

Problem Assessment

In an effort to purchase new ambulances in 2004, during an era of improved seating restraints for almost all passenger vehicles, the Winter Park Fire-Rescue Department (WPFDR) quickly found that ambulance attendants were not included in new passenger safety initiatives. Seeing this as a failure of the industry to address the basic safety needs of paramedics, WPFDR established what is now referred to as the Ambulance Safety Initiative (ASI) project.

During the 1990's, there were more than 300 fatal ambulance accidents in the United States and a majority of these deaths involved attendants who were unrestrained in the rear compartment of the ambulance. Before the ASI units were developed by WPFDR, paramedics would sit unrestrained on a bench-style seat facing the patient. Because it was necessary for them to render care during transport to the medical facility, paramedics were not able to use the standard lap-type seat belts provided. In order to communicate via radio, reach necessary medical equipment and perform other patient care functions, they were routinely moving about the ambulance.

The ASI project assessed passenger restraint systems needed for paramedics to travel safely as well as the basic ergonomics of emergency medical care itself. As a result, the entire patient care continuum was thoroughly researched. Everything from vehicle markings to equipment accessibility was considered in an effort to make the environment and activities of the first responders as safe as possible. The cornerstone of the ASI project is the improved passenger restraint systems designed for the patient-care attendant.

Program Implementation

The entire ASI process, including receiving competitive bids for the redesign, took just over two years. In early 2004, the ASI project was initiated by Lieutenant Andrew Isaacs of WPFD. He was meeting with a local ambulance manufacturer when he was told there was no such design on the market like he had envisioned. As a result, Lt. Isaacs began to draft his thoughts for the redesign. Eventually, WPFD staff including Lt. Isaacs and Fire Chief James E. White traveled to the manufacturing plant in Goshen, Ind., to ensure the seating and equipment positioning concepts could be built to meet the ASI specifications.

It was important for the Winter Park team to support their findings with factual information in order to call for change. Studies regarding ambulance safety by the National Institute of Occupational Safety and Health (NIOSH) were used to convince manufactures of the need to change the way they were building ambulances. These studies, along with historical facts and crash-test videos, were used to convince firefighters and paramedics of the inherent dangers to medical attendants working in the patient compartments of American ambulances. This comprehensive approach resulted in several design conclusions.

To enhance the concept proposed by Lt. Isaacs, Chief White offered his thoughts for the design of the seating restraint system which were developed in conjunction with Schroth Safety products and Emergency Vehicle Seating (EVS), the producer of the final ASI attendant seat system. The simplicity of the harness operation was a very important aspect in meeting restraint compliance requirements. Because a cumbersome harness design would ultimately be rejected by attendants, it was critical to develop a seating and restraint system that was very user-friendly.

The City of Winter Park is the funding source for all activities of the fire-rescue department and the city's Vehicle Replacement Fund (VRF) serves as a type of internal leasing function for each city department. After specifications were drafted, the ASI units were placed for competitive bid adhering to the city's purchasing policies and procedures as well as Florida state law. The purchase order was initiated and a contract was signed for the production of the units to meet all specifications. The total cost for each unit was approximately \$170,000 and they were budgeted under the VRF program.

Tangible Results

The single most important achievement of the ASI project is the increased level of safety available to City of Winter Park paramedics and paramedics across the United States. Since this initiative has improved the level of safety for Winter Park paramedics, it is also, in turn, being considered as the standard for change in the industry. Combined with all other safety improvements made to the ASI units, WPFD's innovative thought process to ergonomic design has yielded what is being referred to in the industry as America's safest ambulance.

The three most important measures currently being used to evaluate the success of the ASI project are **1) personal compliance** with the use of the new ambulance restraints and safety systems, **2) reduction in Workers' Compensation** injuries related to all ambulance operations and **3) reduction in motor vehicle crashes** involving ambulances in Winter Park.

1. Personal Compliance:

Prior to implementation of the new seat restraints for ambulance attendants, riders often chose not to use the standard lap-only belt during transport. Transitioning to a five-point restraint offered greater security in all circumstances while also allowing for continued mobility necessary to treat patients. Since the ASI units were placed into service, personal compliance has been measured qualitatively through spot checks and supervisor observations. During the first three months, a compliance rate of approximately 75 percent was observed. Compliance eventually improved to an observed rate of 90 percent.

2. Reduction in Workers' Compensation:

The tracking of all compensable injuries is a quantitative look at the amount and type of injuries in the new units compared to those experienced using former designs and procedures. Prior to introduction of the ASI features, WPFD experienced two serious employee back-related injuries, one of which resulted in a disability retirement. Additionally, numerous needle-sticks and cross-contamination of attendant's personal protective equipment occurred. Since implementation of the ASI features, Workers' Compensation injuries have been reduced to zero.

3. Reduction in Motor Vehicle Crashes:

The ASI project also incorporates features designed to reduce the possibility of a stationary collision while operating on an emergency scene. Vehicle markings, lighting and firefighter equipment placement were all strategically incorporated into the ASI vehicles. Policies allow for qualitative assessments by duty supervisors in order to ensure compliance. Since the ASI units have been in service, compliance is near 100 percent for this important performance feature.

Lessons Learned

Although there were many obstacles during the implementation of this project, which resulted in greater knowledge and understanding of ambulance safety, the most significant obstacle was that WPFD is not an ambulance manufacturer. The ASI project identified industry-wide issues relating to the design and operation of fire-based ambulance units throughout the United States. Once specifications were developed and placed into the market for consideration, two manufacturers responded and accepted the challenge to change the design of the standard American ambulance. As an end result, there are currently five manufacturers producing similarly designed units.

The second significant obstacle to the ASI design was that of user compliance. Although the dramatically improved safety features of the ASI units are offered to Emergency Medical Service (EMS) attendants, getting them to acknowledge these benefits and use the product requires continued training, supervision and policy enforcement. Although it is understood that complete compliance will take time, reinforcement of safety policies by use of ASI restraints as well as general vehicle safety compliance measures will help achieve desired results.

The ASI project designed by and produced for the WPFD is truly a first in the United States. Although other agencies and manufacturers have attempted various types of restraint systems in an effort to keep medical attendants safe, previous designs failed to address the ergonomics of the attendant which resulted in non-compliance. Firefighters and paramedics were not advocating change in design for fear that restraints would not allow them to perform their jobs properly. Winter Park's ASI design incorporates the demands of today's EMS personnel.