Metropolitan Washington
Council of Governments

Metropolitan Washington
Council of Governments

Railroad Emergency Response Manual

Approved by the COG Fire Chiefs Committee

Metropolitan Washington

Council of Governments

Second Edition
May 2020

ACKNOWLEDGEMENTS

This manual could not have been written without the assistance of many
Dedicated rail safety personnel and members of the Metropolitan Washington Council of Governments regional emergency response agencies that have spent many hours providing the material for the creation of this manual. We thank all emergency responders from all jurisdictions, including our federal agency partners that shared their firsthand experiences of recent commuter railroad incidents. Many of their experiences were incorporated into sections of this manual.

Many Railroad representatives, private industry and governmental organizations provided their invaluable technical assistance. This committee would like to thank Steve Truchman formerly of the National Railroad Passenger Corporation (Amtrak), Greg Deibler from Virginia Railway Express (VRE), David Ricker from the Maryland Rail Commuter (MARC), Paul Williams of Norfolk Southern Railway Corporation and Mike Hennessey of CSX Transportation, all of whom provided the specific diagrams, illustrations and other technical information regarding railroad equipment. We recognize Elisa Nichols of Kensington Consulting, LLC for her contributions to this manual as well as representatives from many Federal Agencies who also provided information on the technical accounts of railroad equipment and their integrity on past railroad incidents.

The members of the Metropolitan Washington Council of Governments (COG) Passenger Rail Safety Subcommittee gratefully presents this manual to both Fire and Rescue Service and Railroad organizations in an effort to instill readiness within our own personnel that they might effectively and collaboratively respond to a railroad incident.

SCOPE AND UPDATES

This Manual provides specific information on rail equipment and procedures. Due to the size and diversity of the National Capital Area, only general information on tracks and facilities is provided. Each jurisdiction should create appendices to this manual covering the unique rail lines, stations, yards, tunnels, and bridges in their area. Each jurisdiction should also develop a working relationship with the rail representative in their area. This working relationship is most beneficial if it is done prior to an emergency.

Updates will be made to this manual every three years. Any suggestions for updates or corrections should be submitted to the COG Passenger Rail Safety Subcommittee.

DEDICATIONS

This Manual is dedicated to the Men and Women who selflessly respond to rail events throughout our Nation, many of whom have made the ultimate sacrifice for their fellow responders and the citizens they serve. May the principles and concepts contained within this book serve to provide safe and effective work practices for mitigating these incidents and to prevent any future sacrifices.

TABLE OF CONTENTS

(Corresponding page numbers to be inserted after final edits)

CHAPTER 1 RAILROAD FACILITIES AND TRACK ROADWAY

A. Operational Considerations
B. Train Stations
C. Railroad Roadway Components
D. Amtrak's Electrified Territory
E. Railroad Yards
F. Railroad Tunnels
G. Railroad Bridges
H. Preplanning the Railroad Infrastructure

CHAPTER 2 LOCOMOTIVES

A. Electric Locomotives
B. Diesel-Electric Locomotives
C. General Locomotive Information
D. Emergency Shut Down
   1. Electric Locomotives
   2. Diesel-Electric Locomotives
E. Locomotive Batteries
F. Locomotive Doors and Windows
G. Locomotive Fires

CHAPTER 3 PASSENGER TRAINS

A. Passenger Rail Service Overview
   1. MARC Commuter Rail Service
   2. VRE Commuter Rail Service
   3. Amtrak Regional and National Passenger Rail Service
B. Features Common to All Passenger Trains
   1. Head-End Power (HEP)
   2. Air and Hand Brake Systems
   3. Keys
C. Cab Cars
D. Passenger Cars (Trailer Cars)
E. General Information on All Passenger Car Doors
   1. Outside End Doors (Collision Post)
   2. Inside End Doors (Vestibule Side)
   3. Exterior Side Entrance Doors (Vestibule Side)
   4. Other Exterior Side Doors – Middle of the Car
F. Specific Information on Passenger Rail Cars
   1. MARC II Car Information and Car Door Configurations
      a. Opening Doors from Outside
      b. Opening Doors from Inside
   2. MARC III (Kawasaki) Car Information and Car Door Configurations
   3. VRE Gallery Car Information and Car Door Configurations
   4. Amtrak AMFLEET I Car Information and Car Door Configurations
   5. Amtrak AMFLEET II Car Information and Car Door Configurations

6. Amtrak Superliner Car Information and Car Door Configurations
7. Amtrak High-Speed Train Set Information and Car Door Configurations

G. Utilizing Emergency Windows on All Passenger Rail Cars
1. Opening All Types of Emergency Windows from Inside the Car
2. Opening Amtrak Windows from the Outside
3. Opening MARC and VRE Windows from the Outside
4. Last Resort Methods to Remove Lexan Polycarbonate Windows

H. Cutting into the Car Body
I. Other Emergency Equipment
J. Freight Cars on Amtrak Passenger Train

CHAPTER 4 FREIGHT TRAINS

A. Train Consist (Shipping Papers)
B. Brake Systems
C. General Information on Freight Cars
D. Types of Freight Cars
1. Flat Car
2. Intermodal Service
   a. Trailer on Flat Car (TOFC)
   b. Container on Flat Car (COFC
   c. RoadRailer
3. Auto Rack
4. Box Car
5. Refrigerated Car (Reefer)
6. Gondola Car (Gon)
7. Hopper Car (Covered and Uncovered)
8. Tank Car
   a. General Service Tank Car
   b. Pressure Tank Car
9. Coil Cars
10. Spine Cars
11. Caboose Car
12. Hi-Rail Vehicle

CHAPTER 5 SAFETY

A. Working on the Right-of-Way
B. Working Around Rolling Stock
C. Working at Railroad Incidents
D. Electrified Territory
E. Flagging and Lockout Protection
F. Grade Crossing

CHAPTER 6 OPERATING PROCEDURES FOR RAILROAD INCIDENTS

A. General Operational Considerations
B. General Command Considerations
C. General Unit Tasks

APPENDIX A: RAILROAD EMERGENCY ACTION CHECKLIST

CHAPTER 1 – RAILROAD FACILITIES AND TRACK ROADWAY

A. OPERATIONAL CONSIDERATIONS

It should be remembered that unlike the National Highway System, the Nations rail network is private property. This is significant, as it carries with it several considerations that may not apply to highway and other transportation modes.

While Emergency Response assets have a duty to act during emergency operations involving public safety, once the immediate emergency has been mitigated, Emergency Response personnel become invited guests of the Railroad, and may legally be asked to leave at any time after that point. This represents a change in Fire and Rescue operational standards, since Emergency responders do not automatically retain control of the scene once the event has been stabilized. Since the Nation's Railroads are self-Insured, they will have their own procedures for emergency response to incidents not involving threats to life and public property. Incident Commanders are well advised to have a Railroad representative or trained Heavy Rail Safety Liaison to advise them on how Railroad procedures and Emergency Operations procedures can work in concert for a successful mitigation of the incident.

Emergency Response Commanders can avail themselves of assets during Rail Incident Mitigation that are not available to them on other incidents. Railroads maintain contracts with Hazardous Materials clean up companies, heavy equipment operators and other hazard-mitigation companies. Many times, these entities can bring specialized resources to bear on the event that can greatly assist in the event resolution. Since these assets may be some distance, early recognition and request is strongly advised. Again, Railroad representatives or Fire & Rescue Rail Safety Liaisons can assist command with these requests.

B. TRAIN STATIONS

In the National Capital Region (NCR), train stations are found in a variety of designs and sizes. Some of these structures are huge transportation complexes, such as Union Station, while others are small single room structures designed to protect commuters from the inclement weather. Station construction types range from masonry to wood frame structures with canopies. These structures are owned by the major railroads and by state, local and federal agencies in the District of Columbia, Maryland and Virginia. Some train stations are staffed while others are unattended and utilize vending machines for ticketing. Some stations are only steel canopy and are not considered to be a structure.

Commuter railroads will try to halt trains at the closest station during an emergency. Responders should preplan these locations and structures. Rail station parking facilities located near the railroad tracks may be used as triage and equipment staging areas.

Additionally, train stations have become targets for a terrorist attack as these structures are assembly areas for commuters. Terrorists tend to select these locations to produce the greatest harmful effect. Therefore, it would also be prudent for responders to evaluate railroad stations for their structural integrity, pre- determine the effects of a possible blast and damage that would be achieved on these structures.

Picture 1-1: Damage to both the commuter train and station in Madrid Spain. The attack occurred on March 11, 2004 - 202 people were killed and hundreds of patrons were injured. Should these fire fighters be standing underneath the canopy structure?

C. RAILROAD ROADWAY COMPONENTS

In the Washington Metropolitan area, both commuter rail and freight service are provided by several large railroad entities that own and operate a network of tracks that traverse through outlying counties and converge in the District of Columbia. CSX Corporation owns and operates rail lines in Maryland, Virginia and the District of Columbia. Some of these train tracks may be referred to in old maps as Conrail, Chessie or B&O Railroad who are all predecessor railroads of the current CSX Corporation.

There are three major CSX rail lines in Maryland that span the National Capital Region. The first is the mainline track of CSX that enters Montgomery County at the Northwest corner proceeding through Rockville and Silver Spring into Washington D.C. and designated by CSX as the "Metropolitan Subdivision." This section of track may also be identified as the "Brunswick Line" by the MARC Commuter Services. However, since this designation is for the most part used within MARC it may not help CSX representatives with determining your exact location on the railroad during an emergency. The second mainline track in the region originates in Baltimore and parallels highway Route One in Prince George's County and terminates in Washington D.C. This trackage is identified as the "Capital Subdivision" or called by MARC the "Camden Line." The last major rail line is identified as "Old Main Line." This line traverses through Frederick County.

The CSX and Norfolk Southern Railroad also own and operate separate rail lines in Arlington, Fairfax and Prince William Counties in Virginia. Virginia Railway Express (VRE) provides commuter service similar to the MARC System. The CSX "RF&P Subdivision Line" travels Northward away from Richmond, Virginia passing

Ronald Reagan Washington National Airport and enters the District of Columbia from the South. The Virginia Railway Express identifies this line as the "Fredericksburg Line." The Norfolk Southern "Piedmont Division" separates from the CSX lines in Alexandria and then continues southwest through Manassas and travels to other destinations southward. This line is labeled the "Manassas Line."

Additionally, Amtrak owns and operates rail lines that extend from Boston, Massachusetts through New York, Baltimore and New Carrollton, Maryland and then terminate at Union Station in Washington D.C. This rail line is principally used for passenger service and is designated as the "Northeast Corridor" by Amtrak and called the "Penn Line" by MARC. This rail line facilitates the movement of Amtrak's high- speed trains and offers intercity passenger rail service along the east coast.

Many of these railroad tracks have additional branch or spur lines that join main line tracks and are labeled with different names or identifiers. They are not listed here because of their relative large number. Nevertheless, they are equally important and should be learned. The Washington Metropolitan Area Transit Authority (WMATA) also operates their own rail subway system adjacent to CSX railroad tracks in high train traffic areas called the "common corridor."

Picture 1-2: The railroad tracks of several organizations are often intertwined with each other. Responders must notify all the adjacent railroad operators to ensure that trains are halted. Pictured here are CSX tracks in the foreground and Amtrak tracks in the background. Metro Subway trains are up above on the aerial structure.

It is important to understand that many of these rail lines are frequently located side by side with neither railroad entity knowing what commodity or type of train is traveling on the adjacent track. All railroads control their own particular Roadway. The term "roadway" is defined as the section of property between tunnel walls, fence lines and bridges in which the railroad utilizes for the movement of commerce and people which generally consist of approximately 50 feet outward measured from the center of the outward most tracks. This term is used frequently in the railroad industry.

Trains from various railroads may operate on tracks owned by another railroad but the movement of trains on a given track is always controlled by the individual railroad that owns and operates the track. For example, Amtrak often operates on its own line or it can operate on both CSX and Norfolk Southern tracks. If there is an incident involving an Amtrak train or MARC train on a CSX track, CSX must stop the other trains not the local carrier. It should always be remembered that trains can operate on any track, in any direction, at any time.

Before an incident occurs, fire and rescue personnel should meet with railroad representatives to gain a complete understanding of which railroad entities own and operate the tracks in their response area. This information is critical for responder safety.

All railroads have a method of determining a given location on a particular rail line. Markers, called "mileposts", are spaced at one-mile intervals along the roadway and indicate the distance from a selected starting point. In the NCR many mileposts are missing. Maps produced by the railroad industry showing their rail lines will display milepost measurements as one of their map features. Mileposts may be constructed with either a square or round metal sign attached to a pole or a concrete obelisk, shaped like a miniature Washington Monument. Milepost distances are also stenciled on bridges and other railroad structures. AT&T Telephone cable signs are posted at regular intervals along Amtrak's roadway. At the bottom of these signs are other milepost markings. These markings are not official railroad measurements, but they are close enough to be used in an emergency. AT&T and MCI cable identification signs that are posted along the roadway of major CSX sections of track do NOT have correct milepost distances on them and are of little or no value. Learn where mileposts are located along the roadway as these markers will be the incident address to which units will be dispatched.

Picture 1-3: CSX Milepost indicating a section of track, identified as the Metropolitan Subdivision. This section of track originates in Washington DC's Union Station and extends north and westward. The mile post marker pictured here is positioned on the Frederick and Montgomery County boundary. This marker indicates 37 miles from Union Station.

Picture 1-4: A Norfolk Southern Milepost indicating the section of track that begins in Alexandria at Milepost 8 and extends to locations southward. Milepost 12 is where a large amount of rail activity begins. Note the cable identification sign next to the milepost. On Norfolk Southern roadway these identifiers provide little information for responders to use.

Picture 1-5: This Amtrak Milepost is situated on the "Northeast Corridor" in Prince George's County near the Washington DC boundary line. On this track a stone obelisk is used. The mileage demarcation for this line starts in Philadelphia.

Please be aware that the mileposts shown above are selected for presentation purposes only and not representative of what responders may find in the right of way. In the field, milepost may be missing or difficult to read due to vandalism and the lack of maintenance by the railroad.

Track switches are located at various locations on the railroad. These switches or "crossovers" provide a means to move a train from one track to another. Some switches operate remotely by railroad controllers as far away as Jacksonville, Florida. These remote switches operate either electrically or electro-pneumatically by a distant command signal and hence, may open or close at any moment without warning. When switch operation occurs, they close with several hundred pounds of force and present a significant risk of a body part becoming crushed between the rail switch points. Emergency responders should keep feet, hands, tools and equipment clear of all switches. Because of the hazards associated with switches and other unforeseen consequences, only railroad personnel are to operate control devices.

Switches may also have heaters attached to them to maintain their operability in the freezing rain and snow conditions. Portable heaters are powered by kerosene. Permanent heaters utilize electricity, natural gas or liquefied petroleum gas (LPG). A 1000-gallon LPG tank supplies each LPG switch heater. Some sections of track with many switches may have up to six 1000-gallon LPG tanks. The natural gas, LPG, kerosene heaters have small flames that impinge on rails. These open flames can be mistaken for hostile fires. The natural-gas lines and LPG tanks are installed above the ground along the tracks exposing them to possible rupture. The open flames also provide an ignition source for fuel spills.

Railroad electric signal wires extend under or above the ground and are energized up to 6,900 volts. Signal power lines operate switches, signals, bridges, at- grade crossing gates and other equipment. These signal lines are controlled by the railroad that owns and operates the tracks and local power companies have no control over them.

Another hazard associated with the railroad industry can be found in the method railroad employees signal trains to stop. Highway flares are called "fusees" in the railroad industry. Fusees can be waved horizontally or laid by the tracks to signal trains. Emergency responders should use caution when utilizing fusees as their open flames could ignite combustibles.

D. AMTRAK'S ELECTRIFIED TERRITORY

Amtrak's electrified territory utilizes overhead catenary lines that carry 12,000 volts of AC electrical power to propel trains. THE CURRENT IN THESE LINES CAN ARC UP TO THREE FEET, WHICH WILL ELECTROCUTE ANYONE WITHIN THREE FEET OF CATENARY LINES. CONSIDER ALL WIRES TO BE ENERGIZED UNTIL ADVISED TO THE CONTRARY BY A QUALIFIED AMTRAK ELECTRICAL TRACTION EMPLOYEE.

Remember that this electrical hazard may not always be overhead. Firefighters operating on roadway bridges spanning Amtrak tracks have often place hose streams dangerously close to wires affixed under the bridge.

Even when the power is shut down, these lines should be considered deadly until an on-site Amtrak Class-A employee (electrician or lineman) secures a grounding stick to overhead wires and installs the grounding wire from the stick to the rail.

Picture 1-7: Amtrak utilizes these grounding sticks to protect responders from the catenary system becoming re-energized. Notice the correct method of attaching the bottom wire from the device to the rail. This picture was taken at a railroad exercise with the District of Columbia Fire Department at Union Station. Also notice the access bridge on top of the track – the wires make this location an unsafe place to park fire apparatus in the event of an incident below.

A schematic drawing of the catenary system along the Northeastern Corridor is provided on the following page. Please examine the substantial amount of voltages that can be passed through in these wires.

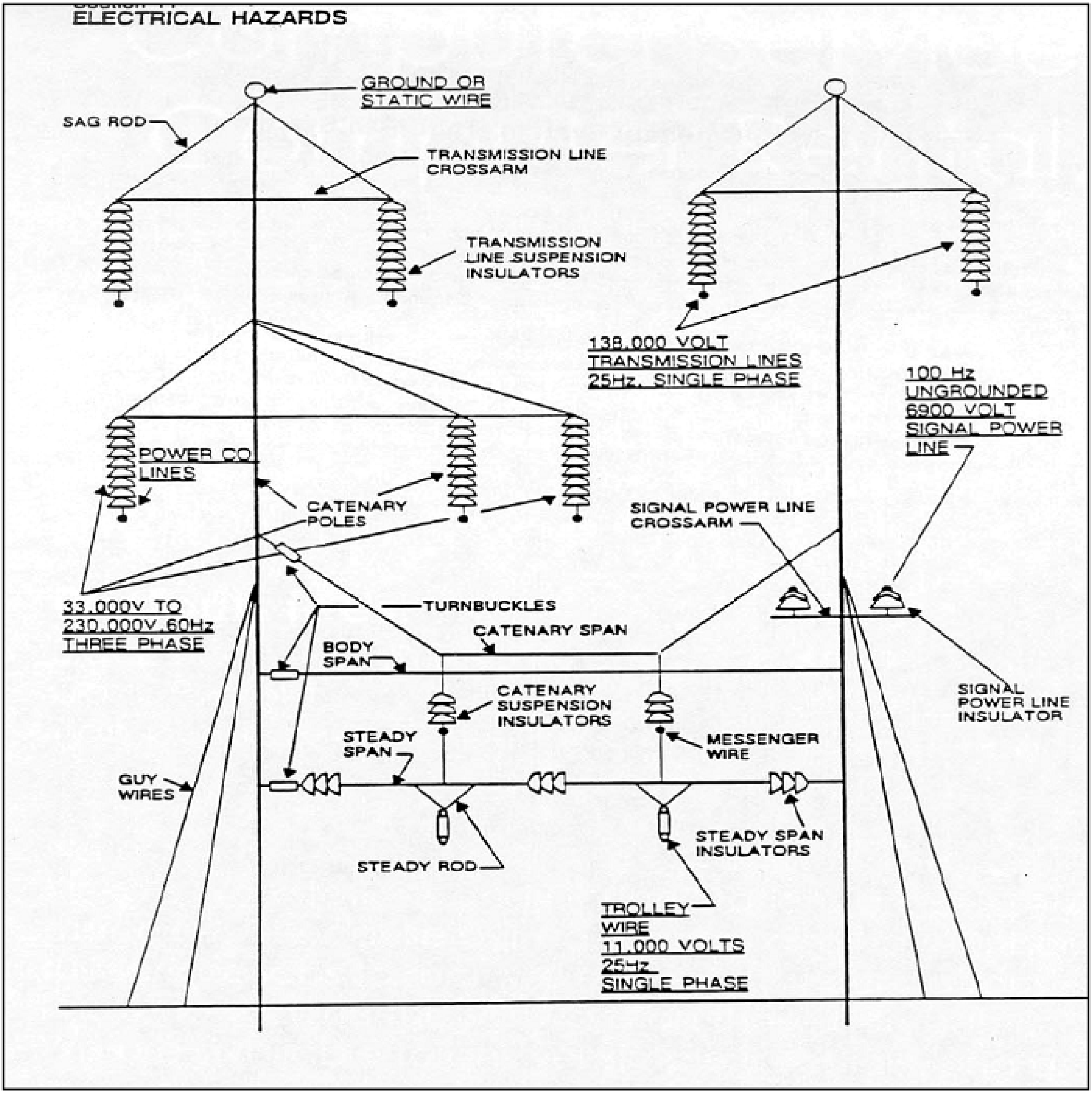


Diagram 1 -1: Drawing delineates various components of a typical catenary system. These lines carry approximately 11,000 to 138,000 volts above the track bed.

When examining a schematic picture of a catenary bridge, the large number of wires becomes quickly apparent. The following paragraphs describe the catenary system from the top of the catenary pole down to the lowest wires.

At the top of the catenary system is a ground wire (static line). The ground wire is not energized but there may be stray current running through this wire. The purpose of the ground wires is to simply protect electrical system components from lightning strikes.

Moving lower, we find the transmission lines below the ground wire. In portions of the Northeast Corridor in Maryland, these transmission lines are energized at 138,000 volts and objects must not be allowed within eight feet of these lines. None of these particular Amtrak transmission lines are located in the District of Columbia.

The next set of wires is the signal power lines, which are usually found below the transmission lines. They are energized at 6,900 volts and objects must not be allowed within three feet of these lines. The signal power line transmits current between substations to various locations along the roadway, where it is transformed to other voltages to feed signals, track circuits, switch heaters and other equipment. In other areas, the signal power line is at lower voltages and located underground.

The lowest wires in the system are the catenary (trolley) wires. They are energized at 12,000 volts and objects must not be allowed within three feet of these lines. Power from the catenary wires is transmitted to locomotives through pantographs on the roof of locomotives. The current is then used to power the electrical motors in the locomotive and is returned through the train wheels, to the tracks and back to the substation. **If a train derails, but remains in contact with the catenary wire, any object or person that touches the train may serve as the ground for the 12,000 volts.**

There are impedance bonds placed between the rails near signals. Impedance bonds are electrical devices that permit passage of higher voltage propulsion current but prevent the passage of lower voltage signal current. These impedance bond devices are an electrocution hazard due to the high voltage that may be present. Wires connected to the impedance bonds, often called leads, are also extremely dangerous if they become loose or broken. Personnel, tools and equipment must be kept away from these wires or leads and impedance bonds.

Picture 1-8: Amtrak Impedance Bonds are situated between the tracks. Note the small wires protruding from the side of the casing. These wires may be energized even if the

local catenary power is removed.

