



### Real world answers to real world questions -

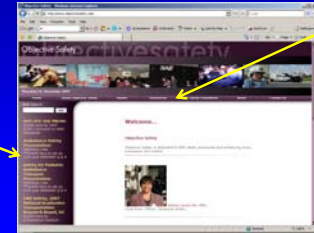
- ▶ What features will enhance safety of my new vehicle purchase?
- ▶ What color scheme do I want on my vehicle to make it safest?
- ▶ Do I need a helmet, and if so which one?
- ▶ What policies offer the safest system?
- ▶ How do I get my team to address safety issues?
- ▶ What data should I collect when something goes wrong, and how to analyze it?

Your Interactive Handout awaits you online at...

▶ [www.objectivesafety.net](http://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>



Firstly!

▶ **An accident ?**

- ▶ or  
a predictable and preventable event

A tragic emergency health care intervention outcome



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.....

### Creating a Safety Culture

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

- ▶ Awareness
- ▶ Training
- ▶ Incentive

### 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

### EMS Safety

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

## 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

## 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
- SAFETELU, 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
- Transportation Research Board (TRB) – Inaugural EMS Safety Subcommittee meeting Jan 2008
- NIOSH Emergency Responder Round table March 2008
- OSHA EMS best practices late 2008
- Worker visibility Act to be implemented, Nov 2008
- Transportation Research Board (TRB) – Inaugural EMS Transport Safety Summit Nov 2008

## ... Nov 8<sup>th</sup>'s Fatality

### Putnam Co. paramedic dies in ambulance crash

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

Authorities say Matthew Lamb of Carmel was riding in an ambulance owned by [State Ambulance Corp.](#) which is a 50-50 partnership between the county and a private firm in Canton.

#### Lamb suffered massive head trauma

State police senior investigator Bruce Curcio told the journal news, it appears the ambulance was traveling south on Route 141.

Carmel Fire Chief David Johnson says Lamb was taken off the support of the ambulance on Thursday at the Westchester County Medical Center.

The state police report says the ambulance was traveling south on Route 141.

## Thursday July 5<sup>th</sup> 2007..... Paramedic Allan Parson's killed

### NEWS CENTER

#### Paramedic Killed in Turner Ambulance Crash

Turner, Mich. (AP) — A 36-year-old paramedic was killed when the ambulance he was driving crashed into a tree on Thursday.

The Michigan State Police Department said the ambulance was traveling south on State Road 141 when the crash occurred at about 10:30 a.m.

The ambulance driver, 36-year-old Allan Parson of Turner, was killed when the ambulance struck a tree. The driver was wearing his seat belt and was not wearing his seat belt.

The ambulance was traveling south on State Road 141 when the crash occurred at about 10:30 a.m.

The paramedic who died has been identified as 36-year-old Allan Parson of Turner.

A review of the crash is under way by the Michigan State Police.

Several patients were dropped to help the second ambulance arrive on the scene within 10 minutes. The crash occurred on the southbound side of the road near the intersection of State Road 141 and County Road 141.

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

Posted By: **concerned 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.....

1 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...

1 Add your comments

Posted By: **concerned at July 5, 2007 4:38 PM** (Suggest Removal)  
to it is needless, why don't we just get guns that a mor in cloud and I want to know if the nation and nation surrounding this with worth this loss, and I'd like to know what can be done so that this never happens again

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

### Five Killed in Crash of Ambulance and Semi

July 21, 2007 08:20 AM EDT

The Highway Patrol says three EMS workers were killed. They were identified as 40-year-old Sammy Smith, 31-year-old Mark McCougl and 30-year-old Andy Egan. The two patients were also killed. They were identified as 64-year-old Robert Neale 60-year-old Amanda Neale of Hicksville.

Another emergency medical technician, Matt McCougl, 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 van and lights were turned on.

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 67. The ambulance then burst into flames.

## Antwerp fire chief says, "They were doing what they loved..."

Lisa Merty

July 21, 2007

D. LONARDO

ANTWERP — They were doing what they loved...

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 Shubert of the Payne Fire Department.

"Everyone is a brotherhood," said Fried. "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."



## June 17<sup>th</sup> 2008 a paramedic and a patient killed

### EMS CRASH KILLS PATIENT AND A SUSSEX COUNTY (DE) PARAMEDIC IN THE LINE OF DUTY

Towhee, 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 12:40 Hours on the Julia J. Williams Highway near the Levens Forkhook joint for company relocation in Angula.

