Montgomery County Fire and Rescue Service

POST INCIDENT ANALYSIS

Major Medical &

Technical Rescue Incident

Montgomery Mall

Incident Date: May 23rd 2013

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POST INCIDENT ANALYSIS
MAJOR MEDICAL INCIDENT

Summary

A partial collapse of a section of parking garage at Montgomery Mall resulted in one fatality and injuries to three construction workers. A section of reinforced concrete weighing 55,000 lbs. shifted while workers were in the process of preparing it for removal, pinning two workers, one of which was a fatality and one of which was a Priority 1 patient. Montgomery County Fire Rescue Services (MCFRS) personnel, including a Technical Rescue Team response, worked more than six hours to remove these victims. There were also two other patients who were not trapped or pinned as a result of this incident. This Post Incident Analysis has been written to provide an analysis of this event and to present lessons learned.

Introduction

On Thursday, May 23, 2013 at 1:46 p.m. the Montgomery County 911 Center received multiple calls for a partial collapse of a parking garage structure at Westfield Shoppingtown Montgomery (commonly referred to as Montgomery Mall). Callers described two adult male construction workers who were pinned, with one of them unconscious. The Emergency Communication Center (ECC) quickly dispatched the Building Collapse assignment for 7101 Democracy Boulevard. Crews arrived within 2 minutes of the initial call, promptly confirming the circumstances as reported to ECC.

MCFRS personnel confirmed reports that construction crews were removing the interior portions of the parking deck when a catastrophic event caused a large section of concrete to shift, pinning these two workers. One was killed instantly while the other was severely pinned by his left arm more than 12 feet off the floor, initially un-supported. This incident quickly grew in scope and complexity requiring the entire assignment of on-duty Montgomery County Fire Rescue Service Technical Rescue Team personnel. Anticipating a campaign event, a call was issued for specific additional off-duty resources from the Maryland Task Force 1 Urban Search & Rescue Team. As a local event, the Incident Commander built out the functional components of the Incident Command System combining the responding command staff, private sector resources, Montgomery County Government agencies and state resources into the network of decision-makers. Combining the subject-matter expertise of on-site construction personnel with the Montgomery County Fire Rescue Service Technical Rescue Team leaders provided stabilization and eventual resolution to the incident.

Initial responding Advanced Life Support (ALS) personnel maintained patient contact with the pinned worker throughout the entire incident, and patient care transitioned well with the TRT medical assets and eventually with the experts from the University of Maryland Shock Trauma "GO Team". The GO Team is an advanced resuscitative team that is capable of responding to the scene of seriously injured patients, and is a tremendous asset of the Maryland Medical System. He was extricated approximately 4 hours and 5 minutes after the first 911 call, and transported by Maryland State Police Helicopter to the R. Adams Cowley Shock Trauma Center at the University of Maryland in Baltimore for additional treatment. The other two live victims included an adult male with chest pains who was treated and transported to a local Emergency Room (ER) by MCFRS personnel, and another adult male with moderate orthopedic injuries who was taken to Suburban Hospital in a co-workers' vehicle prior to the arrival of the fire rescue units.

Background/Unique Circumstances/Problems

This incident provided a complex rescue scenario challenging the responding resources and network of supporting agencies to work together for a good outcome. Built in 1968, Montgomery Mall is a two-level structure with more than 1.2 million square feet of retail, restaurant, and assembly (Movie Theater) space. The entire mall sits on 60-acre site near the intersection of Democracy Boulevard and the I-270 Spur. There are a total of five vehicular access points to Montgomery Mall from the surrounding streets: one on the Democracy Boulevard side, two on the Westlake Terrace side and two on the Westlake Drive side. A ring road links the entrance drives with all of the parking facilities. A bus transit center is located in the northwestern portion of the site near the entrance drive off of Westlake Terrace. Parking for Montgomery Mall employees and patrons is provided through a combination of at-grade parking lots, several two-level parking decks (one level of elevated parking structure over an at-grade parking lot), and one, 3-level, above-ground parking structure which fronts the Westlake Drive side of the complex. The collapse occurred in this 3-level parking structure.

Montgomery Mall has recently been working though a major development project that will add approximately 400,000 square feet of additional retail and restaurant space in the area of the 3-level parking garage. To complete this addition, construction crews have to dismantle some sections of that parking garage, place a tower crane in the area that has been opened, and expand the food court and movie theater areas westward, toward Westlake Drive. On the date of this collapse, construction crews were engaged in disassembling sections of the top level of the parking garage to make way for the tower crane.

