

*The Wheels on the Bus
Go Upside Down*



Objectives

- Describe incident challenges associated with responding to motor vehicle crashes involving buses
- Review recent bus crash case studies and discuss resources required to mitigate these types of incidents
- Identify strategies that EMS agencies can use regarding the deployment of multiple levels of mass casualty equipment and resources

Ask Yourself...

- Do I have a planned MCI response for a large-scale bus crash?
- Do I have adequate supplies and the proper tools?
- Have I trained on bus extrication?
- Do I have adequate mutual-aid resources?



Challenges

- Life threatening injuries
- Difficulty in gaining full access to patients
- Restricted work areas
- Associated hazards



Approach

- Need an organized and methodical approach to potential multiple/mass casualty (MCI) incidents
- Efficient and effective MCI mitigation is dependent upon simultaneous medical and physical rescue activities
- Pre-planning is necessary if everything possible is to be done to save lives
- Occupant safety – based on a principle of compartmentalization

Fundamentals

- Scene safety remains priority
- Establish incident command structure
- The condition of the patient(s) and the degree of entrapment will form the basis of the initial action plan
- Extrication principle = the extrication hole must fit the patient versus making the patient fit the extrication hole

Initial Information

- Size Up: Number of vehicles, impact areas and hazards involved
- Bus information
 - Type
 - Occupied
 - Capacity
 - Hazards
 - Access
- Resource requests
 - Type and amount of assistance
 - Non-injured resources

Bus Information

- Type
 - School
 - Passenger
- Average capacities
 - Minibus – 20 - 30
 - Full size school bus – high/middle school 44 - 52; elementary school 65 - 78
 - Motorcoach – 45 - 60
 - Double decker – 60 - 85
 - Articulating – up to 200
 - Handicapped – varies
- Driver – source of information



Resource Requests

- *EMS Surge Planning Template and Toolbox for Mass Casualty Incidents (MCI) in Virginia*
- MCI Level 1 (3-10 Immediate/Red victims).
 - 5 Ambulances
 - 2 Engines (6 responders)
 - 1 EMS Supervisor/Operational Chief
- MCI Level 2 (11-20 Immediate/Red victims)
 - 10 Ambulances
 - 5 Engines (15 responders)
 - 2 EMS Supervisors/Operation Chiefs
 - 1 MCI Trailer

Resource Requests

- MCI Level 3 (21-100 Immediate/Red victims)
 - 15 Ambulances
 - 10 Engines (30 responders)
 - 3 EMS Supervisors/Operation Chiefs
 - 1-2 MCI Trailers
- MCI Level 4 (101-1000 Immediate/Red victims)
 - 20 Ambulances
 - 10 Engines (30 responders)
 - 2 Busses
 - 5 EMS Supervisors/Operation Chiefs
 - 2 MCI Trailers