In an emergency, the catenary system must be shut down by Amtrak personnel in Philadelphia and grounded by an on-site Amtrak Class-A employee (electrician or lineman). De-energized catenary system wires that are not grounded are still dangerous for three reasons. First, the wires could accidentally remain energized due to mistaken identification of the area that must be de-energized. Second, the wires carry a potentially fatal static charge until grounded. Third, the wires can accidentally become re-energized by human error. The on-site Class-A employee must attach a grounding device and leave it in place before operations can begin near the electrified area. This will remove the dangers listed above. The attachment of a grounding device serves as a safeguard, similar to a circuit breaker, to protect against accidental re-energizing of the circuit. The catenary system can be shut down immediately by Amtrak's Power Director in Philadelphia but it may take up to an hour to have a Class-A employee arrive to a location where he or she can ground the system.

In the absence of Class-A electricians, the catenary system can be shut down and grounded by foremen and Class B employees in two sections of the Ivy City Yard in the District of Columbia. In this exception, the catenary systems at the Motor Pit area near the Annex Building, and tracks 7 and 8 in the Service and Inspection (S&I) Building, can also be de-energized and grounded by on-site foremen and Class B employees.

When safety devices automatically de-energize the system due to something touching the wire, the system may automatically re-energize. Overhead wires even when downed may be energized. The catenary system must always be considered a deadly hazard until Amtrak guarantees that power has been removed and the system is grounded. Stay 15 feet away from all catenary wires until this action occurs.

Rescue techniques used with lower voltages, such as ropes and poles, CANNOT be used with energized catenary systems. The volt probe or Metro hot stick utilized within Metro CANNOT be used with the catenary system to detect voltage. Do NOT use any type of extinguisher, including Class C extinguishers, on any energized catenary equipment. Rescuers must de-energize and ground the catenary wires first.

If a derailed locomotive's pantograph is still in contact with the catenary wires, there is a real possibility that rescuers will be electrocuted if they come in contact with the train.

Picture 1-9: This picture illustrates the all-encompassing hazards of catenary wires. This train happens to be pushed by a diesel powered locomotive rather than an electric locomotive. The procedure for removing 480-volt electric train power to each type is vastly different but the catenary electrocution hazard above the incident will still be there.

Picture 1-10: Rail yards present challenges such as access & train movement.

E. RAILROAD YARDS

Extreme caution must be used when responding to rail yards. Most yards have moving trains 24 hours a day, seven days a week. In Amtrak rail yards, catenary lines are energized 24 hours a day.

Rail yard workers perform maintenance, repairs, loading and unloading, cleaning and fueling for trains. Emergency response personnel must be aware of what activities take place in rail yards in their area of responsibility. Many entrances and roads in yards have unprotected grade crossings. Extreme caution must be used when crossing tracks in or near rail yard access points. Tracks near a yard may be owned and operated by a different railroad than the one that owns and operates the yard tracks.

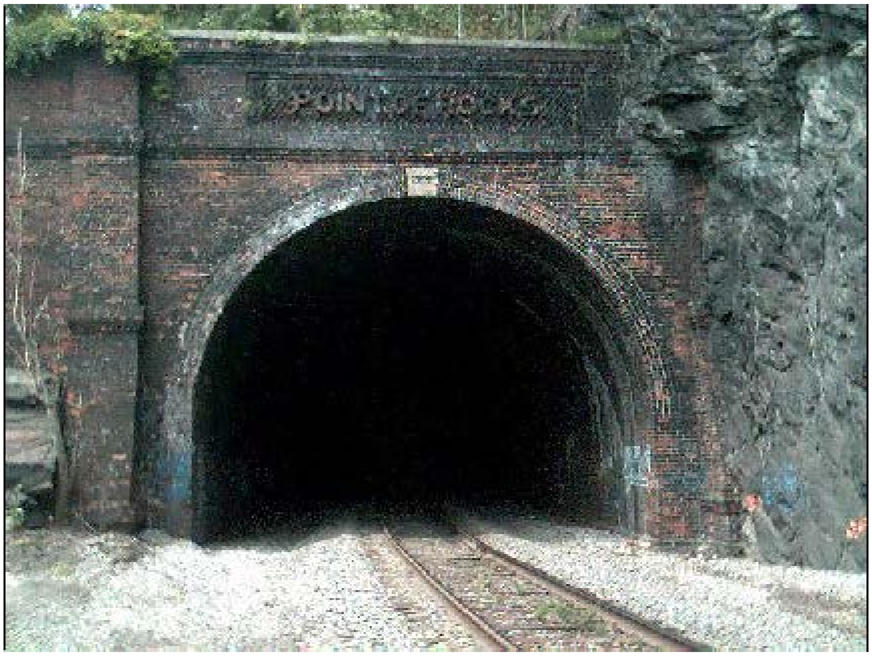
Yard personnel will have no knowledge of train movement on adjacent tracks. Both railroads must be notified to stop movement of trains on their separate tracks. Before entering a rail yard, responders must contact the Yard Master or terminal superintendent to stop train movement.

F. RAILROAD TUNNELS

In the western areas of Frederick County, Maryland, there are several relatively short tunnels. In the District of Columbia there are two significantly long tunnels that extend for approximately a mile. The CSX Virginia Avenue Tunnel has no fire protection features installed in the structure. Amtrak's First Street Tunnel has fire protection features such as a standpipe, tunnel lighting, railroad communications and telephones but the tunnel is constructed with no emergency exits that lead to the surface. Entrance and egress can only be made from a portal (opening) at each end of the tunnel. There are signal and catenary wires in the tunnels. Fire and rescue service radios only have marginal performance in the tunnels which will make communication difficult between tunnel and surface units. There are several other tunnels in outlying counties that are shorter in length that do not have any of these features.

On July 18, 2001, a CSX Freight train derailed in the Howard Street Tunnel causing a large fire and a chemical release. This tunnel is approximately 1.7 miles long. In a Technical Report published in July 2001, by the Federal Emergency Management Administration concluded that, "Firefighters attempted to advance water cannons [large diameter monitors] from each end of the tunnel in an effort to extinguish a fire they could not see. The heavy black smoke totally obscured vision inside the tunnel. Portable lighting was useless. Firefighters attempting to enter the tunnel lost all vision within 300 feet of the entrance as the smoke deposited a black film on face pieces and goggles. Initial fire crews were only able get within 900 feet of the train inside the tunnel due to the intense heat."

Temperatures in the tunnel reached 1,500 degrees Fahrenheit which caused freight cars to glow red like steel in a blast furnace.



Picture 1-11: A single set of tracks enter this tunnel in Frederick County. While limited work space may not be a problem here, the coordination of a multi-jurisdictional response from opposite ends may provide a different set of obstacles!

Picture 1-12: The First Street Tunnel pictured here is in the District of Columbia. Notice the lack of work space between the train and the tunnel walls. A fire department standpipe extends down the wall into to tunnel. Most tunnels in the NCR do not have this feature.

Picture 1-13: Tunnel fires present other challenges besides access. Smoke obscuration, darkness, limited work space, communication problems, hazardous materials and water supply issues will all be obstacles in controlling this type of incident. Tunnel fires like this one in Baltimore, represents the worst-case scenario for emergency workers.

In most railroad tunnels there is very little clearance between trains and the tunnel walls. If an unexpected train approaches the incident area, firefighters must leave the tunnel, enter a passageway between tubes or find a refuge area (manhole) in the wall of the tunnel. Rescue workers without self-contained breathing apparatus can possibly find refuge by lying in the corner where the wall and floor come together but safety at that location is NOT guaranteed. In very narrow tunnels, such as the Amtrak's First Street Tunnel, firefighters wearing self-contained breathing apparatus who attempt this maneuver, will probably be struck by the train.

When confronted with a tunnel emergency, the length and width of the tunnel, close clearance, the presence of multiple tracks and smoke conditions all must be considered before entry. A tunnel emergency represents the most formidable worse- case scenario for life safety.

G. RAILROAD BRIDGES

Railroad bridges in the Metropolitan Washington Area are made of steel, masonry and wood. These bridges can be built with an open or closed deck feature or a combination of open and closed deck construction. Closed deck bridges are constructed as the name implies - a closed substructure that will usually be covered with gravel.

Open deck bridges, however, have many openings in the floor and are not protected by railings. Therefore, extreme caution must be used when performing fire department operations as victims and responders can fall though the openings to surface below.

Picture 1-14: The Long Bridge spans across the Potomac River in the District of Columbia. Notice the open deck type of construction that exposes the river below. Responders not knowing this hazard will consequently fall into the water.

Some bridges have limited refuge areas for persons to use if a train were to cross the bridge span, hence trains must be stopped a distance away when rescue and suppression efforts are performed on these structures. Close clearances, the presence of multiple tracks, the length and width of the bridge and difficult access to the site must be considered with a bridge emergency.

Picture 1-15: A picture of a bridge made of wooden construction. These structures present a different kind of intimidating safety hazards for both victims and responders. Note the lack of fall protection on the right side. The elevation of this bridge is approximately 85 feet.

Picture 1-16: A picture of a wooden deck bridge well involved in fire. Note the coal cars getting ready to fall into the ravine.

H. PREPLANNING THE RAILROAD INFRASTRUCTURE

Many railroad tracks and structures can be seen from public streets. This attribute of the railroad gives responders a false impression that the tracks and structures are easy to access in an emergency. The collision between a MARC commuter train and Amtrak's Capital Limited in Silver Spring, Maryland, illustrates the problem getting personnel and equipment to the incident site. Responders encountered access difficulties even though the incident occurred in an urban area with major roads and two parking lots near the collision site.

Dense woodland, fences and a track bed that was slightly elevated caused time delays in reaching the train that was on fire. Rescue efforts were further hampered by snow conditions that obscured visibility and impeded the movement of equipment to the scene. All of these rescue hindrances were found in an urban area. These obstacles will be further multiplied if the railroad incident were to occur in a rural area or on a bridge.

Most track beds consist of gravel, called ballast, which makes walking on the roadway extremely difficult. Access to remote areas is normally achieved by driving on one lane gravel and dirt roads or by walking along the roadway. In some isolated areas, access to the incident is best reached by four-wheel drive vehicles or specialty vehicles.

Emergency response personnel must pre-plan access points to tracks, structures and facilities in their response areas to find the best means to reach the incident site and to obtain a water supply.

A majority of the railroad incidents occur at switches, curves, bridges and grade crossings. Special attention must be given to these areas when pre-planning rail responses. As a general rule of thumb, the railroad maintains a vehicle access dirt road to access signaling equipment.

Personnel verifying access to structures and tracks must be sure to gain permission and not to trespass on railroad property. Remember that moving trains kill more than 500 trespassers a year on railroad roadways and property.

There could be a time delay as to when the fire dispatch is notified and when the railroad can confirm that all train traffic is stopped. Planning for apparatus at designated railroad crossing to protect fire units on the scene is extremely important. This may cause adding additional units to the initial response dispatch or utilizing law enforcement or highway maintenance representatives to secure track from a safe location.

CHAPTER 2 - LOCOMOTIVES

Currently, there are two types of locomotives used by the railroad industry for regular service. They are classified as either electric locomotives or diesel-electric locomotives. Amtrak has retired all older HHP Locomotives. All locomotives are marked with a permanent number assigned by the railroad entity that owns the locomotive.

A. ELECTRIC LOCOMOTIVES

A typical electric locomotive utilizes a pantograph to collect the 12,000 volts, 25 Hz, alternating current (AC) from the catenary wire. The electrical power is transferred to a large transformer inside the locomotive that produces 600 volts of direct current (DC) at 800 amps, with a total potential capacity of 2,500,000 Watts of power. This power is transferred to the electric traction motors to directly propel the locomotive axles. The transformer and other equipment are located in a machine room of the train engine. The entire roof area of electric locomotives, including the pantograph, is energized and extremely hazardous. On electrical locomotives, firefighters must always maintain a 15-foot clearance from all locomotive rooftop equipment. Amtrak and MARC operate electric locomotives on Amtrak's Northeast Corridor and Washington Terminal tracks. Electric locomotives are not used with freight trains.

There are several types of electric locomotives. They have unique features that are described in this chapter. The first model viewed in the diagram below is the older AEM-7. This locomotive may operate by itself or with multiple units coupled together. The crew member may be either present in the lead locomotive or in the trailing units. This locomotive weighs about 201,500 pounds and operates by the overhead electrical catenary system.

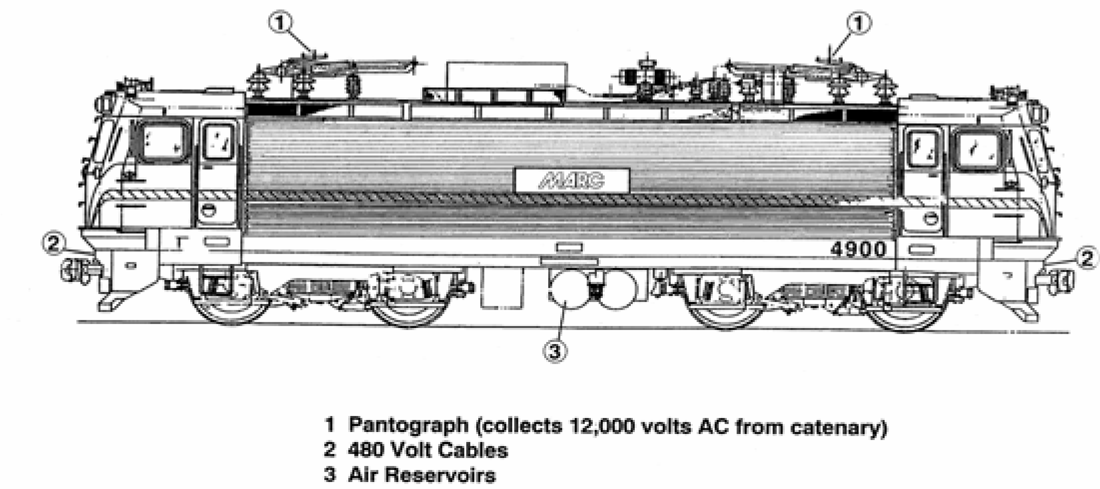


Diagram 2-1: The above diagram is of an AEM -7 Electric Locomotive. These units are currently in use by both Amtrak and MARC. Enter the locomotive by any of the four side cab doors (two pictured here.) Remember that these doors open inward.

The newer ACS-64 bi-directional locomotive is used with conventional passenger cars and travels up to 125 mph. These locomotives are numbered 600 to 670. These electrical locomotives can be identified by the distinctive feature of having a rounded operator's cab on both ends.

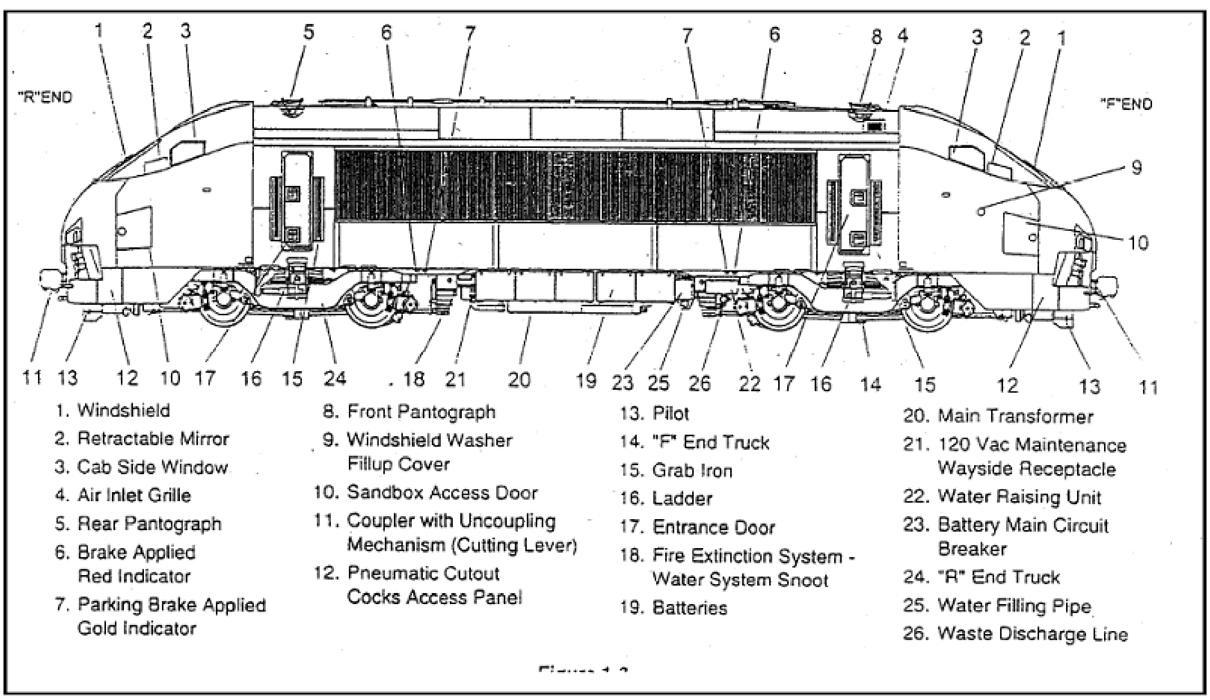


Diagram 2-2: This diagram illustrates the newer HHP-8 Electric Locomotive. This type of locomotive is currently used only by Amtrak.

Amtrak also operates a High Speed Train known as "Acela Trainset". The Trainset consists of a power car permanently coupled to each end of a six-car passenger consist, making a total of eight cars. The power cars are numbered 2000 to 2039 and the cars are in the 3000 series. These train sets can travel up to 150 mph but will travel at 135 mph in the Washington Metropolitan Area.

Picture 2-1: A picture of Power car getting ready to leave the Ivy City Maintenance Yard in Washington DC.

B. DIESEL-ELECTRIC LOCOMOTIVES

A typical diesel-electric locomotive's operation is similar to that of an electric locomotive, except that a diesel engine powers a generator that produces current for the traction motors. Diesel-electric locomotives are used by all railroads, on all tracks, in the District of Columbia, Maryland and Virginia. Diesel-electric locomotive fuel tanks range in size from 800 to 5,000 gallons. A typical locomotive weighs more than 150 tons.

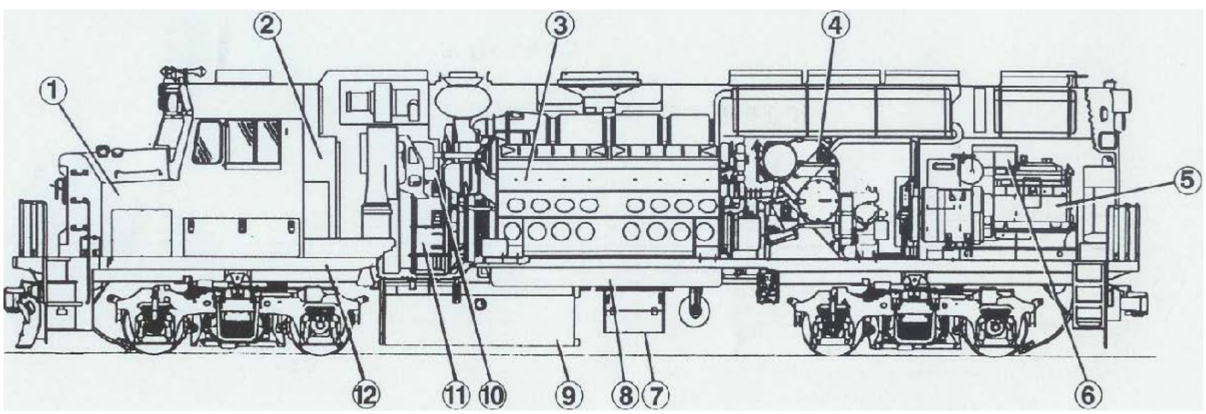


Diagram 2-3: The above diagram is of a typical MP39 diesel-electric type of locomotive used by both MARC and VRE. Listed here are the various components identified above:
1. Handbrake (inside)
2. Emer. Fuel Shut Down (cab)
3. Engine
4. Lube Oil Cooler Assembly
5. HEP Plaint
6. HEP High Voltage Cabinet
7. Battery Box
8. Main Air Reservoir
9. Fuel Tank
10. Auxiliary Generator
11. Main Alternator
12. Emergency Engine Shut Down Button

Picture 2-2: A view of an oncoming MARC Diesel- electric locomotive. The major difference between this locomotive and a freight locomotive is locomotives in passenger service provide the electrical power to the remainder of the passenger train by a separate motor.

Picture 2-3: A view of two on- coming train sets of different types. Notice that both are traveling in the same direction. ALWAYS remember that trains can come in ANY direction at ANY time! Also notice the exterior fuel tanks on each locomotive.

C. GENERAL LOCOMOTIVE INFORMATION

In addition to motive power (power that moves the train), both electric and diesel- electric locomotives in passenger service provide the electrical power to the remainder of the passenger train. This auxiliary power is often described as “Head-End Power” (HEP) or “train line power.” 480-volt Alternating Current (AC) head-end power (HEP) delivers electrical energy needed to run electrical components of passenger cars. This includes heating, air conditioning, lighting and other power needs of passenger cars. HEP is described in detail in the chapter on passenger trains. Freight trains do not have head-end power. Freight train locomotives do not have a separate HEP auxiliary motor and power plant.

The numbers of crew members differ depending on the type or function of the train. Freight locomotives, at a minimum, will have an engineer in the lead locomotive. The freight train will likely also have a conductor in the lead locomotive as well depending upon whether the train is performing work locally or simply travelling through the territory. There may also be personnel in additional trailing locomotives. Passenger locomotives will have at a minimum an engineer in the lead locomotive if the engine is coupled without a cab car. Conductors of passenger trains will most likely be in the passenger cars. Passenger locomotives will generally not be occupied if the engineer relocates to the cab car, although mechanical and supervisory personnel may also be occupying a locomotive not occupied by the engineer. Cab cars are explained in Chapter 3.

Some locomotives contain a bathroom in the forward nose, machine room or engine room located in the rear of the engine. VRE locomotives are NOT equipped with restroom facilities. Machine and engine rooms have very narrow internal passageways. Some machine and engine rooms are constructed with a great deal of overhead wires that will drop down in a fire. The engine areas of some locomotives are not built with an internal passageway for walking, as these units are designed to be serviced from the outside. These engines have access panels on all sides. Employees may be present in the forward nose, engine room (diesel-electric) and in trailing locomotives. It is not uncommon for extra employees to be present in locomotives. VRE locomotives all have an internal walkway running from the operators cab, aft to the rear of the locomotive.

Train locomotives are outfitted with a variety of fire safety equipment. All locomotives have at least one fire extinguisher, a small first aid kit and fusees (Flares). Amtrak’s High-Speed locomotives and power cars have a dry-chemical extinguishing system in the electrical cabinets. VRE locomotives feature two fire extinguishers; one in the operators’ cab, the other in the engine room.