On-Scene Operations

The initial dispatch at 1346 hours included the standard Structural Collapse assignment as recommended by CAD. This dispatch was for Medic 726, Ambulance 710, Engine 726, Rescue Squad 741, Aerial Tower 751, Battalion Chief 702 and Recon 731. The units were assigned to 7-Golf for operations. Immediately after dispatch, there was a tremendous amount of radio traffic with command staff and other resources checking up as responding, and several units staffed with Technical Rescue Team personnel attempting to determine the ability of Technical Rescue Team vehicles to respond.

About 4 minutes after dispatch, Battalion Chief 702 was forced to order radio silence so that Engine 726 could give their Initial On Scene Report (IOSR).

> "*Engine 726 is on the scene. I've got the second level parking deck; it appears to be a double 'T' that has collapsed. I have a confirmation of two trapped. I'm going to have command and we'll call it Montgomery Mall Command."*

While Engine 726 set out to ensure the parking garage was completely evacuated of all construction workers, Medic 726 entered the garage in order to determine the status of the injured persons. The crew of Medic 726 placed themselves at extreme risk by entering this unstable area, but this was a calculated risk that the crew measured carefully using the "Risk a Lot to Save a Lot" mantra that has been taught and reinforced throughout MCFRS. Medic 726 quickly determined that there were two trapped victims, with one of them obviously dead and the other was awake and alert but with his left arm severely pinned. Medic 726 quickly requested that Command initiate a request for response of the "GO Team" from the University of Maryland Shock Trauma Center in Baltimore.

Engine 726 had a tremendous challenge with multiple priorities and multiple hazards. These included construction workers still engaged in their work assignments, unaware that a collapse had occurred. Several pieces of gas- and diesel-powered construction equipment (air compressors, generators, etc.) were operating on several levels of the parking garage, potentially producing vibrations. And there was no working fire alarm system for rapidly ordering an evacuation.

After gathering information from the job foreman and other construction workers, Engine 726's crew of three split up and worked to cover as much area as possible and evacuate and the structure and mitigate those issues. Rescue Squad 741 and Aerial Tower 751 arrived shortly afterward and after getting a briefing from Medic 726 and Engine 726, the crew of Rescue Squad 741 began to examine the extent of the entrapment of the live victim in order to develop an initial action plan.

Battalion Chief 702 arrived and took the command from Engine 726 and assigned Engine 726 Office-in-Charge to be the Incident Scene Safety Officer with his crew assisting him, and Rescue Squad 741 was assigned as the Reconnaissance Group Supervisor with Aerial Tower

751 supporting that role. A few minutes later, Rescue Squad 741's Officer in Charge provided the following situation report and initial action plan:

> *"Recon to Command, what we have is one "T" section of the parking deck – stand by – we're getting pictures to you now – what we have if you look at the parking deck – there's 3 or 4 sections. We're going to need, when Urban Search and Rescue gets here, all of their jacks. I'll work with them when they get here. I heard a request for the 'Go Team'. They will be needed. This "T" section is buckled, and it's going to be extremely difficult to be able to lift this thing. It's being supported now by one cleat. I do need something in here to get this gentleman up off his feet, because he's starting to go in and out. I'm afraid that he's going to go unconscious, so I'm going to work with my driver and (Aerial Tower) 751 and try to come up with something to support him."*

Plan of Action/Strategy

Command was initially established by Engine 726 and passed to Battalion Chief 702 in a face-to-face meeting. Battalion Chief 702 retained command of the incident throughout the entire event. Shortly after Battalion Chief 702 took the command there was a deluge of MCFRS personnel arriving on the scene, including Technical Rescue Team personnel and MCFRS command officers and support staff. These personnel were divided into functional groups using the standard Incident Command System model and terminology.

Rescue Squad 741 initially entered the collapse area to determine whether or not there was an immediate intervention that could be done to extricate the live patient using the assets that were on the scene at that time.

The Incident Action Plan that was developed included the following:

- Ensure responder safety by limiting access to the collapse zone.
- Ensure complete evacuation of the structure except for the pinned workers.
- Stabilize the area of the collapse to prevent secondary collapses.
- Extricate the live patient if at all possible.
- Coordinate with the GO Team if an emergency surgical amputation is needed to extricate the live patient.

