

## **CONTAINER TRANSPORTATION BY RAIL: WHICH DIRECTION WILL THAILAND PURSUE?**

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### **ABSTRACT**

*The improvement of railway freight services including container transportation is an important element of Thailand's Logistics Development Strategy (2007-2011). For this, the State Railway of Thailand (SRT) is implementing a number of reform measures and physical projects to enhance the capacity and efficiency of the railway freight service. Under a new policy, the Government will take the responsibility for making investments in infrastructure and SRT will remain responsible for network management and administration. In the future, the freight sector will be opened to private operators who would be allowed to invest in their own locomotives and rolling stock and provide services by paying a network access charge to SRT. SRT will be required to compete with private operators.*

*The article discusses these reform measures and provides an account of the projects that are being implemented or are under consideration to improve SRT's competitiveness and capacity to provide more efficient freight services. It also provides an account of the railway freight transportation in Thailand and its future potential. Finally, it draws conclusions on the on-going reform measures.*

### **AN OVERVIEW ON DEVELOPMENT STRATEGIES OF THAILAND**

The Government of Thailand is committed to improving people's standard of living and quality of life. Thailand's Tenth National Economic and Social Development Plan outlines the country's development agenda. The Plan, to be implemented between 2007-2011, aims for balance and sustainability in all areas of development. It focuses on effective utilization of

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the country's economic, social and natural resources to empower Thai society at all levels and strengthen institutional capacity throughout the country, which would in turn improve Thailand's potential as a knowledge-based society. Priority areas in the Plan include human and social capital development, community strengthening, economic restructuring, environmental diversity, and good governance.

One of the new development strategies for economic restructuring under the 10<sup>th</sup> Plan is basic infrastructure and logistics development through rail, road and water transport to lower cost and increase competitiveness. The strategy has also been reflected in Thailand's Logistics Development Strategy (2007–2011) where the vision of development is to establish a world-class logistics system to support Thailand as Indochina's trade and investment centre. The objectives are to enhance trade facilitation through improvement of cost efficiency and customer responsiveness of businesses, including reliability and security of their logistics process, and to create economic value from the logistics and other supporting industries. It is expected that logistics cost of the country will reduce from 19 per cent of GDP in 2005 to 16 per cent by 2011. The Strategy has five strategic agenda: Business Logistics Improvement; Transport and Logistics Network Optimization; Logistics Service Internationalization; Trade Facilitation Enhancement; and Capacity Building.

The Ministry of Transport will take the leading role in implementing the second strategic agenda: Transport and Logistics Network Optimization. The target of this agenda is to establish an integrated transport network and logistics management system which will cover the activities of collection and distribution of goods and transshipment at both national and regional levels, and will accommodate and support the role of Thailand to become the trade hub in the Indochina subregion. One of the measures clearly stated under this agenda is to promote transport management for energy saving by giving priority to rail, water and pipeline transport. However, it is important to be noted that this is the first time that there is a clear policy statement specifying that the Government will be responsible for rail infrastructure investment while the role of the State Railway of Thailand (SRT), a public enterprise under the Ministry of Transport, will be restricted to network management, administration and carriage of passengers. In the future, SRT needs to compete with the private sector operators who will be allowed to invest in their own locomotives and rolling stocks for providing carriage of goods services.

## I. CHALLENGE IN RAIL TRANSPORT

The efficiency of Thailand's transport system is an important issue. As transport is an essential supporting sector for the whole economy, gains in transport efficiency will lower production and distribution costs and also help improve the country's foreign trade.

Thailand's recent economic growth has led to significant increase in demand for transportation. So far as domestic transport is concerned, road transport has represented about 90 per cent share of the total demand for transportation. In spite of all the advantages of rail transport in terms of fuel efficiency, environmental friendliness, traffic congestion and safety, it remains a relatively minor player in the country compared to road transport. Rail transport accounts for about 15 per cent of all inter-provincial passenger traffic and only 2 per cent of all inter-provincial freight traffic. To a large extent, this is due to a relatively poor competitive position of rail compared to road and other modes transportation. The principal disadvantage of rail transport for freight services is due to its inability to provide door-to-door services. As SRT does not connect directly with the origins or destinations of the main freight flows, the overall transport cost involves trucking at either end of the journey, with high handling costs for transferring from truck to train and vice versa. For short distances, this additional cost is greater than any savings gained by rail transport.