The Amtrak High-Speed locomotives and power cars also have a dry-pipe sprinkler system. The sprinkler heads are on the sidewalls of the machine room. The sprinkler system is supplied by a single 2 ½ inch National Standard Thread (NST) female connection. There is one fire department connection installed on each side of the locomotive or power car. Before charging the sprinkler system, the pantographs on the locomotive must be down or the catenary power must be shut down and grounded.

D. EMERGENCY SHUT DOWN

1. Electrical Locomotives

There are no emergency shut-offs on electric locomotives. Power to electric locomotives is only removed by lowering and latching the pantographs or by shutting down and grounding the catenary system. This task should be performed by an Amtrak employee. To lower the pantograph, responders must find the Pantograph-Down switch located on the right-hand side of the dashboard in the operator’s cab. Once this switch is moved to the “down” position, all the pantographs on that engine only will be removed from contact with the catenary wires. Amtrak employees can only perform total removal of the electrical power from the catenary wires. Once electric locomotives have had catenary power removed and grounded, or the pantograph dropped and latched, there is no electric hazard in the locomotive. IF AN AMTRAK EMPLOYEE SHUTS DOWN THE LOCOMOTIVE BY LOWERING THE PANTOGRAPH, THERE IS STILL A SEVERE ELECTRICAL HAZARD IN THE CATENARY WIRES ABOVE THE LOCOMOTIVE.

MARC “cab cars” (the first car of a train when the train is in the push mode) will also have a toggle switch that is located in the overhead console of the cab car that will either lower the pantograph of an electrical locomotive or cut off the fuel to a diesel locomotive that will be located at rear of the train. This switch is a secondary means of power cut off. VRE does not have pantograph equipment and relies on fuel cut-off buttons to perform an emergency shutdown.

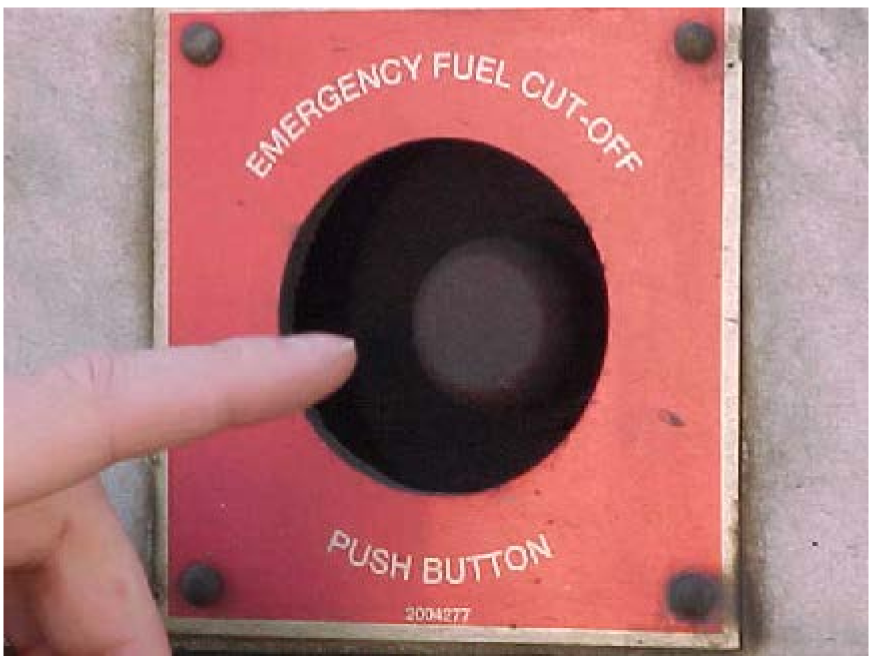
2. Diesel- Electric Locomotives

All diesel-electric locomotives are equipped with three clearly marked emergency fuel shut-offs. The first shut-off is generally located on the rear wall approximately in the middle of the locomotive cab. The button is well marked and can easily be identified by responders. When at all possible, a VRE crewmember should assist the shutdown process as there are also options in the locomotive cab for shutting down the main engine without shutting down the head-end power, which maintains passenger comfort.

Two more accessible fuel shut-offs are installed on the exterior; one on each side approximately mid-point of the locomotive. Shutting off the fuel to the diesel motor stalls the engine, which in turn, halts electrical power generation for the cars. The two exterior emergency fuel shut-offs are on each side of the locomotive usually directly above the fuel tanks. The newer locomotives have red push buttons and the older yard locomotives have pull rings. VRE locomotives are all push-button. The more common red push buttons are recessed into the side of the locomotive. Firefighter should be careful not to mistake red brake indicators on cars for emergency fuel shut-offs on locomotives. Both devices are similar in appearance.

When fuel shut-offs are activated they may take anywhere from several seconds to a minute to shut down the locomotive. Press and hold for 10 seconds. Any one of the three shut-offs can stop motive power. On a few passenger train locomotives, the shut-off in the cab will not shut down the head-end power source. To ensure that both motive power and head-end power are removed on passenger locomotives, use one of the shut-offs located on either side or lower middle section on the exterior for both freight and passenger locomotives.

Picture 2-4: The red square on the side of the locomotive walkway is one of the fuel shut offs on a VRE diesel-electric locomotive seen from a distance. The exterior shut off is a quick and easy way to shut down the engine and electrical power.



Picture 2-5: A close-up view of the fuel shut off button found on the side of a locomotive. Press and hold until the motor stops running. On passenger trains this action will cut off all the HVAC EQUIPMENT. Before YOU push this button, consider the affect this action will have on the passengers the entire length of the train.

E. LOCOMOTIVE BATTERIES

Switches in the cab or machine and engine rooms can disconnect the batteries on electric and diesel-electric locomotives. Battery cut-offs are usually well marked knife or rotary switches, or may be an electrical push device similar to a fuel cut off device. Handling the knife switch should be avoided unless critically necessary. Consult with a qualified railroad employee before taking this step.

F. LOCOMOTIVE DOORS AND WINDOWS

Locomotive entry doors are manually opened hinged doors. Most are not locked during train operations. They are the preferred method of entering the locomotive. If the locomotive cannot be entered through the doors, use the windows. Remember that all entry doors open inward!

Locomotive windshields are made of safety glass. Side-door windows and sliding side windows are made of either polycarbonate material or safety glass.

To remove locomotive windows from the outside:

1. If a windshield cage is installed, remove slotted bolts that secure it and remove the cage.

2. Grasp the split end of rubber molding and completely remove the molding.

3. Insert a pry bar between the window and the frame and pry out the pane.

The cabs of both the Amtrak ACS-64 locomotive and Acela train-set power car are accessed via the locomotive's equipment room. To enter the cab, go through a secondary door that separates the cab interior from the equipment room. Windows on the cabs of these locomotives swing inward and can only be opened from the inside.

There is an emergency hatch in the roof of these locomotives that can be opened from the outside. The emergency hatch intended use is when the locomotive has rolled over. The hatch can be opened by breaking the small, round cover over the handle, then turning the handle. If this hatch is used when the locomotive is right-side up, catenary power must be shut down and grounded.

The Acela train-set power cars also have a "soft spot" over the equipment room that can be cut with a circular rescue saw. The soft spot is clear of any electrical, communication or compressed air lines. It is marked by a decal showing its location and size. It is intended for use when the locomotive has rolled over. If this soft spot is used when the locomotive is right-side up, catenary power must be shut down and grounded.

G. LOCOMOTIVE FIRES

IT MUST BE REMEMBERED THAT DIESEL-ELECTRIC LOCOMOTIVES CAN TRAVEL UNDER CATENARY WIRES. THE OVERHEAD CATENARY WIRES ARE YOUR PRIMARY CONCERN.

A stack fire is a railroad term that means a fire within the exhaust of a diesel-electric locomotive and is usually caused by the buildup of a carbon or faulty turbocharger. Companies usually allow the fires to burn themselves out in order to clear out the carbon buildup. A stack fire in a diesel-electric locomotive can burn through catenary lines and cause live wires to fall onto firefighters. The railroad traffic must first be halted. Both electric and diesel-electric locomotives must be shut down prior to attacking the fire. The overhead catenary must also be shut down and grounded. Once the locomotives and catenary are shut down, water can be used on locomotive fires. The dry chemical agent of a Twinned Agent Unit can be used on hard to reach areas of the machine and engine rooms. The use of foam on diesel-electric locomotives, particularly where burning fuel is present, is highly recommended.

Do NOT apply water down a diesel-electric locomotive exhaust stack during a stack fire. A burst of steam will come up from the stack. Case covers may also blow off the engine. Shut off the fuel at an emergency shut off to stop the stack fire. If the stack fire continues to burn, cool the exterior of the exhaust manifold in the ceiling of the locomotive. The dry chemical agent from a Twinned Agent Unit can also be directed down the stack.

Both the Amtrak ACS-64 locomotives and the Acela power cars are equipped with dry chemical fire extinguishing systems in the electrical cabinets of their equipment rooms. Both are also equipped with a dry-pipe sprinkler system. The sprinkler heads are located along the walls of the equipment room. A single 2 ½ inch National Standard Thread female connection is located on each side of the locomotive. On the train-set power car, the connection is located behind a cabinet door, in front of the rear wheels. Before charging the sprinkler system, the pantographs on the locomotive must be down or the catenary power must be shut down and grounded.

Pictures 2-6: Given here and below are pictures illustrating a typical stack fire in varying situations. These types of locomotive fires are fairly common and can be difficult to extinguish.

Pictures 2-7 and 2-8: Begin extinguishing these types of fires by first securing the railroad traffic and catenary power. Then proceed to shut down the engine thereby removing the electrical power to the train. If *feasible, perform a search of the cab area to determine if the crew is off the train. Then attempt to extinguish a "stack fire" by cooling the exhaust manifold. Do not deploy water streams down the exhaust stacks!*

CHAPTER 3 – PASSENGER TRAINS

A. PASSENGER RAIL SERVICE OVERVIEW

MARC, VRE and Amtrak provide passenger rail service in the Washington Metropolitan area. MARC and Amtrak provide passenger rail service in Maryland while VRE and Amtrak provide passenger rail service in Virginia. All three passenger rail service lines converge in Union Station within the District of Columbia. Most of these train-sets are staffed, regardless of the rail line, minimally with a conductor and an engineer. Commuter passenger trains with large numbers of riders usually have an assistant conductor and additional service personnel. Conductors and service personnel wear uniforms. Uniforms are not required for train engineers. The conductor is the person in charge and has the overall responsibility of the train and the onboard personnel and communicates with those crew members by a portable radio. Mobile radios are available in locomotives and in the front of cab-cars for the crew to utilize. In addition to these revenue trains, many out-of-service trains move back and forth between Union Station and Ivy City Rail Yard for servicing or positioning to run as later revenue trains. These trains can be made up of any combination of locomotives and cars and will have, at a minimum, an engineer and conductor.

The fundamental difference between MARC, VRE and Amtrak is the service area of these rail lines. While MARC and VRE are considered "commuter carriers," Amtrak is classified as a "regional" or "passenger carrier". This distinction is important to responders because Amtrak maintains a listing, or "Manifest" of passengers whereas a commuter carrier does not. Secondly, the rail passenger cars utilized by the commuter carrier are basically an open design and the Amtrak rail cars have many different interior layouts.

Passenger trains can reach speeds of 110 mph in the District of Columbia, 135 mph in Maryland and 79 mph in Virginia. VRE trains are currently governed to 72 miles per hour. These trains often travel next to the Washington Metropolitan Area Transit Authority (WMATA) subway trains in a railway zone referred to as the "common corridor." The track roadways of these railroad systems are often very close together, separated only by a chain-linked fence.

Now we will examine different passenger railroad entities in further detail. We will begin with the local commuter railroads and end with the regional railroads throughout this chapter.

1. MARC Commuter Rail Service

MARC provides commuter rail service to Maryland and West Virginia residents Monday through Friday. There is not MARC service on weekends. MARC often uses electric locomotives on Amtrak's electrified territory tracks, but diesel-electric locomotives can be interchanged with MARC passenger trains on the Amtrak electrified territory and CSX tracks. Train crews operating MARC trains on CSX tracks are CSX employees. Crews staffing MARC trains on Amtrak tracks are Amtrak employees. Most trains usually consist of a locomotive, two to six trailer cars and a cab car. Occasionally, a train will not have a cab-car but will have a locomotive at each end. Each car typically has sitting capacity for approximately 100 passengers however this number will be doubled with standees during rush hour. When MARC trains travel south toward Union Station, the engineer performs the operating functions from the cab-car located at the front of the train with no engine crew in the rear locomotive. Conversely, when the trains leave Union Station and travels north, the engineer is in the locomotive at the north end of the train.

2. VRE Commuter Rail Service

VRE provides commuter rail service to Virginia in the same fashion as the MARC on weekdays. There are no scheduled VRE trains on weekends or federal holidays. VRE utilizes diesel- electric locomotives with their passenger trains on Amtrak, CSX and Norfolk Southern tracks.

VRE trains usually consist of a locomotive, a minimum of three trailer cars and a cab-car. Each passenger car has the capacity of about 120 - 140 seated passengers, but these trains also carry many standing passengers during peak hours. As these trains travel north to Union Station, the engineer is positioned in the cab-car at the north end of the train and no operators will be found in the locomotive. When returning to Virginia, the trains leave Union Station and travel south with the engineer in the locomotive at the south end of the train.

3. AMTRAK Regional and National Passenger Rail Service

Amtrak provides regional as well as long-distance passenger rail service seven days a week. Amtrak will generally use electric locomotives to propel their passenger trains on their electrified territory tracks on the Northeast Corridor. Diesel-electric locomotives are often utilized with Amtrak's passenger trains on Amtrak's electrified territory, CSX and Norfolk Southern tracks. The trains usually consist of one or two locomotives, seven passenger cars, three baggage or material-handling cars for mail, passenger baggage and utility equipment. Amtrak trains typically carry a total of 250 passengers. Amtrak trains usually have the locomotive in front, followed by passenger cars, and may have material-handling cars near the locomotive or at the end of the train.

There are two types of Amtrak High-Speed passenger trains. Both types use a newly designed locomotive. These locomotives have unique features that are described in Chapter 2 of this manual. In one form, the HHP8 bi-directional locomotive is used with conventional passenger cars and can travel up to 125 mph. These locomotives are numbered 650 to 664.

The "Acela" consists of a High-Speed locomotive, called a power car, at each end of the six passenger cars. The power cars and passenger cars are semi- permanently coupled into high-speed train-sets for rail service travel. These train-sets can travel up to 150 mph but will travel at 135 mph in the Washington Metropolitan Area. The power cars are numbered 2000 to 2039 and the passenger cars are numbered the 3000 series.

B. FEATURES COMMON TO ALL PASSENGER TRAINS

Most passenger rail cars in operation in the United States have design features that are in common to one another. Unless specifically stated otherwise, information discussed in this section can be applied to all passenger train equipment operated in the District of Columbia, Maryland and Virginia by Amtrak, MARC and VRE. Later in this chapter, the specific features of each passenger rail cars will be described.

1. Head End Power (HEP)

Electric power to passenger cars is provided from the locomotive at 480 volts AC. The current travels through cables underneath passenger cars and is reduced down in individual cars from 480 volts AC to 220 and 110 volts AC. This electrical system is referred to as Head-End Power (HEP). Parallel HEP cables run from the locomotive, under the cars, for the entire length of the train. Connections between passenger train cars are referred to as jumpers, pigtails or HEP cables. These connections can be found at both ends of each car, locomotive and cab-car on each side of the train.

All passenger locomotives (diesel-electric and electric) can provide HEP. When multiple locomotives are in use at the front or rear of the train, the locomotive closest to the cars will usually provide HEP. When a locomotive is at each end of the train, either one of the locomotives will supply HEP.

Picture 3-1: Picture of a typical Amtrak trainset with two diesel-electric locomotives to propel the train. Remember that both locomotives must be shut down!

HEP source shut-offs are located in the locomotive cab and at the power plant. It is designed this way so that engineers on all passenger trains can remove HEP to the entire train without shutting down the locomotive. Individual cars can isolate HEP from the rest of the train by throwing breakers in the electrical control cabinet of each passenger car. Isolating the car by way of the circuit breaker does NOT de-energize HEP cables under the car. No attempt should be made to remove HEP cables, nor should any emergency response personnel go between or under cars until a responsible train crewmember (conductor or engineer) has guaranteed that HEP has been de-energized and the train will not move.

Emergency response personnel can also shut down HEP from diesel-electric locomotives by using the emergency shut-offs on the side of the locomotives. By shutting down the diesel engine within the locomotive, the generation of electrical current is halted. Diesel-electric locomotives provide HEP in a variety of ways.

To ensure that both the motive power and HEP is shut down, use one of the two external emergency shut-offs on each side of the locomotive. Using the emergency shut-off in the cab of passenger locomotives may only shut down the motive power source and not the HEP source.

Totally electric locomotives can be shut down either by lowering and latching pantographs or by de-energizing and grounding the catenary system. When either one of these actions occur, HEP will also shut down.

MARC “cab” cars (the first car of a train when the train is in the push mode) also have a toggle switch that is located in the overhead console of the cab car. This toggle switch will lower the pantograph of an electrical locomotive or cut off the fuel to a diesel locomotive that is located at rear of the train. This switch is a secondary means of power cut off.

Picture 3-2: The 480-volt Head End Power (HEP) cables have red connections. The low voltage communication cables have blue connections. Also located in this area, but not visible, are 140-psi air lines with “Glad Hand” connections. Never attempt to disconnect hoses or cables.

Stationary passenger trains can also receive ground power (wayside power) through cables connected to circuit breakers at Union Station and some rail yards. At these facilities, passenger trains can carry the full 480 volts without a locomotive attached to the cars. Power is turned on and off at the breaker boxes. Different types of breaker boxes are used at different locations. All types use keys that are left in the box when a car, or cars, are energized. To de-energize a car(s) connected to the ground power cables, push the green “open” button to open the circuit and disconnect power from the cables. Do NOT try to remove ground power by pulling apart cables. Railroad employees should perform this function.

Only one locomotive supplies HEP to the whole train and it is that particular locomotive that must be shut down to de-energize the train. Do NOT attempt to remove HEP by disconnecting cables. An electric arc will be created causing injury.

2. Air and Hand Brake Systems

Locomotives are installed with huge compressors that deliver compressed air through piping which extends the entire length of the train. On passenger trains, these are air brake lines that are pressurized up to 110 psi and main-reservoir lines pressurized up to 140 psi. The locomotive supplies both air systems. The brake line (brake pipe) controls the brakes. The main reservoir operates other systems such as the doors.

As with HEP cables, air brake lines are dangerous and are to be connected or disconnected ONLY by railroad personnel. Responders will find a red emergency brake handle for the air brake system in each passenger car. This emergency brake handle is only for halting trains while they are in motion. If the emergency brake handle is pulled on a stationary train, the brakes will be applied and cannot be released.

Instead of pulling the emergency air brake, a hand brake is provided and should be used by emergency response personnel to totally immobilize the trains during an incident. These hand brakes are located at the "B" end of each car. These devices are mechanical parking brakes that apply the brake shoes independently of the regular air brake and main reservoir systems. Hand brakes should not be mistaken for an emergency brake that operates the air brake system. Hand brakes are operated either by a wheel or lever. Hand brakes are applied by either turning the wheel clockwise or pumping the lever until it cannot be turned or pumped anymore. The amount of turning or pumping will vary from hand brake to hand brake. The chain attached to the wheel or lever will be taut when the brake is applied and loose when disengaged. During emergency operations, at least two hand brakes must be applied. Railroad or emergency response personnel can apply the brakes, but railroad employees must be informed when emergency responders apply the brakes. Hand brakes are only to be released by railroad employees.

Picture 3-3 and 3-4: These pictures illustrate the two types of hand brakes on train cars. Picture 3-3 displays the "lever-ratchet" type of hand brake. Picture 3-4 shows the more common type of a large hand wheel on the inside of a passenger car. It is a prudent to place barrier tape around the hand wheel to indicate that the hand brake has been applied.

3. Keys

The standard Amtrak coach key is used on Amtrak, MARC and VRE passenger cars. The unique old-style skeleton shape can identify this key. In addition to their specific functions stated below, the standard Amtrak coach key can be used to operate the public address system and to open a variety of access doors and control panels. A coach key is carried by most passenger railroad employees and assigned to passenger rail service. Emergency responders can obtain their own coach keys from railroad representatives prior to an incident.

Not all cabinet doors need a key to gain access. Many cabinets which must be accessed by emergency responders can be opened by using a pen, pencil or similar thin rigid object. VRE is phasing out this style of lock.

C. CAB CARS

The term “cab-cars” or “push-pull” cars are used to describe the first car on passenger trains when locomotives are used to push the train. MARC and VRE use cab-cars in their commuter train consists everyday they provide rail service. The exteriors of cab-cars are similar in appearance to other passenger cars except they are equipped with horns and headlights. VRE cab cars also have distinctive yellow and black stripes on the end of the cab car. Internally, cab-cars not only contain passenger seating, but also have just a small control stand for the operator of the train.

When an engineer operates the train from the control stand, the locomotive at the opposite end of the train will not be staffed, and all movement and braking will be controlled from the cab-car. There are no traction motors or motive power source underneath the frame of the cab-car.

Cab-car doors and emergency windows are similar to regular passenger cars and can be accessed easily from the outside. Most cab-cars have bathrooms and wheel-chair lifts for passengers.

It is extremely important that the Incident Commander determine the front of the train in a railroad crash or derailment as a train in “push mode” will cause confusion as to which part the train is the forward end. Use spray paint to number and to identify car position relative to the front of the train. On the Silver Spring Amtrak MARC collision, responders had difficulty determining the front of train as some of the locomotives were off the tracks and the MARC train was in the “push” mode.

Picture 3-5: The distinctive VRE "Cab Car" shown in adjacent picture is in the push mode. This car is one of the newer Gallery Cars just delivered to VRE. The locomotive is pushing the train from the other end. The train operator will normally be found here when the train is in push mode. Cab Cars can cause confusion to emergency responders as to which part of the train is the forward end. The Incident Commander on a train incident must determine the front of the train early in a railroad incident if a commuter train is suspected to be in the "push mode."

Picture 3-6: Displayed here are markings painted on the bottom of an overturned passenger railcar with orange spray paint. Here the "C" stands for the word "car." Locomotives would in turn be given designations such as L1, L2, etc. Other markings on the train can be used to identify if the rail car has been searched and the amount of victims found and removed. The Incident Commander can also use these

marking systems to separate cars or multiple cars into divisions. Medical tape can also be used but it is not as effective.

D. PASSENGER CARS (Trailer Cars)

Passenger cars may be designed for passenger coach use only, or for a combination of other functions, such as, passenger coach and snack bar, passenger coach and lounge, etc. Some trailer cars may have sleeper berths exclusively, diner use exclusively, or a combination of these uses in place of or in concert with coach seating. These distinctive passenger cars may have one or two (double-decker) levels. Cars of this design may have bathrooms, dressing rooms, public phone rooms, service spaces, baggage spaces above and below seats and sleeping berths.

