

BSI Family of Products

Moveable Barriers



QMB for Permanent Applications



QMB for Construction Applications

Crash Cushions



ABSORB 350®



TAU-II®



X-TENUator®

Specialty Barriers



ArmorGuard®



Safe-T-Curve™

Guardrail Attenuators



X-MAS®



X-Tension®

Truck Mounted Attenuators



U-MAD®



U-MAD® Trailer

Specialty Crash Cushions



Raptor®



DR46®



A LINDSAY TRANSPORTATION SOLUTIONS COMPANY

Construction Applications

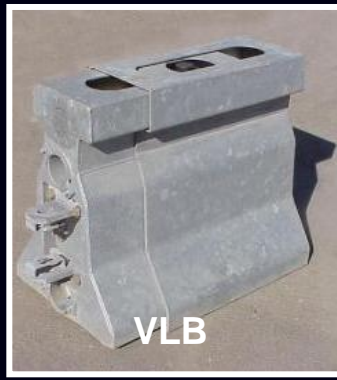


**Partial Road Closure
with Moveable Median**



**Shoulder Work
Inside / Outside**

Moveable Barrier System Components:



- 1m Barriers pinned together to form continuous wall
- Barrier Transfer Machine lifts barriers by modified “T-Top”
- Barriers transferred laterally 4 to 18 ft in one pass
- BTM transfers up to 5 mph
- VLBs = Tapers, curves, & expansion
- ABSORB 350 Crash Cushion protection

“Every Day Counts...”

- **Every Day Counts – FHWA initiative to identify and deploy innovative strategies to shorten project delivery, enhance safety & protect the environment (FHWA Every Day Counts)**
- **FHWA Guidelines on “Work Zone Safety & Mobility (Subpart J) and “Temporary Traffic Control Devices” (Subpart K)**
- **“Congestion should be considered and factored into evaluating the construction of every project”**
- **“It takes an average of 13 years to plan and build the average construction project. We can do better”**

(Victor Mendez, Federal Highway Administrator, Jan. 25, 2011, International Road Federation Key Note Address, Washington DC)

Benefits of Moveable Barrier

- **Reduce Congestion**
 - More lanes remain open during peak periods
- **Accelerate Construction**
 - Open more lanes for construction during non-peak periods
 - Can lead to increased Productivity
- **Increase Safety**
 - positive separation

