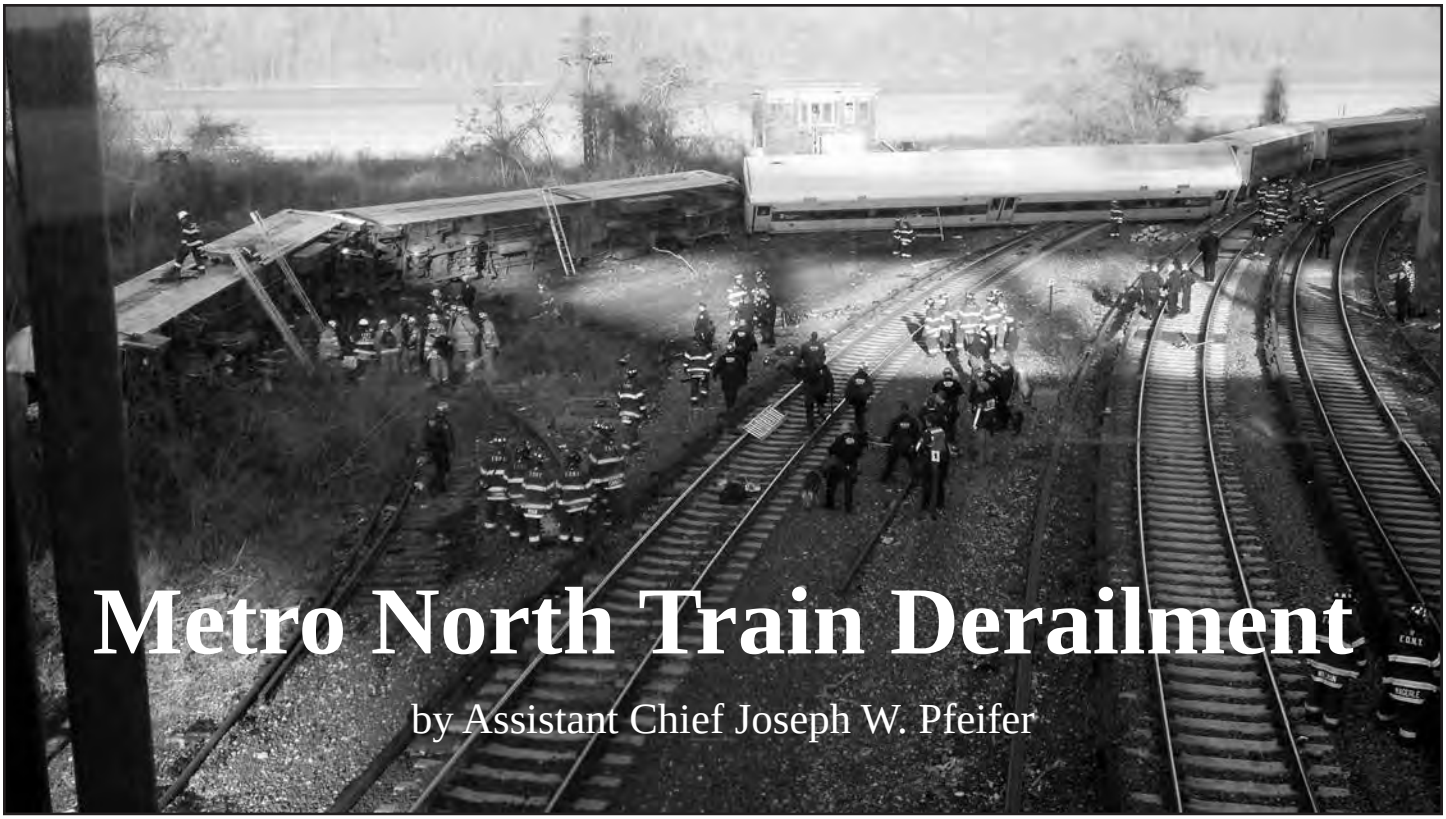

photo by FDNY AV Unit

Metro North Train Derailment

by Assistant Chief Joseph W. Pfeifer

An overview of a jagged stretch of the Metro North railcars lying on their side, along the Hudson River in the Bronx.

