MONTGOMERY COUNTY FIRE & RESCUE SERVICE

POST INCIDENT ANALYSIS

19350 Churubusco Lane

March 14, 2016

ACKNOWLEDGEMENTS

Lead Writer:
Assistant Chief Charles Bailey

Guidance Provided by:
Chief Scott Goldstein
Division Chief Stephen Jones

Assistance Provided by:
Assistance means that the person either wrote a substantial portion of the document or participated in substantial data or media management.
Assistant Chief John Gallo
Assistant Chief Maurice Witt
Battalion Chief Mike Hamilton
Battalion Chief Tracy Coleman
Battalion Chief Monte Fitch
Battalion Chief Michael Baltrotsky
Captain Eric Ramaciotti
Captain Peter Dugan
Captain Jason Masters
Captain Ben Kaufman
Captain Joel Shackett
Lieutenant Dan Maxwell
Mr. Buddy Rogers, SCBA Shop

Input/Review Provided by:
Input means that the person offered ideas, concepts and/or suggestions that were captured in this report even in the absence of official attribution.
Assistant Chief Ed Radcliffe
Assistant Chief Barry Reid
Battalion Chief Mark Davis
Captain Amy Vanderryn

"The story doesn't of course tell the whole truth – what story does? – but perhaps it makes the essential truth…a little clearer."

John Berger

TABLE OF CONTENTS

UNIT LIST

Unknown Emergency: Paramedic Engine 729, Medic 729

Balance of box alarm:

Paramedic Engine 734	Truck 734	
Paramedic Engine 708	Aerial Tower 708	Battalion Chief 705
Engine 753		Battalion Chief 703
Paramedic Engine 731,		

(Paramedic Engine 722 bid on the run. Their response was approved by Battalion Chief 705. They became 3rd due and Paramedic Engine 731 was told to continue as extra.)

Rapid Intervention Dispatch:	Truck 731	Rescue Squad 717
		Medic 708

Fire Task Force:

Paramedic Engine 722	Aerial Tower 735	Air Unit 733
Paramedic Engine 735		Canteen 708

(While Battalion Chief 705 gave Paramedic Engine 722 permission to respond the tactical radio talkgroup operator did not add them to the run. When the task force was requested the computer aided dispatch system showed them as available.)

Second Alarm:

Paramedic Engine 728	Aerial Tower 703	Ambulance 734
Paramedic Engine 732	Aerial Tower 723	Medic 731
Paramedic Engine 717		
Paramedic Engine 703		

Third Alarm:

Engine 726	Aerial Tower 923	Ambulance 722
Paramedic Engine 713	Truck 725	
Paramedic Rescue Engine 709		
Paramedic Engine 723		

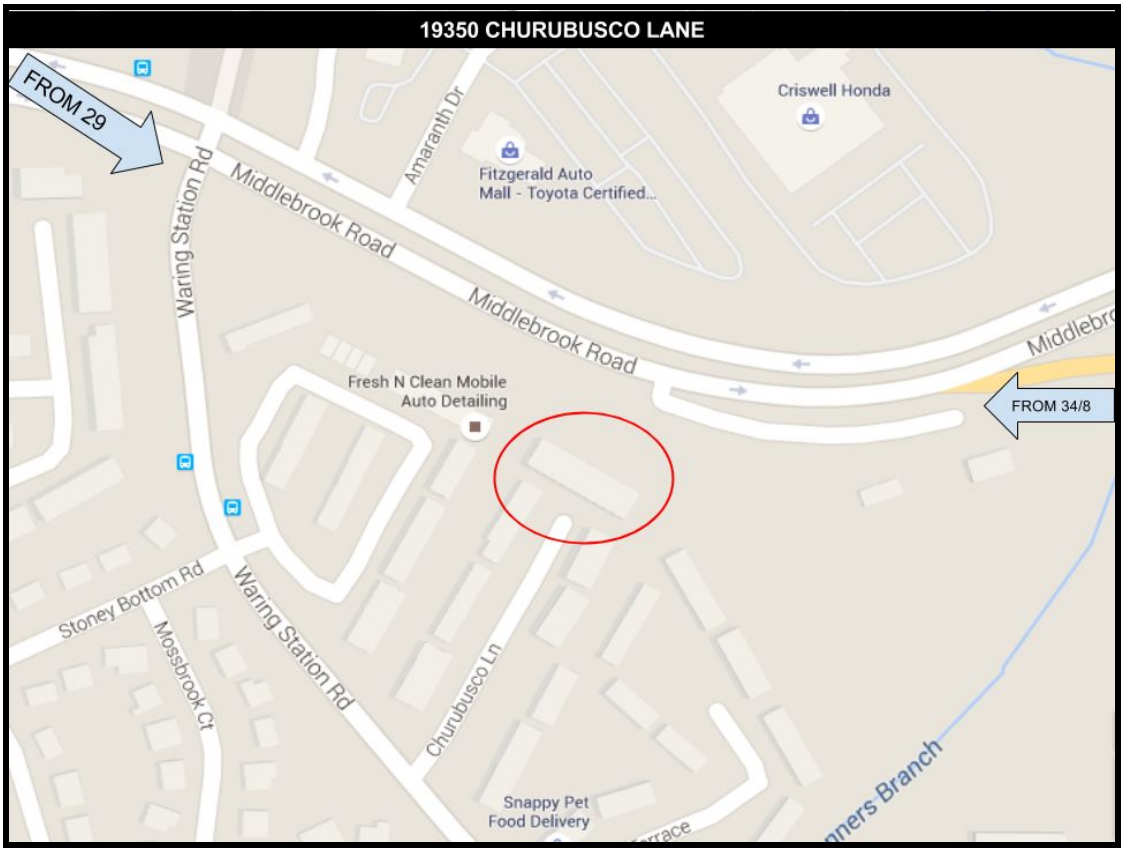
Medic units after Mayday: Medic 735, Medic 703, Medic 713

