

International Scan on Freight Mobility and Intermodal Connectivity in China: Trip Summary

September 7 - 22, 2007

Purpose

The purpose of this scan was to identify the key characteristics and the potential applications to the U.S. context of the investment strategies adopted by Chinese officials to foster freight mobility and intermodal connectivity in support of their global competitiveness.

Scan Context and Panel Composition

China's transportation system is rapidly being expanded to support economic growth, meet projected global intermodal freight demands, and promote expansion into underdeveloped regions of the country. It is in the United States' best interest to understand how this infrastructure development impacts the growing trade flows between China and the United States. In addition, the scan focused on the different approaches and technologies that China is using to connect its intermodal freight network to its maritime ports.

The scan team represented a diverse set of interests and concerns for national and State decision making. In addition to FHWA officials (at the national and division levels), the team included representatives from the departments of transportation for the States of Maine, California and Pennsylvania; a representative of the I-95 Corridor Coalition; a representative of the American Association of State Highway and Transportation Officials; a representative of the American Trucking Associations; and a university professor who also acted as the report writer. These scan members represented different modal interests and expertise in intermodal freight transportation, trucking, transportation policy and planning, and transportation system operations.

The scan team met with the following types of groups during its 15-day trip.

- Ministry of Communications (intercity highways, airports and ports)
- China Railway Container Corp (organization under the Ministry of Railways)
- Provincial and Special Administrative Regions
- Port authorities
- Port terminal operators
- Ocean carriers
- Municipalities (Shanghai, Shenzhen and Hong Kong)
- U.S. shippers and retailers
- Logistics/warehousing firms
- China Development Institute

Although most of the team's visits were to specific organizations, meetings were also held under the auspices of the local American Chambers of Commerce in Shanghai and Hong Kong that provided an opportunity to meet with individuals representing many different shipper, carrier, and trade organizations.

General Observations

It should be noted at the outset that China has a very different form of government and decision making process than found in the United States. With a strong centralized government and central planning authority, much of what happens in China is strongly influenced by central government policy. There is a significant difference in land ownership and how land is transferred to private developers (it is leased by the government). China is also in a very different stage of development than the United States. In essence, China is building a transportation network in 10 years comparable to what the United States did in 50 years. Given the rapid pace of economic growth and the resources this places in the hands in of the government, their government structure, their willingness to partner with private capital and private capital's interest in the development opportunities in China, and the ability to utilize technological standards for roadway design and construction developed in the US and the EU, it is not surprising to find that China has been able to expand its transportation infrastructure at such a rapid pace. However, even with these differences, the scan team found much that was of interest to the United States.

The major observations from this scan are organized in four categories---China's economic growth and driving forces; transportation infrastructure development; governmental structure, decision-making and analysis; and global shipper/carrier perceptions.

China's Economic Growth and Driving Forces

1. The economic growth of China over the past 10 years has been dramatic. Both **government officials and private sector representatives met during the scan expected this growth to continue in the foreseeable future at or near, its current rate.** The current estimate for this calendar year is that China's GDP will increase by approximately 10 percent. This follows a trend line that shows annual GDP growth of 10.4 percent per year for the past 10 years. The growth in the economy was mirrored by the office expansion of the global companies met during the scan, such as the rapid expansion of subsidiary offices of Maersk and Prologis throughout China.
2. Much of the economic growth has been fueled by private investment. **As different sectors of the economy have been opened to foreign investment, joint ventures and other financial partnerships have provided the institutional framework for the expansion of the economy.** This is especially true in the transport and logistics sectors where foreign investments have occurred.
3. **The economic expansion of China first started in the south (Pearl River Delta), moved north based on national economic policy, and is now being pushed west based on government policy.** Ninety percent of China's exports are manufactured in

the coastal provinces; this is causing large demographic shifts that are straining China's resources and social fabric. The "Go West" campaign is an attempt to mitigate these strains and was a continuing theme of the discussions held with both government officials and private sector representatives during the scan (note: by west is meant the next set of provinces west of the coastal provinces). This national campaign has significant implications to supply chain logistics costs and to the efficiency of the Chinese transportation system in moving exports to the coastal ports. With logistics costs already very high in China (approximately 20 percent of GDP), the movement of manufacturing westward will require efficient intermodal services leading to the coastal ports, approximately 400 to 500 miles away.