In an emergency, all the above-mentioned areas must be searched thoroughly. This proves to be a formidable task when the train car is found lying on its side or the entire car is obscured by smoke. Passenger car interiors are mostly made of fire- resistant material; however, diesel fuel from the locomotive can cause all non-metal materials in the car to burn when ignited. Wiring and electrical equipment is found in and underneath the car. Trash cans in the passenger railcars are places where fires are likely to occur.

All rail cars, both passenger and freight, do not have a front or rear end. They have an “A” or “B” end based on where the hand brake is located. The end of the car with the hand brake is designated the “B” end; the other end of the car is the “A” end. The left and right sides of the car are determined by standing at the “B” end of the car, facing the “A” end. From this orientation, the left side of the car is now on the left and the right side of the car is on the right.

A train car sits on two truck assemblies or trucks. Each truck has two sets of wheels (axles) and can weigh more than ten tons. A center pin on the car body fits into a hole in the truck’s center plate. Gravity is the main means for keeping the train body on the two truck assemblies in freight cars. The truck assemblies are designed to “drop away” in a derailment to ensure that the freight car comes to rest quickly and does not roll to an undesired location. On passenger cars, there is a supplementary restraining device that keeps the center pin in the center plate, so that the truck assemblies are connected to the body of the car. A restraining device is also found on Metro subway cars.

As an additional safety measure, passenger cars are designed with “tight-lock” couplings with sides that tend to keep the passenger cars coupled together in a derailment. While these devices do reduce accidental uncoupling of train cars, if a train were to become partially derailed on an embankment, the rest of the train may be pulled off.

This action may leave portions of the uncoupled train in a cantilever position and not supported. Conventional cribbing cannot be used to support unstable railroad equipment due to weight and mass of cars and locomotives.

All passenger cars are marked with a permanent number assigned by the railroad that owns the car. Care must be taken not to mistake a changeable train number with the permanent car number.

Passenger cars have a combination public address and intercom system. The system can be used to address passengers in the whole train or the individual car. The intercom can also be used for discrete two-way conversation between two cars. Some systems require a standard Amtrak coach key for operation.

Most cars have 110-volt outlets in bathrooms and passenger areas that are supplied by head-end or ground power. Some outlets are reached by rotating passenger seats.

Some passenger rail cars have an access panel, or "soft spot," on the roof of the passenger car that can be cut with a circular rescue saw. This area is clear of electrical wiring and high-pressure air lines. This area is clearly marked with a decal or paint. If this access panel is used when the car is in an upright position, the catenary system must be shut down and grounded. All VRE cars have four of these “soft spots.”

Picture 3-7: This photograph shows an access panel, or "soft spot," on the roof of the passenger car that can be cut with a circular rescue saw. This area is clear of electrical wiring and high-pressure air lines.

E. GENERAL INFORMATION ON ALL PASSENGER RAIL CAR DOORS

Due to the heavy construction of passenger cars, egress should be through doors, and if necessary, through windows. Passenger car exterior doors are manually, electrically or electro-pneumatically operated. Under emergency conditions, all doors can be manually operated. Manual doors are hinged or slide into a pocket. Electric and electro-pneumatic doors also slide into pockets. Damage to the exterior of the passenger car were the door is recessed can prevent the door from sliding into the pocket even when controls are bypassed. If this type of damage occurs it will be extremely difficult to force open the doors using hydraulic entry tools. The key to quick entry is to understand how a train door operates and to be able to adjust forcible entry techniques to the conditions found.

Most passenger rail cars have three types of doors. Generally, they are grouped as outside vestibule end doors (exterior collision-post doors or body-end doors), inside end doors (interior vestibule doors) and exterior entrance side doors (side doors). See diagram below:

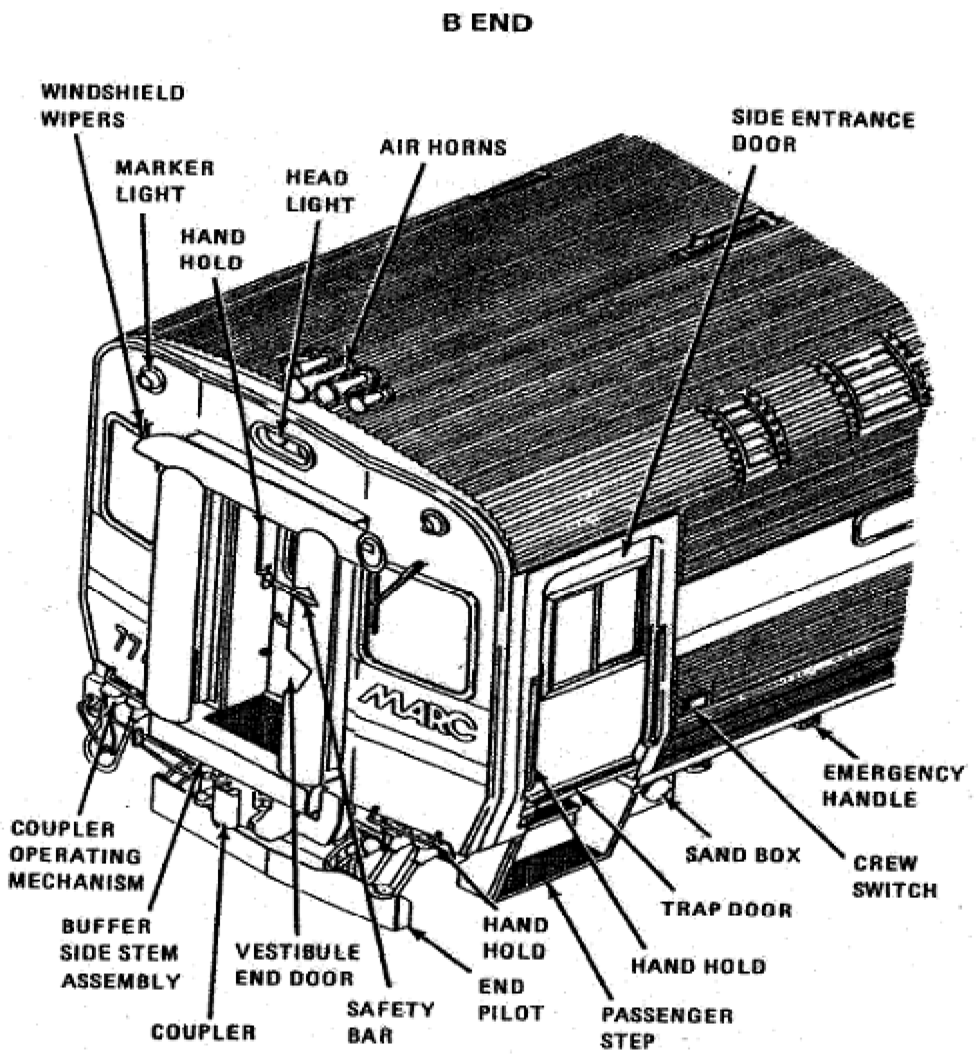


Figure 1-1. Exterior Arrangement (Cab Car)

Diagram 3-1: Illustrated here is a schematic drawing of a typical passenger rail "cab car" door assembly. Note the correct names of the various door openings. They are identified as the outside vestibule end doors (exterior collision-post doors or body-end doors), inside end doors (interior vestibule doors), and the most important, exterior entrance side doors.

Both outside and inside vestibule doors provide the means for passengers to pass from one car to the other. End doors on Amtrak Superliner cars are on the upper level of the double-decker car.

Exterior side doors are used to enter and exit trains. Except for some lounge, diner and buffet cars, all passenger cars have exterior side doors. In normal conditions, passengers occupying the lounge, diner or buffet cars must transverse through the end doors to another car and then exit the train.

When two passenger cars are joined together, a drop plate on the floor and rubber diaphragms at the ceiling and sides enclose the connection. On some older cars, there are curtains on the interior side of the diaphragms that are fastened to both cars. The outside end doors are secured in an open position and the inside end doors remain closed but unlocked. This joins the vestibules from each car to create a single vestibule between the two cars. There are usually one or two sets of exterior side doors in this joint vestibule.

1. Outside End Doors (Collision Post Doors or Body End Doors)

Outside end doors are on the exterior of a freestanding passenger rail car and protect the car from the elements. These doors separate the vestibule from the exterior of the car. When cars are connected together into a passenger train, these doors are secured open. A person traversing through the train does not need to open these doors and they are often out of sight.

Outside end doors are manually operated hinged doors. Most of these doors have latch handles on both sides of the door and lock on the inside. The Marc III cars do not have outside handles. The outside end door of a freestanding car, or a car at the end of the passenger car portion of an Amtrak train, may be latched and locked shut. If it is latched shut, it still can be opened from the outside. If the outside end door of an Amtrak train is locked, it can be unlocked with a standard Amtrak coach key from INSIDE the car only. There is no key access on the outside of the door.

2. Inside End Doors (Interior Vestibule Doors)

Inside end doors are on the interior of a freestanding car. These doors separate the vestibule from the passenger compartment. When cars are connected together, these doors protect the passenger compartment from the noise and drafts of the joint vestibule between the cars. A person traversing through the train will find these doors closed but not locked.

Inside end doors are electric or electro-pneumatic operation. In most passenger train cars, there is an Emergency End Door Switch on both sides of the door if the door malfunctions. The Emergency End Door Switch either opens the door or releases the door so it can be pushed open. To operate an Emergency End Door Switch, lift the red colored guard and put the toggle switch in the open position. On the MARC III and VRE, Kawasaki electric inside end doors have an off and on switch with a neutral position in the middle. These MARC III and VRE Kawasaki inside end doors can only be manually opened when the switch is in the middle neutral position. Sometimes, malfunctioning power assisted doors can be pushed open without using the Emergency End Door Switch.

In the rare case that the Emergency End Door Switch does not work, some end- door windows can be pushed out, some can be broken, and some can be removed by pulling out the rubber “zip strip.”

3. EXTERIOR SIDE ENTRANCE DOORS (VESTIBULE SIDE DOORS)

Exterior side doors allow passengers to enter and leave the train. They are arranged in matched sets with a door on each side of the car, opposite its mate. These side-door sets can be at the vestibule on one end of a car, at the vestibules on both ends of a car or in the middle of the car. Amtrak and VRE side doors have Lexan polycarbonate windows that can be forced into the car. Exterior side doors are designed for use at either ground level or elevated station platforms. When a side door is opened, the floor is even with elevated platforms. If passengers are exiting to ground level, trapdoors are lifted out of the way to allow access to the ground. To lift the trapdoors from inside the car, first open the door, and then push on the foot pedal. The trapdoor will spring up enough to be lifted and latched to the side of the wall. To raise the trapdoor from outside the car, first open the door and then push on the foot pedal with a Halligan bar or other tool. The trapdoor will spring up enough to be pushed up from the outside and latched to the side. The Halligan bar or other tool serves to extend the emergency responder's reach and is not used to force the foot pedal. Some cars also have a handle on the outside of the car that is pulled down, or pulled out, to raise the trap door. Stairs are either already in place or lower when the trapdoor is lifted.

Care must be taken not to be struck by these stairs when lowering them into position. Some passenger cars have wheelchair lifts at side doors. The side doors of Amtrak High Speed train-sets do not have stairs or trap doors.

4. Other Exterior Side Doors – Middle of the Car

Different types of cars have different exterior side door operations. A passenger train will often have many different types of cars. If a particular type of car is difficult to enter, an easier to enter car may be located elsewhere in the train. End doors between cars are not locked and it is easy to gain access by traveling between cars.

Pictures 3-8, 3-9 and 3-10: The three photographs displayed above show an array of door configurations. The top picture shows door configurations found on a single level car. The bottom picture illustrates the obstacles responders will find with center exterior doors. Responders must know how to access all types of rail equipment doors in the event rescues must be made within the cars.

F. SPECIFIC INFORMATION ON PASSENGER RAIL CARS

This section of the chapter describes the specific characteristics of different passenger rail cars. The cars are grouped by railroads, starting with MARC, then VRE, and finishing with Amtrak. Each railroad group will start with single deck cars and conclude with larger double-decker cars.

1. MARC II Car Information and Car Door Configurations

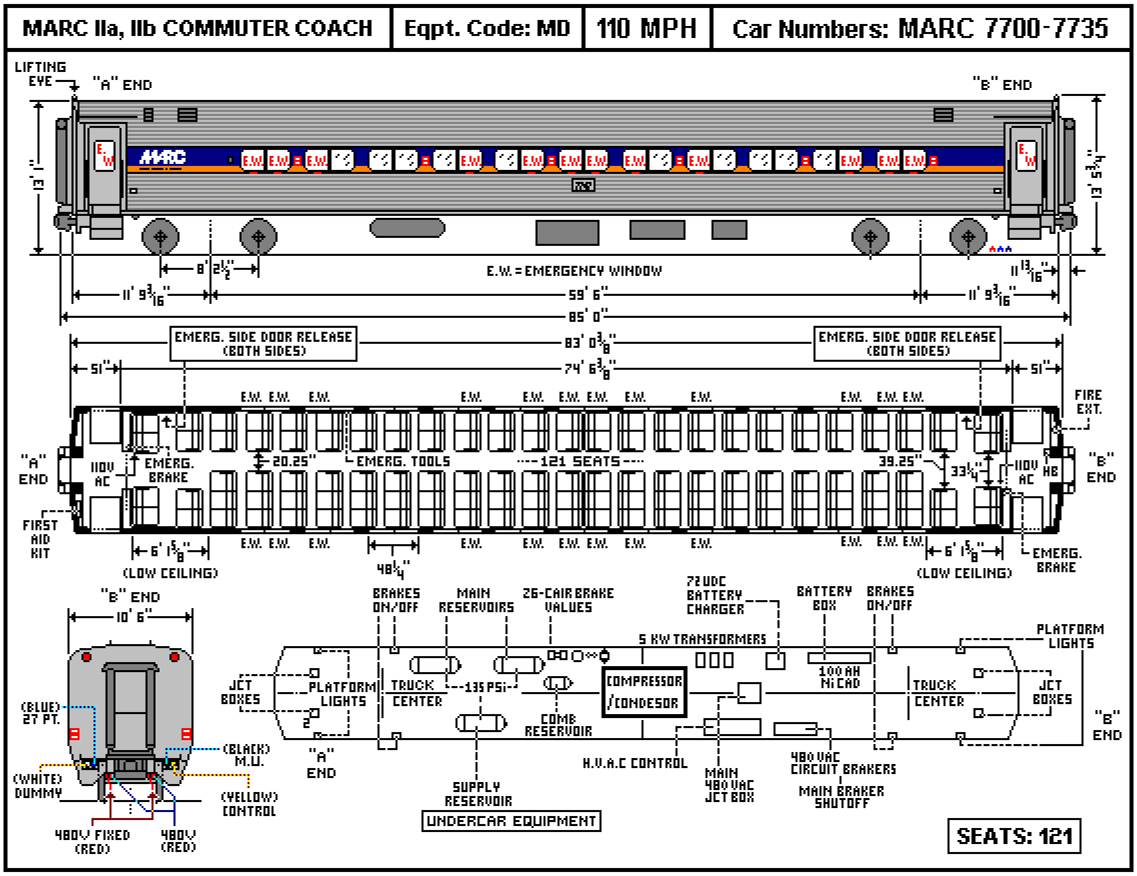


Diagram 3-2: Above is a schematic drawing of a typical MARC II passenger trailer car. Note the position of the emergency side door release on the inside of the car on both ends.

Picture 3-11: A view of both a "Cab Car" and two trailer cars. This train is in the push mode. If you were to respond to this incident, what is the best method to enter this type of rail car if it were derailed?

MARC single level passenger rail cars are manufactured by Nippon Sharyo and are very similar to VRE II cars. Each car weighs approximately 100,000 lbs. and the exterior shell of the car is ¾ inch stainless steel. The cars are designed to withstand the impact from a collision with far more survivability then light rail subway train cars.

As stated prior in this chapter, these commuter rail cars are of open design where passengers are seated in a row of two or three seats on each side of the middle isle. Most MARC II cars have luggage racks located above the heads of the passengers. The luggage rack and the items stored on the racks will hinder responders entering a derailed train if the car would come to rest on its side.

The MARC II passenger cars carry approximately 120 commuters. These cars have a variety of safety equipment that passengers and crew can utilize in the event of an emergency. The rescue equipment includes a portable fire extinguisher, first aid kit and a tool kit. The tool kit contains a saw, a pointed iron rod and a small sledgehammer. All these tools are located in a horizontal box in the passenger compartment.

The MARC II cars have exterior side doors on both sides at each end of the car. These passenger cars have electrically operated sliding exterior side doors that open in a pocket. These doors have grab handles on both sides of the door and a lock on the outside. In addition to the door handles, there is a manual latch that allows the doors to open mechanically. The latch is located at the top of the door. This latch can be manually engaged or released from the inside only. All MARC II cars have an automatically inflated weather stripping around the door. If the weather stripping malfunctions and does not automatically deflate, puncture the rubber with a knife or sharp tool. This will release the air pressure from the weather-stripping.

a. Opening Doors from Outside

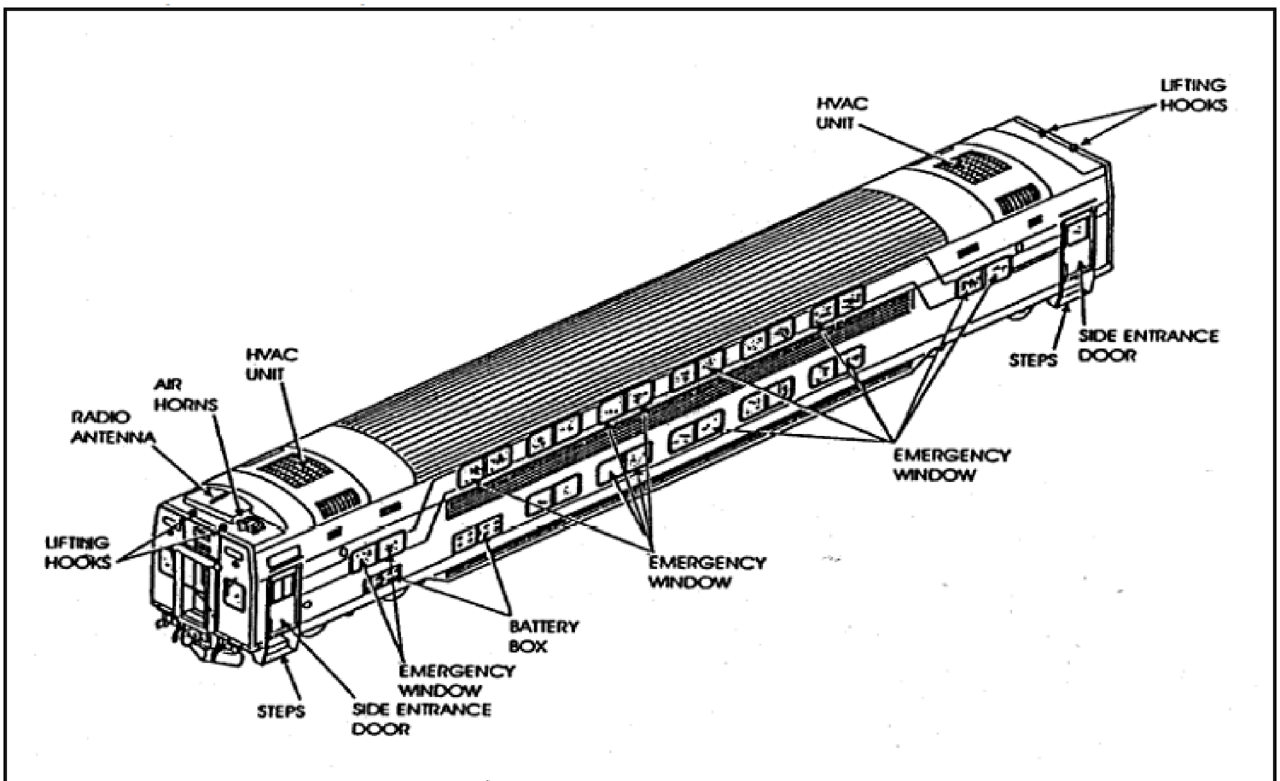
These doors have handles on both sides of the door and can easily be opened from the inside or outside if the door is not latched. If the door is latched on the inside, the handles will not work.

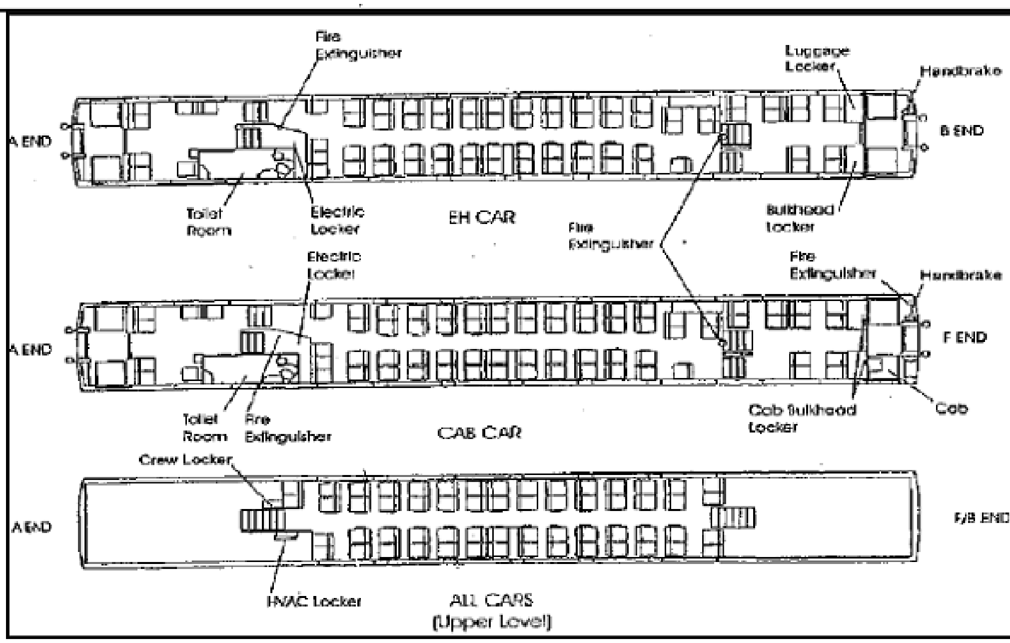
The outside locks are not usually locked. If the door is locked, it can be unlocked with the standard Amtrak coach key. This lock has no effect on the inside latching system. There are no manual emergency releases on the outside. If the door is latched on the inside, entry must be gained through an end door or window.

b. Opening Doors from Inside

The first option is to break the plastic "bulls-eye" located in the vestibule adjacent to the door, and then pull the emergency door handle. If the inside latch is applied, release the latch at the top of the door, then pull on the door handle. This handle can also be reached from the outside after forcing down the side door window.

