

2011

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Recommended Citation

Davidson, David L. (David Lindsay), "Testing a Reconfiguration of FAST at the Blaine POE" (2011). *Border Policy Research Institute Publications*. 23.
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Testing a Reconfiguration of FAST at the Blaine POE

Volume 6, No. 2 Spring 2011

by David Davidson*

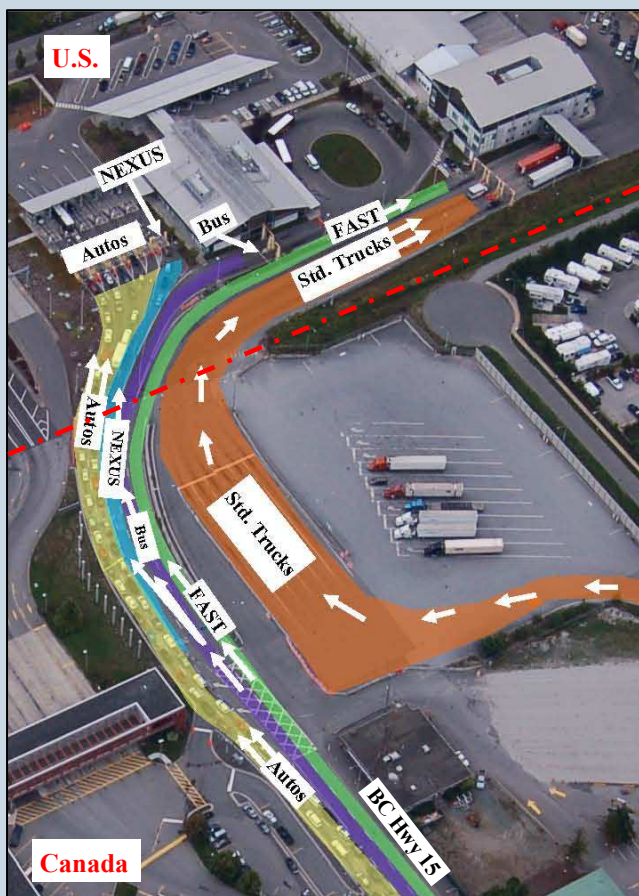
Web Address: www.wwu.edu/bpri

There has been light usage of a dedicated southbound FAST lane and booth at the Blaine, Washington, truck crossing. A 2009 queuing model revealed that overall wait times at the port would be greatly reduced if the dedicated booth was instead made available to all trucks. In November 2010, USCBP invited our institute to conduct a pilot test of such a scenario. Working with the Whatcom Council of Governments, we completed the test in the spring of 2011. In peak traffic periods (8 a.m. to 3 p.m., Monday through Thursday), the pilot configuration resulted in an average wait time of 11.8 min. for the mingled truck traffic, as compared to wait times of 3.9 min. and 49.2 min. for FAST trucks and standard trucks, respectively, in the baseline condition.

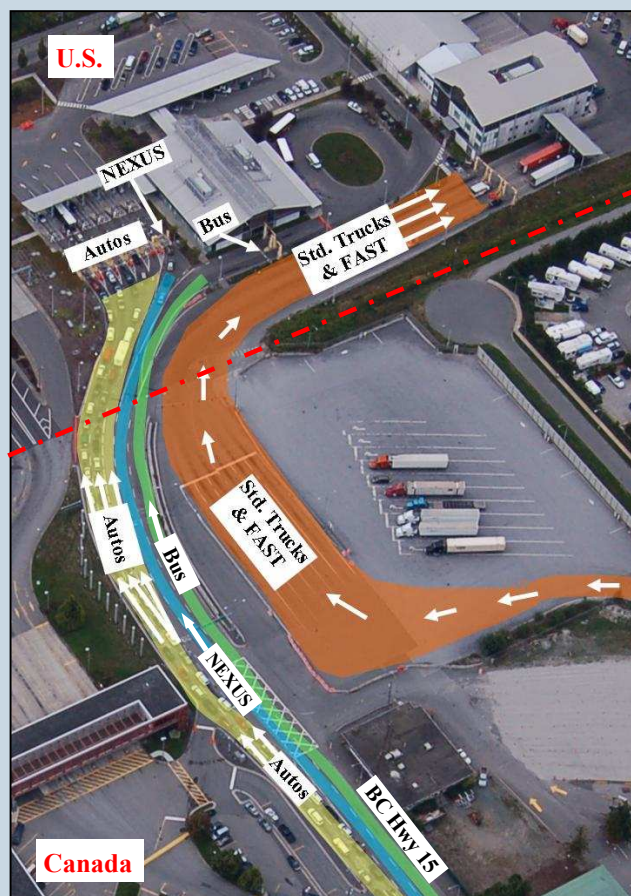
Introduction. In prior articles we have described problems with efficacy of the Free and Secure Trade (FAST) trusted-shipper program at the Blaine, Washington, port-of-entry (POE).¹ At Blaine, state and provincial transportation agencies invested in the construction of highway lanes dedicated to FAST trucks, but there has been relatively light usage of those lanes. In a 2009 field study we found that 23 percent of southbound trucks and just 2 percent of northbound trucks used the FAST lanes. Of the southbound FAST traffic, 73 percent of the trucks were empty. Southbound, the FAST lane seems primarily to be a rapid path by which a FAST carrier and driver can travel empty across the border—i.e., rather than expediting the cross-border flow of goods, FAST expedites empty backhauls and therefore serves as an incentive to inefficient freight transport, from an environmental point of view. Meanwhile, long delays are a frequent occurrence in the standard truck lanes.

