University Transportation Research Center (UTRC)
NYMTC Brown Bag Seminar, January 17th, 2007

Emergency Medical Services: A Critical Condition in Transportation Safety –

Nadine Levick, MD MPH
Research Director,
Objective Safety LLC,
EMS Safety Foundation

A tragic emergency health care intervention outcome

It does happen….

Recently in New York

What are the solutions?

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

EMS

- Emergency Medical Services (EMS) - an important and unique aspect of the transportation system, it encompasses public safety, public health and an emergency service.
- What are the system wide transportation safety issues and challenges faced by the Emergency Medical Services?

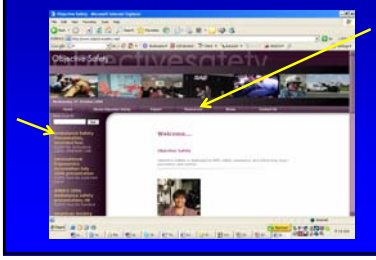
In a nutshell

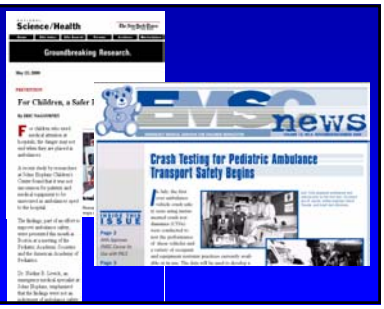
- Comprehensive perspective on:
  - system wide data
  - the challenges
  - the cutting edge
  - the gaps in knowledge and application of transportation systems safety in the big picture of Emergency Medical Services transportation

Your Interactive Handout awaits you online…

- www.objectivesafety.net

http://www.objectivesafety.net



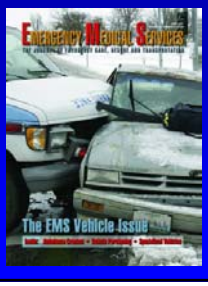


Transport related aspects of EMS

- dispatch of EMS vehicles
- transport policies and protocols
- vehicle fleets and vehicle design
- vehicle purchase standards
- Intelligent Transportation Systems technology
- driver training
- training simulation
- driver performance monitoring
- roadside and road design
- integrated traffic safety technologies
- scene safety and visibility
- safety data capture
- safety oversight

USA EMS

- EMS Systems - >15,000
- Personnel - ~1 million
  (~30% F/T professional & 70% volunteer)
- Vehicles - ~50,000
  (Type I, Type II, Type III, Freightliners, ?motorcycles)
- Transports - ~50 million
  (to Emergency Depts ~ 50%, < 1/3 emergent)
- Cost - ~$8 Billion annually
- Safety Oversight - ? Disparate



Transport oversight?

- In contrast to the bus and truck industries, which have comprehensive safety oversight, and transportation safety interventions, as well as 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 service and largely outside of much of the other transportation oversight infrastructure that exists.
- This is an opportunity for transportation planners, engineers, and system operators to see a comprehensive overview some of the multidisciplinary transportation challenges faced by Emergency Medical Services.

What is 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 (EMS) vehicles - Ambulances

- What are the transport 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 transport system be optimized?

EMS Definition

- An Emergency Medical Services system is –
  - A coordinated arrangement of resources (including personnel, equipment, and facilities) which are organized to respond to medical emergencies, regardless of cause. (ASTM, 1988).
- EMS –
  - The services provided to accident victims and patients suffering from severe acute illness and psychiatric emergencies.
  - Detection and reporting of medical emergencies, initial care, transportation and care for patients in route to health care facilities, medical treatment for the acutely ill and severely injured within emergency departments, and the provision of linkages to continued care or rehabilitation services. (EMS Research Agenda 2001)

History of EMS

- EMS is a relatively new industry
- An unusual history of beginnings within the mortician industry.
  - Early ambulances were hearses, once motorized usually a Cadillac, a vehicle in which an occupant could be transported in the recumbent position
- Over the past 100 years, the sophistication of EMS medical care has advanced dramatically
- EMS communications and transportation technology have not kept up with that pace

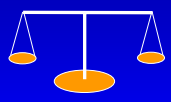
Firstly!