2. MARC III (KAWASAKI) CAR INFORMATION AND CAR DOOR CONFIGURATIONS





Diagrams 3-3 and 3-4: Illustrated above are diagrams of a typical MARC III passenger trailer car. Like the MARC II the emergency door release is located under the body of the car.

Picture 3-12: A view of an electric locomotive pulling a train-set of MARC III cars. What is the best method to rescue persons from the top deck if this train was derailed?

MARC III Kawasaki's are identical to the VRE Kawasaki cars. Both passenger car designs have electrically operated and locked sliding exterior side doors. These doors do not have handles on the inside or outside of the door. These doors automatically close and lock during train operation. MARC III, VRE Kawasaki and MARC II cars have exterior side doors on both sides of both ends of the car.

a. Opening Doors from Outside

If the car still has head-end or battery power, then these doors can be unlocked and opened from the outside using a standard Amtrak coach key. Keyways are located next to the door they operate. The keyways are under a protective door that easily lifts up to expose the keyhole. If the door has electric power, it will slide open. If the door does not have head-end or battery power, it will not open even if it is manually pushed.

Like the MARC II, the MARC III cars have a well-marked "T" handle to manually open side doors from the outside whether or not the door has power. The pull handle is located under the car deck just below and to one side of all side doors.

These handles are out of sight and covered with a metal plate that reads "EMERGENCY DOOR HANDLE." Above the handle are large red and white decals on the side of the car that reads "EMERGENCY DOOR HANDLE RELEASE BELOW." Pull the "T" handle and the door will release and can be pushed completely open.

Below are pictures that illustrate the sequence of door operation:

Picture 3- 13a: The first objective is to find the emergency door release handle. The emergency handles shown here are just to the left of the door under the main car body. In a derailment these handles may become buried in the ground or be covered with debris.

Picture 3-13b: After the handle is pulled, then slide the exterior side door back towards the center of the car. Locate the trap door release and pull same. These doors may be difficult to open in a derailment if the door or side of the car is deformed.

Picture 3-13c: The emergency trap door will spring open a short distance. Continue to open the trap door, lock in place and then enter the train car. Remember that these trap doors are heavy and will cause harm if allowed to fall.

In the collision and derailment of MARC Train 286 and the Amtrak train 29, near Silver Spring, Maryland on February 16, 1996, the NTSB Railroad Accident Report described the actions of the victims that were trying to escape after the two trains collided. The report stated that, “Ten out of the eighteen passengers on board the control car 7752 survived the accident. The passengers were unsuccessful in opening the left and right rear exterior doors after the train was struck.” Two of the fatalities were found in the vestibule between the inner and outer exterior doors. As a result of this incident, both emergency door and window release mechanisms were greatly enhanced. Responders should be aware that damage to the door itself, angulations of the rail car and passengers gathered by the door will interfere with rescue efforts.

3. VRE GALLERY CAR INFORMATION AND CAR DOOR CONFIGURATIONS

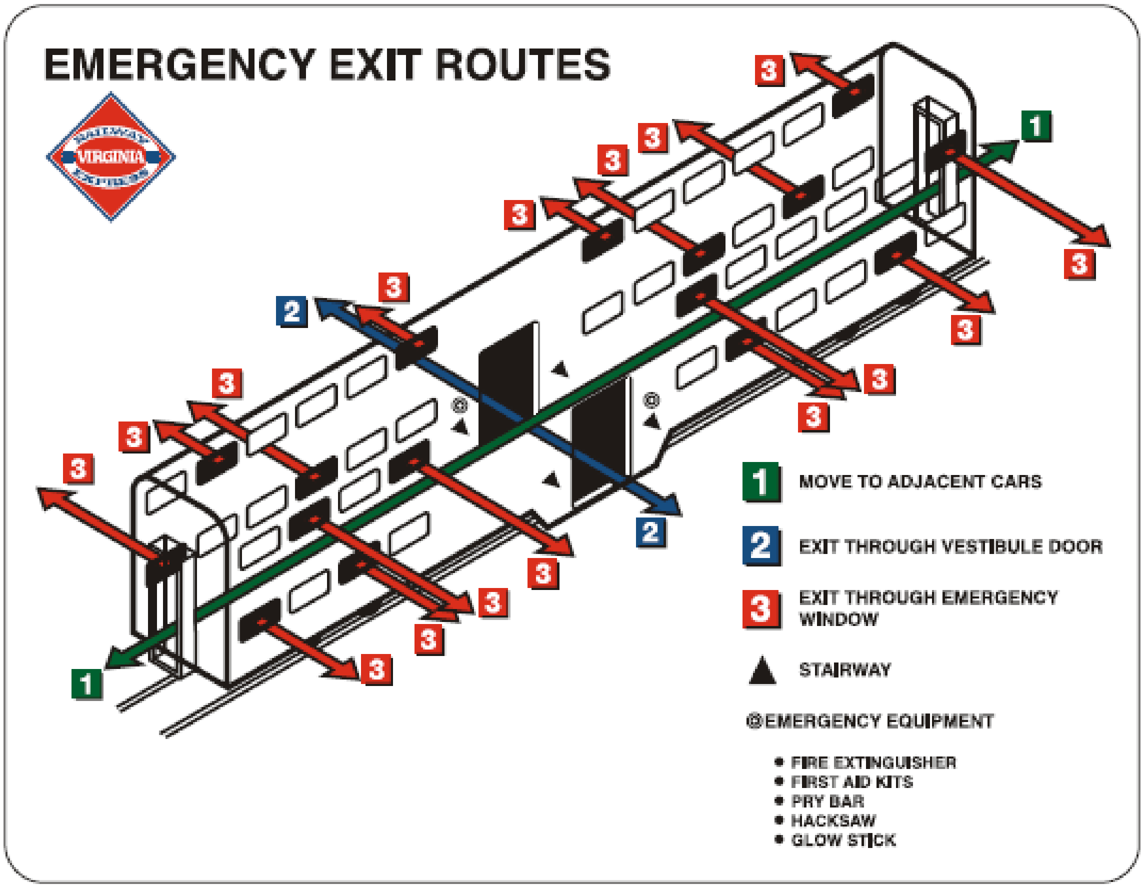


Diagram 3-8: Illustrated above is a diagram of a typical VRE Gallery passenger trailer car. Like the MARC II the emergency door release is located by the side door.

Picture 3-20: A picture of one of the newer style VRE Gallery cab cars. The spiral staircase means rescue from the top deck will be difficult.

a. Opening Doors from Inside

To open the door from inside the car, pull on the door handle. If the inside latch is applied, release the latch at the top of the door, then pull on the door handle. This handle can also be reached from the outside after forcing down the side door window.

Picture 3-21: A VRE Gallery car - notice the emergency valve handle to the left of the middle exterior door. By turning the handle, the door can be manually opened.

b. Opening Doors from Outside

The Gallery car doors have handles on both sides of the door and can easily be opened from the inside or outside if the door is not latched. If the door is latched on the inside, the handles will not work. The outside locks are not usually locked. If the door is locked, it can be unlocked with the standard Amtrak coach key. This lock has no effect on the inside latching system. If the door is latched on the inside, entry must be gained through an end door or window.

There is a manual emergency release on the outside of the car. It is located under the car body to the left of the outside middle door. After turning the valve, push the door open. If the door is latched on the inside, entry must be gained through an end door or window. Window removal will be covered later in this chapter.

4. AMTRAK AMFLEET I CAR INFORMATION AND CAR DOOR CONFIGURATIONS

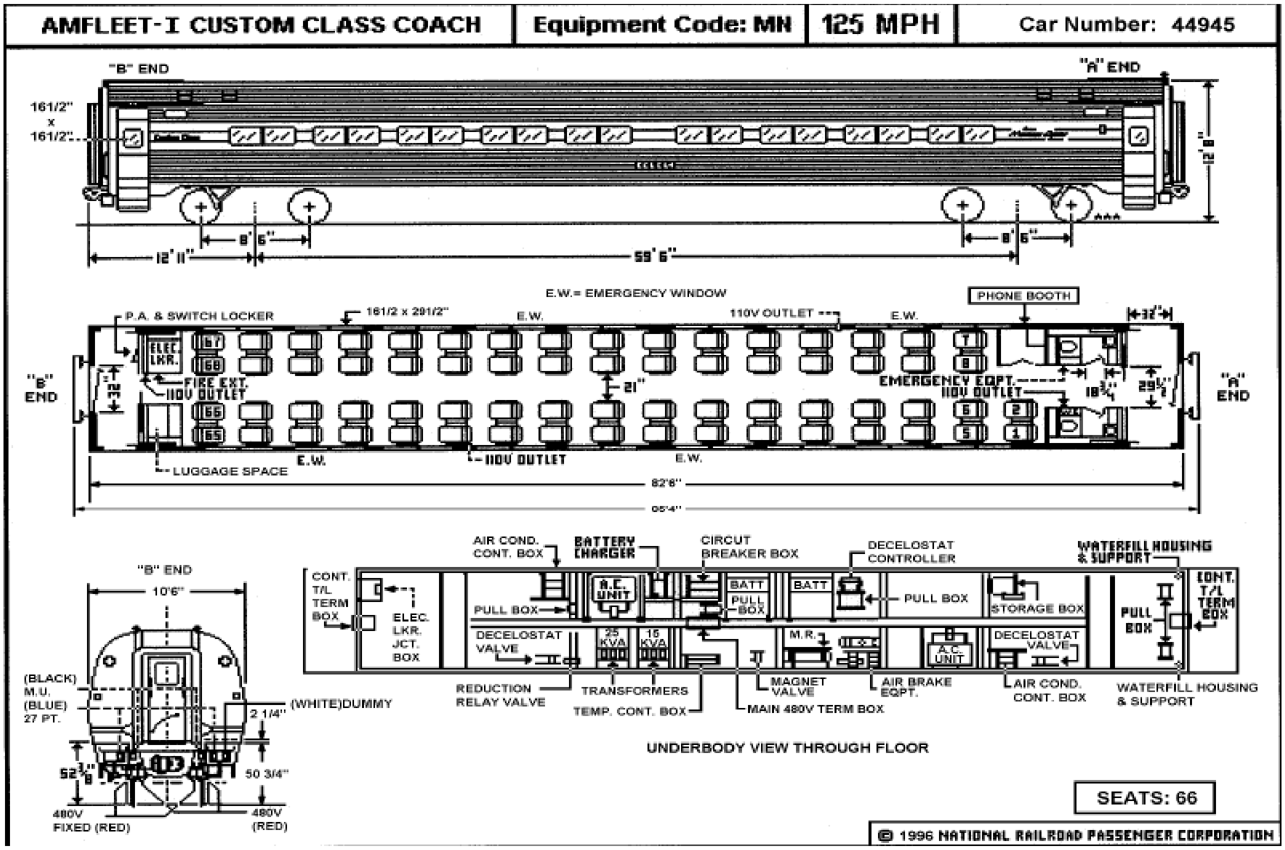


Diagram 3-11: Illustrated above is a diagram of a typical Amfleet 1 passenger single trailer car. Like other regional commuter train-sets the door configuration is similar.

Picture 3-23: A view of an Amtrak Amfleet I Passenger car. Note the two exterior side exit doors on each end of the car. Amfleet II cars have one set of doors on one end.

Amtrak Amfleet I passenger cars are electrically operated with locked, sliding exterior side doors. These doors do not have handles on the inside or outside of the door. These doors are automatically closed and locked during train operation. In addition to the locking device, Amfleet I cars have automatically inflating weather stripping around the door. When inflated, the weather stripping can restrict door movement. If the weather stripping malfunctions and does not automatically deflate, puncture the rubber with a knife or sharp tool. This will release the air pressure and allow the door to move freely when using the door opening methods listed below. The Amfleet I cars have side doors on both sides of both ends of the car.

a. Opening Doors from Outside

When the car has head-end or sufficient battery power, two of the four doors can be unlocked and opened from the outside using a standard Amtrak coach key. When facing the car from the side, the door that can be opened with the coach key is usually on the left. The keyway is located at the end of the car, around the corner from the side door it opens. The keyways are under a protective door that easily lifts up to expose the keyhole. If the door has sufficient electric power, it will slide open. If the door does not have head end or battery power, it will not open entirely, even if it is manually pushed.

There are no manual emergency releases on the outside. If the door does not have electric power, entry must be gained through an end door or emergency exit window.

Picture 3-24: A view of the key way where a standard train door key can be inserted. If there is still battery power, then the door next to keyway will open.

b. Opening Doors from the Inside

When the car has head-end or sufficient battery power, these doors can be unlocked and opened from the inside using a standard Amtrak coach key. Keyways are located next to the door they operate. If the door has sufficient electric power, it will slide open. If the door does not have electric power, it will not open, even if it is manually pushed.

Whether or not the car has head end or battery power, Amfleet I interior doors can be unlocked and manually opened from the inside using a "T" handle or ball handle. This emergency release is well marked and recessed in the ceiling above the door. Pull the "T" handle or ball handle and the door will release and can be pushed completely open. The handle can also be reached from the outside after forcing in the exterior side door window.

5. Amtrak Amfleet II Car Information and Car Door Configurations

Amfleet II have manually operated sliding exterior side doors. These doors have handles on both sides of the door and a lock on the outside. In addition to the door handles, there is a manual latch. The latch is at the top of the door. This latch can be manually engaged or released from the inside only. Like Amfleet I cars, there is automatically inflating weather stripping around the door. If the weather stripping malfunctions and does not automatically deflate, puncture the rubber with a knife or sharp tool. This will release the air pressure. The Amfleet II cars have side doors on both sides of one end of the car.

a. Opening Doors from Outside

These doors have handles on both sides of the door and can easily be opened from the inside or outside if the door is not latched. If the door is latched on the inside, the handles will not work. The outside locks are not usually locked. If the door is locked, it can be unlocked with the standard Amtrak coach key. This lock has no effect on the inside latching system. There are no manual emergency releases on the outside. If the door is latched on the inside, entry must be gained through an end door or window.

b. Opening Doors from Inside

To open the door from inside the car, pull on the door handle. If the inside latch is applied, release the latch at the top of the door, then pull on the door handle. This handle can also be reached from the outside after forcing down the side door window.

6. Amtrak Superliner Car Information and Car Door Configurations

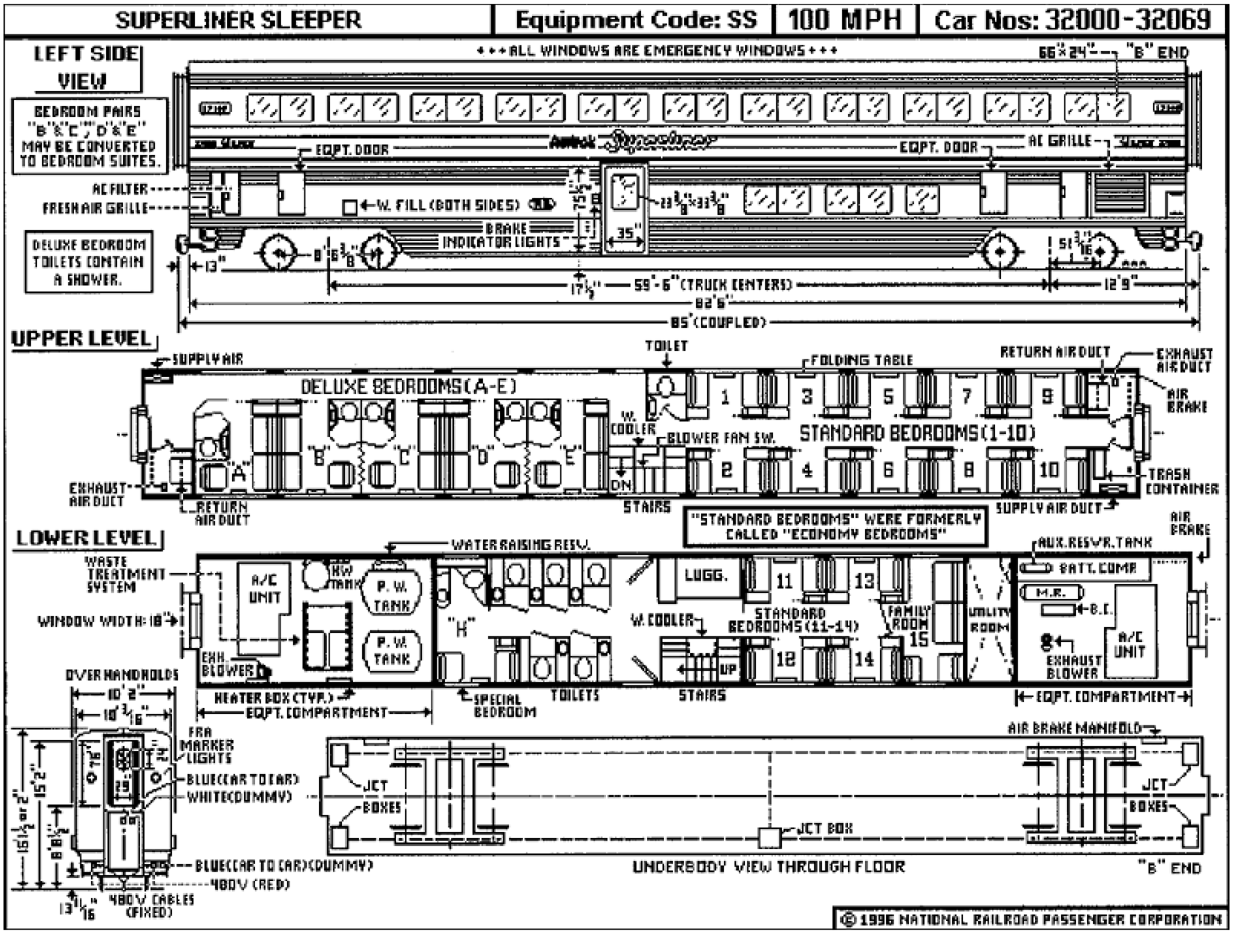


Diagram 3-12: Illustrated above is a diagram of a typical Superliner sleeper passenger multi-level trailer car. Note the small stair wells. Removing victims from this car will be difficult during emergency conditions. Understanding the layout of these cars is very important.

Picture 3-25: A Superliner multilevel car. The name of this type of car is largely printed on the side of the car making them easy to identify.

Amtrak Superliner passenger cars have manually operated hinged exterior side doors that swing inward. These doors have latch handles on both sides of the door and a lock on the outside. Some of the doors are "Dutch" style with separate latches for the top and bottom sections. These doors are closed and latched, but not locked, during operation. The Superliner cars have doors on both sides, in the middle of the car, at the lower level.

a. Opening Doors from Outside

These doors have handles on both sides of the door and can easily be opened from the inside or outside if the door is not latched. If the door is latched on the inside, the handles will not work. The outside locks are not usually locked. If the door is locked, it can be unlocked with the standard Amtrak coach key. This lock has no effect on the inside latching system. There are no manual emergency releases on the outside. If the door is latched on the inside, entry must be gained through an end door or window.

b. Opening Doors from Inside

To open the door from inside the car, pull on the door handle. If the inside latch is applied, release the latch at the top of the door, then pull on the door handle. This handle can also be reached from the outside after forcing down the side door window.

7. AMTRAK HIGH-SPEED TRAIN-SETS Information and Car Door Configurations

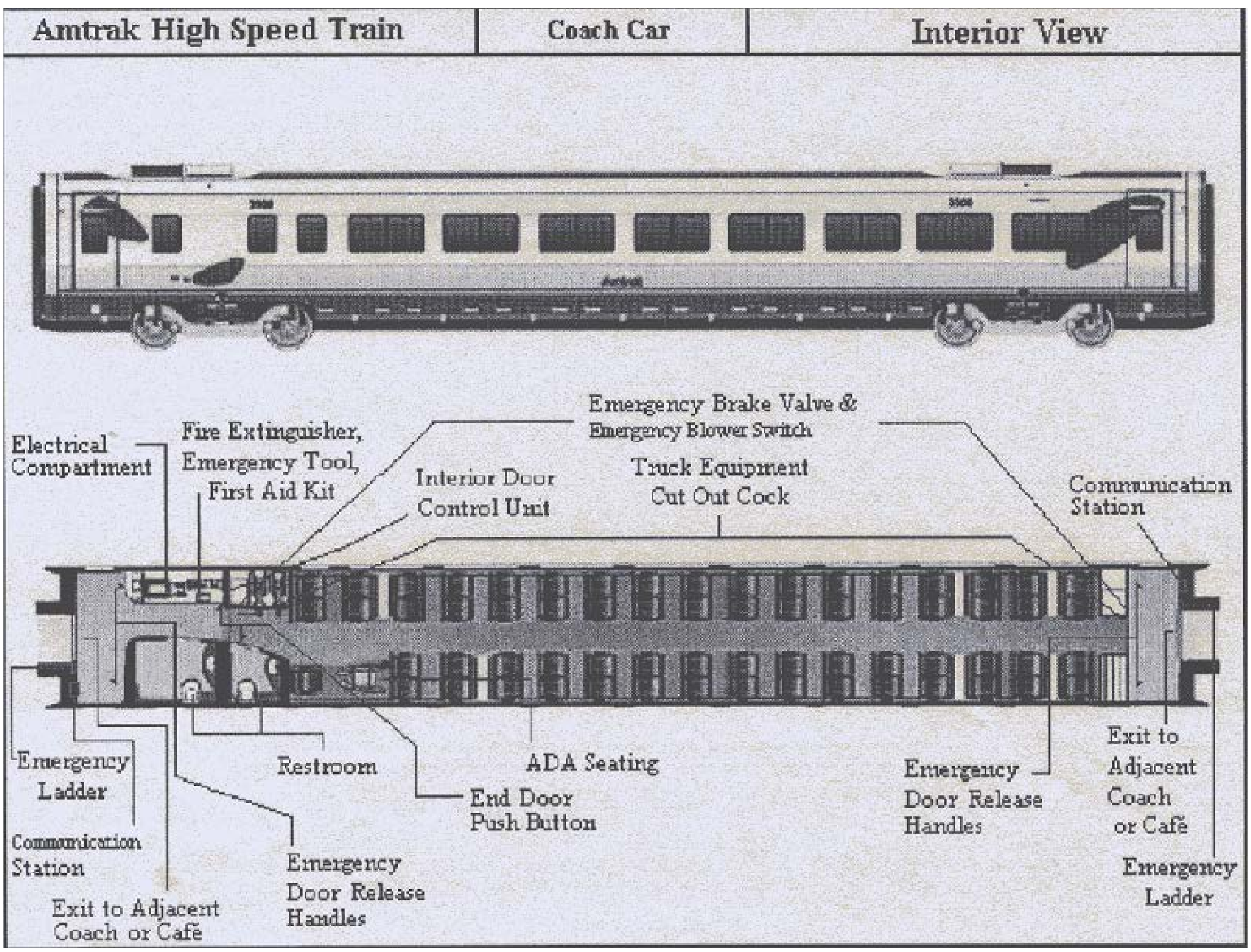


Diagram 3-13: Illustrated above is a diagram of a high speed train car. The door configuration and rescue methods are different from older equipment.

