

**SAFETY2008**  
 June 18-19, 2008  
 Las Vegas, Nevada

*Safety2008*

## Approaches to Optimizing Emergency Medical Services Transportation Safety




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 CEO, Objective Safety  
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- ### Outline
- ▶ Background issues and hazards
  - ▶ Size fleet, fleet mix, personnel mix
  - ▶ General approaches to safety
  - ▶ Future needs

- ### Introduction
- Emergency Medical Services – (EMS)
- ▶ Important interface between public health, transportation, public safety and emergency and acute care and the community
  - ▶ Unique challenges - patient, provider and public safety and transportation safety
  - ▶ Unique needs of this important part of our health care and transportation system

- ### An important and unique system
- ▶ Public safety, public health and emergency service
  - ▶ Is there to save lives
  - ▶ A more recent service compared to Fire and Police



- ### What is the scope of EMS?
- ▶ Emergency care, public health, public safety and patient transport
  - ▶ Bridge between the community and the hospital
  - ▶ Volunteer – professional
  - ▶ Urban – rural
  - ▶ Disaster response
  - ▶ Majority of transports NOT critical or life threatening

- ### Emergency Medical Service – Ambulance Transport
- ▶ What are the safety issues that pertain to this important public service and public safety industry?
  - ▶ What do we know of the risks and hazards and how can we measure these ?
  - ▶ How can the safety of this system be optimized?

### A tragic emergency health care intervention outcome



**Rollover Crash Kills Medical Technician**  
 Ambulance Plunges Off Side and Rollover Killing Two Employees and a Patient

**It does happen....**

- ### A problem
- 2007 Insurance data –
- ▶ **27** fold more likely to have a claim based on transport than related to medical care

## Transport Science...

## A BIG Problem

- ▶ Operating in an environment where many aspects of safety are still devoid of safety standards – requires detailed technical knowledge and understanding in technical disciplines OUTSIDE of healthcare disciplines

## Friday July 20<sup>th</sup> 2007... The worst ambulance crash in USA history

### Five Killed in Crash of Ambulance and Semi

July 21, 2007 08:20 AM EDT

VAN WERT, OHIO (AP) — The Ohio State Highway Patrol continues to investigate the crash of an ambulance that killed five people Friday night, including three emergency medical technicians. Troopers say the ambulance was broadsided by a semitrailer in Coate Township, about 65 miles southwest of Toledo.


The ambulance, with four Antwerp Emergency Medical Services workers aboard, was taking two victims from an earlier car crash to a hospital. Troopers say it was broadsided by a tractor-trailer at the intersection of County Road 176 and County Road 07. The ambulance then burst into flames.

The Highway Patrol says three EMS workers were killed. They were identified as 41-year-old James Smith, 33-year-old Mark McCougal and 25-year-old Kelly Rager. The two patients were also killed. They were identified as 60-year-old Robert Walls and 60-year-old Arnette Wells of Knicville.

Another emergency medical technician, Matt Chapman, 31, of Findlay, was both taken to the hospital. It's not yet clear whether they suffered any injuries.

Authorities have not said who had the right of way at the road intersection nor have they said if the ambulance's emergency siren and lights were turned on.

**Antwerp fire chief says, 'They were doing what they loved...'**  
LexisNexis  
July 23, 2007  
By USA TODAY  
http://www.lexisnexis.com  
ANTWEP -- They were taken with the aid



Emergency personnel throughout the region are also shocked and mourning their own. "That's one of our worst scenarios when it's one of our own," said Con Shuehik of the Payne Fire Department.

"Everyone is a brotherhood," said Friend. "Everybody looks after everybody."

Randy Shaffer, director of Paulding County Emergency Management Agency, said the accident has had a deep impact.

"It has affected every emergency personnel in the county," he said. "We know it could happen at any time. We read about it in our newsletter. We just don't think it's going to happen to us."

Shaffer said when a call came in that an ambulance was involved in an accident Friday, "I think every squad in the county activated."