- An accident ?
- or
  a predictable and preventable event

This IS a transportation safety issue

- Systems engineering
  - Where do ambulance crashes occur?
  - What transportation safety engineering interventions
  - ITS –
  - Does opticom work effectively in this environment given the traffic density and emergency vehicle density?
  - Merit of emergency vehicles being fitted with early warning technologies
  - Proper design of emergency vehicle traffic flow
  - Fleet mix to match anticipated transport environmental challenges (ie police model – bicycle, motorcycle, horse, three wheeled, cruiser, van, truck)?

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

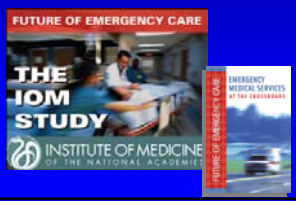
the EMS transport process

- 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

TIME & PLACE

"Nation's Emergency Care System is fragmented, unable to respond to disasters",

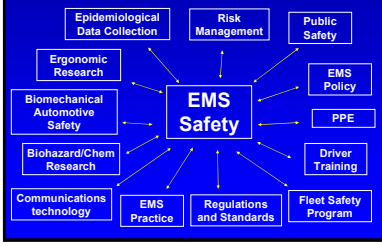
says Institute of Medicine, June 14, 2006



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

EMS Transport Safety IS Complex AND Multidisciplinary



This is not acceptable

In the USA*

- ~ 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

*FARS/BTS 2004-5

Is it your services tragic year?

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

Paramedic charged in crash that killed 2

By Tillie Fong, Rocky Mountain News
July 25, 2006

STORY TOOLS

Email this story | Print

STERLING - A paramedic with MetroRural Ambulance has been charged with careless driving in connection with an accident in May that killed two people and injured two others.

Chris Larusso, 22, of Westminster, was issued a summons for two counts of careless driving resulting in death and two counts of careless driving resulting in serious bodily injury.

All are misdemeanor charges and carry possible sentences of 10 days to a year in jail and fines of $100 to $1,000.

Larusso was driving an ambulance May 9 on interstate 76, about 15 miles west of Sterling, when he apparently rear-ended a semi-tractor truck.

Two passengers in the ambulance - nurse Karen Woods, 43, of Elizabeth, and ultrasound technician Vicky Thomas, 35, of Goodland, Kan. - were killed.

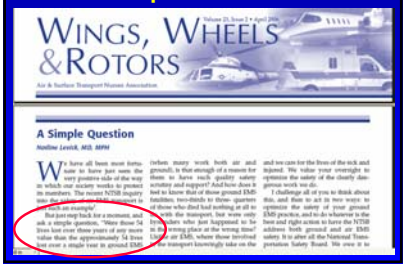
A patient, Kelsey Schlichenmayer, 43, of Burlington, was seriously injured, but hours after the accident, gave birth to a boy at Sterling Regional Medical Center.

Larusso and paramedic Dan Beza, 31, of Centennial, were treated for their injuries and released.

Safety oversight of what and by …. whom

- Vehicle Safety
- Vehicle Design
- Safety Equipment Design
- Vehicle and Safety Equipment Testing and Standard development
- Safety policies

A Simple Question….



The NTSB

About the NTSB

History and Mission

The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in the other modes of transportation -- railroad, highway, marine and pipeline -- and issuing safety recommendations aimed at preventing future accidents. The Safety Board determines the probable cause of:

- all U.S. civil aviation accidents and certain public-use aircraft accidents;
- selected highway accidents;
- railroad accidents involving passenger trains or any train accident that results in at least one fatality or major property damage;
- major marine accidents and any marine accident involving a public and a nonpublic vessel;
- pipeline accidents involving a fatality or substantial property damage;
- [illegible] and
- selected transportation accidents that involve problems of a recurring nature.

