



Cable Barrier – A High Tension Transformation: The Utah Experience

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The Past

Roadside Design Guide (3 strand cable)

- Cable barrier works (NCHRP-350 TL-3)
- Redirects by developing tension
- Long sections need repair after impact
- Non-functional until repaired

Today

- Still meets NCHRP-350 TL-3 (inc. anchors)
- Cable pre-stretched and pre-tensioned
- Limited repair needed
- Remains functional after hits

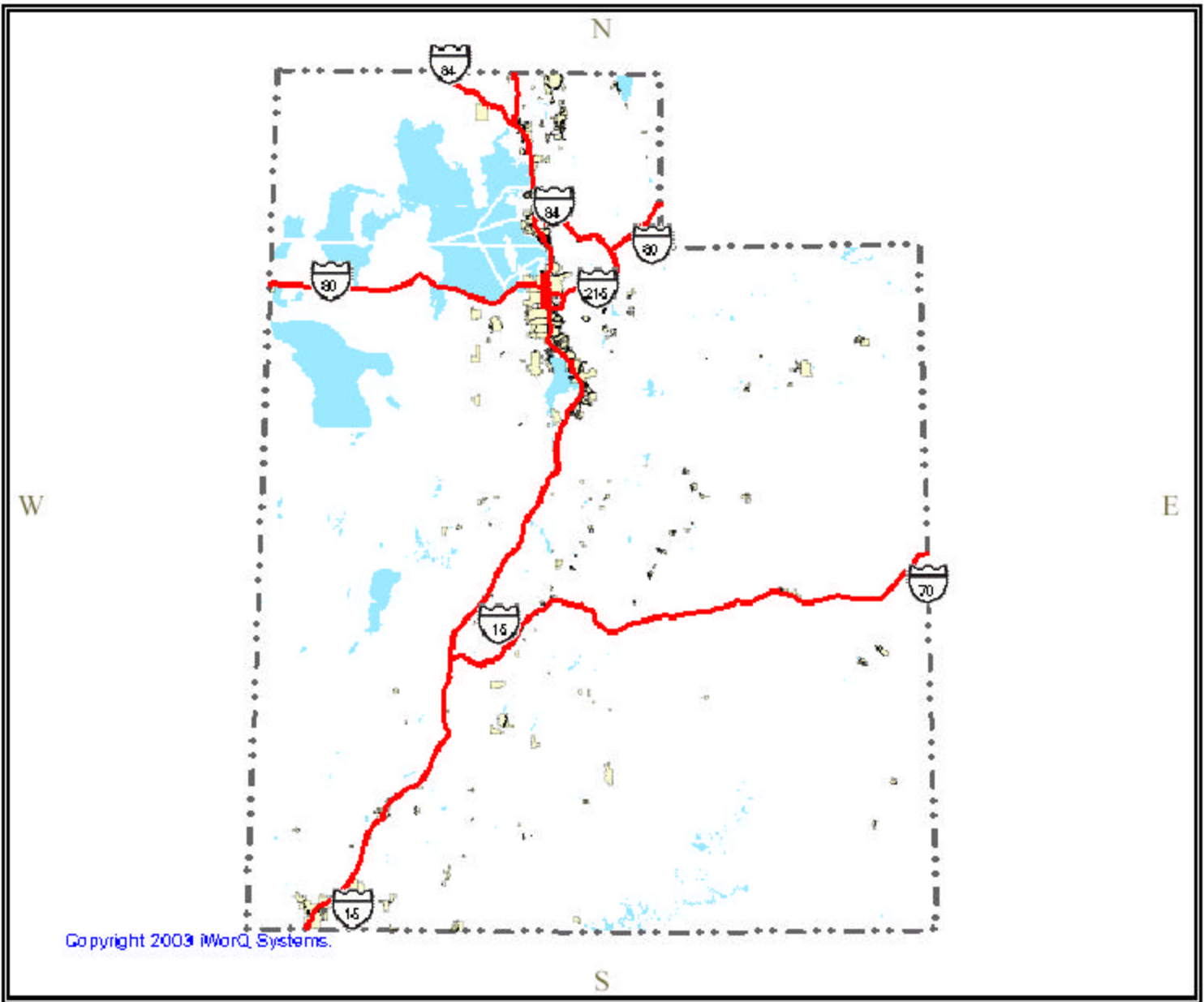
Tensioned Cable Barrier Installations

- I-15, Lehi (Briefen; 2 miles; 2003)
- I-15, Provo/Orem (CASS; 8 miles; 2003)
- I-15, American Fork (CASS; 8 miles; 2004)
- I-15, Springville (CASS; 3 Miles; 2004)

