Georgia Association of EMS Meeting,
Calloway Gardens, GA, November 8th, 2007

EMS Transport Safety: How do we protect our most valuable resources

Nadine Levick, MD MPH
Research Director, EMS Safety Foundation
CEO, Objective Safety
New York, NY

Paramedic critically injured November 7, 2007 - yes… yesterday…

Paramedic Critically Injured After Ambulance Crash

POSTED: 9:37 am EST November 7, 2007
UPDATED: 9:36 am EST November 7, 2007

GARRISON, N.Y. -- A paramedic for Empire State Ambulance Company was critically injured when the ambulance he was riding in went out of control along Route 9 in Garrison and crashed around five this morning. State Police at Cortlandt say the ambulance was patrolling the area when the driver apparently fell asleep, and crashed at Oak Hollow Road.

The injured man was in the back of the rig. Police say he was given CPR at the scene and rushed to the Hudson Valley Hospital Center - and then airlifted to the Westchester Medical Center.

Todays news…

THE HUDSON VALLEY'S NEWSCENTER NOW 5PM 7PM

Paramedic from Carmel left brain dead in ambulance crash

By TERENCE CORCORAN
THE JOURNAL NEWS

(Original publication: November 8, 2007)

GARRISON - The driver of an Empire State Ambulance may have fallen asleep at the wheel early yesterday just before his ambulance went off Route 9 and struck a tree, leaving his paramedic brain dead last night, authorities said.

The paramedic, Matthew Lamb, 25, of Carmel, was being kept on life support for organ donations, the Westchester County Medical Examiner's Office said.

Lamb and the driver, Jonathan Romero, 27, of the Bronx, were taken to Westchester Medical Center in Valhalla after the 5:15 a.m. accident, said Senior Investigator Bruce Cuccia of the state police at Cortlandt.

Romero and Lamb, who was in the back of the ambulance, were heading north on Route 9 returning from a call when the accident happened about a quarter-mile north of Snake Hill Road. Lamb suffered head and spinal-cord injuries, police said. Romero's injuries were thought to be not as serious, police said.

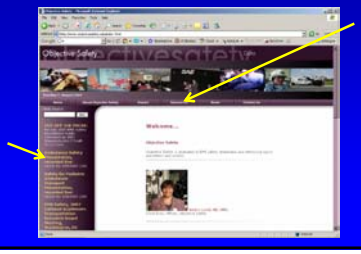
- To quote Steve "Sid" Caesar – Director IHS ES

  "We want everyone to get home safely each day"

In a nutshell

- Am here to try to save you
  Lives
  Time and
  Money

http://www.objectivesafety.net



Thursday July 5th 2007……

NEWS CENTER

Paramedic Killed In Turner Ambulance Crash

"…I'd like to know what can be done so this never happens again…."

Posted By:mad at July 5, 2007 4:38 PM (Suggest Removal)
to all the people worried about how fast the emt was going. would it be fast enough if it was your loved one in there.....

[Add your comments]

Posted By:concerned at July 5, 2007 4:40 PM (Suggest Removal)
To mad: It would be too fast if they ran over my family member on their way to another's family member...

[Add your comments]

Posted By:concerned at July 5, 2007 4:58 PM (Suggest Removal)
To X responder: Why can't I second guess this? A man is dead and I want to know if the actions and situation surrounding this were worth this sort loss. And I'd like to know what can be done so that this never happens again.

Friday July 20th 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 Crane 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 87. The ambulance then burst into flames.

The Highway Patrol says three EMS workers were killed. They were identified as 64-year-old Sammy Smith, 31-year-old Heidi McDougall and 25-year-old Kelly Rager. The two patients were also killed. They were identified as 64-year-old Robert Wells 60-year-old Armelda Wells of Hicksville.

Another emergency medical technician, Matt McDougall, and the truck driver, Gerald Chapman, Jr. of Indiana, were 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 rural 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...'

Lisa Nicely

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 Shuherk 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."

A tragic emergency health care intervention outcome

Rollover Crash Kills Medical Technician

It does happen....

A devastating tragedy...

- An ETT down the wrong hole may kill your patient and be a terrible burden for the pts family and for the medic involved
- BUT an EMS crash can kill all involved AND wipe out an EMS systems response capacity.....

Charged with Vehicular Homicide

Penn Twp. ambulance driver faces charges in crash - Pennsylvania

A Penn Township Rescue 6 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 6 ambulance driver faces a charge of homicide by vehicle in an Oct. 30 accident in Hempfield that killed a Westmoreland County Prison guard.

Jason Fait, 30, of 9650 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 DeMarchis. Bond was set at $25,000 unsecured. Fait also was charged with reckless driving, careless driving and other traffic offenses.

State police at Greensburg said Fait 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 Murrysville, 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 criminal complaint, Scalise was taken by medical helicopter to UPMC Pittsburgh. He died Nov. 3 of blunt-force trauma of the head, according to the Allegheny County Medical Examiner's Office.

Fait 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 Fait's employment status Friday, a representative of the ambulance association had no comment.

...as he had been trained to do...??

Sides differ on who ran red light in ambulance wreck that killed teen - Alabama

Assistant District Attorney Robert Becher told the jury today in his opening statement that Tennessee ambulance driver Charles Christopher Eakes was speeding and ran a red light when he collided with Dianna Bowden at U.S. 231/431 and West Limestone Road.

But Eakes' lawyer, Robert Presto, said in his opening argument that Bowden ran the red light and darted into the path of the ambulance.

Bowden, 18, was killed in the wreck Oct. 13, 2005, about seven miles north of Huntsville in Hazel Green.

Troopers estimated that Eakes was driving 81 mph in a 60 mph speed zone. But Presto said Eakes had slowed to about 50 mph to go through the intersection, as he had been trained to do.

When the wreck occurred, the ambulance was transporting a patient, Earnest Cook, to Huntsville Hospital from Fayetteville on a non-emergency basis.

2 killed, 3 injured.... September 23, 2007 - PA

Car, Ambulance Collide In Marshall Township; 2 Dead

MARSHALL TOWNSHIP, Pa. --
An ambulance and car collided along Route 19 at Brushcreek Road in Marshall Township Sunday, killing two people and injuring three others.

Police said Douglas Stitt, 30, of Mercer, and Philip Bacon, 31, of Sharpsville, were driving a car at about 2:30 a.m. when their vehicle and the ambulance collided.

The medical examiner said both Stitt and Bacon died of head injuries.

Three people riding in a Cranberry Township ambulance were also injured. Their conditions and names have not been released.

The three injured victims remain in the hospital.

