

STATE OF COLORADO

DEPARTMENT OF TRANSPORTATION

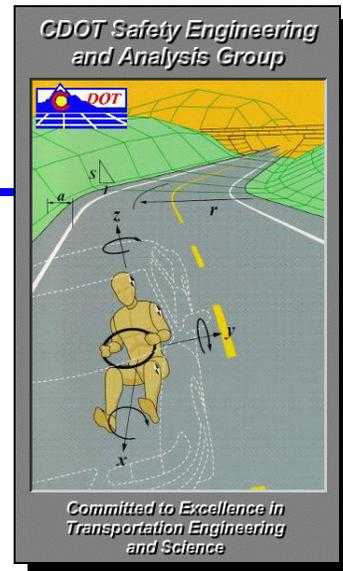
HQ Safety and Traffic Engineering Branch
Safety Engineering and Analysis Group
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DATE: March 3, 2008

TO: Mike Perez, R-2 Hwy 50 Corridor Project Manager

FROM: Bryan K. Allery, HQ Safety and Traffic Engineering

SUBJECT: **Abbreviated Safety Assessment Report:
SH 50B: MP 386.00 - 397.00, Las Animas West**



Attached for your review is a copy of the Abbreviated Safety Assessment Report for the above referenced location. The observations and recommendations in this report are based on the analysis of five years of accident history and review of video log. The Region is advised to verify through field survey, the observations made in this report regarding physical features, roadside characteristics and traffic control devices in the study area.

If you have any comments on the content or format of this report, please provide them to us by April 4th. If we do not hear from you by this date, we will assume that the report has met with your approval.

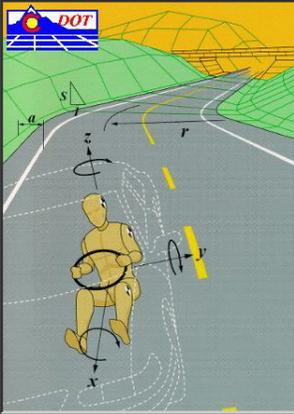
Should any questions arise concerning this report, or if further assistance is needed, please do not hesitate to contact me at (303) 757-9967 or Ron Nelson at (303) 512-5101.

attachment

c: Karen Rowe, Region 2 Resident Engineer, Pueblo
Paul Westhoff, Region 2 Resident Engineer, Lamar
Sasan Delshad, Region 2 Traffic & Safety Engineer
Ajin Hu, Region 2 Traffic Engineer
Terry Shippy, Region 2 Traffic Engineer
Keith Flowerdew, Region 2 Maintenance Supt. (memo only)

File

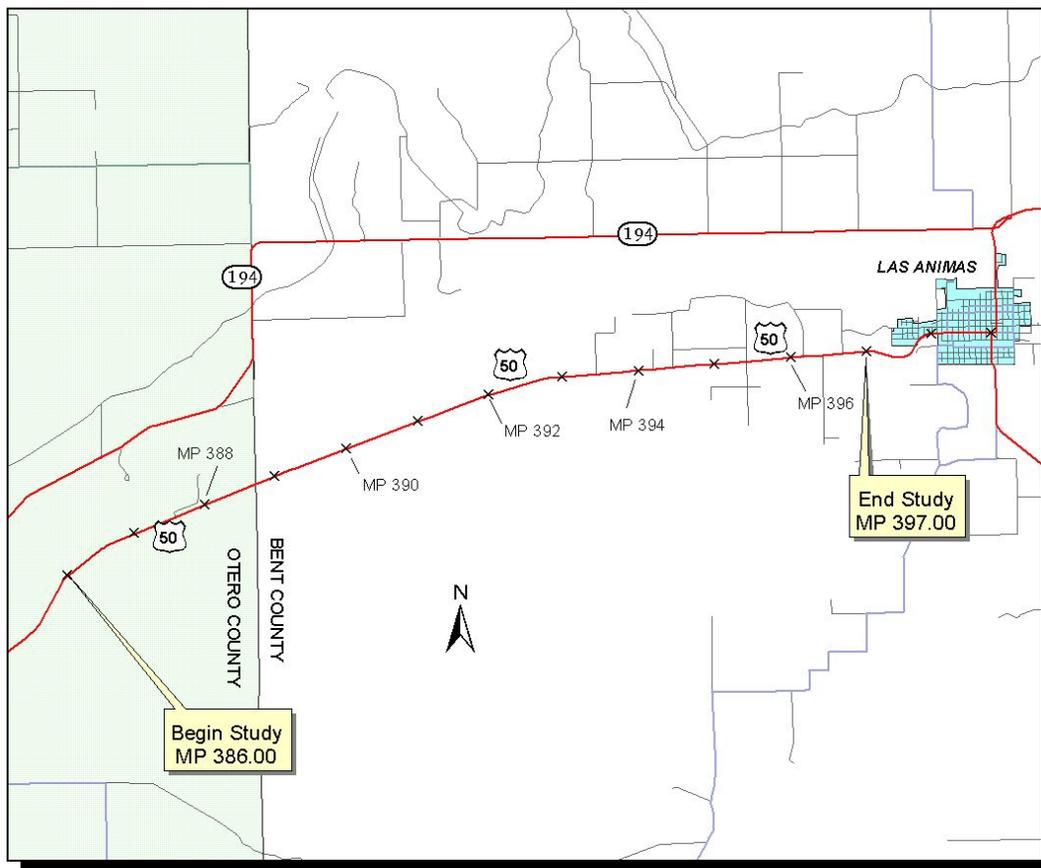
CDOT Safety Engineering
and Analysis Group



Committed to Excellence in
Transportation Engineering
and Science

Abbreviated Safety Assessment Report

SH 50B: MP 386.00 - MP 397.00
March 2008



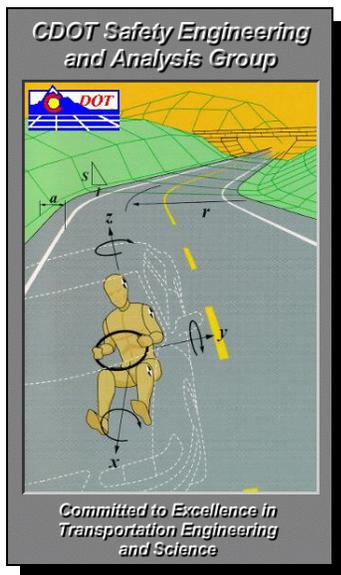
Prepared by: **The Colorado Department of Transportation**
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Safety Engineering and Analysis Group
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Written Authority from the CDOT Safety Engineering and Analysis Group*

This report is prepared solely for the purpose of identifying, evaluating and planning safety improvements on public roads. It is subject to the provisions of 23 U.S.C.A. 409, and therefore is not subject to discovery and is excluded from evidence. Applicable provisions of 23 U.S.C.A. 409 are cited below:

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 152 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists or data.

Any intentional or inadvertent release of this report, or any data derived from its use shall not constitute a waiver of privilege pursuant to 23 U.S.C.A. 409.



A Statement of Philosophy

The efficient and responsible investment of resources in addressing safety problems is a difficult task. Since crashes occur on all highways in use, it is inappropriate to say of any highway that it is safe. However, it is correct to say that highways can be built to be safer or less safe. Road safety is a matter of degree. When making decisions effecting road safety it is critical to understand that expenditure of limited available funds on improvements in places where it prevents few injuries and saves few lives can mean that injuries will occur and lives will be lost by not spending them in places where more accidents could have been prevented¹. It is CDOT's objective to maximize accident reduction within the limitations of available budgets by making road safety improvements at locations where it does the most good or prevents the most accidents.

Introduction

This abbreviated, corridor safety assessment report was prepared to review and summarize recent traffic accident history on State Highway (SH) 50B along a portion of the segment between La Junta and Las Animas in Otero and Bent Counties. The study examines the 2-lane roadway section, extending from milepost (MP) 386.00 to MP 397.00 for opportunities to implement safety improvements at spot locations.

This report is based on the comprehensive analysis of five years of accident history and video log review. The Region is advised to verify through field survey, the information included in this report regarding physical features and roadside characteristics in the study area.

Existing Conditions

State Highway 50 is classified as a federal aid, primary, rural principal arterial within the 11 mile-long study segment. It traverses flat to rolling terrain on an east-west alignment. The posted speed limit is 65 mph over the large majority of the study segment. This corridor is characterized by occasional county road intersections and driveways. The 2004 average daily traffic (ADT) was estimated at 6,300 vehicles per day. About 12% of this volume is estimated to be trucks.

Accident History

The accident history for the period of September 1, 2001 through August 31, 2006 was examined between MP 386.00 and MP 397.00 to locate accident clusters and identify accident causes. During this period, 39 crashes were reported. Included were 2 fatal (FAT) crashes, 10 injury (INJ) producing accidents and 27 property damage only (PDO) crashes.

¹ Hauer, E., (1999) *Safety Review of Highway 407: Confronting Two Myths*. TRB

Table 1 summarizes the annual accident rates and weighted hazard indices (WHI) for the study segment of SH 50 and provides a comparison to the 2004 statewide average rates for similar highways.

Table 1

PERIOD (Sept 1 - Aug 31)	Weighted Hazard Index (WHI)	ACCIDENT RATES*			
		PDO (Property Damage Only)	Injury	Fatal	Total
2001-2002	-2.98	0.33	0.17	0.00	0.50
2002-2003	-2.61	0.22	0.22	0.00	0.44
2003-2004	-2.48	0.43	0.04	3.93	0.51
2004-2005	-2.78	0.09	0.04	4.36	0.17
2005-2006	-3.22	0.17	0.04	0.00	0.21
SH 50 Average	-2.81	0.25	0.10	1.66	0.37
2004 Statewide Crash Rates for Rural, Principal Arterials		0.97	0.34	2.07	1.33

* PDO and INJ Rates are reported in accidents per million vehicle-miles of travel.
FAT Rates are reported in accidents per 100 million vehicle-miles of travel.

Table 1 indicates that this segment of Hwy 50 exhibits annual and 5-year average crash rates that are consistently well below (better than) the statewide averages for other similar rural, principal arterial facilities. The negative average WHI also confirms this status.

Figure 1 presents a breakdown of the accident type detected along this highway. Running off the road and colliding with various fixed objects was the most frequently occurring type, accounting for 14 accidents or 35% of the total. Among the fixed objects struck, delineator posts and roadside fencing were most common. Collisions with deer or other wild animals were next in frequency of occurrence, accounting for an additional 5 of the 39 total accidents. Various other crash types were identified, all of which were reported at frequencies of 3 or less during the 5 year study period.

