

THE TERMINAL GATE APPOINTMENT SYSTEM AT THE PORTS OF LOS ANGELES AND LONG BEACH: AN ASSESSMENT

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Abstract

This paper presents an evaluation of the terminal gate appointment system at the Los Angeles/Long Beach ports. The appointment system was implemented in 2002 in response to California Assembly Bill (AB) 2650, which seeks to reduce vehicle emissions and highway congestion by reducing truck queuing at marine terminal gates and distributing truck traffic over a greater period of time throughout the day. The legislation permits terminals to adopt either gate appointments or off-peak operating hours as a means of avoiding fines for truck queues. We find no evidence that the appointment system has affected queuing at marine terminal gates. We conclude that responses to AB 2650 are largely explained by institutional and contractual relationships that drive port operating practices.

THE TERMINAL GATE APPOINTMENT SYSTEM AT THE PORTS OF LOS ANGELES AND LONG BEACH: AN ASSESSMENT

Growing international trade volumes at Pacific Coast ports over the past decade have created many challenges for metropolitan areas. Rapid increases in truck traffic have added to congestion problems, noise and other neighborhood impacts. Emissions from ships, trains, trucks and port equipment add to air quality problems. Increased international trade has led to calls for massive new investment in highways, rail and airport facilities. However, added capacity is at best years away, while forecasts suggest a doubling of current trade volumes within the next 20 years. In California these problems have led to regulatory efforts to reduce freight traffic impacts. This paper presents an analysis of California Assembly Bill (AB) 2650 as implemented at the Ports of Los Angeles and Long Beach. AB 2650 regulates truck queuing at terminal gates to reduce vehicle emissions. It is significant in that it targets port terminal operations for air quality objectives rather than targeting emissions directly. Terminal operators have the option of either extending gate operating hours from the typical 45 hours per week to 70 hours, or by offering appointments for specific cargo pickups or drop-offs. Our paper is organized as follows. First, we provide a brief review of the relevant literature. Second, we describe the growth of international trade in Southern California and discuss the events that led up to the passage of AB 2650. We also include a description of the major stakeholders involved in goods movement and international trade. Third, we discuss the implementation of AB 2650. We follow with presentation of our results, and finally conclusions and policy implications.

RELATED WORK

There is little prior research directly relevant to our analysis of AB 2650. The combination of dramatic increases in freight traffic and transportation systems operating at or

near capacity has only recently resulted in growing visibility of freight and its role in urban congestion and environmental problems. Research is also limited by lack of data: goods movement is a largely private sector endeavor, and the available data sources are particularly limited at the metropolitan level.

Much of the research focus has been on road congestion as a symptom of greater supply chain congestion. Regan and Golob (1999) conducted a survey of about 1,200 trucking firms operating in California to identify the major constraints and deficiencies affecting freight transportation in the state. Factors identified included congestion, highway capacity, safety, geometrics and surface conditions, and intermodal connections.

A few studies have addressed the environmental impacts of port-related goods movement. Lena et al (2002) conducted a study of truck traffic in low income neighborhoods near the New York-New Jersey port. They document high volumes of truck traffic in these neighborhoods, and estimated associated increases in emissions. They conclude that low income residents experience higher exposure levels as a result. In Southern California, a 1999 study found that 71% of all cancer risk from air pollution comes from diesel exhaust (South Coast Air Quality Management District, 2000), and the entire San Pedro Bay port complex generates approximately 25% of the diesel pollution in the region. A long-term child health survey in Southern California has demonstrated a significant relationship between school absences and exposure to particulate concentrations (Coussens, 2004).

More directly related to our work are two studies that reveal findings about truck behavior at Southern California ports. Barber and Grobar (2001) conducted a study of truck delay at the Los Angeles and Long Beach ports. They estimated total wait time (both on dock and at the gates) for almost 20,000 individual moves based on data from three trucking

companies. About 40% of all transactions had reported wait times of over two hours. Barber and Grobar estimated more than 3.7 million hours of truck wait time at the ports annually; such delays have significant implications for heavy duty truck emissions.

Monaco and Grobar (2004) conducted a study of harbor drayage, extended gate hours and gate appointments. Survey results from 60 drayage firms and drivers at the port confirm that drivers spend a significant portion of their workday waiting at the ports. Though firms indicate that they utilize the appointment systems at available terminals, most do not use the system consistently. Truck turn time data (e.g., the total time spent entering a terminal, picking up or dropping off cargo, and leaving the terminal) provides some evidence that time spent inside terminal facilities decreased on average between the summer of 2002 and the fall/winter of 2003; although this differs from terminal to terminal and may depend in part on individual agreements between terminal operators and trucking companies.

Yahalom's (2001) study of productivity at NY/NJ PATH's intermodal transfer facilities (7) also underscores the importance of institutional agreements. His research includes an analysis of lease arrangements; and his recommendations include changes in terminal gate operating hours and use of appointments to pick-up and deliver containers.