Additional transport units: Ambulance 708, Ambulance 741-Bravo

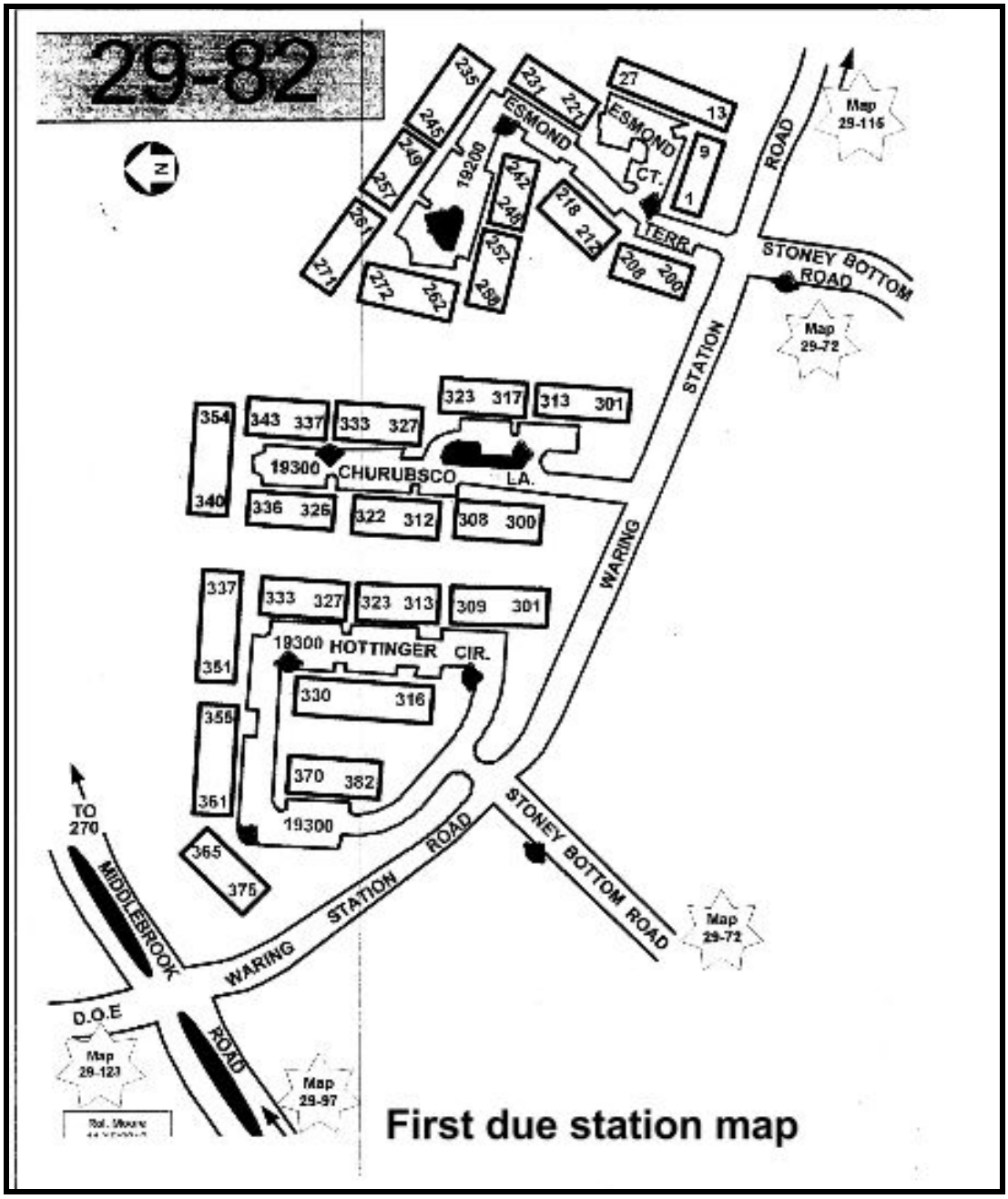
Other Chief Officers and Support Personnel: Fire Chief 700, Volunteer Duty Chief 700, Emergency Medical Services Duty Officer 703, Safety Officer 700, Chief 729, Volunteer Chief 700, Chief 708, Duty Chief 700-Alpha, Duty Chief 700, Health and Wellness Chief 700, Operations Chief 700, Bomb Squad Commander 700, Canteen 717, Special Operations Chief 700, Inspector 722

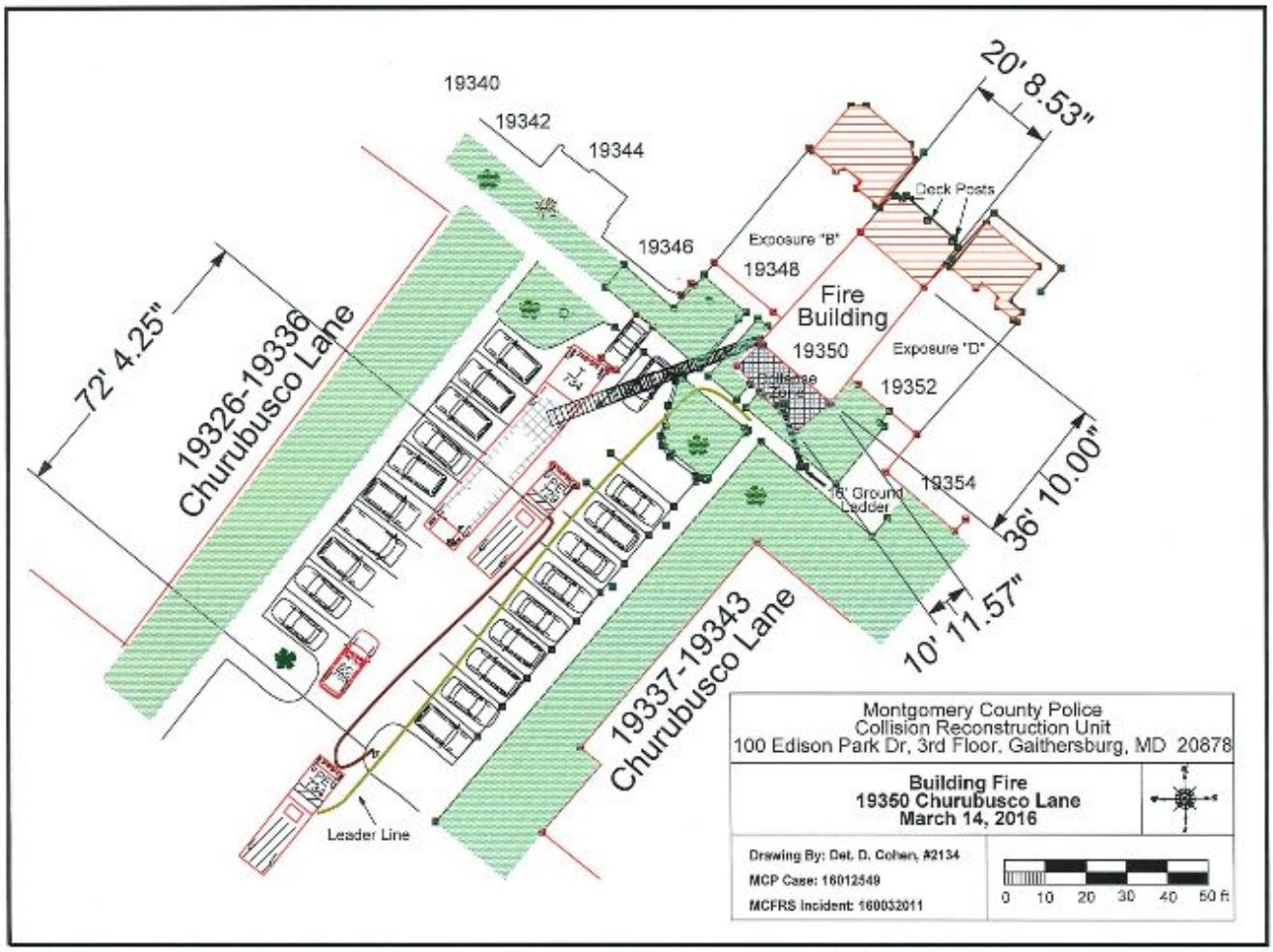
FEI: Fire and Explosives Investigator 740, Fire and Explosives Investigator 741, Fire and Explosives Investigator 742, Fire and Explosives Investigator 732, Fire and Explosives Investigator 731, Fire and Explosives Investigator 710