2 counts of vehicular homicide... November 5, 2007 - PA

Drunken ambulance driver killed 2 in car crash - Pennsylvania

A 22-year-old ambulance driver drank before her shift and was impaired when she collided with a car in Marshall, killing two men instantly, Allegheny County District Attorney Stephen A. Zappala Jr. said today.

Shanea Leigh Climo, 22, of Evans City, is charged with two counts of homicide by vehicle and involuntary manslaughter, driving under the influence and several traffic offenses in the Sept. 23 collision at Perry Highway and Brush Creek Road. She was arrested this morning, arraigned and released on her own recognizance, authorities said.

Police said an on-board camera system in the ambulance helped them decide to file charges. The camera allegedly shows the face of the driver, Shanea Climo.

Zappala said Climo was traveling south on Route 19, transporting a patient with a do-not-resuscitate order to UPMC Passavant, when she ran a red light and hit a Chevrolet Cavalier driven by Douglas Stitt. Stitt and a passenger, Phillip Bacon, were killed.

The patient later died, but his death was not believed to be related to the crash, Zappala said.

November 5, 2007

Speeding, Alcohol Blamed In Fatal Ambulance Crash

POSTED: 12:40 pm EST November 5, 2007
UPDATED: 5:54 pm EST November 5, 2007

MARSHALL TOWNSHIP, Pa. -- Speeding and alcohol are being blamed for a crash between an ambulance and car along Route 19 at Brushcreek Road in Marshall Township on Sept. 23, killing two people and injuring three others.

The driver of the ambulance, Shanea Leigh Climo, 22, of Evans City, was charged on Monday with two counts of homicide by vehicle and involuntary manslaughter, driving under the influence and several traffic offenses.

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

Date last updated: Tuesday, January 25, 11:14:43

81/0476887 | Print this Article | Mail this Article to a Friend | LexisNexis

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

By Elizabeth Evans
The York Dispatch (Pennsylvania)
Copyright 2007 York Newspapers, Inc.
All Rights Reserved

An Adams County ambulance rushing a patient to York Hospital collided with a car at the intersection of routes 30 and 616 in West Manchester Township at 9:07 this morning, and the patient was pronounced dead at the scene.

York County Deputy Coroner Claude Stabley said the patient, a woman, was being transported from Gettysburg Hospital because she was suffering a "significant" heart condition.

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

Outline

I. Review of data on ambulance crashes and safety standards and guidelines that exist for the ground EMS

II. Identification of ground EMS transport safety issues, hazards and areas of risk to patients, providers and public

III. Highlight unacceptable mythology and challenges to advancing EMS transport safety

IV. Profile innovation, new safety technologies and strategies and knowledge transfer to enhance safety and reduce risks of ground EMS and patient transport

Key Elements to Safety

- Data Capture
- Vehicle Biomechanics and Crashworthiness
- Ergonomics and Biohazards
- Transportation Environment
- Safety Management – evaluation and analysis

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

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##

*Kahn CA, Pirralllo 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

EMS Transport General Concerns

- Consequences can be predictable & likely preventable
- Costs of these adverse events are high in loss of life, financial burden and negative impact on delivery of EMS care
- Other high speed vehicles (eg. racing cars) have a different safety paradigm
- Design of interventions to mitigate injury is predicated on a valid testing model
- Complex both engineering and public health issues

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??

Firstly!

- An accident ?
- or

a predictable and preventable event

Some odd facts

- Ambulances are generally not built by the automotive industry
- Intelligent Transportation Systems (ITS), transportation safety engineering is not generally integrated into EMS systems
- Although all EMS systems have medical direction and oversight, it is rare for there to be transportation expertise oversight

Some recent adverse outcomes

UPS and Laundry trucks have very similar design and even more stringent safety requirements to EMS vehicles BUT very different cargo……

People are passengers and NOT packages or parcels

Do we ask our vehicle builders to write cardiac arrest protocols…? Vehicle design and safety is not what we are trained to do!!!!

1960 to 2007

A passenger vehicle - sure

A 'laundry or mail truck' - ?

A passenger vehicle – yes!

- "Ambulance transport has a death toll…."

Carl Craigle EMT-P, Chief Platte Valley Ambulance

adn.com Anchorage Daily News

Paramedic injured in crash is recovering

By Julie O'Malley
Anchorage Daily News
Published: December 26, 2006
Last Modified: December 26, 2006 at 05:07 PM

An Anchorage Fire Department ambulance rushing a patient to the hospital was struck by a Dodge pickup this morning, injuring three paramedics, according to the Anchorage Police Department.

The Dodge broadsided the ambulance, which had lights flashing and sirens on, hitting it in the back around 8 a.m. as the medic vehicle was crossing the Glenn Highway at Airport Heights Drive. Onboard the ambulance were seriously injured patient Antonio Malarce, his wife, Gail Malarce, and four Anchorage Fire Department personnel: driver Eric Tuott, 31, EMT Jess Werner, 40, and paramedics Dave Wallace, 43, and Toni Brugliera, 36.

Brugliera, who was riding with Malarce in the back of the rig, was hospitalized with a head injury and is in stable but guarded condition. Werner and Wallace were treated for minor injuries and released. Clifton Tyler, 42, the driver of the pickup, and

Clinical Care? Occupational Health and Safety…..?

- This IS a Transportation and Automotive Safety issue
- This is a Systems safety issue

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

*FARS/BTS 2005-6

‘Workplace’ Hazards

Preventable…

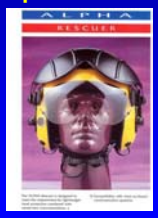
- James Woodman
  - is a paramedic who, on his first day as a paramedic, suffered a severe TBI when the ambulance he was riding in (in the back) was t-boned and rolled onto its side.
  - He remains in a persistent vegetative state in an ECF in Colorado.
- It is assumed that when the ambulance rolled onto its side, the lifepack 10 struck James in the head.....

Rollover Crash Kills Medical Technician

Ambulance Runs Off I-66 and Rolls Over, Injuring Two Employees and a Patient

It does happen….

But what about head protection?



Role of a head protective device

- A simple, immediate and inexpensive adjunct – a protective device -
  - To protect occupants from hazardous interiors
  - As vehicle crashworthiness design advances
  - As driver training advances
  - For when equipment becomes unsecured
  - As EMS Safety Standards are developed, for both EMS vehicles and EMS occupational safety

New EMS helmet prototypes for 2006-2007

EMS Transport Safety

- ‘patient safety’
  AND also
- ‘provider’ and ‘public safety’

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

The Emergency Department (ED)

An ambulance is not an ED /ICU on wheels

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*

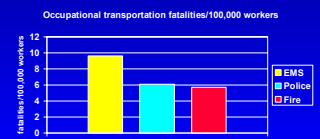
- 74% transportation related
  - 1/5 of ground transport fatalities were struck by moving vehicles
- 11% were cardiovascular
- 9% were homicide
- 4% needle sticks, electrocution, drowning and other

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

So does it make sense ?

