

<u>Purchase Class</u>	<u>Expenditure Reduction (\$)</u>
Food	76
Household furnishings	49
Clothing	36
Medical care	122
Transportation	164
Entertainment	61
Services	54

Of course these changes are relative. If compared to 1982 expenditure levels, all classes would show a positive growth.

The lower level of expenditure for transportation reflects the reduced mobility of households under the low-investment case. In the 1978 service level scenario, the typical U.S. family is projected to drive 17,226 miles in 1995. In the low-investment scenario, that family's highway VMT would be 12,786 miles, a reduction of 26 percent, or 4,440 miles. This would lead to less frequent replacement of motor vehicles and smaller expenditures on items related to automobile use. For example, the family would spend \$45 less on gasoline, \$21 less on automobile repairs, and \$9 less on tires. On the other hand, there would be a minor increase in the use of buses, local transit, and railroads.

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Casino Bus Transportation System

WALTER CHERWONY

ABSTRACT

The relationship between transportation services and economic development has been well established. An interesting case study of this link is the casino bus transportation system serving Atlantic City, New Jersey. The casino buses provide a premium intercity bus service connecting numerous metropolitan areas in the Northeast Corridor with nine casinos. The casino buses bring more than ten million visitors to this resort community annually and in large measure have contributed to the economic success of legalized casino gambling. In this paper a description is presented of how the service is provided including the various subsidies and incentives provided by the casinos. Bus and passenger volumes, which indicate the dimensions of this privately operated bus

service, are also presented. There is a discussion of the economic benefits of the special bus service as well as of the necessary role of government.

The need for transportation services and facilities to support economic development has been well established. Moreover, the location and pattern of industrial and commercial development within a region or state have often been influenced by existing or proposed transportation facilities. In some cases other factors such as business climate and labor force characteristics have guided development decisions. However, these situations typically call for the planning and implementation of transportation services to support development. An interesting case study of the latter situation is the casino bus operations in Atlantic City, New Jersey.

Several years ago Atlantic City became the first area outside Nevada to have legalized casino gambling. The introduction of this significant tourist attraction has reversed the decline in visitors to this resort community. At present nine hotels and casinos are in operation, and another is under construction. Several more hotels and casinos are planned as is expansion of existing casinos. Casino gambling has resulted in substantial construction, the creation of tens of thousands of new jobs, and the rapid expansion of Atlantic City's economic base.

As a result of this development a new transportation system (casino bus), which provides an incentive for tourists to visit the hotels and casinos and thereby encourages further economic development, evolved. Also, because it relies on intercity coaches, the casino bus transportation system is an environmentally attractive and energy efficient transport mode. This use of common carrier vehicles is desirable from a traffic engineering viewpoint because of the narrow grid network of streets in Atlantic City.

The casino buses represent an interesting case study for a variety of reasons. First, the Atlantic City example clearly indicates the linkage and interrelationship between transportation and economic development. Second, the magnitude of the system and the number of passengers carried are larger than those of most urban bus systems. Third, the casino bus system is owned and operated by private carriers and has evolved over the past few years with no previous planning efforts. Fourth, the bus system is an integral part of each casino's marketing program and provides incentives to attract patrons. Finally, the casino bus system has necessitated an unusual role and level of responsibility for transportation agencies in the Atlantic City area.

From the foregoing discussion it would appear that the Atlantic City casino bus system provides an usual case study of transportation and economic development. A description of the system from the perspective of the passengers, operators, and casinos is presented in this paper. Also presented are the economic impact of the bus system and the promotional activities to encourage visitors and tourist expenditures that translate into jobs. Finally, as brief discussion is provided of the function and role of government in regard to a privately owned and operated casino bus system.

SYSTEM DESCRIPTION

The use of buses to transport visitors to Atlantic City is not surprising in view of the strategic location of this resort community within the Northeast Corridor. Several large urban areas (e.g., New York, Philadelphia, and Baltimore) are within a relatively short driving distance of Atlantic City. Given the generally unsuitable nature of air travel and the current deteriorated state of rail service to and from the area, the bus service represents a mode that is competitive with the private automobile. Before casino gambling, conventional intercity bus service was offered between Atlantic City and other metropolitan areas. Patrons were transported from a terminal in their home town to the Municipal Bus Terminal in Atlantic City. In some cases riders had to transfer at intermediate locations to complete a trip when direct bus service was not provided. This type of bus service continues today although its relative importance has been somewhat less since the introduction of casino buses.