SITE OVERVIEW

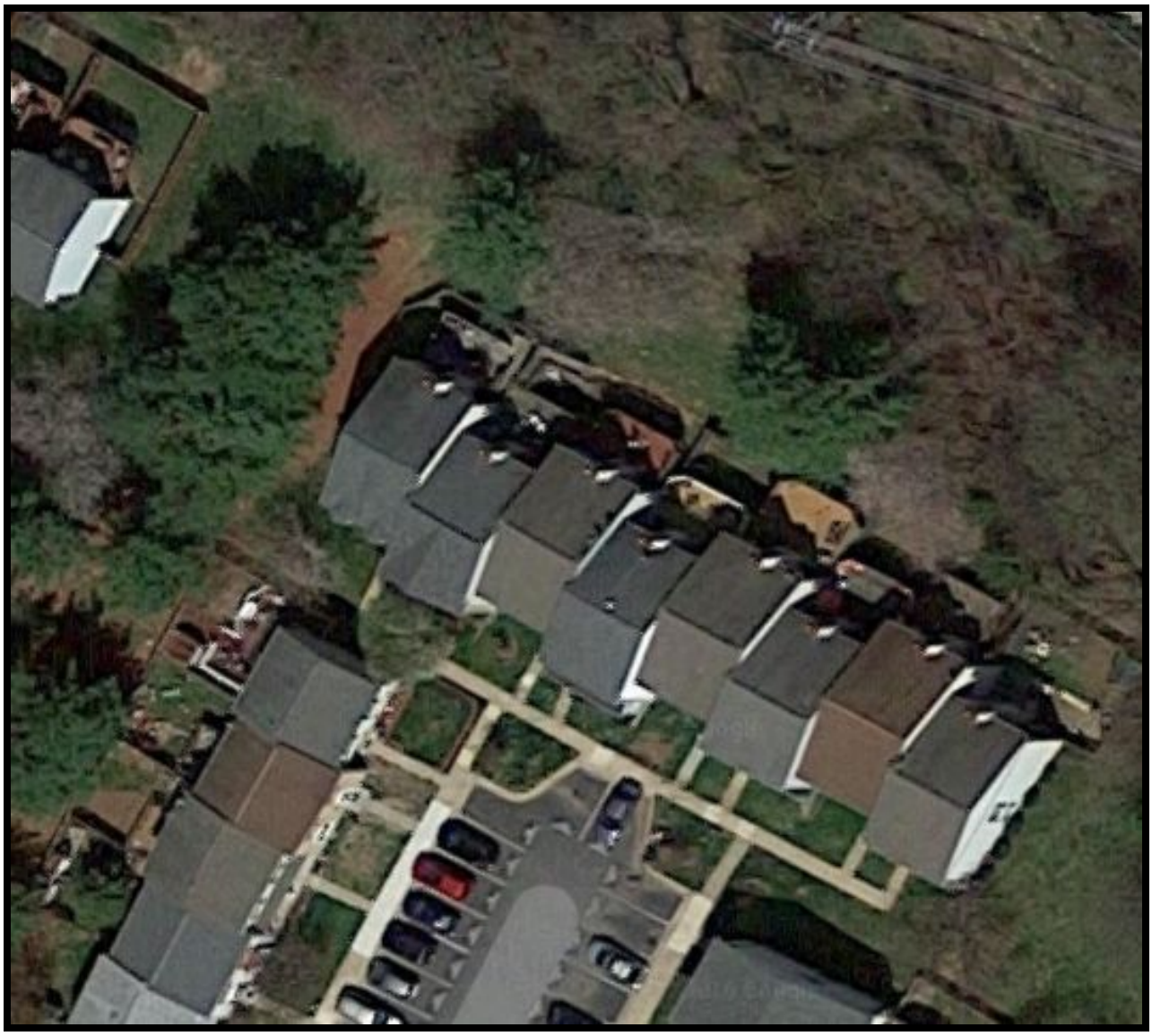


Google map of the area.


29-82
N
ESMOND
ESMOND CT.
TERR.
ROAD
Map 29-115
STONEY BOTTOM ROAD
Map 29-72
STATION
19300 CHURUBSCO LA.
WARING
19300 HOTTINGER CIR.
TO 270
MIDDLEBROOK
STATION ROAD
WARING ROAD
STONEY BOTTOM ROAD
Map 29-72
D.O.E
Map 29-123
Map 29-97
First due station map



Scene layout generated by Montgomery County Police showing final apparatus placement on Side Alpha



Google satellite view of area

INCIDENT NARRATIVE

The fire at 19350 Churubusco Lane most likely started with an unattended candle left burning on a sofa in the basement of a middle of the row townhome.

An occupant (Occupant One), sleeping in the basement, awoke to find the sofa on fire. He attempted to remove the building smoke by opening the sliding glass door in the basement. He then moved back to the sofa and attempted to fight the fire by beating it with blankets.

At some point it became obvious to Occupant One that he would not be able to put the fire out. He then raced up the stairs to warn Occupant Two and Occupant Three. Occupant Two awoke quickly, and exited the structure using the interior stairs. She reported that there was a tremendous amount of heat and smoke in the stairs as she attempted to escape. Occupant Three was difficult to arouse. Occupant Two, realizing that the stairs were quickly becoming untenable, decided to leave the structure. Occupant Three finally woke up, realized what was happening, and headed for the interior stairs but was unable to use them because there was too much heat and smoke. Occupant Three then jumped out of a second story window on Side Alpha, landing uninjured.

On his way out of the front door Occupant One grabbed a portable landline phone and pulled the front door shut. Occupant One then called 911. This call was received at the 911-Center at 00:53:50. Occupant One provided his address to the 911-Center and when asked what was wrong he indicated that there was a fire in his basement. The 911-Center call-taker transferred the call to the MCFRS Emergency Communications Center (ECC). When the ECC call-taker engaged Occupant One the occupant repeated his address and the call was disconnected.

The ECC personnel followed their procedure for 911 disconnects and subsequently dispatched an “unknown emergency” while they attempted to gather additional information. The unknown emergency was dispatched at 00:55:13. While enroute to the scene the units were advised to stage and wait for the police. This advice was given because computer aided dispatch location history for the address indicated that the Montgomery County Police Department should go to provide scene security.

Paramedic Engine 729 and Medic 729 arrived on the scene of the event at 01:02:40. They arrived just under nine minutes from when the fire was first reported and **the fire had a significant burn time** before initial notification. Just as they were arriving the ECC provided information both verbally and via a Mobile Data Computer (MDC) message that there was likely a fire in the structure.

The officer from Paramedic Engine 729 immediately initiated a water supply by using a hydrant very close to the rear of the engine. His initial report was of a "two story middle of the row with smoke showing from Side Alpha and fire showing from Side Charlie." As he announced the on scene report and he ordered his crew to, "...stretch a line to the front." The officer of Paramedic Engine 729 then walked around the delta side of the row of townhomes to conduct a his circle check On the way around he spoke with Occupant One, Occupant Two, and Occupant Three. Occupant Two reported that everyone was out of the house. Paramedic Engine 729's officer reported this fact via radio.

At this point the occupants moved to their car and tried to get out of the neighborhood. On the way out they met the Emergency Medical Services Duty Officer, in his words:

> There was a white vehicle with approximately four occupants that seemed to be leaving the scene. A brief conversation with a police officer told me that the occupants of the white vehicle were inside of the affected townhouse that was on fire. I informed the occupants of the white car to drive out to Waring Station Road and I would meet them there. They agreed and I assisted them with leaving the immediate area. T731 was able to gain the position.
>
> I walked out to Waring Station Road and met up with the occupants of the white vehicle. It did not take long to realize that everyone was ok and accounted for confirming that no one was left inside the townhouse. I attempted to relay this information to the incident commander but there was too much communication going on. I proceeded to gain additional information (# of people living in the house, is everyone accounted for, point of contact for the incident commander and whether or not they will need Red Cross for assistance) from the occupants. As I was finalizing this process, I heard the Mayday transmission.
>
> After hearing the Mayday transmission, I informed the occupants of the white vehicle that I would return to help them.

The rear of the group was bounded by a steep wooded slope. Paramedic Engine 729's officer was forced to walk in the low area, as the slope was slicked by a steady rain. As he approached the fire building he could see fire on the first floor (from the front) and the second floor, with flames lapping over the roof line. Of note, there were tall privacy

fences in the rear of the row. Paramedic Engine 729's officer was not able to visualize that there was also fire on the basement level of the townhome.