- Gloves and universal precautions?...
  … good biohazard protection BUT aren't going to give much protection in a ambulance crash

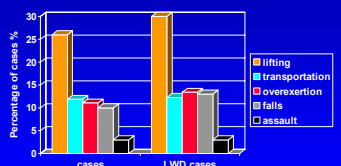
Occupational transportation fatalities..



- 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*

EMS provider injury events*



** Maguire, Hunting, Guidotti, Smith Occupational Injuries among Emergency Medical Services Personnel Pre-hospital Emergency Care, Vol. 9:4 October 2005 pages 405 - 411*

EMS Injuries*

- Higher than the injury rate for any private industry published by DOL
- 34.6 injuries/100 fulltime workers per year
- 1.5 x that of fire fighters
- 5.8 x that of health services personnel
- 7 x the national average

** Maguire, Hunting, Guidotti & Smith, Occupational Injuries among Emergency Medical Services Personnel, Pre-hospitial and Emergency Care Oct/Dec 2005*

What are the solutions?

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

Goals

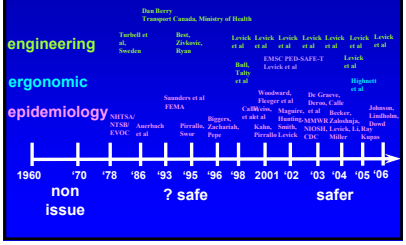
- Standards for safety
- Policy based on Science
- Databases to demonstrate outcome

"Ripoff and Duplicate"

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

EMS Best Practice, Sept 2006

Ambulance Safety Research: A New Field



DOT Funding for Reptiles and Road Kill

The Crash Event - Crash Testing

- An introduction
- What one needs to know
- What do the tests really mean
- And, what tests are meaningful

Dynamic Safety Testing

- requires sophisticated, expensive equipment
- measurably demonstrates forces generated during collision
- accepted international standard for vehicle restraint systems

If we know this – and its published….

Levick NR, et al. Development and Application of a Dynamic Testing Procedure for Ambulance Pediatric Restraint Systems, SAE Australasia 1998;58:2:45-51

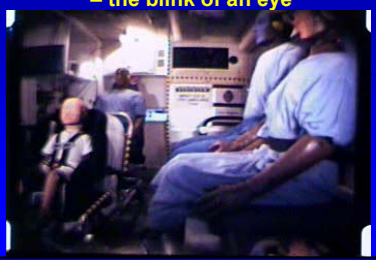
Why do we do this?

Full Vehicle Crash Testing

Test 1 – Right side impact

1 – Target vehicle, Type I ambulance
2 – Bullet vehicle, Type II ambulance
Closing speed 44 mph

And this all takes place in 60 millisecs – the blink of an eye



EMS Transport General Concerns

- Consequences can be predictable & likely preventable
- Costs of these adverse events are high in loss of life, financial burden and negative impact on delivery of EMS care
- Other high speed vehicles (eg. racing cars) have a different safety paradigm
- Design of interventions to mitigate injury is predicated on a valid testing model
- Complex both engineering and public health issues

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:

Management Opportunities

- Fleet Safety Management
  - Z-15
  - Driver monitoring and feedback
- Life Safety Initiatives
- Visibility and Conspicuity
- Resources and information

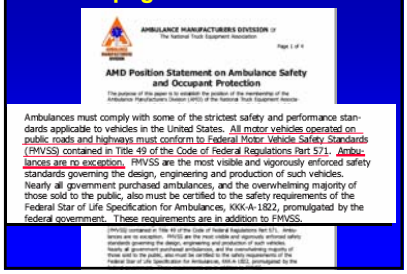
USA Ambulances: FMVSS Exempt

DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration

49 CFR Parts 571, 572, and 589
[Docket No. 92-28; Notice 7]
[RIN No. 2127-AB85]

Federal Motor Vehicle Safety Standards;
Head Impact Protection

Propaganda that kills…



AMBULANCE MANUFACTURERS DIVISION
The National Truck Equipment Association

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.

USA ambulance purchase specifications GSA:KKK-A-1822F, Aug 2007

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

KKK – static 'safety testing'

- Ignorant of automotive safety principles – and specifies that a 'successful test' is -
  - No structural damage to any load bearing or supporting members, i.e., torn or broken material, broken welds, popped or sheared body rivets, bolts, and/or fasteners, shall be evident during the application of the force and after the release of the force.

Occupant protection……?? July 2007

Unacceptable, and ridiculous AMD/KKK-F '*safety testing*' practices and standards !!

Internationally there are standards for proper crash testing for safety performance

Common European Community (CEN) EN 1789:1999/A1:2003,

European Committee for Standardization
Medical vehicles and their equipment - Road Ambulances

- "Without exception, all persons, medical devices,equipment, and objects normally carried on the road ambulance shall be maintained to prevent them from becoming a projectile when subject to a force…"
- 50th percentile manikins - 10 G in Forward, Rearward, Transverse, & Vertical directions
- Certified by Notified Body and Ambulance Mfg.

No 'a'… then NO 'F' !!!!!

$$F = ma$$

where F – force
m – mass
a – acceleration

KKK/AMD

- Ignorant of basic automotive safety principles -
  - Makes no reference to dynamic testing and YET makes reference to this standard providing protection in the setting of vehicle crash forces
  - The complete ABSENCE of any real world injury data applied to the determination of these test protocols

FMVSS exempt……

Background: USA Problems

- No reporting system or database specifically for identifying ambulance crash related injury
- No occupational and health safety standards to protect providers from injury
- Rear passenger compartment, > 60cm behind driver - exempt from Federal Motor Vehicle Safety Standards (FMVSS)

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

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

Valuable information… where are we??

FMCSA - safety mandate

- Develops and enforces data-driven regulations that balance motor carrier (truck and bus companies) safety with industry efficiency
- Harnesses safety information systems to focus on higher risk carriers in enforcing the safety regulations
- Targets educational messages to carriers, commercial drivers, and the public
- Partners with stakeholders including Federal, State, and local enforcement agencies, the motor carrier industry, safety groups, and organized labor on efforts to reduce bus and truck-related crashes.