Scene Priorities

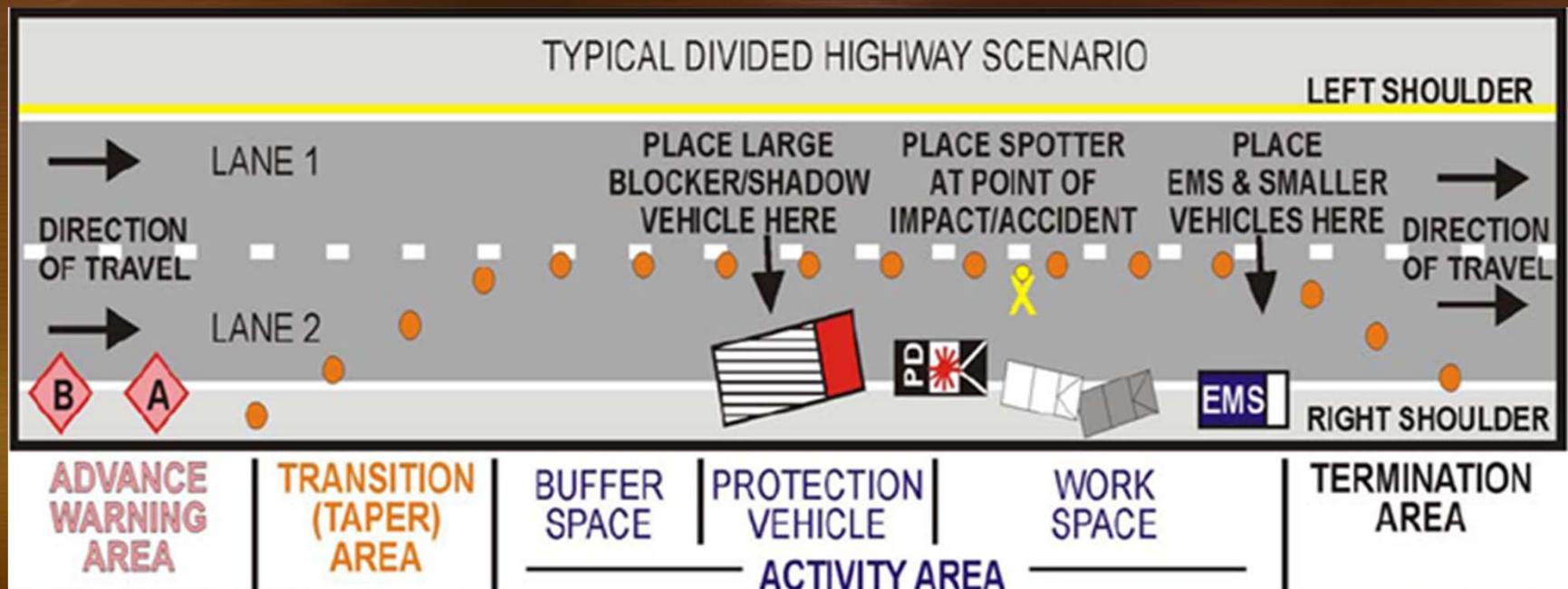
- Maintain safe area for operations
 - Advance warning, signs, cones, flares
- Traffic control, crowd control, evacuation
- Account for casualties
 - Number, severity
- Address hazards
- Secure vehicles
- Access vehicles (ladders)
- Triage, treatment, transport

Safe Work Area & Scene Control

- Scene protection
 - Coordination – with fire/rescue responders and law enforcement
 - Proper PPE
 - Scene lighting
 - Environmental elements (e.g. rain, snow, high heat)

Safe Work Area & Scene Control

- Scene access
 - Apparatus placement
 - Home response
- Scene egress



Causalities

- Early patient contact
 - Inner/outer circles
 - Triage



Inner Circle Survey

- Survey the vehicles involved
 - Casualties
 - Hazards
- Helps to establish:
 - Presence of casualties underneath/around the vehicles
 - Vehicle stabilization needs
 - Presence and type of hazards

Outer Circle Survey

- Vehicle and out to the perimeter of the scene
- Assessing
 - Additional casualties
 - Obstructions
 - Hazards
 - Any other potential problems
- Depending on the situation, a thorough search may be appropriate

Hazard Assessments

- Fuel spills
 - Contain and control fuel spills
 - Shut down and/or disconnect fuel and electrical systems
 - Passenger side rollovers - most fuel tank fill locations
- Fuel systems vary
 - Diesel
 - Gas
 - Butane
 - Propane
 - Natural gas
 - Hybrid (Don't cut the orange sheathed wire)

Hazard Assessments

- Engine liquids
- School bus batteries
 - Most often found on the driver's side near the front wheels
 - Disconnect or cut the battery cables per your department's procedures
- Presence of supplement restraint systems (air bags)
- Downed power lines
- Maintain a continuous fire watch

Vehicle Stabilization

- Stabilize vehicles
 - Stable work environment
 - Address hazards
- Access patients/extrication needs



Vehicle Stabilization

- Obstacles
 - Overall large size - height and weight (>12 tons)
- Remember the basics
 - Initial stabilization and crib as you go
 - Amount must be proportional to the bus size
 - Large supply if positioned on roof
 - Constantly recheck the vehicle
 - Never operate in an unsafe position
- Options – know the application and limitations
 - Hand and hydraulic tools
 - Air bags
 - Heavy duty tow trucks and cranes

