is shown in Figure 3. Until recently the network in Tajikistan was split into three unconnected sections:

- northern section from Bekabad in Uzbekistan through Khudjand in Tajikistan to Fergana in Uzbekistan (on Tajikistan’s eastern border with Uzbekistan), with a route length of 110 km;
- central section from Sariasiya in Uzbekistan to through Dushanbe to Vakhdat, 22 km east of Dushanbe, with a route length of 88 km; and
- southern section from Amuzang in Uzbekistan through Kurgan-Tube to Kulyab, with a route length of 380 km.

In mid-2016, a 40.7 km missing link between Vakhdat and Yavan was completed, thereby joining up the central and southern sections of the Tajikistan railway.

Source: Country paper of Tajikistan presented to the 4th working group on the Trans Asian Railway

**Figure 3: Railway network (existing and planned) in Tajikistan and neighbouring countries**

Altogether the route kilometrage of the Tajikistan Railway is 618.7 km, of which 110 km is in the north. The total track kilometrage is about 950 km.

The railway was reported to be in a good condition, as it was built only recently. This was confirmed when the UNESCAP team crossed the mainline south of Kurgan-Tube (see photo below).
The northern line was considered to “work very well”, but there are very limited services on the southern line. Services on the Tursunzade-Dushanbe section were understood to have been interrupted by political and border issues with Uzbekistan.

Photo of Tajikistan Railway at its intersection with AH7, south of Kurgan-Tube (taken after visit to Nizhniy Panj border, 01 February 2017). Note high density laying of sleepers.
2. Visit to Dusti truck terminal at Tursunzade (border with Uzbekistan)

Date and Time: 1130 hours 31 January 2017

Participants: Abdulhakov Dilshod Izzatulloevich, Head, Department of International Automobile Terminals, TVT; Faizullo Haitov, Director of the Association of International Automobile Transport of Tajikistan (AIATT); staff of Dusti terminal. Fedor Kormilitsyn and Peter Hodgkinson representing UN ESCAP

Discussion:

Functions and capacity of Dusti terminal

The terminal was built only recently on the western border with Uzbekistan, 62 km from Dushanbe. Since Uzbek trucks are not permitted to enter Tajikistan, their cargo must be transferred (trans-loaded) at the terminal to Tajik trucks. In the case of trailer trucks (accounting for the majority) both the prime mover and trailer are exchanged.

The terminal was financed and is operated by the Dusti Company which is not affiliated with TVT.

All border clearance functions are undertaken at the terminal. After clearance, goods coming from Uzbekistan are released for domestic transport.

The terminal truck park has capacity for 100 trucks at any one time. There are 8 cold storage rooms for fruits and other perishable goods and about 8 ordinary storage rooms in the warehouse. Other buildings include: an administrative building which accommodates terminal administrative staff, customs inspectors, freight forwarders and customs agents; a hotel; restaurant; mosque; and workshop. [See pictures below]

Due to the economic downturn, the terminal currently handles only 10-20 trucks per day (equivalent to about 300-400 tonnes of cargo per day or 110,000-150,000 tonnes per year). Only 15 trucks were observed in the truck park at the time of the visit.
1. Administration building
2. Warehouses and reefer storage
3. Hotel
4. Truck park

3. Meeting with Deputy Minister of Transport in Dushanbe

Date and Time: 1600 hours 31 January 2017

Participants: Sherali Ganjalzoda, Deputy Minister of Transport, Tajikistan; Farrukh Nematzoda, Head of Road Transport Division, Ministry of Transport Tajikistan; one other staff member of the Ministry of Transport.

Discussion:

(i) Current status of Tajikistan Railway

Final construction in mid-2016 of a 40.7 km “missing link” between Vakhdat and Yavan joined up the previously separated mid and southern sections of the Tajikistan Railway.

This project consumed a lot of funding. No new railway links are now required, so funds can be used for upgrading the existing network.

Tajikistan has a Transport Master Plan which includes plans for network upgrading and for renovation and purchase of locomotives and rolling stock. Recently, passenger coaching stock has been bought from Latvia, as well as locomotives from Kazakhstan, but for the future the priority will be on other components, such as track and signalling system improvement, for which more funds will be needed. The Ministry has support from the World Bank, European Bank for Reconstruction and Development and the Asian Development Bank.