Figure 1

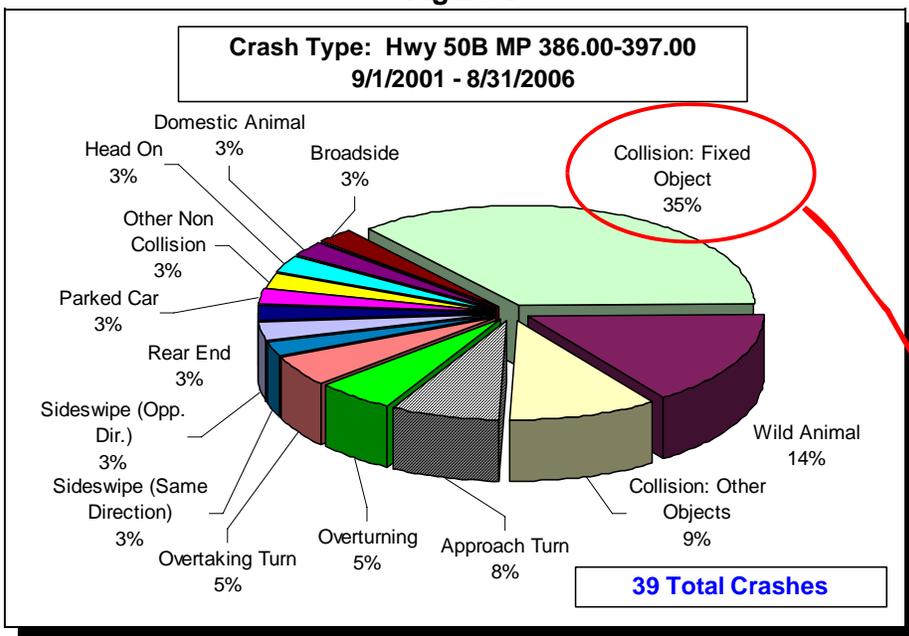
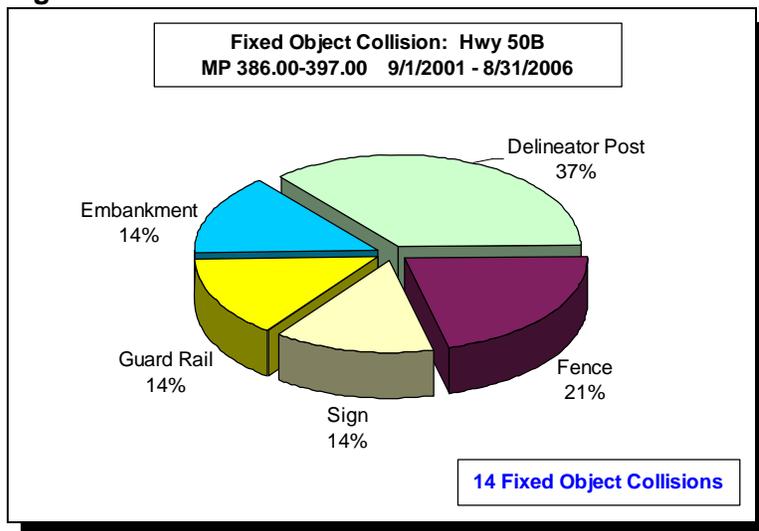


Figure 1a



Crash severity is shown in **Figure 2**. The 27 property damage collisions accounted for 69% of the total while just over 25% (10) of the total were injury accidents. There were two fatal accidents along the corridor. A 2004 fatal crash involved an eastbound vehicle whose driver was ejected after falling asleep, losing control and overturning. Alcohol may have been involved. The second fatal crash occurred in 2005 when a westbound driver fell asleep, drifted into the eastbound lane, colliding head on with a semi truck.

Figure 2

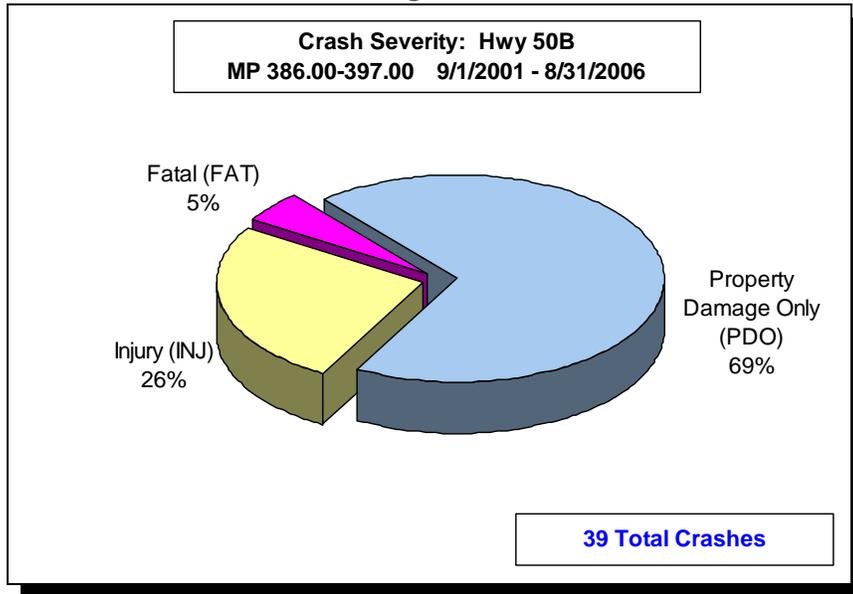


Figure 3 presents the accident distribution by location. Within this highway segment, drivers who run off the road appear to exhibit a tendency to run off on the shoulder side of the road as indicated by the higher fraction of off right incidences.

Figure 3

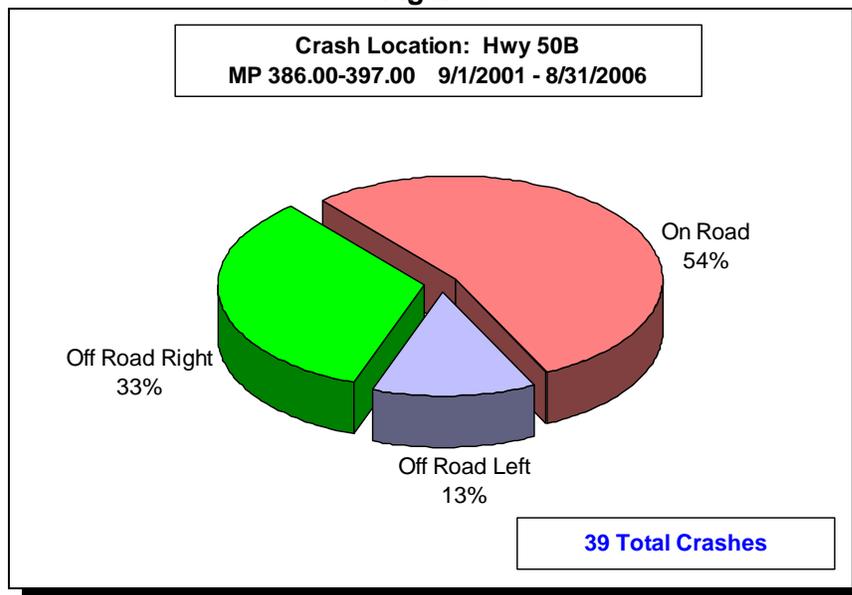


Figure 4 shows the travel direction of the at-fault vehicle (vehicle 1). During this study period, eastbound vehicles were involved in nearly twice as many accidents as those in the westbound lanes. This may be due in large part, to the directional volume difference as the eastbound lanes carry, on average, 10% - 20% more traffic.

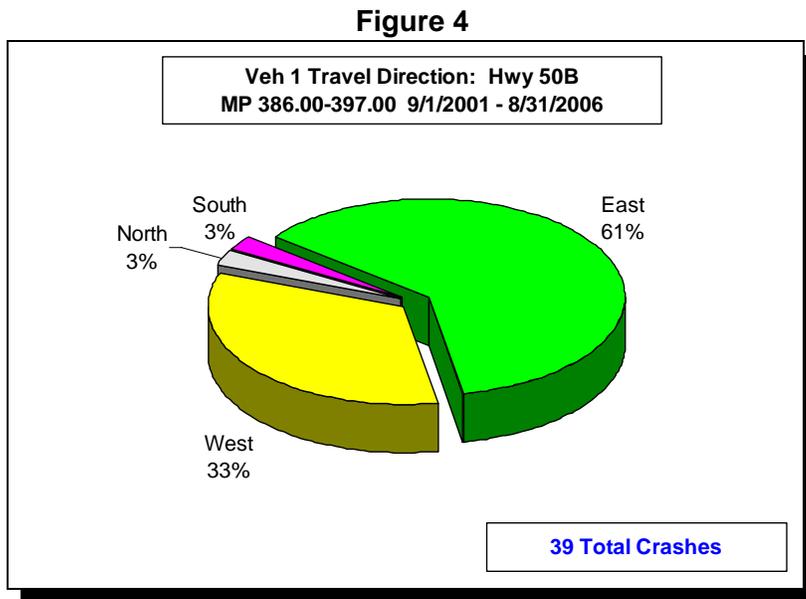
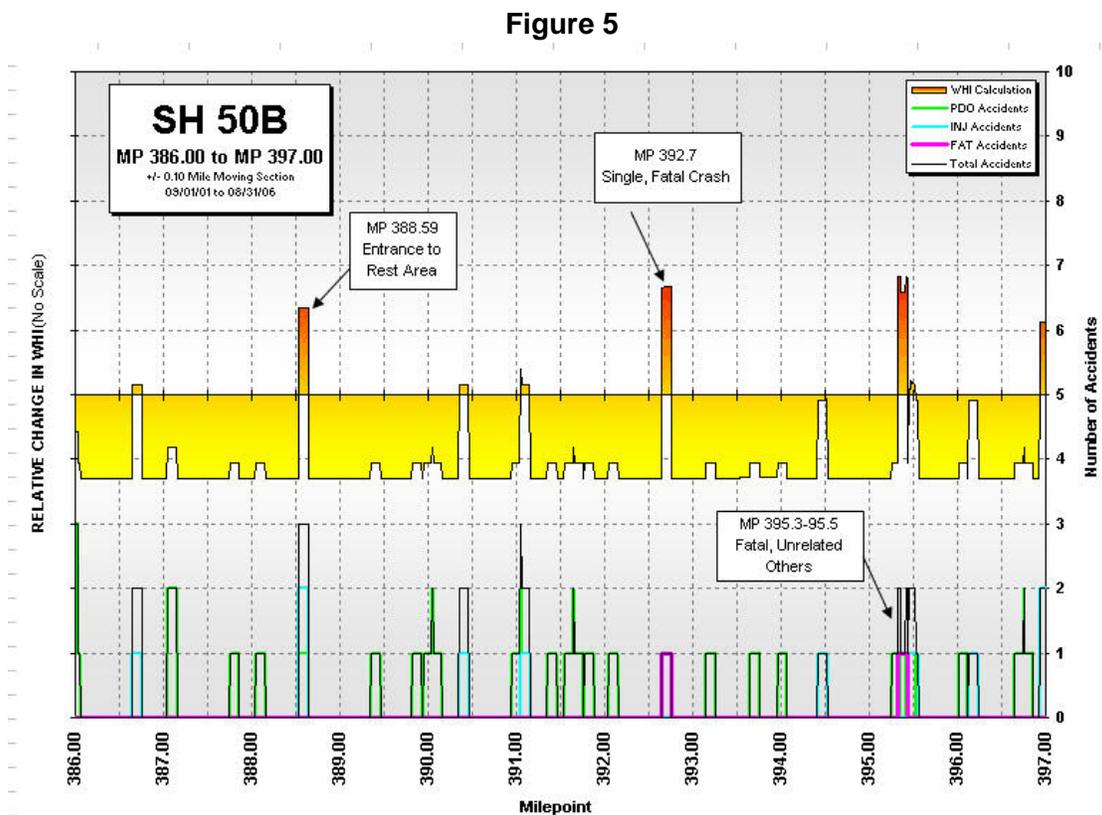


