FREIGHTWORKS

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

GOODS MOVEMENT BORDER CROSSING STUDY AND ANALYSIS

FINAL REPORT

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EXECUTIVE SUMMARY

With today's global economy and time-based competition, efficient freight transportation networks serve as extremely critical links between manufacturers, distributors, and consumers. Therefore, planning agencies across the Country are faced with the difficult task of planning, pro-actively, for adequate transportation infrastructure and freight facilities that enhance goods movement in their region. This is particularly challenging for border regions for which limited information on true origin-destination patterns and end-to-end travel times is available. In addition, such planning should not only seek to reduce current congestion delay, improve travel time reliability or safety, but also anticipate potential shifts of commodity flows and traffic across modes, routes, and ports of entry. Successful infrastructure planning, therefore, hinges on accurate and reliable multi-mode freight data, gathered and validated through consensus among various transportation and community organizations.

The primary purpose of this project was to gather and synthesize information on goods movement across the U.S.-Mexico border in Imperial County, in order to assist SCAG in its assessment of current infrastructure needs and in its general planning efforts. For that purpose, Origin – Destination (O/D) surveys and measurement of wait times at the border were collected in the two main Ports of Entry (POEs) of Imperial County: Calexico (downtown) and Calexico East.

The study found that maquiladora[1] activity, fostered by the benefits of Foreign Trade Zones (FTZs) and improved logistics, is a key driver for the regional economy. Similar findings are reported in other binational areas (e.g., San Diego – Tijuana, Laredo – Nuevo Laredo) and can be mainly attributed to the trade liberalization resulting from the North American Free Trade Agreement (NAFTA), which spurred the mobilization of investment and resources into the border region, creating clusters of industries favored by the trade agreement.

In particular, this 'clustering' behavior was observed among firms in the city of Mexicali. The study found that firms establish themselves in industrial parks, and that these locations are important generators of border-crossing tips, representing an important share of the origins and destinations of international trade flows.

The study validated the high degree of integration between the States of California and Baja California. Data on goods transported through Imperial County's POEs shows that the main origin for northbound flows is the city of Mexicali, whereas the main destinations are located in the State of California (particularly, in the SCAG region). Similarly, southbound flows originate primarily in California (and specifically, in the SCAG area) and are bound almost entirely for the city of Mexicali.

Furthermore, the study was able to provide a high-level characterization of the supply chain in the region. One of the important findings is that the structure of supply chains is different for large, multinational firms and regional ones. Large firms seem to have an integrated supply chain that reaches across both sides of the border while regional firms usually contract local companies to transport their goods.

[1] 'Maquiladora' is the term used in Mexico for manufacturing operations commonly established in a free trade zone (FTZ).

Additionally, drayage was found to be an important element in the transportation of northbound goods across the border. As a natural consequence, warehouses were identified as key locations in the supply chain of goods.

More interestingly, though, is the fact that border-crossing procedures differ based on the type of transportation company used. In particular, shipping companies in the study area make limited use of trusted-traveler programs (such as FAST), while trucking companies use these programs consistently. One possible explanation for this observed behavior is the share of border-crossing time in the total travel time of goods. In general, shipping companies reported a larger portion of long-haul trips compared to truck companies, thus reducing the importance of border-crossing time relative to total travel time.

In order to provide a complete assessment of the current conditions on border-crossing infrastructure in the area, the study measured performance and reliability indicators for commercial and passenger vehicle traffic in the two main POEs in Imperial County. A variety of methods of data collection were used to measure border-crossing travel time – including license plate matching (both using hand-recorded and photographic time stamp methods), anonymous Bluetooth signal recording, and GPS data collection. Each of these methods has strengths and weaknesses based on their capacity to collect data, installation requirements, operating requirements (including manual labor), mobility, capacity to distinguish different types of traffic and overall accuracy. No single method provides the best solution to measuring border crossing times, and their utilization depends primarily on the characteristics of the individual project.

Using the data collected, performance statistics were defined as those related to the crossing conditions that would be faced by the average user of the POE, including average border-crossing time, standard deviation of crossing times as well as minimum and maximum crossing times. Reliability statistics, on the other hand, were defined to characterize the entire set of possibilities observed in the sample, including the border-crossing time for the 10th and 90th percentile of the sample as well as the median (50th percentile) crossing time.