## An interhospital transport ? "Do no harm...." ?

Date last updated: Tuesday, January 23, 07 11:02:01  
LexisNexis

Pa. ambulance involved in crash; patient pronounced dead at scene

By Rickie H. Funn  
The York Dispatch (York, Pa.)  
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An Adams County ambulance, making its way to York from a collision with a van at the intersection of Routes 20 and 216 in North Manchester Township at 4:45 a.m. on Sunday, and the patient was pronounced dead at the scene.

York County Deputy Coroner Claude Stebley said the patient, a woman, was being transported from Gettysburg Hospital back to the van in facing a "significant" heart condition.

He said he's still trying to determine whether she was into cardiac arrest and died prior to the crash, or whether she suffered a fatal heart attack because of it after the crash. Stebley said she suffered no significant traumatic or external injuries.

## Charged with Vehicular Homicide

Penn. temp. ambulance driver faces charges in crash - Pennsylvania  
A Penn Township Rescue & ambulance driver faces a charge of homicide by vehicle in an Oct. 30 accident in Hempfield that killed a Westmoreland County Prison guard.

A Penn Township Rescue & ambulance driver faces a charge of homicide by vehicle in an Oct. 30 accident in Hempfield that killed a Westmoreland County Prison guard.

Jason Fatt, 30, of 9950 Barnes Lake Road, North Huntingdon, was arraigned this week and will have a preliminary hearing at 1:45 p.m. Sept. 27 before Jeannette District Judge Joseph DeBaruchis. Bond was set at \$25,000 unsecured. Fatt also was charged with reckless driving, careless driving and other traffic offenses.

State police at Greensburg said Fatt was driving an ambulance west on Route 130 at 5:49 a.m. Oct. 30 when he ran a red light at North Greengate Road and hit a Ford Bronco driven by Frank Scalise Jr., 46, of Marysville, that was traveling south.

Scalise, who began working at the prison in 1992, was reportedly on his way there at the time. According to the coroner's report, Scalise was taken by medical helicopter to UPMC Pittsburgh. He died Nov. 3 of blunt-force trauma to the head, according to the Allegheny County Medical Examiner's Office.

Fatt was not injured, but the ambulance was heavily damaged. Police indicated the ambulance was returning to its station after transporting a patient and did not have lights or sirens activated. Asked about Fatt's employment status Friday, a representative of the ambulance association had no comment.

Firstly!



▶ **An accident ?**

▶ or  
a predictable and preventable event

## New Information 2007-2008

- ▶ Enhanced Safety of Vehicles (ESV), June 2007
- ▶ APHA, Nov 2007
- ▶ AMD Engineering Public Comments, July 2007
- ▶ NHTSA August 2007
- ▶ OSHA September 11, 2007 Federal Register
- ▶ SAFETEA-LU, 2006 (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) - State Strategic Highway Safety Plans, October 2007
- ▶ American Society Safety Engineers (ASSE), June 2007 - 2008
- ▶ EMS Safety Foundation Jan 2008
- ▶ NAEMSP Jan 2008
- ▶ Transportation Research Board – EMS Safety Subcommittee, Jan 2008
- ▶ ICEM 2008
- ▶ SAEM Regional New York, New England, April 2008
- ▶ RETTmobil May 2008
- ▶ International Ergonomists Association (IEA), June 2008
- ▶ State EMS Council Policies
- ▶ SAE - October 2008
- ▶ OSHA EMS best practices late 2008
- ▶ Worker visibility Act, to be implemented, Nov 2008

## Benefit of Safety

- ▶ Any cost of addressing these issues is dwarfed in contrast to the huge burden of not doing so - in financial costs let alone the personal, societal, ethical and litigation costs

## Unique workplace

- ▶ In vehicles
- ▶ At roadside and other emergency scenes

## Absence of standards and oversight

- ▶ Challenges in identifying best practice
- ▶ Myriad of unregulated commercial products
- ▶ No safety performance standards
- ▶ Absent national safety oversight

- ▶ What we need to consider, where is the 'bang for buck' in ambulance transport safety:

## National EMS data

In the USA\*

- ▶ ~ 50,000 vehicles
- ▶ ~ 5,000 crashes a year
- ▶ One fatality each week
  - ~ 2/3 pedestrians or occupants of other car
  - Approximately 4 child fatalities per year
- ▶ ~10 serious injuries each day
- ▶ Cost estimates > \$500 million annually
- ▶ USA crash fatality rate/capita 35x higher than in Australia

\*NHTSA 2005-6

## Is it your service's tragic year?

- ▶ ~ 50 fatalities a year
- ▶ 15,000 EMS services
- ▶ Each year one in 300 services experiences a fatality

## the EMS transport process

- ▶ communications/dispatch
- ▶ the patient
- ▶ restraining device/seat
- ▶ transporting device/gurney
- ▶ paramedics/transport nurses, doctors & family
- ▶ patient monitoring equipment
- ▶ clinical care & interventions
- ▶ protective equipment
- ▶ the vehicle
- ▶ the driver/driving skill
- ▶ other road users
- ▶ the road



## Predictable risks

- ▶ Fatal crashes more often at intersections, & with another vehicle ( $p < 0.001$ )\*
- ▶ 70% of fatal crashes EMS crashes during Emergency Use\*
- ▶ Most serious & fatal injuries occurred in rear (OR 2.7 vs front) & to improperly restrained occupants (OR 2.5 vs restrained)\*\*
- ▶ 82% of fatally injured EMS rear occupants unrestrained\*\*
- ▶ > 74% of EMT occupational fatalities are MVC related\*\*\*
- ▶ Serious head injury in >65% of fatal occupant injuries#
- ▶ More likely to crash at an intersection with traffic lights (37% vs 18%  $p=0.001$ ) & more people & injuries/crash than similar sized vehicles##

\*Sohn CA, Pinals RD, Kuhn EM. *Painop* Emerg Care 2001 Jul-Sep;5(3):261-9

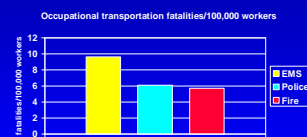
\*\*Sohn CA, Zimring, Lovick, LI, Miller, Acc Anal Prev 2002

\*\*\*Maguire, Hunting, Smith, Levick. *Annals Emerg Med* Dec 2002

#WJSH, 2003

##Ray AM, Kopp DP. *Painop* Emerg Care 2005 Dec; 9(12):415

## Occupational transportation fatalities..



▶ WE HAVE A BIG PROBLEM HERE

\* Maguire, Hunting, Smith & Levick, *Occupational Fatalities in Emergency Medical Services: A Hidden Crisis, Annals of Emergency Medicine*, Dec. 2002

## What do we know now??

- ▶ Intersection crashes are the most lethal
- ▶ There are documented hazards, some which can be avoided
- ▶ Occupant and equipment restraint with standard belts is effective. (Over the shoulder harnesses for patients should be used, with the gurney in the upright position where medically feasible)
- ▶ Some vehicle design features are beneficial - automotive grade padding in head strike areas, seats that can slide toward the patient
- ▶ Electronic Driver monitoring/feedback systems appear to be highly effective
- ▶ Head protection??

## Balance of concerns and risk during transport

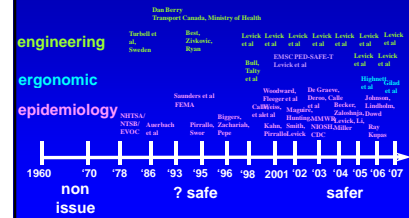


- ▶ Response and transport time
- ▶ Clinical care provision
- ▶ Occupant safety/protection
- ▶ Public Safety

## Goals

- ▶ Standards for safety
- ▶ Policy based on Science
- ▶ Databases to demonstrate outcome

## Ambulance Safety Research: A New Field



## General approaches

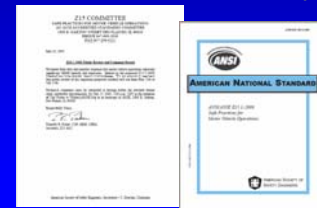
- Policy
- Training
- Technology
- Vehicle design –chassis, interior features and layout, vehicle type
- Standards
- Learning from global best practices
- Contrast with an office chair
- Current fleet
- Future fleet