Birth of a Pilot Project. Using our 2009 data, BPRI economist Mark Springer constructed a queuing model of the southbound traffic flow and analyzed some alternate highway configurations, including one in which dedicated FAST facilities were eliminated and FAST trucks mingled with standard trucks.² In that scenario, the aggregate wait times experienced at Blaine were predicted to be greatly reduced, albeit at the expense of trucks that now make use of the FAST lane. In November 2010, U.S. Customs and Border Protection (USCBP) proposed that a pilot project be undertaken to evaluate exactly that scenario. The proposal was broached at a meeting of the International Mobility and Trade Corridor (IMTC) project, which is a region-specific stakeholder forum that seeks to improve mobility at the four POEs that serve the I-5 corridor.³ The IMTC is an ideal forum through which to implement such a project, in that it is attended by federal, state, and provincial transportation agencies, as well as USCBP and the Canada Border Services Agency. The BPRI agreed to conduct the project in partnership with the Whatcom Council of Governments (WCOG), which facilitates the IMTC forum. The Washington State Dept. of Transportation agreed to pay the bulk of the project cost, making use of federal Coordinated Border Infrastructure funds. The B.C. Ministry of Transportation agreed to make the necessary temporary alterations to the signage and striping that guide southbound trucks to the Blaine POE.

**B.C. Hwy 15 Historical Configuration:
2 auto lanes + NEXUS + Bus + FAST**



**B.C. Hwy 15 Pilot Test Reconfiguration:
3 auto lanes + NEXUS + Bus**



Photos courtesy of Washington State Department of Transportation

Highway Reconfiguration. The diagrams above show the configuration of the highway lanes on B.C. Highway 15 during the pilot test and during prior years. As seen in the left photo, FAST trucks typically remain on the highway, while other trucks are diverted (at a location upstream of the photo) into a queue that forms to the west (right) of the highway. The FAST trucks proceed directly to a dedicated USCBP inspection booth, and standard trucks share the remaining two booths. In the pilot configuration (right photo), the FAST trucks follow the path of standard trucks, and the three inspection booths are shared among all truck traffic. Every booth is capable of processing a FAST shipment, so a FAST truck still receives other program benefits, such as a more rapid primary inspection, less frequent referrals to secondary inspection, and “head of the line” treatment if referred to secondary. The highway lane relinquished by FAST makes possible a shuffle of modes on the highway, with the bus and NEXUS lanes shifting to the right, and the standard auto traffic gaining a third approach lane.

Methodology. A field crew was deployed for 11 days (2 each of Monday – Thursday, 1 each of Friday – Sunday) to collect baseline data in the period from February 25 through March 10, 2011. Using time-synchronized handheld devices stationed at the end of the queues and at the booths, the crew collected exact wait times for trucks, buses, and NEXUS automobiles passing through the POE between the hours of 8:00 a.m. and 3:00 p.m. After the baseline phase, the highway signage and striping upstream of the POE were modified by the B.C. Ministry of Transportation. The pilot phase involved 15 field days (3 each of Monday – Thursday, 1 each of Friday – Sunday) in the period from March 21 through April 7, 2011. During both the baseline and pilot phases, USCBP measured the wait times of standard automobile traffic using a separate methodology.