Extrication

The entrapment of the victim consisted of his upper arm pinched/pinned between two steel I-beams that where bearing weight of the double T between the two “t’s”. The I-beams where supported on top of the H-frame pipe scaffolding that was being used to support the double T move.

Figure 1 Patient Entrapment Condition

Initial shoring consisted of pneumatic rescue shoring, from Rescue Squads 741 and 703, being placed as an immediate spot shore with diagonal strap tie backs. This was then expanded by additional pneumatic rescue struts with raker braces and cross braces from the MD-TF1 cache.

Figure 2 Shoring Overview

After developing several extrication plans and in discussion with the Go-Team personnel, the extrication consisted of cutting the H-frame pipe scaffolding in the thread segment with a grinder. This allowed the support base, similar to a “U” channel to allow the I-beams to be lowered and the patient freed.

Management Structure

The Incident Command structure was organized as follows:

Incident Commander	Battalion Chief 702
Senior Advisor	Operations Executive Chief
Liaison Officer	Chief 703 Foxtrot
Information Officer	Executive Assistant Chief
Safety Officer	Safety Chief
Operations Section	Operations Section Chief
Technical Rescue Branch	Special Operations Battalion Chief

Communications

Primary operations remained on 7-Golf with operations were divided into Recon, EMS, and Technical Rescue Team. Recon, EMS and Safety operated on Talk-group 7-Golf, while Technical Rescue Team was assigned to 7-Hotel under the direction of Technical Rescue Branch. Later on, Safety was assigned talk-group (7-India) under the Safety Chief, and Rehab was assigned 72-Juliet under (Emergency Medical Services Supervisor 700).

The Emergency Communication Center (ECC) supervisor and ECC staff did an excellent job throughout this entire incident of overseeing communications on multiple talk groups and dealing with a high volume of 911 calls and other calls related to this event. Command provided the ECC supervisor with updates on a regular basis, and as the incident progressed and the possibility of severe weather increased there were updates provided in 30 minute intervals.

Effective radio communications by operations personnel (radio discipline) was severely lacking in the early minutes of this incident, to the point where radio silence had to be ordered in order for Engine 726 to provide the Initial-On-Scene-Report. This lack of discipline can prove hazardous and all personnel must understand the ramifications of unnecessary communications.

During the early stages of this incident, hospital notifications were problematic because various snippets of information funneled to the local hospital from a variety of sources and did not

contain the complete facts. As previously described, one injured worker was driven by a co-worker to Suburban Hospital and he relayed to the staff there that there was a building collapse with multiple, seriously injured people. It took some time for this to be clarified. As described later in this document, communications with Shock Trauma was excellent as it was managed by the Go-Team. Additionally, the Maryland Institute of Emergency Medical Services Systems (MIEMSS) sent a liaison to the Montgomery Mall MCFRS command post to provide updates to Maryland State Police Aviation System Communications (SYSCOM) and the Emergency Medical Resource Center (EMRC).

Division/Group Operations

Initially, Command developed a Recon Group, a Safety Group, and an Emergency Medical Services Group. Upon the arrival of Technical Rescue Team units and personnel, Recon was disbanded and those units were reassigned to Safety. Later, a Rehabilitation (Rehab) Group was established. Under the umbrella of Technical Rescue Team, there were several sub-groups and disciplines represented. This included Staging, Logistics, Shoring, Extrication, and Medical. There is additional discussion of the TRT organizational structure in the Lessons Learned Section of this document.