The Mid-Sussex Responder Squad ambulance was transporting to Berke Medical Center with a patient, 2 MSB 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 lower page. Tragically, the patient was killed as was the Sussex County EMS Paramedic, who was killed as 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 critical truck the Millard Fire Company ambulance he was riding in, while returning from a run. Additional details on the morning crash will follow.



## Fatalities and funerals

**Funeral Services Held For Marble Falls Paramedic**

Funeral and burial services for Hanson were held in Marble Falls, Texas, on Tuesday. The paramedic was killed in a crash on Tuesday while the ambulance he was driving was on its way to a house on highway 75 near...

It was an emotional day for Hanson's family and his fellow emergency workers, but also tinged with happy memories and smiling remembrance. Hanson's life was suddenly cut short earlier this week, leaving his friends, family and colleagues grieving that he's gone.

But today, as hundreds of mourners in his hometown gathered for a memorial service on the death he served as an emergency responder in a Marble Falls funeral home, an ambulance crew and paramedic.

They came to reflect and remember the short life of this Hanson, who gave his life in service of others as a paramedic on a Tuesday and died on Tuesday in a crash on highway 75 near...

## 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, Philip Bacon, were killed.

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

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

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

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

By Elizabeth Trane  
The York Dispatch (York, Pa.)  
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An Allegheny County ambulance carrying a patient to York Hospital, collided with a car at the intersection of Routes 20 and 61 in West Manchester Township at 7:47 a.m. Monday, and the public it was pronounced dead at the scene.

York County Coroner Clive DeStefano told the patient, a woman, who being transported from Gettysburg Heights, Kansas City was suffering a "significant" heart condition.

The crash will still be up to determine whether it was a cardiac arrest and if not prior to the crash, or whether she hit a fatal heart attack because of it after the crash. The city said she killed on highway 61 in a fatal crash on Monday.

## 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

## Benefit of Safety

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

### Unique workplace

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

### Absence of standards and oversight

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

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

### 1960 to 2007



### Some recent adverse outcomes



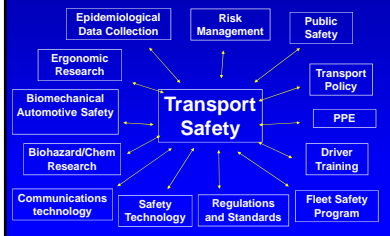
### Some odd facts

- ▶ 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

### 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

### Ground Transport Safety IS Complex AND Multidisciplinary



### 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

### 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



### The Emergency Department (ED)



### An ambulance is not an ED /ICU on wheels



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

### USA EMS data

In the USA\*

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

\*NHTSA 2005-6

### Is it your service's tragic year?

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

### So for EMS personnel...

- ▶ What's going to kill you?
- ▶ What's going to injure you?

### 'Workplace' Hazards



## 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

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

- ▶ "Ambulance transport has a death toll...."

Carl Craigle EMT-P, Chief Platte Valley Ambulance  
Colorado Springs, April 2007

## Clinical Care? Occupational Health and Safety.....?

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

## Safety is Good Business

The screenshot shows a webpage with the title "Safety is Good Business - Crashes Hurt Your Bottom Line". It features a navigation menu with links like "Home", "About Us", "Regulations", "Forms & Services", "Data & Statistics", "Contact Us", and "Help". The main content area includes a section titled "Safety & Security" with sub-sections for "Safety is Good Business", "Why Safety is Good Business", and "Why Safety is Good Business". The text discusses the benefits of safety for businesses, including reduced costs and increased productivity.

The image shows the cover of the June 2007 issue of EMS magazine. The headline is "An Ounce of Prevention". The cover features a photograph of a crash site with an ambulance and a car. The text on the cover includes "Crash Costs: Assessing the Hidden Damages of an Ambulance Accident" and "The number of crashes that result in a fatality is still higher than in any other industry. The number of crashes that result in a fatality is still higher than in any other industry. The number of crashes that result in a fatality is still higher than in any other industry."