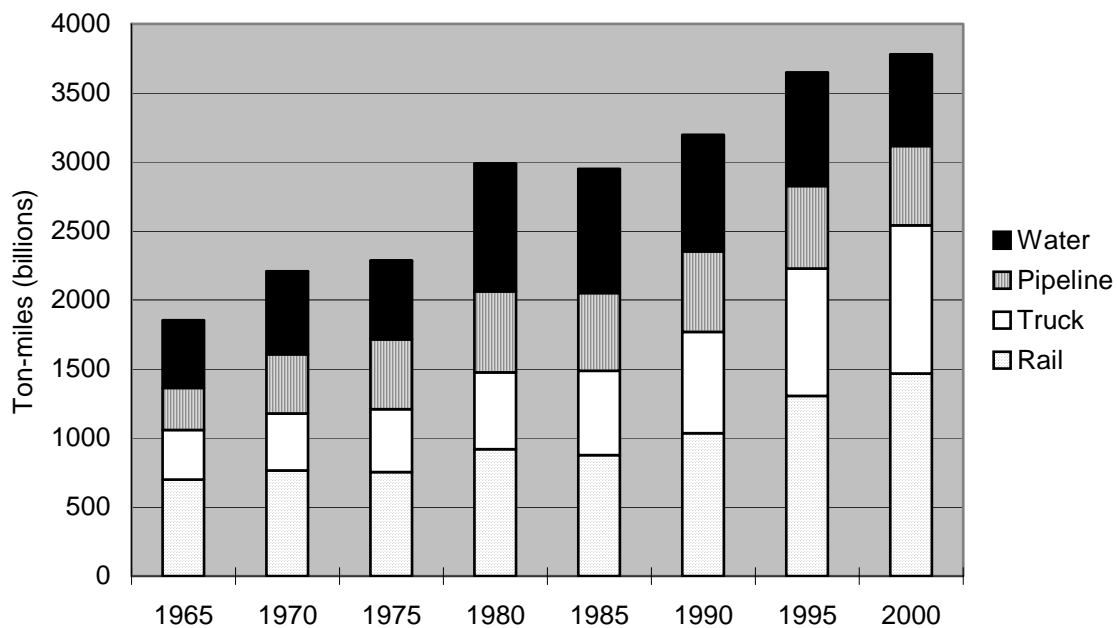
AB 2650 is an attempt to bring about these changes via the regulatory environment, seeking to reduce truck emissions by changing the behavior of terminal operators. A similar indirect approach was taken in the late 1980s and early 1990s by local agencies which hoped to influence driver behavior and reduce average vehicle ridership by regulating employers. Studies from Southern California determined that while certain employer-based trip reduction strategies did result in average vehicle ridership at targeted sites, enforcement proved difficult and the political imperative short-lived (Giuliano and Wachs, 1997).

GROWTH OF GOODS MOVEMENT AND PUBLIC RESPONSE

International trade is a significant and growing part of the U.S. economy. Its share of US GDP grew from 13.8 % of US GDP in 1991 to 22.2 % in 2001. Growth in international trade has been accompanied by structural changes in the global economy that imply much greater volumes of goods transport and more dependence on a low cost, fast, and reliable transportation system. These changes include manufacturing processes distributed around the world, just-in-time inventory practices, combining manufacturing and warehousing, etc. Growth in domestic freight has increased across all modes, as shown in Figure 1. Increased freight flows have particularly affected major import/export nodes, such as the Los Angeles region.

FIGURE 1 Domestic Intercity Ton-miles by Mode

Source: Calculated by the authors from BTS data



The Ports of LA and Long Beach and their Role in Delivering Goods to the Nation and Beyond

The Ports of Los Angeles and Long Beach combine to form the largest container shipping facility in the U.S. in terms of both value of cargo and container traffic. The 10,000 acre San Pedro complex moved a combined 164 million tons and more than \$200 billion worth of cargo in 2003, more than 85% via container (Chang, 2004). They are also the fifth busiest container facility in the world, handling 13.1 million TEU (Twenty-foot Equivalent Units, the standard measure of cargo volume) in 2004. The ports serve the entire US: about 60% of all cargo originates or arrives outside the Los Angeles region. The next largest west coast ports are Oakland (2.04 million TEU in 2004) and Seattle (1.77 million TEU in 2004). The increase in volume handled by LA-Long Beach between 2003 and 2004 alone (1.26 million TEU) surpasses the capacity of most US ports. The LA/Long Beach share of US west coast traffic continues to grow; from below 50% in 1992 to 62% in 2002 (Keyser and Huang, 2003). These trends are expected to continue. Although estimates vary, a doubling of freight container traffic is expected by 2020 or 2025.

Infrastructure Pressures and Environmental Concerns

The ports are a major economic engine for the region. It is estimated that port-related international trade accounts for about 550,000 jobs (8% of all jobs) in the Los Angeles region (State of California, 2005). Economic benefits are particularly significant, since many of these jobs are good paying blue collar jobs (Husing, 2004). Historically the economic benefits of international trade have assured broad public support for the ports and the infrastructure to serve them. However, several factors have changed public perceptions.