Vehicle Stabilization



Patient Access

- Try before you pry
 - Occupants may open emergency exit windows, doors and/or roof hatches
 - Makes initial access much easier
- Front and rear doors can be jammed or heavily damaged in a crash

Patient Access

- Front door
 - Operate the door release mechanism with emergency air release lever – typically located above the door
 - Open front doors by removing the windows and use manual door control (may need pike pole reach) or
 - If both options fail – consider use of reciprocating saw to cut the piano hinge and remove the entire frame

Patient Access

- Rear door (school buses)
 - Handle is typically locked from the outside
 - Best option is to open by operating the locking mechanisms from the inside
 - Option - shear off the bolts or cut the hinges to remove the door
 - Fully secure door depending on bus position to eliminate an overhead hazard

Patient Access

- If positioned on its side or roof
 - Front window - best entry/exit point
 - Rear window
 - Openings dependent on structural integrity and patient(s) location

Patient Access

- Consider flow
 - Patient removal can be slowed if rescuers rush into multiple openings without leaving an exit route
 - Mark entry and exit points during rescue operations to maintain the flow of victim removal.



Extrication

- Access by
 - Windshield
 - Windows
 - Roof hatches
 - Exit doors
 - Ladders
 - Flapping bus skin

Extrication

- Tools
 - Reciprocating saw – lightweight and smaller for tight quarters; have plenty of replacement blades
 - Rotary saw - loud and produce sparks
 - Axes, sledgehammers
 - Pry bars, pike poles
- Hand and hydraulic spreaders/cutters/rams
- Air bags



Triage

- Identify ambulatory victims – direct to safe area (Green Treatment Area)
- Account for other victims
 - START
 - JumpSTART (1-8 y.o.)
 - Apply triage ribbons
- Deceased victims are left as they are unless required to access live patients
- Begin non-ambulatory patient movement to Treatment Area

Treatment

- Separate areas – red, yellow, green
 - May need an isolated area for victims who die in the Treatment Area
- Arriving patients are prioritized for treatment using a more in-depth assessment method
 - Apply triage tags
- Continuously reevaluate patients
- Provide medical care based on triage priority
- Resources are allocated to patients based on triage priority

Transportation

- Contact emergency department's (ED) early
 - Patient estimates
 - Assist with patient distribution to medical facilities
- Typically the closest ED ("Coordinating ED") will usually be contacted and in turn notify other emergency departments
 - "Coordinating ED" role may be handed off to another facility - RHCC
- Resources assigned based on triage priority
 - Move patients to Transportation Area
 - Load appropriate transport vehicles

Transportation

- Transport patients to most appropriate facility by the most appropriate means available
- Patient care is continued en route to the hospital
- Patient movements are documented

Communication Needs

- Command structure
- Interoperability with other responding agencies
- Hospital notifications
- Patient tracking

Case Studies



Discount Fare Buses

- Lure passengers with cheap fares, convenient routes, internet access
 - \$10 to \$15 for a ride from Boston to New York, compared with \$70 or more on Amtrak
 - \$22 for round-trip fare from Philadelphia to Manhattan
 - Amtrak can't match price or internet access
- Customers queue up daily from curbside pickups in Boston, New York, Philadelphia, Atlantic City, Baltimore and Washington, D.C.

Discount Fare Buses

- Rapid expansion of industry
 - 2010 - Ridership on intercity lines was up 6 percent; curbside discount services accounting for almost all of the growth
 - Don't operate from terminals - saves on user fees and space rental charges
- Drivers typically have 12 hour days; long wait periods between routes = sleeping in bus seats

Discount Fare Buses

- NTSB findings
 - Certain low fare curbside companies involved in fatal crashes seven times as often compared to traditional companies (e.g. Greyhound)
 - Low fare: 1.4 fatal accidents per 100 vehicles
 - Conventional: 0.2 accidents per 100 vehicles
 - Oversight has not kept pace with industry growth
- Megabus – recent stats (2/2009 – 2/2011)
 - Better than the national average on inspections and in safety rankings
 - Of 105 buses in the Northeast - 20 received speeding tickets (15%)
 - Comparison – 1,400 Greyhound buses - 117 received speeding tickets (8%)