Figure 3 Scene Arrangement/Layout

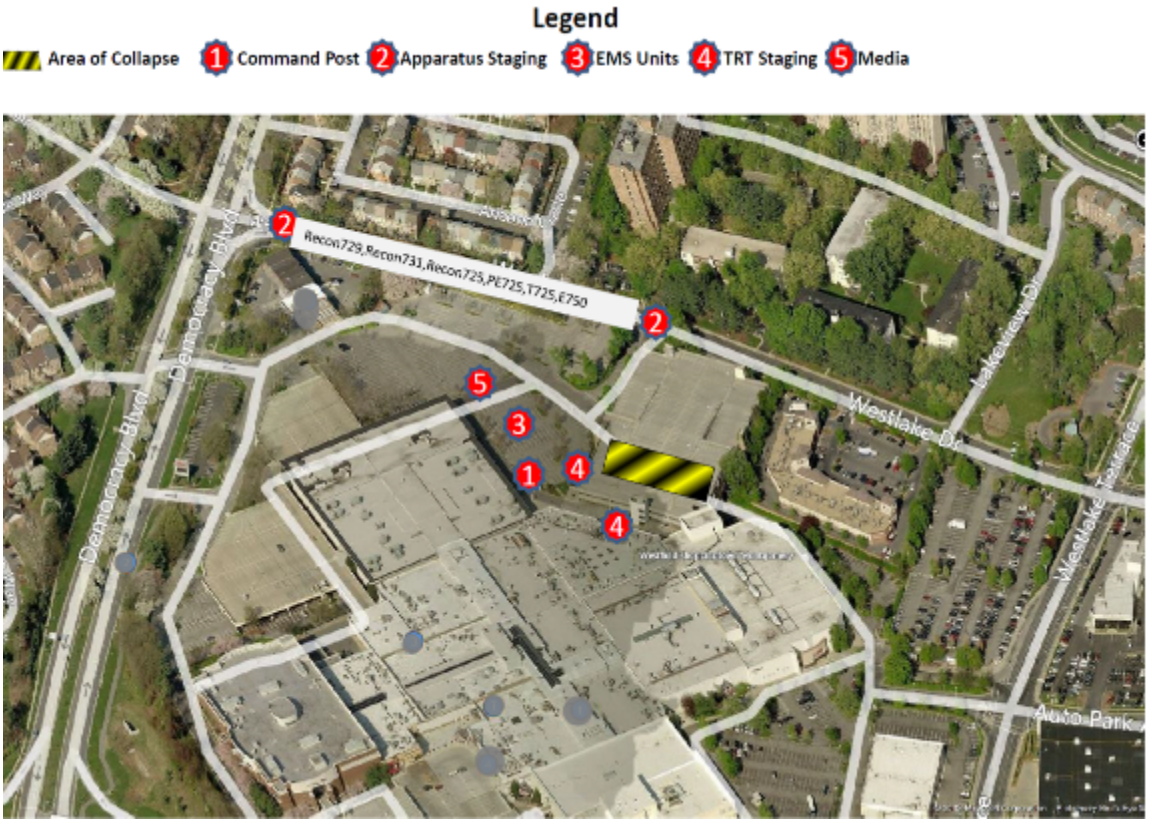

Figure 1: Overview of location of key MCFRS functions in relation to the incident and to the main roadways in the area

Involvement/Coordination with Other Agencies:

Montgomery County Police Department

Within a few minutes of arriving on the scene, a Montgomery County Police Department (MCPD) supervisor reported to the Incident Command Post and asked for information and law enforcement needs. This Police Officer was advised that there was one confirmed fatality and at least on seriously injured worker, and the most pressing need for law enforcement would be to ensure that a section of Westlake Drive be closed and that closer in, vehicular traffic be directed away from the area of the garage. There were many positives from this initial interaction between MCFRS and MCPD, and there was coordination in several areas that are described elsewhere in this report. Several MCPD command officers came to the Command Post but as the event continued they leave the Command Post and became hard to locate.

MCPD Detectives also stopped by the Command Post and gathered facts and this made for effective information sharing and helped to smooth the transitions from Rescue to Recovery and from Recovery to Investigation.

However, the lack of continuous presence by a Montgomery County Police Department (MCPD) Executive Staff Officer in the MCFRS Command Post made coordination with MCPD increasingly difficult. Eventually, both the MCFRS and MCPD Command Post vehicles arrived on the scene and this double resource created difficulty in coordinating activities. Due to the nature of this incident (workplace fatality pinned in an area where there was a long-term, complex extrication of a live patient) there was a need for unified command with MCFRS as the initial lead agency to an eventual transition to MCPD as the lead agency. This did not occur as smoothly as it should have.

Montgomery Mall

Early in the incident, the General Manager from Montgomery Mall reported to the Command Post and offered whatever assistance was necessary. This was a tremendous benefit as he was able to provide site plans and blueprints for the affected areas, and direct Montgomery Mall resources to support the rescue effort, including security officers, facility engineers, maintenance staff, administrative staff, and conference rooms. The General Manager or his deputy remained in the MCFRS Incident Command Post for the duration of Fire/Rescue Operations. The value of this liaison relationship cannot be overstated.

Shortly after the General Manager arrived at the Command Post, there was a brief, direct conversation between the Incident Commander (IC) and the General Manager about the whether or not the rest of Montgomery Mall should remain open for business. The decision was made that yes, it would but this would be re-evaluated as the incident progressed. This was an important aspect of this operation as continuity of operations must be a consideration in all emergencies as part of the Incident Stabilization priorities.

