APPARATUS SYMPOSIUM
January 18 ~ 21, 2009

Ambulance Safety -

What You Can't Afford Not To Know

A Crash Course in Ambulance Vehicle Safety Design Issues and Crashworthiness

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What we shall cover…

- Multimedia overview of safety statistics, demonstration of crash testing, and a review of what is on the horizon in ambulance safety development.
- An outline of strategies and new safety technologies to enhance occupant safety, highlight of important predictable and preventable occupant risks, and expose mythologies regarding safety practices and devices.

ASSOCIATED PRESS

Jump start

A RoboRoo Series II kangaroo tests dummy is used in New South Wales, Australia, to help automobile designers study a unique Australian road safety issue — traffic accidents with kangaroos.

Your Interactive Handout awaits you online at…

- www.objectivesafety.net

This WILL be FAST!!
No need to take any notes – all text slides will be awaiting you in your online Handout

http://www.objectivesafety.net

Highlight some of the areas of ambulance transport system safety and risk management-

- Safety for the patient, the provider and the public
- System safety data
- Interdisciplinary aspects
- Innovations to optimize system safety performance

Real world answers to real world questions -

- What features will enhance safety of my new vehicle purchase?
- What color scheme do I want on my vehicle to make it safest?
- What do KKK and AMD really mean from an occupant safety perspective?
- What policies offer the safest system?
- How do I get my team to address safety issues?
- What data should I collect when something goes wrong, and how to analyze it?

In a nutshell

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

Firstly!

- An accident ?
- or
  a predictable and preventable event

Arizona, September 11th 2001

… Nov 8th's Fatality

Putnam Co. paramedic dies in ambulance crash

VALHALLA, N.Y. - A Putnam County paramedic returning from an ambulance call has died after the vehicle went off the road and struck a tree.

Authorities say Matthew Lamb of Carmel was riding in an Empire State Ambulance Corp. vehicle at 5 a.m. Wednesday when it went off the road and struck a tree in Garrison.

Lamb suffered massive head trauma. State police senior investigator Bruce Cuccia told the Journal News it appears the driver fell asleep.

Carmel Fire Chief Daryl Johnson says Lamb was taken off life support and pronounced dead on Thursday at the Westchester County Medical Center.

The driver, Jonathan Romero of the Bronx, suffered minor injuries.

Thursday July 5th 2007……

"…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 4:19 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 one 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 44-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 Amelda 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.

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……

Car, Ambulance Collide In Marshall Township; 2 Dead

POSTED: 9:08 am EDT September 23, 2007
UPDATED: 9:52 pm EDT September 23, 2007

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

Police said Douglas Stitt, 38, 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.

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 9850 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.

June 17th 2008 a paramedic and a patient killed

EMS CRASH KILLS PATIENT AND A SUSSEX COUNTY (DE) PARAMEDIC IN THE LINE OF DUTY
Tuesday, June 17, 2008

We regret to advise you that a female Sussex County (DE) Paramedic was killed in the Line of Duty as was a patient killed in a horrific crash involving an ambulance in Sussex County (DE) this morning.
The single vehicle crash happened around 0240 Hours on the John J. Williams Highway near the Lewes-Rehoboth joint fire company substation in Angola.
The Mid-Sussex Rescue Squad ambulance was transporting to Beebe Medical Center with a patient. 2 MSRS Squad members and the Sussex County Paramedic were on board when it struck a tree, which opened the side of the ambulance as seen on our home page. Tragically, the patient was killed as was the Sussex County EMS Paramedic, who was killed in the Line of Duty.
Sussex County EMS also suffered a close call last year when a Paramedic John Schmitt was seriously injured in a crash when a civilian struck the Milford Fire Company ambulance he was riding in, while returning from a run. Additional details on this mornings crash will follow.

In this vehicle…

October 31, 2008, Kentucky

Florida - January 12, 2009

Fire truck vs ambulance…

Are we designing vehicles that are difficult to see…?