As Paramedic Engine 729's officer was making a circle check, the crew of Paramedic Engine 729 stretched the line as ordered. They found the front door unlocked. Once their attack line, a 1 ¾" hose, was charged, they prepared to enter the structure with the intent of putting the fire out. When Paramedic Engine 729's officer returned to the front he removed the kinks from the line.

While this was happening Medic 729, along with MCPD officers, knocked on the doors of the rest of the exposures in the row and escorted the occupants outside. Medic 729 also stretched a backup line to Side Apha, leaving it in position for a later arriving engine.

Layout of the first floor as viewed from the front door. Taken from comparable exposure structure.

On the first floor Paramedic Engine 729 found that the floor was sloping from front to back, the neutral plane that was only about 3.5-4 feet off of the floor, and that of all of the water that they flowed into the overhead spaces, none of it rained back down. The crew advanced about 10 feet inside the structure under harsh conditions, this is where the nozzle person was burned.

The crew backed out to the front, switched around the nozzleman and the backup person then made entry a second time. They found the conditions unchanged and were again unable to make progress inside. Paramedic Engine 729's officer and crew then assumed a position at the front door, initially flowing into the first floor and later into the basement. They would hold this position until the wall came down.

In the meantime the balance of the box alarm was arriving on the scene.

Paramedic Engine 722 had just recently returned to quarters from a medical run and had not yet statused their MDC. They were not included in the initial dispatch. However, the officer was still awake. He heard the alarm being upgraded and ran out to the engine, grabbed a portable radio and requested to respond on the call. ECC told him to switch to 7-Charlie (the tactical radio talkgroup) and bid with the Battalion Chief.

About the same time Fire Station 34 got a phone call on the station phone. The caller simply said, "29 Box." and hung up. The firefighter who answered the phone paged over the station intercom, alerting the rest of the station to the call.

Truck 734 was the next unit to arrive on the scene followed closely by Rescue Squad 729. Truck 734 attempted to get a position in front of the structure in preparation for ladder pipe operations. Truck 734's officer was able to visualize Side Charlie of the as he approached the scene. By his recollection there was significant fire on all three levels of the structure from the rear with flames extending over the roof line. In his mind there was never a question that operations on the main fire building were going to be conducted from the exterior and likely involve the use of master streams.

The townhouse row was at the very end of and perpendicular to Churubusco Lane. There was parking for residents on both sides of the relatively narrow street. Where the street terminated there were two additional parking spaces in the "T", configured such that when Truck 734 arrived they were facing the front of two parked cars. Further complicating their position was the position of Paramedic Engine 729. Truck 734 came

to a stop. Truck 734's officer told the driver to "push" one of the civilian cars up onto the curb using the bumper of the truck. The driver found another way to accomplish the mission.

Once in position the driver, officer, and tiller-person of Truck 734 all dismounted the truck. The driver tried to find the owner of the car that was blocking his desired position. The officer began to conduct his scene size up. He entered Exposure Bravo then went out of the basement slider to visualize the fire building. As he moved through the structure he conducted primary searches.

The tiller-person, after donning the remainder of his turnout gear and turning on his self contained breathing apparatus (SCBA) (he turned it on while it was still in the compartment, as is his practice), moved to the front of Exposure Bravo and began the final donning of his gear. As he was making final preparations, the truck driver found him and called him back to help move the truck. The driver had located the owner of the car in question, obtained the keys and drove the car up onto the curb, making room for the truck.

Truck 734's tiller-person returned to the truck, wearing all of his gear (including his SCBA) and helped to put the truck into what would be its final position. He then dismounted the truck and re-joined his officer in front of the fire building. Truck 734's officer recalls:

> I met with E729 Officer at the front door and discussed holding this position because floor was soft. I sounded floor myself, confirmed it was soft just inside and no progress could be made through there. E734 was extending line through B exposure and I helped pull hose for them. My driver and tiller was working hard to get the truck into position by moving a parked car. [The tiller person] met me in the B exposure and we found heavy smoke coming from basement. We followed smoke to exposure wall but chose not to open wall until a hand line was available.

As Truck 734 was moving into final position Battalion Chief 705 arrived on the scene, confirmed the nature of the event and assumed command of the incident. Battalion Chief 705 had travelled the same route to the fire as Truck 734 so he too had a good view of the rear of the structure. In his mind this was an exterior operation with the focus being the placement of large caliber lines onto the fire from the rear. With that in mind he ordered Paramedic Engine 708, Engine 753 and Aerial Tower 708 to set up operations on Side Charlie of the structure.

When Battalion Chief 705 took his final command position it was behind Truck 734 and he had no view of the structure for the duration of the event.

Paramedic Engine 734 took a position on the hydrant Paramedic Engine 729 laid out from. Paramedic Engine 734 stretched a leader line to the front of the structure. Understanding that the strategy was an exterior attack and that there was no vantage point for attack from the front he stretched into Exposure Bravo, stopping to get permission from command. Once permission was granted, he took a position on the deck of Exposure Bravo and directed his line onto the fire building from that vantage point.

The Volunteer Duty Operation Chief arrived on the Middlebrook Road side of the event and offered to take the supervision of units assigned to Middlebrook Road. Command obliged this request. Paramedic Engine 708, Engine 753, and Aerial Tower 708 were all placed under the control of the Volunteer Duty Operations Chief.

View from Side Charlie of Paramedic Engine 734 attacking the fire.

Paramedic Engine 708 advised that there was no water supply immediately available on Middlebrook Road. They did however, position their engine and began to initiate a fire attack as directed. The deck gun stream was about 200 feet from the structure and its path was blocked by a row of trees. Paramedic Engine 708 still attempted to follow the given orders and placed the deck gun into service. Even though the stream was being broken by the trees it appeared that it was effective.

It was later determined that the stream from Paramedic Engine 708 never had an impact on the fire. The knockdown that Paramedic Engine 708 saw was the result of Paramedic Engine 734's line operating from the deck.

Paramedic Engine 708 stopped their deck gun evolution and began to stretch a handline on a path through the tree line to the rear of the structure. It was about this

time that Paramedic Engine 734 reported that the deck on the main fire building collapsed along with a part of the rear wall. The collapse was such that the deck separated from its point of attachment on the bandboard of the primary fire building and fell straight down, blocking access to the rear basement. Paramedic Engine 708's officer remarked that he was unable to visualize the basement of the fire building.

After Paramedic Engine 708's line was in place he took his crew through the basement of Exposure Bravo and moved to the second floor. Once on the second floor they opened up the attic space and found fire in the attic space. Of note Paramedic Engine 708's officer did not see the smoke or fire reported by Truck 734's officer in the basement of Exposure Bravo. It is unclear why two officers report different conditions in the same space moments apart.

Battalion Chief 705 allowed Paramedic Engine 722 to run the call and he did not place \ Paramedic Engine 731 (originally the fifth due engine) in service. Based on what he saw on approach, Battalion Chief 705 ordered Paramedic Engine 708 and Aerial Tower 708 to take positions on Middlebrook Road and initiate master stream operations from that vantage point. Battalion Chief 705 made two key assumptions:

1. That there were fire hydrants on Middlebrook Road
2. That from a position on Middlebrook Road the master streams would be effective. He was so sure of these assumptions that he ordered the second due Battalion Chief (Battalion Chief 703) to take a position on Middlebrook Road and supervise the Side Charlie operation.