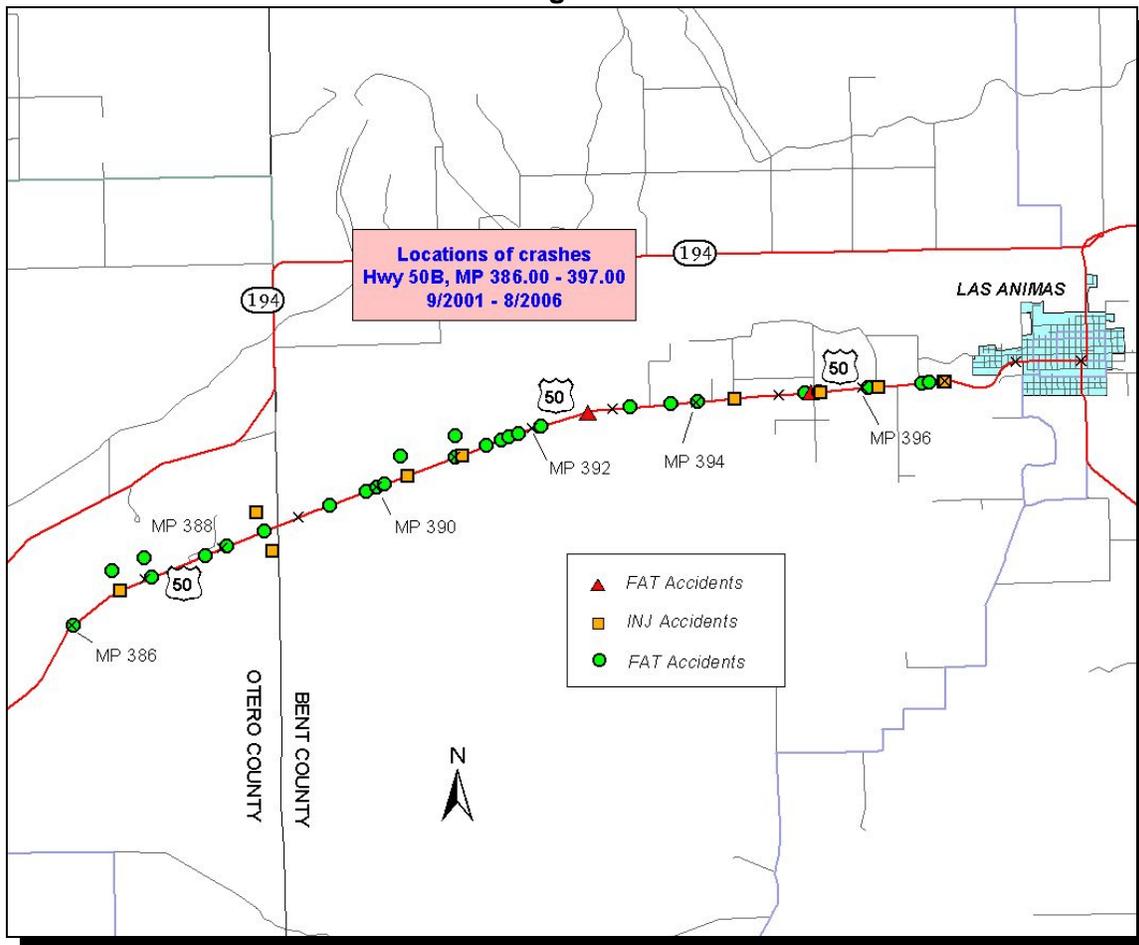
Figure 5 shows the location of accidents and the change in weighted hazard index (WHI) along the study segment.



The WHI graph of **Figure 5** does not indicate that there are locations with severe or unusual accident concentrations. The minor spikes shown at MPs 388.59, 392.7 and 395.4 correspond to locations with 3 crashes (2 injury, 1 PDO), a single fatal crash and a fatal crash with adjacent PDO and injury collisions respectively.

A map depiction of accident location and severity is shown below. Again, the 39 crashes appear to be distributed in a generally uniform pattern throughout the corridor.

Figure 6



Safety Performance Function Analysis

We have refined the assessment of the magnitude of safety problems on highway segments through the use of Safety Performance Functions (SPF). The SPF reflects the complex relationship between traffic exposure, measured in ADT, and accident count for a unit of road section, measured in accidents per mile per year. The SPF models provide an estimate of the normal or expected accident frequency and severity for a range of ADT among similar facilities. Two kinds of Safety Performance Functions were calibrated. The first one addresses the total number of accidents and the second one looks only at accidents involving an injury or fatality. It allows us to assess the magnitude of the safety problem from the frequency and severity standpoint.

Development of the SPF lends itself well to the conceptual formulation of the Level of Service of Safety (LOSS). The concept of level of service uses qualitative measures that characterize safety of a roadway segment in reference to its expected performance and severity. If the level of safety predicted by the SPF will represent a normal or expected number of accidents at a specific level of ADT, then the degree of deviation from the norm can be stratified to represent specific levels of safety.

- LOSS-I - Indicates low potential for accident reduction
- LOSS-II- Indicates better than expected safety performance
- LOSS-III - Indicates less than expected safety performance
- LOSS-IV - Indicates high potential for accident reduction

LOSS reflects how the roadway segment is performing in regard to its expected accident frequency and severity at a specific level of ADT. It only provides an accident frequency and severity comparison with the expected norm.

The study segment of Hwy 50 was partitioned into 4 sub-sections of either 2 or 3 miles each and the non-intersection crash history of each was plotted on the following SPF models for analysis. In **Figure 7**, the SPF for total accidents is shown. Accident data for all four of the sub-segments (note: two of the points are over-lain) falls in the LOSS II envelope, suggesting better than expected safety performance. In this case, accidents are occurring less frequently (on a per mile, per year basis) than on similar highway types throughout the state.

Figure 7

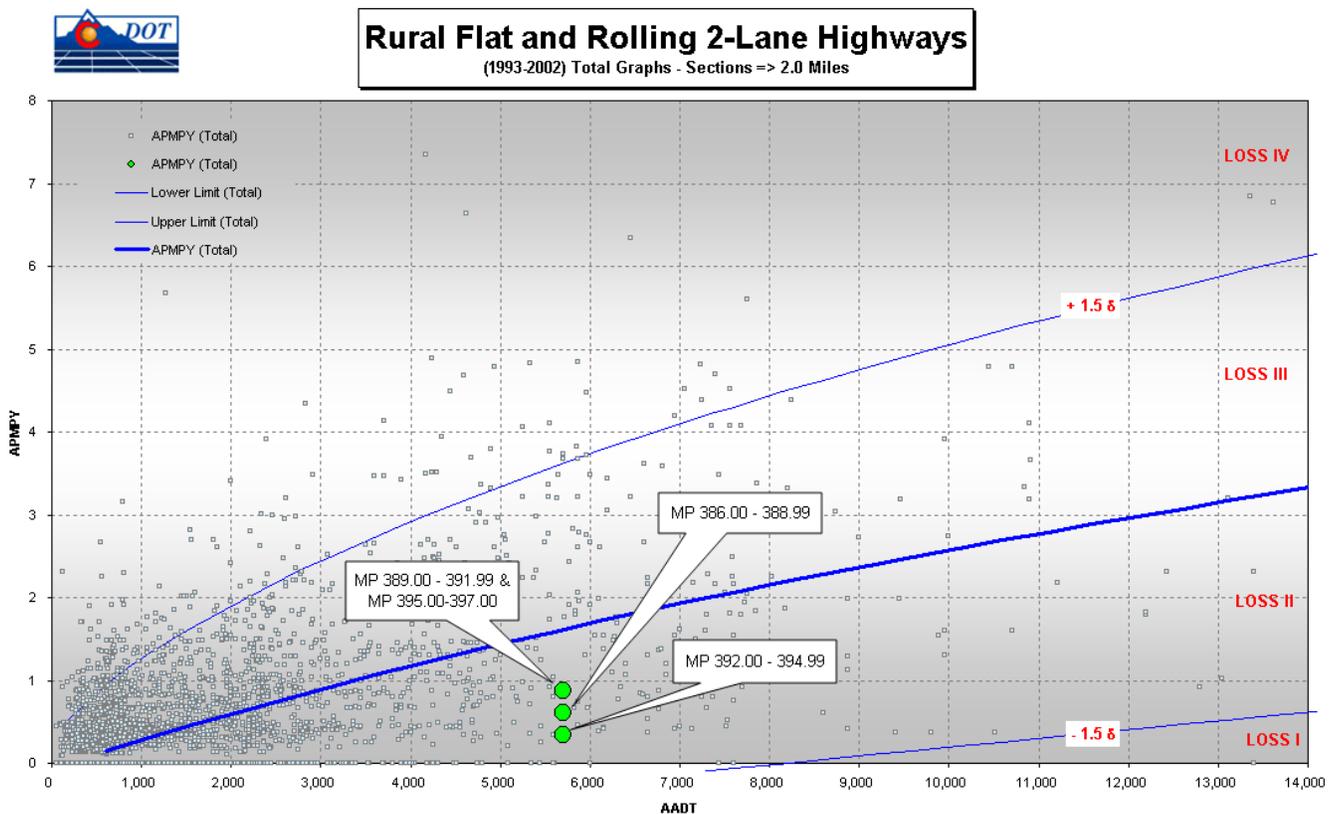
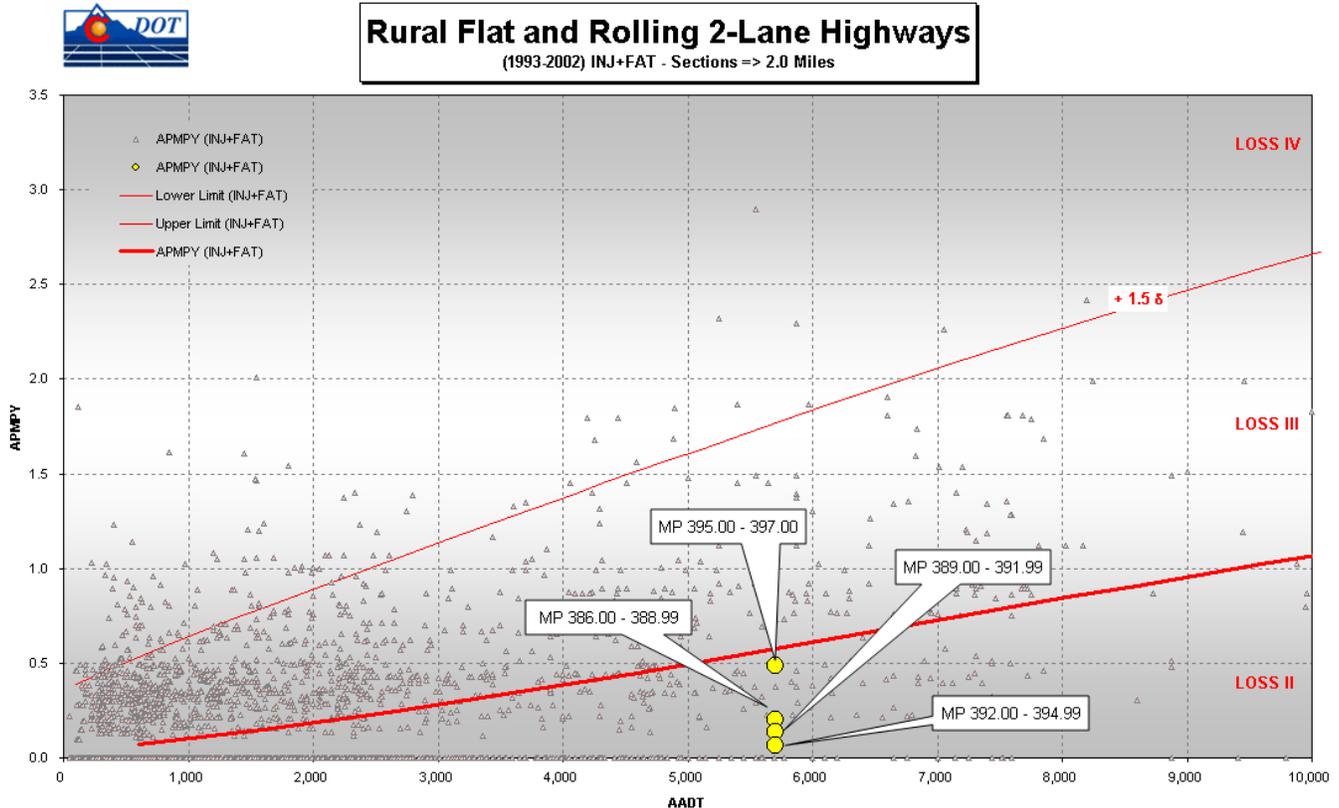


Figure 8 shows the SPF analysis for the injury and fatal accidents only. As with the total crash analysis above, all four sections are performing at a LOSS II level (better than expected), with a severe crash frequency less than the statewide average among similar highway types.