4. Although China has had large urban populations for centuries, urbanization has reached unprecedented levels over the last 10 years. Much of China's economic expansion has occurred in urban areas where the population exists to provide the labor force. However, many laborers often move from one urban area to another looking for jobs, so large portions of the urban labor force is transient. **The consequence of such large urban concentrations is that the central government focuses its resources and attention on making sure the basic needs of these populations are met.** The term "social harmony" was an often heard theme to describe the intent of governmental programs. **From a transportation perspective, the consequence of this policy focus is that passenger transportation often receives priority over the movement of freight (although in port cities freight movement often receives close attention from transportation officials).**
5. Environmental degradation and energy consumption are consequences of China's rapid economic growth and the equally rapid increase of its urban populations. Air pollution in particular has been receiving increased attention from the government. **Although it appears that economic development is still the primary goal of governmental policy, additional goals and performance measures relating to environmental quality and energy consumption have been added to the national agenda.**

Transportation Infrastructure Development and Operations

1. **Recognizing the vital role that transportation plays in its goal of continued economic growth, China is investing heavily in transport infrastructure, over 9 percent of the country's gross domestic product. This investment comes from both public and private (that is, joint venture) sources.** The current five-year plan has allocated billions of dollars [can we quantify?] for a national expressway system, new freight rail lines, port improvements and 18 new rail intermodal yards. Much of the national investment in transportation is intended to attract private investment to specific facilities, such as toll roads.
2. **Substantial levels of private capital are being invested, in some cases with low expectations of rapid return on investment,** that is, the investors are anticipating long-term benefits from investing in China. This investment has primarily occurred over the past several years in highways, port facilities, and logistics parks. Private

investment has been sought in rail infrastructure and intermodal terminals with limited success. .

3. **China is leveraging its natural geography to facilitate movement of goods; river and coastal shipping continue to be a significant component of China's intermodal transportation system.** The Pearl and Yangtze Rivers have traditionally been China's highways to the world. To a large extent, this is true today. China relies on barges and coastal shipping to access its major ports served by rivers. For example, approximately 40 percent of the containers shipped to Shanghai's new port of Yangshan arrive by barge. New barge-only ports upstream of the Pearl River Delta, provide a similar percentage of barge traffic to several container ports in the Pearl River Delta. The central government is also adopting barge design and energy standards along with subsidies for their adoption to improve consistency and efficiency in barge operations. For the development of the ports along the Bo Hai Bay, rail and truck access is utilized to bring cargo to the port facilities.
4. **The "Go West" policy of the central government has shifted investment attention on inland transportation, and the current challenges facing such transportation, especially the connections to the major international ports.** In those circumstances where barge transportation can be used in the most cost effective way, such as on the Pearl and Yangtze River, the inland economic development is relying on barge transportation to move a large percentage of the intermodal freight. However, where barge transportation is not feasible or not economical, government investment in highway and rail networks is providing alternative means of accessing the coast. Both the trucking and barge industry, however, are highly fragmented and consist of many small owner operators, offering little economies of scale that occur with larger companies. Thus, although the market for moving containers is very competitive, the limited capacity of individual barge and trucking firms force shippers to deal with many different operators, thus increasing the transaction costs associated with the movement of substantial levels of intermodal freight to the coast.
5. **China's intermodal rail service is facing significant challenges.** The movement of containers receives very low in priority on China's rail network, following military, energy (that is, coal), food and passenger movements. Accordingly, intermodal rail movement tends to be unreliable, often with no scheduled departures. It is estimated that rail handles approximately two percent of the intermodal moves in the country. However, the government is investing heavily in improving this service. Eighteen intermodal yards are in various stages of development, although those that are open are lightly used because of network reliability problems. Approximately 12,000 kilometers of freight-only track are being built to separate passenger and freight movements. And a goal of 10 million TEUs carried by rail (currently less than 3 million) has been established for the current five-year plan period. However, even with a threefold increase in TEUs handled (which will be very challenging), the market share for rail intermodal movements will still be only 3 percent.
6. **The Chinese central government has encouraged joint ventures to finance the national expressway system, the intent of which is to stretch government funds to support a variety of new modal investments.** Tolls on these expressways have historically not been used as a means of influencing travel behavior, but rather as a

means of raising revenue. **However, consideration is now being given in some locales to how tolls can be used to influence the movement of trucks.** In Shanghai, for example, a distance-based toll system on a ring road was converted to a considerably less expensive flat toll rate in order to encourage trucks accessing the port to use the ring road and thus reduce congestion on other inner city expressways in the region. This is exactly what resulted. This mechanism is not always possible. In Hong Kong, there are three tunnels between Kowloon and Hong Kong all of which are tolled. The ability to change toll rates is limited and, as a result, the older tunnel, which is priced lower than the other two, has considerably more traffic and is routinely congested. Governmental authorities are facing heavy resistance against toll increases for ‘social reasons’ and so the other two toll tunnels, even though they are providing what could be viewed as premium service for a higher price, are under-utilized.