The casino bus transportation system affords a premium service at reduced fares, and riders are provided cash premiums and other incentives. The

service is operated by private carriers with the approval of the individual casinos. Routes typically originate at shopping centers in residential areas where patrons can park their cars and purchase tickets. This affords riders a relatively convenient trip because they do not have to travel to a downtown bus terminal as is the case with conventional intercity bus service. Further, casino buses originate at numerous locations throughout the metropolitan areas thereby enhancing coverage. Typically, buses stop at a few locations to pick up passengers and then travel nonstop to a particular casino. Approximately 6 hours later the bus returns to the casino to pick up passengers and then travels to the originating locations.

At the casino, before unloading, riders are issued coupons that can be redeemed at the casino for cash and other premiums. Most casinos offer riders at least \$10 in quarters as well as meal slips and other promotional incentives. The cash value of the premiums varies among the nine casinos and reflects the competitive nature of the gambling industry and its marketing efforts to attract visitors. Because the cash incentive nearly equals the bus fare, the casinos are providing a user-side subsidy to riders. With the exception of shared advertising expenses, the casinos make no direct payments to the bus companies. Another feature of the casino bus system, with respect to user costs, is the discounting of fares. In most urban areas casino bus fares are less than those charged on intercity buses. In general, the greater the distance from Atlantic City, the greater the fare discount.

Two primary types of casino bus service are provided by the private operators--line and charter. Line runs are similar to scheduled line-haul intercity bus service. Buses operate along a fixed route with a predetermined schedule. Unlike conventional intercity service, casino bus patrons must make an advance reservation (a day or two before the trip). When the number of passengers exceeds the capacity of the scheduled buses, additional buses or extra sections may be added. As previously noted, most casino buses travel to and from only one casino. When there is less than a fully seated load to a single casino, casino buses are sometimes scheduled to stop at two or three casinos. This situation reflects the need for each operator to recover costs and a reasonable profit from farebox revenue.

Charter service is used when a group makes arrangements with either a bus operator or a casino. Patrons are offered relatively low fares, cash and other incentives from the casinos, and are provided with a 6-hour visit. Reservations are normally made 2 to 3 months in advance and confirmed several weeks before the trip.

Casino buses are operated by several dozen carriers although approximately ten operators serving the Philadelphia and New York metropolitan areas account for the majority of buses and patrons. Each casino has a bus program that is an integral part of its overall marketing plan. The casinos control the number of arriving buses because the carriers must have prior authorization to stop at a casino. Operators can be prohibited from discharging passengers at a casino. More important, casinos can refuse to issue coupons, redeemable for cash or meals, or other incentives to passengers. Of particular note is that all services and facilities of the casino bus system are provided by private firms.

BUS AND PATRONAGE VOLUMES

The quarterly growth in the casino bus transportation system and the importance of this transport

mode are clearly underscored by the bus volume trend shown in Figure 1. As each new casino has opened, it has instituted a casino bus program in cooperation with private carriers. Of interest is the steady increase in bus volumes during the 3-year period when the number of casinos increased from one to nine. These results would suggest that the casino bus market increases with each new casino. Further, the increase in bus volumes is large enough that increases in the number of buses to each new casino are attained by overall market growth rather than by diversion from other casinos. Another interesting observation is that the rate of growth is not declining. This would suggest that a saturation level of bus volumes should not occur in the foreseeable future, especially given the construction of new casinos. The casino bus transportation system can be expected to grow at the same rate as casino development.

To further describe the dimensions of the casino bus system, bus activity level data from July 1982 for the casinos are summarized in Table 1. Bus volumes vary considerably by day of the week. The largest bus volumes are observed on Wednesday and are nearly one-sixth greater than those of the average day. Tuesdays and Thursdays also have relatively high bus volumes, which would indicate that peak travel days occur during the middle of the week. In contrast, bus volumes preceding (Friday) and following (Monday) the weekend are relatively low. During the weekend bus volumes are generally smaller than

during weekdays, and there is considerable variation between Saturday and Sunday. The daily variation in bus volumes is attributable to two major factors. First, bus volumes reflect the days on which tourists wish to visit Atlantic City. Second, the casinos attempt to attract casino bus patrons when other visitor activity levels are relatively low. For example, the casinos sometimes increase the premiums during slow days such as weekdays, and during busy periods (e.g., weekends) the incentives are often reduced. Because the bus program is an integral part of each casino's marketing program, desired activity levels are important in establishing bus activity levels.