The Board derives its authority from Title 49 of the United States Code, Chapter 11. The rules of the Board are located in Chapter VIII, Title 49 of the Code of Federal Regulations.

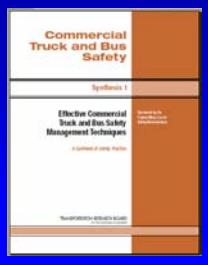
The NTSB is responsible for maintaining the government's database of civil aviation accidents and also conducts special studies of transportation safety issues of national significance. The NTSB provides investigators to serve as U.S. Accredited Representatives at

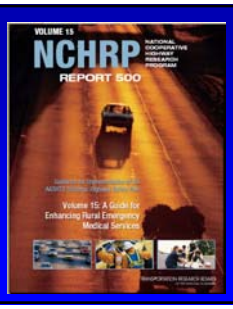
TRB TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Active Projects

(all due late 2006)

- Commercial Motor Vehicle Driver Training Curricula and Delivery Methods and Their Effectiveness
- Commercial Motor Vehicle Carrier Safety Management Certification
- The Role of Safety Culture in Preventing Commercial Vehicle Crashes
- The Impact of Behavior-Based Safety Techniques on Commercial Motor Vehicle Drivers
- Health and Wellness Programs for Commercial Motor Vehicle Drivers





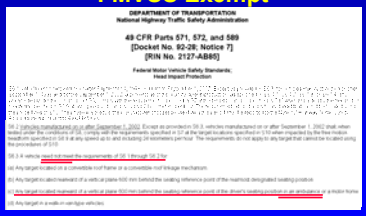
What about FMCSA's Mission

- Office of Research and Analysis is committed to reducing the large truck-related fatality rate from 2.8 per 100 million truck-miles in 1996 to 1.65 by 2008.

Mission

- The mission of FMCSA's Office of Research and Analysis is to reduce the number and severity of commercial motor vehicle (CMV) crashes and enhance the efficiency of CMV operations by:
  - Conducting systematic studies directed toward fuller scientific discovery, knowledge, or understanding
  - Adopting, testing, and deploying innovative driver, carrier, vehicle, and roadside best practices and technologies
  - By expanding the knowledge and portfolio of deployable technology, the research and technology program will help FMCSA reduce crashes, injuries, and fatalities and will deliver a program that contributes to a safe and secure commercial transportation system.

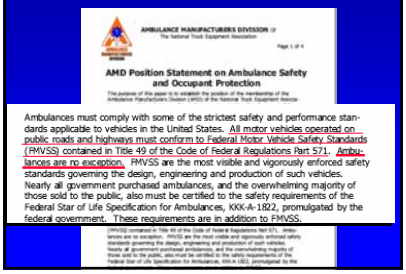
USA Ambulances: FMVSS Exempt



DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration

49 CFR Parts 571, 572, and 589
[Docket No. 92-28; Notice 7]
[RIN No. 2127-AB80]

Federal Motor Vehicle Safety Standards;
Head Impact Protection



AMBULANCE MANUFACTURERS DIVISION

AMD Position Statement on Ambulance Safety and Occupant Protection

Ambulances must comply with some of the strictest safety and performance standards applicable to vehicles in the United States. All motor vehicles operated on public roads and highways must conform to Federal Motor Vehicle Safety Standards (FMVSS) contained in Title 49 of the Code of Federal Regulations Part 571. Ambulances are no exception. FMVSS are the most visible and vigorously enforced safety standards governing the design, engineering and production of such vehicles. Nearly all government purchased ambulances, and the overwhelming majority of those sold to the public, also must be certified to the safety requirements of the Federal Star of Life Specification for Ambulances, KKK-A-1822, promulgated by the federal government. These requirements are in addition to FMVSS.