Motor Carrier Management Information System (MCMIS)

- FMCSA operates and maintains the MCMIS
- MCMIS contains information on the safety fitness of commercial motor carriers
- MCMIS is a collection of safety information including state-reported crashes, compliance review and roadside inspections results, enforcement data, and motor carrier census data
- The Crash Profiles use the National Governors' Association (NGA) recommended data elements reported to FMCSA by states through the SAFETYNET computer reporting system

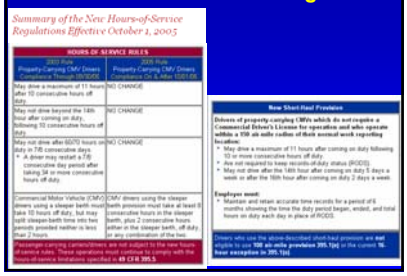
MCMIS - NGA reportable crash

- Must involve:
  - a truck (a vehicle designed, used, or maintained primarily for carrying property, with a gross vehicle weight rating or gross combination weight rating of more than 10,000 lbs.) or
  - bus (a vehicle with seats for at least nine people, including the driver)
- The crash must result in:
  - at least one fatality
  - one injury where the person injured is taken to a medical facility for immediate medical attention; or
  - one vehicle having been towed from the scene as a result of disabling damage suffered in the crash.

FMCSA - Exceptions

- Unless otherwise specifically provided, the rules do not apply to —
  - (f)(1) All school bus operations as defined in §390.5;
  - (f)(2) Transportation performed by the Federal government, a State, or any political subdivision of a State, or an agency established under a compact between States
  - (f)(3) The occasional transportation of personal property by individuals not for compensation nor in the furtherance of a commercial enterprise;
  - (f)(4) The transportation of human corpses or sick and injured persons;
  - (f)(5) The operation of fire trucks and rescue vehicles while involved in emergency and related operations;

FMCSA - Hours of Service Regulations



FMCSA HOS – detailed info

A very serious gap in data, performance and oversight

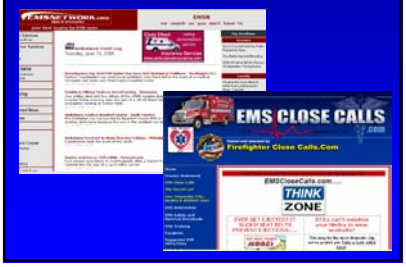
- FMCSA Truck safety goals – to decrease the fatality rate of 2.8 per 100 million truck-miles in 1996 to 1.65 by 2008
- EMS crash fatality estimates are - 7.66 - 41.93 fatalities per 100 million ambulance-miles

Information we need…

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

Increasing awareness …



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

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

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]
  - [New ASSE/ANSI Z15 – fleet vehicles]
- USA Other
  - Purchase Specification: KKK & NTEA – AMD
  - Guideline: EMSC Dos and Donts, and (CAAS and CAMTS)

Commission on Accreditation of Ambulance Services - CAAS

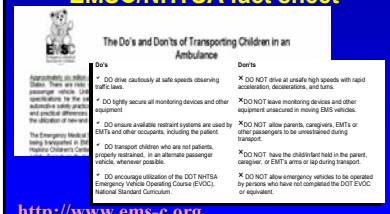
Commission on Accreditation of Medical Transport Systems - CAMTS Accreditation Standards

January:2006

camts

Commission on Accreditation of Medical Transport Systems

Transport Safety Guidelines EMSC/NHTSA fact sheet


The Do's and Don'ts of Transporting Children in an Ambulance

Do's

- ✓ DO drive cautiously at safe speeds observing traffic laws.
- ✓ DO tightly secure all monitoring devices and other equipment
- ✓ DO ensure available restraint systems are used by EMTs and other occupants, including the patient.
- ✓ DO transport children who are not patients, properly restrained, in an alternate passenger vehicle, whenever possible.
- ✓ DO encourage utilization of the DOT NHTSA Emergency Vehicle Operating Course (EVOC), National Standard Curriculum.

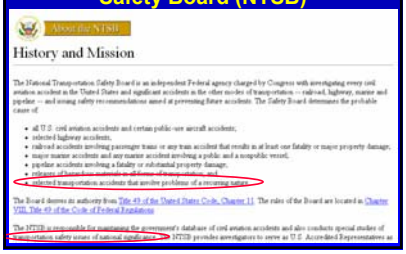
Don'ts

- ✗ DO NOT drive at unsafe high speeds with rapid acceleration, decelerations, and turns.
- ✗DO NOT leave monitoring devices and other equipment unsecured in moving EMS vehicles.
- ✗DO NOT allow parents, caregivers, EMTs or other passengers to be unrestrained during transport.
- ✗DO NOT have the child/infant held in the parent, caregiver, or EMT's arms or lap during transport.
- ✗ DO NOT allow emergency vehicles to be operated by persons who have not completed the DOT EVOC or equivalent.

http://www.ems-c.org
http://www.nhtsa.dot.gov

Role of the NTSB

The National Transportation Safety Board (NTSB)


About the NTSB

History and Mission

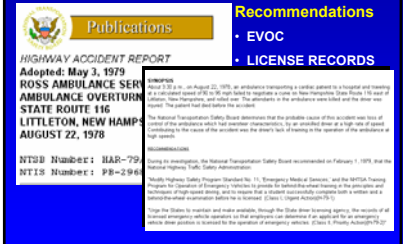
The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in the other modes of transportation -- railroad, highway, marine and pipeline -- and issuing safety recommendations 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;
- releases of hazardous materials in all modes of transportation; 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

NTSB 1979 Accident Report


Publications

HIGHWAY ACCIDENT REPORT
Adopted: May 3, 1979
ROSS AMBULANCE SERV
AMBULANCE OVERTURN
STATE ROUTE 116
LITTLETON, NEW HAMPS
AUGUST 22, 1978

NTSB Number: HAR-79/
NTIS Number: PB-296

Recommendations

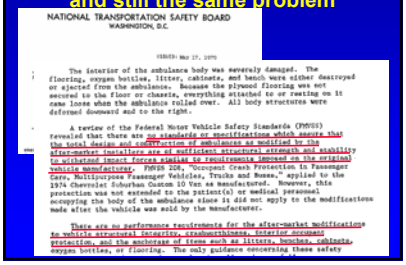
- EVOC
- LICENSE RECORDS

30 Years and 1,600 Fatalities later -

- NTSB 1979 Recommendations never implemented
  - To NHTSA – Class II & III Priority Action
    - Extend Federal Motor Vehicle Safety Standards (220, 221, 301) to include ambulances and other emergency vehicles
    - Extending FMVSS re: padding and restraints
  - To GSA – Class II Priority Action
    - Maintenance of handling
    - Loading instructions
    - Body structural integrity
    - Anchorage for all equipment
    - Occupant protection
  - To National Committee on Uniform Traffic Laws
    - Modify criteria

?