The northern line handles the majority of the rail freight volume carried in Tajikistan. This is because of its important transit role in connecting two regions of Uzbekistan, i.e. the Tashkent region with the Fergana Valley, as well as linking Uzbekistan with Kyrgyzstan. Transit traffic accounts for nearly two thirds of the freight volume of the Tajikistan Railway. This transit traffic mostly comprises high-volume and low-value commodities, such as building materials, cotton, wheat, and cement.64

---

64 Asian Development Bank, Tajikistan Trade Facilitation and Logistics Development Strategy Report, 2009
The northern line is also important due to its proximity to the Kazakhstan Railway. Tajikistan receives up to 900,000 tonnes per year of wheat and flour from Kazakhstan, with about 90 per cent being transported by rail for storage and milling in Khudjand. More than 60 per cent of this volume is sent southwards by truck. This traffic is not sent through the southern line owing to the high transit charges of the Uzbekistan Railway and the consequent need to minimize the transit distance through Uzbekistan.65

As the southern line connecting Tajikistan and Uzbekistan is not operational, there was an initiative proposed by Tajikistan to build a link connecting Tajikistan with Turkmenistan through the territory of Afghanistan. The ESCAP team was informed that Turkmenistan had already built a 1520-mm gauge link to the border of Afghanistan. At the same time, no construction has yet commenced in Afghanistan, and the decision on the type of gauge to be chosen has not been taken.

Hopes appeared recently that cross-border operation of the southern line could be resumed. In this case the interest of Tajikistan in the new link through Afghanistan would probably be significantly diminished.

(ii) Strategic plan for rail linkage between China, Kyrgyzstan, Tajikistan, Afghanistan and Islamic Republic of Iran

The plan has been discussed extensively under the aegis of the Economic Cooperation Organization (ECO), but agreement to implementation of the plan by all five countries has yet to happen. Its main benefit would be to provide landlocked countries and regions with a secure rail access to the sea through ports in Islamic Republic of Iran. Potential routes for such a rail corridor feature in a map published by ECO, re-produced here as Figure 4.

The Ministry of Transport recently sponsored a study by an Iranian consultant which assessed the feasibility of constructing the rail corridor through Tajikistan in standard gauge.66

The objective would be to have a new standard gauge corridor starting in Kashi, China running through Kyrgyzstan, Tajikistan, and northern Afghanistan to connect with the existing Iranian standard gauge network west of Herat. Realization of such a corridor would involve new line construction throughout, including construction of a standard gauge line in a small section of 131 km in Tajikistan parallel to currently existing 1,520 mm gauge (see area identified in the map by a red ring).

The total length of the corridor from Kashito the Afghanistan/Islamic Republic of Iran border would be about 2,500 km. A preliminary construction cost estimate provided by the Deputy Minister of Transport is US$ 5 billion, suggesting a unit rate of US$ 2 million per km. This rate appears to be low, given that a high proportion of the route would be in mountainous terrain.

65 dlca.logcluster.org/display/DLCA/2.4+Tajikistan+Railway+Assessment
66 Metra consulting engineering company (Islamic Republic of Iran), Study for the economic development for conducting Feasibility study on construction of standard railway (1435 mm) inside Tajikistan, 2012
Figure 4: Map showing potential route of a continuous standard gauge rail connection from Kashi to the Islamic Republic of Iran

Source: Economic Cooperation Organization (ECO)
4. **Visit to border with Afghanistan at Nizhniy Panj**

**Date and Time:** 1000-1500 hours 01 February 2017

**Participants:** Abdulhakov Dilshod Izzatulloevich, Head, Department of International Automobile Terminals, TVT; Faizullo Haitov, Director of the Association of International Automobile Transport of Tajikistan (AIATT); TVT project staff at Panj.

Fedor Kormilitsyn and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **En-route stop at Dushanbe Southern Gate Passenger Terminal**

This is a bus terminal which has recently been built by TVT about 8-9 km from the Dushanbe City Centre and is soon to start operation. Its function is to transfer passengers from city buses to long distance buses travelling all over Tajikistan as well as to trans-border destinations. The terminal is equipped with a modern ticket office, as well as a restaurant and other passenger facilities.