## Safety concepts out there now

- ▶ Fleet Safety Management
  - Z-15
  - Driver monitoring and feedback
- ▶ Enhanced ambulance vehicle design
- ▶ Intelligent Transport Technologies - ITS
- ▶ Visibility and Conspicuity
- ▶ New Safety Standards
- ▶ Independent resources and information

## American National Standard ANSI/ASSE Z15.1-2006

Safe Practices for Fleet Motor Vehicle Operations



## What Z15 encompasses

- ▶ Safety Program
- ▶ Safety Policy
- ▶ Responsibilities and Accountabilities
- ▶ Driver Recruitment, Selection and Assessment
- ▶ Organizational Safety Rules
- ▶ Orientation and Training
- ▶ Reporting Rates and Major Incidents to Executives
- ▶ Oversight

## What are the solutions?

- ▶ Training?
- ▶ Practice Policy?
- ▶ Transportation Systems Engineering?
- ▶ Automotive Engineering?
- ▶ Education of other road users???

## The Driver

- ▶ Driver selection
- ▶ Driver monitoring and feedback
- ▶ Driver Impairment
- ▶ Driver training

### Driver issues

Journal of Emergency Medical Services, Volume 15, Number 1, February 1990

**The Relationship Between Ambulance Crashes and Emergency Medical Technicians (EMTs)**  
 Joseph S. English and Eric Stone

**Abstract:** The purpose of this study was to determine if there was a relationship between ambulance crashes and the experience of EMTs. Data were collected from 100 ambulance crashes that occurred in a 12-month period. The results of the study showed that the odds of having been in an ambulance accident within the past year were significantly higher for younger EMTs. Future studies should investigate the effects of various interventions such as increased field supervision or driver safety training programs on the driving performance of younger EMTs.

**Conclusions:** When controlling for call volume and ambulance time, the odds of having been in an ambulance accident within the past year were significantly higher for younger EMTs. Future studies should investigate the effects of various interventions such as increased field supervision or driver safety training programs on the driving performance of younger EMTs.

### Which is best, how many hours...??

### What about changing driver behavior in the real world??

**AN OPTIMAL SOLUTION FOR ENHANCING AMBULANCE SAFETY: IMPLEMENTING A DRIVER PERFORMANCE FEEDBACK AND MONITORING DEVICE IN GROUND EMERGENCY MEDICAL SERVICE VEHICLES**

Nadine R. Levick, MD, MPH  
 Maimonides Medical Center

**REAL WORLD APPLICATION OF AN AFTERMARKET DRIVER HUMAN FACTORS REAL TIME AUDITORY MONITORING AND FEEDBACK DEVICE: AN EMERGENCY SERVICE PERSPECTIVE**

Nadine Levick  
 Objective Safety LLC  
 United States of America  
 Larry W. Korsch  
 Michael J. Nagel  
 Objective Audiology  
 United States of America  
 Paper Number 07-2214

### Purpose of 'Feedback box' Program

- ▶ Enhance Safety
- ▶ Improve Driver Performance
- ▶ Save Maintenance Dollars
- ▶ Aid Accident / Incident Investigation

### How the Device Works

- ▶ Computerized monitoring device installed on each vehicle to measure parameters
- ▶ Each driver has individual key "fob"
- ▶ Data collected every second including: vehicle speed and performance, driver behaviors and emergency mode
- ▶ Auditory feedback of warning 'growls', and penalty tones
- ▶ Data downloaded automatically every day

### Demonstrated Effectiveness

I – blind data, no growls  
 II – growls & tones ON unidentified data capture  
 III – identified data

### And when a rare crash happens....

### Unit 302 Accident

### A key to safe ambulance transport

### Monitoring and feedback devices

- ▶ Implementation well received by the providers.
- ▶ 20% cost saving in vehicle maintenance within 6 months.
- ▶ No increase in response times
- ▶ Fewer crashes and less severe crashes
- ▶ Sustained improvement in safety proxies, with no inservice or retraining after the initial introduction period.