"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)

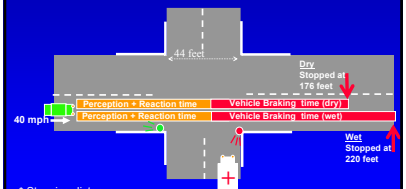
**Comparison of Crashes Involving Ambulances with those of similar sized vehicles – Adam Ray, Douglas Kupas, PEC Dec 2005;9:412-415*

So.. The real world for an EMS vehicle approaching a red light

- You think they heard you…
- You know they must have seen you..
- And maybe they did
- ….. But..
- There is NO way humanly possible that they could stop…..

The real world

Intersection passenger car stopping distance* at 40 mph dry and wet

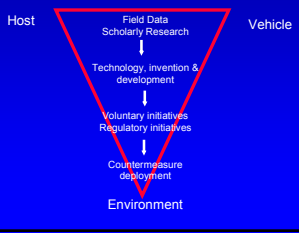


* Stopping distance:
Perception time + Reaction time + Vehicle braking time
(varies with age, skill, agility, alertness + vehicle type, tire pressure, road etc)

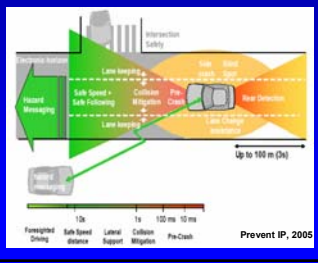
A peer reviewed tragedy

- Persistent disconnect between automotive safety science and EMS transport safety approach
- Pre-hospital and Emergency Care 2004
  - *"EMS vehicle drivers are advised to approach the intersection, slowing to ensure that traffic has stopped and making eye contact with other drivers before entering the intersection."*
- In the modern era of road safety to suggest that a strategy of "eye contact" to be made at an intersection with a driver traveling at ~ 40mph in the hope that this would result in a safety intervention, is at best frightening

Automotive Injury Triangle and Safety Development



Intelligent Transport Safety Systems



Prevent IP, 2005

Increasing awareness …

'Move Over' law takes effect on New Year's Day

A new state law takes effect Monday, aiming to protect emergency workers from road injury.

It's the "Move Over" law.

The new law requires drivers approaching stopped emergency vehicles with lights activated to move a lane away from the equipment or slow to a safe speed when such a lane change is impossible or unsafe.

The law covers all roads with two or more lanes in the same direction.

"Anyone who works alongside our highways is particularly vulnerable to being hurt by inattentive and careless drivers," said Trina Roberts, director of the Office of Highway Safety. "Sadly, dozens of law enforcement officers alone in Delaware have been injured and even killed by passing motorists while working outside of their vehicles."

Col. Thomas F. MacLeish, superintendent of Delaware State Police said emergency workers depend on motorists' attentiveness.

Some challenges

- No accepted national safety standards for -
  - EMS fleet management or safety practice
  - Ambulance vehicle rear compartment design and performance
  - Provider occupational injury protective equipment
- Yet convincing data for injury risk and hazard
- Need for patient, provider and public safety focus

Safety oversight of what and by …. whom

- Vehicle Safety
- Vehicle Design
- Safety Equipment Design
- Vehicle and Safety Equipment Testing and Standard development
- Safety policies

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

Data

- What national statistics are there for EMS transport safety
- What is known about 'wake effect'

EMS Best Practice, Sept 2006

Qr What can emergency workers do in their own organizations to promote ambulance safety?

Pull back on aviation safety models. Secure all equipment – oxygen cylinders, defibrillators, cell phones; there is no reason for not doing so. Unsecured defibrillators have caused serious life-threatening injury. A cell phone in the head at 40 miles per hour can kill you.

Firmly screw patients with over-the-shoulder harnesses. If medically feasible, have them sit as upright as possible for safety. Seat belt all passengers, unrestrained occupants risk themselves and others. Most of the time EMS providers do not need to curve around the vehicle.

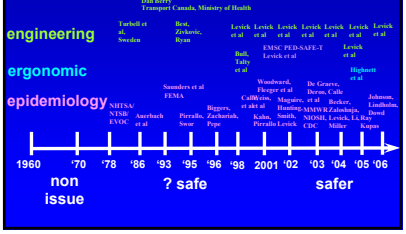
sonnel Not Buckling up

...ig to a survey reported not securing their patients, and one-half said that wearing a ...survey of more than 300 EMS providers ...Academic Emergency Medicine. The survey ...did not identify the correct method of ...sponse did not choose the correct method ...despite the fact that most respondents ...ative was time-consuming nor difficult.