Construction Companies

Key representatives from Whiting Turner and the other companies associated with the construction project arrived and were granted access to Technical Rescue Team commanders after going through the Liaison Officer (Chief 703 Foxtrot). These personnel were helpful providing blueprints of the garage in addition to subject matter experts from the working construction site.

Shock Trauma (Go Team) and the Maryland Institute of Emergency Medical Services Systems

One engine company and two EMS units were sent to Cabin John Regional Park (0.5 mile from the incident scene) to meet with the two Maryland State Police helicopters which brought most of the Go Team personnel and equipment. Upon being transported to the Command Post, the Go Team personnel were immediately met and were briefed by the Technical Rescue Team Medical Group Supervisor and were able to rapidly enter and assess the scene and the trapped patient. Other Go Team members responded to the scene in assigned vehicles. A liaison officer from the Maryland Institute of Emergency Medical Services Systems (MIEMSS), reported to the Command Post, provided the names and vehicle descriptions of these additional Go Team members to MCPD in order to allow them access to the scene.

Maryland Occupational Safety and Health (MOSH)

The MOSH representatives arrived about two hours into the incident and, like the construction company representatives, after going through the Liaison Officer were provided access to the Technical Rescue Team Command staff.

Office of the Chief Medical Examiner

Once the victim had been removed from the building he was released to the Medical Examiner Investigator and Montgomery County Police Department detectives. As the incident had evolved these entities were provided with regular situation status reports. This helped the transition from rescue to recovery to investigation. This relationship with the Office of the Chief Medical Examiner made the process of body recover and removal seamless.

Montgomery County Government Health and Human Services Mobile Crisis Team

About 90 minutes into the incident, there was a recognized need for short-term mental health assistance for the uninjured construction workers. Many of them knew the deceased worker but were unaware that he had died, and all needed to be interviewed and debriefed by MCPD Homicide Detectives. A coordinated effort between MCFRS and MCPD brought a response of three Mobile Crisis Team personnel to the scene, and they effectively used a Montgomery Mall conference room to conduct their operations while a Basic Life Support unit stood by.

Support Functions:

Safety

Engine 726 initiated the safety function as they did the initial check of the structure, ensuring that all possible sources of vibration were identified and eliminated. This proved quite challenging as there were construction crews operating on all levels of the garage and there were no systems in place to notify all of these workers of the need to immediately cease operations and evacuate the structure. Engine 726 then became the Safety Group Supervisor and that position quickly changed leadership and number of assets assigned over the next 30 minutes of the incident. Ultimately, the Safety Chief held that position and had 2 units and a deputy safety officer under him. They were responsible for frequent perimeter checks, as well as coordinating with the Technical Rescue Team Safety Officer.

Safety was also an integral part of planning for the likelihood of severe weather. As the afternoon progressed, the National Weather Service forecasted a line of severe storms to move through Montgomery County between 1600 and 1700 hours. This line of storms was predicted to be capable of producing high winds (up to 60 MPH) and heavy rains. The following were developed by Safety, in consultation with the affected parties:

(1) Plans for broadcasting to all response personnel on the scene about the impending arrival of the storm
(2) An evacuation plan,
(3) A shelter-in-place plan, and
(4) A return to rescue operations plan.

At approximately 1650 the predicted storm hit the area, but fortunately the winds were not as high as expected and an all-clear was declared about 10 minutes later.

Logistics – Equipment/Supplies

This is covered in the Technical Rescue Team Section of this Post Incident Analysis Lessons Learned.

Staging Operations

This is covered in the Technical Rescue Team Section of this Post Incident Analysis Lessons Learned.

Accountability

There was no effective accountability system in place on this call. This is extremely troublesome given the fact that this is a low frequency/high risk event that at any one time had more than a dozen MCFRS personnel operating in the area imminently at risk of secondary collapse. Even more troubling is the fact that many of these people in the collapse zone were self-dispatched or had responded while off duty and therefore were not associated with a response unit, making accountability even more challenging. This is a point stated in the Lessons Learned Section from Operations.

Rehabilitation

All operational personnel were funneled through rehab at different times throughout this operation. Canteens 703, 704, and 705 provided significant quantities of drinks and snacks to MCFRS, MCPD, and other response personnel. As usual, this resource was well received. Additionally, due to the length of the operational period, MCFRS Command Staff purchased meals for personnel. This was appreciated by all personnel on the scene.