Picture 3-26: A view of an Acela electric locomotive pulling a train-set out of the Ivy City rail yard. Their distinctive color and shape make them easy to identify.

There are six passenger cars in a High Speed train-set. The exteriors of the six cars, including the doors, are identical. The train-set passenger cars have electrically operated doors that open away from the car and slide along the outside of the car. The side doors do not have stairs or trap doors. The cars have side doors on both sides of one end of the car. Two emergency escape ladders are stored in the car near the doors. These ladders can be used to evacuate passengers when the train is not at a high platform. These side doors can be opened from the outside by breaking the cover over a red lever recessed in the outside wall by the door. Pull the lever to release the door.

Some Acela train-set passenger cars also have a “soft spot” in the roof that can be cut with a circular rescue saw. The soft spot is clear of any electrical, communication or compressed air lines. It is marked by a decal showing its location and size. It is intended for use when the car has rolled over. If this soft spot is used when the car is right-side up, catenary power must be shut down and grounded.

The train-set power and passenger cars are semi-permanently attached. They must be separated in an Amtrak shop.

G. UTLIZING EMERGENCY WINDOWS ON ALL PASSENGER CARS

Passenger train doors are the preferred means of entering and exiting cars. If train doors cannot be open because of mechanical damage, emergency train windows provide rescuers another quick manner to enter the train. The next option is non- emergency windows.

Emergency windows are provided in all passenger train cars. Each car will have at least two emergency windows on each side and will be evenly distributed along the entire length of the car body. Some passenger cars are being retrofitted so that most or all windows will be emergency windows. All emergency windows are marked on the interior and exterior of the car. Opening directions posted by the outside of a window do not necessarily mean a window is an emergency window.

Emergency windows can also be recognized by red handles located inside the car at the top or bottom of the window. On the inside of the car, directions for opening the windows are posted near the window. On the outside of the car, directions are posted at the end of the car around the corner from the window side of the car. Directions are also often posted on the outside near the window. All windows, even non-emergency windows, can be opened from the outside by following the posted directions. Amtrak windows are made of Lexan polycarbonate material that is extremely difficult to cut or break. VRE and MARC use multi-ply safety glass.

Windows can provide an easy way to remove patients out of the train. For example: a patient may need to be placed in a Stokes basket and passed through the window rather than down narrow stairs.

Please note that if a window is removed, the railcar cannot continue on its journey as occupied. To avoid pulling a window if the conditions do not fully warrant it, the luggage rack between the upper and lower levels is rated for several thousand pounds. An individual can be packaged on this rack and then lowered by team into the vestibule.

1. Opening All Types of Emergency Windows from Inside the Car

All Amtrak, VRE and MARC emergency windows can be opened from the inside using the procedure found in the picture below:

Picture 3-27: The decal directs passengers how to remove emergency windows. The decal states: first, pull the red handle: second, pull out the window by using the handles on the glass.

Firefighters on the outside of the rail car can direct passengers to remove the emergency windows on their own accord. While this action may assist in the rescue effort, remember there may be a nine-foot drop to the ground. When some emergency windows are opened from the inside, only one-half of the window assembly is removed. On others, the whole window is removed.

2. Opening Amtrak Windows from the Outside

Amtrak passenger car windows are made of Lexan polycarbonate materials. On these cars, both emergency and non-emergency windows, can be opened from the outside using the prescribed sequence found on the decal located at the bottom of the window. Rescuers need only to follow the instructions.

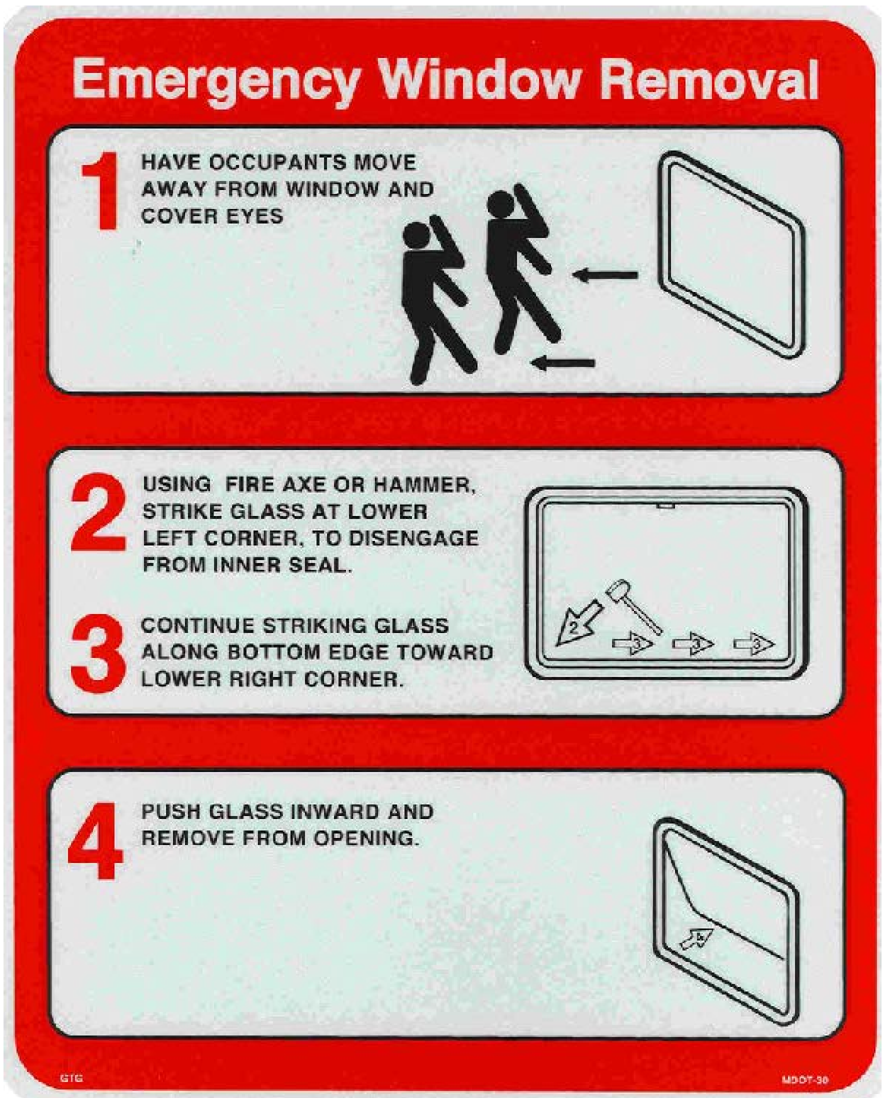
Picture 3-28: This top picture shows the pictorial sequence decal of the procedure for window removal. A rescuer would find this decal on an outside window of a VRE rail passenger car. Note the installed handles.

Picture 3-29: This bottom picture shows the decal removal sequence for Amtrak passenger rail cars. This picture was taken of an Amfleet I car window.

When windows are opened from the outside, the whole window assembly is removed. Some VRE windows have the red emergency pull handle located on the exterior of the window for use by emergency response personnel on the outside of the car.

3. Opening MARC and VRE Windows from the Outside

MARC recommends that their windows (safety glass), both emergency and non- emergency windows, be opened from the outside by breaking them, VRE recommends simple removal by pulling exterior gaskets. Use the following method:



Picture 3-30: A view on the decal stenciled on the exterior side of a MARC passenger car. Remember that most MARC passenger train car windows are glass and have a totally different procedure in removal. This fact is the most distinctive difference between the MARC and VRE trains and the Amtrak equipment.

Using the “zip-strip” removal method can also easily open many of the MARC windows. This will avoid the hazard of broken glass. MARC windows should be checked for the accessibility of the “zip-strip” and this method is preferred where possible.

4. Last Resort Methods to Remove Lexan Polycarbonate Windows

The above methods should be adequate in the vast majority of emergency situations. In extremely rare circumstances where the removal of windows by the prescribed means is precluded, a carbide-tipped CHAIN saw can be used to cut Lexan polycarbonate windows. When using a carbide-tipped chain saw, large sharp pieces of Lexan polycarbonate will fly in all directions. Another last choice option is to freeze the Lexan polycarbonate pane with several large CO2 fire extinguishers and then shatter the window with a Halligan bar. Do NOT use any type of circular saw. The Lexan polycarbonate will melt and foul the blade before it can cut very far. Any tool swung at the Lexan polycarbonate windows will rebound dangerously and this method is not to be used.

H. CUTTING INTO THE CAR BODY

If access cannot be obtained through doors or windows, cut the metal body between structural supports but remember that the outer skin is ¾'' stainless steel. Avoid cutting car floors because of their heavier construction and the presence of 480-volt HEP lines, high-pressure air lines and other utilities. Hurst and other standard vehicle-extrication tools will not work on train car structural supports. Reciprocating saws and cutting torches are the best tools to cut structural supports. Be aware that electrical wiring and high-pressure air lines are located throughout the body of the car.

As described earlier in this chapter, there are access panels, or "soft spot," on the roof of some passenger cars that can be cut with a circular rescue saw.

I. OTHER EMERGENCY EQUIPMENT

All passenger cars are equipped with one or two dry chemical extinguishers, a small first-aid kit, a sledgehammer, a pry bar and other tools. They are in well-marked cabinets inside the car. MARC III cars are provided with a sledgehammer on the outside of the car to assist in breaking the windows. Two are mounted on the underside of each MARC III car. One is mounted on each side and they are marked with a decal of a firefighter holding an axe.

74-volt nickel-cadmium rail car batteries provide emergency lighting and door power. Batteries are located in boxes under the car or in compartments on the side of the car. The emergency lights will automatically come on when normal head-end power is lost. These batteries are rated for six hours but may not last that long in an actual emergency. The batteries may also be torn off or disabled in a derailment. Individual lights may also have their own battery power independent of the rail car batteries.

Seats in Amtrak cars can be rotated to allow better access to emergency windows. The seats are pulled out toward the aisle and then rotated. Some seats have a foot-pedal release that must be activated while pushing the seats. VRE and MARC cars do not have this feature.

J. FREIGHT CARS ON AMTRAK PASSENGER TRAINS

Amtrak passenger trains can include boxcars for mail, baggage and material handling. These cars are similar to those used on freight trains and typically carry U. S. Mail or bulk packages. Amtrak freight cars are identified by a set of numbers printed on the side of the car. Amtrak freight cars typically do not have end doors like their passenger rail counterparts; making access limited to heavy cargo doors located on each side. Because freight cars do not have a passageway in which patrons can transverse through the car, they are positioned either near the locomotive or at the end of the train.

Some types of Amtrak baggage cars are unique to Amtrak. Baggage combination cars are equipped with dormitories that may be occupied by Amtrak personnel while the train is in motion. They are usually toward the front of the train. They can be identified by the presence of end doors and windows. Doors will be unlocked when baggage handlers are present. Baggage combination cars have emergency windows similar to passenger cars.

Some Amtrak passenger cars have been converted to baggage cars. These cars will have end doors but not emergency windows. They will not be occupied when the train is in motion.

Picture 3-31: The tail-end view of a train pulling multi-level Superliner cars and one box car. Note the foliage on each side of the roadway. How would fire and rescue equipment access this site and where would set up be for a triage or patient collection area? This picture was taken in Gaithersburg, MD.

CHAPTER 4 – FREIGHT TRAINS

CSX and Norfolk Southern provide freight rail service to the Metropolitan Washington Area. Most freight trains are operated with a minimum of a conductor and an engineer. There may also be a brakeman or other railroad personnel on board. The conductor is in charge of both train and railroad personnel. The conductor has a portable radio and there are mobile radios available in locomotives for the engineer to utilize. Conductors and engineers on freight trains do not wear uniforms. When the train is in motion all railroad personnel will usually be located in the locomotive.

Freight train locomotives can pull as many as 100 freight cars. The maximum speed freight trains are permitted to travel is 30 mph in the District of Columbia, 55 mph in Maryland, and 60 mph in Virginia.

A. TRAIN CONSIST (SHIPPING PAPERS)

Every freight train has a document that delineates the prearranged order of each car in the train starting at the locomotive and continuing to the end of the train. This document is identified as the train consist or sometimes called “shipping papers.” These are usually kept in the locomotive. Consists can also be faxed to the scene by railroad communication centers.

It is absolutely critical that responders obtain this information to properly size-up and to control a rail incident. In addition to giving the position of the rail cars place in the train, the consist or set of shipping papers also indicates the car number, whether it is loaded or empty, its type and special instructions for the railroad, including whether the car is carrying hazardous materials.

Picture 4-1: This picture is a typical example a freight car derailment. The IC must designate a survey team to make a complete assessment of every car that is derailed. Responders should mark a number on each car and make drawings of their respective resting position.

The train consist documents will be used by the incident commander on the scene to reconstruct the position of each freight car if many of the cars have derailed. Additionally, Hazmat teams will perform a very thorough damage assessment of each and every derailed car. Damage assessments will confirm the information found in the train shipping papers. Observations from the damage assessments will also give the magnitude of the incident. A damage assessment is intended to determine other information, such as the car situation, the location of spilled product and obtaining important specifications indicated on tank cars.

There are instructions for all hazardous materials carried on the train. There are no instructions provided for the non-hazardous materials shipments. Cars containing hazardous materials will have a shipping description that includes the following information: product name, hazard class (by number only), UN number, packing group, emergency contact number, Standard Transportation Commodity Code (STCC) number and the shipper's name. See the examples of a train consist on the following pages of the manual.

A consist will also have Hazardous Special Handling Instructions for all the hazardous materials carried on the train. These instructions are similar to Material Safety Data Sheets (MSDS) and provide information for handling spills and fires.

The conductor has the responsibility to review this document with emergency response personnel in the event of a derailment or hazardous material release. The conductor is authorized to provide the instructions to emergency responders. He or she cannot give up possession of the original consist but the conductor may allow the incident commander or his designee to make copies. The conductor may also have an extra copy of the consist that can be given directly to emergency response personnel.

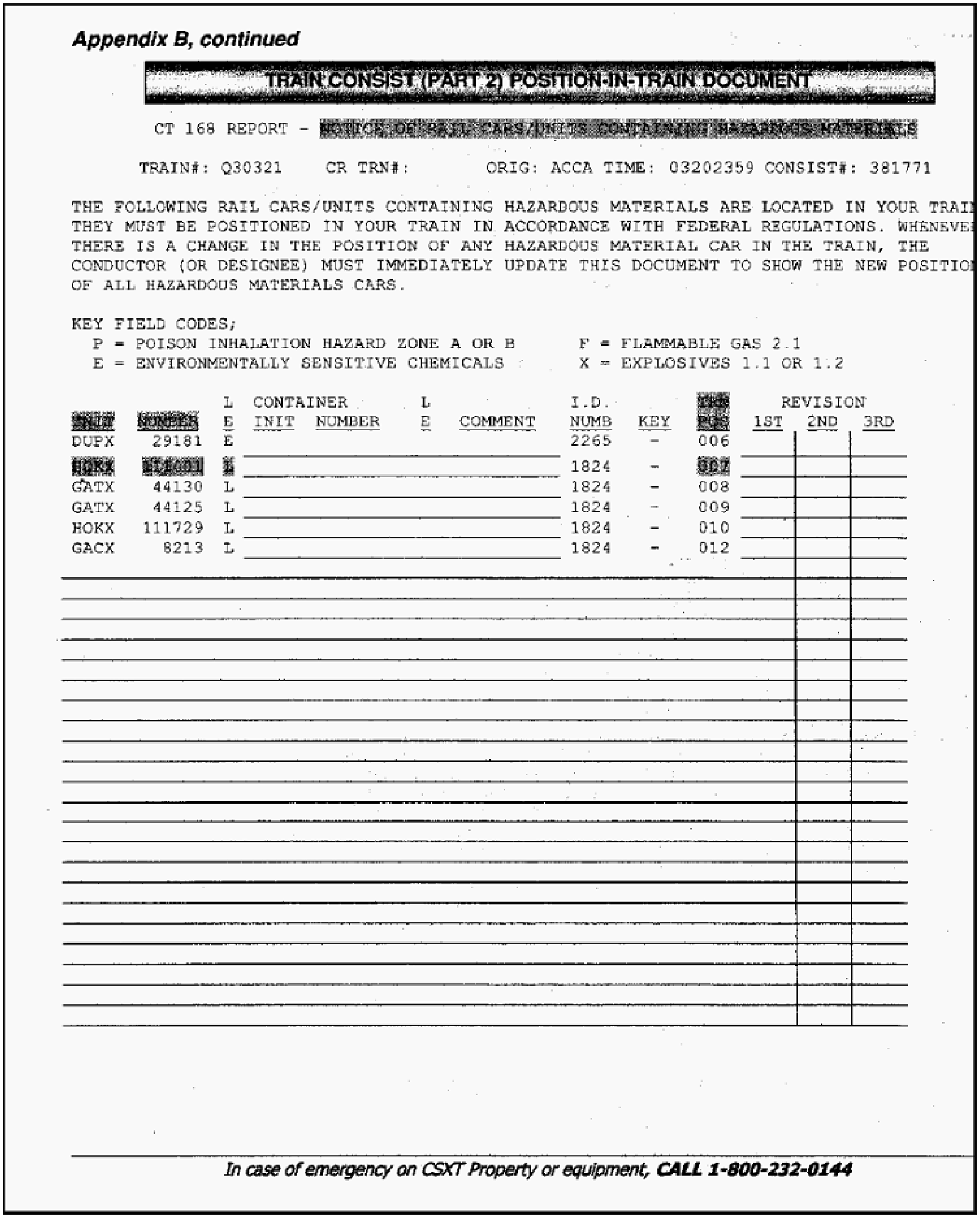
Appendix B, continued

CSXT TRAIN CONSIST (PART 1) "TONNAGE GRAPH"

```
*************************************************************************************
START OF TRAIN DOCUMENTS
                               CSXT TRAIN DOCUMENTATION

       THIS DOCUMENT IS REQUIRED BEFORE DEPARTURE FROM ALL ORIGINATING TERMINALS
**************************************************************************************
                                    TONNAGE GRAPH
                                    ==============

TRAIN # Q30321    CR TRN#:         ORIG: ACCA        TIME: 03202359    CONSIST#:
381771

C= SHIPMENT GOVERNED BY CLEARANCE BUREAU INSTRUCTION
R- POTENTIAL RESTRICTED EQUIPMENT - SEE "RESTRICTED AND SPECIAL HANDLING LIST".
REFERENCE
   TIME TABLES, OPERATING RULES AND MECHANICAL INSTRUCTIONS FOR HANDLING IN YOUR TRAIN.
L= LONG CAR
S= SHORT CAR
*= EMPTY TOFC CAR
---
 |      PLATE SIZE-------+      *= 4 TONS
 |      CAR TYPE--------+|      H= 4 TONS HAZ MAT
 |      LOAD/EMPTY-----+||
 |                     |||
 | RES   CAR  ---CAR---LC UNNA ---------TONS--------------------------- EST   TRN   A
---KEY---INIT   NUMBER ET NUMB 20   40   60   80   100   120   140      TONS  LGTH  X
CAR            1-RBOX 31625 LBC      *******************   |              78    56  4
INITIAL        2-CSXT129824 EAB      ******                |             109   112  4
AND            3-CSXT130211 EAB      ******                |             140   168  4
NUMBER         4-LXOH  7267 LAB      **************************         246   360  4
               5-CSXT142909 EAC      ******                |             277   416  4
R  9250  6-DUPX 29181 LTB 2265 HHHHHH                      |             312   470  4
R  9250  7-HOKX111001 LTB 1824 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH       442   512  4
R  9250  8-GATX 44130 LTB 1824 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH        570   558  4
R  9250  9-GATX 44125 LTB 1824 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH        698   604  4
R  9250 10-HOKX111729 LTB 1824 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH       828   646  4
        11-UTLX 24617 LTB      ************************************      957   688  4
R  9250 12-GACX  8213 LTB 1495 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH       1082   733  4
R  9040 13-ECUX882386 LCC      *********************************        1209   778  4
        14-VAPX 91079 EHB      *****                                    1239   827  4
        15-BB    7068 LAC      *********************                    1322   892  4
GRAND
 TOTAL      MERCHAN     PIGFLAT    COAL    PERISH    AUTORAK     TOTAL  TOTAL   TOTAL
 L   E      L    E      L   E      L   E   L   E     L   E       TONS   LENGTH  AXLE
 10  5      10   5                                               1,322   892     60

RESTRICTION KEYS*******************************************************************
   9250 = HAZARDOUS-SEE HAZ MATERIAL DESCRIPTION
   9040 = RE RULE 7 - HIGH CUBE CAR

 ENGINEER IS TO BE PROVIDED WITH TONNAGE GRAPH OR A LEGIBLE COPY OF THE TONNAGE GRAPH.
 THE UNNA NUMBER COLUMN CAN BE USED TO REFERENCE THE PRODUCT NAME OF THE HAZARDOUS
 MATERIAL IN THE EMERGENCY RESPONSE GUIDEBOOK.
```

In case of emergency on CSXT Property or equipment, ***CALL 1-800-232-0144***

Picture 4-2: This illustration is the first page of current documentation carried on a train. Part 1 of the train consist is the Tonnage Graph and shows all 15 cars of the train. The cars' reporting marks (ID) are the letters and numbers in the second row. The number to the left of each car's reporting mark shows placement in the train. Car number one is closest to the locomotive. The graph of the car's tonnage is represented by asterisks or "Hs". The "Hs" are only used for cars containing hazardous material.



Appendix B, continued

TRAIN CONSIST (PART 2) POSITION-IN-TRAIN DOCUMENT

CT 168 REPORT - NOTICE OF RAIL CARS/UNITS CONTAINING HAZARDOUS MATERIALS

TRAIN#: Q30321 CR TRN#: ORIG: ACCA TIME: 03202359 CONSIST#: 381771

THE FOLLOWING RAIL CARS/UNITS CONTAINING HAZARDOUS MATERIALS ARE LOCATED IN YOUR TRAIN THEY MUST BE POSITIONED IN YOUR TRAIN IN ACCORDANCE WITH FEDERAL REGULATIONS. WHENEVER THERE IS A CHANGE IN THE POSITION OF ANY HAZARDOUS MATERIAL CAR IN THE TRAIN, THE CONDUCTOR (OR DESIGNEE) MUST IMMEDIATELY UPDATE THIS DOCUMENT TO SHOW THE NEW POSITION OF ALL HAZARDOUS MATERIALS CARS.