Figure 8



Pattern Recognition Analysis

Although the Safety Performance Function analysis suggests that the overall crash frequency along this segment of Hwy 50 is lower than expected among similar highway types, a supplementary diagnostic analysis of accident characteristics can identify specific accident patterns that may offer an opportunity for mitigation efforts.

Pattern recognition analysis indicates that accidents involving drowsy drivers or those asleep at the wheel were over-represented during the study period. At least 8 of the 39 total crashes or 20% involved drivers falling asleep. Three crashes of this type occurred between MP 388.1 and 389.4. Fortunately, none involved injuries. Two, however, did involve crossing the opposing direction lane. An additional two related crashes occurred at MP 396.98 & 396.99. Both of these resulted in injuries and involved vehicles running off the road to the right. Shoulder rumble strips are a safety improvement option that can help reduce the incidence of this type of crash and should be considered for this location unless local guidelines resist this type of enhancement. The larger-scale option of adding lanes to accommodate increasing traffic volume in concert with median separation is the most reliable countermeasure for reducing the potential for severe cross-over type crashes associated with fatigued drivers.

Collisions with various, non-fixed objects were marginally over-represented along the study segment. Three accidents of this type are noted between MP 390.0 and 391.1. These collisions involved vehicles hitting debris on the roadway or items falling off of preceding vehicles. The random nature of these accidents do not suggest safety improvement countermeasures.

Minor patterns of run-off-road related crashes are noted between MPs 386.5 and 388.5. These included various fixed object accident types such as collisions with delineator posts, fences, signs, embankments, etc. Again, drivers falling asleep and drivers losing control during snow-packed or icy road conditions appear to be the two primary contributing factors involved in these accidents. The incidence of drivers losing control during adverse road conditions, in itself however, does not appear to be over-represented and has, in recent years, declined. Winter road maintenance, therefore, appears to be improving and at a commendable level on this rural highway segment. The previously mentioned shoulder rumble strip safety improvement option is expected to moderate the frequency of these fixed object crashes as well.

Additional Observations

Opposing direction collisions such as head-ons and opposite direction sideswipes were not common on this 2-lane, undivided segment of Hwy 50. Only one of each type was noted during the 5-year accident history period. Passing-related accidents were comparatively infrequent as well, with only two reported. Review of accidents over an extended crash history period indicates that these severe crashes have been relatively rare. For example, during a 20 year period, only 3 head-on's and 9 opposite direction sideswipe crashes were reported. In general, crashes of this type were uniformly distributed over the length of the study segment, without clusters or areas of concentration. As noted previously, a significant reduction in these severe crashes is a beneficial by-product of constructing additional lanes and median separation to improve mobility.

Although accidents involving deer or other game/wild animals were the second most common crash type, these were not statistically over-represented in frequency of occurrence. Two locations did appear to display modest concentrations of this type of accident: MP 388.8 - 389.1 and MP 391.4 - 392.1. Neither location satisfies the typical warning sign recommendation of 5 accidents per mile per year, however.

Several direct access driveways, field entrances and county road intersections are noted along this section of Hwy 50. Based on an extended crash history period, only two locations reported multiple accidents: The east entrance to the rest area at MP 388.76 and the County Rd. 7.5 intersection at MP 395.47. Neither location, however, exhibited over-represented accident frequency. At one or two other driveways, solitary overtaking turn-type accidents occurred as following vehicles attempted to pass preceding vehicles that were slowing to make a left turn.

For the rest area entrance, consideration may be given to installing a side road ahead warning sign (W2-2R) behind the guardrail on the south side of the highway near MP 388.7 for the eastbound lane to help alert eastbound drivers of the potential for westbound to southbound left-turning vehicles ahead. Additionally, consideration may be given to enlarging the Rest Area guide signs at MPs 388.25 for the EB lane and 388.89 for the WB lane.

At the CR 7.5 intersection, implementation of a short no-passing zone around this intersection may be considered to marginally reduce the potential of overtaking turn crashes.

The extended crash history period also indicated small concentrations of off-road crashes (off left as well as off right) associated with two very minor curves located approximately at: MP 389.00-389.40 and 391.8-392.1. Consideration may be given to installing centerline rumble strips just

through these short curves to alert drivers if they deviate to the left out of their driving lane. Five older overturn crashes were noted at the curve at MP 391.8-392.1. These were all related to excessive speed during icy road conditions. Consideration may also be given to installing seasonal icy road signs (W8-50) at this location. Similarly, reducing the delineator post spacing (adding delineator posts) through both curves may help drivers maintain a proper path during nighttime, or when any adverse lighting conditions exist.

A minor cluster of crashes is noted approaching Las Animas between MP 396.70 and 397.00. Some of these crashes involved running off-the-road to the right as well as fatigued drivers or impaired driving. Again, shoulder rumble strips may be the most cost-effective crash countermeasure to reduce the typical crash occurring at this location.

Older runoff-type crashes are noted at the west end of the project from MP 386.00 -386.20. Several of these accidents involved alcohol. Here again, enhanced delineation, in concert with shoulder rumble strips, can help reduce the incidence of run off road crashes.

Based on videolog review, many of the intersections are already improved with acceleration and deceleration lanes. This has undoubtedly contributed to the relatively low incidence of accidents, in particular, sideswipe and rear-end collisions. Operational aspects and mobility in general have also benefitted. The Region has also improved safety and operations along this corridor by employing widened paved shoulders. In addition to providing a better opportunity for recovery after minor run offs, the widened shoulders offer safer winter maintenance aspects and emergency pull off space.

During future resurfacing projects, consideration may be given to further enhancing the roadway's safety by finishing the pavement edge with a low-angle (30°), sloped profile. This "Safety Edge" is an FHWA recommended technique that eliminates vertical edge drops which occasionally accompany resurfaced or reconstructed roadways. This safer pavement edge can help errant drivers more smoothly and safely drive back onto the road surface after having accidentally driven off, even if the gravel shoulder material has eroded away from the pavement edge. The "Safety Edge" can be formed during construction by using angled or wedge-shaped devices mounted on the screed of paving machinery. These devices can provide a gentle, compacted, angled face to the pavement edge without significant additional construction cost. Further information on this paving option is provided in the appendix.

The Region has taken good advantage of the relatively open, flat terrain by providing stable shoulders, generally unobstructed clear zones and gentle, traversable sideslopes. The few existing culvert crossings were not crash factors during the study period. Should the roadside be impacted as a result of construction, any culvert ends or associated headwalls should be made traversable or extended beyond the clear zone.

CONCLUSIONS AND RECOMMENDATIONS

SH 50B, east of Las Animas: MP 386.00 - 397.00

These conclusions and recommendations are based on the analysis of five years of accident history and review of video log. The Region is advised to verify through field survey, the observations made in this report regarding physical features, roadside characteristics and traffic control devices.

Based on Safety Performance Function analysis, the segment of Highway 50 from MP 386.00 to 397.00 exhibits crash frequency and severity that is lower (better) than expected among similar highway types throughout the state. This safety performance in the LOSS II regime is also supported by lower than average observed accident rates and a weighted hazard index of -2.8 during the 5-year study period.

In this area of Hwy 50, accidents in general, appear to be broadly distributed over the length of the study section. Collisions with various fixed objects such as delineator posts, fences and guardrail were the most common crash type. This is indicative of drivers losing control and running off the road.

Eastbound drivers were involved in 60% of the accidents. This may reflect a directional volume imbalance which shows the eastbound lane carrying 10%-20% more traffic.

Pattern recognition analysis reveals that crashes involving drivers asleep at the wheel are over-represented in number. Approximately 20% of the crash total may have included this as a contributing factor.

Installation of shoulder rumble strips is recommended to help reduce the incidence of this crash type.

Minor patterns of run-off-road related crashes are noted between MPs 386.5 and 388.5. These included various fixed object accident types such as collisions with delineator posts, fences, signs, embankments, etc. Drivers falling asleep and drivers losing control during snow-packed or icy road conditions appear to be the two primary contributing factors involved in these infrequent accidents.

Review of intersection and driveway-related accidents over an extended crash history period suggests the following modest safety and operational options for consideration:

For turning-related crashes at the east entrance to the Hadley rest area, installation of a side road ahead warning sign (W2-2R) behind the guardrail on the south side near MP 388.7 for the eastbound lane may help alert eastbound drivers of the potential for westbound to southbound left-turning vehicles ahead.

Enlarging the Blue Rest Area guide signs at MPs 388.25 for the EB lane and 388.89 for the WB lane may provide more awareness of the entering and exiting traffic in the immediate area.

(conclusions and recommendations continued)

SH 50B, east of Las Animas, conclusions and recommendations continued

At the CR 7.5 intersection (MP 395.47), introduction of a short no-passing zone around this intersection may be considered to marginally reduce the potential of passing-related or overtaking turn crashes.

Small concentrations of run-off-road crashes (off left as well as off right) associated with two very minor curves located approximately at: MP 389.00-389.40 and 391.8-392.1 were noted over an extended accident history period. Both run-off left and run-off right crashes were reported.

Consideration may be given to installing centerline rumble strips just through these short curves to help alert drivers if they deviate to the left out of their driving lane.

A minor group overturn crashes were noted at the above curve (MP 391.8-392.1). These were related to excessive speed during icy road conditions. Consideration may be given to installing seasonal icy road signs (W8-50) at this location.

Reducing the delineator post spacing (adding delineator posts) through both curves may help drivers maintain a proper path during nighttime, or when any adverse lighting conditions exist.

During future resurfacing or reconstruction projects, consideration may be given to further enhancing the roadway's safety by finishing the outside pavement edges with a low-angle (30⁰), sloped profile ("Safety Edge") prior to bringing the shoulder material up to the new surface. More information on this paving technique is provided in the appendix.