Regardless of the day examined, the bus volumes are substantial. The dimensions of the system are apparent from comparisons with other bus systems. For example, New Jersey Transit, which provides public transportation throughout the entire state, operates approximately 1,200 buses during the morning and evening rush hours. Moreover, few transit systems in the nation operate as many buses as are in service in the casino bus system.

Another way to describe the casino bus transportation system is by the type of service offered. About five of every six casino buses are line runs (see Table 2). The proportion of charter buses fluctuates by day of the week with the greatest number and percentage of all buses noted on Sunday. The proportion of other buses declines between Monday and Friday. Like the daily variation in bus volumes, the number

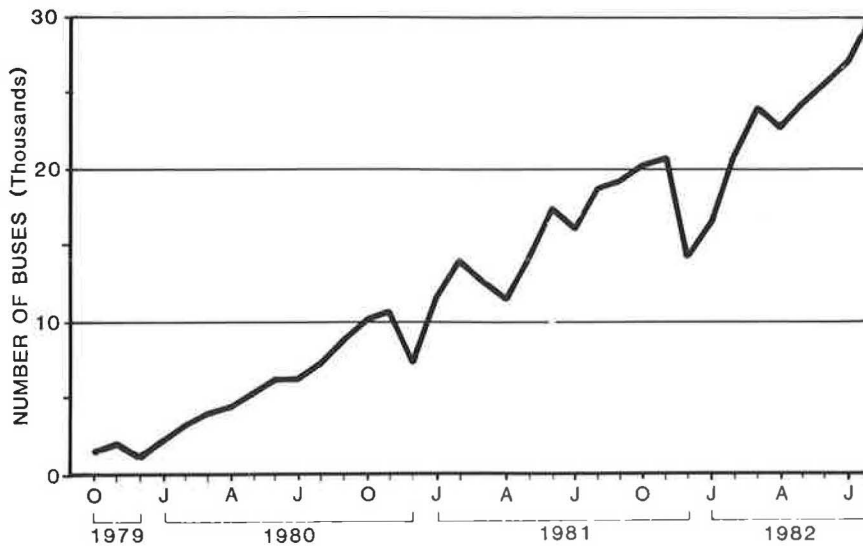


FIGURE 1 Trend in bus volume activity.

TABLE 1 Daily Variation in Bus Volumes—Summer 1982

Day	Number of Buses	Percentage of Daily Average
Weekend		
Saturday	940	97
Sunday	785	81
Average	864	89
Weekday		
Monday	902	93
Tuesday	1,057	109
Wednesday	1,111	115
Thursday	1,039	107
Friday	947	98
Average	1,012	105
Daily average	967	100

TABLE 2 Bus Volumes by Service Type—Summer 1982

Day	Number of Buses			Percent Charter
	Line	Charter	Total	
Weekend				
Saturday	805	135	940	14.4
Sunday	672	163	785	20.8
Average	713	151	864	17.5
Weekday				
Monday	733	169	902	18.7
Tuesday	883	174	1,057	16.5
Wednesday	931	180	1,111	16.2
Thursday	896	143	1,039	13.8
Friday	835	112	947	11.8
Average	856	156	1,012	15.4
Daily average	813	154	967	15.9

of buses by service type reflects the marketing strategy of each casino. It should be recognized that some casinos prefer and actively encourage charter buses. At these casinos, the proportion of charter buses is greater than the averages presented for all nine casinos.

An unusual feature of the casino bus transportation system is the pattern of bus arrivals and departures by time of day for both typical weekday and weekend conditions. As shown in Figure 2, more than one-third of all weekend bus arrivals occur between noon and 2 p.m. About 20 percent of all buses arrive in the single hour beginning at 12 noon. During the afternoon, bus arrivals decline until 7 p.m. For the next three hours, bus arrivals are more pronounced, which reflects evening visitors. Hourly variations in bus departures exhibit peaking characteristics similar to those of arrivals. The peak period (6 p.m. to 8 p.m.) includes 34.1 percent of all weekend buses. The shift in the peak reflects the standard practice of scheduling a 6-hour visit at the casino.