(ii) **Border crossing restrictions at Nizhniy Panj border**

Until very recently, Afghan trucks were not allowed to enter Tajikistan owing to security problems and operators were obliged to discharge their cargo at a terminal on the Afghan side, Shirkhan Bander, about 6km from the border. Tajik trucks, on the other hand were permitted to enter Afghan territory as far as Shirkhan Bander to discharge their loads and re-load with Afghan cargo. Very recent changes to regulations now permit Afghan trucks to proceed as far as Kurgan-Tube, where they can discharge and re-load at a purpose-built terminal (see Section 1 of this report for details). It is expected that Afghan truck operators will be persuaded to move their operations to the *new Nizhniy Panj terminal after it opens.*

(iii) **Nizhniy Panj terminal details**

*Location*

The TVT Nizhniy Panj trucking terminal is currently in the early stages of construction at a site about 2 km north of the Tajik customs border post. It is scheduled to open for service in spring 2017.

The terminal site is approached via AHi7 which lies from Kurgan-Tube to the border, and has been substantially improved, with wide shoulders permitting trucks to pull over without delaying other traffic (see picture below).

The area of the terminal will be just over 5 hectares. The site is opposite that of the planned Special Economic Zone for the border region.
1. Asian Highway 7 near Nizhniy Panj

2. The Panj river (border with Afghanistan)

3. Terminal entrance and security gate

4. Temporary administrative building including driver accommodation

5. Construction of truck park and cargo transfer area

Pictures taken during visit to Nizhniy Panj border on 01 February 2017
The TVT terminal will be one of two terminals being planned for Nizhniy Panj. Another is the terminal to be developed by ABBAT (see Section 5 below).

Functions

The terminal will have the principal function of handling and clearing containers transported to and from Bandar Abbas port and will have all necessary facilities for this function. *It must be questioned, however, whether it will be necessary to have container storage and stuffing/unstuffing facilities at the site. Such facilities are more appropriately located close to concentrations of industry which generate trade.* The facilities which may be essential for the Nizhniy Panj terminal are those which are necessary for the X-ray scanning of containers and for the rapid cross-checking of container documentation.

The terminal will be provided with rail access, but it was noted that the terminal site is on the opposite side of the AH 7 in 50 km from railway mainline to be built from Kolkhozobod (Tajikistan) to Shirkhan Bander (Afghanistan).

When the terminal is complete, Tajik trucks which now go to Shirkan Bander will stop at the new terminal and transfer cargo to Afghan trucks.

Border control functions will remain at the border and customs and other border staff will come to the new terminal to carry out inspections as required.

Facilities

The main export cargo currently handled at Nizhniy Panj is bagged cement, of which about 400,000 tonnes per year is sold to Afghanistan. Priority will be given to the construction of hangar style warehouses for the storage of bagged cement.

Apart from a container yard, warehouses and other cargo handling areas, the terminal will have offices for customs agents and forwarders as well as accommodation and food service facilities for truckers.

Investment and financing options

TVT owns the land on which the terminal is being built and is investing in the construction of the terminal infrastructure, but will operate the terminal and lease container lifting equipment (probably reach-stackers) and forklifts.

Company representatives posed certain questions about financing options during the visit. They were informed that TVT could reduce its risk exposure by outsourcing the operation of the terminal, including responsibility for investing in the operating equipment. Ownership of the land and infrastructure would remain vested in TVT. The operating party would lease these assets and pay regular lease income to TVT, which would be retained to offset land ownership and other costs, and provide TVT with a return on its investment. The operating party would collect user charges and retain these as income to offset operating costs, including lease payments, and provide it with a return on its investment.

Traffic volume trend
This year (2017), the volume of traffic passing through Panj has been very low as a result of the economic downturn in Central Asian countries, but last year 700 trucks per day crossed the border (in both directions). Aside from bagged cement, commodity exports to the northern part of Afghanistan this year have comprised fruit (mainly melons).

5. **Meeting with Association of International Automobile Carriers of Tajikistan (ABBAT) in Dushanbe**

**Date and Time:** 0900 hours 02 February 2017

**Participants:** Mohmadoly Shokirov, President, ABBAT; Larisa Kislyakova, Head Department of Foreign Economic Relations, ABBAT; two other ABBAT staff.