30 years later, ~1,600 fatalities and still the same problem



NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

The interior of the ambulance body was severely damaged. The flooring, oxygen bottles, litter, cabinets, and bench were either destroyed or ejected from the ambulance. Because the plywood flooring was not secured to the floor or chassis, everything attached to or resting on it came loose when the ambulance rolled over. All body structures were deformed downward and to the right.

A review of the Federal Motor Vehicle Safety Standards (FMVSS) revealed that there are no standards or specifications which assure that the total design and construction of ambulances as modified by the after-market installers are of sufficient structural strength and stability to withstand impact forces similar to requirements imposed on the original vehicle manufacturer. FMVSS 208, "Occupant Crash Protection in Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses," applied to the 1974 Chevrolet Suburban Custom 10 Van as manufactured. However, this protection was not extended to the patient(s) or medical personnel occupying the body of the ambulance since it did not apply to the modifications made after the vehicle was sold by the manufacturer.

There are no performance requirements for the after-market modifications to vehicle structural integrity, crashworthiness, interior occupant protection, and the anchorage of items such as litters, benches, cabinets, oxygen bottles, or flooring. The only guidance concerning these safety

Why ISN'T EMS on the NTSB's "Most Wanted List"??

NTSB
MOST WANTE
Transportation Safety Improven
20

Actions needed by Federal Agencies

HIGHWAY

The Federal Motor Carrier Safety Administration should act to:

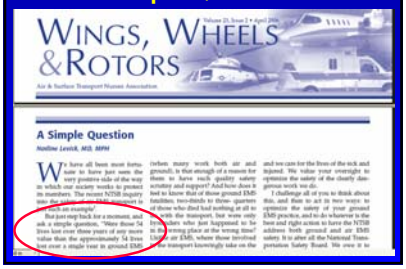
Improve the Safety of Motor Carrier Operations
- Prevent motor carriers from operating if they put vehicles with mechanical problems on the road or unqualified drivers behind the wheel.

Prevent Medically-Unqualified Drivers from Operating Commercial Vehicles
- Establish a comprehensive medical oversight program for interstate commercial drivers.
- Ensure that examiners are qualified and know what to look for.
- Track all medical certificate applications.
- Enhance oversight and enforcement of invalid certificates.
- Provide mechanisms for reporting medical conditions.

The National Highway Traffic Safety Administration and U.S. DOT should act to:

Enhance Protection for Bus Passengers
- Redesign motor coach window emergency exits so passengers can easily open them.
- Issue standards for stronger bus roofs and require them in new motor coaches.
- Devise new standards to protect motor coach passengers from being thrown out of their seats or ejected when a bus sustains a front, side, or rear impact or rolls over.
- Develop standard definitions and classifications for each of the different bus body types.

A Simple Question….



WINGS, WHEELS & ROTORS

Air & Surface Transport Nurses Association

A Simple Question

Nadine Levick, MD, MPH

Why isn't EMS ground transport data captured by FMCSA?

Truck and Bus Crashes Reportable to FMCSA

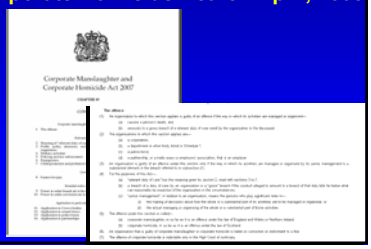
C45 - A criminal offence to not act in a way that protects the worker

Canada

How does an organization become a party to a crime of negligence?

http://canada.justice.gc.ca/en/dept/pub/c45/section03.html

Canada - Corporate Manslaughter Corporate Homicide Act: 8th April, 2008

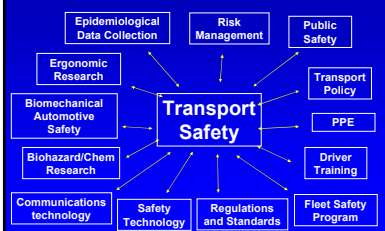


Corporate Manslaughter and Corporate Homicide Act 2007

New Information 2006-2008

- Enhanced Safety of Vehicles (ESV), June 2007
- American Society Safety Engineers (ASSE), June 2006 & June 2007
- International Ergonomists Association (IEA), June 2006
- Transportation Research Board – EMS Safety address, Jan 2007
- AMD Engineering Public Comments, July 2007
- KKK-F, 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
- State EMS Council Policies
- APHA, Nov 2007
- OSHA EMS best practices late 2008
- Transportation Research Board – Inaugural EMS Safety Subcommittee meeting Jan 2008
- Worker visibility Act, to be implemented, Nov 2008

Ground Transport Safety IS Complex AND Multidisciplinary



And very Predictable…

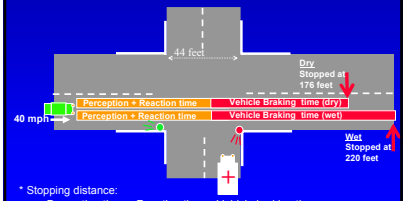
- Intersections are lethal environments

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)

Vehicle design and safety

- The principles of automotive safety involve a complex science, engineering technical skill, expertise, training and knowledge
- "Give the engineers a working list of our needs and let them tell us how it should be built to accomplish those tasks….."
  John Russell MD, Advisory Panel, EMS Safety Foundation, 2007

Rash of "Safety Concept" vehicles….. Devoid of substantive automotive safety engineering input or testing

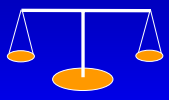
concept vehicles I & II ??

An admirable goal – BUT… implementing interventions that have not in anyway been demonstrated to be effective let alone safe is a very serious problem

NO automotive safety engineer
NO crashworthiness engineer
NO ergonomist
NO reference to ANY existing or relevant automotive safety or crashworthiness technical publications….
yet multiple occupant fatalities and injuries annually….

'Safety' approaches being driven by manufacturers claims and sales rather than by science and data

Balance of concerns and risk during transport



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

Absence of ground standards and oversight

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

Safety concepts out there now

- Driver feedback technologies
- Tiered dispatch
- Enhanced ambulance vehicle design
- Intelligent Transport Technologies - ITS
- New Safety Standards

What are the solutions?