Crash occupant hazards

NEVADA FIREFIGHTERS SURVIVE SERIOUS FD AMBULANCE CRASH AND FIRE

Tuesday, July 3, 2007

Henderson Fire (Nevada) experienced a very serious ambulance accident Monday night around 2000 hours. A medic unit responding to a confirmed structure fire was leaving Saint Rose Dellma hospital. A Ford Taurus wagon with a family in it ran the red light and struck the ambulance broadside in an intersection. The saddle tank of the ambulance ruptured and the vehicle rolled on it's side and instantly caught fire. Both firefighters had their seatbelts on. 1 FF kicked through the windshield and crawled out a small hole then tore out the rest of the windshield and worked to free his partner. His partners foot was stuck in the wheel well while the fire was engulfing the cab area. He was able to free his partners foot and drag him out of the vehicle. Both he and his partner are both OK with minor injuries. This is the fourth serious accident at the HFD in less than a month.
THANKS TO THE OFFICERS AND MEMBERS OF THE HFD FOR SHARING THIS SO OTHER CAN LEARN.

Fatalities and funerals

An interhospital transport ? “Do no harm….”?

Last updated: Tuesday, January 23, 7:15 PM ET

01/24/2007 | 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)
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An Adams County ambulance rushing a patient to York Hospital collided with a car at the intersection of routes 30 and 462 in West Manchester Township at 5:40 this morning, and the patient was pronounced dead at the scene.

York County Deputy Coroner C. Jude Stanley 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. Stanley said she will wear no significant traumatic crash-related injuries.

This IS a Transportation and Automotive Safety issue

Key Issues

- Mythology
  - That Emergency Medical Service personnel are safe
- Injury Hazards
  - Biohazard
  - Chemical/Radiation
  - Physical/Mechanical trauma – THE BIG PROBLEM
- Motor Vehicle Crashes are the highest cause of death at work – EMS has > 2X the mean national rate in USA
- An R & D and Regulatory Gap
  - Occupational Health and Safety
    - the workplace is in a vehicle – exposure data are scant
  - Automotive Safety
    - a vehicle is the work place – ‘exempt’ from automotive research and regulation

New Information 2006-2009

- 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 2007-2008
- APHA, Nov 2007
- OSHA EMS best practices late 2008
- Transportation Research Board – Inaugural EMS Safety Subcommittee meeting Jan 2008
- Worker visibility Act, implemented, Nov 2008
- TRB Inaugural Ambulance Transport Safety Summit, Nov 2008
- TRB Summit for October 2009

Safe Systems Approach

Source: **Road Safety Branch, Infrastructure and Surface Transport Policy, Department of Infrastructure, Transport, Regional Development and Local Government, Australia.**

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

Federal Motor Carrier Safety Administration….

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

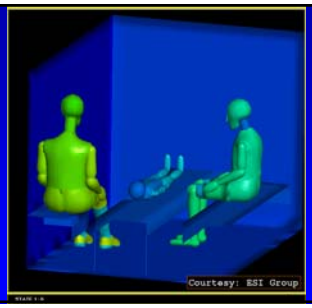
Some odd facts

- 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

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

Testing the real world



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?

So

- What's important
- What's not important

- What's going to save your life
- What might take your life

- What's going to hurt you
- What's going to protect you

- What is factual
- What is garbage

- What is new
- What is not new

Unique workplace

- In vehicles
- At roadside and other emergency scenes

Absence of standards and oversight

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

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

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


Corporate Manslaughter and Corporate Homicide Act 2007

October 2008 JEMS Article "Rig Safety – 911"

2008 - Air EMS on the NTSB's "Most Wanted List", where is ground EMS??

National Academies TRB EMS/Medical Transport Safety Summit – November 7, 2008

Safety - Why now?

- Operating optimally in a transportation environment that is largely devoid of specific safety standards for the hazards and risks present
- Bridge the gap between what technical information exists and what is accessible and applied to EMS

1960 to 2009

- "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

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

There are more safety standards for moving cattle than for moving patients in the USA

the EMS transport process

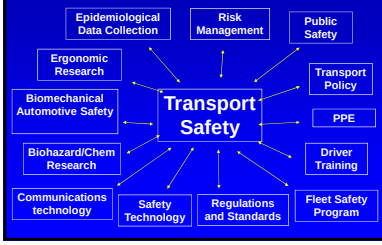
- communications/dispatch
- the patient
- restraining device/seat
- transporting device/gurney
- paramedics/transport nurses, doctors & family
- patient monitoring equipment
- clinical care & interventions
- protective equipment
- the vehicle
- the driver/driving skill
- other road users
- the road

TIME & PLACE

The Emergency Department (ED)

An ambulance is not an ED /ICU on wheels

Ground Transport Safety IS Complex AND Multidisciplinary



Occupational Health and Safety…..?