On December 1, 2013, at 0719 hours, a southbound Metro-North passenger train out of Poughkeepsie, New York, en route to Grand Central Terminal, derailed just north of the Spuyten Duyvil Railroad Station in the Bronx. The National Transportation Safety Board (NTSB) reported the train's estimated speed of 82 mph, around a sharp, 30-mph curve, as the cause of the accident.

The derailment occurred with 115 people onboard; four were killed instantly and 59 others were injured, 16 of whom were in critical condition. Fire and EMS units responded quickly, rescued those entangled, treated the injured and transported scores to local hospitals. Everyone who was alive at the time FDNY reached the derailed train is still alive today, due to the professionalism of Firefighters and emergency medical personnel.

Adhering to the *City Incident Management System (CIMS)*, FDNY joined with NYPD, Office of Emergency Management (OEM), Metro-North Railroad, Office of City Medical Examiner (OCME), NTSB and other City and State agencies to manage this incident. The level of collaboration and coordination demonstrated the readiness of FDNY and New York City to respond to major incidents. This article highlights core disaster response capabilities of emergency operations, communications, incident management and inter-agency recovery operations that were carried out at the derailment.

Emergency operations and pre-hospital emergency care

In the still of a cool fall morning, a South Bronx neighborhood awoke to the screeching sound of a derailing seven-car passenger train that was pushed from the rear by one locomotive. As FDNY units arrived, they witnessed a jagged stretch of disjointed railcars lying on their side along the chilly Hudson River. Accessing the crash site was difficult, until Firefighters cut a hole in the perimeter fencing and guardrail. This provided a means for access and egress, served as a control point for deployment and funneled patient movement to treatment and transport areas.

As units entered the crash site, they were met with about three dozen people who had self-evacuated and had to be escorted across the tracks. However, the main concern was to rescue those seriously injured who could not evacuate on their own. Members of the first-alarm units had to climb into each car and navigate a train that was on its side, which

(Left) Overhead view of the derailment area and Command Post.

photo by CTU

Multi-agency representatives managed the derailment incident.

meant stepping over seats to reach victims.

Units extricated and removed dozens of victims. These tasks took a steady supply of backboards from fire apparatus and ambulances, as well as backboards carried by EMS' Logistical Support Units (LSU) and Special Operations.

Coordination and Sectoring were essential to this successful emergency operation. Initially, two Sectors were created by dividing the scene in half. Train cars 1, 2, 3 and 4 were one Sector and cars 5, 6, 7 and 8 comprised the second Sector. This was further divided into medical groups, a stabilization group for car 4 (see Rescue Operations sidebar on page 6) and a Haz-Mat group that off-loaded diesel fuel from a leaking locomotive (car 8), which was on its side. With 1000 gallons of diesel fuel leaking, Haz-Mat and Squad Companies captured the leaking fuel and siphoned it into a container. Engine companies stood by with a foam line as a precaution. Once the locomotive was placed back on the track, this no longer was a problem. However, it took hours before this transpired.

Sadly, four fatalities were found ejected or under the train. In the case of one fatality, FDNY members tunneled under the car to free the remains. Each fatality was kept in place or turned over to NYPD and OCME for investigation. Fearful that there were more fatalities, the Unified Command requested that the entire area be searched. FDNY conducted at least three extensive searches of the area on foot with thermal imaging cameras. NYPD used a thermal imaging camera from their helicopter and placed divers in the water. These searches were extremely important since Metro North does not maintain a list of passengers' names. Law enforcement also was asked to check missing person reports. Final searches were conducted the following day when each train car was uprighted.

photo by Gary Hearn

Firefighters use the rail cart to move equipment.