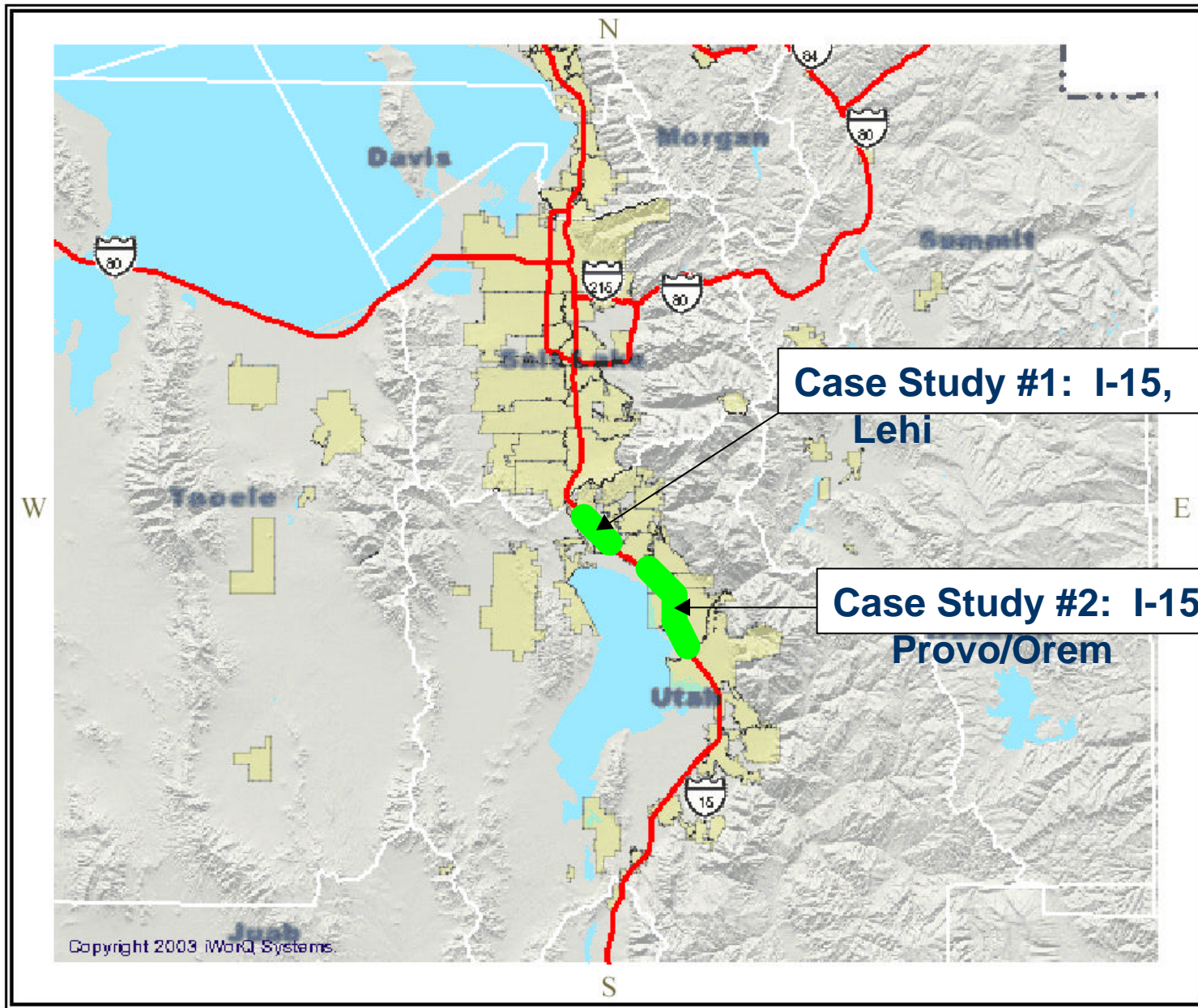
Total = 21 miles

Case Studies:

- I-15, Lehi (Briefen; 2 miles; 2003)
- I-15, Provo/Orem (CASS; 8 miles; 2003)



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**Case Study #1: I-15,
Lehi**

**Case Study #2: I-15,
Provo/Orem**

Case Study #1: I-15, Lehi (Briefen; 2 mi; 2003)



Case Study #1: Prior Conditions

- AADT = 110,000
- 3 Lanes each direction
- Median width = 36 feet
- Side slopes = 1:6

Case Study #1: Installation



Case Study #1: Installation



Case Study #1: Briefen Crash Experience

- Approximately 18 months of data
- 11 Documented hits
- 1 Serious injury involving the median
- 3 penetrations of cable barrier (2 under, 1 over)

Lessons Learned

- Median should have a compacted surface
- Cable should be offset from water flow to facilitate winter maintenance and avoid erosion around foundations
- Concrete foundations should be flush with ground to avoid vehicle contact
- 1:6 is the steepest desirable slope

Case Study #1: Modified Median



Case Study #2: I-15, Provo/Orem (CASS; 8 mi; 2003)



Case Study #2: Prior Conditions

- AADT = 120,000
- 3 Lanes in each direction
- Median width = 36 feet
- Side slopes between 1:4 and 1:5

Case Study #2: Prior Conditions

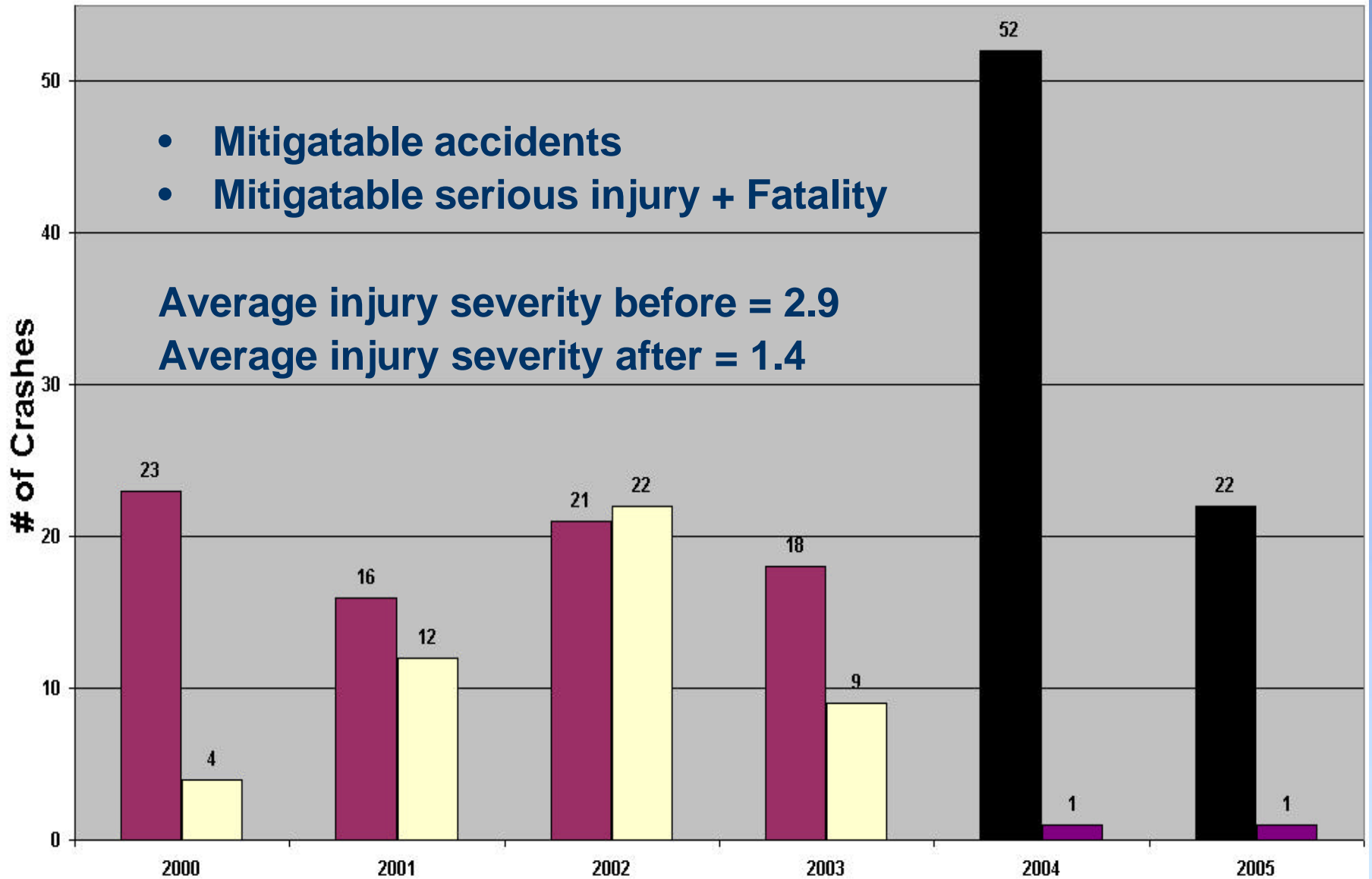


Case Study #2: CASS Crash Experience