Highway Congestion

All of this trade-generated economic activity places tremendous pressures on local infrastructure. Heavy duty truck miles in the Los Angeles region (i.e. those trucks with five or more axles) have more than doubled since 1982. It is estimated that terminal activity at the Port of Long Beach alone generates an average of more than 403,000 annual HDDT trips (Starcrest Consulting Group, 2004). The increase in truck traffic has become a major public policy issue, particularly with respect to planning the expansion of the I-710, the major conduit for goods leaving the ports. The Southern California Association of Governments estimates that the shipment of goods on some major routes near the ports reduces average highway speeds in excess of 65% (Haveman and Hummels, 2004). Heavy duty trucks also add disproportionately to non-recurrent congestion. According to the California Highway Patrol, between January 2000 and August 2003, 20% of all incidents in Los Angeles County that impeded the flow of traffic for 30 minutes or more involved trucks. Furthermore, when trucks were involved, the length of the delay averaged two hours (California Highway Patrol, 2003). Increased truck traffic exacerbates congestion problems generated by a growing population.

Infrastructure Demands

The Alameda Corridor opened in 2002. The \$2.4 billion project, widely praised as the model for future public/private investment partnerships, is a 20 mile freight rail corridor that connects the ports with intermodal facilities in Los Angeles and with the national rail network. By consolidating several at-grade rail lines and eliminating 200 at-grade crossings, the Corridor was expected to reduce street congestion, reduce diesel emissions from idling trucks and trains, and greatly improve rail travel time). There were also expectations that the Corridor would help

to reduce truck traffic on the I-710; shorter rail travel time should divert some truck traffic to rail. This did not happen, generating criticism of the project (Agarwal, Giuliano and Redfearn, 2004). Proponents argued that the Corridor was one piece of a much larger set of rail improvements that would be required to handle more container volume. With no immediate prospects for funding additional rail capital improvements, it was apparent that rail would not offer the solution to truck traffic.

During the same time period, plans for a major expansion of the I-710 were developed. The preferred plan called for a ten lane facility, 6 lanes for general traffic and 4 truck lanes. The plan required additional right-of-way that would remove a large number of businesses and residences. Public reaction was negative and swift, and city and county leaders quickly withdrew the plan. Although another round of planning was initiated, lack of local support, together with growing state fiscal problems made it apparent that major expansion of the I-710 was at least a decade away.

Environmental Impacts

The AQMD Multiple Air Toxics Exposure (MATES) II Study was released in 2000. MATES II was an ambient air monitoring and risk modeling exercise using 10 fixed regional sites and 14 mobile platforms in communities throughout Southern California. It assessed potential disproportionate cancer burdens and found that 71% of all cancer risk from air pollution comes solely from diesel exhaust (South Coast Air Quality Management District, 2000). A widely circulated map from the report showing concentrated diesel emissions was used to demonstrate that a “diesel death zone” existed in and around the ports. While ships are the

largest polluters in and around the ports, trucks are the most visible, and the report contributed to public perceptions that trucks were major polluters and needed to be regulated.

Subsequent research, such as the long-term child health study, has provided further evidence of the harmful effects of diesel emissions. However, the major source of emissions – ships – is exempt under international law. Railroads are exempt from local regulation under US interstate commerce provisions. Only trucks and on-dock vehicles could be targeted by local air quality regulators.

Increased Visibility of Port-Related Trade: The 2002 Port Shutdown

Ports along the US west coast were closed for 10 days from September 27 to October 8, 2002. The shutdown was the result of an unresolved labor dispute between the International Longshoremen and Warehouse Union (ILWU) representing the dock workers and marine clerks, and the Pacific Maritime Association (PMA), a group representing ports and shipping lines. The shutdown was preceded by a month of labor-management conflicts that reduced productivity during the peak season for imports. The labor dispute occurred during a time of rapid increase in port activity. Between 1999 and 2002, total annual TEU for the combined ports rose from 8.2 million to 10.6. Impacts of the shutdown were immediately apparent: increasing numbers of ships were anchored in the harbor, and truck traffic on I-710 dropped by more than 10,000 trips per day (Giuliano et al, 2005). The short disruption was a graphic illustration of both the volume of port-related trade and its impacts on the region. It took months to recover from the shutdown. The build-up of cargo on the docks led to severe congestion in dock operations, greatly increasing queuing of trucks both inside and outside the terminals.

AB 2650

The cumulative effect of these factors was to increase public pressure on local decision-makers to better manage port activity and its impacts. However, solutions were elusive. In order to understand why, it is useful to identify the major stakeholders.

Port activity takes place within a complex institutional structure. Both ports operate under the 1911 Tidelands Trust Act, meaning that the ports' operating authority is granted by the state. The ports are managed by governing boards whose members are appointed by their respective mayors, but have significant authority on port management. The funds of each agency are also largely protected from use for other purposes by state law and city charter. The ports operate as landlords (tenant terminals have long-term lease agreements), and their primary focus is a stable and adequate source of lease revenues. Tenant terminals serve specific products or steamship lines; they load and unload ships and manage movement of product to and from landside customers. Steamship line customers include the producers and consumers of product: foreign manufacturers, wholesalers and retailers. Typically relationships between steamship lines and terminal operators are long-term and contractual.

Dock operations are influenced by longshore labor (ILWU, International Longshore and Warehouse Union) agreements, which cover wages, working conditions, and allocation of labor. Container cargo is hauled to and from the ports via truck or rail, with about 75% of annual container moves on truck (Giuliano et al, 2005).