At a multi casualty incident (MCI) with traumatic injuries, the Medical Branch Director shall inform Unified Commanders periodically regarding the number of patients and how many red-tagged remain on the scene. The Medical Branch Operations Chief shall coordinate with the Unified Command regarding what is needed to facilitate patient care and transportation. It is expected that all red-tagged patients will be removed from the scene within 30 minutes.

It was extremely helpful having an accurate count of patients sorted by tag color posted on the EMS Command Board at the Interagency Command Post. Patients' transportation had to be prioritized and distributed across area hospitals. Red-tagged patients are triaged to go first to increase patient survivability and avoid "reverse triage syndrome," where the emergency medical care system is overcrowded with less severely injured patients.

Agencies worked together to coordinate patient removal, not just from the train, but also in getting patients into ambulances and to a designated hospital. The Unified Command structure was especially useful when several agencies' vehicles blocked ambulance egress. However, at a future incident, a more proactive stance should be taken to control, assess and remove emergency vehicles that block patient transport corridors. EMS deployed the Mobile Emergency Response Vehicle (MERV) and the Mobile Respiratory Transport Unit (MRTU) to assist in transporting patients. Victim extrication is not complete until the victim is in an ambulance and on the way to the hospital.

Communications

Communications is the key to effective incident management. Realizing the severity of the situation, dispatchers filled out the alarm and special-called a rail-cart Engine, Rescue Company and Squad Company on the primary response ticket. The rail-carts as-

Tagging of Patients

Triage is structured based on S.T.A.R.T. (simple triage and rapid treatment) that allows for the assessment, sorting and ordered treatment/transportation of patients at the scene of a mass casualty incident. S.T.A.R.T. comprises five categories, based on a quick evaluation of a patient's respiration, circulation and mental status. The breakdown follows:

- **Red Tags**--*Immediate.* Presents with one of the following: After repositioning the airway of a patient without respirations (apneic) once, respirations resume; a respiratory rate greater than 30 breaths per minute, an absent radial pulse; unconscious or unable to follow simple commands. All infants considered patients and do not meet Black triage criteria.
- **Orange Tags**--*Urgent*. Presents with all of the following: Patients are spontaneously breathing with a respiratory rate less than 30 breaths per minute, radial pulses are present and the patient is conscious and able to follow simple commands and, in the opinion of the EMT or Paramedic assessing the patient, the patient's signs and/or symptoms suggest a need for urgent treatment and transport.
- **Yellow Tags**--*Delayed.* Presents with all of the following: Non-ambulatory patients (the injury prevents them from walking or walking complicates their presenting problem); a respiratory rate less than 30 breaths per minute; radial pulse is present; can follow simple commands.
- **Green Tags**--*Minor.* Ambulatory patients with minor injuries.
- **Black Tags**--*Deceased/moribund.*

Rescue Operations

by Battalion Chiefs Stephen Geraghty and James Yakimovich

Upon arrival at the Spuyten Duyvil train derailment, the scope of the incident appeared that numerous technical rescues would be needed for extrication. However, gathering situational awareness and communicating this among the Rescue Battalion, Rescues and Squads quickly lowered expectations. Two Rescue Task Forces (RTF)--made up of a Rescue Battalion, Rescue Company, with second piece Collapse Rescue Unit, Squad Company, SOC Support Ladder and Rescue Medic--were formed and operated under a Rescue Branch that reported to the Operations Chief.

Primary searches of the train cars indicated a need for two possible technical rescues. One was for a deceased male victim under the third car. Air bags originally were requested to flip the train car off the victim; instead, members were able to extricate him from the interior of the train by removing the train window against which he was wedged. The second fatality was a female, who had her leg caught under the train. The Hurst tool was called for, but not used. The ballast--rocks used to secure the ties--were taken away and her leg was freed and she was removed. Two other victims were left in place for the medical examiner.