In order to implement the underlining policy to make rail more competitive to road transport and the commitment to adopt measures to switch the mode of transport from road to rail,<sup>1</sup> the current problems faced by railways will be redressed. For example, new rail infrastructure development will be invested by the Government. The debt payments for the previous infrastructure development carried out by SRT will also be borne by the Government. With the government investment, rail tracks will become a common facility like roads, which users can utilize by paying access charges.

At present, the rail service is not a real alternative for the carriage of most goods and passengers, despite its obvious potential benefits in terms of energy efficiency, environmental impacts, and safety. In order to reduce logistics cost to improve the country's competitiveness, and in view of the recent energy crisis, "modal shift from road to rail" has been one of the main

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<sup>1</sup> Although the Ministry of Transport intends to develop railways to play a more active role in the nation's future transport needs, road transport retains the importance as it enables door-to-door transportation from the origin to the final destination.

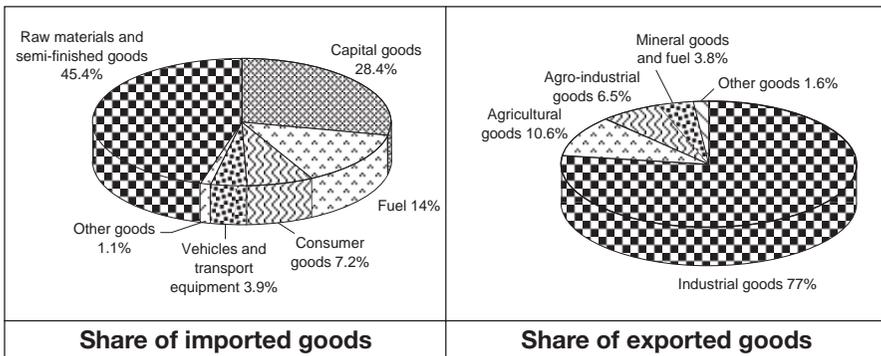
transport policies. In this respect, priority of development has been given to container transportation in the corridor between the main origins and destinations of export and import cargoes and the gateway ports. This would involve deployment of more dedicated container trains, more intermodal facilities at key locations throughout Thailand where containers can be transferred from rail to trucks or ships and vice versa.

## II. THE WAY FORWARD TO PROMOTE CONTAINER TRANSPORTATION BY RAIL

### A. Demand for rail transport

There has been little change in the structure of imported and exported goods in Thailand in the last five years. In 2004, the volume of freight traffic was about 500 million tons, of which 96 million tons was imported goods and 87 million tons of exported goods, and the rest was domestic. The main import markets of Thailand are Japan (23 per cent), ASEAN (17 per cent), the European Union (10 per cent) and the United States of America (8 per cent), whereas the main export markets are ASEAN (22 per cent), the United States of America (16 per cent), and Japan and the European Union (14 per cent each). The commodity wise structures of imported and exported goods are shown in figure 1.

**Figure 1. The structure of imported and exported goods in 2004**



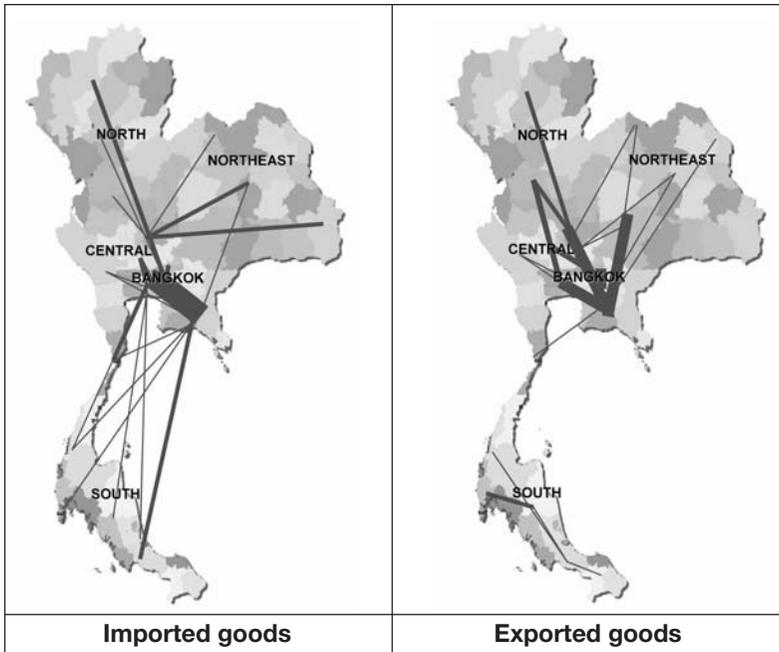
Source: Study on the Development of Multimodal Transport and Logistics Supply Chain Management for Implementation of Action Plan 2006.