Another interesting aspect of the Chinese experience with tolls is that the toll rates are comparable to those found in the United States and Europe, but the Chinese feel this does not reflect the economic reality of travelers in China where the GDP per capita is much less. Accordingly, in some cases, the Chinese are trying to renegotiate concession agreements that will allow lower toll rates, but offset lower toll revenues with longer concession time periods (from 30 to 50 years).

There was some limited indication that similar to the United States the tolling of highways can run into public opposition. In Hong Kong, for example, tolls on a new highway were opposed by truckers and the public, and the government thus had to invest its own dollars (instead of private investment) to build the road. The official in charge noted that this represented a perspective of a road being a “social asset” rather than an economic one.

7. **The national expressway plan is centered primarily on three major economic and political centers--Beijing, Shanghai, and the Pearl River Delta.** In essence, the national expressway system will be the major means of connection between the political and economic centers of the country, thus reinforcing their importance in the economic future of China. It was interesting to note that all of the new intermodal rail terminals are next to a national expressway as are ports and major airports. **Intermodal connection has been an important consideration in network design.**
8. **Trucking is the predominant means of moving containers to and from the ports, especially in the river delta manufacturing regions.** The trucking industry consists mainly of small businesses (one to three trucks), which makes the contribution it has provided to China’s economic growth even more impressive. There is no standard vehicle configuration, and there seems to be very little integration of technology into trucking operations. Truck movements are responsive to changes in cost structure as seen above in the example from Shanghai. The trucking industry is a maturing one, with a variety of strategies being used or being considered to improve the productivity of the industry; different strategies are being considered for different purposes. American trucking companies are also entering partnerships with Chinese companies to provide financial capital and expertise.

The makeup of the Chinese trucking industry also means that containers do not move considerably beyond the port facilities. Goods are brought into consolidation /deconsolidation facilities where they are placed in containers for export or devanned for further movement inland. It will be interesting to see how these operations change as China's trucking industry matures and their commercial motor vehicles more closely resemble what is seen in the US or the EU, and when China's intermodal rail network is complete and containers can be loaded directly onto double stack rail for movement west.

9. **Given the relatively large number of trucking businesses found in China, and the intense competition for freight movements, it was not surprising to find that oversized and overweight trucks have become an emerging, important concern to transportation officials.** Chinese officials are developing a national strategy for enforcing size and weight regulations especially on the country's new expressway system and are primarily considering fixed truck weigh stations; no serious consideration is apparently being given to weigh-in-motion technologies. A national campaign to enforce load limits has been in place for about a year.
10. **Chinese port productivity is "best in the world."** Chinese ports operate 24 hours/7 days per week/365 days per year. Operational strategies are very impressive—cranes that lift four TEUs, 20 to 30 minute truck turns, nine cranes working one ship, etc. New ports are being developed and the capacity of existing ports is being expanded very rapidly. Although no safety data were examined by the scan team, terminal operators noted that the safety record for Chinese terminals was as good if not better than terminals elsewhere in the world.
11. **Given the significant level of trade to the United States, security was of great concern to port terminal operators.** The relatively new infrastructure at China's ports has allowed terminal operators to build security measures into terminal operations, especially using technologies screening outbound containers. One terminal in Hong Kong, in particular, has undertaken a three-year demonstration that shows how x-ray and other scanning technology can be used to screen all containers entering the terminal with minimal disruption to terminal efficiency.
12. **China has not progressed to the point of systematically managing their infrastructure – they are still in the 'build' mode.** Nevertheless, at a few of the more mature areas that are experiencing significant congestion, transportation officials indicated a need to begin paying serious attention to system management.
13. **Intermodal connectivity and landside access to Chinese ports are not approached differently or in a more sophisticated way than what is found in the U.S. or the EU.** With the singular exception of a truck-only access road that was retrofitted from the national network to the port of Yantian, there was little evidence of the Chinese building into their port facilities a dedicated capacity to maintain free flow of cargo into and out of their large container port facilities. The general consensus is that the congestion would be dealt with when it arrived.
14. **Rail access to maritime port facilities is not being consistently built into new port design.** With the exception of the port of Qingdao, which has no river access and which is being looked at as the entry port for land bridge cargo from the rest of Asia

to the EU and Russia, no other port facility was being built with on-dock rail. This seems to be a reflection of the lack of reliability that stems from the low priority that intermodal cargo has on the rail network (fourth behind passengers, energy and agricultural products) and that the majority of the goods manufactured for export are manufactured within the coastal provinces, making the distance from manufacturing facility to export port a distance of less than 500 kms. How this will play out with the building of the 18 intermodal rail terminals and the 'Go West' policy will be interesting to watch.