Rescue 3 reported to the Rescue Battalion that during primary searches, they discovered stability problems with the fourth car. Hearing this, Deputy Chief John Jonas, Division 7, who was the Incident Commander at the time, special-called one additional Rescue Company and an additional Squad Company. When they arrived, Squad 41 and Rescue 1 members were ordered to secure the car. Squad 41 secured one end of the car to the fifth car's coupling with a griphoist and sling, while Rescue 1 secured the other end of the car to a light tower via a griphoist and wire rope. Secondary searches then were performed safely.

Due to the extended use of Rescue Companies, Chief of Department Edward S. Kilduff ordered Rescue 6 staffed and placed into service. This policy is enacted when the incident will be an extended one and commitment of special units will be ongoing.

photo by Gary Hearn

photo by Steve Spak

(Left) Rescue Task Force members shore the fourth rail car. (Right) The Hazardous Materials Group off-loads a diesel fuel leak from the locomotive.

sisted in victim removal, as well as the transport of members, tools and equipment. At FDNY Headquarters, FDOC called Metro North directly to confirm the severity of the derailment. This was followed by early requests from the arriving units for additional specialized units and a second alarm.

Calm, concise and descriptive messages were transmitted on both the tactical and command channels, as well as the Department radio. Communications with other agencies were made face-to-face. However, one communication difficulty was discovered by EMS when attempting to communicate from the Command Post to the transportation area a substantial distance away, making it too far for low-power, point-to-point handie-talkies. Since then, EMS Chiefs and Officers are equipped with high-power Post radios that are able to overcome terrain and distance challenges.

Good communication is not simply about radio technology, but also relies on clear terminology to create a common operational picture for first responders. A lesson learned to enhance communication and coordination is to physically number each train car with spray paint, starting with the lead car as number one. Each car's unique, stenciled, four-digit identification number is an alternative, but is more difficult to remember. Train car identification methodology should be transmitted to all agencies for coordination.

Incident management

At complex events, the practice of incident management is an emerging process that is constructed from the bottom-up, as well as from the top-down. With people still inside the train cars and others wandering injured on the tracks, the first-arriving units took command and ordered all train traffic stopped and power off. These units attained situational awareness, assessed the wreckage, directed the walking injured to triage and began to assist the more seriously injured patients. EMS personnel established triage, treatment and transport areas for a major MCI.

Initially, a Command Post was established at track level by Deputy Chief John (Jay) Jonas, Division 7, for tight resource management. As the incident expanded, Assistant Chief John Sudnik, Manhattan Borough Commander, moved the Command Post to the pedestrian bridge overlooking the tracks. From this vantage point for incident management, Assistant Chief Joseph Pfeifer, Incident Commander (IC), took command and assigned Chief Sudnik as the Operations Section Chief and EMS Chief Roberto Colon as the Medical Branch Director. This allowed the IC to collaborate with other City and State agencies in setting strategic objectives and inter-agency directions, while the Operations Section Chief coordinated tactics with the Medical Branch and geographical Sectors.

A Unified Command was formed early, which proved to be a valuable method for managing this major incident. By having response agencies within "arm's distance" of each other, they were better able to share information and coordinate efforts. FDNY, NYPD, OEM and Metro-North were within sight and voice contact at the Command Post, which created favorable conditions for collaboration and incident management.

As the scope of incident became known, then-Fire Commissioner Salvatore J. Cassano with Chief of Department Edward S. Kilduff responded to manage strategic and political objectives with City and State elected officials. Chief of Operations James E. Esposito, with the assistance of Abdo Nahmod, Chief of the Bureau of EMS, commanded operations. Inter-agency objectives were set for search and rescue, patient medical care and removal, train stabilization, locomotive fuel leak mitigation, crime scene investigation and site security. Geographical Sectors and task forces were formed to accomplish these goals.