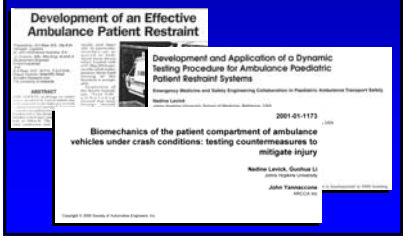
...while in the front of an ambulance

...when necessary, inform the driver. Other actions include:
- Establish and maintain vehicle inspection policies;
- Require a full stop at and avoid driving through red lights;
- Increase attention to policies and equipment to prevent on-scene EMT-to-patient accidents;
- Use thorough and comprehensive driver selection and training;
- Use real-time driver monitoring and feedback devices;
- Use tiered response. Traveling at breakneck speeds to get to a sprained ankle is not wise; one crash during that and the negative impact on EMS is huge;
- Consider using head protection inside and outside the vehicle, with a race for biohazard protection, integrated sound and maybe other safety features;
- Implement elements of the ANSI/ASSE Z15 standard for safe motor vehicle practices; and
- Support collection of population-based injury data. -JP-v

Ambulance Safety Research: A New Field



We should use the best safety practices demonstrated in engineering



Predictable risks

- More often at intersections, & with another vehicle ($p < 0.001$)*
- 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#
- 70% of fatal crashes EMS crashes during Emergency Use#
- More likely to crash at an intersection with traffic lights (37% vs 18% $p=0.001$) & more people & injuries/crash than similar sized vehicles##

*Kahn CA, Pirrallo RG, Kuhn EM. Prehosp Emerg Care 2001 Jul-Sep;5(3):261-9
**Becker, Zaloshnja, Levick, Li, Miller, Acc Anal Prev 2003
***Maguire, Hunting, Smith, Levick, Annals Emerg Med Dec 2002
#NIOSH, 2003
##Ray AM, Kupas DF. Prehosp Emerg Care 2005 Dec; 9:412-415
###NHTSA, 49 CFR Parts 571, 572 & 589 Docket no. 92-28; notice 7

EMS Provider Fatalities

- 12.7 fatalities/100,000 EMS workers
- Greater than 2 X the national average (5.0 fatalities/100,000)
- Similar to Police (14.2/100,000) and Fire Fighters (16.5/100,000)

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

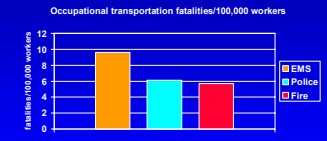
and what is killing EMS ?

EMS personnel fatalities*

- 74% transportation related
  - 1/5 of ground transport fatalities were struck by moving vehicles
- 11% were cardiovascular
- 9% were homicide
- 4% needle sticks, electrocution, drowning and other

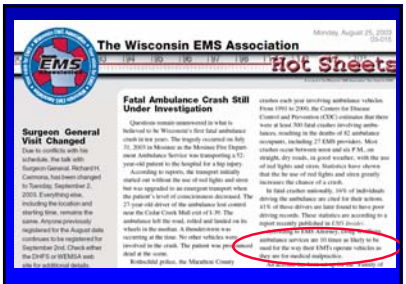
** Maguire, Hunting, Smith & Levick, Occupational Fatalities in Emergency Medical Services: A Hidden Crisis, Annals of Emergency Medicine, Dec 2002*

A word about occupational transportation fatalities..