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

What is a survivable impact?

$E = \frac{1}{2} mv^2$ $v^2 = 2as$

37 mph (60 km/h) - survivable

What is a survivable impact?

$E = \frac{1}{2} mv^2$ $v^2 = 2as$

62 mph (100 km/h) – not survivable

A survivable impact??

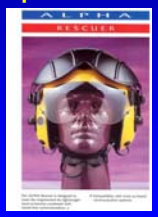
A survivable impact??

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?



EMS Transport Safety

- 'patient safety'
  AND also
- 'provider' and 'public safety'

Is there an acceptable rate of morbidity and mortality for pre-hospital transport systems??

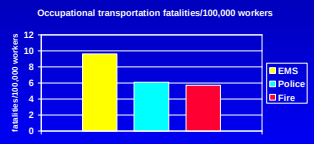
This is not acceptable

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 2005-6

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*

Standards and Policy

- Operations and fleet management
  - USA : Z -15 (2006)
- Vehicle design safety and crashworthiness
  - Australia: ASA (AS/NZS 4535:1999)
  - Europe: CEN (EN 1789:1999/A1:2007)
  - USA: KKK-F 2007, AMD 2007 (not by national standardizing bodies)
- Worker and vehicle visibility
  - Some apparel, minimal vehicle visibility standards limited evidence base

Ambulance Standards??

- Australasia
- Europe
- USA
  - KKK?
  - AMD?
  - FMVSS?
  - NFPA?

Australia & New Zealand Ambulance restraint standard AS/NZS 4535:1999

- "Restraint systems shall apply to all equipment and people carried in an ambulance…"
- Dynamic Testing - 50th & 95th percentile manikins
- 24G in Forward and Rearward
- 10G in Transverse

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.

What KKK-A-1822F, AMD and FMVSS state and don't state…

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

- Specifications for the purchase of a Star of Life Ambulance
- Static Pull test
- 2200 Lbs. static stretcher test in longitudinal, lateral & vertical
- No dynamic test for vehicle, occupants or equipment
- No automotive test manikin
- Voluntary www.nsa.com/WorkArea/downloadasset.aspx?id=1352

USA Ambulance Manufacturing Division (AMD) Ambulance Standards – August 2007

- No dynamic or impact test
- No automotive test manikin
- Mandates NO 'crumple zone'
- No impact tested anchorages for occupant restraint or equipment
- Internal, not independent

http://www.nsa.com/WorkArea/showcontent.aspx?id=1350

KKK/AMD

- Appear 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

AMD 2007 - 025 'occupant safety testing'

- Compared with -

Accepted automotive safety occupant testing

AMD – static 'safety testing'

- Inconsistent with 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

Medic Survivors

Medic Fatality

No 'a'… then NO 'F' !!!!!

- **F = ma**

where F – force
m – mass
a – acceleration

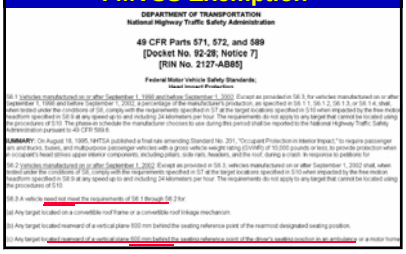
Sir Isaac Newton (1642-1727), Philosophiae Naturalis Principia Mathematica (Mathematical Principles of Natural Philosophy), published in 1687. http://en.wikipedia.org/wiki/Newton's_laws_of_motion

Unacceptable, and non-automotive AMD/KKK-F '*safety testing*' practices and standards !!??

KKK Specification and AMD Standards both default to the FMVSS for safety – however..

- FMVSS has a specific exemption for ambulance vehicles once you are 600mm or 2 feet positioned rearward of the driver
- KKK require a 'national test lab' to conduct AMD 'tests' BUT NOT an automotive test lab!
- No dynamic impact tests AT ALL
- No crashworthiness tests

USA Ambulances: FMVSS Exemption



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]

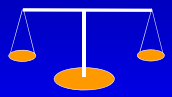
Federal Motor Vehicle Safety Standards;
Hood Inward Protection

FMVSS exempt……

NFPA Ambulance Standard Development

- NFPA Ambulance Standard Development underway
- Scope for integrating appropriate technical expertise
- The Public Comment period for the development of the new NFPA Ambulance Standard – closed October 15, 2008
- http://www.emssafetyfoundation.org/NFPA Ambulance0001.pdf