Governmental Structure, Decision Making and Analysis

1. **China's policy making and implementation process identifies national goals some of which have performance metrics. However, local officials have some leeway in implementing projects so that they also meet local objectives.** A national five-year plan provides policy direction on what will be emphasized during the plan's timeframe (China is currently in its 11th five-year plan). For example, the current plan identified the following initiatives that were to be accomplished from 2006 to 2010:

- The target for economic growth was to be an annual growth rate of 7.5%.
- National policy was aimed at supporting the "Go West" campaign.
- Logistics was for the first time identified as a national issue, with reducing logistics cost being defined as a governmental objective.
- Six new rail lines (17,000 kms), six railway transportation hubs, 18 intermodal yards, 40 container handling stations, 150 intermodal sub-stations, and one million kilometers of rural roads are to be built.
- A 10% market share for rail intermodal traffic was established.
- All cities over one million population and 90 % of those cities between 200,000 and one million population will be connected to the national road network.

Within the construct of the five-year plan, local officials seem to have some flexibility in investing in transportation infrastructure that meets the national goals and their jurisdiction's needs. Accordingly, it was not surprising to note that discussions with national transportation officials emphasized the cooperative nature of transportation investment, whereas at the local level decisions were being made that seemed much more competitive with surrounding jurisdictions.

2. The transportation agencies in the national government have different responsibilities focusing on different modes (e.g., Ministry of Communications, Ministry of Railways, Ministry of Construction). **Because governmental officials' performance is measured by results, attention is paid to measures of progress. National data are collected and analyzed with respect to overall modal performance, and to the state of the economy.** Some challenges are being faced by the national transportation agencies that are responsible for the sometimes conflicting roles of planning, operating and regulating a modal system. This was viewed by some as hindering the progress it was making in achieving its performance goals. This was

the specific reason the CRCT was carved out of the Ministry of Railroads and given the sole responsibility of operating the rail network.

3. **Data analysis is used to determine the extent to which goals are being met at different levels of government.** This was referred to by some as “results-oriented planning.” The port terminals are all private operations and it is routine that the terminal operators use metrics.
4. **The performance of local officials and local governments is measured against national goals.** Thus, for example, it was noted by many that the most important metric for local officials is the degree to which economic growth occurs during their tenure, defined primarily as job growth for their residents. The tax policy of China also supports this goal as the tax revenues from the economic activity in a province stays, for the most part, in the province. The local officials clearly understand the linkage between expanding transportation infrastructure and their ability to create new economic development. While economic development is still the primary metric and motivator, growing environmental concerns seem to be increasing attention on measuring governmental performance with respect to environmental quality (for example, the number of days that cities face a certain level of air pollution).
5. Although this scan did not conduct a systematic assessment of the capability of municipal government agencies to plan and provide for transportation infrastructure and services, every meeting with local officials included the staff members responsible for each mode. In other words, **all of the modes were located in one agency, which encouraged the adoption of a multimodal systems perspective when looking at regional transportation investment.** For example, in Hong Kong the relationship among sea cargo, barge transportation, highway travel and air cargo was discussed with an understanding of how each affected the other. The same was true in the other municipalities visited.
6. **In most cases, there was little evidence that carriers or shippers were sought for advice on national strategic transportation plans or investments. However, at the provincial/regional level the inclusion of the private sector in tactical investment decisions was evident in the number of public/private partnerships.** For example, in Hong Kong an advisory committee to the Hong Kong government consisting of carriers and shippers routinely provides advice with respect to overall transportation policy. Additionally, the private sector is actively being sought for their advice as the 18 intermodal rail hubs are being developed.
7. **Port development plans considered modal access strategies as part of the planning process, but didn’t always result in multimodal port access.** The officials responsible for ports, and especially the newer ports, were very aware of and concerned with port access. The planning for ports included attention to highway and barge access and, in the case of Shenzhen, rail. This represented a much broader, multimodal perspective on planning than what is usually found in the United States. Interestingly, rail access to the ports is very limited, primarily due to a perception that the rest of the intermodal rail network suffers from unreliable and slow service.
8. **Project development occurs much faster in China than in the United States.** Transportation projects are viewed as a priority for economic development, as a

consequence they move forward very rapidly. With respect to environmental mitigation concerning transportation projects, Chinese officials noted that project alignments and other project characteristics were sometimes modified by environmental considerations, but they could not identify any project that was stopped due to environmental reasons. Given the rapid growth in China's economy and the need for expeditious provision of supporting infrastructure, it is not surprising that environmental factors are not viewed as a controlling factor of project development (similar to the early years of the U.S. Interstate Highway Program). However, it appears that environmental considerations are becoming a more important issue for local officials and that future project development efforts will be influenced even more by such factors.