A commodity flow survey was undertaken for the top 20 high value imported goods, the top 12 high value exported goods, the top 10 high net

export value goods, and the top 10 of the high volume transit goods.<sup>2</sup> It was found that the selected imported goods had main destinations at Bangkok and its vicinity and industrial estates, especially the eastern industrial estate and the upper-central industrial estate. For the selected exported goods, the main origins were located at the central, northeast and lower-north regions of Thailand. The main gateways for the import and export goods were Laem Chabang Port, Bangkok Port, Maptaphut Port, Songkhla Port, Ko Si Chang Port and Bangkok International Airport.

Figure 2 shows the main flows of the selected imported and exported goods.

**Figure 2. The flows of selected imported and exported goods**



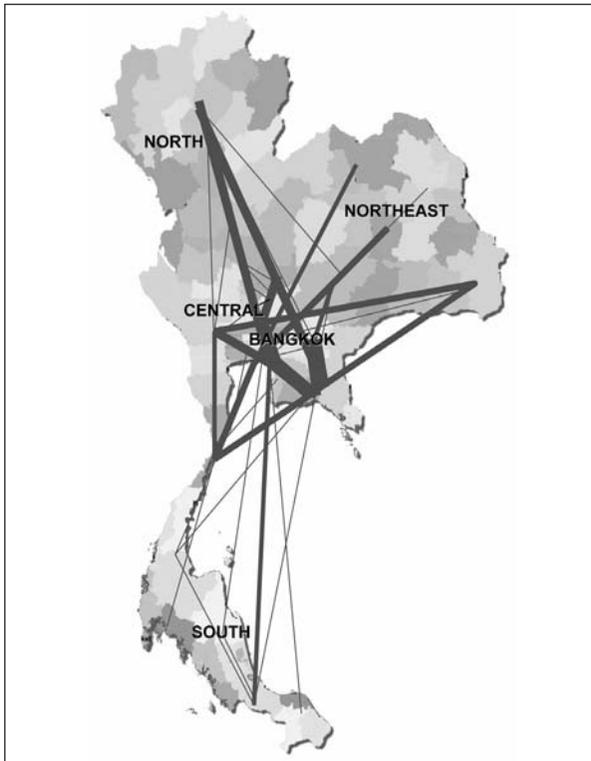
*Source:* Study on the Development of Multimodal Transport and Logistics Supply Chain Management for Implementation of Action Plan 2006, Office of Transport and Traffic Policy and Planning, Ministry of Transport.

<sup>2</sup> The survey is a part of a study on “The Development of Multimodal Transport and Logistics Supply Chain Management for Implementation of Action Plan” made by the Office of Transport and Traffic Policy and Planning in 2006. The 52 commodities included in the survey represent 50 per cent of the overall weight of international freight traffic of Thailand and 18 per cent of the country’s total freight traffic.

Thailand provides transit corridor to the Lao People’s Democratic Republic for its trade with third countries. In 2004, the volume of export cargo from the Lao People’s Democratic Republic transiting Thailand to third countries was 190,000 tons, while the volume of its import cargo from third countries transiting Thailand was 100,000 tons. The main points through which the transit traffic passed were at Nong Khai, Nakhon Phanom, Mukdahan and Phibun Mangsa Han.

Figure 3 shows the main flows of the import, export, transit and domestic goods traffic in 2004. The figure also shows that the transportation activities concentrate in Bangkok and the surrounding areas. The movement of

**Figure 3. Flows of the main import, export, transit and domestic goods traffic**



Source: Study on the Development of Multimodal Transport and Logistics Supply Chain Management for Implementation of Action Plan 2006, Office of Transport and Traffic Policy and Planning, Ministry of Transport.

goods was mainly between the north and northeastern areas and the eastern seaboard where Laem Chabang port is located. Coastal shipping had a role in transporting goods from the Southern provinces to Bangkok and Laem Chabang ports.