Balance of concerns and risk during transport



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

Benefit of Safety

- Safe practices save lives, time and money

Safety Management

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

The Crash Event - Crash Testing

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

Intrusion vs Deceleration

- Intrusion
  = vehicle to vehicle or vehicle to fixed narrow object
- Deceleration
  = sudden stop – ie. sled test

Intrusion

Deceleration

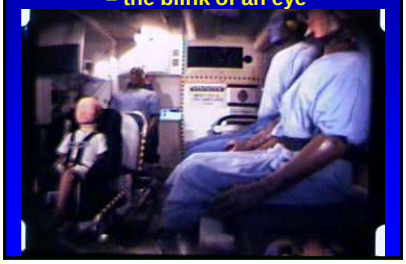
Dynamic Safety Testing

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

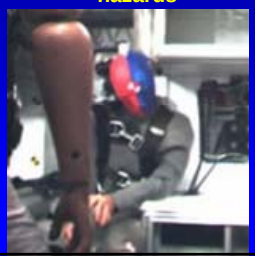
If we know this – and its published….

Why do we do this?

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



USA 2004, NIOSH Head strike zone hazards



A few key words about restraint systems…

NOT new technical data…

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

Side facing shoulder harnesses demonstrated to be lethal, even at slow ground vehicle speeds

Being seated IN an automotive seat is what will protect you

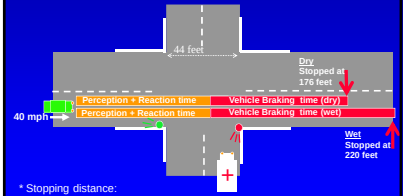
- Anything that allows or encourages you to get up out of your seat will also encourage you to be injured or killed – it is potentially lethal to be out of your seat in any fashion
- 4 or 5 point harnesses for sidefacing occupants are potentially lethal – and is in NO WAY SUPPORTED BY ANY DATA OR AUTOMOTIVE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

And very Predictable…

- Intersections are lethal environments

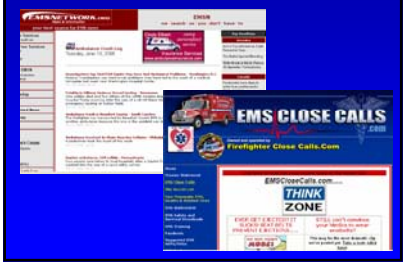
The real world

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)

Increasing awareness …



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??

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

Wyoming Ambulance Manufacturer, August 17, 2007..

- "…. the current crop of "Safety Concept Vehicles" being built by some manufacturers are a sham and they do not address the problem but are merely used as a sales gimmick."

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

There is NO vehicle safety without real world injury data and automotive safety expertise

- With what authority has ground EMS squandered >$3,000,000 on these concept vehicle shams??
- We NEED meaningful injury data to better understand the mechanism of injury and fatality
- A crash test program without automotive safety expertise and real world representative injury data is irresponsible
- Without real world injury data it is not possible to effectively measure the burden of the hazard NOR the effectiveness of any interventions

Yet another potentially hazardous example marketed as a 'safety innovation', YET outside of automotive safety practice

Yes, the ride of your life….

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

JEMS and EMS Responder ARE NOT automotive safety journals

- And the reviews in them are completely inappropriate, misleading and outside of what is known in automotive safety
- We should NOT TOLERATE this as it is both completely irresponsible and very dangerous ……

Innovation

What's new

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

Safety concepts out there now

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

Important…

- Ergonomics and automotive safety issues are interrelated
- Crashworthiness priorities override the ergonomic issues

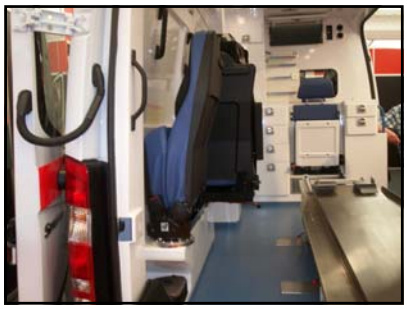
RETTmobil – 'Mobile Rescue' European EMS vehicle innovation

http://www.rettmobil.com/

Vehicle Occupant Safety design

2007 European design

Safety technology is a key focus



Ergonomic layout and equipment

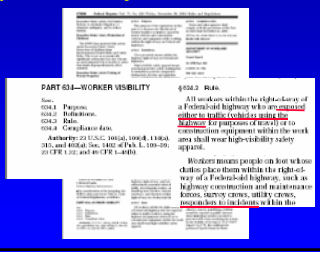
NSW Australian vehicles

Flexibility to manage two patients

Awkward tasks? Develop solutions!