9. **In keeping with the national policy of social harmony, government officials are concerned about the negative impacts of transportation facility operations and expansion on local communities.** For example, there was evidence that at least two of the new ports that replaced old central city ports were built some distance away from the city center to reduce the traffic and development pressures on the surrounding communities and to reduce the complications of inner city congestion. When community displacement does occur, there were examples of efforts to mitigate the impacts (e.g., a new logistics park that displaced farmers trained them to earn a living in the logistics park).
10. **Hong Kong's role in the competitive market of the Pearl River Delta is evolving.** When Hong Kong became a special administrative region of China, it was given certain advantages with respect to intermodal freight that could soon disappear. First, having the largest container port terminals in south China positioned it as a major port of departure for mainland exports. However, new ports in nearby Shenzhen and along the Pearl River (along with dredging in the river to allow access to these ports for bigger ships), as well as new manufacturing development on the west bank of the river will likely cause a shift in container exports to other ports. Second, special tariffs were established for goods exported through Hong Kong, which has provided cost advantages for containers moving through its port terminals. These tariffs will soon expire. Third, containers can only enter Hong Kong on trucks being driven by Hong Kong drivers. This labor cost is much higher than comparable movements to the Shenzhen ports. Once the special tariffs expire, the cost structure for goods moving through Hong Kong's terminals will not be very advantageous. It remains to be seen how the market adjusts to these changing conditions, but it appears that Hong Kong's relative position in global container flows could very well evolve in a different direction in the future.

Shipper/Carrier Perceptions

1. **Many of the international ocean carriers and shippers met during this scan view the serious constraint in international trade and supply chain efficiency as being on the receiving end, that is, in Europe and the United States.** The prevalent perception is that terminal throughput in the US and the EU there is limited by terminal operational limitations, landside access capacity, and growing levels of road congestion. There was a strong perception that the United States lacks the political

will to invest in infrastructure and could not deliver needed investments in infrastructure in a timely manner even if desired. China is viewed as being very proactive with respect to infrastructure provision by building for the future and clearly stating in their strategic plans what will be built and when; the United States is perceived as being very reactive. The largest complaint was the length of time it took to reach decisions on transportation projects. Industry representatives expressed an understanding of the different governmental laws, regulations and structures, but were frustrated with the uncertainty of not knowing a project's fate for a long period of time, so long in some cases that other investment or logistics decisions could not be made.

2. **Shippers and carriers felt that the effect of a widened Panama Canal and increased transits through the Suez Canal will likely be more shipments heading to east coast ports, but that west coast ports will still be the major destination for most of the containers.** The shifting sea routes are in response to transportation costs and the reliability of ground access modes at the west coast ports. With increased capacity at the Panama Canal, some carriers thought it would become a more appealing route than relying on rail or truck services across the continental United States. In addition, carriers mentioned that one of the constraints in all of the movements is that the new generation of container ships (10,000 to 12,000 TEUs) cannot physically dock at most U.S. ports (except perhaps a few that are deepening their ports). The larger ships are being used primarily in service to Europe.

Lessons for the U.S.

The lessons learned from this scan are organized in two major categories – consequences to the United States and its transportation system, and different approaches to planning and project development in support of a growing economy.

Consequences to the United States and the U.S. Transportation System

1. **China competes as a nation.** Under current economic growth projections in the US and China, trade flows to the United States from China will continue to grow. China is building the infrastructure to handle them, but there are important questions as to whether the U.S. transportation system is ready. With a limited number of ports of entry, the U.S. transportation system necessarily concentrates these imports at a few strategic locations. **If the United States wants to stay competitive globally, investment in transportation infrastructure is needed, new system management technologies should be applied, and institutional change in how we identify, fund, operate and make key infrastructure improvements to key elements of the transportation system should be considered.** These improvements help not only to expedite the movement of imported goods, but to reduce the logistics cost of U.S. companies to compete in the global market.
2. **Trade from China will increasingly become an east coast issue.** With new service routes through the Suez and Panama Canals, States on the east coast will be experiencing increasing demands on their transportation system. Shippers and

carriers noted that these routes will become even more important if the land access to west coast ports deteriorates.