General Observations:

Severe opposing direction collisions such as head-ons and opposite direction sideswipes were not common on this 2-lane, undivided segment of Hwy 50. Passing-related accidents were comparatively infrequent as well. Although a more optimal configuration for preventing opposing direction collisions and offering improved passing opportunities is a multi-lane, divided section with wider or barrier-equipped median, the present highway layout appears to be satisfactory at current traffic volume and heavy truck percentage.

Based on recent crash history, winter road maintenance appears to be improving and at a commendable level.

CDOT Region 2 has taken good advantage of the relatively open, flat terrain by providing stable shoulders, generally unobstructed clear zones and gentle, traversable sideslopes.

The Region has already improved many of the intersections with acceleration and deceleration lanes. This has undoubtedly contributed to the relatively low incidence of accidents, in particular, sideswipe and rear-end collisions. Operational aspects and mobility in general have also benefitted.

The Region has also improved safety and operations along this corridor by employing widened paved shoulders.

(conclusions and recommendations continued)

SH 50B, east of Las Animas, conclusions and recommendations continued

In conjunction with future construction along this segment of SH 50, the following features should be provided:

- » Elimination of pavement edge drop-offs.
- » Superelevation and crown correction where required.
- » Appropriate pavement markings, signing and delineation.
- » Good skid resistance and drainage of the roadway surface.
- » Appropriate advance warning signing of intersections and curves.
- » Upgrade of mailbox supports to ensure breakaway characteristics.
- » Replacement of all delineator post reflector buttons and guardrail reflector tabs.
- » Adjustment, repair and upgrade of existing guardrail and bridge rail to meet current standards.

APPENDIX

Five Year WHI Calculation and Detailed Summary of Traffic Accidents

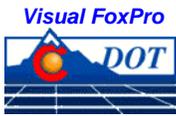
WHI Calculation and Summary of Traffic Accidents by Year/Weighted Hazard Index:

- ▶ 09/01/01 - 08/31/02
- ▶ 09/01/02 - 08/31/03
- ▶ 09/01/03 - 08/31/04
- ▶ 09/01/04 - 08/31/05
- ▶ 09/01/05 - 08/31/06

Stripmap of the Current Traffic Control Devices

Five Year Accident Listing

FHWA Safety Edge information



**Colorado Department of Transportation
Transportation Safety and Traffic Engineering
Detailed Accident Summary Report**

01/22/2008

Job #: 20080122103318

Highway: 50B Begin:386.00 End:397.00 From:09/01/2001 To:08/31/2006

Severity	Multi-Vehicle	Location
PDO: 27	One Vehicle: 25	On Road: 21 Off in Median: 0
INJ: 10 16 :Injured	Two Vehicles: 14	Off Road Left: 5 Unknown: 0
FAT: 2 2 :Killed	Three or More: 0	Off Road Right: 13
Total: 39	Unknown: 0	Off Road at Tee: 0 Total: 39
	Total: 39	

Accident Type		
Overturning: 2	Domestic Animal: 1	Tree: 0
Other Non Collision: 1	Wild Animal: 6	Large Boulder: 0
School Age Peds: 0	Light/Utility Pole: 0	Rocks in Roadway: 0
Other Pedestrians: 0	Traffic Signal Pole: 0	Barricade: 0
Broadside: 1	Sign: 2	Wall/Building: 0
Head On: 1	Bridge Rail: 0	Crash Cushion: 0
Rear End: 1	Guard Rail: 2	Mailbox: 0
Sideswipe (Same): 1	Median Barrier: 0	Other Fixed Object: 0
Sideswipe (Opposite): 1	Bridge Abutment: 0	Involving Other Object: 4
Approach Turn: 3	Column/Pier: 0	Road Maintenance Equipment: 0
Overtaking Turn: 2	Culvert/Headwall: 0	Unknown: 0
Parked Motor Vehicle: 1	Embankment: 2	Total: 39
Railway Vehicle: 0	Curb: 0	Total Fixed Objects: 14
Bicycle: 0	Delineator Post: 5	Total Other Objects: 4
Motorized Bicycle: 0	Fence: 3	

Lighting Conditions	
Daylight: 24	
Dawn or Dusk: 1	
Dark - Lighted: 0	
Dark - Unlighted: 14	
Unknown: 0	
Total: 39	

Weather Conditions		
None: 36	Dust: 0	
Rain: 0	Wind: 1	
Snow/Sleet/Hail: 2	Unknown: 0	
Fog: 0		
Total: 39		

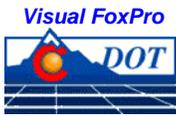
Road Description	
At Intersection: 2	
At Driveway Access: 5	
Intersection Related: 1	
Non Intersection Urban: 1	
In Alley: 0	
Non Intersection Rural: 30	
Highway Interchange: 0	
Unknown: 0	
Total: 39	

Road Conditions	
Dry: 33	
Wet: 1	
Muddy: 0	
Snowy: 1	
Icy: 2	
Slushy: 1	
Foreign Material: 0	
With Road Treatment: 0	
Dry w/Icy Road Treatment: 0	
Wet w/Icy Road Treatment: 0	
Snowy w/Icy Road Treatment: 0	
Icy w/Icy Road Treatment: 1	
Slushy w/Icy Road Treatment: 0	
Unknown: 0	
Total: 39	

Mainline/Ramps/Frontage Rds		
Mainline: 39		
Crossroad (Ramp A): 0		
Frontage Rd: 0		
Ramps		
B: 0	H: 0	
C: 0	I: 0	
D: 0	J: 0	
E: 0	K: 0	
F: 0	T: 0	
G: 0		
Intsrx Frontage/Ramps		
M: 0	N: 0	
O: 0	P: 0	
HOV Lanes: 0		
Ukwnn: 0	Total: 39	

Accident Rates	
PDO: 0.24 MVMT Total: 0.34 MVMT	
Injury: 0.09 MVMT	
Fatal: 1.74 100 MVMT	

ADT: 5700 WHI: -2.44 Length: 11.02 Coris File: tcoris2006.dbf



**Colorado Department of Transportation
Transportation Safety and Traffic Engineering
General Accident Summary Report**

01/22/2008

Job #: 20080122104102

Highway: 50B **Begin:** 386.00 **End:** 397.00 **From:** 09/01/2005 **To:** 08/31/2006

Severity			
PDO:	4		
INJ:	1	1 :Injured	
FAT:	0	0 :Killed	
Total:	5		

Number of Vehicles	
One Vehicle:	4
Two Vehicles:	1
Three or More:	0
Unknown:	0
Total:	5

Location	
On Road:	2
Off Road:	3
Unknown:	0
Total:	5

Accident Type					
Overturning:	0	Sideswipe (Same):	1	Bicycles:	0
Other Non Collision:	0	Sideswipe (Opposite):	0	Domestic Animal:	0
Pedestrians:	0	Approach Turn:	0	Wild Animal:	1
Broadside:	0	Overtaking Turn:	0	Fixed Objects:	3
Head On:	0	Parked Motor Vehicle:	0	Other Objects:	0
Rear End:	0	Railway Vehicle:	0	Unknown:	0
				Total:	5

Lighting Conditions	
Daylight:	2
Dawn or Dusk:	0
Dark - Lighted:	0
Dark - Unlighted:	3
Unknown:	0
Total:	5

Mainline/Ramps/Frontage Rds	
Mainline:	5
Ramps:	0
Frontage Roads:	0
Intsx Frontage/Ramps:	0
HOV Lanes:	0
Unknown:	0
Total:	5

Weather Conditions	
None:	4
Rain:	0
Snow/Sleet/Hail:	0
Fog:	0
Dust:	0
Wind:	1
Unknown:	0
Total:	5

Vehicle Types	Vehicle 1	Vehicle 2	Vehicle 3
Passenger Car/Van:	2	1	0
Passenger Car/Van w/Trl:	0	0	0
Pickup Truck/Utility Van:	1	0	0
Pickup Truck/Utility Van w/Trl:	1	0	0
Truck 10k lbs or Less:	0	0	0
Trucks > 10k lbs/Busses > 15 People:	0	0	0
School Bus < 15 People:	0	0	0
Non School Bus < 15 People:	0	0	0
Motorhome:	0	0	0
Motorcycle:	0	0	0
Bicycle:	0	0	0
Motorized Bicycle:	0	0	0
Farm Equipment:	1	0	0
Hit and Run - Unknown:	0	0	0
Other:	0	0	0
Unknown:	0	0	0
Total:	5	1	0

Road Conditions	
Dry:	4
Wet:	0
Muddy:	0
Snowy:	0
Icy:	1
Slushy:	0
Foreign Material:	0
With Road Treatment:	0
Unknown:	0
Total:	5

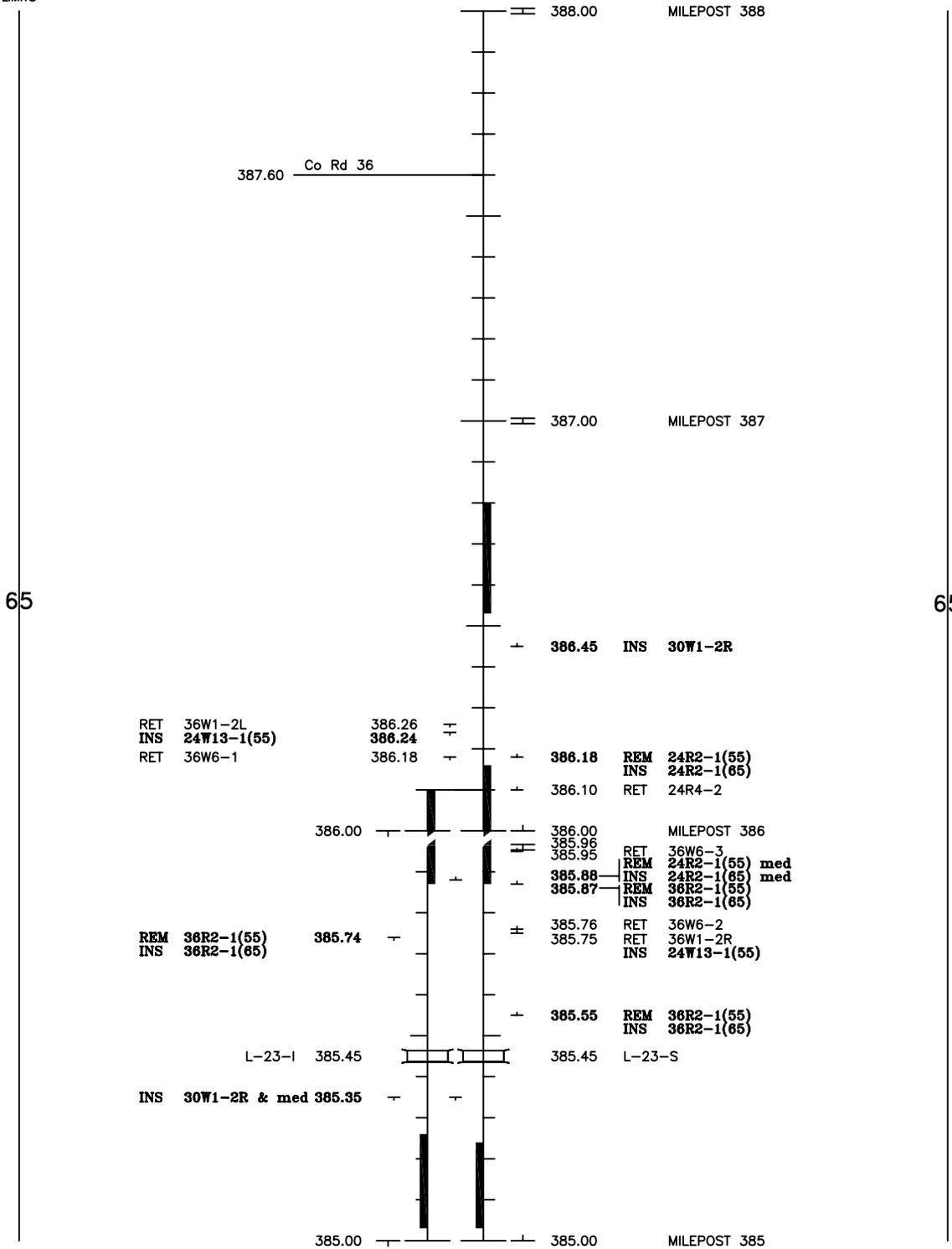
Accident Rates		
PDO:	0.17 *	* MVMT
INJ:	0.04 *	** 100 MVMT
FAT:	0.00 **	Total: 0.22 *