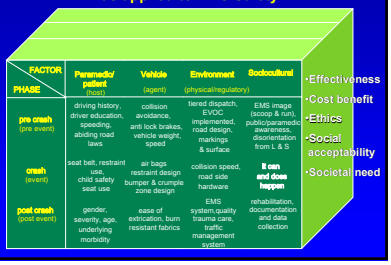


- WE HAVE A BIG PROBLEM HERE

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



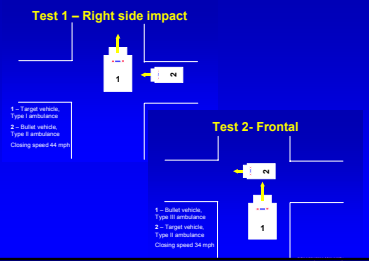
Haddon/Baker/Runyan Phase-Factor Matrix as applied to EMS Safety*



EMS Research /Data Vacuum

- ? total no. of ambulances
- ? total no. of medics
- ? total no. of runs (per age & severity)
- ? total pt. miles (per age & severity)
- ? true crash fatality rate per mile
- ? crash injury rate
- ? adverse events

Full Vehicle Crash Tests



Air EMS is a role model for safety initiatives and focus

Safety Management

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

EMS Risk/Hazards

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

What's new

- New automotive safety technologies
  - EVS
  - ITS
  - Monitoring and feedback enhancements
- New expertise
  - TRB
  - ASSE
  - SAE
  - UTRC
  - Ergonomics
  - Industrial Design

Regional University Transportation Research Centers

Protective devices/concepts

To prevent a crash
- Driver feedback
- Driver monitoring
- Driver training
- Vehicle Intelligent Transportation System (ITS) technologies
- Tiered dispatch
- Appropriate policies

In the event of a crash
- Vehicle crashworthiness
- Seat/seat belt systems
- Equipment lock downs
- Padding
- Head protection

Tiered Dispatch

Back up Camera….. Shouldn't all vehicles have one of these?

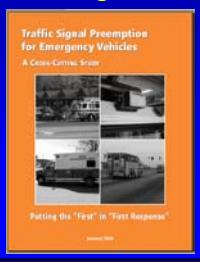
The "Black Box"

Driver behavior monitoring and feedback device

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

Data, but is it generalizable



EMS is emerging in the transport safety arena

- First and only presentation of ambulance safety research at ESV Congress was 2001
- SAE Toptec on Military and Emergency Vehicles, USA , September 2001
- Emergency Vehicle Symposium, Australia, Melbourne, May 2003
- Sporadic Ambulance safety research presented at peer reviewed AAAM, ITMA, SAEM, Safe America, World Injury, Asia Pacific Injury Conferences 1999-2005
- Next week at inaugural meeting at 2007 TRB Congress in DC

Global EMS Vehicle Safety Standards v Specifications and Guidelines

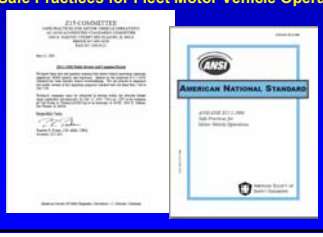
- EMS Safety and Performance Standards
  - Australia & New Zealand 4535
  - Common European Community (CEN) EN1789
- Non EMS Specific USA Standards
  - [Aviation - FAA/CAA/JAA]
  - Z15 – Fleet vehicles safety management
- USA EMS Specification & Guidelines
  - Purchase Specification: KKK & NTEA – AMD
  - Guideline: EMSC Dos and Donts
    ASTM, CAAS and CAMTS

USA ambulance purchase specifications GSA:KKK-A-1822E, 2002

- Static Pull test
- 2200 Lbs. (8G's) in Longitudinal and Lateral
- No dynamic test
- No definition to manikin mass
- No restraint for equipment
- Voluntary

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

Legal Perspectives on Z.15

ANSI Z15.1 Standard: A Tool for Preventing Motor Vehicle Injuries and Minimizing Legal Liability
By Adele L. Abrams, Esq., CMSP
Law Office of Adele L. Abrams P.C.