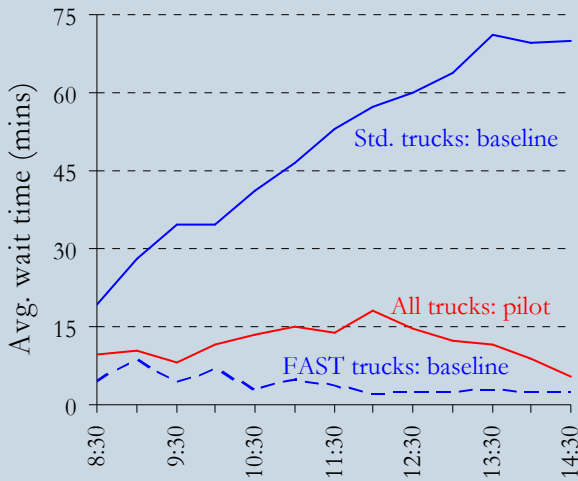


Figure 1: Hourly Profiles of Average Wait Times in Baseline (FAST & Std. Trucks) and Pilot Phases

Baseline

- Data includes 8 weekdays (Monday – Thursday)
- n = 2,226 trucks
- Overall average of 49.2 minutes for standard trucks and 3.9 minutes for FAST

Pilot

- Data includes 8 weekdays (Monday – Thursday)
- 4 other weekdays excluded because 1 or more booths were at times closed, resulting in non-pilot conditions
- n = 3,012 trucks
- Overall average of 11.8 minutes for mingled truck traffic

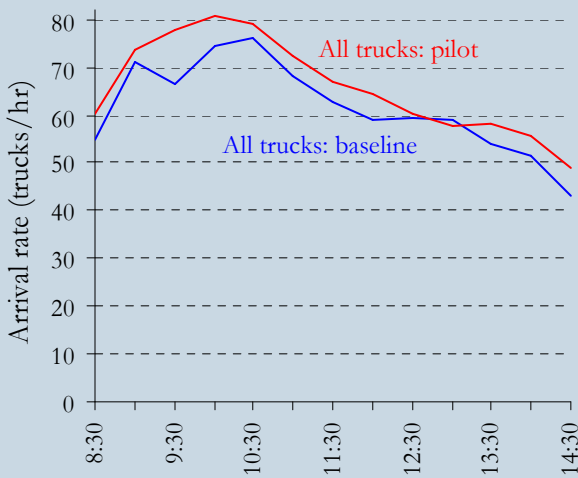


Figure 2: Hourly Profiles of Average Arrival Rates of Trucks in Baseline and Pilot Phases

Baseline

- Data includes 6 weekdays (Monday – Thursday)
- Equipment failure spoiled arrival data on 2 other weekdays
- n = 2,359 trucks
- Average 24-hour daily traffic (ACE) = 1,106 trucks⁴
- Plot line adjusted upward to account for estimated number of trucks that jumped the queue (4 per hour)

Pilot

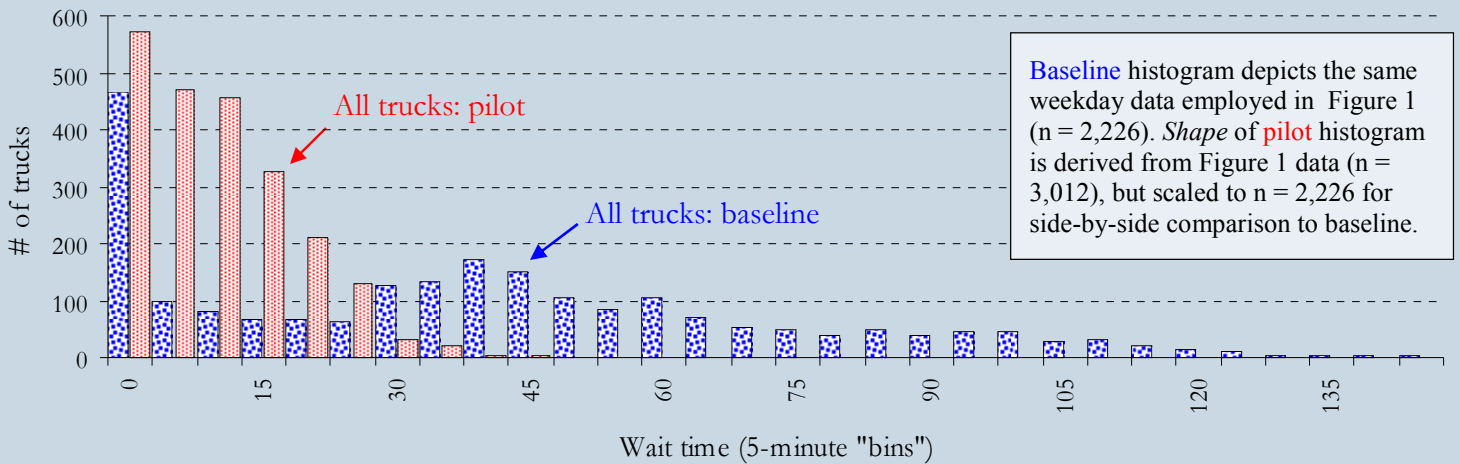
- Data includes 12 weekdays (Monday – Thursday)
- n = 5,426 trucks
- Average 24-hour daily traffic (ACE) = 1,182 trucks⁴