The Technical Rescue Team of the Montgomery County Fire Rescue Services did respond to this complex building collapse and entrapment completing the rescue of a live patient and recovery of a deceased victim. This event produced a set of after action documents which revealed a set of strengths, weaknesses and opportunities for improvement in the response to technical rescue incidents. Capturing those items in a comprehensive method the lessons learned bullet points from the Technical Rescue Team lens examines the roles of the team coupled with improvements stated for future action.

Lessons Learned from the Technical Recue Team (TRT)

Technical Rescue Team Chain of Command

- The Technical Rescue Team Chain of Command was very fluid in the first few minutes.
- Personnel assigned in the Technical Rescue Team Special Operations Team must drill on the roles and responsibilities of the incident objectives and tasks to complete those items.
- The use of command vests would have greatly improved the identification of roles and responsibilities and the key leaders for direction, decision and accountability.

Clear roles of authority for the Technical Rescue Team

- The roles and responsibilities of the Technical Rescue Team Operation Section Leaders (Search, Rescue, and Logistics) need to be clearly identified.
- Multiple personnel were giving direction to the Shoring lead which caused unclear and sometimes contradicting orders.

Disagreements with Technical Rescue Team chain of command

- If personnel do not agree with plans or techniques they should make their position known and accept the decision from their supervisors and discuss their point at an appropriate location and time.
- This type of behavior should never occur in proximity to the patient or other personnel.

Logistics/Staging for the Technical Rescue Team

- Equipment used included Maryland Task Force 1 assets.
- The request for the Urban Search and Rescue (US&R) Maryland Task Force 1 (MD-TF1) rescue cache was made early by multiple personnel.
- This equipment from MD-TF1 was necessary for the successful mitigation of this incident.
- The equipment used was left in place and was replaced by the contractor to minimize secondary collapse possibilities.
- A staging area must be designated with the command point of contact and staff to support this mission.

Equipment tracking for the Technical Rescue Team

- A tracking process needs to be in place early to ensure accountability of all equipment.
- Equipment was used from multiple pieces of apparatus as well as the MD-TF1 rescue cache. This led to additional work to ensure all equipment was replaced.

Equipment Deficiencies for the Technical Rescue Team

- Deficiencies were identified and plans are in place to adjust inventories when funds are available.
- After the incident two rescue squads had inventory shortages for weeks due to the need to order replacement equipment. Spare inventory should be developed to reduce shortage timeframes.
- Technical Rescue Team resources need to be maintained to a specific inventory in ready condition to deploy.

Resource requisitions for the Technical Rescue Team

- Logistics acquired the correct resources from Maryland Task Force 1 that were not available in the normal Technical Rescue Team equipment inventory.

Security in the Hot Zone

- Personnel from the construction site were allowed in the hot zone by unknown authority.
- All unnecessary personnel should be removed unless required for operations.
- Fire/Rescue personnel that are not directly involved in operations should not be in the hot zone.
- Command personnel should report to the Incident Command Post for an assignment.
- The incident command and staff must coordinate a security perimeter with the local law enforcement to aid in control of unauthorized personnel at the scene and traffic flow for resources into and out of the scene.

Dissemination of the Technical Rescue Team Operations Plan and Other Specific Information

- The Technical Rescue Branch Director requires a solid communication plan with group and squad supervisors on the incident objectives and contingencies.
- The Technical Rescue Branch Director assigned tasks and did confirm when some were not completed. Developing a policy task list of first actions in technical rescue would assist as a memory jogger for the operation personnel and command staff.
- The Technical Rescue Branch Director should assign liaisons early to gather information and have a clear picture of non-fire/rescue resources available.