### Other monitoring devices

- ▶ Primarily to record events during and immediately preceding a crash
- ▶ Give no driver crash prevention feedback
- ▶ Administratively burdensome
- ▶ Intrusive
- ▶ Not demonstrated to be as effective in improving vehicle maintenance costs or as effective in modifying driver behavior long term

### You want a system that works!!

- ▶ Does the system really work
- ▶ Is it going to be a major burden on your staff to implement
- ▶ What are the real costs
- ▶ Are you going to have video of your company vehicle on you tube??

### The jury is out on

- ▶ Opticon
- ▶ Simulators

### Policy makes a difference...



### "Are our policies killing people?"

- ▶ 1991-2000, 302,969 Emergency vehicles were involved in MVCs - 1,565 involving fatalities\*
- ▶ In PA 1997-2001, ambulances were more likely than similar sized vehicles to be involved in\*:
  - 4 way intersection crashes (43% vs 23%, p=0.001)
  - Collisions at traffic signals (37% vs 18%, p=0.001)
  - MVCs with more people injured (76% vs 61%, p=0.001)

\*Comparison of Crashes Involving Ambulances with those of similar sized vehicles - Adam Ray, Douglas Kupas, PEC Dec 2005;0-412-415

### Vehicle Operations Position Statement



### WEMSA – October 2007

1. Emergency Vehicle Operations Policy
2. Vehicle operations training and evaluation
3. A program of graduated driver responsibility
4. Drivers only age 25 and over
5. Complete stop at an intersection
6. Restricted use of Red Lights and Sirens
7. Monitoring of emergency vehicle operations

### WEMSA covered some key and important policies and procedures But....

- ▶ What about hours of service?
- ▶ What about visibility at the scene? For providers and the vehicles...?
- ▶ What about protective equipment?
- ▶ What about ambulance design safety?
- ▶ What about reporting of adverse events?

## Integration and Collaboration

EMS Transport Safety Strategies - 2006-2007 New York State Strategic Highway Safety Plan

**Strategic Highway Safety Plan**  
2006 - 2007

## State Strategic Highway Safety Plans

- ▶ Required as part of the SAFETEA-LU legislation
  - (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users)
- ▶ Effective October 1<sup>st</sup> 2007
- ▶ Focus is the 4 'E's'
  - Engineering
  - Education
  - Enforcement
  - Emergency Medical Services
- ▶ EMS is a core theme

## State SHSP EMS Focus\*

STATE SHSP	AREA of EMS FOCUS
<b>New York</b> EMS Section 6 of 43 pages	<ol style="list-style-type: none"> <li>1. Emergency Medical Services Dispatch Services</li> <li>2. Emergency Medical Services Partnerships</li> <li>3. Pre-hospital Training Programs</li> <li>4. Road Condition and Incident Response</li> <li>5. EMS Response/Crash Prevention</li> </ol>
<b>Maine</b> EMS Section 4 of 36 pages	<ol style="list-style-type: none"> <li>1. Establish EMS Legislation and Regulation</li> <li>2. Provide EMS Funding</li> <li>3. Enhance Capabilities for Medical Response to Disaster</li> <li>4. Expand EMS Human Resources</li> <li>5. Enhance EMS Frictionless Systems</li> <li>6. Expand EMS Services</li> <li>7. Facilitate EMS Communications</li> <li>8. Conduct EMS Public Education and Information Programs</li> <li>9. Conduct Injury Prevention Public Awareness Efforts</li> <li>10. Enhance Medical Direction</li> <li>11. Provide Enhanced Trauma System and Facilities</li> <li>12. Establish an EMS Information System</li> <li>13. Evaluate and Monitor EMS Programs</li> </ol>
<b>Alabama</b> EMS Section 8 of 47 pages	<ol style="list-style-type: none"> <li>1. Identify and Analyze Performance Data</li> <li>2. First Responders</li> <li>3. Identify Crash Location</li> <li>4. Statewide assessment and Plan</li> <li>5. Improve EMS Rural Access</li> </ol>

\*Credit to LEVAC, Strategic Highway Safety Plans - Where in EMS?, Jan 2008

## July 2007 Report

**ANALYSIS BRIEF**  
Factors Underlying the Adoption of New Safety Technologies by U.S. Commercial Motor Carriers

**Summary**  
New safety technologies for commercial motor vehicles have driven increased awareness among carriers, shippers, insurers, and government as to the potential benefits of these technologies to reduce the liability factors contributing to the adoption of new safety technologies. This survey explored the relationship between motor carrier organizational factors and the use of safety technology solutions. The results of the survey...