The truck drayage industry is composed mainly of owner-operator drivers who contract with small trucking companies. These are low-skill, low-pay jobs. Drivers receive a lump sum based on the cargo hauled and the distance traveled which must cover all costs including fuel, insurance, registration and maintenance. Because they are considered private contractors and not

employees, drivers are prohibited under federal anti-trust legislation from cooperative action that could impede interstate commerce. This would include setting a single rate for their services.

Our observations of the last two years lead us to conclude that port operations are determined by the major stakeholders – terminal operations, steamship lines, their large customers, and the ILWU. For example, ships are serviced 24/7 in order to minimize time spent at port. Terminal gates typically operate a normal weekday schedule, but special arrangements for cargo moves outside of those hours are made for key customers. Hence outcomes of the appointment system would depend on responses of the terminal operators, who were the target of the legislation, and whose customers are steamship lines and shippers, not drayage truckers.

Passage of AB 2650

One of the obvious solutions to port-related highway congestion problems is to spread out truck traffic over more hours of the day. This would require terminal operators to extend gate operating hours, something most terminal operators have resisted, claiming that the expected volume of cargo moves during evenings or weekends would not be sufficient to cover the additional costs of dock labor (which under ILWU rules receives substantial shift pay differentials). In addition, it was claimed that warehouses and retailers generally will not accept night deliveries, and that there are no secure locations to store cargo once it is off the dock.

The bill's sponsor, Assemblyman (now Senator) Alan Lowenthal of Long Beach, proposed AB 2650 at a time when port operations were under increased scrutiny. The intent of the bill was to force some change in port operations, but a legal basis for regulation would be required to do so. Hence the focus of the bill is the reduction of truck vehicle emissions associated with queuing at terminal gates.

Assembly Bill (AB) 2650 became law in 2002 and was to be implemented by July 1, 2003. The legislation imposes a penalty of \$250 on marine terminal operators for each truck idling more than 30 minutes while waiting to enter the terminal gate at either LA, Long Beach or Oakland. Terminals can avoid fines by extending full service gate hours to 70 per week (65 hours at the Port of Oakland), i.e. adding evening or weekend gates designed to spread out truck traffic, or by offering a gate appointment system to trucks to drop off or pick-up cargo containers. The bill had some important caveats: the penalty applies only to 1) trucks idling (not waiting with engine off), 2) trucks with an appointment, 3) wait time to the official entry of the terminal property (not the pedestal within the entry where trucks receive permission to enter docks). A clean-up bill, AB 1971, was passed in summer 2004 to make the law applicable to both engine idling and truck queuing, but still only regulated activity outside of the terminal property. AB 2650 has no jurisdiction over queuing within the terminal.

Implementation of AB 2650

Given that the appointment system is voluntary, terminal operators could respond in many different ways. Among those who did implement an appointment system, operating policies differ regarding appointment availability, rules for making appointments, etc. Responses of the terminal operators as of summer 2004 are listed in Table 1. All of the 5 terminals that have extended gate hours operated these hours before July 2003. Eight terminals chose to implement an appointment system rather than extended gate hours, and one terminal chose to simply comply with the 30 minute queue limit. That is, no terminal chose to comply by implementing extended gate hours.

The provisions of the bill are enforced by the South Coast Air Quality Management District (SCAQMD), which assigned one full-time inspector to the two port complexes. The inspector roves the port conducting random inspections of queues. SCAQMD established a Working Group designed to provide interested parties with a forum in which to discuss implementation and assess the bill's impacts.

OUTCOMES OF AB 2650

Our assessment is based on monitoring of the appointment system over a 16 month period from January 2004, six months after its operational inception, through June 2005. We collected data from a variety of sources: 1) extended interviews with managers at both ports, 8 terminal operators, trucking industry representatives, longshore labor, public agency representatives and elected officials; 2) field observations at two terminals; 3) a trucking company survey, 4) SCAQMD compliance reports; 5) publicly available data on port operations; 6) newspapers and newsletters, and 7) data provided by selected terminals. This paper provides an overall assessment of AB 2650; later work will include more specific analysis of appointment use and impacts on cargo transaction times.

Appointments have the potential for increasing the efficiency of gate operations. If terminal operators know in advance which containers are being picked up or dropped off, they can better manage truck flows and container moves within the terminals. This would translate to shorter transaction times for truckers, as less time would be spent waiting for a container to be available. Without appointments, cargo may be picked up as soon as it is available (taken off the ship, passed through customs, and stored on the dock). Appointments could also be used to

meter truck arrivals to prevent congestion on the dock. Truckers should have an incentive to use appointments if appointments assured a load was ready and available.

It is also important to consider the role of gate entry within the process of picking up or delivering container cargo (including empties). It is possible that the terminal gate serves as a metering point, allowing a rate of entry based on the rate at which each truck can be serviced. If appointments increase the rate of entry, the rate of servicing must also increase, or queuing will result inside the terminal. The terminal operators potentially have two conflicting objectives. On the one hand, they seek to optimize their own productivity, and so would use appointments only to the extent that they improve throughput. On the other hand, the Lowenthal bill specifically targets queuing outside the gates, and one obvious response is to shift those delays to inside the gates.