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

The Relationship between Ambulance Crashes and Emergency Medical Technician Age

ABSTRACT

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.

The Driver

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

- "The best driver safety device is a rear view mirror with a cop in it"

Dudley Moore

November 5, 2007
Here's a good example of why you don't want this technology…..

Drunken ambulance driver killed 2 in car crash - Pennsylvania

A 22-year-old ambulance driver drank before her shift and was impaired when she collided with a car in Marshall, killing two men instantly, Allegheny County District Attorney Stephen A. Zappala Jr. said today.

Shanea Leigh Climo, 22, of Evans City, is charged with two counts of homicide by vehicle and involuntary manslaughter, driving under the influence and several traffic offenses in the Sept. 23 collision at Perry Highway and Brush Creek Road. She was arrested this morning, arraigned and released on her own recognizance, authorities said.

Police said an on-board camera system in the ambulance helped them decide to file charges. The camera allegedly shows the face of the driver, Shanea Climo.

Zappala said Climo was traveling south on Route 19, transporting a patient with a do-not-resuscitate order to UPMC Passavant, when she ran a red light and hit a Chevrolet Cavalier driven by Douglas Stott. Stott and a passenger, Phillip Bacon, were killed.

The patient later died, but his death was not believed to be related to the crash, Zappala said.

- With more effective technology you can tell if your driver has had an argument with their spouse – and take appropriate action, in advance!
- With this all get to see is that you killed two people with your driver drunk – and that you got no information to avert this horrific event!!!

Risk/Hazards

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

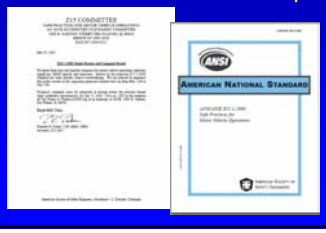
Innovation

What's new

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

American National Standard ANSI/ASSE Z15.1-2006

Safe Practices for Fleet Motor Vehicle Operations



Systems Safety Engineering - Z.15…..

www.ASSE.org

http://www.objectivesafety.net/TransActions%20Z15.pdf

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

Incident Rates

- Incident rate based on number of vehicles operated:
  Incident rate = Number of incidents x 100 / Number of vehicles
- Incident rate based on vehicle mileage:
  Incident rate = Number of incidents x 1,000,000 / Vehicle mileage
- Injury incident rate based on vehicle mileage:
  - Injury incident rates, the most frequently used indicator of incident severity, are useful for tracking events that have the potential to affect financial or operational performance of the operating unit.

  Injury incident rate = Number of incidents with injury x 1,000,000 / Vehicle mileage
- Incident rates based on service activity:
  - Motor vehicle operations that pose injury risks other than those associated with driving should also use the service activity as the basis of a safety performance rate. The number of deliveries, stops, or loads should be considered as appropriate indicators of performance.

  Incidents per 10,000 transports = Number of incidents x 10,000 / Number of transports
- Vehicle injury rates based on work hours:
  Vehicle incidents per 200,000 hours = Number of incidents x 200,000 / Number of hours worked

Driver behavior monitoring and feedback device

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

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 Warsick
Michael E. Nagel
Cytronics Ambulance
United States of America
Paper Number 07-0254

Demonstrated Effectiveness

- Change driver behavior
- Carrot not stick
- Vehicle maintenance improvement
- Decreased administrative burden
- Insurance benefits

The "Feedback Box" - A transportation safety monitoring and feedback device

This technology is conceptually like a vehicle safety 'pulse oximeter' – that with auditory feedback - can save your life, your coworkers life, your patients life, and others on the road

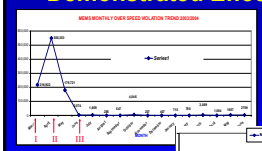
Purpose of a real-time monitoring and auditory feedback program

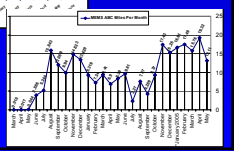
- Enhance Safety
- Improve Driver Performance
- Save Maintenance Dollars
- Aid Accident / Incident Investigation

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

Auditory alarm warning thresholds Pilot 2

Speed Low Speed (LSCOUNT) High Speed (HSCOUNT)	10 second warning period - 73 / 78 mph - >79 mph
Cornering Low Over Force (LFCOUNT) High Over Force (HFCOUNT)	warning at 25% - 38% - 48%
Reverse Count (RVCOUNT)	- 1 count for each time vehicle is placed in reverse without engaging reverse spotting switch
Seat Belt Distance (SBCOUNT)	- 1/10th mile with no belt secured

Results

	Phase I 11/01/04-04/30/05	Phase II 05/01/05-06/30/06	Phase III 07/01/06-08/31/06
Distance -miles	193,210	682,320	75,957
LSCOUNT [LSCOUNT/mile]	89,250 **[2.16]**	100,195 [0.15]	96 **[0.001]**
HSCOUNT [HSCOUNT/mile]	12,936 **[14.94]**	14,448 [0.02]	2 **[0.00003]**
LFCOUNT [LFCOUNT/mile]	37,347 [0.19]	64,328 [0.09]	1,250 [0.02]
HFCOUNT [HFCOUNT/mile]	552 [0.003]	1,210 [0.002]	56 [0.001]
RVCOUNT [RVCOUNT/mile]	15,697 [12.31]	69,779 [0.10]	7,100 [0.09]
SBCOUNT [SBCOUNT/mile]	40,893 **[4.72]**	45,366 [0.07]	90 **[0.001]**

Crashes

There were:

- 19 vehicle incidents in 2004
- 11 in 2005
- no major vehicle crash during the fully implemented phase of the study period.

Direct Cost savings

- Decreased crashes
- Cost saving in vehicle maintenance expenses:
  - $271,091in 2004
  - $242,965 in 2005
  - $237,193 in 2006

Extensive Indirect cost savings

- Fewer out of service vehicles
- Improved transport times
- Decreased administrative lost in managing unsafe behaviors
- Decreased legal burden
- Automatic system wide data
- Insurance benefits

An ideal technology tool for improving driver behavior and enhancing safety

- Implementation of feedback and monitoring system over 2 years
- Safety performance improvement
- Cost savings
- Improved transport times

Demonstrated clearly

- Driver risk behavior can be substantially modified and improved with monitoring device, with real time auditory feedback.

A key to safe transport

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

The jury is out on

- Opticon
- Simulators

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??