As the supplier of rail transport, SRT is the sole responsible agency for building, operating and maintaining Thailand's railway infrastructure and providing both passengers and freight carriage services. SRT is the second largest state enterprise of Thailand in terms of manpower. The total length of railroads is about 4,100 km, serving 47 provinces in the country. The main

Figure 4. SRT network

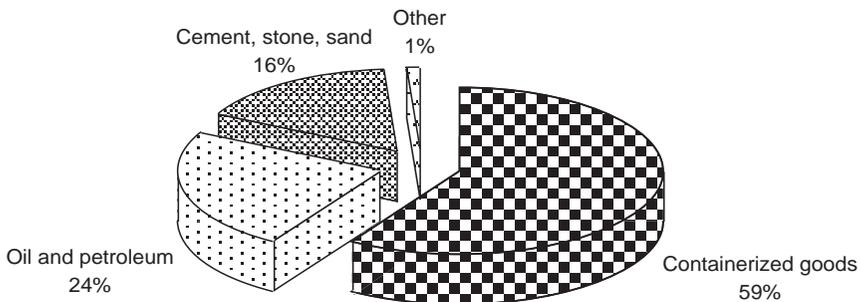


Source: [www.railway.co.th](http://www.railway.co.th).

points of linkage between rail and road transports are Bangkok Port, Laem Chabang Port and ICD Ladkrabang. The railway network can also link with neighbouring countries. It links the Lao People’s Democratic Republic via Nong Khai station, Cambodia via Aranyaprathet station, and Malaysia via Padang Besar and Sungai Kolok stations.

In 2004, 12.8 million tons of freight was transported by rail, constituting 7.6 million tons of containerized freight, 3.1 millions tons of fuel and petroleum products and 2.1 million tons of combined cement, stone and sand.

**Figure 5. Share of commodity cargo by rail transport, 2004**



Source: State Railway of Thailand.

The following table 1 shows the main movements of goods carried by rail and their origins and destinations.

The information (in table 1) on the major flows of cargoes and their service routes shows the priority areas for promoting rail transport of containerized cargo are between ICD Ladkrabang and Chachoengsao Junction-Sri Racha Junction-Laem Chabang Port. The container traffic moving over this section has grown rapidly over the years. It can also be seen that there has been a high demand of rail transport between the northeastern (Nakhon Ratchasima Province) and central (Saraburi Province) areas of the country and Laem Chabang Port where some export cargoes can be containerized and transferred to the port via Chachoengsao Junction. The southern corridor has also high potential as it provides the railway link between Thailand and its southern neighbours Malaysia and Singapore. The current landbridge service between Malaysia and Thailand, a rail container service for the transshipment of containers between ICDs in Thailand and ports in Malaysia, uses this corridor.<sup>3</sup>

<sup>3</sup> A companion article in this volume is on this landbridge service.

**Table 1. Major flows of cargoes by rail, 2004**

Commodity	Routes		Volume (tons)
	From	To	
Containerized cargo	ICD Ladkrabang	Laem Chabang Port	3 861 400
	Laem Chabang Port	ICD Ladkrabang	2 929 516
	ICD Ladkrabang	Tha Rua Noi (Kanchanaburi)	143 439
	Nuon Payom (Kohn Khen)	Laem Chabang Port	116 422
	ICD Ladkrabang	Phahonyothin	91 445
	Tha Rua Noi (Kanchanaburi)	ICD Ladkrabang	77 809
	Surat Thani	ICD Ladkrabang	45 500
	Jira Junction (Nakorn Ratchasima)	ICD Ladkrabang	45 054
	Surat Thani	Bangkok Port	39 948
Fuel and petroleum product	Huey Gueng (Udon Thani)	Laem Chabang Port	38 720
	Bung Phra (Phitsanulok)	Laem Chabang Port	573 187
	Bung Phra (Phitsanulok)	Bangkok Port	571 080
Cement	Map Ta Phut	Khon Kaen	254 599
	Map Ta Phut	Lam Pang	190 907
	Hin Lap (Nakhon Ratchasima)	Preng (Chachoengsao)	375 951
Stone	Hin Lap (Nakhon Ratchasima)	Phahonyothin	320 779
	Ban Chong Tai (Saraburi)	Phahonyothin	319 722
	Bu Yai (Saraburi)	Ladkrabang	367 049
Gypsum	Ban Song (Surat Thani)	Padang Besar	95 308
Flour	Phahonyothin	Padang Besar	16 543
Rubber	Thungsong Junction	Bangkok Post	18 068
Noodle	Ban Pong (Ratchaburi)	Padang Besar	4 352
Sugar	Buriram	Laem Chabang Port	2 271

Source: State Railway of Thailand.