ADT: 5700 **WHI:** -3.22 **Length:** 11.02 **Coris File:** tcoris2006.dbf

AUTHORIZED SPEED LIMITS AND RECOMMENDED TRAFFIC CONTROL DEVICES



AUTHORIZED
SPEED
LIMITS



AUTHORIZED
SPEED
LIMITS

Traffic Engineer
Date: _____



SIGNLOG ON 04-16-96

FILE	MEMO	SHEET	Implemented with changes as marked
880.050.06	5937	3	Date: _____ By: _____

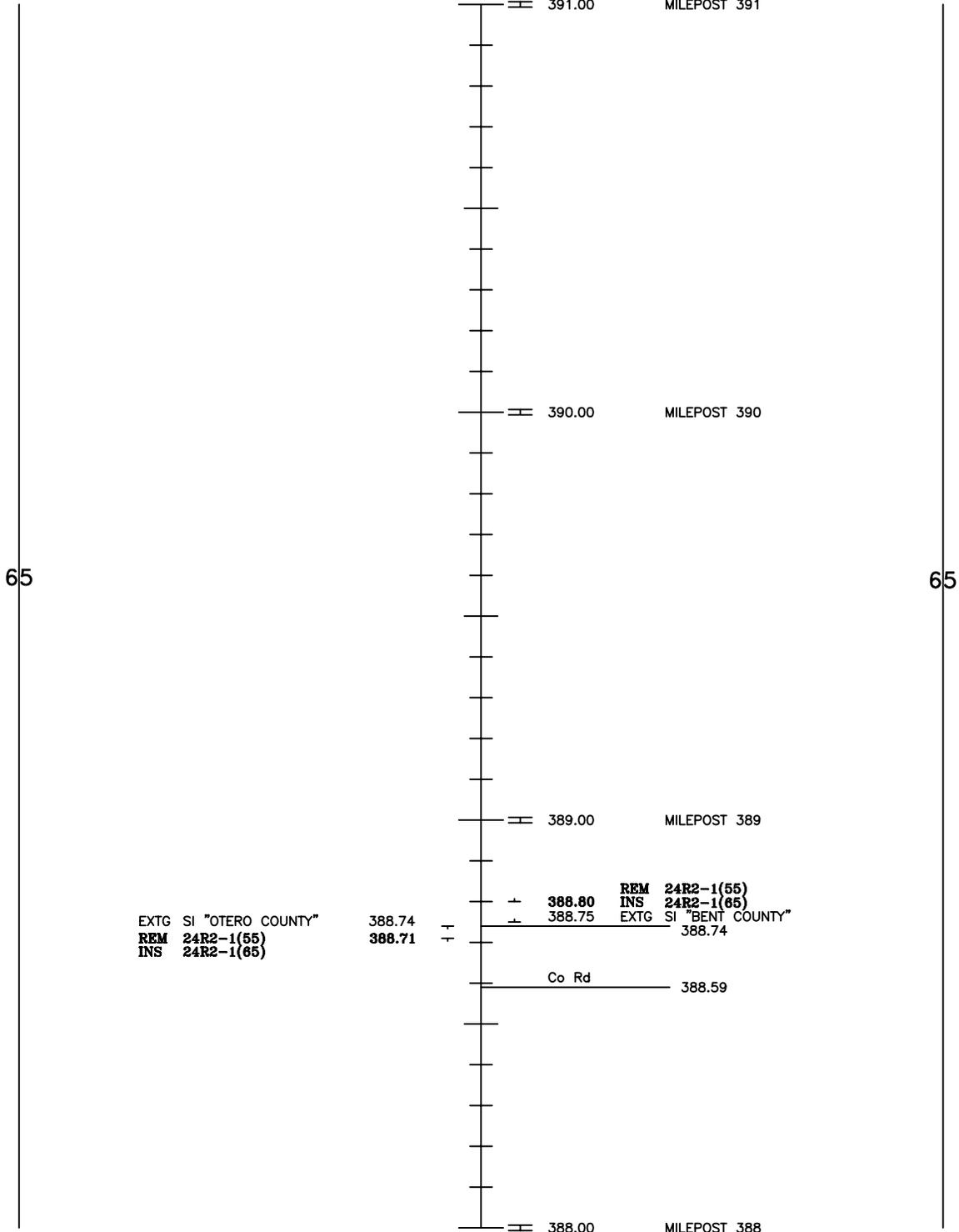
SH 50 FROM SH 350 IN LA JUNTA TO KANSAS STATE LINE

SUPERSEDES SHEET 2, MEMO 2711, 08-21-63

AUTHORIZED SPEED LIMITS AND RECOMMENDED TRAFFIC CONTROL DEVICES



AUTHORIZED
SPEED
LIMITS



EXTG SI "OTERO COUNTY"
REM 24R2-1(55)
INS 24R2-1(65)

388.74
388.71

REM 24R2-1(55)
INS 24R2-1(65)
EXTG SI "BENT COUNTY"
388.74

Co Rd 388.59

Traffic Engineer

Date: _____



AUTHORIZED
SPEED
LIMITS

SIGNLOG ON 04-16-96

	FILE	MEMO	SHEET	Implemented with changes as marked
	880.050.06	5937	4	Date: _____ By: _____

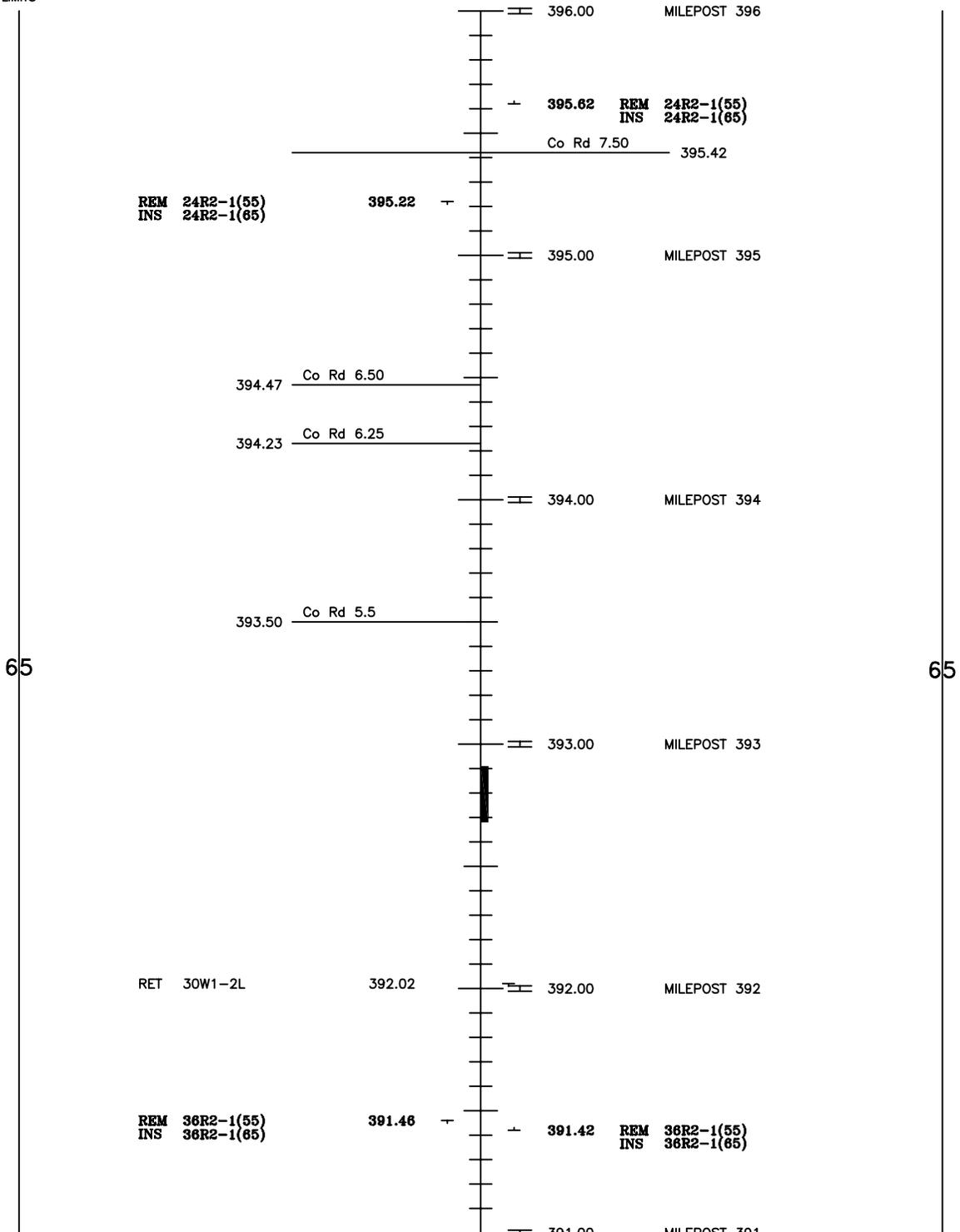
SH 50 FROM SH 350 IN LA JUNTA TO KANSAS STATE LINE