SCAQMD Enforcement

From October 2003 through June 2005, the SCAQMD inspector conducted over 4000 surveillances, or about 12 per day. Surveillances ranged from 5 minute checks to extended observations of queues. For the July 2004 through June 2005 period, average queue length at the terminals ranged from 5 to 26 minutes. Maximum observed queues ranged from 5 to 122 minutes. CUT, the terminal that opted for direct compliance, had a maximum queue of 24 minutes. In addition to daily random checks, the SCAQMD responds to complaints; 90 complaints were received. When there is “cause” to suspect a violation, a “targeted inspection” is conducted, and this inspection can result in a Notice of Violation. At Los Angeles and Long Beach, three Notices to Comply have been issued, and no fines were imposed over the entire life of the regulation. Four Notices of Violation (fines) have been imposed at Oakland. However, the

fact that no fines were imposed means only that no truck with an appointment was observed and documented to be waiting for more than 30 minutes. This could be due to 1) any observed queue was less than 30 minutes, 2) a longer queue resulting from “an unavoidable or unforeseeable event” which is not subject to fines, 3) trucks with appointments being pulled out of long queues, 4) no surveillance by SCAQMD at the time of the occurrence.

There is anecdotal evidence that queues were reduced between July 2003 and June 2004, based on our interviews with terminal operators. We have no empirical evidence, as there is no source of systematic data on queue length at the ports for a period before and after the implementation of AB 2650. Computerization of some processing tasks and installation of OCR (Optical Character Recognition) equipment at terminal gates was permitted under the new ILWU contract, and conversions were largely complete by summer 2003. Terminal operators attributed shorter queues to the new technology which sped up the process of gate entry.

Terminal Operator Responses: Appointments vs. Extended Hours

The appointment system was implemented differently across terminals. The legislation includes some guidelines: appointments must be for a window of at least 60 minutes, and be available throughout the day. The number of appointments made available, types of transactions permitted, rules regarding making appointments, and operating procedures were flexible. Appointments are made via a proprietary web-based information system. The terminal operator determines which service is to be used, and the trucking companies and others pay to access the service based on volume of transactions. The most widely used is e-Modal, which existed prior to AB 2650 as a container information system (See Table 1). It is used by trucking companies to determine cargo availability and whether there are any holds on the container because of

TABLE 1 Implementation of AB 2650

Terminal	Compliance method	Extended hours	Appt system provider	Same day appts?	Phone appts?	Gate procedures
WBCT	Appointments	Saturday, Sunday – limited hrs	MTC Voyager	Yes	Yes	
Yusen	Appointments	Day shift 7 days/week	Navis (no fee)	Yes, to 3:30 PM	Yes	3 appt lanes; all 9 at AM opening
APL	70 hr gate operation	Yes, for specific moves, shipping lines	N/A	N/A	N/A	
APM Maersk	70 hr gate operation; appt system not in use	Yes, 7 AM – 2:30 AM 7 days/week	N/A	N/A	N/A	
Evergreen	Appointments	T-W-Th early AM gates as needed	MTC Voyager	Yes	Yes	1 of 4 lanes for appts
Trapac	70 hr gate + appointments	Night gate by appt, wheeled loads only	e-Modal	No	No	
CUT	Direct	No	N/A	N/A	N/A	
ITS	Appointments	Sunday gate for special cargo	e-Modal	Yes	No	Trucks with appts pulled from queue if wait time near 30 min.
LBCTI	Appointments	Sat, Sun 7 AM – 6 PM	e-Modal	No	No	Trucks with appts pulled if wait time over 20 min.
PCT	Appointments	No	e-Modal	Yes	---	Appt trucks to main gate
SSA – A	Appointments	No	e-Modal	---	---	Appt trucks to main gate
SSA – C	70 hr gate	Full night gate 4 days/week	N/A	N/A	N/A	
TTI	70 hr gate + appts	M-F early AM, limited; full Sat; limited Sun	MTC Voyager	Yes	Yes	

demurrage fees (the charge paid for cargo left at the terminal beyond the time permitted by the terminal operator), or needed customs clearance. Based on the information offered by these various systems, a customer orders delivery, and the truck company makes the appointment and dispatches the truck. Trucking companies typically service all terminals, so using the appointment systems requires subscribing to each of the information systems used by the terminals they service. Table 1 also gives information on when appointments can be made, and whether entry lanes are reserved for trucks with appointments. Two terminals reserve lanes for appointments, and two terminals direct appointments to a separate gate. No terminal makes special arrangements for trucks with appointments once they are inside the terminal.

There are four types of truck transactions: pickup of import container, pickup of empty container, drop off of export, and drop off of empty container. Combinations, or dual transactions, are also possible. Typically import pickups are the most complicated, as the container must be cleared with all fees paid before it is released. The container must be moved from a stack and deposited on the truck chassis. If a container is in a stack, the trucker must go to the stack and wait until the container crane operator locates and moves the container. There is somewhat more flexibility with export drop-offs and with empty container moves. Thus appointments are most likely to be made for import pickups.