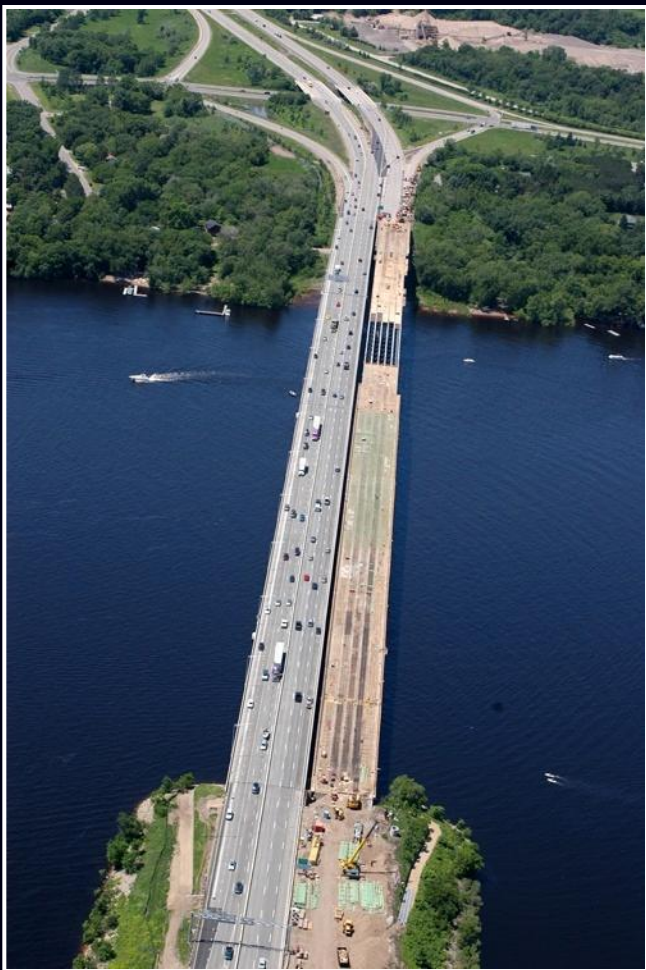
Indiana US-31 over I-465

Bridge Superstructure Replacement



- Original plan, temporary bridge widening (Project Estimate \$6 Million)
 - Utilized Moveable Barrier in 2+1/1+2 pattern (Project Estimate \$4.8 Million)
 - Actual Project Bid \$4,016,316
 - MBW = \$327,640
 - \$1.2 Million savings on Proj. Estimate
 - Provided 2-lanes for peak traffic
 - 2011 Honor Award for Engineering Excellence from the Indiana Chapter of the ACEC
- Stephen J. Christian & Associates*

St. Croix River Bridge Reconstruction Dual Structure



- Completed in one season versus two
- Construction cost savings >\$1M*
- User-delay cost savings >\$1.5M*
- No crossover accidents during construction
- Av speed w/ MB 51 mph; versus 9 mph without MB

* Rush Hour Remedy, Ayres Associates

SR 171 Widening - Salt Lake City, UT

Partial Closure - Arterial



- 2 lanes always open in peak direction using 3 lanes vs. 4
- Project finished 7 months early
- Total benefits of using MB were \$1.7 M - \$2.4 M
- Greater than 10:1 B/C

Evaluation of Movable Barriers in Const WZ's,
Ken Berg, P.E. et al, TY Lin Int'l, 2010

Chicago, IL. So. Lakeshore Drive



- ✓ **Type Project:** Widening
- ✓ **Contractor:** Walsh / Riteway Const. 7-02
- ✓ **Length of Project:** 1 ½ Miles **ADT:** 60,000+
- ✓ **Innovative Strategies:** MTCB enabled the contractor to increase the size of the work space, positively protect workers / motorists and protect the haul lanes.
- ✓ **Results:** Contractor was able to quickly reconfigure traffic lanes and provide extra inbound and outbound lanes to reduce congestion and accelerate project completion

Managed Lanes

optimizing capacity, mobility, positive protection & expediting project completion

Quickchange[®] Moveable Barrier



“Integrated Corridor Management”



.....Optimize the use of available infrastructure by directing travelers to underutilized capacity...



2010 FHWA Public Roads

Maximizing Operational Efficiency Managed Lanes

- Flex op strategies / Redistribute traffic to match demand
- Cost effective way to manage capacity more efficiently



Multi-Functional Managed Lanes: BRT, HOV, HOT, Reversible, Contraflow, Truck Lanes, Special uses