## A problem

2007 Insurance data –

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

## A number of potential interventions to enhance safety have been identified:

- ▶ Safety Policy
- ▶ Safety performance standards
- ▶ Vehicle crashworthiness
- ▶ Vehicle interior ergonomics
- ▶ Personal Protective Equipment design
- ▶ Driver selection, training and simulation
- ▶ Safety and risk awareness modification
- ▶ Risk behavior modification
- ▶ Intelligent Transportation Systems (ITS)

## 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 ?
  - Driver Feedback technology ?
  - Tiered dispatch ?





## Dynamic vs. Static Safety Testing

- ### Dynamic Safety Testing
- ▶ requires sophisticated, expensive equipment
  - ▶ measurably demonstrates forces generated during collision
  - ▶ accepted international standard for vehicle restraint systems

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



### Full Vehicle Crash Testing

Test 1 – Right side impact

1 - Target vehicle, Type I ambulance  
2 - Barrier vehicle, Type II ambulance  
Closing speed 44 mph



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



NIOSH Ambulance Occupant Safety Crash Testing



Impact Direction  
25 MPH !

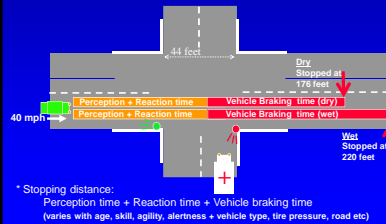
And very Predictable...

- ▶ 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



Ambulance Standards??

- ▶ KKK?
- ▶ AMD?
- ▶ FMVSS?
- ▶ NFPA?

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.gsa.gov/WorkArea/showcontent.do?cid=705](http://www.gsa.gov/WorkArea/showcontent.do?cid=705)



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.nrc.com/WorkArea/showcontent.do?cid=705>



### 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 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 sidelifacing occupants are potentially lethal – and is in **NO WAY SUPPORTED BY ANY DATA OR AUTOMOTIVE SAFETY EXPERTISE**

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

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

### Innovation

### Safety concepts out there now

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

### The Driver

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

### Driver issues



**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.

### 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. Levis, MD, MPH  
 Maimonides Medical Center

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

Nadine Levis  
 OnStar Safety LLC  
 United States of America  
 Larry Wierach  
 Michael E. Nagel  
 Citizens Ambulance  
 United States of America  
 Paper Number 07-2214

## Purpose of 'Feedback box' Program

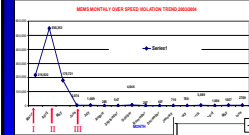
- ▶ Enhance Safety
- ▶ Improve Driver Performance
- ▶ Save Maintenance Dollars
- ▶ Aid Accident / Incident Investigation

## How the Device Works

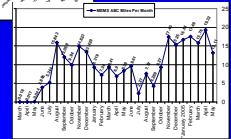
- ▶ Computerized monitoring device installed on each vehicle to measure parameters
- ▶ Each driver has individual key "fob"
- ▶ Data collected every second
  - including: vehicle speed and performance, driver behaviors and emergency mode
- ▶ Auditory feedback of warning 'growls', and penalty tones
-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



## Demonstrated Effectiveness



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



## A key to safe ambulance transport



## Monitoring and feedback devices

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

## Other monitoring devices

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

## You want a system that works!!

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

## The EMS Safety Foundation

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

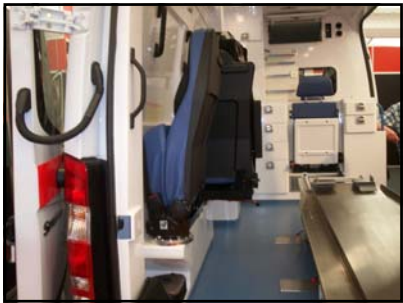


## International approaches

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

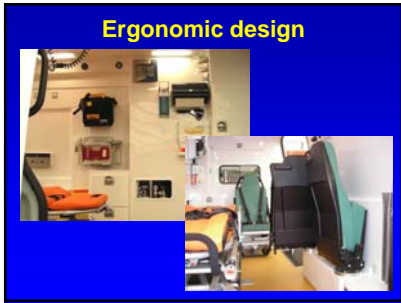
**RETTmobil – 'Mobile Rescue'**  
 Major European event for EMS innovation  
 Fulda, Germany May 2008  
<http://www.rettmobil.com/>

**RETTmobil 2008**  
 zusammen mit dem 5. Deutschen Feuerwehrtag  
 19. bis 20. Mai 2008 - 14. bis 17. Mai 2008  
 Die europäische Leitmesse für Rettung und Mobilität



**Vehicle Occupant Safety design**

2008 European design  
 Safety technology is a  
 key focus



**Flexibility to manage two patients**

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



**Ergonomic layout and equipment**



**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?

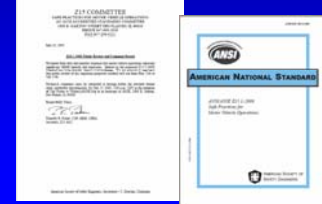
**Were we safer in the Cadillac???**



**Other successful models**



**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

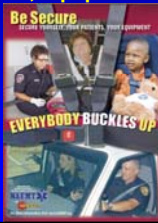
**Use proven safety tools**



**NAEMT July 2006 Position statement**



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



Hmm...