## July 2007

Commercial Truck and Bus Safety

Health and Safety Program for Commercial Drivers

The Role of Public Safety in Promoting Commercial Motor Vehicle Safety

## Pennsylvania Code

Part 71. Emergency Medical Services

§ 71.1. Application and liability reporting. An ambulance service shall report to the appropriate regional EMS council, or a service member prescribed by the Department, an ambulance vehicle accident that is reportable under 79 Pa. C. S., and an accident or injury to an individual that occurs in the line of duty of the ambulance service that results in a fatality or medical treatment at a facility. The report shall be made within 2 hours after the accident or injury. The report of a fatality shall be made within 8 hours after the fatality.

## NAEMT July 2006 Position statement

**National Association of Emergency Medical Technicians**  
Statement on Safety Restraint Use in Emergency Medical Services

**Background**  
Emergency Medical Services (EMS) throughout the nation has been struck by a dangerous epidemic. Although there is no single cause, the most likely cause of death of a member of the EMS community is due to motor vehicle-related collisions (1). Each year there are an average of 40,000 EMS-related motor vehicle collisions resulting in an average of one death per week (2).

## Patients must be in the over the shoulder harness, medics restrained in seat belts, equipment secured in seat belts, equipment secured

**Be SECURE**  
Every patient, every medic, every piece of equipment.  
**EVERYBODY BUCKLES UP.**



## Transport oversight?

- ▶ In contrast to the bus and truck industries, which have -
  - comprehensive safety oversight
  - transportation safety interventions
  - transportation safety data capture via the Federal Motor Carrier Safety Administration (FMCSA)
- ▶ EMS has been focused more as an acute health care delivery and emergency medical service and largely outside of much of the other transportation oversight infrastructure that exists

## Safety oversight of what and .... by whom

- ▶ Vehicle Safety
- ▶ Vehicle Design
- ▶ Transportation systems safety
- ▶ Safety Equipment Design
- ▶ Vehicle and Safety Equipment Testing and Standard development
- ▶ Safety policies

## Vehicle design –chassis, interior features and layout, vehicle type

### 1960 to 2007



### Some recent adverse outcomes

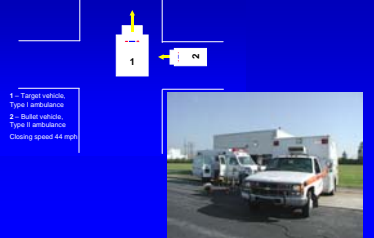


### 'Workplace' Hazards



### Full Vehicle Crash Testing

#### Test 1 – Right side impact





No 'a'... then NO 'F' !!!!

▶ **F = ma**

where F – force  
m – mass  
a – acceleration

Sir Isaac Newton (1642-1727), Philosophiæ Naturalis Principia Mathematica (Mathematical Principles of Natural Philosophy), published in 1687. [https://en.wikipedia.org/wiki/Newton's\\_laws\\_of\\_motion](https://en.wikipedia.org/wiki/Newton's_laws_of_motion)

**KKK certified and FMVSS exempt..?**

2 dead in Michigan ambulance crash

The Associated Press

SKANDIA TOWNSEND, 48, along on Upper Peninsula members, state police said.

The truck was stopped in Township waiting for train General Hospital rear-end.

Investigators found no ambulance patient Carrie Cornell, died at the scene member, Ryan Peterson,



**JEMS.com**

Colorado ambulance safety thrust in spotlight

News Report

Page Last Updated: Tuesday, May 16, 12:20:07

Colorado ambulance safety thrust in spotlight

A pair of ambulance crashes in little more than a week have left three people dead in Colorado. State health officials plan to make ambulance safety a key issue in the coming weeks. JEMS is highlighting a series of news stories about the incidents and an article from the November 2003 issue of JEMS that details a consensus approach to staying safe while riding in an ambulance.