Fedor Kormilitsyn and Peter Hodgkinson representing UN ESCAP

**Discussion:**

(i) **ABBAT’s involvement in developing logistical terminals**

ABBAT has been developing logistical terminals since the 1990s, some at the border and some inland. It operates a bigger terminal at the border with Uzbekistan than the one visited (the Dusti terminal) and is planning an even bigger terminal at that location. ABBAT also manages a terminal in Dushanbe. Hitherto, these have all been truck terminals, but in future ABBAT is looking to develop dry ports with intermodal handling facilities.

The current status of truck terminal development in Tajikistan is shown in Figure 1 above. The colour coding of these terminals was explained in greater depth at the meeting. Terminals shown in green and denoted as “transitional terminals” satisfy two needs: one is the consolidation or de-consolidation of domestic cargoes and the other is the provision of “stopover” facilities on long transit routes.

(ii) **Concepts for future development projects**

- Give priority to building *trans-loading facilities for transfer of cargo from road to rail*. Truck over-loading and related road damage is a problem in Tajikistan. There is a need to preserve roads and there are opportunities to transfer road-hauled goods from Uzbekistan to rail for transport through Tajikistan.

- Build more facilities for *container transport*. Existing terminals do not handle many containers, but this could change markedly in future.

- Upgrade and modernize cargo storage facilities. Existing storages are small and insufficient for minimizing supply costs. There also a need to provide storages to cover the full range of traded goods (especially refrigerated storages for fruit).
ABBAT has been developing a logistical information system to connect logistical centres and reduce empty running between them. ABBAT is also giving priority to the upgrading of its refrigeration facilities for the storage and transport of agricultural commodities.

(iii) Major dry port projects being planned by ABBAT

ABBAT is planning to build two large scale dry ports. These will be: a new dry port to replace the existing ABBAT truck terminal at Tursunzade on the border with Uzbekistan and a dry port at Nizhniy Panj on the border with Afghanistan.

Tursunzade dry port

ABBAT will build the new dry port on land which it owns adjacent to its existing truck terminal. The area of the site is 7.5 hectares. The ABBAT’s president expects that additional land will be provided by the government.

The dry port will provide comprehensive services for the storage, handling and border clearance of containers and container cargoes. It is intended that containers will be delivered by road from Uzbekistan, cleared in the terminal and then transferred to rail for transport throughout Tajikistan. As observed above, it is unlikely that such an arrangement will result in minimal logistics costs. *Indeed a better strategy might have been to locate the dry port in close proximity to trade sources, probably in the vicinity of Dushanbe, and to encourage line-haul transport of containers to the facility by rail and local distribution of container cargo from the facility by road.*

As shown in Figure 5, provision of rail access to the dry port would be via a loop line diverting from the existing branch-line to the nearby aluminium plant. The loop line would run through the container yard of the dry port before re-connecting with the branch-line. Loading/unloading tracks would run off the loop line providing a length between turnouts of 720 metres. This will be sufficient to accommodate a full length container train inside the terminal.

The layout of the terminal is illustrated in Figure 6.

It is proposed to finance the dry port with a Private Public Participation arrangement although ABBAT is not aware of the details of a PPP scheme. If the government could contribute additional land for the project and become responsible for the construction and financing of the rail access and sidings, it is likely that a PPP could be formed. ABBAT has an expectation that the government could improve the financial returns of the project by providing tax exemptions, at least during the initial period of operation.
Figure 5: Rail access to the proposed ABBAT dry port at Tursunzade, Tajikistan

Figure 6: Layout of the proposed ABBATT dry port at Tursunzade, Tajikistan
Nizhniy Panj dry port

It has been proposed to construct the dry port on an area of 10 hectares owned by ABBAT. The site is located to the west of Asian Highway 7 and of the proposed Free Trade Zone. The site will be accessible by rail from the 50km mainline which is planned for construction to link Kolkhozobod in Tajikistan with Shirkhan Bander in Afghanistan.

Only conceptual designs of this terminal exist at the moment and some options were displayed at the meeting. These options seemed to feature a terminal which has predominance of warehousing, but with no container handling facilities, such as a container yard, container freight station, etc. In addition, it was unclear from the drawings shown how and where the rail access would be provided.

Financing options for the Nizhniy Panj dry port development have yet to be determined, but it is understood that the Asian Development Bank will be assisting with the funding of the project. It is also hoped to identify PPP options for the project.