> Enroute to the scene I heard Paramedic Engine 729 report a working fire and at some point reported that there were three occupants in the structure and that all three were out and accounted for. Paramedic Engine 729 requested a Rapid Intervention Dispatch and Task Force be dispatched to assist. As I passed the rear of the structure I observed heavy fire conditions on all three levels of the structure and fire extending into the attic and roof. From the vantage point on Middlebrook Road, it appeared that the most direct and fastest method to attack the fire was with a master stream from Middlebrook Road. I did assume that hydrants would be available on Middlebrook Road and my assessment of the building set off from the road indicated that it would be within reach of a master stream device. (Battalion Chief 705)

Battalion Chief 703 arrived and moved into the command post to assist Battalion Chief 705. At this point neither Battalion Chief 705 nor Battalion Chief 703 were certain of all

the units assigned to the event. Battalion Chief 705 had started the tactical worksheet and had listed the box alarm units, with the units assigned to Side Charlie, however, it was incomplete.

Paramedic Engine 731, hearing the need to establish a water supply for the units on Middlebrook Road, took a position in the court on Hottinger Circle, adjacent to Churubusco Lane and dragged about 400' of four inch hose down the hill and through the woods. Duty Chief 700 and Safety 700 also arrived on the scene and also took positions on Hottinger Circle.

Duty Chief 700 walked down the hill and around to Side Charlie where he saw that the deck was collapsed and that there was still significant fire in all visible areas on all floors from the rear.

At about the same time the Duty Chief was coming down the hill, an adult female arrived at the front of the fire building. She was visibly frantic. She told the crews that her son was still inside. Rescue Squad 729 had to physically restrain her as she attempted to make entry. It was later discovered that the frantic female was the mother of Occupant One. She lived nearby and was alerted to the fire by Occupant Two. By the time she arrived on the scene Occupant One had already left the scene.

A Montgomery County Police officer witnessed the actions of Occupant One's mother and ran over to the Command Post. He told Battalion Chief 705 what he heard and Battalion Chief 705 announced this via radio about the same time as the units in the front of the structure attempted to advise him of the same information.

Battalion Chief 705 then called Paramedic Engine 722. He advised them to search the fire building with Rescue Squad 729. Paramedic Engine 722 reminded command that he was the Rapid Intervention Company. Command did not retract his order. Paramedic Engine 722 however thought that the order was to search with Rescue Squad 717 not Rescue Squad 729. Paramedic Engine 722 then deployed a handline into Exposure Bravo and began to extinguish fire that was on the first floor, "rolling across the ceiling."

There is no indication that either Paramedic Engine 734, on the deck, or Paramedic Engine 708, on the second floor, were aware of the growing fire blocking their egress.

As Duty Chief 700 was moving to Side Alpha he saw Paramedic Engine 722 stretching a handline into Exposure Bravo. He also witnessed crews entering the second floor of the fire building off of a ladder. It was at this point that Duty Chief 700 called Command on the tactical talkgroup and advised that, "...you need to pick a strategy, you have people working from the outside in and the inside out." Battalion Chief 705 answered this transmission in a way that made it clear to Duty Chief 700 that he was not aware of what was happening in the front.

Duty Chief 700 then walked over to the command post to conduct a face to face discussion with Battalion Chief 705. After this discussion, during which Duty Chief 700 attempted to describe the mismatch between what was being ordered and what was actually happening, Duty Chief 700 began to walk back to Side Alpha.

It was about this time that Safety 700 took a position on Side Alpha and ordered personnel who were on the ladder to not go in. He picked up his portable radio to tell command to "...get those guys out...:" when he witnessed a large push of smoke out of the front door, followed by the crash of the second floor onto the first floor. Safety 700 then immediately declared a Mayday.

When the Mayday occurred, Truck 731 was the only unit from the rapid intervention dispatch on the scene and in position to perform rapid intervention duties. The captain from Paramedic Engine 731, unassigned at the time, walked around to the front of the house to see if he could help. The officer from Aerial Tower 708, along with one of his firefighters came out of Exposure Delta to see if they could help. Various other firefighters, drivers, and police officers also converged on the front of the house.

There was a firefighter on a ladder on Side Alpha when the collapsed occurred. He was thrown from the ladder onto the ground. The crew from Paramedic Engine 729 was at the front door flowing water into a hole in the first floor. They felt and saw a rush of fire and smoke as the floor collapsed and the front wall collapsed onto them a second later.

The Captain of Truck 734 later recalled that Inside the structure,

> "The ceiling drywall fell, blocking the window I then moved the drywall to keep my exit open. I then heard a radio transmission that fire was getting better, and the firefighter with me was still flowing water. We located a bed, but found nobody. Then, without warning, the floor falls. Although I was close to wall it moved so fast could not get to the window. The floor fell slanting to the interior towards side C, like a 'funnel'."

When the collapse occurred, it caused an overpressurization of the first floor pushing a dark viscous cloud of smoke across the scene. The Duty Chief saw this cloud as he walked around the back of Truck 734 towards the front of the building. Other units reported hearing a large crash.

Safety Officer 700 sounded the Mayday by radio. Other units reacted to the collapse immediately as well. The Rapid Intervention Team (RIT), at this point Truck 731, began to free the pinned firefighters with assistance from MCPD officers on the scene.

Once the firefighters trapped by the front wall were freed, resources were split between providing care for the injured and initiating rescue operations for the three personnel still trapped inside the structure. The Duty Chief initially focused on ensuring care for those freed. Initially the full scope of the injuries was not known. All but one of the injured, the most seriously injured firefighter who was thrown off the ladder and unable to move on his own, immediately moved in to assist with the rescue operation.

Because resource deployment was not consistent with the verbalized orders command was not aware of the identity of those inside the structure.

Once care was underway for the one known firefighter injury, the Duty Chief attempted to assume control over the rescue operation. The Duty Chief made numerous transmissions to Command, updating him on the status of the operation and providing some direction to the rescue effort.

The three personnel inside the building essentially rode the second floor platform down onto the first floor. The integrity of the second floor remained intact and remained attached to the front wall framing, such that the window they entered on the second floor via the ladder was the same window they exited from onto the ground.

In the fall the crew remained generally together with the firefighter landing on top of one of the Captains. The Captain closest to the window was able to maintain his orientation during the fall and once he checked on the well-being of the other had a solid idea of which way led to the outside.

The firefighter, when he came to rest heard his SCBA vibra-lert activate and though he never lost airflow, determined that he needed to buddy breathe. He managed to connect

his buddy breather hose to his Captain's SCBA with sufficient ease that the Captain was unaware that the maneuver ever occurred until later.

After taking stock of their situation, the crew made their way as a unit towards the front of the house guided by the Captain of Truck 734 who was able to maintain his orientation to the exit despite the fall. Later those trapped recalled that the hose streams that were being directed into the structure and the lights they could see at the front of the structure aided in finding the way out.

Truck 731's officer took a position on the Alpha/Delta corner, and using his thermal imager began to search for the firefighters. The officer from Aerial Tower 708 took a similar position on the Alpha/Bravo corner of the building. After a few moments they saw the three firefighters moving towards the window and assisted them out.

Once all personnel were out of the structure, the focus of operations again shifted, this time to providing medical care. At this point, the crews realized that the number of patients was actually higher than originally thought.

During the Mayday operations command continued to coordinate the fire attack and also ensured that the Emergency Medical Services operations were adequately resourced.

View from Side Alpha after the Mayday was resolved.

COMMUNICATIONS

Overall tactical communications for this incident were suboptimal and while they are not the proximal cause of the collapse or firefighter entrapment, the lack of effective communications hampered the completion of objectives and created a precondition for eventual operational failures. The communications failures can be broken into some key areas as listed below:

Incident Commander

The incident commander had a well formed mental picture of how he wanted the incident to unfold. There were however, multiple points where the intent of the incident commander was misunderstood by unit officers. The lack of clear direction in this fast paced operation complicated matters.