## **B. Policies, strategies, and plans/projects intended to improve the capacity and efficiency of the rail services**

### ***Improvement of essential infrastructure and related facilities***

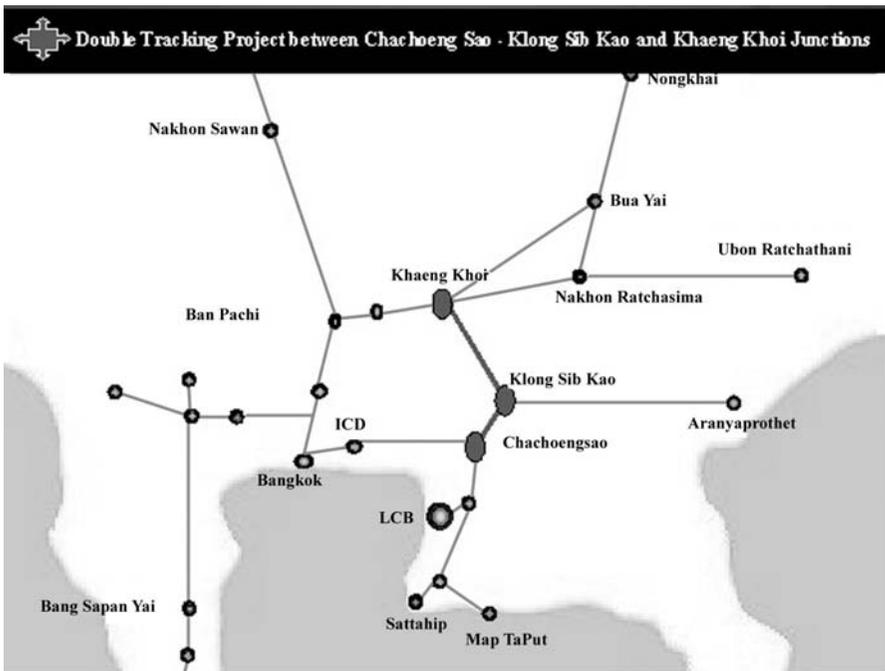
Inadequate railway infrastructure and facilities cause disruptive train operations. The improvement of rail infrastructure and facilities that are currently being considered can be divided into five categories: double tracking, track rehabilitation, construction of chord lines, new network expansion, and upgrading of signalling and telecommunication systems.

Measures for substantial improvement of rail tracks will be undertaken. In the sections where the traffic volume is high and there is high potential for new users of rail services, double tracking will be considered. This will greatly

increase capacity by providing a separate railway line for each direction of travel rather than having to share a single line for two way movements. An initial study carried out by SRT shows that about 800 km of double tracks are needed to facilitate freight transportation by rail.

It has been agreed that the first priority double tracking will be in the Eastern Seaboard Area. The 78 km double tracking project to be started in 2007 will connect Chachoengsao Junction to Laem Chabang Port. The other double tracking project in the pipeline is 106 km section between Chachoengsao-Klong Sib Kao-Kaeng Khoi and further towards Nakhon Ratchasima. This project will serve the demand of traffic between the north-eastern provinces and the Eastern Seaboard.

**Figure 6. Double Tracking Project between Chachoengsao, Klong Sib Kao and Khaeng Khoi Junctions**



The other routes that require special attention for double tracking are about 150 km of the northern line between Lopburi and Nakhon Sawan, and 336 km of the Southern Line between Nakhon Pathom-Petchburi-Chumphon-Surat Thani-Nakhon Sri Thammarat.

Track rehabilitation involves replacing existing rails with heavier rail sections and concrete sleepers. This permits higher train speeds and lower maintenance costs. A recent study by SRT also shows that about 810 km of track rehabilitation covering many areas of the north, north-eastern and southern lines are needed for the improvement of speed and punctuality of train operation and avoidance of derailment. Such rehabilitation incorporates the replacement of existing 70 lb rails with 100 lb rails, the replacement of existing sleepers with monoblock concrete sleepers together with elastic rail fastenings and rebalasting and improvement of embankment.

