ENERGY ABSORPTION
SYSTEMS, INC.

Quixote
Transportation Safety

The StopGate™ System

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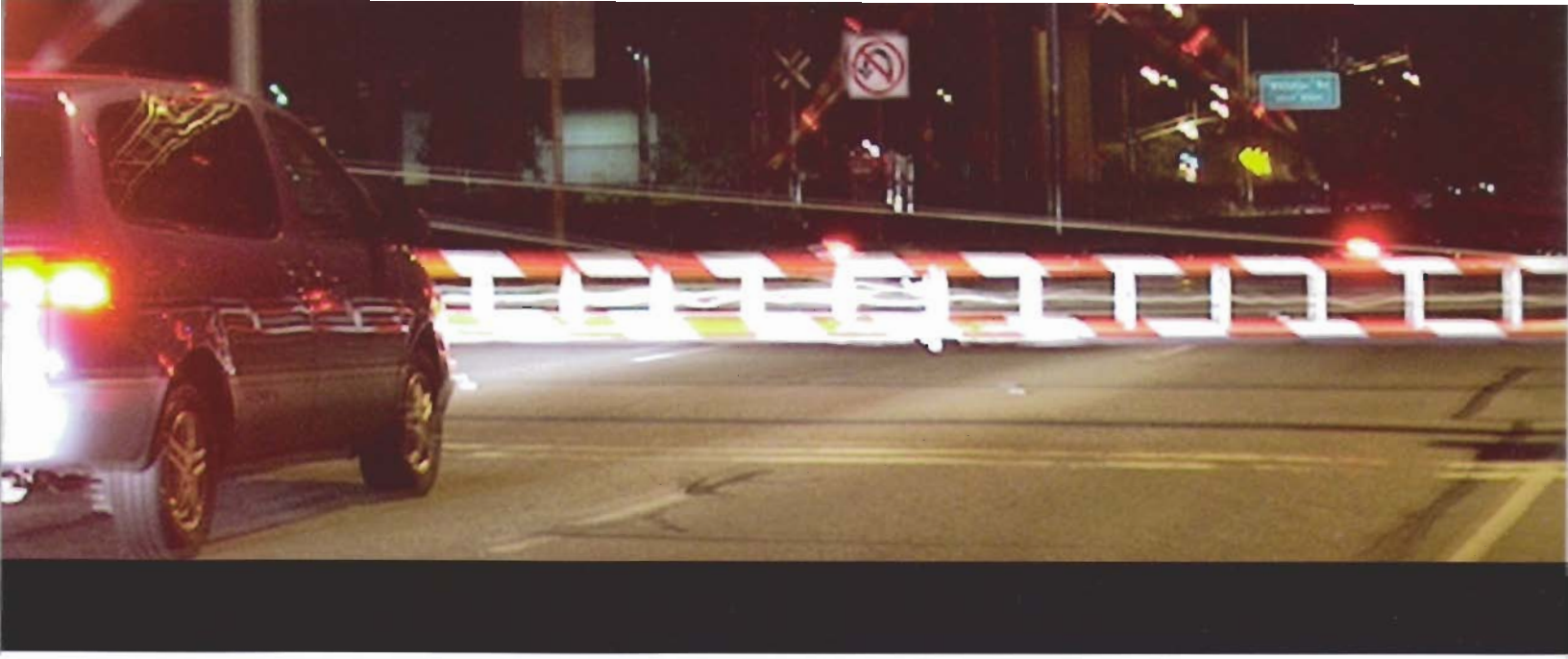
The StopGate System is a safety barrier gate specifically designed for highway-rail grade crossings. Its design provides positive, crashworthy protection to help prevent vehicles from intruding into grade crossings when a train is present or approaching. In essence, the StopGate System closes the roads temporarily at a highway-rail crossing, which has proven to be a cost effective way to separate the vehicle from the train.

The StopGate System is equipped with an energy absorption cable assembly, weatherproof housing, and operating mechanisms. The StopGate System housing contains electro-mechanical components that lower and raise the gate arm. When the gate is in the down position, the end of the gate fits into a locking assembly that is bolted to a concrete foundation. The gate arm consists of three cables, the top and bottom of which are enclosed in aluminum tubes. Each gate arm is custom designed for each grade-crossing application. The gate arm design can extend up to a length of 53 feet (16.2 meters).



According to the U.S. Department Of Transportation, a motorist is 40 times more likely to be killed if involved in a vehicle-train crash than in any other type of highway collision. Nearly half of the railroad crossing incidents occur when warning gates, lights, and bells are working properly. This type of incident is often the result of driver distraction, alcohol, cell phone usage, mechanical problems, bad weather, etc.

As a result of the expanded use of passenger, high-speed rail, whistle bans, increasing freight and hazardous traffic flow, and the upsurge in driver distractions, railroads, local authoritites, and state road authorities are seriously considering moving from warning devices to crashworthy systems.

The StopGate System is equipped with the latest technologies in gate warning systems. The high-intensity red and white reflective tape is designed to enhance day and night visibility. An LED lighting system is included on all StopGate System arms. The StopGate System's gate arm mass and structure provide higher visibility and allow motorists additional braking distance over traditional warning gates.

CRASHWORTHY PROTECTION WHEN NEEDED

The StopGate System is deployed using a vertical pivot action silmilar to a standard automatic warning gate and utilizes a positive locking device at each end of the arm to secure the StopGate System arm across the roadway. Once the arm is in position, it creates a temporary barrier for the crossing. Upon a vehicle impact, the StopGate System's energy absorption gate design creates a structure that brings a vehicle to a complete stop in as little as 13 feet (4 meters).

MAINTENANCE COST

Traditional arm replacements are costing the railroad industry millions of dollars in replacement fees associated with arms that are broken by vehicles. The StopGate System has over six years of operating experience with an estimated 130,000 train movements and 30 million vehicles passing through grade crossings where StopGate Systems are installed. In its six years of operation at two locations, the StopGate System has not had one arm replaced because of a vehicle hitting or getting caught between the arms.

RELIABILITY

The mechanical design of the StopGate System has been in existence for over thirty years on bridges across the United States. The StopGate System has proven itself repeatedly through all types of weather conditions.

Product	Life Cycle Average
Traditional gate mechanisms	17.5 years [1]
StopGate System	36.6 years [2]

[1] Life cycle on gate mechanism provided by Rail Development Group
[2] Based on the following calculation: 267,000 cycles/20 (average number of cycles per day for traditional warning systems) = 13,350
13,350/365 days in a year = 36.6 years.

The StopGate™ System has gone through rigorous testing to ensure that the gate arm and electro-mechanical components meet the needs of our customers.

LIFECYCLE TESTING

A full scale model of the StopGate System was subjected to lifecycle testing. This model passed a 267,000-cycle test and only required the replacement of a $10 bearing.

IMPACT PERFORMANCE - MEETS NCHRP 350,TL-2

The StopGate System has been accepted by the Federal Highway Administration (FHWA) as an NCHRP 350, Test Level 2 vehicle arresting system. It is designed to arrest a 4410 lb. (2000 kg) pick-up truck traveling at 70 km/h (45 mph) in as little as 13 feet (4 meters).

GUIDANCE AND APPROVALS

DOT and FRA Technical Working Group - GUIDANCE ON TRAFFIC CONTROL DEVICES AT HIGHWAY-RAIL GRADE CROSSING: Suggests the StopGate System should be considered as a supplemental safety device at crossings with passenger trains, high-speed trains, quiet zones, or as otherwise recommended by an engineering study or diagnostic team.

System Analysis Test: An 800 point safety analysis exam was completed by Kemper Engineering.