Technical Rescue Team Staffing

- Technical Rescue Team needs to develop Technical Rescue Team Officer criteria and a Technical Rescue Team Officer training program
- Special Operations, in cooperation with Technical Rescue Team needs to develop and disseminate the response policy for Technical Rescue Team incidents. This should include when and how non-consolidated and off-duty personnel should be requested and how they should respond. Additionally, this response policy should address when and how FEMA US&R personnel are recalled for Technical Rescue Team incidents.
- Special Operations, in cooperation with Technical Rescue Team needs to determine minimum staffing levels at Technical Rescue Team stations. Once established they need to incorporate those needs into the scheduling process (e.g. Telestaff).
- Mutual Aid partners need to be verified and typed (using recognized standards) in order to assist on Technical Rescue Team responses in the event of a large scale event.
- The Technical Rescue Team Daily Line-up needs to be modified to identify the Technical Rescue Team Medical Team point-of-contact. This is vitally important to the patient outcome since the term “medic” does not represent universal term or certification and since not all paramedics that are members of the Technical Rescue Team have medical specialist training. In the case of this incident the Paramedic was very proficient in these areas and did an excellent job, but this is not always going to be the case.
- Currently there is not a medical component assigned to the Technical Rescue Team. As a result MD-TF1 Medical Specialist was utilized to provide supervision of patient care on this incident.

Communications (on scene):

- Additional fire portable radios for the Go-Team would have been beneficial.
- With limited portable radio resources the medical team used runners to communicate messages where we staged the Go Team.
- A Communications Unit Leader should have been assigned to facilitate radio interoperability at the scene.

Hot Zone Control:

- The Go Team and Maryland State Police (MSP) Flight Medics should have staged in the warm zone until requested.
- Inappropriate discussion about the fatality was made within range of the Priority 1 patient. While it may be because of the infrequency of having live patients to work around, this isn't acceptable.
- No clear delineation of Hot Zone, Warm Zone and Cold Zone markers were established. This segmentation of the scene provides personnel the anticipation of actions within each zone and provides a footprint to set up resources points such as rehabilitation and staging for supplies.

Medical care of providers:

- The Incident Commander needs to assure rehabilitation service for members working in the immediate hot zone. These services include hydration, rotation between teams, and rest cycles for all personnel engaged in the hot zone activities.

Medical care of the patient:

- Training with subject matter experts prior to the event was critical. Upon arrival, MD-TF1 Medical Specialist (MD-TF1 MS) was able to quickly establish contact with the patient. Observing the conditions, the MD-TF1 MS was able to provide a situational update assessment of the interior garage damage stating the possibility of secondary collapses. Working with the paramedics from Medic 726, ALS care was established in a relatively short period. Once the Go Team arrived, MD-TF1 MS consulted with the lead physician

and escorted them into the hot zone. The physician emailed photos of the injury to the lead arm surgeon at Shock Trauma, who immediately came to the scene with two residents. At one point two MSP flight medics, an anesthesiologist, two surgeons, and two surgical residents, two MCFRS medics, and two USAR medical specialists were at the patient's side.

- Planning for the sequence of patient care is critical and requires a designated medical planner to arrange the resources and paths for a hasty retreat and controlled exit.

- Appoint a Safety Officer in the Hot Zone.

- This event was a single patient trapped. If more than one patient were pinned the medical resources on the scene could not have sustained the patient care for a long duration event (4 hours). Attention is required to develop a depth in the medical response capability to include policy, strategy and tactics techniques and procedures.

- Logistically the Technical Rescue Team Medical Response is dependent on the medications and supplies carried in the normal Advanced Life Support Transport (ALST) unit inventory. These supplies are not adequate for the treatment of patients in complex rescue environment. The gap is the ALST medical supply cache is calculated on a single patient performance platform limiting the inventory of the unit to a just in time supply model. Special Operations medical deployment requires a deep inventory of medical supplies with a greater sophistication in medications carried to treat in multiple complex medical situations.

Lesson Learned from Operations:

- All non-MCFRS personnel should be credentialed and badged at the Command Post before access to the scene and the incident command staff.

- The Go Team had recently been involved in extensive training with the MCFRS Technical Rescue Team and the benefits of that relationship were immediately recognized. Common terminology enhanced situational awareness, and the ability to

integrate medical and rescue operations seamlessly were essential to the eventual positive outcome of this incident with regards to the care of the live patient.

- The MCFRS must find and use an effective accountability tool that is scalable and use this tool on every working incident, no matter the nature of the incident. This tool must also include non-MCFRS personnel required to assist in operations.

Technical Rescue Team Summary of Lesson Learned:

The Technical Rescue Team resources were able to provide adequate care to this patient with the resources on hand, but would not have been able to contend with multiple patients entangled or pinned. There must be some recognition of the medical component of the Technical Rescue Team on a daily basis, *assuming that the end-goal is to rescue victims and provide optimal care in the process*. Alternately, for "normal" Technical Rescue Team responses establishing a Technical Rescue Team specific medical course that would incorporate medical care issues for trench, confined space, etc., those are not part of a normal scope of practice. Medics with that training would still need to be identified for command purposes.

