

# Additionally Selected Technologies

## Priority, Market-Ready Technologies and Innovations

# 2007

## Low Profile Barrier Systems

### *The Challenge:*

Safe Work Zones for the Traveling Public and Work Zone Personnel.

Barrier systems must redirect a variety of vehicles in a smooth, stable manner without causing vehicle rollover; limit vehicle intrusion into the work zone; and, be lightweight and portable so that barriers can be installed, repositioned and removed with minimal effort.

Current design choices do not lead to optimal barriers and, as a result, a need exists for an alternative design for conventional high and low profile barriers.



### *The Solution:*

#### **Low Profile Barrier Systems**

Low profile portable roadway barriers provide vehicle operators with a greater field of vision and can be configured to be easily moved to define the ever changing work zone perimeter.

#### **How Do Low Profile Barriers Work?**

A portable low profile roadway barrier uses a segment-to-segment connection scheme in which a steel channel in each segment is connected via steel bolts. This mechanism provides a continuous steel path to transfer the load of impact throughout the entire installation.

The 18 inch high barrier can be successfully broken down into 12-foot segments that may be connected in straight, concave or convex arrangements to permit easy deployment on a range of geometrics including uneven surfaces.



*Images from the left:*

*Barriers can be curved in any configuration needed.*

*The linkage between barrier segments.*

*Sloping ends will soon replace blunt barrier ends.*

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## Putting It In Perspective

More than 1,000 fatalities and 40,000 injuries occur in U.S. construction zones each year.

High profile concrete barriers provide excellent redirection and separation capabilities but can obscure a driver's field of view and lead to accidents.

Low profile barriers provide increased visibility but do not safely redirect vehicles away from the work zone on a consistent basis and endanger the lives of construction personnel in the work zones.

## *Successful Application: Florida Department of Transportation*

New developments and heavy tourist traffic require that new roads be built and old ones maintained regularly in Florida, the nation's fourth most populous state. This dense traffic makes roadway work zones dangerous. In fact, the National Work Zone Safety Information Clearinghouse ranked Florida (in 2005) second highest nationally in the number of construction and work zone fatalities, with a total of 162.

Safety barriers are commonly used to separate traffic from work zones. However, on low speed urban roads with side entries from cross streets and driveways, these zones need lower barriers that allow wide visibility. As a result, FDOT initiated a project to develop low profile roadside barriers that would meet Federal Highway Administration (FHWA) safety standards.

University of Florida Civil & Coastal Engineering faculty began the project focusing on structural adequacy, occupant risk and vehicle trajectory. FDOT also required that the barriers consist of segments that could be easily deployed in different configurations. Following several simulations and full-scale crash testing, the final version of the newly-designed barrier became an FDOT design standard in 2005. In fact, between January 1, 2005 and December 31, 2006, 22 FDOT road contracts included this barrier as a bid item.

The 18 inch high, 12 foot long, 28 inch wide concrete sections are linked with steel rods rather than bolted to the pavement, so the force of impact is distributed along the barriers. The segments can be linked in straight or curved lines as needed. Links between segments are somewhat flexible as well. When struck, the joints between segments open a bit but stay in alignment so the vehicle does not collide with the segment end. To reduce deceleration forces inside the vehicle, the barrier is allowed to slide about 9 inches into the work zone upon impact.

Though well-designed, FDOT requested further refinement of the barrier ends, which are vertical. The research team is developing a tapered end treatment to further reduce work zone injuries. The modified design has been tested through simulation and the prototype is being reviewed by FDOT. Once crash tested and approved, the new barrier will be deployed.

### **Additional Resources**

Further information about Low Profile Barrier System technology is available [here](#)

### **University of Florida Barrier Website**

[UF University of Florida](#)

### **Barrier Form Manufacturer**

[Tucker's Machine & Steel Service, Inc.](#)

### **Barrier Moving Equipment**

[Kenco](#)

### **Other Articles**

[Temporary Low Profile Barrier for Roadside Safety: Phase II](#)

[New Highway Barrier Coming to Fla. | South Florida Business Journal September 20, 2004](#)



## **Benefits**

Increased safety for workers, pedestrians and vehicle operators

Unimpeded view of all oncoming traffic at points of crossing

Reliable load transfer, uncomplicated field installation and simple replacement of damaged parts

Decreased time, labor and costs required for roadway construction

## **Contacts**

### **Karl R. Zawoy**

University of Florida  
Office of Technology Licensing  
(352) 392-8929  
[kzawoy@ufl.edu](mailto:kzawoy@ufl.edu)

### **Jim Mills**

Florida Department of  
Transportation  
Roadway Design Office  
(850) 414-4318  
[Jim.Mills@dot.state.fl.us](mailto:Jim.Mills@dot.state.fl.us)