Terminal operators responded to AB 2650 by doing what would have the least impact on operations inside the gates. The legislation does not appear to have changed general operating policies. The terminals that already had extended gate hours did not need to design an appointment system. Two of the three terminals whose only means of compliance was extended gates had already incorporated them into new operations after changing terminal locations. These are state of the art facilities with numerous entry and exit gates, and with enough space to keep

most cargo on chassis (“on wheels”). When containers are stored on chassis, truckers attach the chassis to the truck, eliminating the need for longshore labor in container moves. This greatly reduces the costs of extended gate hours and improves turn time.

Two terminals chose to comply with AB 2650 with both a 70-hour gate and appointments. In one case, the terminal already operated extended gates on a limited basis, but full service is required by the legislation. In this case, appointments were adopted because it was simpler and cheaper than modifying already existing off-peak gates to accommodate grounded containers. In the second case, appointments were part of a broader company plan to improve operations.

Eight of the 14 container terminals at the two ports complied with AB 2650 by developing appointment systems only. Two of these belonged to the Voyager system. A third had a different proprietary system. In each of these three cases appointments were seen to be an integral part of changing operations on the docks that were in development prior to the onset of the Lowenthal bill. It is important to note that Voyager terminals also accommodate phone appointments, adding flexibility to the process. Why they do not also operate off-peak gates appears to be a function of terminal size (not enough land to run wheeled operations), and nature of the client base in addition to cost. Space constraints would motivate efforts to increase efficiency. In the five remaining cases, it appears that appointments were viewed simply as a cheaper alternative to extending gate hours.

When asked of their assessment of the appointment system, terminal operators had differing responses. Those who did not see appointments as a useful strategy made the following observations. First, terminals must be flexible and organize their operations based on the nature of their business. There is great variety in type of product, number of ships served, customer

requirements, and dock space. When extended hours are warranted, they are offered. Second, the web-based container information systems were already providing data on container availability; hence it was unclear what additional benefit appointments would add. Third, the most promising option for improving productivity is technology, such as efficient use of OCRs, using GPS to track container movers, and streamlined cargo tracking. Fourth, an appointment system adds to the data burden of terminal operators. Finally, there is an incentive to discourage appointments, since the greater the proportion of appointments, the more likely it will be that a truck with an appointment will be present in a long queue, and hence the greater risk of being fined.

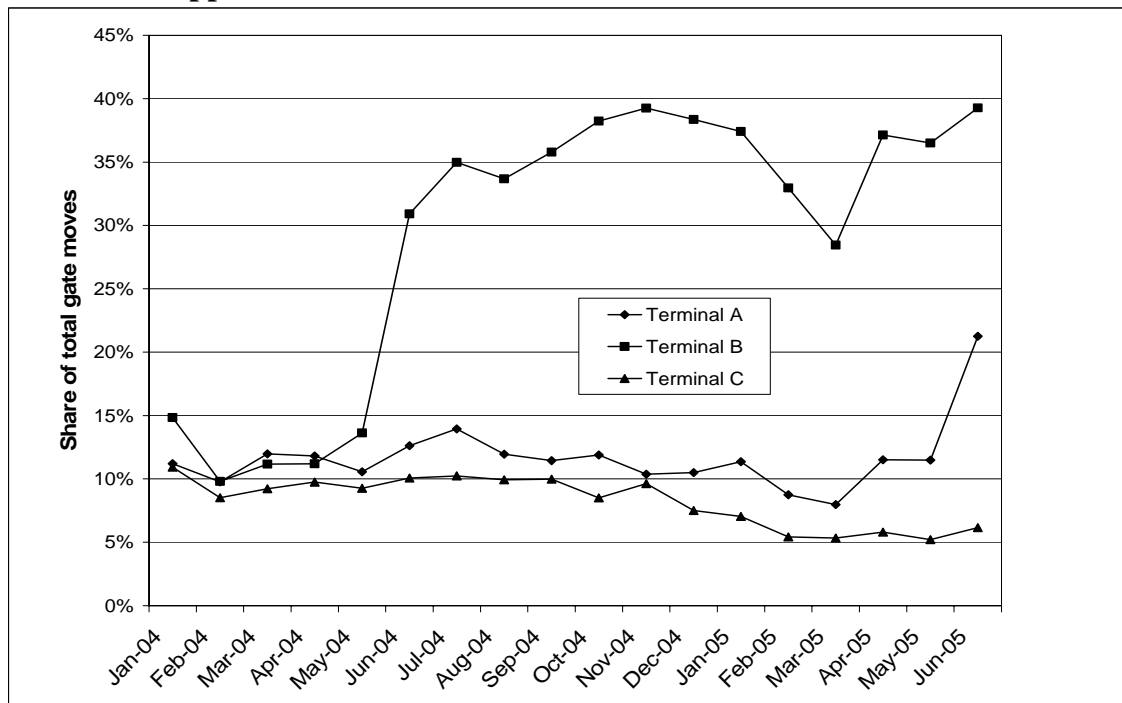
The three terminals that had already developed an appointment system see it as an essential means for managing dock operations. Appointment slots can be determined for each yard area so that traffic on the docks is smoothed across the day, and so that high demand areas can be rationed.