SUPERSEDES SHEET 1, MEMO 2711, 8-21-63

AUTHORIZED SPEED LIMITS AND RECOMMENDED TRAFFIC CONTROL DEVICES



AUTHORIZED
SPEED
LIMITS



65

65

AUTHORIZED
SPEED
LIMITS

Traffic Engineer
Date: _____



SIGNLOG ON 04-16-96

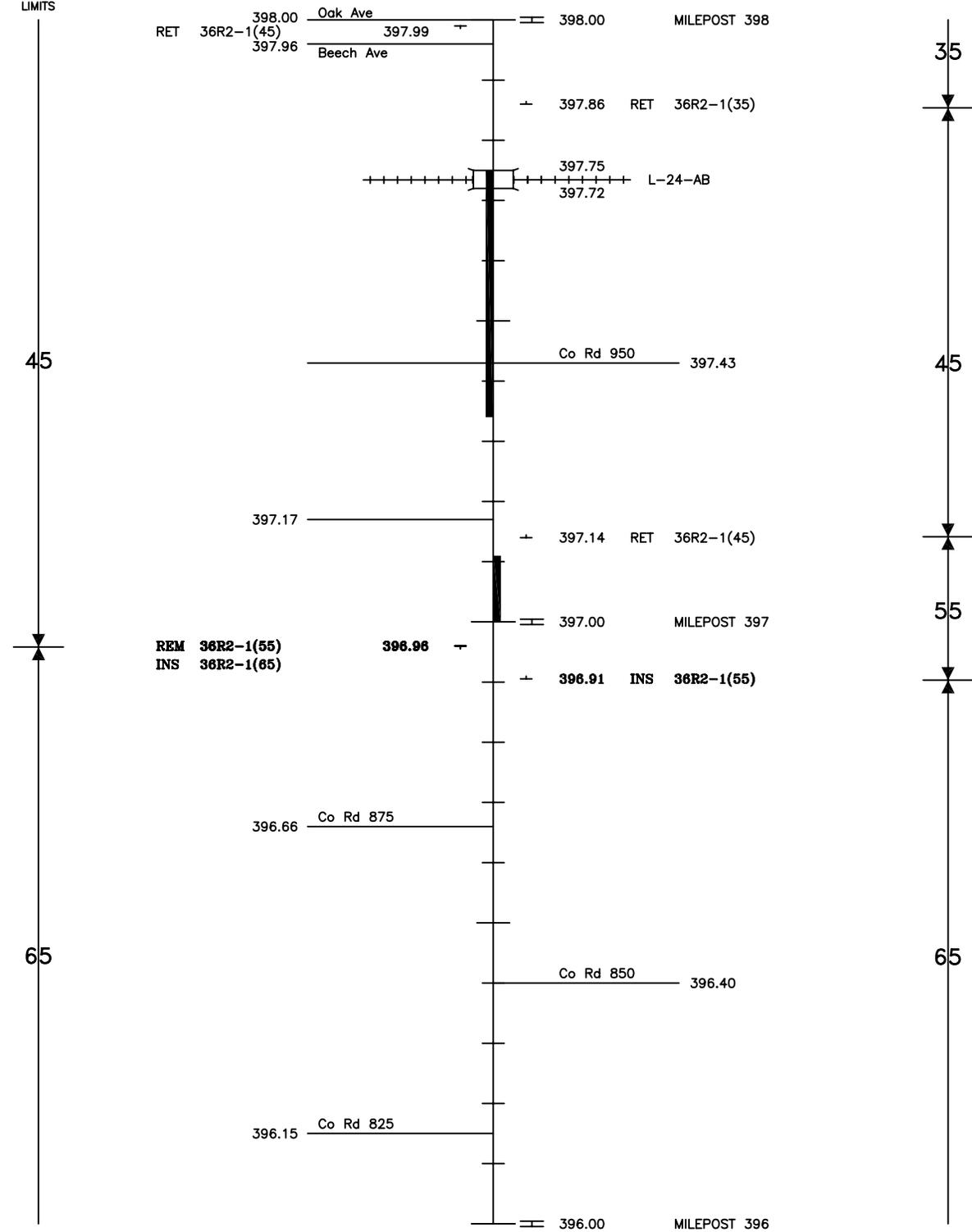
FILE	MEMO	SHEET	Implemented with changes as marked
880.050.06	5937	5	Date: _____ By: _____

SH 50 FROM SH 350 IN LA JUNTA TO KANSAS STATE LINE
SUPERSEDES SHEET2, MEMO 2711, 8-21-63

AUTHORIZED SPEED LIMITS AND RECOMMENDED TRAFFIC CONTROL DEVICES



AUTHORIZED
SPEED
LIMITS



AUTHORIZED
SPEED
LIMITS

Traffic Engineer _____
Date: _____



SIGNLOG ON 04-16-96

FILE	MEMO	SHEET	Implemented with changes as marked
880.050.06	5937	6	Date: _____ By: _____

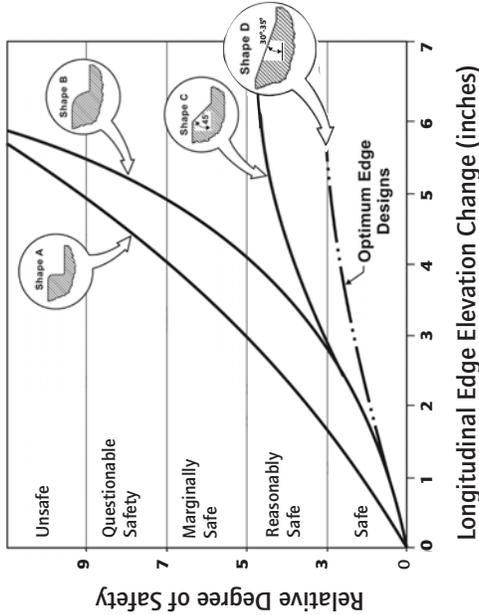
SH 50 FROM SH 350 IN LA JUNTA TO KANSAS STATE LINE

SUPERSEDES SHEET 8, MEMO 4767, 11-10-86

5-YEAR CRASH LISTING: SH 50B, MP 386.00 - 397.00																										
STUDY PERIOD: 9/1/2001 - 8/31/2006																										
hwy	mp	date	time	sev	location	road_desc	vehs	contour	road_condition	lighting	event_1	event_2	dir_1	vehicle_1	driver_1	factor_1	speed_1	veh_move_1	dir_2	vehicle_2	veh_move_2	loc01	dist	loc02	violcode_1	
1	050B	386	6/25/2004	0930	PDO	OFF LEFT	NON-INTERSECTION RURAL	1	CURVE ON-LEVEL	DRY	DAYLIGHT	DELINEATOR POST	SIGN	E	PASS CAR/VAN	NO IMPAIRMENT	DRIVER PREOCCUPIED	65	GOING STRAIGHT			COLORADO 50		MILEPOST 386	CARELESS DRIVING	
2	050B	386.7	12/16/2001	2315	INJ	OFF RIGHT	NON-INTERSECTION RURAL	1	CURVE ON-LEVEL	DRY	DARK-UNLIGHT	DELINEATOR POST		W	PASS CAR/VAN	NO IMPAIRMENT	ASLEEP AT WHEEL	75	GOING STRAIGHT			Colorado 50	007ME	Milepost 386	CARELESS DRIVING	
3	050B	386.7	2/14/2004	0800	PDO	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	DELINEATOR POST		E	PASS CAR/VAN	NOT OBSERVED	DRIVER INEXPERIENCE	65	GOING STRAIGHT			COLORADO 50		MILEPOST 387		
4	050B	387.1	1/31/2003	2040	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	WILD ANIMAL		E	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			Colorado 50	001ME	Milepost 387		
5	050B	387.1	12/12/2001	2330	PDO	OFF LEFT	NON-INTERSECTION RURAL	1	UNKNOWN	ICY	DARK-UNLIGHT	FENCE		E	PASS CAR/VAN	NOT OBSERVED	NONE APPARENT	40	GOING STRAIGHT			Colorado 50	002ME	Milepost 387		
6	050B	387.8	12/13/2001	0510	PDO	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	OVERTURNING		E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	NONE APPARENT	35	GOING STRAIGHT			Colorado 50	003MW	Milepost 388	CARELESS DRIVING	
7	050B	388.1	10/14/2001	0820	PDO	OFF LEFT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	FENCE		E	PASS CAR/VAN	NO IMPAIRMENT	ASLEEP AT WHEEL	65	GOING STRAIGHT			Colorado 50	002ME	Milepost 388	CARELESS DRIVING	
8	050B	388.59	6/4/2003	1620	INJ	ON	AT DRIVEWAY ACCESS	2	STRAIGHT ON-GRADE	DRY	DAYLIGHT	APPROACH TURN		W	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	15	MAKING LEFT TURN	E	PASS CAR/VAN	GOING STRAIGHT	Colorado 50	008ME	Milepost 388	CARELESS DRIVING
9	050B	388.59	6/4/2003	1620	INJ	ON	AT DRIVEWAY ACCESS	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	APPROACH TURN		W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	DRIVER PREOCCUPIED	15	MAKING LEFT TURN	E	PASS CAR/VAN	GOING STRAIGHT	Colorado 50	002MW	Milepost 389	TURN LEFT/ONCOMING TRAFFIC
10	050B	388.59	4/25/2003	2322	PDO	OFF RIGHT	AT INTERSECTION	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	SIGN		E	PASS CAR/VAN	NOT OBSERVED	ASLEEP AT WHEEL	65	GOING STRAIGHT			Colorado 50	006ME	Mile Post 388		
11	050B	389.4	4/15/2004	0755	PDO	OFF LEFT	NON-INTERSECTION RURAL	1	STRAIGHT ON-GRADE	DRY	DAYLIGHT	EMBANKMENT		W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	ASLEEP AT WHEEL	65	GOING STRAIGHT			COLORADO 50		MILEPOST 389	CARELESS DRIVING	
12	050B	389.87	8/11/2006	2320	PDO	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	GUARD RAIL		W	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			COLORADO 50		MILEPOST 390	CARELESS DRIVING	
13	050B	390	10/6/2003	1515	PDO	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	INVOLVING OTHER OBJECT		W	TRUCK GVW <= 10K LBS	NO IMPAIRMENT	NONE APPARENT	65	UNKNOWN	W	PASS CAR/VAN	GOING STRAIGHT	Colorado 50	at	M.P. 390	SPILL LOAD ON HIGHWAY
14	050B	390.1	4/25/2002	2040	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	WILD ANIMAL		E	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	70	GOING STRAIGHT			COLORADO 50		MILEPOST 390		
15	050B	390.4	12/12/2001	1045	INJ	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	SNOWY	DAYLIGHT	SIDESWIPE OPPOSITE DIRECTI		E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	DRIVER PREOCCUPIED	55	GOING STRAIGHT	W	PASS CAR/VAN	GOING STRAIGHT	Colorado 50	004ME	Milepost 390	
16	050B	390.4	12/18/2005	1830	PDO	OFF LEFT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	ICY	DARK-UNLIGHT	FENCE		E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	NONE APPARENT	60	PASSING			COLORADO 50		MILEPOST 390	CARELESS DRIVING	
17	050B	391	1/16/2004	1600	PDO	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	INVOLVING OTHER OBJECT		E	TRUCK GVW > 10K/BUSSES > 15	NOT OBSERVED	NONE APPARENT	65	UNKNOWN	W	PICKUP TRUCK/U	GOING STRAIGHT	COLORADO 50		MILEPOST 391	
18	050B	391.1	11/20/2004	1300	PDO	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	SLUSHY	DAYLIGHT	GUARD RAIL		E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	NONE APPARENT	60	GOING STRAIGHT			COLORADO 50		MILEPOST 391	CARELESS DRIVING	
19	050B	391.1	9/9/2003	1140	INJ	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	INVOLVING OTHER OBJECT	OVERTURNING	E	PICKUP TRUCK/UTILITY VAN W/TI	NO IMPAIRMENT	NONE APPARENT	65	UNKNOWN	E	MOTORCYCLE	GOING STRAIGHT	Colorado 50	001ME	Milepost 391	SPILL LOAD ON HIGHWAY
20	050B	391.4	11/8/2005	0700	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	WILD ANIMAL		E	PICKUP TRUCK/UTILITY VAN W/TI	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			COLORADO 50		MILEPOST 391		
21	050B	391.6	11/10/2003	1220	PDO	OFF RIGHT	NON-INTERSECTION RURAL	1	CURVE ON-GRADE	DRY	DAYLIGHT	DELINEATOR POST		W	PASS CAR/VAN	NO IMPAIRMENT	DRIVER PREOCCUPIED	65	GOING STRAIGHT			Colorado 50	006ME	Mile Post 391	CARELESS DRIVING	
22	050B	391.7	11/22/2002	0510	PDO	ON	NON-INTERSECTION URBAN	1	STRAIGHT ON-GRADE	DRY	DAYLIGHT	WILD ANIMAL		E	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			COLORADO 50		MILE POST 391		
23	050B	391.82	11/10/2004	2345	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	WILD ANIMAL		E	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			COLORADO 50		MILEPOST 392		
24	050B	392.1	10/12/2001	1915	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	WILD ANIMAL		E	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			Colorado 50	001ME	Mile Post 392		
25	050B	392.7	5/13/2005	1415	FAT	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	HEAD-ON		W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	ASLEEP AT WHEEL	50	GOING STRAIGHT	E	TRUCK GVW > 10	GOING STRAIGHT	COLORADO 50		MILEPOST 393	
26	050B	393.2	3/5/2004	0650	PDO	ON	AT DRIVEWAY ACCESS	2	STRAIGHT ON-LEVEL	WET	DAYLIGHT	OVERTAKING TURN		W	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	60	PASSING	W	PASS CAR/VAN	MAKING LEFT TURN	COLORADO 50		MILEPOST 393	PASSED ON LEFT WHEN NOT CLEAR
27	050B	393.7	3/1/2003	1800	PDO	OFF RIGHT	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DAWN OR DUSK	REAR-END		W	TRUCK GVW <= 10K LBS	NO IMPAIRMENT	DRIVER PREOCCUPIED	05	BACKING	W	PASS CAR/VAN	STOPPED IN TRAFFI	Colorado 50	003MW	Milepost 394	UNSAFE BACKING/SHOULDR OF ROAD
28	050B	394.01	11/21/2001	0545	PDO	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	PARKED MOTOR VEHICLE		W	TRUCK GVW > 10K/BUSSES > 15	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT	UK	PASS CAR/VAN	PARKED	Colorado 50	040FE	Milepost 394	FAILED TO DRIVE IN SINGLE LANE
29	050B	394.47	9/26/2001	1700	INJ	ON	INTERSECTION RELATED	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	OVERTAKING TURN		E	PICKUP TRUCK/UTILITY VAN	ALCOHOL/DRUGS	NONE APPARENT	94	GOING STRAIGHT	E	TRUCK GVW > 10	MAKING LEFT TURN	Colorado 50	003FW	County Road 6.5	DRIVE UNDER INFLUENCE ALCOHOL
30	050B	395.3	5/28/2004	2210	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	INVOLVING OTHER OBJECT		W	PASS CAR/VAN	NO IMPAIRMENT	NONE APPARENT	65	GOING STRAIGHT			COLORADO 50		MILEPOST 395		
31	050B	395.38	3/13/2004	0535	FAT	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	DELINEATOR POST	OVERTURNING	E	PASS CAR/VAN	ALCOHOL	ASLEEP AT WHEEL	80	GOING STRAIGHT			COLORADO 50		COUNTY RD 7.5		
32	050B	395.47	11/5/2005	1400	PDO	OFF RIGHT	AT INTERSECTION	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	SIGN		S	PASS CAR/VAN	NO IMPAIRMENT	DISTRACTED BY PASSE	10	STARTING IN TRAFFIC			COUNTY RD 7.5		COLORADO 50		IMPROPER START/PARKED POSITION
33	050B	395.5	7/14/2003	1245	INJ	ON	AT DRIVEWAY ACCESS	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	APPROACH TURN		W	PASS CAR/VAN W/TRL	NO IMPAIRMENT	NONE APPARENT	30	MAKING LEFT TURN	E	MOTORCYCLE	GOING STRAIGHT	Colorado 50	005ME	Milepost 395	TURN LEFT/ONCOMING TRAFFIC
34	050B	396.06	10/4/2003	2215	PDO	ON	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	DOMESTIC ANIMAL		E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	NONE APPARENT	50	GOING STRAIGHT			Colorado 50	001MW	County Road 8.25		
35	050B	396.18	10/5/2005	1855	INJ	ON	NON-INTERSECTION RURAL	2	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHT	SIDESWIPE SAME DIRECTION		E	FARM EQUIPMENT	NO IMPAIRMENT	NONE APPARENT	15	GOING STRAIGHT	E	PASS CAR/VAN	GOING STRAIGHT	COLORADO 50		COUNTY RD 8.25	
36	050B	396.7	9/18/2003	0655	PDO	ON	AT DRIVEWAY ACCESS	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	BROADSIDE		N	PASS CAR/VAN	NO IMPAIRMENT	UNKNOWN	15	OTHER	E	TRUCK GVW > 10	AVOIDING OBJECT I	Colorado 50	003MW	Milepost 397	PARKED/PAVED PORTION OF HIWAY
37	050B	396.8	8/29/2004	1430	PDO	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	OTHER NON-COLLISION		E	PICKUP TRUCK/UTILITY VAN W/TI	NO IMPAIRMENT	NONE APPARENT	45	GOING STRAIGHT			COLORADO 50		MILEPOST 397		
38	050B	396.98	4/18/2003	1430	INJ	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	OVERTURNING		E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT	ASLEEP AT WHEEL	55	GOING STRAIGHT			Colorado 50	100FW	Milepost 397	CARELESS DRIVING	
39	050B	396.99	10/13/2004	1630	INJ	OFF RIGHT	NON-INTERSECTION RURAL	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	EMBANKMENT		E	PASS CAR/VAN	NO IMPAIRMENT	ASLEEP AT WHEEL	65	GOING STRAIGHT			COLORADO 50		MILEPOST 397	DROVE ON WRONG SIDE OF ROAD	