The weekday bus volumes by time of day exhibit a more pronounced peak than the weekend situation in terms of the number of buses and proportion of total daily buses. As shown in Figure 3, the arrival peak period occurs between 11 a.m. and 1 p.m. and includes 450 buses or approximately 40 percent of total daily buses. Arrivals decline after this peak period but exhibit a modest surge between 7 p.m. and 9 p.m. (about 10 percent). The greatest number of bus departures occurs between 5 p.m. and 7 p.m. with nearly one-fourth of all buses departing between 6 p.m. and 7 p.m.

The distribution of bus arrivals and departures reflects the efficient use of the casino buses as an integral part of each casino's marketing program. For example, most bus patrons arrive at the casino during the day when activity levels at the casino are relatively low. There is little reason to attract large numbers of bus patrons during the evening hours when most casinos are busy. The arrival of buses around noon reflects the desire for midday visitors as well as the 2- to 3-hour trip time to

Atlantic City. This way, passengers board buses at relatively convenient times. The scheduled 6-hour visit of bus passengers provides ample opportunity for gambling.

Bus volumes are substantial, and the number of passengers carried is also impressive. On average, load factors vary from 35 to 40 persons on each arriving bus. On an annual basis, the casino bus transportation system carries approximately ten million visitors. During the summer, monthly patronage levels of about one million riders are attained. These figures clearly indicate the importance of the casino bus transportation system in bringing visitors to Atlantic City and the contribution the bus system makes to the economic viability of the city.

ECONOMIC IMPACTS

The primary impetus for casino gambling in Atlantic City was the encouragement of economic development and the creation of new jobs for this depressed resort community. The economic impact of gambling is apparent from the level of investment in new construction and the number of permanent jobs created. The construction cost per casino has varied from less than \$100 million for renovation of existing hotels to more than \$300 million for the more recent hotels and casinos that are of entirely new construction. The number of jobs created by this construction boom and the resulting economic stimulus is significant.

The introduction of casino gambling has had a substantial impact on permanent jobs. Employment levels at each casino are a function of facility size and range from 3,000 to 5,000 full-time employees. With nine operating casinos, the economic consequences of an entirely new industry are readily apparent. A complete support industry has also been created to serve the needs of the casinos and hotels in Atlantic City.

In view of the magnitude of the economic development attributable to casino gambling, those factors

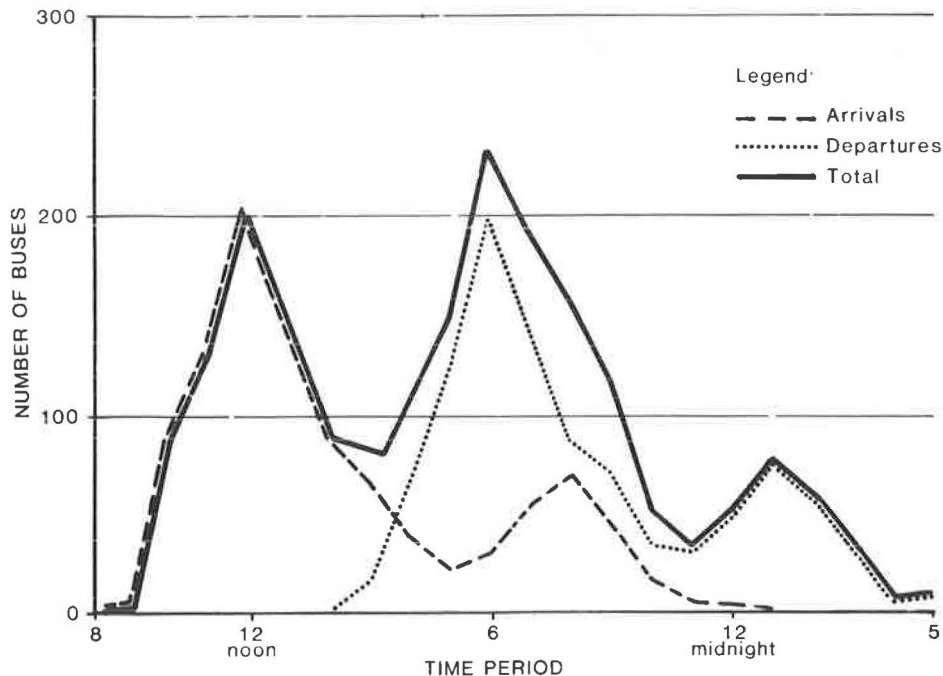


FIGURE 2 Hourly variations in bus volumes—weekend design day.