- Approximately 16 months of data
- 74 documented hits (~4 unreported / month)
- 2 Serious injury (both had other contact prior to entering median)
- 32 crashes at speeds of 50 to 80 mph (likely crossovers)
- Three penetration incidents

- Mitigatable accidents
- Mitigatable serious injury + Fatality

Average injury severity before = 2.9
Average injury severity after = 1.4



Lessons Learned

- System can sustain hits and remain effective
- Ave. repair is 4-5 posts and takes 30 to 60 minutes
- # incidents increased, but severity was cut in half
- Offsetting the barrier 6' to one side appears to have increased the number of hits from that side (43/71 = 61% NB)

Some Examples

“The cables saved my life!”







DIAGRAM WHAT HAPPENED BELOW.

Reason For No Diagram _____

- 1 Officer not at scene
- 2 Vehicles moved
- 3 Other _____

7/15 Crash

CASE

ESTIMATED TRAVEL SPEED

80

-

ESTIMATED IMPACT SPEED

80

-

POSTED SPEED

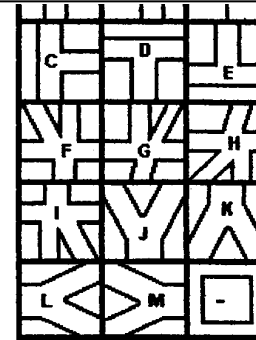
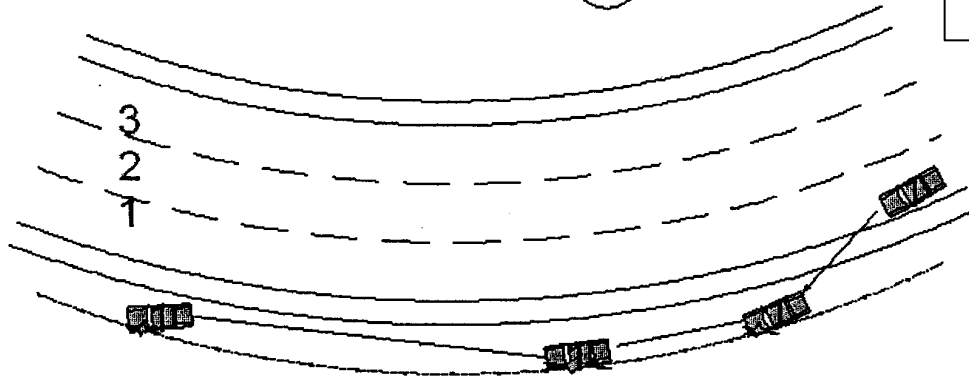
65

-

ADVISORY SPEED

-

-



INDICATE INTERSECTION TYPE

DESCRIBE WHAT HAPPENED
(Refer to Vehicle by Number)

Vehicle #1 was northbound I-15 in the #1 lane. Vehicle #1 drove left of and hit the crash attenuator. Vehicle #1 came to rest facing northwest.