Use of the Appointment System

Terminal operators are not required to report on use of the appointment system. Terminal data are proprietary, and only summary data are reported to the ports. We obtained data for three terminals over a long enough period of time to observe trends. The others gave broad estimates of appointments as a share of total gate moves. These ranged from 5 to 30 %, with most appointments made for import pickups. Figure 2 shows appointments made by month as a share of total gate moves, from January 2004 through June 2005. Patterns for the three terminals are quite different, and reflect different practices with regard to appointments. Terminal B has pursued a strategy of increasing appointments as a way of managing truck moves on the dock.

Once almost exclusively made for import pickups, appointments are being made for an increasing share of export drop-offs. Terminal A has recently decided to promote appointments; Terminal C has not aggressively promoted appointments. Appointments are promoted by encouraging trucking companies to make appointments, making sure cargo is ready for pickup, and minimizing trucker wait time. Truckers are paid by the load, not by the hour. Hence if appointments reduce trip times, truckers have every incentive to make them.

FIGURE 2 Appointments as Share of Total Gate Moves



Trucking Company Response

We conducted a survey of drayage trucking companies to elicit information on their responses to the appointment system. The trucking company decides whether to subscribe to the various appointment information services and makes the appointments on behalf of the contract driver. There is no readily available database of owner operators or drayage firms. We worked with the local regional unit of the California Trucking Association to contact drayage companies.

Through meetings, follow-up calls and faxes over a period of 4 months, we obtained usable surveys from 27 companies. Our sample is small, non-random, and likely biased to larger companies; hence our results should be viewed with caution.

All but three firms reported that they use the appointment system, but the extent to which it is used varies greatly, which is consistent with the reports from terminal operators.

Appointments are used primarily for pick-up of import containers; all of those who use the appointment system use it for import pick-ups. About 1/3 also use appointments for export drop off, and pick-up and drop off of empty containers. Second, they are generally made for a particular time of day and for certain terminals. Respondents were also asked about keeping appointments. The average percentage of appointments kept is 63, with a range of 6 to 100 percent. Since there is no penalty for missing or canceling appointments, the incentive is to keep them only when convenient to do so. The most common reason given for missing an appointment is delays at the marine terminal.

There is an overall perception that the appointment system has not improved conditions for truckers. The majority stated that it did not improve their ability to meet customer demands, or in reducing turn times (Table 2). No firm gave an unequivocally positive response. Respondents were also asked to rate the effectiveness of the appointment system at each terminal in reducing turn times. We asked about turn times explicitly, because the intent of AB 2650 was to reduce queuing at the terminal gates, which should in turn lead to shorter turn times. However, it was also possible that the appointment system would simply shift the queue to inside the terminal if the rate of processing transactions did not change. Terminals are not given high marks: mean scores range from 1.4 to 2.3 on a scale of 1-5, with 5 being exceptionally effective.

TABLE 2 Effectiveness of the Appointment System

Has the appointment system...	Yes	Somewhat	No
Improved your ability to meet customer demands?	0	10	15
Had any impact on reducing turn times?	0	8	17

Written comments, as well as the open-ended discussion conducted with respondents after completion of the survey, provide some explanations for their negative assessment. First, there was an expectation on the part of truckers that appointments would reduce transaction time by assuring that containers and/or chassis were ready and available for pick-up. However, this was not the case; practices “inside the gate” did not change as a result of the appointment system. Respondents commented that those with appointments still must wait in line for container moves, may find that the container is in fact not available, or that a chassis is not in working order.

Second, some respondents noted that the real constraints are limited gate hours and limited dock labor. If container volumes are increasing and the container processing rate remains constant, transaction time will increase, with or without appointments. Third, several respondents noted the difficulty of using several different appointment systems, rather than having one system for all terminals and all appointments. Finally, respondents cited the difficulties of making and keeping sequential appointments, because any delay with an earlier transaction cascades to all other later transactions.

The survey also included an open-ended question regarding the advantages of using the appointment system. Of the 16 respondents who answered, 7 said there were no advantages. Others stated that the appointment system could work better if containers and equipment were ready (e.g. if terminal operators kept appointments), on-dock transaction times were reduced, or those with appointments did not have to wait in line at the terminal gates or on the dock.

The drayage firm survey shows that while the vast majority of firms use the appointment system, they see little benefit in doing so. Respondents reveal a consistently negative assessment of the appointment system, both on its operation at the terminals, and on its overall impacts on serving customer demand and on transaction turn times. From the perspective of drayage firms, there is no evidence that drayage has become more efficient as a result of the appointment system.

CONCLUSIONS

Our conclusions may be summarized as follows: 1) use of the appointment system varies greatly and depends upon operating policies of individual terminals; 2) perceptions of the appointment system's effectiveness differ across user groups; 3) there is no evidence that the appointment system has affected queuing at marine terminal gates or significantly improved air quality; 4) while a majority of the terminals who did not already offer extended gate hours implemented an appointment system in response to the legislation, most did so in order to avoid paying the high labor costs associated with extending operations to off-peak hours. We conclude with some explanations for our findings.