New York – March 2011

- World Wide Travel bus was returning to New York from a Connecticut casino
- Bus swerved off I-95 in the Bronx borough of New York; flipped onto its side and was sliced in half by a pole
- 15 fatalities



New York – September 2010



- Megabus

- Driver missed exit and smashed into a low bridge on an unfamiliar parkway
- 4 fatalities



New Jersey – March 2011

- Super Luxury Tours bus was heading to Philadelphia from New York City's Chinatown
- Bus drove off the New Jersey Turnpike; struck a bridge support
- 2 fatalities and 40 injuries
 - Driver ejected through front windshield and killed
 - Passenger killed



New Jersey – March 2011

- Company history
 - Crashed the same bus three times previous year
 - Repeatedly cited for failing to hire drivers who can speak and read English
 - High number of traffic tickets and driver work-hours violations for a company its size

Federal Motor Carrier Safety Administration

Caroline County, VA – May 2011

- Sky Express Bus was headed to Chinatown, NY from Greensboro, NC
- Bus ran off side of road and then overturned
- 4 fatalities and 54 injured



Caroline County, VA – May 2011

- Bus driver charged with 4 counts on involuntary manslaughter
 - Driver stated he complained about being too fatigued to drive but felt he would be fired
- Dispatcher charged with same but charges were dismissed
- Regulators shut down bus company following crash
 - Bus company reorganized and re-opened in just days following crash

Montgomery County, MD – Sept 2010

- Charter bus – 29 passenger
- Bus drove off an elevated ramp on Interstate 270; broke through a guard rail; plummeted down a 45-foot embankment through trees and brush; came to rest on its wheels
- 1 fatality and 11 injured
- In addition to the bus crash, two passenger vehicles involved in crash
 - Vehicle struck by a falling light pole
 - Second vehicle struck rear of first vehicle