3. Given the navigable draft and terminal capacity of most US ports, **the largest container ships will not be providing service to the U.S.** This means that US ports will be served by vessels carrying $\leq 10,000$ TEU and with increasing cargo volumes that means more vessel calls.
4. **Similar to other the intermodal freight scans in Europe and Latin America, the difference in port efficiency between China and the United States is dramatic.** Hours of operation, the time to turn trucks, crane productivity and good land access make Chinese ports very efficient. If U.S. ports are unable to physically expand due to community concerns or terrain limitations, maximizing the use of existing capacity and improving port throughput is imperative to the U.S. being able to handle increasing container flows.
5. **The United States can learn a lot from China on the use of barge and coastal shipping as access modes to major ports.** Major river ports are being developed to act as transshipment points, with major river ports being developed near new manufacturing sites. Although there are few locations in the United States where manufacturing concentration is located along navigable rivers that connect to major ports as in China, the Chinese experience in barge operations might be very informative in those locations where such operations make sense. Further, even if the US river systems and the ports they serve do not provide logical conduits for containerized freight movement they provide key assets for bulk commodity movement and need to be well maintained so they ensure those goods move efficiently and do not shift to and already burdened rail and highway network.
6. **Freight bottlenecks are viewed as a drain on transportation system and economic productivity.** This is an important perspective for the United States as well. Solving these bottlenecks involves more than just expanding physical capacity, but also using technology and operational strategies. The port of Yantian is a good example of this. Ten years after the port was built it became apparent to the local officials that congestion on the roads serving the port was affecting not only freight movement but local traffic as well – they built a truck separated access route to the port to eliminate the bottleneck.
7. **Chinese officials have recognized that freight-oriented transportation investments, especially near ports, are an important part of the nation's economic development. Accordingly, Chinese transportation agencies have implemented some system management strategies aimed at improving port access.** Efforts to encourage more efficient movement of trucks have included differential tolls, prohibiting trucks in congested areas, enhanced enforcement of pedestrian and passenger vehicle flows on streets near ports, separating trucks from passenger highway lanes, and encouraging the use of barges as an alternative access mode (although rail does not seem to be a major consideration at this point).
8. **The United States is fortunate to have a much more developed rail network, which in many cases provides on-dock service to port terminals. This is a significant advantage to U.S. trade flows, and one that needs to be nurtured.** The

efficiency of the feeder services into and out of U.S. ports will be a key factor in the ability of the U.S. transportation system to support increased container demands from China. The U.S. rail network, although often facing congestion issues of its own, still provides an important capacity for moving containers once they reach U.S. ports. Improving the productivity of such services will be an important element of the U.S. strategy to remain competitive in the global market. Interestingly, the new Chinese freight-only rail track that is being built to connect the 18 new intermodal hubs will have no at-grade crossings.

9. **Given China’s current experience with oversize and overweight vehicles and the infrastructure damage they’re grappling with, the United States should ensure that its commercial motor vehicle size and weight program continues to advance and is provided adequate resources.** This is a critical part of the road management system. As was seen in China, when such a program is not in place, roads wear out much faster than expected. Thus, federal and state efforts to monitor and enforce truck use of the nation’s road network need to be continued and supported.
10. **One of the challenges facing west coast ports is the bunching of vessel departures in China that result in vessels arriving about the same time in the United States.** This is primarily due to operations in China where ships depart Chinese ports over the weekend in response to manufacturing, supply chain, and market requirements. If vessel bunching could be reduced, this could have significant benefits to both U.S. and Chinese ports. In discussions with shippers and carriers in China, there was some optimism that this could in fact occur.

Lessons From How the Chinese are Investing In and Operating Their Transportation System to Support a Growing Economy

1. **China has a national transportation investment policy that is closely linked to its trade and economic policy.** It was clear in discussions with Chinese officials at all levels of government that they were aware of what the national transportation policy is and what it is intended to accomplish. **China competes as a nation.** National transportation investment seems to focus on two major goals (forgetting for a moment military defense) – strategies to foster “social harmony” among Chinese citizens, and strategies to support economic growth, with the second goal helping to support the first. Given where China is in its development cycle, there is little question that **transportation infrastructure is viewed as a critical component of the nation’s economic future** and that the creation of a transportation infrastructure network was critical to and in some cases leading the economic development pattern. The United States would benefit from adopting national transportation investment policy that supports the nation’s economic health. Linkage of transportation, trade and economic policies that coordinates transportation investment, especially as it relates to freight is vital.
2. The Chinese central planning function is not a model that would work in the U.S. However, **the concept of a centrally planned/financed and locally executed national strategic expressway network, along the lines of the initial effort to build the Interstate System, which uses performance measures for monitoring**

progress in developing and operating key elements of the national transportation system is worth considering. This centrally planned and financed national expressway network provides the platform for China to compete as a nation - a united whole. It serves the “national benefits.” The three tiered planning effort the Chinese employ, which covers central, provincial, and local needs appears to be working well in addressing national, intra-region and local transportation needs. For example, performance measures (and standards) for the interstate highway system might be established nationally with the exact means of achieving desired performance left to the states.

