EMS Focus

A Collaborative Federal Webinar Series



Staying Safe on the Road: How You Can Help Make Ambulances Safer and Prevent Crashes









WITH SHOULDER AND LAP RESTRAINTS

*IN SERIOUS CRASHES INVESTIGATED BY NHTSA

SIT DOWN & BUCKLE UP! Secure Your Patients, They Rely on You!

This safety message brought to you by NHTSA's Office of EMS.

of patients were

ejected from the cot in serious crashes*

44%



restrained with lateral belts only*

61%

38%

shoulder harnesses were available but were not used*





- Reporting vehicle and equipment defects
- Defect investigations and recalls
- Ambulance crash investigations
- Questions



Today's Speakers

Peter Kivett

Safety Defects Engineer, NHTSA Office of Defects Investigation

Harold Herrera

Crash Investigation Specialist, NHTSA Special Crash Investigation Program

Max Sevareid, MPH

EMS Specialist, NHTSA Office of EMS





Office of Defects Investigation Initiation What Can ODI Do For You

Peter Kivett Office of Defects Investigation



AGENDA

Mission

- Safety Defect Definition and Review
- ODI Investigation Initiation Process



Office of Defects Investigation





Office of Defects Investigation Mission





Office of Defects Investigation Mission

- Identify design or manufacturer defects relating to motor vehicle safety
- Assure that defects are remedied effectively and promptly
- Assure that non-confidential information relating to investigations and recalls is made available to the public







ODI Jurisdiction

- Vehicles licensed for road use
 - \triangleright Cars, motorcycles
 - \triangleright RVs, HD trucks, buses
- Vehicle Equipment
 - ⊳ Tires
 - Child Restraints
 - \triangleright Accessories







NHTSA Consumer Vehicle Complaint Process





Risk Matrix

Risk-Based Processes for Safety Defect Analysis and Management of Recalls

https://www.nhtsa.gov/sites/nhtsa.dot.gov/ files/documents/14895_odi_defectsrecalls pubdoc_110520-v6a-tag.pdf

Pre-investigative, Generic Risk Matrix used by ODI for Risk Ranking and Resource Prioritization Purposes

	Severity	Frequency Level					
Severity Level	Detectability of Condition	Consequence of Failure	1	2	3	4	5
SL-5	None/poor	Severe or fatal injury	Y	R	R	R	R
SL-4	detectability	Moderate injury	G	Y	R	R	R
SL-3	Good/reasonable	Severe or fatal injury	G	G	Y	R	R
SL-2	detectability	Moderate injury	G	G	G	Y	R
SL-1	Not considered	Minor Injury	G	G	G	G	Y
Notes:							
Detectabilit abnormal n	ty: Presence or lack of w oises; vehicle handling	arning lights, messaging and/or performance and	and noti	fications; the preser	audible w nce of whi	arnings a ch would l	nd be

significant medical treatment and/or hospitalization, moderate means AIS 2 type injuries, a means AIS 1 or any injury allegation such as minor cuts or soft tissue.

Incidents: Appear to involve a common fault condition and consequence.

Common Fault Condition: Same/similar part, failure mode, and conditions leading to failure.

Common Fault Consequence: Same/similar failure mode and effects caused by failure.



What is a Safety Defect

- Safety-Related Defect (Pursued by ODI): Any defect in performance, design, construction, component, or material that results in an unreasonable risk of crash or an unreasonable risk of death or injury in an accident.
 - A safety-related defect may exist on a vehicle even though it meets all FMVSS requirements.
 - A safety-related defect includes: nonoperational and mission specific





Investigation Process

- ► (PE) Preliminary Evaluation
 - Confirm complaint(s)
 - ▷ Gather parts
 - ▷ Work w/ industry
 - Contact peer municipalities
 - Review current & past precedent activity
 - Document and summarize information gathered
 - ▷ Influence safety recall, close or upgrade
 - ▷ 4 months
- ► (EA) Engineering Analysis
 - D Testing/Survey(s)
 - 2nd mfr response analyzed
 - > Influence safety recall or close investigation
 - ▷ 1 year

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ODI Outreach

- Service managers
- ► Field Reps
- Government officials
- ► Fire Chiefs
- Police
- ► EMS

Your Complaint may be serviced/remedied by the manufacturer but your fellow colleague will not get the fix!