Relative Safety of Various Edge Elevations and Shapes

The chart below shows how various edge shapes relate to safety at speeds of up to 70 mph.



Graphic Source: Zimmer and Ivey, Texas Transportation Institute



Photo Source: FHWA

The Safety Wedge Shoe is a special edging device that asphalt paving contractors can install on new or existing resurfacing equipment to shape the Safety Edge.

Contact the FHWA for More Information about the Safety Edge and other Roadway Departure Crash Countermeasures

For more information about Roadway Departure issues and effective countermeasures to prevent Roadway Departure crashes, go to the FHWA Office of Safety's Web site at <http://safety.fhwa.dot.gov/> and click on "Road Departure." FHWA contacts for technical assistance with the Safety Edge are listed below.

CONTACTS

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Frank.Julian@dot.gov

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Roadway Departure Team
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Mark.Blosschok@dot.gov

- Hallmark et. al: Safety Impacts of Pavement Edge Drop-Offs, AAA Foundation for Highway Safety, Washington, DC, September 2006.



U.S. Department of Transportation
Federal Highway Administration

Publication Number FHWA-SA-07-023

YOU CAN
REDUCE
PAVEMENT
EDGE

DROP-OFF
HAZARDS

THE SAFETY EDGE

PAVEMENT EDGE TREATMENT



Photo Source: FHWA

Saves Lives

Reduces Tort Liability

Reduces Maintenance Expense

Costs Less than 1 Percent of
Pavement Resurfacing Budget

Safe Roads for a Safer Future

Investment in roadway safety saves lives



Pavement Edges Can Pose Serious Safety Hazards

Run-off-the-road (ROR) crashes account for 58 percent of highway fatalities. While national data documenting the role of pavement edge configuration in the sequence of events leading to crashes are not available, some State-level studies sponsored by the AAA Foundation for Highway Safety point to the life-saving potential of safety edges. For example, researchers studying crashes in Iowa during 2002-2004 reported that pavement edges may have been a contributing factor in as many as 18 percent of ROR crashes, and crashes caused by pavement dropoffs resulted in fatalities more often than other types of ROR crashes.¹

How Hazardous Pavement Edges Contribute to Crash Severity

A vehicle that has departed a paved surface can have difficulty re-entering the roadway if the pavement edge is vertical—especially if the edge

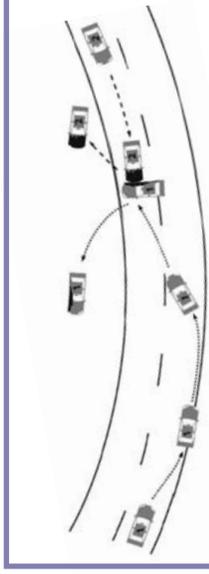


PHOTO SOURCE: FHWA

of the pavement is significantly higher than 2" above the shoulder. When a driver drifts onto the roadway shoulder and tries to steer back onto the pavement, the vertical pavement edge can create a "tire scrubbing" condition that may result in over-steering. If drivers over-steer to

Sharp, steep pavement edge dropoffs can contribute to crashes.

return to the roadway without reducing speed, they are prone to lose control of the vehicle. The vehicle may veer into the adjacent lane, where it may collide with, or sideswipe oncoming cars; overturn; or run off the opposite side of the road and crash.



This is a typical diagram for a crash caused by tire scrubbing. The vehicle at left scrubbed the edge of the pavement, and when it returned, the driver overcorrected, lost control, crossed into the adjacent lane, and struck an oncoming vehicle.

Graphic Source: AAA Foundation for Highway Safety

Increase Roadway Safety at No or Low Cost by Specifying the Safety Edge

A simple and cost-effective way to promote pavement edge safety is to adopt a standard specification for all resurfacing projects that requires a 30° - 35° angle "Safety Edge" that interfaces with the graded shoulder.

Solutions to the Pavement Edge Drop-off Hazard

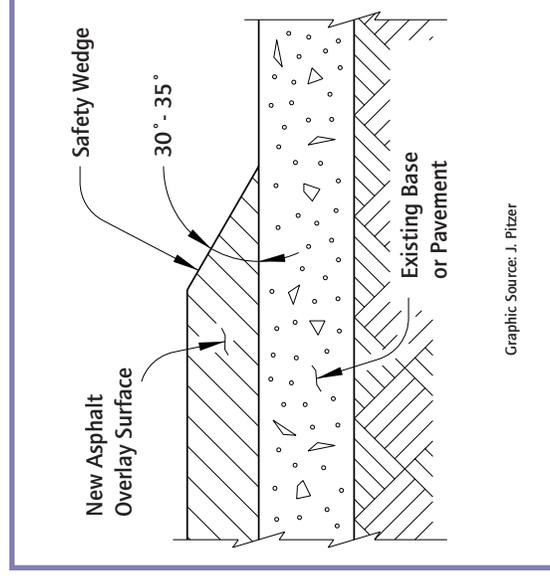
■ Require a 30° - 35° angle asphalt wedge "Safety Edge" at the graded shoulder interface in asphalt resurfacing projects.

■ Routinely resurface shoulders when roadways are resurfaced, and add the Safety Edge.

■ Many highway agencies aim to maintain edge dropoff depths at 2" or less on high-speed highways.

The asphalt wedge provides a safer roadway edge, and a stronger interface between the roadway and the graded shoulder. The additional cost of the asphalt wedge is minimal when included as part of resurfacing projects. Benefits include the avoided economic and social impacts of fatalities, injuries, and property damage.

The placement of the asphalt wedge during resurfacing operations mitigates the hazard posed by edge dropoffs as soon as the paving machine lays down the asphalt mat, allowing the highway agency reasonable time to restore the shoulder.



Graphic Source: J. Pitzer