Loop Interruption

Communication is often described using a loop model. A sender sends a message to a receiver who acknowledges and/or responds, closing the loop. On multiple occasions during this incident units interrupted a loop. When a loop is interrupted the communication is left incomplete. Many times the sender gets distracted and never returns to close the loop. This happened multiple times during this incident, causing confusion and delay.

Bandwidth Limits

The number of transmissions that can be executed at any one time is finite. For this incident there were 116 transmissions on the main tactical talkgroup from the time Paramedic Engine 729 gave his initial on scene report on 7-Charlie until the termination of the Mayday.

Along with these 116 transmissions there were an additional 95 transmissions that were “bonked”; not allowed because the talkgroup was busy. Which one of those 95 transmissions contained mission critical information?

Also, the sheer number of transmissions was such that many people simply did not try to talk, including the Emergency Medical Services Duty Officer who had critical information to relay.

As the incident progressed towards the Mayday declaration the transmissions grew in urgency, not so much that people were in trouble per se but rather it seemed that there was growing frustration at not being able to speak. .

Total Number of 7-Charlie Transmissions	118
Number of 7-Charlie Rejected Transmissions (BONKS)	95
Total number of seconds from arrival to end of Mayday	1508
Total Talk Time in seconds	1160.5
Average Transmission Length in seconds	9.834745763
Longest Transmission in seconds	31.3
Shortest Transmission in seconds	0.7
Number of Transmission greater than 20 seconds	9
Battalion Chief 705 >20 seconds	4
Duty Chief 700 >20 seconds	2
Paramedic Engine 734	1
Paramedic Engine 708	1
Volunteer Duty Chief	1

The unit officer has to monitor two channels of information: the radio and what they are sensing on the fireground. The incident commander has many more input channels to consider:

1. Three radios besides the tactical talkgroup.
2. Other personnel in their car.
3. Personnel outside the car knocking on the windows.
4. MDC traffic.
5. What they can sense.

It is important for the incident commander to limit the number of input channels but it is equally important for personnel to limit the number of interactions that they seek to have with command.

Synopsis of Radio Communications

ELAPSED Mayday TIME	3 MIN 20 SEC	200 SECONDS	
NUMBER OF TRANSMISSIONS DURING Mayday	20		
NUMBER OF UNITS BONKED DURING Mayday	16		
NUMBER OF TIMES A Mayday UNIT BONKED	4		
NUMBER OF EB ACTIVATIONS	1		
NUMBER OF INAUDIBLE TRANSMISSIONS	6		
ELAPSED RADIO TIME Battalion Chief 705	86.5	43.25	% OF TOTAL Mayday TALK TIME
ELAPSED RADIO TIME DC700	82.5	41.25	% OF TOTAL Mayday TALK TIME
NUMBER OF TRANSMISSIONS DURING Mayday Battalion Chief 705	10		
NUMBER OF TRANSMISSIONS DURING Mayday Duty Chief 700	5		

Soft Communications

Soft communications are tentative, petitioning, or non-committal statements. There are many examples from this incident but a few of the most egregious are below:

Example 1: “Paramedic Engine 722 to command we are available at the station on that.” Not only is this request to respond inconsistent with FCGO 09-20 there is no request contained within it**.** While there certainly is a petition embedded in the statement the officer is effectively not taking a position, instead pushing responsibility elsewhere.

Example 2: “We need to declare a strategy...there’s operations from the outside in and the inside. So we are going to have to pick one of those and go with it.” This is was a serious failure in that it was the last real chance to stop the interior search operation. The Duty Chief, noticed a disconnect between the declared strategy and what was actually occurring and instead of making a strong statement to force command in a direction he made a very tentative one.

Statements Without Meaning

Statements without meaning are commonplace and innocuous in normal conversation. However, in the context of a fast paced life and death decision making cycle they are ruinous.

Example 1: “Alright 31... 53 is going to start laying out from the intersection I am going to need you to pick it up and bring it back down to us. We are going to lay out from Waring Station. Ya copy.” This statement contains none of the precursors of effective

communications. There is no indication of who the sender is and the conversation is out of context. There is no indication of which “intersection” the lay is beginning from.

Example 2: “Side charlie- I am not sure the deck gun is making it but they are laying more supply line at this time ...from the look of it eight’s out of water.” Is the deck gun stream effective or not? What does laying more supply line matter in the context of deck gun effectiveness? Is eight out of water and if so what does it matter? We have to do a better job of figuring out what we want to say and presenting it in a cogent, concise statement.

PRE-EMERGENCY PLANNING

Pre-plans were not a factor in this incident. However, in the larger sense there is a “pre-plan” truth to be reminded of. A structural members exposed to an uncontrolled fire will fail. When they fail cannot be precisely predicted but it is usually quickly. How they fail is catastrophically. We should consider this sufficient pre-plan information and use it to reduce our exposure to risk.

ON SCENE OPERATIONS

There were many questionable or incorrect operational decisions made during this incident. They are collected and discussed below using a series of declarative statements:

Developing Situational Awareness Matters

Despite the fact that the first due engine was on the scene long before any other units, and despite the fact that all the occupants were reported to be out of the structure, the first due engine officer did not do a complete circle check. Had he continued a few more feet and visualized the rear of the main fire building he would have seen the fire in the basement. Knowing that there was a fire in the basement would have changed his tactical approach.

The Initial Tactical Approach was Wrong

Even though the first engine officer did not know that there was a fire in the basement he did know that there was a significant amount of fire on Side Charlie of the structure. Further, he knew and could reasonably assume that as the fire burned up, flames licking over the roof, it was also burning into the structure. He also knew that there was only smoke showing from the front door. That said the right answer could not be to make an attack through the front door, a likely flow path exhaust port, before the

exterior fire was controlled.

Reassessments Matter

Once the initial attack failed, because of the high heat, flameover, and low neutral plane common in pre-flashover compartments, the crew tried again to do the same thing in the same way that failed earlier; this despite knowing that the floor was already compromised.

There is a Difference Between SOP fires and Non-SOP Fires

In each case, when questioned, unit officers remarked that they were, "...following the Standard Operating Procedures (SOP.)" There is an easy quick test for determining if a structure fire fits into the SOP, in the words of one Assistant Chief, "If you are not stretching a line through the front door it's probably not an SOP fire."

The SOP was derived for a very narrow range of circumstances, namely a residential structure fire where there was a reasonable likelihood of trapped occupants. The initial report of "everyone out" automatically took this fire out of the SOP. The second command assigns units to groups or divisions he/she is immediately usurping the SOP and units stop taking direction based on SOPs and instead rely on the group and division supervisors to provide orders.

STAGING

Units were not provided with a staging area. Further, units on greater alarms interrupted command to ask for orders. This practice is unseemly at best. Units assigned to greater alarms should stage. If no staging area is declared by command appropriate unit officers should have the operational initiative to designate one and act as the staging area manager until relieved by command.

SUPPORT FUNCTIONS

1. The rehab group was under resourced from the beginning.
2. Canteen support was sufficient.
3. Crew rotation was hampered by a lack of personnel and the complexity of managing the affected firefighters.
4. The command officers should have been relieved sooner than they were.
5. The safety officer should have been relieved sooner than he was.

ACCOUNTABILITY

Accountability was not effective during this incident. Units freelanced and command was not aware of the accurate location of most unit for most of the critical moments of the incident. Additional information is provided in the analysis section.

BUILDING CONSTRUCTION

The structure is a two story middle of the row townhome which featured a walkout style basement, meaning that while two full stories are visible from Side Alpha of the structure there are three full stories on Side Charlie.

Per the Maryland Tax Records, this structure was built in 1984. The livable square footage is listed at 1540 square feet with an additional 300 square feet of finished basement space. Exterior finishes consisted of aluminum siding, exterior wood trim and “3-tab” asphalt shingles. A pressure treated deck was added which was supported by a double 2” x 10” beam and three 6” x 6” posts.