Full Story

**FMVSS exempt.....**




**NOT new technical data...**



Richardson S.A., et al, *Int. J. of Crash.*, 4, 3, 239 - 259, 1999

Side facing 4-point harnesses demonstrated to be lethal, even at slow ground vehicle speeds

**The Ride of Your Life....**



**Being seated IN an automotive seat is what will protect you**

- ▶ Anything that allows or encourages you to get up out of your seat will also encourage you to be injured or killed – it is potentially lethal to be out of your seat in any fashion
- ▶ 4 or 5 point harnesses for sidefacing occupants are potentially lethal – and is in **NO WAY SUPPORTED BY ANY DATA OR AUTOMOTIVE SAFETY EXPERTISE**

**Rash of "Safety Concept" vehicles.....**

Devoid of substantive automotive safety engineering input or testing

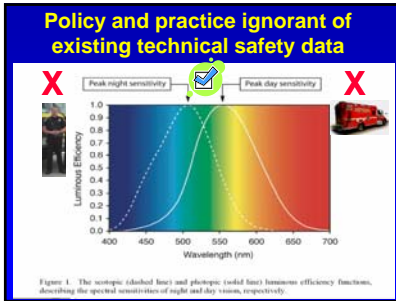


**Yes, the ride of your life....**

- ▶ Sure... these vehicles all parade around the EMS and Fire shows **BUT...**
- ▶ **NOT ONE** of these vehicles has been to the automotive safety shows or scrutinized by the automotive safety industry

### Recent Visibility Webinar www.GlobalEMSForum.org

Daylight color sensitivity is very different, especially for blues and reds, at the ends of the spectrum.

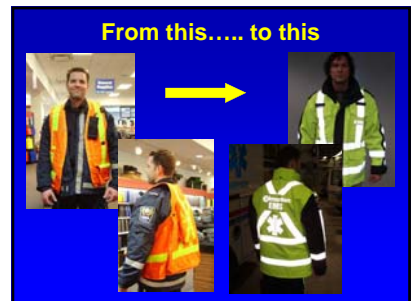


### Under Way... Emergency Vehicle Visibility and Conspicuity Study

- Funded by the USFA conducted by IFSTA
- Looking at the effectiveness of reflective markings used on emergency vehicles
- Doing best practice research and working with manufacturers



- Having access to that technical knowledge supports changes to improve safety practice



Another excellent example -  
From this to ... this!



- ▶ Operating in an environment where many aspects of safety are still devoid of safety standards – requires technical knowledge and understanding

Not rocket science..



But whatever color .... If you run a red light some will be killed



Benefit of Safety

- ▶ Safe practices save lives, time and money

R & D  
“Ripoff and Duplicate”

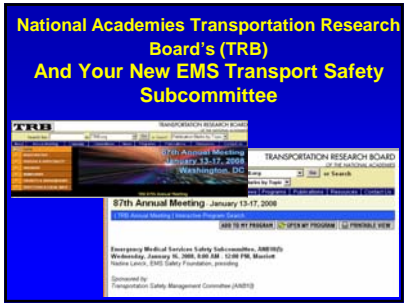
- ▶ Avoid reinventing the wheel at all costs
- ▶ Where are the best practices that we need to transfer knowledge from

Innovation

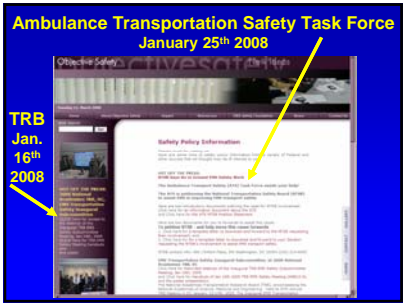
The EMS Safety Foundation  
Intro and Logistics Webinars from  
December 11th 2007 & Jan 8th 2008  
EMS Safety Foundation tab at  
[www.objectivesafety.net](http://www.objectivesafety.net)



Ambulance Transport Safety  
Task Force (ATS) and the  
National Transportation safety  
Board (NTSB)