This patient had an extremely successful outcome as a result of a combined team effort for the MCFRS, MCPD, local construction representatives, Maryland Shock Trauma and the Maryland State Police.

Overall Analysis of Incident from the Incident Commander:

The May 2, 2013 partial collapse of this parking structure was a complex and major incident, stressing the entire County for resources. There is also a history of parking garage collapses in Montgomery County. With the exception of a the items in the previous pages under the sub-heading of *Lessons Learned*, this incident was very successful and underscored the time, effort and cost that the Montgomery County Fire Rescue Service has invested in Emergency Medical Services and the Special Operations Team components. The incident command team recommends that the Lessons Learned be examined to determine if there is opportunity for improvements with training, equipment, and/or procedures.

Figure 4 Area of Collapse from the Charlie Side of the parking garage

Figure 5 MCFRS TRT personnel put the shore assembly in place.

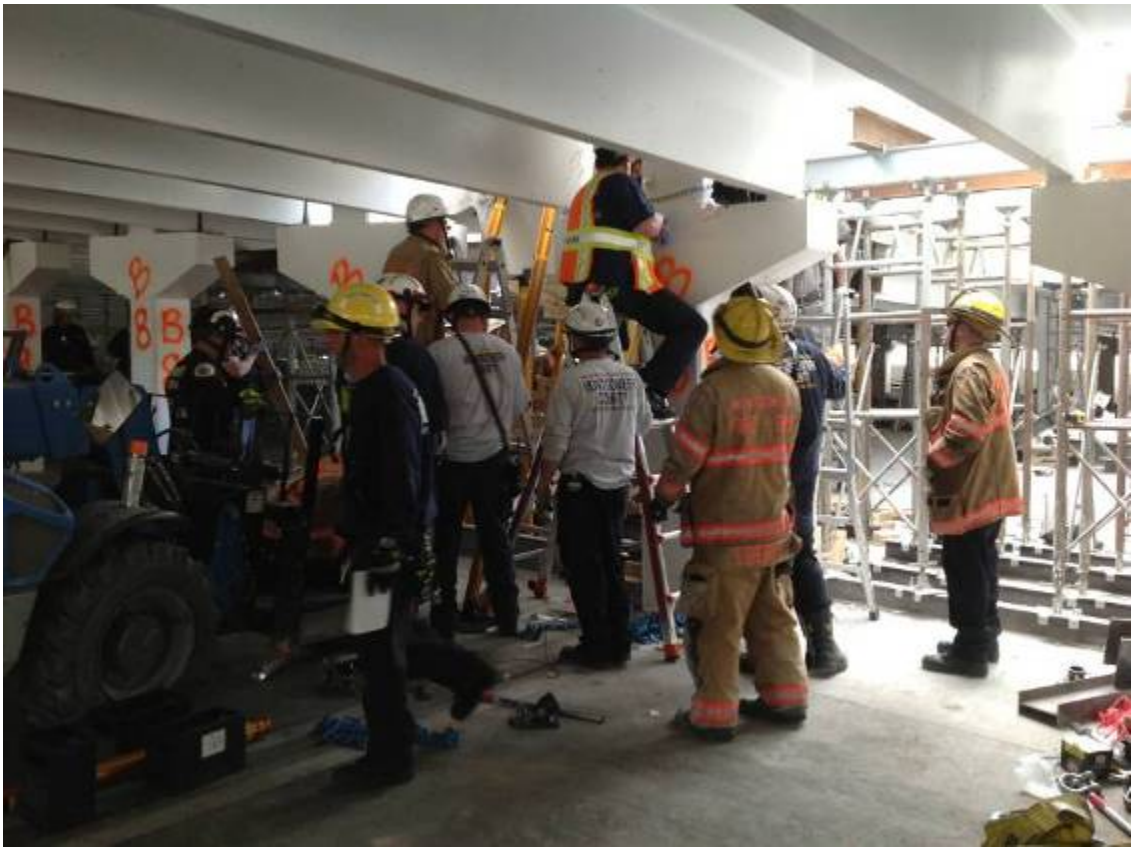

Figure 6 Crew completing the shoring set up from TRT Logistics.

Figure 7 TRT members consult with Shock Trauma “Go Team” Staff.

Figure 8 TRT Members assess and shore the interior area of the collapse