Example Investigations

- ► Issue: Wheel off event
- Alleged cause: Loose or cracked lug nut
- ► Result: Recall 9,814 vehicles
- ODI prompt: 4 reports





Example Investigations

- ► Issue: Total loss of steering
- ► Cause: Drag link failure
- Result: Recall 111,050 vehicles
- ODI prompt: 1 report





Special Crash Investigations Program



Harold Herrera Crash Investigation Division Team Lead Special Crash Investigations Program



Special Crash Investigations Overview

- "Rapid Response" teams for NHTSA that cover the United States
 - The SCI Program was established in 1972 with 3-two person teams and contracted field offices
 - SCI has provided NHTSA with the most in-depth crash investigation data collected by the agency.





Special Crash Investigations Overview

- The SCI program investigates ~100 crashes and non-crashes annually that are of priority interest to the agency:
 - ▷ Office of Defects Investigation (ODI)
 - \triangleright Research
 - ▷ Rulemaking
 - Office of Emergency Medical Services (OEMS)
 - \triangleright Any other offices
 - \triangleright Other Agencies
- Cases are initiated solely on Agency needs
- Cases are published and made available to the public online



SCI Published Cases

- SCI has published over 2,000 cases to the NHTSA website for public access since 1997
 - ▷ Many more in paper format prior to 1997
- Over 100 cases per year are published to NHTSA website
- All personally identifiable information is redacted from all published cases!!!



SCI Ambulance Crash Investigations

► 64 total ambulance crashes investigated

2001 – 2004 contracted to conduct 6 investigations for the National Institute for Occupational Safety and Health (NIOSH)

▷ 2007 – current

- Conducted 58 investigations for NHTSA's OEMS
- 4 closed
- ~4 investigations annually



NHTSA Fatal Ground Ambulance Crash Investigations Decision Tree

Selection/Inclusion Criteria

- Ambulance in traffic
- Was crash potentially survivable?
- ► Fatal injury in the ambulance?
- Cot retention failure
- Patient ejected?
- Incapacitating injury in patient compartment
 Hospitalized for crash related injury
- ► Rollover
- ► Fatigue
- Others
- Ultimately, OEMS makes the call to investigate





Notification of Crashes

► Notifications come from numerous sources:

- ▷ NHTSA Office of EMS
- ▷ EMS Community
- ▷ Law Enforcement
- ▷ NHTSA Regional Offices
- ▷ CISS Field Offices
- \triangleright Google Alerts
- ▷ First Responder links
- \triangleright Etc.



Example SCI Investigation

2009 Ford E-350 Type II Ambulance New Mexico July 2016





Case Overview



2 vehicles involved

- 2009 Ford E-350 Type II Ambulance
 - 2nd manufacturing equipped with Endeavor model in October 2009, by Medtec Ambulance

▷ 2009 Dodge Ram





Case Overview

Total of 7 occupants in ambulance

- Driver and front row occupant (EMS student listed in EMS report as third-party ridealong) both wearing seat belts
- ▷ 5 other occupants in patient compartment area:
 - Patient's mother
 - Patient premature, unrestrained 6-week-old in a incubator that was anchored to a sled that was mounted to the cot
 - Being transported from one hospital to another for emergency surgery
 - EMT primary patient caregiver
 - 2 nurses from hospital

None of the occupants in the patient compartment were belted



Patient Compartment







EMS Focus

Case Overview

Scene

- ► 4-leg intersection
- ► Line of site:
 - Westbound traffic obstructed for ambulance
 - RAM was in freeway underpass





Case Overview

Ambulance driver stated to police:

- ▷ Emergency light and siren activated
- ▷ Braked, looked left and right, sounded air horn
- Saw traffic had stopped, observed RAM slowing, proceeded into intersection with yellow traffic light
- ► RAM driver stated to police:
 - ▷ Heard ambulance siren prior to seeing it, braked but no time to stop
- Front of RAM struck right rear of ambulance

Impact caused ambulance to rotate CCW, rollover ¼ turn and came to rest on right side