- ### TRB EMS Safety Update
- ▶ Brought together NHTSA, FHWA, TRB, National Academies, DOT, CAMTS & EMS
  - ▶ 3 presentations
    - TRB and EMS
    - Safety air/ground
    - Ground Ambulance Safety Issues and Directions
  - ▶ Recorded presentations and handouts available at [www.objectivesafety.net](http://www.objectivesafety.net)
  - ▶ Potential for EMS safety research funding
  - ▶ Next TRB meeting January 11-15, 2009 – all are welcome



- ### International approaches
- ▶ The state of the art non-USA vehicles have NO squad bench nor the after market structural vehicle modifications that can potentially decrease crashworthiness integrity that were seen in study vehicles.



### Flexibility to manage two patients



### High speed crash, rolled and the occupants (patient and medics) had only minor scratches



### Norway initiatives



### Sweden initiatives



### Other successful models



### Ergonomic layout and equipment



### Securing equipment



### Future needs

- ▶ Safe vehicle design and structure
- ▶ Standards –scene visibility, vehicle and personnel visibility
- ▶ Head protection
- ▶ Meaningful driver training and monitoring
- ▶ Communication systems
- ▶ Protective clothing
- ▶ Vehicle testing standards
- ▶ Minimum equipment to carry based on demonstrated outcomes

## Safety Management

- ▶ A Safety Culture
- ▶ Protective Policies
- ▶ Protective Devices
  - ♦ To prevent a crash
  - ♦ In the event of a crash
- ▶ Continuous Education and Evaluation

## So....

- ▶ **Which vehicle do you want to be in ?**
- ▶ Which vehicle is the best for efficient, and effective patient care?
- ▶ Which vehicle provides optimal risk management ?
- ▶ **What is the optimal fleet mix?**

## Risk/Hazards

- ▶ Predictable risks
- ▶ Predictable fatal injuries
- ▶ Serious occupational hazard
- ▶ Public safety hazards

## Creating a Safety Culture

within a company must start with upper management's commitment to safety

- ▶ Awareness
- ▶ Training
- ▶ Incentive

## Some simple and available solutions out there now

- ▶ Intersection Policy
- ▶ PPE
- ▶ 'Feedback' boxes

## What do we know works...

- ▶ Vehicle Operations Safety Policies
- ▶ Squad bench lap seat belts
- ▶ Patient over the shoulder harnesses
- ▶ Securing equipment
- ▶ Forward and rear facing seating
- ▶ Some electronic technical devices
- ▶ Safety awareness
- ▶ Cultural change

## What you can do now

- ▶ Have a written and implemented 'safety program'
- ▶ Secure all equipment
- ▶ Secure occupants with standard belts
- ▶ Don't drive through red lights/stop signs
- ▶ Use properly implemented "Feedback Boxes"
- ▶ Monitor crash events with common denominators (ie. per 100,000 miles and per trip)

## Important Principles !

1. A culture of safety
2. Drive cautiously
3. Wear your belts & restrain all occupants
4. Secure all equipment
5. Integrate scientific data into your policies and procedures

- Unrestrained occupants and equipment are a potential injury risk to all occupants

## Very Important Principle

Ambulance transport safety is part of a **SYSTEM**, the overall balance of risk involves the safety of all occupants and the public

**PREDICTABLE  
PREVENTABLE  
and  
NO ACCIDENT**

### Conclusion

- ▶ EMS transport has serious hazards and safety issues
- ▶ Major advances in EMS safety research, infrastructure and practice over the past 5 years
- ▶ New technologies for vehicle design, occupant PPE and equipment restraint and driver performance are now available
- ▶ Development of substantive EMS safety standards is a necessity and a reality
- ▶ Failure to transfer knowledge from transportation and automotive safety is unacceptable and dangerous
- ▶ EMS is still way behind the state of the art in vehicle safety and occupant protection

### And....

- ▶ It is no longer acceptable for EMS to be functioning outside of automotive safety and PPE safety standards for prevention of and protection of EMS providers and the public from injury and death

**Thank you!  
Any Questions??**

Electronic handout available online  
<http://www.objectivesafety.net>