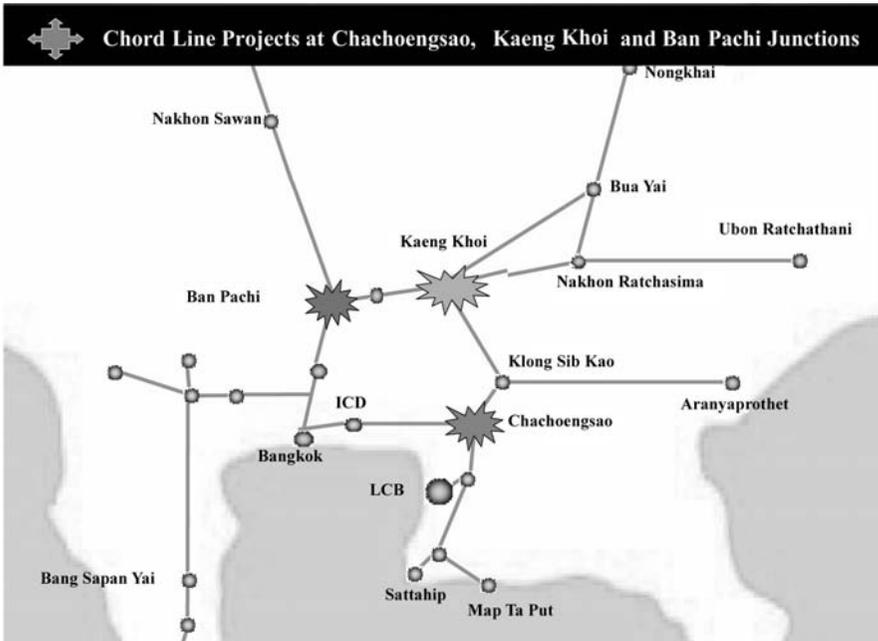
Apart from increasing the track capacity, construction of few chord lines is also being considered to reduce the distance between some major nodes on the rail network. An initial study by SRT shows that three such chord lines are needed. These are as mentioned below:

- A 1-km chord line at Chachoengsao junction to connect the eastern line (Aranyaprathet line) and the eastern seaboard line (Sattahip line);
- A 3.4-km chord line at Khang Khoi junction to connect the north-eastern line and the eastern line (Kaeng Khoi–Klong Sip Kao);
- A 1-km chord line at Ban Phachi junction to connect the northern line and the north-eastern line.

The expansion of the network to recently established transport terminals or new gateways are being planned. It has been suggested that an extension of approximately 320 km of the northern line from Denchai to the Mekong river port at Chieng San or Chieng Kong (where there is a bridge across the Mekong River) be constructed so that goods from Southern China can be carried by road via the Lao People's Democratic Republic and transferred to rail for further transport towards the sea ports in Thailand. Moreover, an extension of the north-eastern line from Bua Yai to Roi Et-Mukdahan-Nakhon Panom, over a length of approximately 368 km, will also help the linkage between Thailand and the Lao People's Democratic Republic and Viet Nam. However, implementation of the above projects will require huge investments. It is expected that the feasibility studies on the proposed railway extensions will be reviewed and updated before resubmitting them to the Government for approval.

Signalling and telecommunications upgrading will provide more efficient control of railway operations and achieve significant time savings by eliminating or reducing train delays. Subsequently, when the existing rolling

**Figure 7. Chord Line Projects at Chachoengsao, Kaeng Khoi and Ban Pachi Junctions**



stock needs to be replaced, they will be replaced by modern rolling stocks which will allow higher speed. The signalling and telecommunications upgrading programme will be implemented in conjunction with the double tracking project mentioned earlier.<sup>4</sup>

***Improvement of operation and management system and restructuring of rail transport service***

During the period when the infrastructure development and modernization of operation facilities are taking place, the freight transport services provided by SRT needs to be improved in terms of reliability, journey time, service and customer satisfaction to increase its share of the freight transport market, particularly through modal shift from other modes. It is also expected that, to improve the services, SRT must be prepared to consider other measures, which include new locomotives and rolling stock, development of inland container depots and container yards, change in the existing service

<sup>4</sup> For more details on SRT's infrastructure development and signalling and telecommunications upgrading projects, see [www.railway.co.th/english/index.asp](http://www.railway.co.th/english/index.asp).

operation, forging strategic partnerships, and new marketing initiatives and other necessary measures.

At the moment, the Ministry of Transport is preparing to open the rail transport market to private operators. The private service operators are to pay access charges to SRT for using its infrastructure. The private operators will provide services with their own locomotives and wagons. While acting as a rail operator, SRT will have to compete with private franchisees on the common rail network. It is expected that SRT will issue regulations specifying the procedures on the matter within 2007. After the establishment of a Rail Regulator and the amendments of the necessary legislations, any interested private party may apply for rail operation directly from the regulator.

