Canadian Association of Road Safety Professionals (CARSP) / La Prévention Routière Internationale (PRI) 2021 Joint Virtual Conference

Rail Crossing Information System (RCIS)

Cory Edgar P. Eng., PTOE, PE | Director and Transportation Lead

CHALLENGE

- The Roberts Bank Rail Corridor (RBRC) represents a critical east-west link for the movement of goods by rail. Built prior to the densification of the Greater Vancouver Area, the railway runs through the core of the “Langley’s” comprised of the City of Surrey, City of Langley, and the Township of Langley. Four major at-grade rail crossings intersect with the rail line in this area.
- When trains transit through the corridor, these major intersections may be blocked for extended periods of time. **Motorists often experience significant delays. Blocked crossings result in a number of other negative impacts – including reduced commerce, increased emergency response times, and increased pollution levels.**
- Rail traffic is predicted to increase both in frequency and in length, which will result in greater impacts to the public. Recognizing the need to address this growing issue, the Ministry of Transportation and Infrastructure and other partner agencies initiated the Rail Crossing Information System (RCIS) project.

SOLUTION

- The RCIS detects trains entering the “Langley’s” area of the RBRC by utilizing multiple train detector checkpoints placed strategically along the corridor. Each train detector is comprised of an innovative suite of integrated sensors and field controllers that detect and measure train metrics. Gathered information is ingested by the system, processed by custom-developed adaptive algorithms within a sophisticated Advanced Transportation Management System, and relayed to six Motorist Advisory Signs (MAS). The MAS are a unique hybrid of static and dynamic information elements.
- The information displayed provides a motorist with the predicted status of the four at-grade crossings relative to the motorist’s location, along with the train’s direction of travel and relative position.
- **The MAS’s unique graphical format provides timely enroute status information that enables motorists to adjust their route choice and divert to nearby overpasses or unimpeded atgrade crossings to avoid travel delays.**

INNOVATION THROUGH IMPLEMENTATION

- The RCIS is the first of its kind in North America to employ this unique messaging, predictive algorithms, and integrated suite of sensors. Extensive human factors analysis and focus group testing were undertaken to optimize the unique sign messaging strategy. PBX drew on extensive experience in other application areas, including industrial process control and critical infrastructure security, to identify, prototype, test, and apply leading edge detection technologies.
- PBX developed the data analysis and event response algorithms. The system performs in a challenging operational environment where trains vary in speed, length, and physical configuration, or may exit onto siding tracks. Adaptive exception processing is employed for system activation to increase accuracy. Extensive multi-stage testing was performed to validate system performance.
- **The engineered solution represents a highly effective fusion of unique driver notification messaging with robust detection technologies and data analysis and response algorithms.**

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Project Owner:
Ministry of Transportation & Infrastructure
Presenter:
Cory Edgar P. Eng., PTOE, PE
Director and Transportation Lead
PBX ENGINEERING