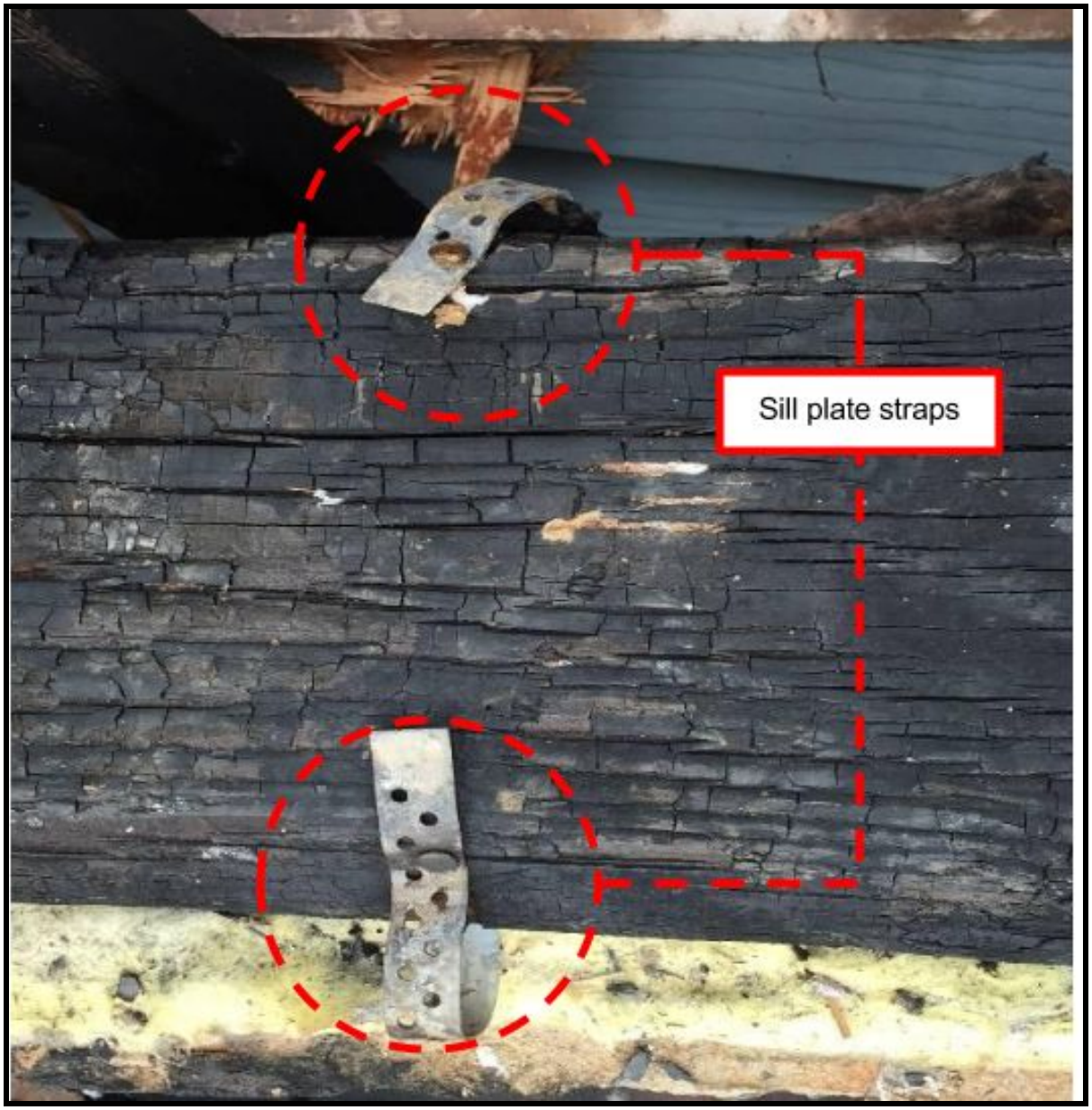
The foundation on Sides Alpha, Bravo, and most of Side Delta was poured wall foundation. A poured wall foundation means that concrete forms are erected on top of a concrete footer system. Reinforcing rods (rebar) is installed in the forms to reinforce the concrete walls. The forms are then filled with concrete to form a hardened solid wall used to support the structure.

A small section of cinder block wall separated the structure from the Delta Exposure. This separation was only noted at the Charlie/Delta corner of the structure. The rear of the structure was wood framing that originated off of the basement level concrete slab without foundation walls.

This structure is platform framed using common building materials. Platform framing described a construction method where the vertical members are only a single story in height. Each finished floor acts as the “platform” upon which the succeeding floor is constructed.

Structural beams and columns originate the basement level and support the floor joist and sub-flooring systems e.g., the first level floor. Exterior and interior walls are erected off of this first platform. This pattern continues for subsequent levels. The roofing systems is the last component added and rests on the uppermost level of the structure.

In most cases, the first floor platform would originate off of the foundation walls. An exception to this would be any framing that originates directly from the slab whether it be an at grade slab or from a basement slab. Framing that originates from the foundation walls begins with a sill plate which is typically pressure treated lumber. The sill plate is fixed to the foundation wall via bolting or strapping. In either case, the goal is to permanently fix the sill plate to the foundation wall prior to the installation of any floor joists. You can see the remnants of the strapping system in the photo below.



The structure meets the definition of lightweight construction which, “uses ‘engineered lumber,’ a term generally used to describe a wood structural member that is fabricated through use of bonded fibers and materials and that is usually put together as a composite joist or beam. Engineered lumber offers a great structural platform for the support of floor and roof assemblies...Such composite beams and joists allow builders to implement the long spans and open rooms that are prevalent in modern-era home construction.”

“...[A]n expanding range of construction methods and building products, particularly wooden truss roofing systems and wood I-joists that together are often termed

"lightweight construction..." These systems are particularly vulnerable to catastrophic failure when exposed to the high heat conditions typical of a post flashover fire.