KEY FIELD CODES;
P = POISON INHALATION HAZARD ZONE A OR B F = FLAMMABLE GAS 2.1
E = ENVIRONMENTALLY SENSITIVE CHEMICALS X = EXPLOSIVES 1.1 OR 1.2

UNIT	NUMBER	L E	CONTAINER INIT	CONTAINER NUMBER	L E	COMMENT	I.D. NUMB	KEY	TRN POS	REVISION 1ST	REVISION 2ND	REVISION 3RD
DUPX	29181	E					2265	-	006			
HOKX	[illegible]	L					1824	-	007			
GATX	44130	L					1824	-	008			
GATX	44125	L					1824	-	009			
HOKX	111729	L					1824	-	010			
GACX	8213	L					1824	-	012			

In case of emergency on CSXT Property or equipment, ***CALL 1-800-232-0144***

Picture 4-3: Part 2 of the train consist is the Position-in-Train Document and shows the placement of only the cars carrying hazardous materials. The first two columns show the car's reporting mark (ID). The last column marked "TRN P05" shows the cars location on the train. For example; Car DUPX 29181 is the &h car from the locomotive. This information should be placed on a site drawing that depicts the derailed cars in the incident.

TRAIN CONSIST (PART 3) TRAIN LISTING

```
                TRAIN LISTING AND HAZARDOUS MATERIAL DESCRIPTIONS            PAGE:001
                =================================================

TRAIN#:  Q30321  CR TRN#:        ORIG: ACCA   TIME: 03202359  CONSIST#: 381771

          CARS IN THIS CONSIST COUNT FROM FRONT TO REAR

  CAR            CAR     COMMODITY CODE   DESTINATION CONSIGNEE  MP     YZCN
  NUMBER         TYPE    STCC     ALPHA
  ------------   -----   --------------   ----------- --------- ------------

1 RBOX   31625 L B314    4024117  4024117 BIGISLANDVA GEOPACIFI  CAB165 4332
2 CSXT  129824 E A302    2631117  EMPTY   RICACCA  VA CMSFLOW    AACA
3 CSXT  130211 E A302    2631117  EMPTY   BIGISLANDVA CMSFLOW    CAB165
4 LXCH    7267 L A302    4024115  SCPAPER BIGISLANDVA GEOPACIFI  CAB165 4332
5 CSXT  142909 E A402             EMPTY   COVINGTONVA WESTVACO   CA 290 4332
6 DUPX   29181 E T108    4914135  EMPTY   BELLE    WV EIDUPONT   CGYNS

  ****************       0000001 TC//0000000//RESIDUE: LAST CONTAINED//
  *    HAZMAT    *       N-DIMETHYLFORMAMIDE//COMBUSTIBLE LIQUID//UN2265//
  ****************       PG III//RQ (DIMETHYLFORMAMIDE)//STCC=4914135
  U.S.A. EMERGENCY CONTACT:  800-424-9300
  FROM SHIPPER: BUNCHER RAIL CAR SVC BUNCHER VA
  TO CONSIGNEE: DUPONT E I DENEMOURS BELLE WV

[illegible] L T104    4935240  4935240 COVINGTONVA WESTVACO   CA 290 1112

  ****************       0000001 TC//0199100 LB//SODIUM HYDROXIDE SOLUTION
  *    HAZMAT    *       //8//UN1824//PG II//RQ (SODIUM HYDROXIDE)//
  ****************       STCC=4935240
  U.S.A. EMERGENCY CONTACT:  800-424-9300
  FROM SHIPPER: OCCIDENTAL CHEMICAL CORP NIAFALLS NY
  TO CONSIGNEE: WESTVACO CORP  COVINGTON VA

8  GATX  44130 L T104    4935240  4935240 COVINGTONVA WESTVACO   CA 290 1112

  ****************       0000001 TC//0194350 LB//SODIUM HYDROXIDE SOLUTION
  *    HAZMAT    *       //8//UN1824//PG II//RQ (SODIUM HYDROXIDE)//
  ****************       STCC=4935240
  U.S.A. EMERGENCY CONTACT:  800-424-9300
  FROM SHIPPER: OCCIDENTAL CHEMICAL CORP  NIAFALLS NY
  TO CONSIGNEE: WESTVACO CORP  COVINGTON VA

9  GATX  44125 L T104    4935240 4935240  COVINGTONVA WESTVACO   CA 290 1112

  ****************       0000001 TC//0194050 LB//SODIUM HYDROXIDE SOLUTION
  *    HAZMAT    *       //8//UN1824//PG II//RQ (SODIUM HYDROXIDE)//
  ****************       STCC=4935240
  U.S.A. EMERGENCY CONTACT:  800-424-9300
  FROM SHIPPER: OCCIDENTAL CHEMICAL CORP  NIAFALLS NY
  TO CONSIGNEE: WESTVACO CORP  COVINGTON VA
```

In case of emergency on CSXT Property or equipment, ***CALL 1-800-232-0144***

Picture 4-4: Part 3 of the consist is the Train Listing and Hazardous Material Description. All 30 cars are listed with information on each car. Cars with hazardous materials have more information and are marked “HAZMAT.”

Appendix B, continued

TRAIN CONSIST (PART 4) EMERGENCY HANDLING INSTRUCTIONS

```
                 HAZARDOUS SPECIAL HANDLING INSTRUCTIONS
                 =======================================

         ------------------------------------------------------
         IN CASE OF ACCIDENT PROVIDE THIS LIST TO RESPONSE TEAM
         ------------------------------------------------------
TRAIN#: Q30321  CR TRN#:         ORIG: AACA TIME: 03202359 CONSIST#: 381771
EMERGENCY HANDLING PRECAUTIONS                     HAZARDOUS COMMODITY 4935240
                                        HOKX 111001          CAR 007 FROM ENGINE
                                        GATX  44130          CAR 008 FROM ENGINE
                                        GATX  44125          CAR 009 FROM ENGINE
                                        HOKX 111729          CAR 010 FROM ENGINE

SODIUM HYDROXIDE SOLUTION                                          493524
CLASS 8 (CORROSIVE MATERIAL)                                       UN1824
             ENVIRONMENTALLY HAZARDOUS SUBSTANCE             (RQ-1000/454)

  SODIUM HYDROXIDE IS A DARK COLORED, THICK LIQUID.  IT IS SOLUBLE IN WATER AND WEIGHS
MORE THAN WATER.  CONTACT WITH THE MATERIAL MAY CAUSE SEVERE IRRITATION TO SKIN, EYES,
AND MUCOUS MEMBRANES.  IT MAY BE TOXIC BY INGESTION.  IT IS CORROSIVE TO METALS AND
TISSUE.  IT WEIGHS 13 LBS./GAL.

IF MATERIAL INVOLVED IN FIRE
  EXTINGUISH FIRE USING AGENT SUITABLE FOR TYPE OF SURROUNDING FIRE
    (MATERIAL ITSELF DOES NOT BURN OR BURNS WITH DIFFICULTY.)
  USE WATER IN FLOODING QUANTITIES AS FOG
  APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE

IF MATERIAL NOT INVOLVED IN FIRE
  KEEP MATERIAL OUT OF WATER SOURCES AND SEWERS
  BUILD DIKES TO CONTAIN FLOW AS NECESSARY

PERSONNEL PROTECTION
AVOID BREATHING VAPORS OR DUSTS
  AVOID BODILY CONTACT WITH THE MATERIAL
  WEAR APPROPRIATE CHEMICAL PROTECTIVE GLOVES, BOOTS AND GOGGLES
  DO NOT HANDLE BROKEN PACKAGES UNLESS WEARING APPROPRIATE
  PERSONAL PROTECTIVE EQUIPMENT
  WASH AWAY ANY MATERIAL WHICH MAY HAVE CONTACTED THE BODY
    WITH COPIOUS AMOUNTS OF WATER OR SOAP AND WATER
  IF CONTACT WITH THE MATERIAL ANTICIPATED,
    WEAR APPROPRIATE CHEMICAL PROTECTIVE CLOTHING

ENVIRONMENTAL CONSIDERATIONS - LAND SPILL
  DIG A PIT, POND, LAGOON, HOLDING AREA
    TO CONTAIN LIQUID OR SOLID MATERIAL
  DIKE SURFACE FLOW USING SOIL, SAND BAGS,
    FOAMED POLYURETHANE, OR FOAMED CONCRETE
  ABSORB BULK LIQUID WITH FLY ASH OR CEMENT POWDER
  NEUTRALIZE WITH VINEGAR OR OTHER DILUTE ACID

FIRST AID RESPONSES
  MOVE VICTIM TO FRESH AIR; CALL EMERGENCY MEDICAL CARE.
  REMOVE AND ISOLATE CONTAMINATED CLOTHING AND SHOES AT THE SITE.
```

In case of emergency on CSXT Property or equipment, ***CALL 1-800-232-0144***

Picture 4-5: The last part of the documentation displays the particular hazardous material's specific chemical information and mitigation techniques.

Part 4 of the consist is the Emergency Handling Instruction and is similar to Material Safety Data Sheets (MSDS). The Standard Transportation Commodity Code (STCC) is posted to the right, with all the cars carrying that commodity listed below the STCC number. On the next line, to the left, is the name of the hazardous material. Below the name of the hazardous material is all the MSDS type information.

B. BRAKE SYSTEMS

Air-brake lines (brake pipes) run the entire length of freight trains. The air-brake lines are pressurized to a maximum 90 psi by the locomotive. Air lines are dangerous and should to be connected or disconnected only by railroad personnel. Freight trains do not provide head-end power to the cars.

Hand brakes are located at the "B" end of each car. These are mechanical parking brakes that apply pressure to the brake shoes independently of the regular air- brake system unlike brakes which operate by the air-brake system. These hand brakes are the same as the hand brakes on passenger trains. Most freight cars utilize a hand wheel, but levers are used on some cars. Hand brakes are applied by either turning the wheel clockwise or pumping the lever until it cannot be turned or pumped anymore. The amount of turning or pumping will vary from hand brake to hand brake. The chain attached to the wheel or lever will be taut when the brake is applied and loose when disengaged. During emergency operations, at least two hand brakes must be applied. Railroad or emergency response personnel can apply the brakes, but railroad employees must be informed when emergency responders apply the brakes. Hand brakes are only to be released by railroad employees. Responders should place barrier tape (fire-line tape) on the hand wheel to mark activation.

C. GENERAL INFORMATION ON FREIGHT CARS

All rail cars, both passenger and freight, do not have a front or rear end. They have an "A" or "B" end based on where the hand brake is located. The end of the car with the hand brake is the "B" end; the other end of the car is the "A" end. The left and right sides of the car are determined by standing at the "B" end of the car, facing the "A" end. The left side of the car is on the left and the right side of the car is on the right.

The typical car sits on two trucks. Each truck has two sets of wheels (axles). A center pin on the car fits into a hole in the center plate of truck assembly. Gravity is the only means for keeping the two together. Unlike passenger cars and Metro subway cars, there is NO restraining device on freight cars that keeps the center pin in the truck's center plate. When freight trains derail, the trucks may separate from the cars and wheel/axle assemblies may separate from the trucks.

In the case of spine cars and some auto racks, the ends of two cars will share the same truck assembly. This type car design will make identifying hazardous materials difficult.

All freight cars are marked with a permanent car number (reporting marks) assigned by the railroad or company that owns the car. The number will usually have two, three or four letters representing the railroad or company name, followed by a serial number. The serial number can be one to six digits long but is usually five to six digits in length. The car number is on both sides and both ends of the car. When facing the car from the side, the numbers will be on the left side of the car.

If a car is required to have hazardous materials placards, the placards will be on both sides and both ends of the car. Some hazardous materials must be placarded for any amount of material, but other hazardous materials do not require a placard until over
1,000 pounds are carried. A dangerous placard can be used on a non-bulk mixed-class load of certain hazardous materials. For example, a boxcar with a dangerous placard could be filled with one-gallon containers of gasoline, car batteries and small propane tanks. If this same car carried a total of less than 1,001 pounds of these materials, no placards would be required. Due to the residue left in "empty" tank cars, tank cars will be placarded for the class carried by the car whether it is empty or full. The consist must be checked by emergency responders for the status of each tank car in the train.

D. TYPES OF FREIGHT CARS

1. Flat Car

Picture 4-6: A picture of an empty flat car. These cars can be utilized as platforms in which responders can move and stage equipment. Most floors of flat cars are wood and can catch fire by overheated wheel hub bearings.

Picture 4-7: The real hazard that flat cars present is the shifting load in a derailment or collision. The same calculation used for determining the safe distance from an unstable wall can be used to find a safe distance to stay away from the load on the flat car. Remember also that contents may shift in a box car.

Flat cars are general purpose cars without sides, ends or tops. Flat cars are used to carry items that do not need protection from the weather, such as large equipment, building materials, ton containers (cylinders) and other items. Some flat cars have racks for holding items in place. Center-beam lumber cars have a support in the middle with the lumber loaded on each side. If the lumber is unloaded improperly, the car will roll over. Flat cars are also used in intermodal service as described below. Sometimes, you may find the floor of the flat car to be made of wood. A wheel hub bearing fire can extend into the wood. Emergency response personnel are not to release cargo tie-downs without assistance from railroad employees.

Flat cars can also be a resource to responders as a way to move rescue equipment to the scene of a long duration incident that occurred far from any vehicle access points. Empty flat cars can also service as platforms from which to work.

2. Intermodal Service

Intermodal service is when one type of freight container is moved by different modes of transportation. Intermodal service allows freight to be transported by more than one mode of transportation with ease of transfer between the modes. There are three types of intermodal service: container on flat car (COFC) trailer on flat car (TOFC) and RoadRailer.

Intermodal hazards are similar to those found in the trucking industry. Commodities range from explosives to frozen food in refrigerated trailers and containers. Much of the freight traffic in the District of Columbia, Maryland and Virginia is carried by intermodal systems.

Picture 4-8: This picture is a typical example of a trailer on flat car transport. This arrangement presents several safety hazards for firefighters. The containers or trailers may have shifted during the derailment. The cargo trailers of the vehicles are less stout then their railroad counterparts and will break apart quicker.

a. Trailer on Flat Car (TOFC)

Trailers on flat car (TOFC) systems allow trailers to be loaded onto flat cars. The trailers are then secured to the flat cars. Tank trailers are not permitted to be loaded on flat cars. Many TOFCs have lever-operated hand brakes. TOFCs are often called piggyback or trailer flat cars.

Picture 4-9: This picture of stacked containers on a flat car. Notice that most of the containers are secured by small pins located on the corners of the box.

b. Container on Flat Car (COFC)

Container on flat car (COFC) systems allow large sealed containers to be taken from ships or trucks and then secured to flat cars. Tanks, or groups of cylinders (tubes), are also permanently mounted into sturdy frames to be transported. Many COFCs have lever-operated hand brakes.

Picture 4-10: This picture shows how a modified truck assembly can be placed under a special reinforced vehicle cargo container to travel on the railroad. These assemblies are called RoadRailers

c. RoadRailer

RoadRailer systems utilize specially constructed truck trailers that are backed into a special set of railroad wheels called a bogie. The road wheels are lifted clear off the rails by a steel spring when the air suspension system is deflated. The RoadRailer truck trailer is now a railroad car. A single bogie will have two RoadRailers connected to it. The bogies are equipped with railroad air brakes and couplers. The trailer/car contains railroad air-brake lines and an air reservoir. Neither the bogie, nor the trailer/car have a standard hand brake wheel or lever.

3. Auto Rack

Auto racks carry two or three levels of automobiles. Automobiles are loaded through end doors. Auto racks used in general freight rail transportation have a solid roof and grate sides. Hose streams can be applied through the side grates. Auto racks used on Amtrak's Autotrain, however, have solid sides and cannot be used for hose stream application. Auto racks have lever-operated hand brakes. Some newer auto racks operate with married pairs of car bodies sharing the same truck between them. The married pair is considered to be one car. When facing the married pair from the side, the car number will only be on the left car body.

Picture 4-11: Auto racks carry two or three levels of automobiles. Automobiles are loaded through end doors. Auto racks used in general freight have a solid roof and grate sides. Hose streams can be applied through the side grates.

4. Box Car

Picture 4-12: Box cars present several safety hazards for firefighters. Loads may have shifted during the derailment. Side doors may fall off their guides and backdraft may occur if a deep seeded fire is allowed to smolder inside a sealed box car.

The primary function of boxcars is to protect freight from the elements. Large capacity boxcars are called "high cubes". Boxcars may be considered large metal containers. Most boxcars have large heavy doors on both sides that slide open with the assistance of a forklift or some other mechanical advantage. Regular doors stay flush with the side of the car. Plug doors come out from the side of the car when open. Plug doors have the added safety hazard of becoming disengaged from the boxcar frame when opened. Hazardous materials and other general freight are carried in bottles, boxes, drums, bladders, tanks and intermediate bulk containers. Large, unstable loads may also be in boxcars. Emergency-response personnel are not to open boxcars without assistance from railroad employees.

DURING A DERAILMENT, DIFFERENT PRODUCTS MAY MIX TOGETHER WITHIN A BOXCAR CAUSING A GREATER HAZARD THAN THE PRODUCTS PRESENT BY THEMSELVES. DUE TO THE LACK OF OPENINGS, FIRES IN BOXCARS MAY CREATE BACKDRAFT CONDITIONS.

TO RECAP THE HAZARDS OF BOXCARS:

- Boxcars may enclose any type of storage containers
- Boxcar doors are heavy and can fall away from their mountings
- Back draft conditions maybe created in box cars involved in fire

5. Refrigerated Car (Reefer)

Refrigerated cars are insulated boxcars with a generator powering a cooling plant. Hazards are presented by both the coolant for the cooling plant, and up to 500 gallons of diesel fuel for the generator.

6. Gondola Car (Gon)

Picture 4-13: Gondola Cars are called "Gon's" by the rail employees. They are used to transport oversize loads such as scrap metals and railroad maintenance materials. They can be used to carry contaminated soil away from a hazmat spill.

Gondola cars are used to carry oversized loads. They have sides without a permanent roof. Covered gondolas have a temporary cover. Gondola cars are used to carry loads such as scrap metal, coils, railroad ties and large equipment. They are also commonly used to carry hazardous waste, such as contaminated soil, but are not used to carry hazardous materials.

7. Hopper Cars (Covered or Uncovered)

Hopper cars have two or more pocket (bay) openings on the bottom for quick unloading of bulk loads. Hoppers have an open top or are covered with a permanent roof. The identifying pockets on the bottom of hoppers are not always easily visible.

Picture 4-14: A picture of a covered hopper car. These cars usually carry powders or grains that cannot get wet. They sometimes carry hazardous materials. Note the product outlets underneath the car. These valves may open during a derailment spilling the product.

Picture 4-15: A picture of a fire in an open or uncovered hopper car. Lack of water supply and limited access might hamper control of this type of fire. Is there a firefighter on top of the product load in the

hopper car? Did the responders remember to apply the hand brake on this car and chock the wheels? A piece of barrier tape should be attached to the hand wheel.

Open-topped hoppers carry sand, gravel, coal and other bulk commodities. Covered hoppers carry powder or granular commodities including hazardous materials such as oxidizers and fertilizers.

Some covered hoppers are pressurized during loading and unloading but not during shipping or movement. Emergency response personnel are not to open bottom doors without assistance from railroad employees.

8. Tank Cars

Tank cars carry powders, liquids, gases, and liquefied gases. Statistics state that approximately three-fourth of the hazardous material shipments in the United States are carried in tank cars. Some tank cars have insulation to maintain the temperature of the contents while others have thermal protection to protect the tank from exposure to fire. The insulation or thermal protection may be covered with a steel jacket. The insulation, thermal protection, and steel jacket will obscure the condition of the actual tank.

Tank cars have required stenciling in addition to the car number found on all freight cars. Included in this information will be the tank capacity, in gallons and liters, on the ends of the tank car. The name of some commonly carried commodities, such as chlorine and nitric acid, will be stenciled on the right side of the car.

Emergency response personnel are not to operate valves, relief devices or mechanical devices without assistance from railroad employees.

a. General Service Tank Car

Picture 4-16: This is a picture of general service low-pressurized tank car. The IC will need most of the stenciled information on this car in order to mitigate a hazardous material leak involving this car.

Most tank cars are general-service (low-pressure) tank cars. They are designed to carry both hazardous and non-hazardous materials. General service tank cars have tank test pressures at or below 100 psi. General service tank cars can be identified by the presence of exposed valves and fittings at the top and bottom of the car.

b: Pressure Tank Car

Picture 4-17: Illustrated above is a pressure tank car. Notice the heavy gauge steel dome protecting the valves. Also note that there are no valves to off load the contents from the bottom of the tank.

Pressure tank cars always carry hazardous materials. Pressure tank cars have a tank test pressure above 100 psi. Pressure tank cars can be identified by the lack of exposed valves and fittings. The valves and fittings are within a protective housing or dome on the top of the car. There are no valves or fittings on the bottom of the pressure tank car.

9. Coil Car

Steel coils are carried in a well with a curved or angled cover placed over them. The cover may have a bracket on top to assist in lifting the cover off the car. The steel coils have a protective coating of oil on them. Sometimes, small amounts of oil can drain off of the coils and collect into the well of the car creating a potential fire hazard. The curved or angled cover can cause coil cars to be mistaken for tank cars.

Picture 4-18: Coil Cars have a general curved appearance of a tank car but they do not have valves or piping. These cars carry coiled steel that weigh many tons.

10. Spine Cars

Spine cars consist of up to five rail car bodies permanently joined into one long rail car assembly. Spine cars operate with a series of platforms sharing one truck assembly (set of wheels) between each individual car body. The series of rail car bodies are considered to be one rail car. When facing the series of rail car bodies from the side, the rail car identification will be printed on the last body to the left. The car number will be stenciled on the outside end of the rail bodies at each end of the series. There are no numbers in the middle where the ends of the two car bodies share one truck assembly.

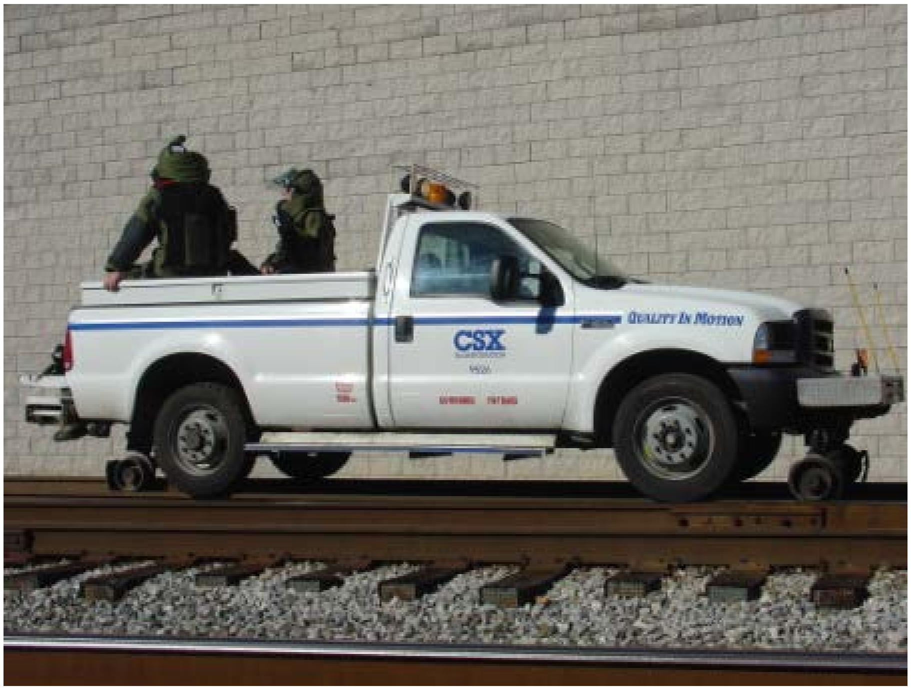
Picture 4-19: Spine cars have an unusual make up as two cars "share" one truck assembly.