Major events for innovation sharing

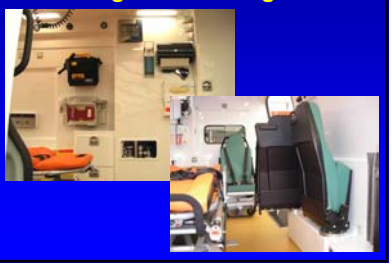
– but regional and often language isolation

Vehicle Occupant Safety design

2007 European design

Safety technology is a key focus

Ergonomic design



Ergonomic layout and equipment

NSW Australian vehicles

Flexibility to manage two patients

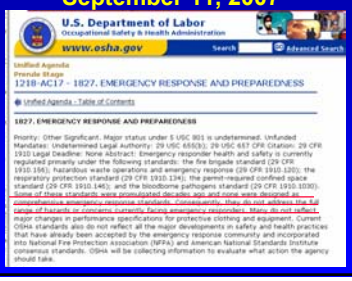
High speed crash, rolled and the occupants (patient and medics) had only minor scratches

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?

Were we safer in the Cadillac???

September 11, 2007



U.S. Department of Labor
Occupational Safety & Health Administration
www.osha.gov

Unified Agenda
Prerule Stage
1218-AC17 - 1827, EMERGENCY RESPONSE AND PREPAREDNESS

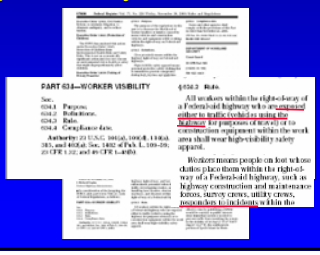
Unified Agenda - Table of Contents

1827, EMERGENCY RESPONSE AND PREPAREDNESS

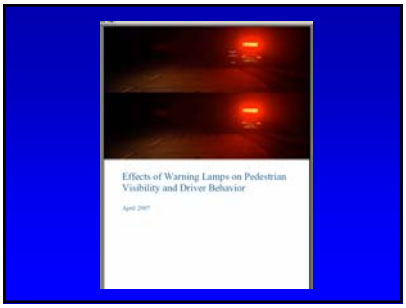
Priority: Other Significant. Major status under 5 USC 801 is undetermined. Unfunded Mandates: Undetermined Legal Authority: 29 USC 655(b); 29 USC 657 CFR Citation: 29 CFR 1910 Legal Deadline: None Abstract: Emergency responder health and safety is currently regulated primarily under the following standards: the fire brigade standard (29 CFR 1910.156); hazardous waste operations and emergency response (29 CFR 1910.120); the respiratory protection standard (29 CFR 1910.134); the permit-required confined space standard (29 CFR 1910.146); and the bloodborne pathogens standard (29 CFR 1910.1030). Some of these standards were promulgated decades ago and none were designed as comprehensive emergency response standards. Consequently, they do not address the full range of hazards or concerns currently facing emergency responders. Many do not reflect major changes in performance specifications for protective clothing and equipment. Current OSHA standards also do not reflect all the major developments in safety and health practices that have already been accepted by the emergency response community and incorporated into National Fire Protection Association (NFPA) and American National Standards Institute consensus standards. OSHA will be collecting information to evaluate what action the agency should take.

Science not, next best guess

Worker visibility Act: Help is on the way !! November 24th 2008



Federally-Mandated Worker Visibility Regulation Summary



Being seen at the scene….

Car kills crash victim; paramedic injured at scene - Temecula, California
A firefighter paramedic was hit by a car while treating an accident victim

A firefighter paramedic was hit by a car while treating an accident victim early yesterday on north Interstate 15 near Winchester Road, according to the Riverside County Fire Department.

Bob Genn was attending to the victim of a traffic accident when he was hit by another car about 2:45 a.m. The car also ran over and killed the person Genn was helping. Genn, 49, was taken to Inland Valley Hospital with a collapsed lung, several broken ribs, and numerous scrapes and bruises.

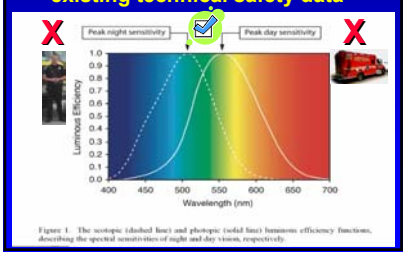
The California Highway Patrol had the car's driver in custody and was investigating.

Recent Visibility Webinar www.GlobalEMSForum.org

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

Policy and practice ignorant of existing technical safety data



We've known for 10 years that red fire trucks are twice as likely as lime yellow trucks to crash at an intersection

Fire Trucks Are Supposed To Be Red, Right?
Not If You Want To Reduce Accidents

Picture a fire truck and you are likely to see red – fire engine red. But when it comes to safety, human factors and ergonomics research paints a different picture

psycho
Researchers Stephen
resear
themselves) were awa
well in
accident data from tho
sensib
City of Dallas started
easier
with white upper cabs
vehicles with white cab
and King found that th
as much as three time
lime-yellow/white pum
emergency vehicles a
damage is less than f
study by Solomon inve
lime-yellow fire pumpe
intersection accidents.

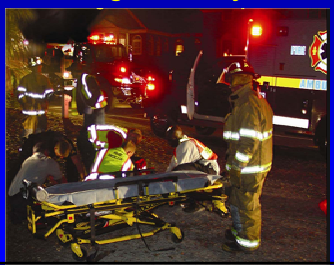
Lime-Yellow Fire Trucks Safer Than Red -- A Conclusion from Four Years of Data

Classic emergency vehicles--red fire engines--may be more dangerous for the public and for firefighters than lime-yellow fire engines. Tabulation and review of data from Dallas, Texas produced the following conclusion:

If other factors are the same, the probability of a visibility-related accident for a red or red/white pumper is greater than the probability for a lime-yellow/white pumper. . . Lime-yellow/white fire pumpers are significantly statistically safer than red and red/white fire pumpers.

Day visibility

Night visibility



A problem

2007 Insurance data –

- **27** fold more likely to have a claim based on transport than related to medical care

What do ambulance crashes really cost ?

- Loss of life and injury
- Negative impact on EMS system
- Collisions are the largest liability cost and exceeds malpractice or negligence
- Besides the direct financial costs of replacing a damaged ambulance and equipment, there are additional hidden costs incurred:
  - investigating the ambulance collision
  - litigation /settlement/lawsuit
  - medical/disability costs of injured EMTs
  - hiring of new employees to replace injured personnel
  - retraining and psychological counseling of personnel involved and others
  - increased insurance rates

June 2007

Indirect Costs

- Estimated to be 10X direct costs!