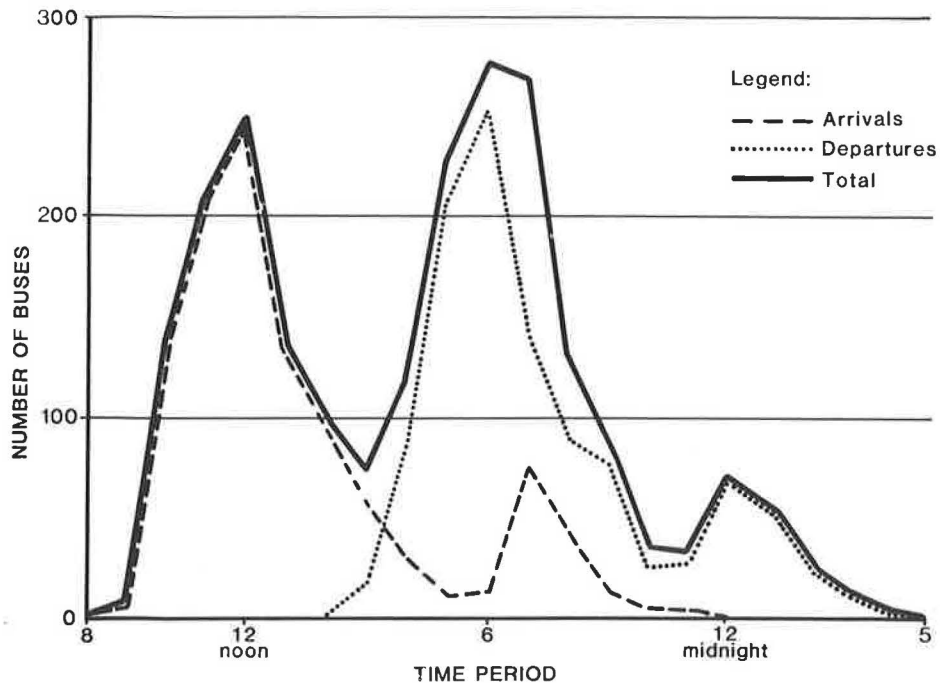


FIGURE 3 Hourly variations in bus volumes—weekday design day.

such as transportation that contribute to the success of the hotels and casinos should be recognized and encouraged. Managers at each of the casinos are aware of this fact and have implemented bus programs. As noted previously, the casino buses are an integral part of each casino's marketing and business plans. Although bus patrons are not "high rollers," they make a substantial contribution to the economic viability of the gambling industry. The casino buses draw visitors to Atlantic City during those hours of the day, days of the week, and months of the year when activity levels would be relatively low. This situation is confirmed by the hours of operation and concentration of buses during only certain time periods. Failure by the casinos to attract those ten million visitors annually would seriously impair the economic viability of the industry and jeopardize thousands of jobs.

Each casino has developed its own marketing strategy and targets for casino bus patrons. A comparison of weekday bus volumes with the size of each casino is presented in Figure 4. Two measures of casino size have been used to portray the bus marketing program. Casino floor space provides a measure of the number of persons that can be accommodated in the casino. The number of slot machines is another useful measure because the majority of bus patrons plays the slot machines rather than the various table games. Three distinct levels of marketing activity are noted for the casino bus program. Some casinos place great reliance on the casino bus program to attract visitors. This high level of casino bus activity is viewed as an essential element of the overall business plan. Other casinos place less importance on casino bus patrons and have been designated as having moderate programs. The third group of casinos has established relatively limited objectives with respect to casino buses. The number of buses is low in comparison to both floor space and slot machines.

Discussions with casino management confirm the three levels of casino bus programs. Moreover, casinos establish the cash values of incentives and