Inter-agency recovery operations

After the last patient was removed and searches were complete (except for under the train), the incident transitioned from a rescue to a recovery operation and accident investigation. An inter-agency meeting was held at 1300 hours by OEM. The Unified Command remained intact, but the NTSB now was taking the lead in the investigation with support from the NYPD.

During this first meeting, NTSB explained the accident investigation process; FDNY reported on the status of the searches, patient count and the fuel leak; NYPD spoke about the investigation and victim missing hot line; OCME outlined how the fatalities were going to be moved; OEM talked about the family reception center; and Metro North discussed getting train traffic moving on an adjacent rail and the plans for lifting the derailed train by crane. This information was captured in an "Incident Action Brief," which was assembled by FDNY. However, in the future, this Brief will be tasked to OEM or an Incident Management Team.

By the next day, all eight train cars were lifted upright, the ground under the train searched and the train removed from the scene. The accident is estimated to have cost more than $9 million in damages and required the collaboration and coordination from multiple agencies.

Though the Metro-North train derailment on December 1, 2013, caused serious injuries and the tragic loss of life, FDNY resources performed well. Members' efforts related to patient care, train stabilization and incident mitigation, as well as precautionary safety actions, kept the incident from escalating. This derailment identified several factors that facilitated smooth inter-agency operations, while suggesting a few points to enhance responses in the future.

Members are urged to review the following *references*:
- "The Griphoist-Tirfor," by then-Battalion Chief Raymond M. Downey, in the 4th/99 issue of *WNYF*.
- "Using the FDNY Post Radios," by then-Battalion Chief Peter J. Hart, in the 1st/2007 issue of *WNYF*.
- "Emergency Rail Carts," by Deputy Chief Peter J. Hart, in the 4th/2008 issue of *WNYF*.
- "Bronx Units Confront Horrific Bus Accident," by Deputy Chief Joseph N. Carlsen and Battalion Chief Patrick M. Ruddick, and "EMS Operations at Bronx Box 75-8998, March 12, 2011," by EMS Captain Thomas Luby, in the 4th/2011 issue of *WNYF*.
- Office of Medical Affairs Directive 2012-01, January 6, 2012, Modified S.T.A.R.T. Triage.

Lessons learned/reinforced

- It is said that "tools equal function." Units that brought medical supplies and backboards were ready to function as medical care providers. As early as possible, incoming units should be informed regarding what tools to bring to major incidents.
- Several procedures and protocols were positively reinforced during the incident. As far as inter-agency interactions, Unified Command was set up early, per CIMS, and many responders confirmed that being in proximity to representatives from other responding agencies greatly assisted in information exchanges and overall cooperation. Within the FDNY response, a second Command Chief, a dedicated Operations Section, use of the Command channel and incident Sectoring were very useful. Finally, close collaboration between Fire and EMS resources facilitated the highest level of patient care.

About the Author...

Assistant Chief Joseph W. Pfeifer is a 33-year veteran of the FDNY. He is the Chief of Counterterrorism and Emergency Preparedness. He holds Masters degrees from the Harvard Kennedy School, Naval Postgraduate School and Immaculate Conception. He is a Senior Fellow at the Combating Terrorism Center at West Point and the Ash Center for Democratic Governance and Innovation at Harvard University. He writes frequently for WNYF *and is published in several books and journals.*

Department Order No. 78, December 3, 2013

Job Well-Done

The Department would like to extend its sincere thanks and appreciation for a job well-done to all members who operated at the Metro-North train derailment, which occurred in the Bronx on Sunday, December 1, 2013. Once again, you demonstrated your bravery, skill, determination and compassion, while rescuing trapped victims, treating and transporting the injured and recovering the remains of those who died in this terrible accident. Your hard work has further enhanced the already sterling reputation of this great Department.

By Order of: **Salvatore J. Cassano**, Fire Commissioner
Edward S. Kilduff, Chief of Department