3. Many of the assets that work in tandem with the Chinese transportation system (port terminal development, logistics parks, etc.) are funded through private investment. In some cases, the return on this investment is not likely to be realized in the short term, but rather will take years for the investment to start producing net gains. However, it was made very clear by those companies investing in China that because the Chinese can make decisions and show progress toward infrastructure improvement, there is a willingness to invest, patiently. As was noted in these same discussions, a similar confidence in the U.S. approach toward decision making and project development was lacking. There was little credibility in the U.S. process for assuring that progress will be made. **This suggests that the degree to which the United States is interested in encouraging more private investment in transportation facilities, greater attention needs to be given to timely public sector decision making, we simply need to get to the decision point earlier.**
4. The instrument of privatization in China is primarily the joint venture. **In almost all cases, private investors do not get a majority share of the investment (the exception being port terminals); government agencies or state owned enterprises retain control.** In some instances, such as in the 18 rail intermodal yards, private investors have turned down participation in a joint venture because the government stipulations were too stringent. The major lesson, however, is that the model of private funding in China is that government still participates in a significant way by steering where the investments can be made.
5. **Chinese planning for intermodal centers and indeed for regional transportation networks adopts a systems perspective on performance and investment.** The regional highway network, ports, airports, intermodal facilities and warehousing/distribution centers seem to be planned with an understanding of how they all interconnect and affect one another. While in the US there are multi-State coalitions that seek to coordinate multi-jurisdictional activity, in order to achieve a systems level coordination more effort along these lines will be necessary.
6. We learned in Hong Kong that the new international airport is rapidly becoming one of the major air cargo airports in the world, not so much due to air cargo planes themselves, but because of the freight being shipped as belly cargo in passenger aircraft. This was viewed by Hong Kong officials as a major new market, especially as it relates to the United States. **Air cargo is the fastest growing segment of freight movement. While it still is only a small percentage of total tonnage, the implication to the U.S. transportation system of this growth in both air cargo**

hubs and belly freight, is new stress to the transportation network on already stressed and overcrowded U.S. airports.

7. National data collection in China provides a springboard for national transportation planning, investment and performance evaluation. This is especially true as it relates to investment in freight facilities and services. This is an important lesson for the United States. **U.S. freight data systems should not only be continued, but expanded to provide the information needed for optimal transportation investment decision-making, especially given the important role that freight plays in the economic health of the nation.**

Implementation Strategies, Dissemination and Recommendations

The scan team developed the following preliminary recommendations relating to further activities that should follow from the scan. They are organized in four major categories: dissemination, policy, outreach, and research/data.

Dissemination

1. The timing of this scan is conducive to disseminating results at upcoming meetings. For example, the scan results will be reported to several AASHTO committees during 2007, some meeting very shortly after the scan team returns to the U.S. These include: the AASHTO annual meeting at the end of September, 2007; and the Special Committee on Intermodal and Economic Development, the Highway/Highway Transport Subcommittee, and the Standing Committees on Rail, Water, Aviation, Planning, and Environment. Leo Penne will coordinate the opportunities of making presentations at these committee meetings.
2. Opportunities will be sought for presenting the results of this scan at next year's regional AASHTO meetings, or possibly the results of the synthesis of all three international scans on intermodal freight (see below). Leo Penne will coordinate the opportunities for making such presentations.
3. Historically, the findings of international policy scans have been presented at the next annual meeting of the Transportation Research Board. Nordahl and Meyer will arrange for the results of this scan to be presented.
4. The results of the scan will also be sent to the TRB staff overseeing the National Cooperative Freight Research Program for consideration in future research project statements.
5. It was clear from meeting with shippers and carriers that there is a perception that the U.S. transportation system is unable to handle increasing intermodal demands. Certainly, some bottlenecks in the system need to be fixed, and increased capacity does need to be provided in many cases. However, the U.S. transportation system is resilient and often responds to changing demand patterns. The deficiencies in the system do need to be addressed, but there is also a need to tell the positive story of how the U.S. transportation system carries large amounts of freight on a daily basis, all of which helps the national economy. All team members should highlight the

positives of the US transportation system at each opportunity and this message should be incorporated into all presentations generated by this scan.