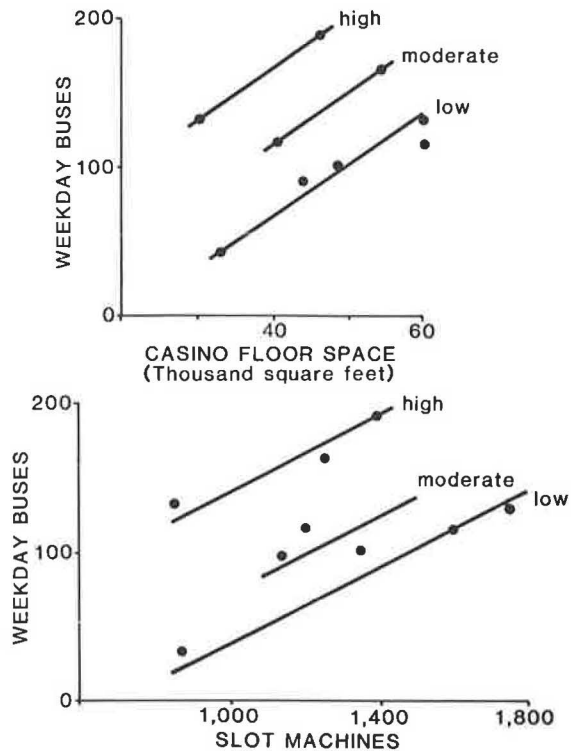


FIGURE 4 Casino bus strategies.

premiums to meet their individual casino bus objectives. For example, the casinos that emphasize attracting casino bus patrons offer coupons for more than the prevailing \$10 in quarters and partial payment of meals. In contrast, those casinos that offer relatively limited incentives can reduce the number of casino bus patrons. The market is quite sensitive to changes in the premiums offered by the

casinos. Bus and passenger volumes can change significantly in response to variations in the incentives offered by a particular casino relative to its competitors. These results are confirmed by the relationships shown in Figure 4.

The preceding paragraphs discuss the various strategies followed by the casinos and their reliance on bus patrons. The importance of this transportation system is confirmed by the fact that all casinos operate a bus program. To indicate the economic impact of the casino buses, the number of patrons was converted to dollars spent. The casinos do not reveal market research data, but it is generally recognized that casino bus patrons spend an average of \$50 to \$70 each visit. Based on ten million annual visitors, the casino bus transportation system generates tourist expenditures that exceed one-half billion dollars and could reach \$700 million. Clearly the casino bus transportation system plays a major role in assuring the economic viability of the casino industry and the Atlantic City region.

GOVERNMENT ROLE

The casino buses are owned and operated by private firms that recover all costs from farebox revenue. For this reason no government funds, either operating assistance or capital funds, are required. This contrasts with urban transit systems throughout the nation as well as intercity bus carriers to a certain extent. Although government funding is not required, a regulatory role is mandated. The large volume of buses can produce traffic congestion and delays for residents. Also, the routing of buses

through and the storage of buses in residential areas can be disruptive. Recognizing these problem areas, the Atlantic County Transportation Authority (ACTA) has developed a management plan for routing and parking casino buses in Atlantic City. To assure the implementation of the plan, ACTA has requested and received power to regulate the flow and movement of buses. In this way the economic and transportation benefits of casino buses can be realized while the potential adverse consequences are limited. Such an approach is unusual for a local authority, but the unique conditions brought about by casino gambling called for such innovative solutions.

CONCLUSIONS

In this paper a brief overview of the casino bus transportation system has been provided. The casino bus system serves as an important transport mode to and from Atlantic City, and it also has encouraged the economic development envisioned with casino gambling. Of particular note is the evolution of this transportation system and its operation by the private sector. It is anticipated that the dimensions and importance of the casino bus system will grow and keep pace with the development of new casinos in Atlantic City in the future. Further, the casino buses will continue to constitute a significant approach to assuring the economic vitality of the tourist industry and the region.

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Optimizing the Use of a Containership Berth

PAUL SCHONFELD and STEPHEN FRANK

ABSTRACT

Total system costs, including those of berths, cranes, storage yards, dock labor, ships, containers, and cargo, are minimized for single-berth containership terminals under various assumptions. The analytic model accounts for queueing delays to ships, mutual interference among cranes, minimum work shifts, and storage yard requirements. Results indicate that total system costs per ship or per ton of cargo can be significantly decreased by increasing the number of cranes per berth and berth use above current levels. The results are especially sensitive to labor costs and work rules.

Containerization has been widely adopted in ocean shipping since the late 1950s because it offers some compelling advantages over break-bulk shipping. By handling the cargo in relatively large standardized intermodal containers, the time and cost of transferring cargo in ports can be reduced substantially. The cost and weight of cranes required to handle containers preclude their installation on modern specialized containerships. Thus, unlike older ships, most containerships have no self-loading or self-unloading capability.

Given the high cost of containerships and terminal facilities, it is desirable to use both ships and terminals as efficiently as possible. However, some current plans for containerport development may lead to underuse of containerport capacity as well as suboptimal turnaround times for ships. Typically