RAILWAY CROSSING RENOVATIONS

TOWN CENTER MASTER PLAN:
AERIAL PERSPECTIVE OF RAILWAY CROSSING

RAILWAY grade crossings are a vulnerable feature found throughout, impacting the safety of drivers, pedestrians, and train passengers. The risk of drivers and pedestrians dying while passing through railway crossings is ten times higher than that of a commuter on the road. This project explores how new technologies can be applied to conventional structural designs of railway intersections to eliminate this generation of railroad crossings that minimizes accidents. The innovative railway intersection designs promote a safer道路交通, and interconnected community environment.

BACKGROUND:
ACCIDENTS AT RAILWAY CROSSINGS

According to the Federal Railway Administration (FRA), human behavior is the primary contributor to railway grade crossing accidents rather than technical, rail-based instrument problems. Inadequate and improper human behavior includes violations of traffic regulations, disregard of warning signals, and trespassing by vehicles and pedestrians. Intentional unsafe actions are the most frequent factors for these accidents, including swiping (skipping around the gate), misjudging the approaching velocity of the train, and driving around stopped vehicles. Accidents often happen because the only warning informing drivers and pedestrians are through signals and markings, which are frequently disregarded. Studies show that the conversion of passive crossing to active crossings, with flashing lights, sound alarms, and automated gates significantly reduce the number of accidents and minimize the frequency and severity of behavioral incidents. The FRA states that preventive measures can be obtained through psychological approaches and social sciences, as well as technological solutions to reduce the fatalities in railway crossing accidents.

STOP GATE
VEHICLE ARMING SYSTEM

The StopGate is an advanced alternative to the conventional manual, automated gates, designed to block out-of-control vehicles from entering the right-of-way. The StopGate's energy-absorbing design absorbs the force of a runaway vehicle, compacting over a three-ton truck traveling through to train equipment installed. Prior to the StopGate system, there was no remedy to immobilize runaway vehicles, except with funnels and bridges, which cost millions of dollars.

WAITING TIME
INFORMATION SYSTEM

The information system automatically communicates the remaining time for the train to pass by a crossing. Research shows that drivers and pedestrians become frustrated at railway crossings, reducing the waiting time seems longer. However, studies show that with the information system, behavioral problems are less noticeable; drivers and pedestrian are less noticeable to act untimely.

SWING GATE
AUTOMATIC GATE SYSTEM

The automated swing gates, similar to the StopGate system, manage pedestrian movement through the railway crossings. Distinct from conventional manual swing gates and automatic traffic control devices, which permit the pedestrian to proceed freely beneath or around the gate, automated swing gates prevent the pedestrian from crossing when the entrapment is blocked. When the swing gates open, the beams function as a fence between the vehicle and the pedestrian and provide safety handles to support the elderly and disabled.

LASER RADAR
OBSTACLE DETECTION SYSTEM

The laser or radar-based detection system is an automatic detection device that emits laser pulses to detect objects. When the recognized object is determined to not affect, an alarm is generated. When conventional contact detection systems are incapable of detecting small objects such as pedestrians, bicyclists, and vehicles, the potential for deadly collisions is eliminated by providing a warning system to alert drivers and pedestrians of potential hazards.

Connecting Communities: Designing a Safer Railway Crossing
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These technological improvements will decrease most erroneous human actions that lead to personal injury. Still, a vehicle could come to an unex- pected halt in the middle of the railway crossing due to car-to-car accidents and engine stalls. The railway crossing system efficiently responds to these emergency situations. After detecting obstacles, the active regulatory system flashes and blocks to prevent any vehicular access and the train gate will be opened to inform drivers of the unavailability of the railway crossing but will provide a sufficient height for the exiting vehicle. The train collision detection system initiates the stopped railroad and informs the train of the accident. The driver can intentionally push an emergency button to inform the train and emergency services. The well-integrated train would cautiously approach the railway crossing and stop until the problem is solved.

An emergency at the pedestrian crossing is another possibility. Again, similar to the vehicular scenarios, what if a person got stuck on the crossing? The automatic swing gates will not shut immediately to prevent entrapment. The laser radar obstacle detection system will identify the obstacle and make the swing gate remain open while warning the approaching train. The train will take precautions when approaching the railway crossing. These technological systems provide timely detection of potentially hazardous conditions and allow a safe environment for every pedestrian.

Railway tracks frequently separate communities, dividing the geography, regional characteristics, and the residents. The railway grade crossings ultimately become an undesirable "crack" in the community. Therefore, the design of the railway crossing focuses on restor- ing and integrating neighborhoods, connections. Continuity is an imperative theme in the design, generating comfort to the traveler approaching the railway crossing. An aesthetic continuous landscape pattern generates a steady motion, bringing order and unity to the space. The sequence of aesthetic, continuous landscape, and landscape elements, on the other hand, presents a healthy and calming waiting experience. Regional integration with seasonal interests creates a sense of enclosure and security, providing a buffer between the vehicular road and the landscape, as well as the sidewalk and adjacent buildings. Upon exiting the crossing, the renewed local street pattern generates a perception of connective passage. These street features contribute to a vehicular- and pedestrian-friendly environment for the railway crossings and their communities.

Interactions are areas of potential conflicts of circulation. Since railroad trains have priority, drivers and pedestrians repeatedly become frustrated waiting. Frustration leads to railway crossing accidents. Therefore, the waiting area is designed to alleviate frustration by creating a socially interactive and calming space. By "cutting a weaving" the corner of the building, it creates an opening and de- string the space with different textures. It becomes an area intended for the purpose of interactive experience while waiting for the train to pass. For example, the seating feature is designed as a short-term resting area that comfortably supports the personal learning against the wall of the building. When the crossing gate opens, which are usually closed for less than a minute, the person sitting is able to resume waiting without diffi- culty and applying too much energy. With an overhead structure for shading, the seating area is a relaxing environ- ment especially for elderly and disabled travelers. By creating a comfortable waiting area, the space becomes an essential experience for people of the railway grade crossings.

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