So why is it...

- ▶ That the EMS providers -
  - Were wearing navy blue – one of the most difficult colors to see at night
  - Had no head protection, when all other emergency personnel at the scene did
  - Had no protective clothing, when other emergency personnel at the scene did???

News we don't want to see

Jan 22, 2007 6:29 am US/Eastern  
**Caught On Video: EMT Struck By Car**  
 Izu Young Reporting  
 (CBS) BROW The car hit 46-year-old Capt. Steven Quindongo so violently it smashed the vehicle's windshield and sent him flying through the air.  
 Quindongo, a 17-year veteran of the city's emergency medical services, was on the scene of a fire on Riverdale Avenue in the Bronx Sunday afternoon when a civilian car moved past police barricades and caught him from behind. Chief Wayne McFarland was on the scene as the damaged health food store where his men had successfully put out the flames.  
 "We had two firefighter minor injuries," he told us, "and they were taking care of our men and when he (Quindongo) was walking back to the ambulance he was struck by the civilian vehicle."

Worker visibility Act:  
 Help is on the way !! November 24<sup>th</sup> 2008

**PART 634—WORKER VISIBILITY**  
 634.3 Rule  
 All workers within the right-of-way of a Federal-aid highway who are engaged in traffic control or other activities for purposes of providing construction equipment within the work area shall wear high-visibility safety apparel.  
 Workers means people on foot who do their jobs within the right-of-way of a Federal-aid highway, such as highway construction and maintenance crews, survey crews, utility crews, and others who are in the right-of-way.



Policy and practice ignorant of existing technical safety data

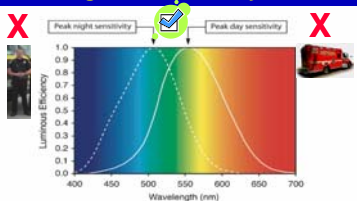
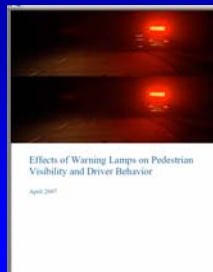


Figure 1. The scotopic (dashed line) and photopic (solid line) luminous efficiency functions, describing the spectral sensitivities of night and day vision, respectively.

Night visibility



Effects of Warning Lamps on Pedestrian Visibility and Driver Behavior  
 April 2007



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

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

**R & D**  
**“Ripoff and Duplicate”**

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



### State Strategic Highway Safety Plans

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

### Ambulance Safety Summit November 7<sup>th</sup>, 2008

- ▶ EMS Transportation Safety Subcommittee of the National Academies Transportation Research Board (TRB)
- ▶ Onsite panel of invited technical experts, in addition to policy makers and EMS leaders:
  - Safety data capture
  - Transport /fleet management, EMS vehicle operations
  - Automotive safety and occupant protection
  - Ergonomics and human factors
  - Standards
- ▶ Will be beamed live via Webinar and recorded electronically and TRB e-circular produced
- ▶ Access to live participation requires pre-registration
- ▶ Pre-registration info disseminated in early October

### TRB Jan 2009 EMS Subcommittee Meeting and Seminar

- ▶ The Subcommittee on EMS Transportation Safety of the National Academies Transportation Research Board winter subcommittee meeting and seminar is in DC during the 2009 January TRB symposium
- ▶ Your input and participation (onsite or online) is valued
- ▶ You can submit your suggestions/input for the TRB EMS Subcommittee meeting online -
  - <http://www.emssafetyfoundation.org/TRBpriority.htm>

### New NHTSA EMS info link

- ▶ There is a new Federal link to EMS info – a great resource!
- ▶ [www.EMS.gov](http://www.EMS.gov)

### [www.GlobalEMSForum.org](http://www.GlobalEMSForum.org) "Running Hot or Not", "Being Seen at the Scene" and "Ambulance Standards" Webinars



### No need to reinvent the wheel...



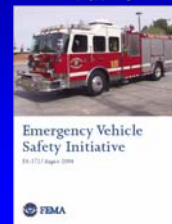
### March 2007 - FHWA



### Tips for Emergency Vehicle Operations



### 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 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??

### Safety Management

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

### 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

### 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
- ▶ 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>