Montgomery County, MD – Sept 2010

- Scene



Montgomery County, MD – Sept 2010



Montgomery County, MD – Sept 2010



Montgomery County, MD – Sept 2010

- Triage and Treatment Area



Montgomery County, MD – Sept 2010

- Transportation Resources

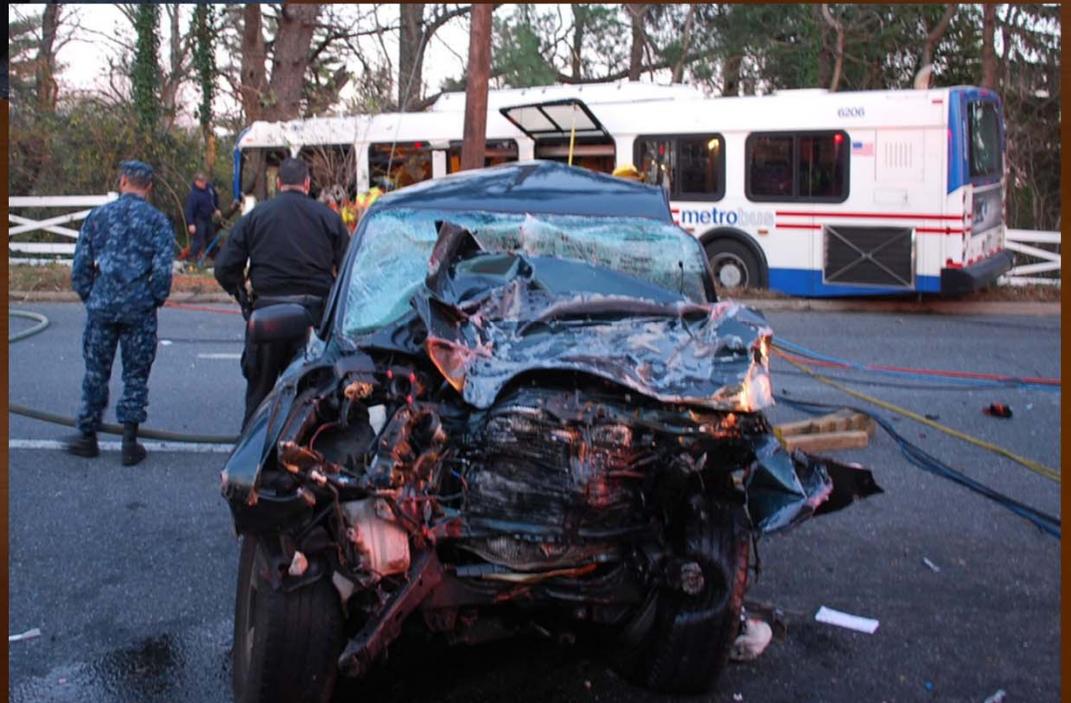
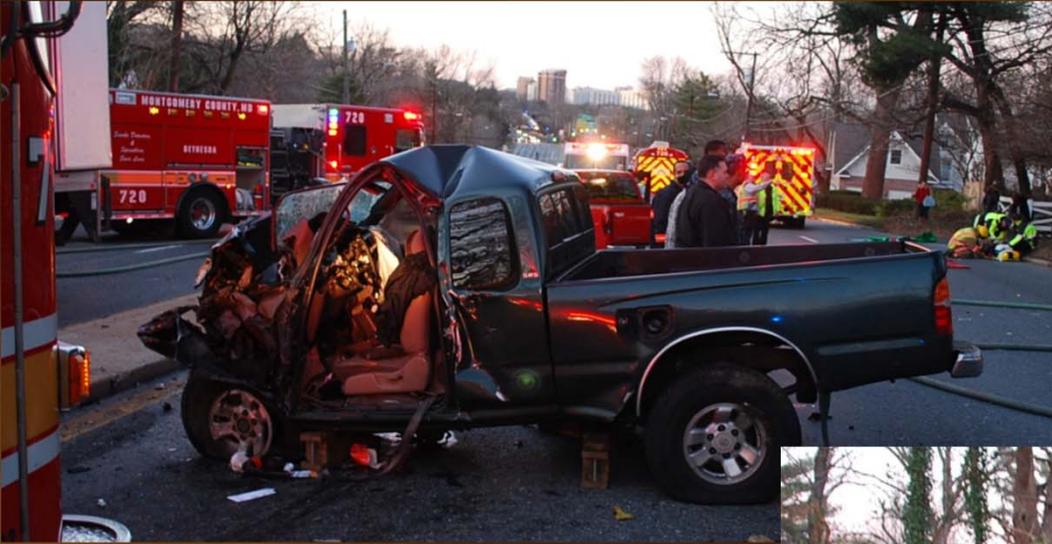


Montgomery County, MD – Dec 2010

- Pickup truck crossed median and veered into a MetroBus – collision #1
 - MetroBus swerves to the right, went off the roadway and hit a tree
- 1 fatality (pickup driver) and
 - Bus driver was trapped
 - 6 passengers transported (1 medevac)
 - 3 refusals

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Montgomery County, MD – Dec 2010



Montgomery County, MD – Dec 2010



Montgomery County, MD – Dec 2010



Montgomery County, MD – Dec 2010



Montgomery County, MD – Dec 2010



Final Considerations

- Request law enforcement
 - Direct traffic
 - Restrict unnecessary individuals from the scene
- Scene safety
 - Vehicle stabilization
 - Hazard control
 - Ensure proper PPE
 - Brief incoming rescuers regarding incident-specific hazards
 - Personnel accountability

Final Considerations

- Implement ICS
 - Scene size up
 - Develop an incident action and backup plans
 - Assign groups, teams, and tasks
- School bus involvement
 - Child identification and tracking
 - May need to a staging area for incoming parents
 - Request school representative
- Media
 - Staging area
 - Assign a public information officer (PIO)

Final Considerations

- Training

- ICS and unified command
- Technical rescue
- MCI
- Low frequency
- Utilization of private resources
 - Heavy duty tow trucks

- Emotional responses

- Children involved
- CISM

Questions/Comments



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