Benefit of Safety

- Safe practices save lives, time and money

This is about you and your safety

- What safety practices do you use??
  - Seat belts ?
  - EVOC training ?
  - Equipment lock down ?
  - Helmets ?
  - “Black Box” technology ?
  - Tiered dispatch ?

Safety Management

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

Use proven safety tools

NAEMT July 2006 Position statement

Policy makes a difference…

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

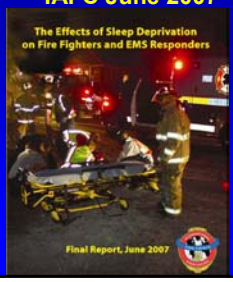
September 2007, Its not magic…..

ASSE Transactions, Fall 2007

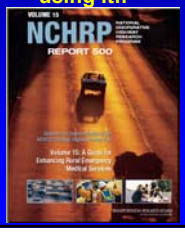
Valuable information from the transportation industry

These folks know what we need to know…

IAFC June 2007



Transportation Research Board is an excellent resource… we should be using it!!



The truck and bus industry is on the right track at the TRB

Knowledge transfer

TRB TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

July 2007

- 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

July 2007

August 2007

Tips for Emergency Vehicle Operations

An excellent model

http://www.EveryoneGoesHome.com

Major crash investigation NTSB has expertise to do this comprehensively

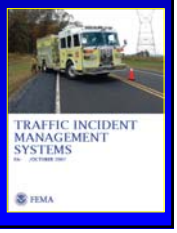
Who has read this information??..

Hours of service? Not new in other realms of ground transport…

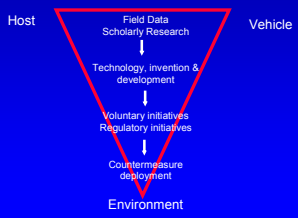
July 2007 Report

Coming Soon! Traffic Incident Management Systems (TIMS)

- USFA report to be released any day
- Research and writing by IFSTA
- Covers setting up safe roadway incident work areas and using unified command at these incidents
- Will be available in a downloadable format



Automotive Injury Triangle and Safety Development



Protective devices/concepts

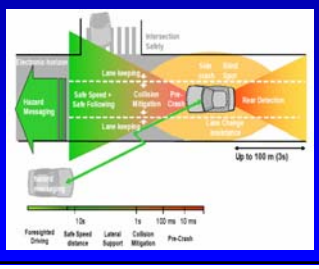
To prevent a crash

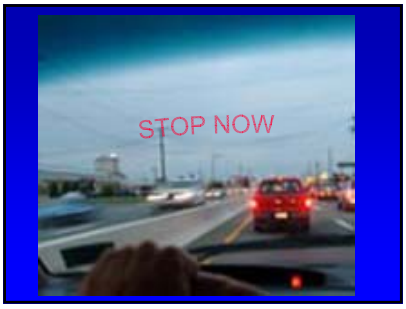
- Driver feedback
- Driver monitoring
- Driver training
- Vehicle Intelligent Transportation System (ITS) technologies
- Tiered dispatch
- Appropriate policies

In the event of a crash

- Vehicle crashworthiness
- Seat/seat belt systems
- Equipment lock downs
- Padding
- Head protection

Intelligent Transport Safety Systems





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

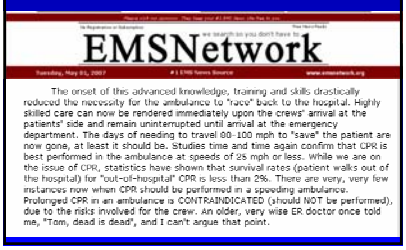
Vehicle visibility and conspicuity

Policy Changes

Canadian EMS occupational safety leadership

Policy makes a difference…

CPR?



State Strategic Highway Safety Plans

Integration and Collaboration

Integration and Collaboration

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

New York State
Strategic Highway Safety Plan
2006-2007

VISION

New York's safety community will continue to work to ensure that its customers -- those who live, work and travel in New York State - have a safe, efficient, balanced and environmentally sound transportation system, and that safety is appropriately considered in all education, enforcement, engineering and emergency medical services activities in New York State in order to reduce fatal and injury crashes.

GOALS

Reduce motor vehicle fatalities from 1,410 in 2005 to 1,285 in 2011

Reduce the Fatal Crash Rate/100 Million VMT from 1.00 in 2004 to .90 in 2011

Tips for Emergency Vehicle Operations

No need to reinvent the wheel...

USFA Emergency Vehicle Safety Initiative

March 2007 - FHWA

New concepts out there now

- Black Boxes
- Tiered dispatch
- Helmets
- Enhanced ambulance vehicle design
- Intelligent Transport Technologies - ITS
- New Safety Standards

Breaking News!! National Academies TRB EMS/Medical Transport Safety Subcommittee – Jan 16, 2008

Challenges to Optimizing EMS Transport Safety

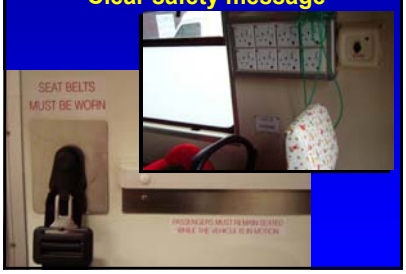
- Disparate and fragmented safety infrastructure
- Lack of a centralized EMS Safety oversight or data
- A large number of small groups of end users, with a mix of volunteers and professionals
- Ambulances are hybrid non-standard vehicles, a truck chassis and an after market box or a modified van
- EMS vehicle safety is not integrated as a part of the transport safety industry

What needs to happen NOW?

- Implement a Fleet Safety Program
- Correct the basic policies and procedures regarding -
  - Intersections
  - Use of occupant restraints
  - Securing equipment
  - Driver performance
- Data
  - Epidemiology
  - Ergonomic
- Safety oversight

UK Ambulance vehicles

Clear safety message



Sweden initiatives

Norway initiatives

Other successful models

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?

Future Directions

- Rational use of limited resource
- Avoid reinventing the wheel
- Formal safety research agenda
- Framework bridging key research and infrastructure
  - Society of Automotive Engineers
  - Involvement with ESV activities
  - EMS safety research funding
  - Foster evidence based initiatives

Future

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

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

small changes can make a BIG DIFFERENCE

- PREPARE – TEACH – REACH – RESPOND
  - Look at your own safety record
  - Teach safety and hazard awareness
  - Reach out with safety information to all your EMS providers
  - Respond with the best safety practices

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
- Development of substantive EMS safety standards is a necessity and a reality
- Multidisciplinary safety issue that EMS cannot solve internally
- 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, transportation and occupational safety

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