The regulation was imposed from the outside, not as an industry response to a perceived problem. We noted earlier that scale economies in shipping and a large local consumer market make these ports very attractive to Pacific Rim trade. The San Pedro complex is one of a few in the world that can receive 8,000 TEU ships and has close proximity to a market of 20 million consumers. Terminal operators have established long-term relationships with major international steamship lines that bring with them a built-in and preferred customer base. In turn, terminal

operators often offer special services, for example extended free storage time for containers, or special gate hours to process their cargo. Until very recently, these ports have not felt the threat of competition from other ports. Indeed, the threat from the port and terminal operator perspective is the lack of rail and highway capacity to handle increased cargo volumes, not port efficiency. The two ports have among the highest ratings in the US. This has made them less likely to feel the need to become more efficient.

There were other operational changes already underway that had a more dramatic impact on the ability of terminals to operate more efficiently. The new labor agreement that followed the 2002 shutdown allowed for use of certain technologies, including OCRs, which enhanced the efficiency of terminal operations just inside the gate. Many MTOs were beginning to adopt these new technologies as appointments were also being adopted. Trucks with or without appointments were able to get through the gates more quickly as a result, eliminating queues outside the gate. At the same time, the ports expanded by 700 acres and opened 120 new gates. This had a positive effect on the ability of LA and Long Beach to move a greater number of TEUs. The new and expanded terminals also had the luxury of organizing space to incorporate the new technology and wheeled operations and to maximize the number of gates, all of which contribute to more efficient operations and shorter queues.

Indirectly seeking to reduce truck emissions by changing the behavior of terminal operators is ineffective. The regulation was imposed on terminal operators who have no incentive to respond to trucker concerns and who argue that drayage truck emissions are a problem for the truckers, not the terminals. AB 2650 allowed for flexibility in the ways in which appointments were

offered. The result was actually multiple appointment systems using different web-based programs and with different rules and constraints. Terminal operators responded in ways that made sense for them. The goal of some appointment systems appeared to be avoiding fines by getting trucks inside the gate, not limiting idling. Truckers' expectations that appointments would mean more cargo on wheels or that terminals would use the information from the appointment system to get containers ready for a driver to pick-up were not realized. This had a negative effect on truckers' willingness to make appointments in the first place and also served to limit the effectiveness of the legislation.

The costs and risks of not complying were low compared to the alternative of extended gate hours. Full service extended gate hours require full labor gangs paid at off-peak rates, even if the volume of cargo moved warrants less labor. Those terminals that had already implemented off-peak gates prior to AB 2650 did so for the days and gates where container volume was predictable and/or where most of the containers could be placed on wheels. The other terminals found it easier to implement an appointment system (built upon an existing online cargo availability system) than to pay for extended gates when there was no guarantee that those gates would be sufficiently used. Even if the appointment system did not reduce truck queue time, a fine of \$250 could be absorbed more easily than the costs of a regular 70-hour gate. The language of the regulation and the large size of the area to be covered by one inspector made enforcement difficult, so the risks of non-compliance were rather low.

Recent Events and the Longer Term Impact of AB 2650 on Port Operations

The 2004 peak season came early. The new 8,000 TEU ships began to arrive, and the increased cargo volume overwhelmed the ports. There was a shortage of dock labor, and one of the major railroads was suffering labor shortages. The result was delays for ships and congestion on the docks. The Southern California Marine Exchange reported that more than 100 ships were diverted to other ports. The inability of the ports to handle the increased cargo sent a clear signal that productivity would have to improve if the ports were to remain competitive.

At the same time, now Senator Lowenthal was threatening the ports with new legislation to require extended gate hours. For the terminal operators, AB 2650 proved that this was not an idle threat; decision-makers were willing to impose regulations on port operations in order to achieve public benefits. Given the choice, the ports and terminal operators agreed to set up their own extended gate hours program. The program, PierPass, imposes a fee of \$40 per TEU moved during peak hours. Revenues from the fee are to be allocated to the terminals to offset the added labor costs of extended hours. Because all terminals will participate in the PierPass program, all will be in compliance with AB 2650. The program was launched in July 2005.

Surprisingly PierPass may encourage terminal operators to embrace gate appointments in a way that legislation could not. Early indications suggest that appointments may be used in the PierPass program to encourage more off-peak moves and to gather valuable information about those moves. This information will allow terminal operators to better predict demand for evening and weekend gates and to order labor accordingly, thereby minimizing costs.

AB 2650 did not bring about the extended gates it intended. However, by effectively forcing terminal operators to adopt appointment systems, it may have provided the tool that will allow those same operators to use extended gates to their advantage. Truckers may benefit from

more efficient operations as well; and emissions may be reduced because terminal operators will have an incentive to limit queuing and idling inside as well as outside of the gates.

For policy makers, the lesson is that regulation (or the threat of legislation) can have a desirable effect; but efforts that indirectly target an industry are likely to be more difficult to enforce and thus less effective. PierPass shifts the enforcement burden to the terminals themselves since they effectively run the program and collect the fees. Unlike the various appointment systems adopted in response to AB 2650, extended gates under PierPass are uniform because there is an economic benefit to do so. PierPass is an industry response to a problem that both the public sector and the private sector now acknowledge.

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