11. Caboose

Cabooses are no longer used on freight trains. CSX uses old cabooses as riding platforms when trains must be backed for long distance. The use of cabooses as riding platforms is rare in the District of Columbia, Maryland and Virginia. An "end-of-train" device that is attached onto the air brake system on the last car of the train has replaced the caboose. The end of train (EOT) device is used to test the air brakes and monitor their continuity. Information from the EOT is transmitted to the locomotive by radio. Some EOTs make emergency brake applications from the end of the train.

12. HI-RAIL Vehicles

Hi-rail vehicles are highway vehicles that have a second set of wheels that allow them to be driven on railroad tracks. There is a wide range of hi-rail vehicles ranging from pick-up trucks to large construction machinery. These vehicles may be available to carry emergency-response personnel and equipment to a remote incident scene.



Picture 4-20: Hi-rail vehicles can expedite many of the tasks that responders need to accomplish during a rail emergency. Call for these resources early! Bomb technicians approach the scene of train explosion – they are unable to walk a great distance in their protective bomb suites.

CHAPTER 5 – SAFETY

The railroad system is an extremely hazardous work environment. Except during emergencies, fire and rescue personnel must not enter railroad property without permission and enter with only the assistance of a railroad representative. With prior notification, the railroad will provide an escort to walk on their roadway. Entering without permission is dangerous and is considered trespassing. This action could lead to criminal prosecution. On average, 500 trespassers are accidentally killed each year on railroad property in the United States.

A. WORKING ON THE ROADWAY

Rules designated for fire and rescue personnel when operating on a rail emergency scene or during normal training activities when an escort is provided:

1. EXPECT TRAIN MOVEMENT ON ANY TRACK, IN ANY DIRECTION, AT ANY TIME.
2. Helmets, eye protection, reflective vest and safety shoes must be worn. Firefighting gear, with eye shield or SCBA face piece, fulfills this requirement.
3. Always look in both directions before approaching or stepping across tracks.
4. Avoid walking between the rails even though this area provides the most level walking area. The risk of being struck by a train is too great. Attempt to walk in the space where the gravel roadway levels out, and the existing terrain begins.
5. Watch where you step at all times. Track beds are uneven and unstable due to the railroad ties and shifting rock ballast.

6. Do not step or stand on the running rails, as they are slippery.

7. On long duration emergencies, situate hose lines under tracks by digging out ballast. Trains must be stopped while digging is performed.

8. Keep personnel, tools and equipment clear of track switches as people who control switch operation are located far away. Switch points usually move in 1 to 5 seconds. Switches can pin or injure personnel and damage equipment. Emergency response personnel are NOT to operate switches. A wooden block can be placed in the open space to ensure that the switch does not move inadvertently. If this action is performed, make sure that the chock is well marked and notify the railroad representatives.

9. If a train approaches while emergency response personnel are operating near tracks, the only safe reaction is to get clear of the roadway. A good rule of thumb is to stay 30 feet away from moving trains. Refuge areas in tunnels and on bridges are designed for railroad employees - not firefighters with SCBA and equipment. There is insufficient space in these refuge areas to protect fully equipped firefighters. If personnel cannot clear the roadway in time, they can try these last possible escape options: lying between two sets of tracks, or if in a tunnel, lie in the corner where the floor and wall meet. There is NO guarantee that firefighters will be safe in these areas. If a firefighter is wearing SCBA, the train will probably strike the cylinder. Never lie on the ties between the rails.

10. People are often struck by a second train while they are avoiding the first train they originally observed.

11. Do not tamper with or move any fusees in the track area.

B. WORKING AROUND ROLLING STOCK

Rules designated for fire and rescue personnel when operating on a rail emergency scene or during normal training activities when an escort is provided:

1. Always leave 25 feet between you and the end of any standing train, car or locomotive.

2. Keep a safe distance, at least 30 feet, from passing trains and equipment.

3. Always face the direction from which a train is traveling. Be alert for loose steel bands or any other items hanging off the train.

4. Be aware of electrical hazards in and around both electric and diesel-electric locomotives.

5. Emergency response personnel are **NOT** to move locomotives or cars.

C. WORKING AT RAILROAD INCIDENTS

1. NO UNITS ARE TO ENTER TRACK AREAS UNTIL THE INCIDENT COMMANDER HAS CONFIRMED THAT ALL TRAINS ARE STOPPED.

2. All railroad incidents involve hazardous materials and proper hazardous material procedures must be followed. All diesel-electrical locomotives carry a large amount of diesel fuel.

3. Ensure that power is removed from railroad power signal wires and power company transmission lines when the wires create a hazard.

4. Do not place any apparatus or equipment within 15 feet of the center line of the nearest track.
5. Emergency response personnel must provide flagging protection if the owner/operator of the tracks cannot be reached to confirm that trains have been stopped. Complete flagging procedures are given later in this chapter.
6. Always have a lookout posted at each end of an incident to warn emergency response personnel if an unexpected train approaches.
7. Before working near, on or under any train that is not derailed, make sure the hand brake is set on at least two cars and that those cars are chocked. Brake handles (wheels or levers) should be marked with barrier tape (fire- line tape) when the brakes are applied. Both sides of a wheel are to be chocked with Metro chocks or railroad company chocks. Railroad employees must confirm that they will not move the train. Railroad employees must also be informed that brakes have been applied and wheels chocked. Hand brakes are only to be released by railroad employees.
8. On passenger trains, head-end or ground power must be shut down before working under or between any passenger cars or locomotives.
9. Engine rooms of diesel-electric locomotives must be treated the same as high-voltage transformers. No one is to enter an engine room until the engine is shut down. Emergency personnel can shut down engines with one of the fuel shut-offs on both sides of the locomotive or on the cab fire wall. Batteries must also be disconnected by switches in the cab or engine room.
10. Do NOT apply water down a diesel-electric locomotive exhaust stack during a stack fire.
11. Do NOT open doors on boxcars, hopper cars and other freight cars without the assistance of railroad employees. Contents may crush or engulf firefighters. Some doors also require forklifts to prevent the door from falling off and crushing emergency response personnel.
12. Do NOT attempt to move or uncouple cars without assistance from railroad personnel.
13. Do NOT operate any valves, relief devices or mechanical devices on tank cars without the assistance of railroad employees.
14. Never put your body over or in front of any valve, gauge or other opening.
15. Always use the safety handles, platforms and ladders provided except on damaged tank cars. When operating on a damaged tank car, utilize emergency response unit ladders and not the ladder attached to the tank. Do NOT stand, step or cross on the center sill (area where two cars are joined together) or coupler. Do NOT jump off cars; use ladders.
16. Beware of fuses when fighting fires in locomotives and railroad buildings.
17. Use care when working around twisted rails. Twisted rails tend to return to their original shape when released.

Picture 5-1: This picture depicts how important it is to establish scene safety on a railroad incident. Notice the vehicles parked in the collapse zone.

Picture 5-2: While placing responders on an overturned rail car may be necessary to affect rescues or to perform work on a tank car, Safety Officers must control the amount and location responders are positioned. Consider if this incident happened at night. Notice both the open window and the 50 ft. drop off the "side" of the car into a ravine. Notice also the power lines on the rail car. These Lexan windows will not support the weight of an average firefighter.

D. ELECTRIFIED TERRITORY

1. Look for downed wires when approaching the scene.

2. When an incident involves Amtrak's catenary system, responding units are excluded from entering the track area until overhead power has been removed and an on-site Amtrak employee (electrician or lineman) grounds the system. PRIOR TO THE POWER BEING REMOVED AND THE SYSTEM GROUNDED, THE CURRENT IN THESE LINES CAN ARC UP TO THREE FEET AND THIS WILL ELECTROCUTE ANYONE WITHIN THREE FEET OF CATENARY LINES. Examples of incidents involving the catenary system are derailments, collisions, train fires, downed wires and damaged catenary poles. The

overhead power should not be removed for small scale incidents where the overhead wires are not affected. Examples of this type of incident are small fires not involving trains or catenary poles, people struck by trains and medical problems in the track area. If there is any doubt about the need to remove power, have the power removed. Trains must always be stopped when units are operating in the track area. This procedure is mandatory whether or not power is removed.

3. It is extremely dangerous to approach a train that has derailed but is still in contact with the catenary system. The current received from the catenary system normally returns through the train wheels, to the tracks and back to the substation. When a train has derailed, people entering or leaving the train may be shocked because they will replace the rails as the path for the catenary power returning to the sub-station. Occupants of the train are to remain on the train until power is removed and the system grounded.

4. Stay clear of impedance bond devices in the track bed. High-voltage power will flow through personnel, tools or equipment in contact with broken or loose leads at impedance bonds.

5. When in electrified territory, responders and victims must first step down on the ground before going from one train to another. This precaution will ensure that the return current will not momentarily shock persons by inadvertently completing the circuit. Do not use ladders or other objects to bridge between two trains.

   Other precautions include:
   - Never climb over or on top of a train in electrified territory.
   - No one is to remove ground ladders from the apparatus or raise aerial ladders without direct orders from the Incident Commander or Operations.

6. Machine rooms and roof areas of electric locomotives must be treated with the same concern as high-voltage transformers. No one is to enter machine rooms for any reason, other than rescue, until power is shut down. Electric locomotives must have their power removed before emergency response personnel operate in or around them. Amtrak employees remove power by lowering and latching down the pantograph or by de-energizing and grounding catenary systems. When an Amtrak employee shuts down the locomotive by lowering the pantograph, there is still a severe electrical hazard in the catenary wires above the locomotive. Most electrical equipment remains thermally hot long after it is no longer electrically hot. Batteries should also be disconnected by switches in the cab or machine room.

7. Standard rescue techniques used with lower voltages, such as ropes and poles, CANNOT be used with catenary systems. The hot stick used with Metro CANNOT be used with the catenary system. Do NOT use any type of extinguisher, including Class C extinguishers, on any energized catenary equipment.

8. The heat from an exhaust stack fire in a diesel-electric locomotive can burn through catenary lines and cause live wires to drop.

E. FLAGGING AND LOOKOUT PROTECTION

All Train movement should be stopped by contacting the specific railroad that owns and operates the tracks. The railroad dispatchers can be contacted by phone, or through on-scene rail employees. Conductors and some other railroad employees have portable radios, and there are mobile radios in locomotives. Be aware that requesting that rail traffic to be shut down may take some time. The emergency phone number for the railroads will contact the railroad’s private police force. The Police will then need to relay the request to the Dispatchers. The Police and Dispatchers are frequently in different cities and communication between the two is more cumbersome that it may first appear. It may take up to an hour for all rail traffic to be shut down. This is a Firefighter safety issue and must always be considered.

Flaggers/ Lookouts are to be posted whenever responding units are working in the track area. If railroad personnel are providing flagging protection, emergency response personnel lookouts must still be posted. NEVER EVER pull Fire Apparatus across railroad tracks to block for an incident, park adjacent to the railroad roadway with warning devices activated and place flares near the gauge of the track. Flagging/lookout protection is always required while operating on the Railroad roadway. The following procedure must be followed for Flagging the Railroad Roadway:

Two officially-marked and highly visible people with a radio and three 30-minute flares will walk down the tracks from each end of the incident. This will require two flagging teams with a total of four people and six flares. Those walking away from the incident site should not walk on the ties or between the rails but rather along the roadway where they can safely clear if a train suddenly appears.

In the District of Columbia, two people will walk until they are one mile from the incident. In Maryland and Virginia, two people will walk until they are two miles from the incident. If the tracks divide before the one or two-mile distance is reached, a third flagging team must cover this second set of tracks.

If a train is spotted or heard, while walking or when in position, light a flare and wave it horizontally back and forth at a right angle to the tracks. If a flare is not available, wave a light, object or empty hand horizontally back and forth at a right angle to the tracks. Continue waving until the train stops or passes. The engineer should acknowledge any stop signal by one or more blasts of the locomotive horn. If the train passes, use the radio to warn units on the scene. The Flagger/Lookout is to make notification on the operations channel, then notify dispatchers on the dispatch channel. Dispatchers will rebroadcast the warning on all channels, including those used by EMS and mutual aid units. The notification will include which track the train is on and from which direction it is coming. Drivers hearing the broadcast will sound their air horns. All personnel are to immediately leave the track area. Where possible, they are to travel in a direction perpendicular to the tracks. Do not try to go along the tracks because trains and debris will travel in that direction if a collision occurs. If a train is approaching the scene, there will be no time for the incident commander to confirm the warning signal from the lookout. Units must leave the track area as soon as they have any indication of an approaching train.

In the rare case that flagging personnel must leave their position, place the three flares in an area away from combustibles. They should be stacked in such a way that they are “stepped” with the bottom flare ignited first. Ballast can be used to secure the flares in position. Light the bottom flare so that as it burns down, it will ignite the second and the second will ignite the third (or top) flare. This method will provide about 90 minutes of flare burn time, allowing time for the railroad dispatcher to be contacted. Some railroads direct trains to stop, and then proceed slowly when they see an unattended flare. Other railroads direct trains to slow down and prepare to stop. This is why flagging protection is always required.

G. GRADE CROSSINGS

Grade crossings are locations where highways and railroad tracks cross at the same level (grade). Use extreme caution when operating vehicles around grade crossings.

All railroad companies post Emergency Notification Signage (ENS) at crossings. These signs include a unique Department of Transportation identification number, the road name and the milepost location of the crossing as it relates to its position on the railroad, not the surface civil road.

Take these safety precautions at grade crossings:

1. Some jurisdictions mandate that emergency vehicles always stop at grade crossings, even if the gates are in the up position. Do not enter a grade crossing unless there is enough room on the other side for your vehicle to clear the tracks.

2. Always be alert for a second train from either direction.

3. Never drive around gates.

4. Do not try to judge a train's speed.

5. Even without sirens sounding, background noise on apparatus can prevent drivers from hearing a train horn. Roll down windows and silence air horns and sirens when crossing tracks.

6. If unable to completely see the track from the vehicle's cab, send someone ahead on foot to ensure that no trains are approaching.

7. Get out of your vehicle, and away from the tracks, if it stalls on the tracks while a train is approaching. If no train is approaching, post lookouts and call the railroad that owns and operates the tracks.

8. The officer in charge of the unit is responsible for challenging the driver if the driver seems to be ignoring an oncoming train. The officer is also responsible for ensuring that all safety precautions are followed when crossing tracks.

9. Federal and state regulations require that Emergency Notification System signs with identifying information be posted conspicuously at rail grade crossings. These signs provide information to road users so that they can notify the railroad company about emergencies or malfunctioning traffic control devices at crossings.

Picture 5-3: This picture is an example of an Emergency Notification Signage (ENS), which includes a unique Department of Transportation identification number, the road name and the milepost location of the crossing as it relates to its position on the railroad.

The ENS Signs must meet certain requirements, such as:

Key information:

(1) telephone number
(2) “Report emergency or problem to __”, or similar text
(3) Crossing identification number (DOT#)

Minimum design requirements:

(1) 12 inches wide by 9 inches high
(2) retroreflective
(3) legible text with minimum character height of 1 inch
(4) white text, blue background, white border
a. DOT# may be black text on a white background

Minimum placement requirements:

(1) Conspicuous
(2) Doesn’t obstruct other signs or signals
(3) Doesn’t limit view of an approaching train
(4) If mounted separately, use breakaway post

CHAPTER 6 – OPERATING PROCEDURES

A. GENERAL OPERATIONAL CONSIDERATIONS

Railroad incidents present unusual situations that are not found on typical fire and rescue responses. The following general operational considerations will facilitate the safe handling of railroad incidents.

All railroad collisions, derailments and fires should first be considered hazardous material incidents until otherwise verified. When it is determined that hazardous materials are a concern to rescuers safety, the incident commander should ensure that all hazardous material procedures are adhered to during its mitigation. Treating a railroad incident as a hazardous materials incident requires units to approach the scene with extreme caution. Hazardous material considerations may also require companies to do doing nothing except identify materials involved, isolate the scene, deny entry and evacuate surrounding areas. There is not only hazardous material cargo on the trains, but all diesel-electric locomotives carry a large amount of diesel fuel. The 12,000 volts delivered to electrical locomotives on passenger trains is also a hazard.

Regardless of the severity of a railroad incident, extreme caution must be taken when approaching railroad facilities and roadways. Day-to-day operations by railroad personnel present hazards that must be accounted for by following safety procedures.

First arriving units will usually find and interview the railroad employees on the scene. Railroad employees, particularly the workers on the train, are a valuable source of general information about railroad equipment and operations. They will also have information about unusual conditions and hazards at an incident. Railroad employees can also call for resources such as hi-rail vehicles and rescue trains. Conductors of freight trains will have a consist for their train. Railroad employees are usually in radio contact with train dispatchers and other railroad resources. Always first ascertain if rail traffic is stopped in the affected area. When initial arriving unit personnel have completed their consultation, direct the rail employee to the incident commander. If their services are still needed by first arriving units, the incident commander must be informed that railroad employees are on the scene.

Standard cribbing is not adequate to restrain the heavy loads found in railroad equipment. When cribbing is necessary to stabilize train cars, construction machinery, such as bulldozers, can be used to support leaning rail cars. Railroad ties can also be used for cribbing.

Access to railroad property is often very limited. Fire apparatus that are not actually performing a service should stay back from the scene. Whenever possible, personnel should walk to the scene with equipment and keep apparatus off access roads. This will allow access for apparatus that will be required to come to the scene as the incident progresses. Additionally, EMS units will need to transport victims away from the scene. EMS units approaching the scene can also carry firefighting personnel to the scene.

Police helicopters can provide many services on railroad incidents. First, they can provide an aerial view of the incident by photograph, sketch, or an observation of the scene. If an incident scene is several miles long, the helicopter may be the only way to quickly gather information. Helicopters have powerful lights and thermal imaging capabilities that can be used to find railroad crews, passengers and victims in the area of the incident. Small fires and hot spots can also be detected. If a hot or cold product leaks from a tank car and flows on the ground, or into a stream, the thermal imaging may be able to detect its location. The use for thermal imaging is still under development. The thermal image can be videotaped for study on the ground. Helicopters and fix wing aircraft can provide a video feed to command vehicles. Helicopters can also be used to transport victims from remote areas. It should be remembered that all of the helicopters have restricted capabilities in that they are limited by weather conditions and topography of the scene.

Moving equipment and personnel to the scene of a rail incident will always be a potential challenge for emergency responders on a rail incident. Metro Emergency Tunnel Evacuation Carts (ETEC) can operate on railroad tracks and can be quickly used in incidents found in the common corridor were the railroad and Metro tracks run parallel. Consider also using flat cars or other rolling stock for this purpose.

Where available, the Operation Respond Emergency Information System (OREIS) computer software can be used to identify the contents of individual railcars carrying hazardous materials. OREIS provides information on the properties and characteristics of the railcar’s hazardous contents. OREIS also provides schematics for Amtrak’s rolling stock, the Association of American Railroad’s chemical list and a railroad telephone directory. Unrelated to railroads, OREIS can also be used to identify contents of a limited number of highway trucks carrying hazardous materials.

The American Chemical Council’s CHEMTREC system (1-800-424-9300) has direct access to the CSX train cargo data base. CHEMTREC can immediately convey information on railcar contents.

B. GENERAL COMMAND CONSIDERATIONS

Railroad incidents involve a wide variety of situations, rolling stock, equipment, structures and geographical locations. There are no specific procedures for railroad incidents. Incident commanders must use established safety guidelines and the following general procedures to develop a plan of action for each incident.

The first arriving unit should inform the incident commander of the exact location of the incident, which railroad owns and operates the tracks and which railroad’s rolling stock is involved. If possible, the incident commander should confirm the information by using maps. If no railroad employees are available to identify the train(s) involved, then the responding units must give the incident commander a locomotive number or several car numbers. The incident commander will then directly call the owner/operator(s) of the affected tracks for information on the train and its contents. If a cell phone is not available, contact can be made through fire department dispatchers.

The establishment of a unified command structure is imperative. Designate a command post location up wind and away from the incident. A well-defined incident command using the principles of the Department of Homeland Security, National Incident Management System/Incident Command System will give you the tools necessary to control the emergency. In the first phases of the incident, designate a survey team to determine the extent of the rail emergency and request additional resources. Incorporate the expertise of railroad representatives as they have extensive railroad knowledge to help with the mitigation of the incident.

Ensure Flaggers/Lookouts are posted at each end of the incident.

The incident commander will request the railroad representative to perform the following actions:

1. Stop trains if emergency responders will be operating in the roadway. Set up flagging/Lookout protection.

2. Shut-off electrical power if catenary or signal wires are affected, or if emergency operations will put emergency response personnel at risk of shock or electrocution.

3. Give to the Railroad dispatcher the name of the incident commander, phone number and location of the command post.

4. Request that the appropriate railroad officials responding to the incident report to the command post. Request Fire Department Rail Safety Liaison, if available within the jurisdiction.

5. If no railroad employees are available at the scene, give the locomotive number or several car numbers to the Railroad Dispatcher so the train can be identified. This will begin the process of identifying what is carried on the train when a train consist is not available at the emergency scene.

The extrication of entangled victims or the isolation of harmful effects of the hazardous material is usually one of the first strategic objectives of the incident commander. It is critical that all responders are equipped with the appropriate Personal Protective Equipment (PPE). Eliminating electrical hazards is also critical.

Due to the large size of rail incidents, the Incident Commander should separate the incident scene into geographic divisions/branches and/or functional groups/branches. If the rail incident involves commuter trains, the Incident Commander should establish a Medical Branch.

Since the control of a rail incident can require the application of resources for a long duration of time, the incident commander must be able to manage a considerable amount of logistical support. The IC can expect to have difficulties in quickly acquiring specialized equipment and coordinating the movement of equipment and personnel to the scene.

Lastly, the news media will play both a positive and negative role. A train accident is always a newsworthy event. The Incident Commander should anticipate a large turnout from these groups and have a Public Information Officer on the scene early. At the major rail derailment in Kensington, Maryland, the cell phone capacity in the local area was overwhelmed by news reporters in the first thirty minutes of the incident. On a positive note, the media have helicopters that can capture good scene video pictures in which the incident command may use to gain information about the scene. The media may also be able to give emergency information to the public if requested.

Picture 6-1: This picture was taken during a train derailment which occurred in Japan. Notice how close the apparatus is parked to the derailed train. Even though the rescue effort lasted for three days, there are still too many people in and around the rescue efforts. It is unknown if there were any structural concerns with the building. This picture also depicts how important it is for the IC to establish scene safety and control accountability on a railroad incident.