Overview of Crash Scene





Police On-scene Images







Case Overview – Post-Crash

- During the crash-rollover, the top mounted access door of the incubator came open and the 6-week-old was ejected from the incubator
 - One of the nurses located the 6-week-old and began emergency breathing procedures until first responders arrived on scene
 - Transferred by air to hospital in another state and admitted for emergency surgery. She expired 28 days post crash cause of death is unknown





Conclusions

- Both front occupants were wearing their seat belts GOOD OUTCOME in a rollover crash!!!
- Although none of the rear occupants were wearing seat belts they fortunately only sustained minor/moderate injuries

Wearing seat belts has good outcome in crashes



Data and Technical Reports

Real American Stress Stress Viewer

NHTSA is authorized by Congress (Volume 489, United States Code Chapter 301 Motor Vehicle Safety, Section 30166, 30168 and Volume 23, Sect motor vehicle crashes to aid in the development, implementation and evaluation of motor vehicle and highway safety countermeasures. The law requ privacy of individuals involved in crashes investigated. Agency procedure for release, accuracy and security of research data collected under the cras dissemination of any information collected, assembled, derived or computed until all conditions of data gathering and reporting, case completeness, o been completed. The cases available through the online web query system have met these conditions.

Q Investigation-Based

Investigation-Based Studies use Police Acident Reports (PAR) as the basis for the majority of qualifying cases. These cases include follow up research, collection and assessment of Driver/Occupant data, Vehicle Interior/Exterior inspection data, Safety Systems data, Scene Data and Medical Record data.

Crash Injury Research Engineering Network MORE

CIREN Crash Viewer (Current) CIREN Crash Viewer (2004 - 2015)

Crash Investigation Sampling System MORE

CISS Crash Viewer (Current) NASS CDS Viewer (2004 - 2015) Download NASS CDS Images (1997 - 2003)

Large Truck Crash Causation Study LTCCS Crash Viewer (2001 - 2003)

National Motor Vehicle Crash Causation Study NMVCCS Crash Viewer (2005 - 2007)

Special Crash Investigations MORE SCI Crash Viewer (Current) * SCI Crash Viewer (2004 - 2015) Download SCI Technical Report/Images (1991 - 2003)

 The viewer contains specific cases conducted prior to 2016 but not published officially prior to 2016.

Records-Based

Records-based Studies use Police Accident Reports qualifying cases. These cases can include additiona medical records. Cases are coded solely from inform documents.

The Fatality Analysis Reporting System MORE How to Access FARS Data FARS Encyclopedia

FARS Application Programming Interface (API)

State Specific Data State Traffic Safety Information (STSI)

𝗞 Other Links

Additional resources are available using the followin study reports and research material. Click the links for

NHTSA Repository for Crash Research Publication CrashStats

Crashviewer.nhtsa.dot.gov



Data and Technical Reports

Search by Case Number or ID or DOT HS Number	Search By SCI Case Type and Case Year
Use this option if you already know Case ID or Case Number (sometimes also called Case String) or DOT HS. Number. Case Number consists of two letters and 5 numbers, like AB12345. Case Id is a number with 4 to 8 digits, like 1234 or 12345678. DOT HS Number is a number with 6 digits, like 123456.	Use this option to search by SCI Case Type and/or Case Year. You can spec more than one value in SCI Case Type and more than one value for Case Year Type: Ambulance Year: ALL Search Adaptive Vehicle
Number or ID or DOT HS Number: ds16014	Advanced Air Bag - NHTSA Advanced Driver Assistance System Advanced Occupant Protection System - AOPS Air Bag Related Adult Driver
Search By Filters	Air Bag Related Adult Passenger Air Bag Related Children in RFCSS
Please select this option to query on basic variables that belongs to Crash, Person and Basic set of 30-40 variables is available and case will have to satisfy ALL the criterias t	J/or Vehicle. □ Air Bag Related Children NOT in RFCSS o be included ii □ Alternative Fuel
Q Sea	rch By Filters Ambulance Automated Driving System
	Crash Avoidance Technology Electric Vehicle
	Front Center Air Bag Guardrail End Treatment Inflatable Seat Belt

Crashviewer.nhtsa.dot.gov



Data and Technical Reports





Questions?

Please submit questions through the webinar platform

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SafeAmbulances.org







EMS Focus





for more info on ambulance safety and other national initiatives



Thank You