Motor vehicle crashes that occur on American roadways have historically been the leading cause of occupational fatalities in this country. In the decade between 1992 and 2001, more than 13,000 civilian workers died in such incidents – accounting for 22 percent of all injury-related deaths. According to the Occupational Safety and Health Administration (OSHA), every 12 minutes someone dies in a motor vehicle crash, every 10 seconds an injury occurs and every 5 seconds a crash occurs.[1]

Employers whose workers are involved in such crashes have tremendous liability exposure, especially if the individuals injured or killed are third parties (non-employees), where no worker's compensation liability shield exists as an exclusive legal remedy. They bear not only the worker's compensation costs for their employees, and the potential damage awards from third party tort claims, but also the costs of equipment replacement and the indirect costs of workforce disruption and lost productivity associated with such incidents.

Healthcare Safety

- Importance of safety as an organizational value
- Proactive approaches to safety management and leadership
- Prevention of accidents, injuries
- Presents authoritative data from OSHA, EPA, NFPA, NRC, and JCAHO
- ? EMS Transport Safety? – Not a mention

Hot off the press… from the IFAC and USFA

IAFC NEWS ALERT
FOR IMMEDIATE RELEASE
Contact: IAFC Communications Department
International Association of Fire Chiefs
703/273-0911
www.iafc.org

The IAFC and the USFA Develop Model Policy and Procedures Guide for Emergency Vehicle Safety

Fairfax, Va., October 20, 2006… The International Association of Fire Chiefs (IAFC) and the Department of Homeland Security's United States Fire Administration (USFA) announce the release of a *Guide to Model Policies and Procedures for Emergency Vehicle Safety*. This innovative, web-based educational program is aimed at reducing the impact of vehicle related incidents on the fire service and the communities they protect. The guide provides in-depth information for developing policies and procedures required to support the safe and effective operation of all fire and emergency vehicles, as well as privately-owned vehicles, which are the leading cause of volunteer firefighter on-duty fatalities responding and returning to emergencies.

NAEMT July 2006 Position statement

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

Statements

The National Association of Emergency Medical Technicians (NAEMT) strongly advocates the use of restraints and safety restraint systems to prevent injuries to EMTs, Paramedics, patients, and all occupants of any emergency response vehicle.

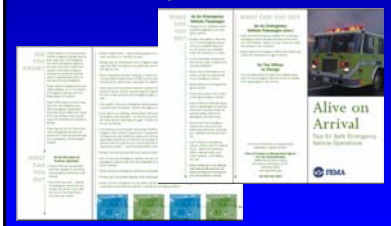
The NAEMT strongly advocates the creation of a National EMS Injury Data Base which can be used to quantify all injuries to EMS providers including all EMS vehicle crashes.

The NAEMT strongly advocates the development of cognitive and scientific studies to determine appropriate restraint and protection systems for the EMS provider, patient and passengers of all emergency response vehicles.

Background

Emergency Medical Services (EMS) throughout its history has been shown to be a dangerous profession. Although there is limited data to clearly define the inherent risk of performing the job functions within EMS, it is generally accepted that 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 in excess of 4000 reportable ambulance crashes resulting in an average of one death per week (2).

Tips for Emergency Vehicle Operations



Sit Down for EMS Safety!

USFA Emergency Vehicle Safety Initiative

VFIS Summer 2006

FDNY a leader in safety

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

What's missing

1. What data is collected nationally?
   - We have no denominator data
   - We have incomplete numerator data
2. Absent population based national injury data or injury mechanics data
3. Absent structured automotive safety engineering input

   1+ 2 +3 = resultant inability to design and evaluate efficacy of injury interventions

4. What oversight is there
5. Which organizations would determine policy

Future

- Meaningful Goals
- New policies
- New practices
- New standards
- New vehicles
- New technologies

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

Conclusion

- 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 transport safety standards is a necessity and a reality
- Enhanced cross disciplinary collaboration in development of safety initiatives now exist
- EMS is still way behind the state of the art in transport and vehicle safety and occupant protection

And….

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

PREDICTABLE
PREVENTABLE
and
NO ACCIDENT

Any Questions??

Electronic handout available online

http://www.objectivesafety.net

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!

Nadine Levick MD, MPH

www.objectivesafety.net

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