Policy

1. The results of this scan will be useful to the National Surface Transportation Policy and Revenue Study Commission, which is in the latter stages of discussion concerning recommendations on the national transportation program. FHWA will contact Commission staff to see if there are opportunities for the scan results to be submitted for Commission consideration.
2. The AASHTO Special Committee on Intermodal Transportation and Economic Development should develop policy recommendations to identify a national freight transportation system and investment program.
3. FHWA will convene a forum to address the streamlining of vessel “bunching” at United States ports. One of the major observations of the scan was a better understanding of the scheduling and operations of ship movements to the U.S. west coast. Due to long-standing traditions and market considerations, most ships leave China during the weekend and thus arrive on the U.S. west coast about the same time, placing peak demands on port operations. It became clear during the scan visit that there could be opportunities in working with the retailers, manufacturers, logistics providers, shippers, carriers and terminal operators of “flattening” out this peak arrival distribution.
4. A study should be commissioned on how the Chinese governance structure establishes and uses performance measures and national data collection to manage transportation policy. The scan team feels that there is some useful constructs in this approach, but it is unclear at this point what specific measures are used. The concept, however, of establishing performance goals or levels for national systems (such as the U.S. interstate highway system) has a potentially useful application in the United States.

Outreach

1. Incorporate materials from the scan into the relevant TRB/FHWA websites. Meyer to write a summary for *TRB News* on the results of the scan, which could be used by FHWA to submit to industry trade and other journals (e.g., the *Journal of Commerce*, *Traffic World*).
2. Seek opportunities to present scan results at transportation stakeholder meetings. Such stakeholders include industry forums and associations such as the following, which are part of Freight Stakeholders Coalition:
 - American Association of Port Authorities (AAPA)
 - American Road and Transportation Builders Association/Association of General Contractors
 - American Trucking Associations (ATA)
 - Air Cargo Association

- Association of American Railroads (AAR)
 - Coalition for American Freight Gateways
 - Highway Users Alliance
 - Intermodal Association of North America (IANA)
 - National Association of Manufacturers
 - National Retail Association
 - National Industrial Transportation League (NITL)
 - U.S. Chamber of Commerce
 - Waterfront Coalition
3. FHWA to identify a strategy for reaching out to other federal government agencies and decision makers on disseminating the results of this scan. These could include Congressional staff for the House Transportation & Infrastructure Committee, Senate Environment and Public Works Committee, Senate Commerce Committee, and Goods Movement Caucus. Within the U.S. DOT, possible agencies would include OST, MARAD, FRA, FAA and RITA. Other federal agencies would include STB, EPA, Department of Commerce, Department of State and the Department of Homeland Security (Transportation Security Administration).
 4. FHWA to identify a strategy for reaching out to other government organizations. Such groups could include: National Governor's Association, National Conference of State Legislators, National Association of Regional Councils, Association of Metropolitan Planning Organizations, NADO – National Association of Development Organizations, I-95 Corridor Coalition (potential impact on east coast ports; infrastructure demands/options), West Coast Corridor Coalition (potential impact on west coast ports; infrastructure demands/options), Eastern Premiers and Governors , Latin American Trade and Transportation Study, State Freight Offices, State Planning Offices, State Freight Stakeholder Groups (to discuss globalization of trade, freight movement and its impact on state economies, transportation systems). The I-95 Corridor Coalition will help in preparing the materials in summary form for such outreach.

Research and Technology Transfer

1. Commission or solicit a synthesis project from NCHRP that assesses the common lessons learned from the three international scans that have now been conducted on intermodal freight.
2. The U.S. DOT will pursue a data exchange program between the U.S. DOT (FHWA and RITA) and the Ministry of Communications. The intent of this exchange program is to compare national data collection strategies and develop common protocols for linking national economic data to transportation system performance.
3. Commission a study that compares and contrasts U.S and Chinese truck information management systems to see if there are areas of joint benefit and possible applications in the United States.
4. The Chinese are in the early stages of truck size and weight enforcement strategies. The FHWA will send information to relevant Chinese agencies on the weigh-in-motion technologies, and identify possible further technology exchange opportunities.

5. Commission a study of the Yantian port truck highway facility. This case study would be conducted by the Chinese Academy of Transportation Systems, under a scope of work prepared by the FHWA.
6. Given the rapid pace in economic growth and the corresponding expansion of the transportation system, consideration should be given to visiting China again in a few years to see what has happened in several key areas. How might be the further development of rail in China affect passenger and freight movement? What lessons can we learn as we invest in our rail systems? What has been the impact of private investment in transportation facilities? How have new security technologies been incorporated into port terminal operations? What has been the impact of the “Go West” campaign on logistics costs? To what extent are barges still an important mode of access to coastal ports? How has the massive investment in port and inland transportation infrastructure affected the relative competitive advantage of different Chinese ports? How has the trucking industry evolved with respect to vehicle technology and industry structure?