It may also be noted that the Government is now in the process of reforming the structure of rail transport service. Due to its past financial condition, SRT was not in a position to make any heavy investments to improve services or build infrastructure to meet the transport demand in the future. Since rail transport will have direct impacts on future competitiveness of the country and the Government has recognized SRT's problem as a national problem, the responsibility of rail transport development between the government and SRT has been reallocated. Under the new rail transport management structure approved by the cabinet in July 2007, the Government will provide annual budget allocations for network development similar to what have been done for the road transport. The role of SRT will be restricted to infrastructure maintenance and operation and as a rail transport operator. A safety and economic regulator for rail transport will be established. Also, a clear line will be drawn between social rail service and commercial rail service. There will be a detailed settlement arrangement for the subsidy that the Government will give to SRT for the provision of public service obligation (PSO) services and for infrastructure maintenance and operation. For this purpose, there will be a separate capital account for social rail service of the government to handle the costs of social service. Under this arrangement SRT will act as a hired service provider.

According to the Action Plan for the Improvement of Management Structure for the Revival of Financial Status of the State Railway of Thailand, which will be submitted to the cabinet for approval, the structure of SRT will be reorganized in four business units. These four units are: Infrastructure and Traffic Control; Freight Transport; Passenger Transport; and General Service. Three new subsidiary companies will also be established: Eastern Line Freight Transport Management Company Limited, Electric and Commuter Train Management Company Limited and SRT Asset Management Company Limited.

The Plan also covers strategies to strengthen SRT's financial condition. The Government has been requested to compensate 2.2 billion baht liability from the loss in running business and 1.4 billion baht liability for infrastructure investment made by SRT. In return, SRT will be required to transfer SRT's land currently utilized by government agencies worth about 4 billion baht to the Treasury Department. The improvement of the pension scheme is also a part of the reform package.

## CONCLUSION

Despite its commonly-accepted benefits in terms of energy efficiency, environmental impacts and safety, rail transport has rarely been taken into consideration by users of the freight transportation service. The Ministry of Transport has for the last five years made attempts to promote a modal shift from road to rail with special attention being paid to certain commodities and between certain origins to destinations. Intermodal transport with rail transport performing the main carriage has been promoted as an alternative to a single mode of road transport. Import and export of containerized cargoes such as rice, sugar and manioc products are the main target groups of the future rail transport users.

The Government has a firm policy that the future rail network development will come from the annual budget and there will be a joint responsibility between the government and SRT in infrastructure maintenance and operation. The Ministry of Transport is formulating plans to progressively improve the efficiency of export and import container transportation via Laem Chabang Port. At the moment, Ladkrabang ICD is the main node for mode transfer from road to rail. The priority of development is therefore the removal of bottleneck between this node and the port. The remaining 78 km double tracking of the corridor will begin this year and is expected to be completed by 2009. The double tracking project will continue further towards Nakhon Ratchasima and Nakhon Sawan from where there are high potential demands for rail transport. With such initial infrastructure improvement, the nodes for rail transfer to/from the port will be moved nearer to the final origins/destinations of export/import traffic. The route will also give benefit to domestic cross-country bulk cargo movement. The role of rail transportation will then be more significant to exporters, importers and domestic users.

In concurrence with infrastructure improvement, the market of freight transport services will be gradually opened to private operators. Private operators will be allowed to provide services under a franchising agreement with SRT.

The improvement of rail transport cannot be completed without the reform of SRT. The reform is intended to improve financial condition of SRT and enable it to provide services efficiently to meet the future freight transportation demand and to become competitive with other private operators. The new structure will allow SRT to separate capital account in accordance with the activities and will be an effective tool for implementing the overall policy for rail transport development. A newly-established subsidiary company will focus on container transportation between Ladkrabang ICD and Laem Chabang Port.

Thailand wants to improve the efficiency and reliability of rail transport services. The assumption of responsibility of railway network improvement by government, the reform of SRT's role and organizational structure with new subsidy schemes and the private participation in rail transport market are among the main directions that Thailand will pursue in the future. It is hoped that improvement of container transportation by rail will lay an important foundation for the country's intermodal transport system and enhance its capacity to serve neighboring countries as the transit corridor to or from third countries.