Results. As seen in Figure 1, FAST trucks traversed the POE very quickly in the baseline configuration, experiencing average waits no greater than 8 minutes early in the day and faring even better in the afternoon. Standard trucks experienced much greater delays, with the average climbing steadily through the morning to a plateau of about 70 minutes by early afternoon. In the pilot phase (for which a single plot line serves to depict the mingled truck traffic), average delays rose slowly to a peak of about 18 minutes at noon, then fell to less than 8 minutes by early afternoon. Figure 1 portrays the conditions on the peak traffic days, Monday through Thursday, during the hours when all booths were in use and the FAST booth was open (in baseline phase). On weekends, traffic volumes are much lower, fewer booths are in use, and no dedicated FAST booth is provided—in essence, there is no difference between the two configurations on weekends.

Clearly, the standard truck traffic stream benefits greatly from the pilot configuration. For the days and times depicted in Figure 1, *the overall average wait for standard trucks was 49.2 minutes in the baseline phase, falling to 11.8 minutes in the pilot.* Of course, the pilot configuration *increased* the wait time for FAST trucks, which had experienced an overall average of just 3.9 minutes in the baseline configuration.

Figure 2 is included in order to demonstrate the extent to which traffic volumes were comparable during the two data-collection phases. The figure shows the average number of trucks arriving per hour throughout the course of two “model” weekdays—one in the baseline phase and one in the pilot. The “model” weekdays are generated by averaging the arrival rates for a total of 18 weekdays. While the pilot-phase plot (red) is derived directly from measurements, the baseline plot (blue) includes an upward adjustment to compensate for queue-jumpers that we observed during

Figure 3: Frequency Distributions of Wait Times: Baseline vs. Pilot



that phase. The highway configuration and lengthy queues that existed in the baseline phase were conducive to queue jumping, but the conditions prevalent in the pilot phase were not.

Figure 2 demonstrates that the traffic load was slightly higher during the pilot phase. This finding is confirmed by data from USCBP’s Automated Commercial Environment (ACE) system showing that the average level of daily traffic was about 6.9 percent higher during the pilot test, when focusing upon the specific weekdays used to construct Figure 2 (i.e., 1,182 trucks per day, vs. 1,106). When focusing upon the specific days used to generate Figure 1, ACE data shows a pilot-phase traffic volume that is 8.5 percent greater. *A substantial reduction in wait times was evident during the pilot test, even though traffic volumes had risen significantly since the baseline phase.* Our queuing model will be used to estimate the reduction in wait times that would have been experienced if the traffic had been constant in both phases.

Figure 3 is provided in order to derive an estimate of the aggregate reduction in delay that was achieved in the pilot configuration. The total delay experienced by the trucks during a given phase can be estimated by summing the delay attributable to each “bin” along the bottom axis of the plot. For example, the delay experienced by the 327 pilot-phase trucks that waited between 15 and 20 minutes (the column identified with the red arrow) can be estimated as 327 multiplied by 17.5 minutes (the midpoint of the “bin”) per truck. In this manner, an estimate of 1,568 hours of wait time was derived for the baseline sample, as compared to 449 hours for the pilot. *The pilot configuration appears to yield a 71 percent reduction in aggregate wait time*, when focusing upon the peak weekday (Monday – Thursday) hours.

Final Remarks. This kind of research is invaluable when deliberating upon whether to deploy (or curtail) programs at specific POEs. Permanent deployment of the pilot configuration would yield very substantial reductions in aggregate wait time at the Blaine POE, thus helping Washington State and B.C. promote efficient trade and reduce environmental impacts. POE-specific stakeholder forums like the IMTC are a necessary kind of organizational infrastructure when striving to plan and conduct a field project within such a brief window of time. An extensive report of findings is forthcoming, and the preliminary results presented here are subject to minor revision.

Endnotes

- * David Davidson is Associate Director of the BPRI.
1. See *Border Policy Brief* Vol. 4, No. 4, “Issues with Efficacy of FAST at the Cascade Gateway,” retrievable from the Publications pane of our website: www.wvu.edu/bpri
 2. See Research Report No. 11, “An Update on Congestion Pricing Options for Southbound Freight at the Pacific Highway Crossing,” by Mark Springer, Ph.D., retrievable at www.wvu.edu/bpri
 3. See information related to the IMTC at the WCOG website: www.wcog.org/Border/About-IMTC/58.aspx
 4. ACE data provided by Chief (Trade/Cargo) Ronald McMillan, USCBP, April 2011