

## California's High-Tech Screening for Inspection Efficiency

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The Cordelia Commercial Vehicle Enforcement Facility, in partnership with the California Department of Transportation (Caltrans), is overseen by the California Highway Patrol (CHP) and operated by the CHP and specially trained civilian staff. Strategically located in the Bay Area's busiest commercial corridor on Interstate 80, Cordelia is a complex commercial motor vehicle screening system that uses high-technology solutions such as weigh-in-motion (WIM), tire safety screening, machine vision and automated database lookups.

The technology at the site enables fast processing of commercial motor vehicles by sorting vehicles into different lanes at the weigh station based on the degree to which the vehicles meet inspection criteria. WIM and tire screening identify vehicles with potential weight and tire condition violations, while database screening identifies vehicles with safety or credential issues.

Caltrans selected International Road Dynamics (IRD) to integrate technology at the Cordelia Eastbound site. The control system and software also offered a high degree of automation while ensuring transparency of operations and availability of manual overrides for crisis scenarios.

### Screening Technology

At such a busy location, screening technology plays an important role in optimizing resources. Commercial vehicle inspection specialists conduct North American Standard Level I, II, III or IV Inspections on more than 40,000 vehicles a year at Cordelia and effective screening ensures their time is not wasted on compliant vehicles. Screening technology is also important for industry, ensuring that a vital transportation route does not become congested and unduly delay drivers.



Tire safety screening in Cordelia, California, using TACS™

While efficiency is considered, safety must always be the top concern and this system has very stringent requirements for accuracy. The WIM sorter system monitors, weighs and measures commercial motor vehicle traffic traveling along the ramp at speeds below 40 mph (65 kph). The Cordelia system specifies higher WIM accuracies than the typical American Society for Testing and Materials Type III required for most pre-clearance operations. The double-threshold single load cell WIM scales on the ramp approaching the inspection station achieve accuracies of  $\pm 4\%$  gross vehicle weight for 95% of vehicles.

Tire safety screening is performed by IRD's Tire Anomaly and Classification System (TACS™) which measures tire footprints using an array of sensors and identifies vehicles that have underinflated, flat, mismatched or missing tires. Vehicles flagged by TACS or flagged as overweight by WIM on the ramp

are identified as such in vehicle records displayed to the inspectors through the operator software. Year-to-date, almost 3,000 commercial motor vehicles were screened with TACS and identified with potential violations.

The site incorporates iSINC® electronics to provide WIM screening and control other devices. Vehicles are identified on the ramp using cameras equipped with optical character recognition to read license plates and USDOT numbers. Cameras at the site also capture images of CVSA decals and will soon have the ability to screen for valid/expired inspection decals.

The recent addition of an intelligent roadside operations computer (iROC) enables rapid screening of identified vehicles against Federal Motor Carrier Safety Administration and safety and fitness electronic records (SAFER) data sources for credential and safety screening.



Inspecting a vehicle inside the facility



Checking tires at the station





Ramp screening technology in Cordelia



Cordelia lane overview

The iROC communicates with the iSINC while also connecting with remote databases to enable screening for compliance with SAFER, intra-state vehicles, permits and tax violations. The iROC provides a data store for future analysis of commercial motor vehicle operations, something that may become a factor for future trend analysis of volumes and types of violations identified by the system. As the iROC maintains local copies of remote databases, in accordance with California privacy law government code 6254, these databases are updated as changes are made to the publication source, so it is kept current and able to continue e-screening in the event the network connection is interrupted.

### At the Station

Based on vehicle compliance, all commercial motor vehicles are directed into either the left or right lane. From these two lanes, they are sorted into one of the four low-speed WIM

lanes downstream. Vehicles suspected of being noncompliant are directed to the two lanes closest to the station; whereas, vehicles more likely to be compliant are directed to the two lanes to the left. All commercial motor vehicles are weighed again in the low-speed WIM lanes.

In the low-speed lanes, vehicles travel at 2-15 mph (3-24 kph) with double-threshold SLC WIM scales achieving accuracies of  $\pm 2\%$ . Weight compliance is determined and signaled to a programmable logic controller (PLC) that interprets iSINC sign decisions to direct the flow of vehicles through the station using signs and signals. The PLC also plays an important role in traffic backup detection and management. When it is determined that a vehicle is compliant, the system sets traffic signals directing the vehicle to leave the station. Non-compliant vehicles are held and directed by a station operator to an inspection bay or static scale for inspection.

### Operator Software

IRD's operator display software was customized to suit the Cordelia sorter system and site layout. The software displays commercial motor vehicle traffic entering the station, including potential weight and credential violations, and maintains a historical record of each vehicle that has passed through the station. Importantly, the system allows authorized inspection staff to adjust screening settings.

### Outcomes

The most important consideration for CHP is that commercial motor vehicles that travel through the Cordelia site will not pose a safety risk to the public. With the volume of traffic at Cordelia, it is important that its inspectors do not miss the opportunity to closely examine vehicles that are potentially unsafe. WIM and e-screening have obvious, established safety benefits and the increase in tire violations identified in pre-screening since implementing TACS has provided significant added value in that respect.

The CHP is a leader in commercial motor vehicle enforcement, and a key goal is to improve safety by utilizing current and advanced commercial motor vehicle technology. ■



The main window showing vehicle records



Operator display (vehicle record with tire anomaly indicated)