Lane Separation Strategies Flexibility and Safety



SR-91, Orange County, CA



M40, Birmingham UK

Combine flexible lanes with Positive protection using Moveable Barrier



Ben Franklin Bridge, Philadelphia, PA

Moveable Median: Before & After

- Lights, striping & buffer lane



- Recovered use of buffer
- More capacity

- Congestion, Crossover accidents

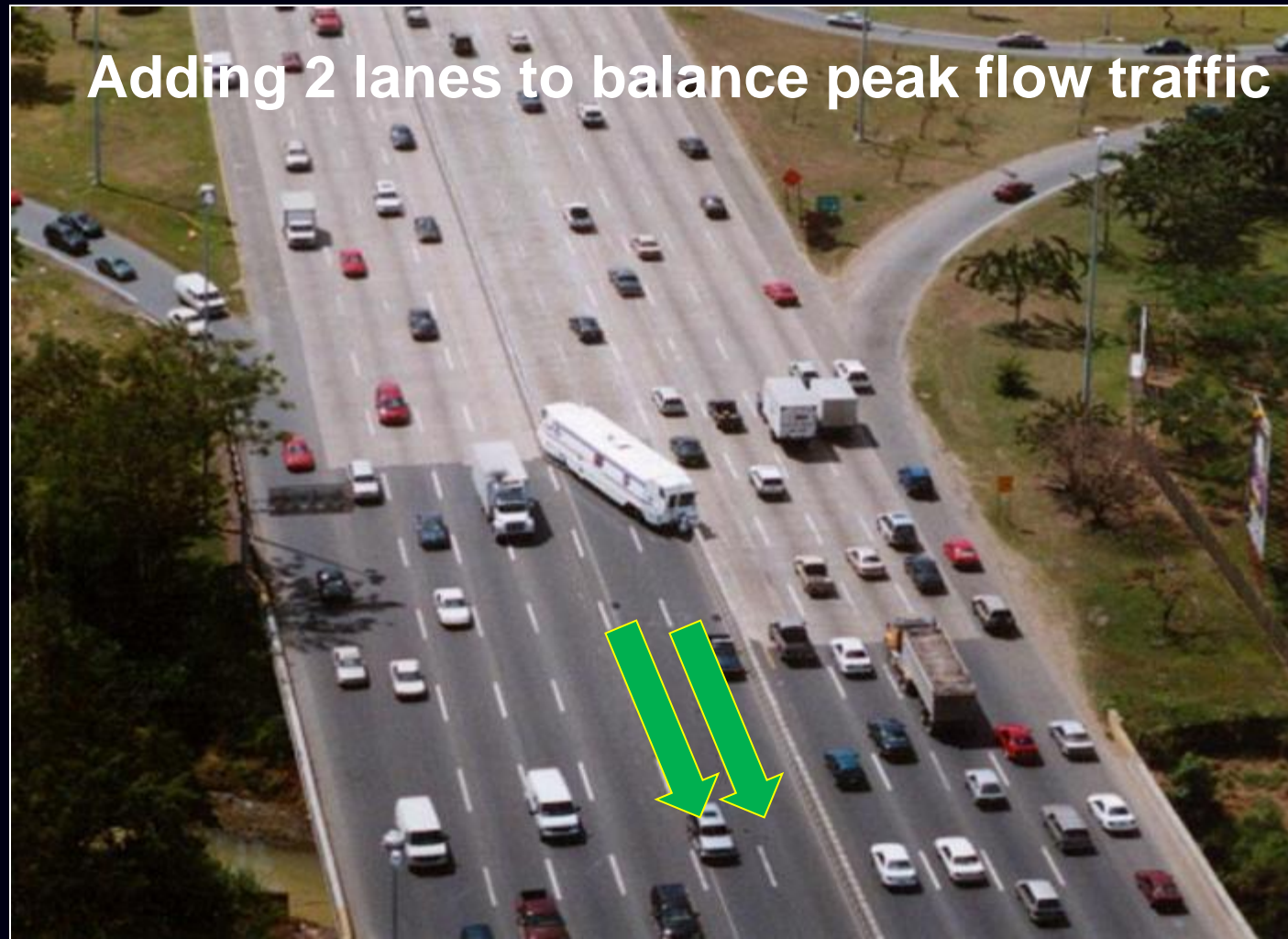


- Head-on collisions eliminated



Source: Delaware River Port Authority

San Juan, Puerto Rico, PR-18 Moveable Median



San Juan PR-18 Two Lane Transfer

San Diego, CA I-15 “Freeway within a Freeway”



Victoria Rd. – Australia

Arterial Application – Bus Rapid Transit



Applications Engineering Services & Support

Design:

- Design Assistance
- Applications Engineering
- Design / Phasing Reviews

Operational Support:

- Training
- Maintenance
- Tech Rep Site Support
- 24 / 7 Trouble Shooting

Questions?



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