

ITS Field Operational Test Summary

Oregon Green Light Commercial Vehicle Operations Test

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Introduction

The Oregon Green Light ITS Field Operational Test is an evaluation of three major technical components intended to enhance commercial vehicle operations throughout Oregon. An electronic preclearance system employs transponders and weigh-in-motion (WIM) devices to reduce required stops by commercial vehicles at 22 weigh stations. The Road Weather Information Systems (RWIS), installed at Ladd Canyon, Columbia Gorge, and Siskiyou Summit collects weather data, processes it, and automatically informs motorists of abruptly changing weather conditions. The Downhill Speed Information Systems (DSIS), located at Emigrant Hill and Siskiyou Summit, calculates and displays a safe downhill speed for each passing truck.

Systems are being installed and data collection will began in fall 1997.

Project Description

The project is testing systems to make commercial vehicle operations safer, more efficient, and less expensive to both operators and the general public.

The goal of the electronic preclearance system is to improve highway safety at and around weigh stations. Installing the system will also modernize and automate a manual weighing system that has been in place for decades. The preclearance system will streamline commercial vehicle traffic flow at weigh and inspection stations. Streamlining operations includes reducing time lost at weigh stations, lowering fuel consumption and pollution, and improving allocation of enforcement resources resulting in increased compliance. Electronic preclearance will also reduce the number of vehicles that exit and rejoin the traffic stream at weigh and inspection stations (often at a reduced speed), thereby enhancing safety for all motorists.

The purpose of the DSIS is to increase road safety by reducing the average downhill speed of trucks. Similarly, the RWIS aims to increase the safety of all motorists by reducing average speeds in inclement weather and by providing pre-trip travel planning information (for example, on the Internet or through kiosks). In addition, the RWIS should reduce the application of environmentally harmful abrasives. The sensors, databases and data interchange protocols associated with Oregon Green Light also have the potential to automate tax administration, thus reducing costs to commercial vehicle operators and the tax payer.

Participating trucks are equipped with transponders that electronically identify the truck to roadside readers as the trucks approach weigh or inspection stations. Through a private "transponder administrator," the test is making transponders available to carriers in good safety standing. Initially, 10,000 transponders were introduced. The test eventually plans to equip 10 percent of all trucks operating in the state - about 26,000 vehicles.

In the electronic clearance component of the test, an antenna reads the identification information from the transponders of approaching trucks and relays it to a central processing unit (CPU). The CPU also receives an approximate weight of the vehicle as measured by WIM. With these

two inputs, the system consults the database of motor carrier information. Considering its built-in rules, the electronic clearance system decides whether to give the truck a green light or direct it to enter the weigh or inspection station. Figure 1 presents a schematic of this component of the test.

For the evaluation of the electronic clearance component, test personnel will determine the rate of compliance with safety regulations directly through an analysis of the state weighmaster database and the state inspection database. The number of transponders in the test is not expected to be large enough to lead to perceptible changes in the operation of weigh stations. Therefore, the test will use a computer model to extrapolate the observed results to a full deployment scenario. This simulation will estimate the impact of full deployment on number of vehicles processed, waiting time, and fuel consumption.

The DSIS measures the vehicle weight using WIM and reads the license plate using a video system. The DSIS computes an advisory speed for each vehicle and displays it on a variable message sign next to the vehicle's license plate number.

The project installed the RWIS in locations of rapidly changing weather patterns. A sensor package measures air and pavement temperatures, dew point, wind speed, visibility and precipitation. An on-site remote processing unit (RPU) autonomously detects hazardous conditions and displays a warning message on variable message signs. The RPU communicates with a central processing unit (CPU) in Salem, which displays all alerts on a website as well as on kiosks installed in major truck stops. From the CPU a system operator can also override the RPU and display other messages.

For the evaluations of RWIS and DSIS components, existing weigh-in-motion sensors will measure the ratio of mean speeds before and after installation. Test personnel may need to supplement this data with measurements made with a radar gun. In addition, Oregon's accident records database will provide the number of accidents both before and after installation.

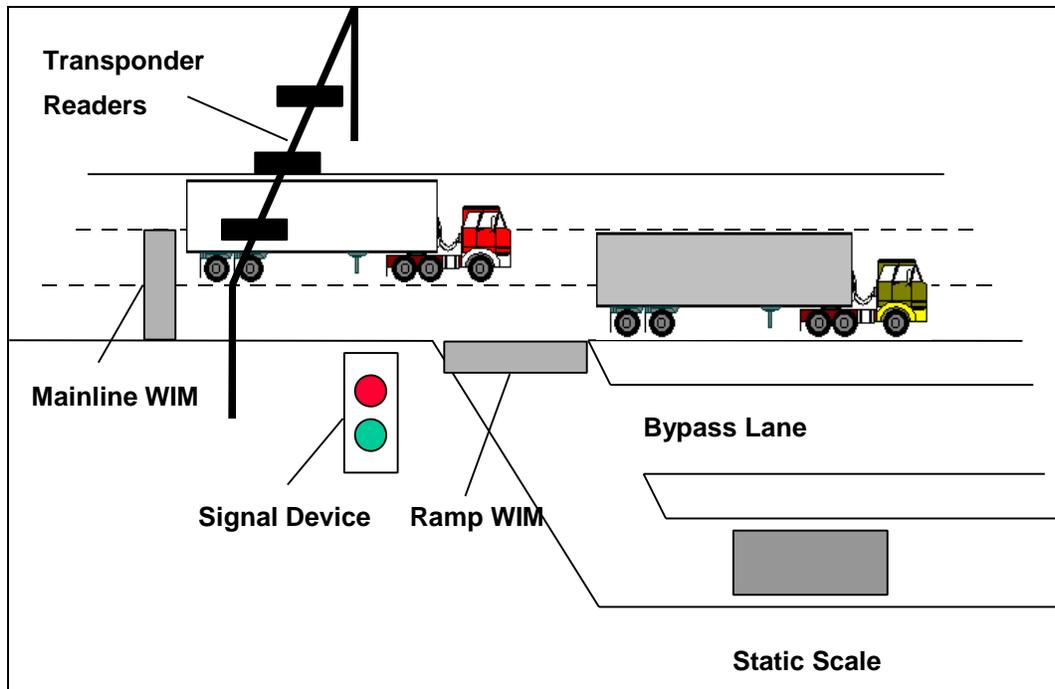


Figure 1: Schematic of Electronic Clearance

Test Status

The first pre-clearance-equipped weigh station began operations in October 1997. Two other stations are nearing the operations phase and system hardware is being installed at several others. Contractors completed installation and testing of the RWIS equipment in the third quarter of 1997. Installation of the DSIS at one site is progressing. Test personnel continue collecting speed and accident baseline data for comparison to the post-installation information.

In light of the large scale of both test and evaluation, the earliest results are expected in January 1998. The final report is due in April 2000.

Test Partners

Federal Highway Administration

Iowa State University - Center for Transportation Research and Education

Oregon Department of Transportation

Oregon State University - Transportation Research Institute

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References

Oregon Green Light CVO Project, Quarterly Report, 3rd Quarter 1997, Oregon Department of Transportation, October 1997.