Regarding commercial vehicles that use the Calexico East POE, northbound traffic was found to have better performance and reliability indicators when compared to southbound traffic. Table ES-1 presents the indicators used in this comparison.

Table ES-1. Summary Statistics for Commercial Vehicles, by Trip Direction

Adjusted Statistic	Northbound	Southbound
Mean	0:48	0:55
Standard deviation	0:35	0:52
Minimum	0:06	0:02
Maximum	3:24	4:34
10th percentile	0:16	0:11
90th percentile	1:35	2:10
50th percentile	0:39	0:36

This particular finding was surprising, since along the U.S.-Mexico border the norm is to find northbound crossing times that exceed those of southbound traffic. One possible explanation for this result is related

to the administrative changes made in Mexican office of *Aduanas* (customs) during the course of the study, where several inspectors and other staff members were replaced, including the POE administrator for Calexico East.

Based on the border-crossing indicators presented in this study, the Calexico East POE has little to no competitive advantage over other commercial POEs in the region. Although a proper comparison between average border-crossing times for trucks between different POEs was not possible, a side-to-side comparison of average border-crossing times with other POEs in the U.S.-Mexico border showed that Calexico East ranks, for the most part, in the middle of the cohort.

When comparing aggregate border-crossing times for passenger vehicles, neither POE has a clear advantage over the other. However, further disaggregation of the data showed that for those users of SENTRI in the region, the Calexico (downtown) POE represents a better option since it features lower average crossing times and better reliability metrics. Despite this, the difference in crossing times between the two POEs (in the order of 3-4 minutes) is very unlikely to create an important number of SENTRI drivers to "switch" to the better-performing POE. The performance and reliability measures for both POEs are reported in Table ES-2.

Table ES-2. Adjusted Summary Statistics for Passenger Vehicles, by POE and Trip Direction

Adjusted Statistic	Calexico (downtown)		Calexico East	
	Northbound	Southbound	Northbound	Southbound
Mean	0:33	0:02	0:34	0:03
Standard deviation	0:17	0:03	0:21	0:03
Minimum	0:00	0:01	0:00	0:01
Maximum	1:28	0:34	1:47	0:32
10th percentile	0:08	0:01	0:07	0:01
90th percentile	0:54	0:05	1:00	0:05
50th percentile	0:31	0:02	0:35	0:03
Sample size	**2,134**	**818**	**1,284**	**862**

Furthermore, the observed border-crossing times at Calexico (downtown) and Calexico East POEs for both commercial and passenger vehicles were used to estimate the economic implications of border delays. It was found that the observed border-crossing times cause significant revenue and output losses in the region, though the majority of the output lost is recorded in the Mexican side of the border due to a lack of diversification and a high degree of dependence from the Imperial Valley economy. However, the majority of the employment losses are felt on the U.S. side of the border, since the large number of person-trips originating in Mexico that are forgone due to delays translates into less spending by Mexican nationals in retail stores located in Imperial Valley. The aggregate economic impact of border delays is presented in Table ES-3.

Table ES-3. Economic Impacts of Commercial and Passenger Vehicle Delays at Calexico (downtown) and Calexico East

Impact Metric	California	Imperial County	Mexico	Baja California
Total Output Losses, $million	-$620	-$384	-$755	-$629
Total Employment Losses, jobs	-4,844	-4,479	-4,552	-3,880
Total Tax Revenue Losses, $million	-$88	-$66	n/a	n/a

Faced with delays at the border that affect economic activity in Imperial County, stated preference surveys were conducted to capture shipping companies and truck drivers' willingness-to-pay from hypothetical reductions in border-crossing time and improved reliability at the border. Results of the surveys differ by interviewee type (shippers and truck drivers) and by direction of flows but in general show a higher disposition by POE users to pay a fee on northbound movement of goods compared to paying a fee on southbound flows. This finding is in line with other studies in the border region.

Finally, to minimize the negative economic effects of delays at the border, the study recommends a set of policy options on both sides of the border to reduce border-crossing times. The options were derived based on the specific characteristics of the Imperial Valley POEs. In most cases, the options require cooperation among Federal, state and local agencies to be successfully implemented. The options focus on freight traffic (i.e., trucks) and can be divided into three broad categories: (i) optimize use of existing capacity, (ii) improve throughput, and, (iii) expand capacity. Each option is described separately.