Visibility and lighting issues

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



PART 634—WORKER VISIBILITY

Sec.
634.1 Purpose.
634.2 Definitions.
634.3 Rule.
634.4 Compliance date.

Authority: 23 U.S.C. 101(a), 109(d), 114(a), 315, and 402(a). Sec. 1402 of Pub. L. 109-59; 23 CFR 1.32; and 49 CFR 1.48(b).

§ 634.3 Rule.

All workers within the right-of-way of a Federal-aid highway who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel.

Workers means people on foot whose duties place them within the right-of-way of a Federal-aid highway, such as highway construction and maintenance forces, survey crews, utility crews, responders to incidents within the

Distances of Nighttime Visibility

Policy and practice ignorant of existing technical safety data

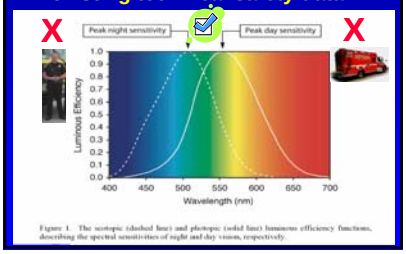
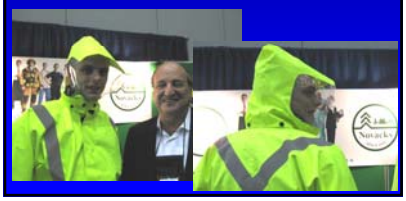


Figure 1. The scotopic (dashed line) and photopic (solid line) luminous efficiency functions, describing the spectral sensitivities of night and day vision, respectively.

Night visibility

Here's the real world at 6 ft…

This addresses some very real risks, very creatively – and currently ONLY available in London Ontario!



Summit County EMS - Colorado

Old vehicle

New yellow vehicle markings

Staff use lime-green vests & jackets

Increasing safety with a 30% cost saving

Queensland Ambulance Australia

Emergency Vehicles – Viewer Awareness

For a timely, appropriate and safe response

- Location
- Size
- Shape
- Speed
- Intended path

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

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???

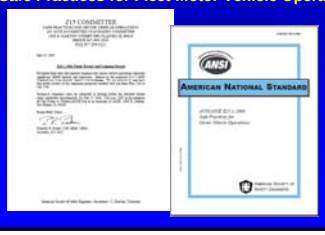
Technical information available

R & D
"Ripoff and Duplicate"

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

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

Best Practices?

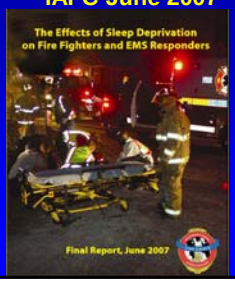
EMS Best Practice, Sept 2006

September 2007, Its not magic…..

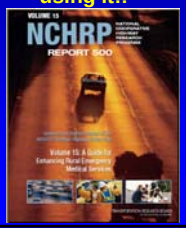
Valuable information from the transportation industry

These folks know what we need to know…

IAFC June 2007



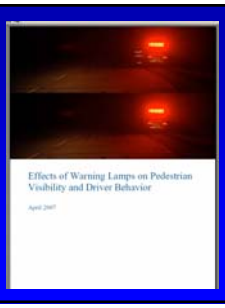
Transportation Research Board is an excellent resource… we should be using it!!



Tips for Emergency Vehicle Operations

An excellent model

http://www.EveryoneGoesHome.com



USFA Emergency Vehicle Safety Initiative

Traffic Incident Management Systems (TIMS)

- Released April 2008
- FEMA, USFA, IFSTA
- Covers setting up safe roadway incident work areas and using unified command at these incidents

Risk/Hazards

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

What do we know works…

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

What you can do now

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

Important Principles !

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

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

Very Important Principle

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

PREDICTABLE PREVENTABLE and NO ACCIDENT

Conclusion

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

And….

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

Thank you!

Any Questions??

Electronic handout available online

http://www.objectivesafety.net