DAMAGE TO PROPERTY
OTHER THAN VEHICLES

"23 cable posts", "3 deliniator posts"

Name and address of
owner of object struck

State Of Utah, (not specified)

WITNESSES

7/15 Crash



7/15 Crash



7/15 Crash



I-15 Four Car Impact (4/18/04)

**4 separate
hits in one
event during
hail storm**



I-15 Four Car Impact (4/18/04)

**1st
Impact:
10 posts**



I-15 Four Car Impact (4/18/04)



I-15 Four Car Impact (4/18/04)



I-15 Four Car Impact (4/18/04)

2nd
Impact:
4 posts



I-15 Four Car Impact (4/18/04)



I-15 Four Car Impact (4/18/04)

**3rd
Impact:
2 posts**



I-15 Four Car Impact (4/18/04)

4th
Impact:
1 post



I-15 Four Car Impact (4/18/04)

Looking
back
upstream



Some Details





UDOT Publications

- Standard Specification for Barrier System
- Standard Drawings for Design and Construction
- Research Publication on Lessons Learned

The perfect solution!

Well . . . almost.























The Media

So far so good.

Press coverage has been positive

deseretnews.com

Deseret Morning News, Monday, April 12, 2004

Cable splits I-15 — to save lives

By [Laura Warner](#)

Deseret Morning News

PROVO — Utah County drivers are watching cable as they drive down I-15.

No, they're not turning on their television sets, but what they are seeing is causing as many rumors as an episode of reality TV.

"I've heard that those wire dividers are supposed to kill drivers before they can kill someone else," said Lindon resident Lynn Stapley.

"It looks like they're supposed to ruin a car's engine before it can get any farther," Lehi driver Ben Lunford proffered.

According to Geoffrey Dupaix, Region 3 spokesman for the Utah Department of Transportation, the tension cable barrier that is being added to the center median along portions of I-15 in Utah County is doing exactly what it is supposed to do — save lives.

"The intent is to prevent or eliminate crossovers," Dupaix said. "It may not reduce the number of accidents in the same direction, but if we are able to eliminate that crossover, then it is definitely worth its being installed."

According to UDOT, crossover accidents on I-15 between American Fork and Provo took the lives of 16 people from 2000 to 2002.

While that number is a small fraction of total freeway accidents, it represents nearly all crossover accidents that took place during that time frame.



Tension cable barrier is being added to the center median along portions of I-15 in Utah County. Its purpose is to prevent crossover accidents, which are frequently deadly.

Scott G. Winterton, Deseret Morning News

Press coverage has been positive

deseretnews.com

Deseret Morning News, Tuesday, September 28, 2004

New barriers a safety boon

By [Zack Van Eyck](#)

Deseret Morning News

WEST VALLEY CITY — When you drive past them, they don't exactly make you feel secure.

Not like concrete barriers would.

But the new cable barriers now used to separate northbound and southbound traffic on two Utah freeways have proven to be more effective than concrete at preventing wayward cars from crossing into the oncoming lanes.

And that should make all motorists feel more secure.

Safety engineers and administrators at the Utah Department of Transportation have been impressed by the performance of the cable barriers, installed on I-215 near the E Center and at two locations on I-15 in Utah County.

As a result of the pilot program's success, UDOT plans to add more cable barriers on Utah interstates and highways to help prevent traffic fatalities and injuries.

Utah motorists simply will have to get used to the fact that the cable barriers — a grouping of three cables held aloft by small posts and looking only slightly stronger than the electric fences used to contain cattle — are more effective than they appear.



Freeway cable barrier on I-215 near the E-Center is made of three high-tension cables that may save lives.

Scott G. Winterton, Deseret Morning News

"I've heard that those wire dividers are supposed to kill drivers before they can kill someone else," said Lindon resident Lynn Stapley.

"It looks like they're supposed to ruin a car's engine before it can get any farther," Lehi driver Ben Lunford proffered.

...Although additional public education is needed



Before



After