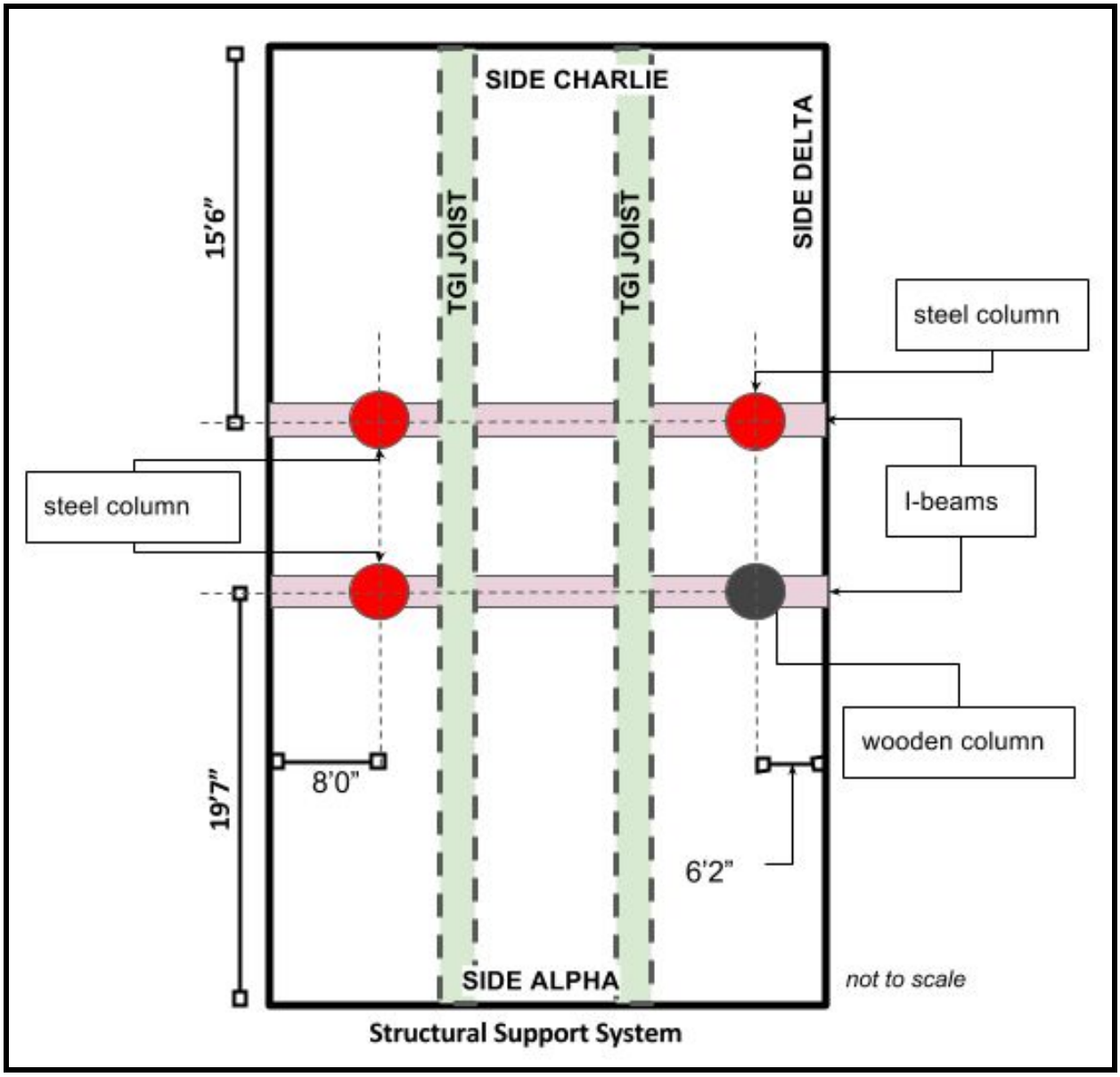
This structure utilized a Truss Joist I-Joist (TJI) based engineered floor system. The term engineered means that the components of the floor system are designed and arranged to provide for load bearing comparable to unaltered wood systems but with a much smaller surface area to mass ratio. In other words the systems are designed to hold more similar loads with less actual wood.

The anatomy of a TJI floor joist is similar to an I-beam in that it includes a top and bottom flange and an inner web. The top and bottom flange are typically made of laminated wood while the inner web is typically a plywood or OSB type of material.

Engineered joists are popular because they are, lighter in weight, allow for longer spans, they are less likely to warp, twist or shrink, and they are easier to run utility lines through.

The exterior and interior partition walls feature 2” x 4” wood framing set at 16 inches on center. A fire wall separated most of the exposure buildings and will be further discussed in this report. There are two “I” beams supported by a beam pocket cut into the foundation wall, three steel columns, and one wood frame column.

The flooring systems consists of TJI floor joists. A 2” x 12” band board encases the floor joists on Sides Alpha and Charlie. Plywood subflooring completes the flooring system on all levels of the home. The roof assembly is comprised of 2” x 4” wood trusses with plywood roof sheathing.



Structural Support System

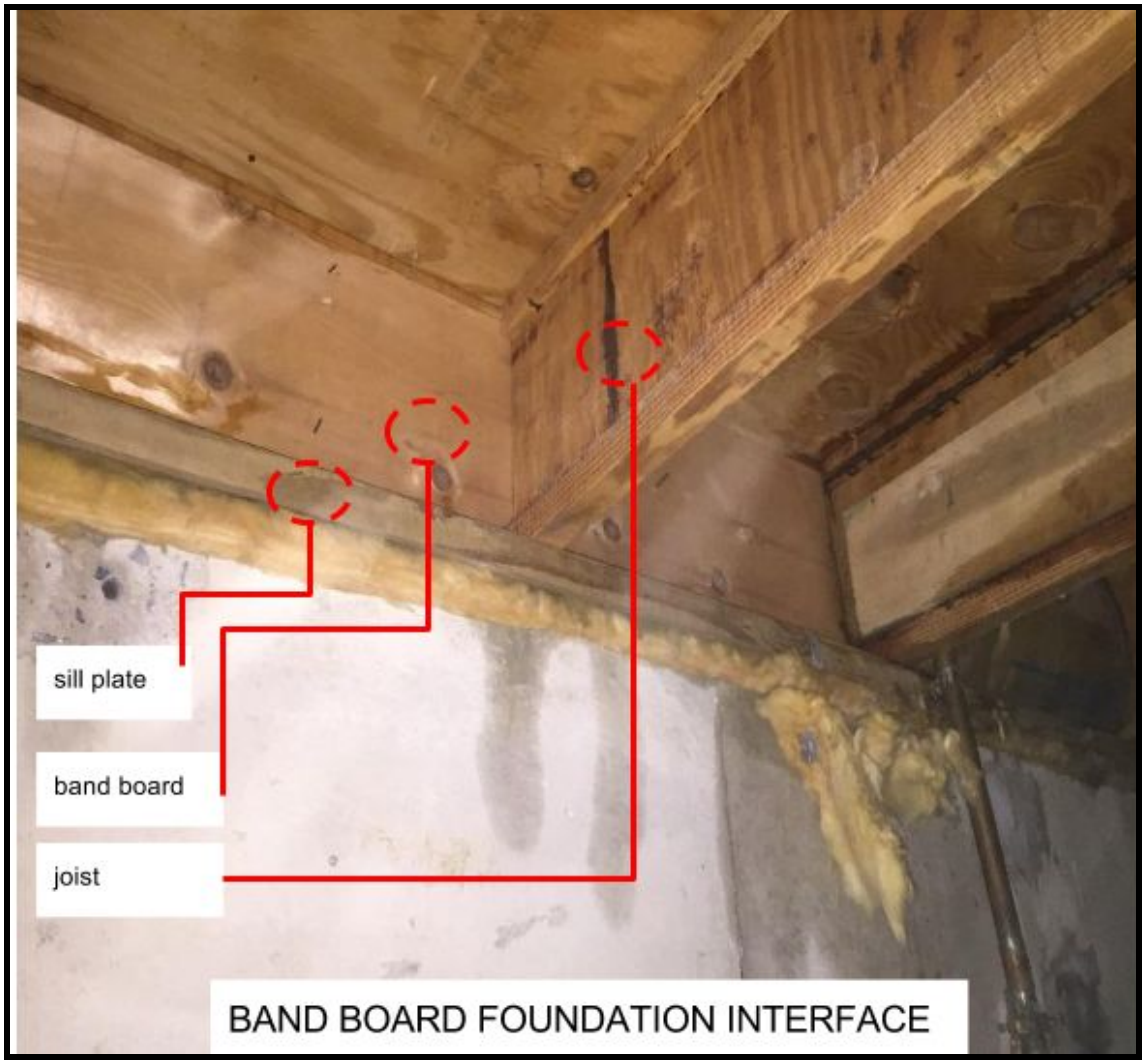
When the band board gets installed along the front face of the floor joists it is secured with nails at both the top and bottom flange. The nail size can range from 10d (3" nail) to a 16d (3 ½" nail) based on the manufactures specifications. Nail size requirements depend on the size of the upper and bottom flange.

In the case of this structure several nails were noticed on the front band board with only an average of ¾" embedment through the 2" x 12" band board and into the floor joist. This could indicate that the nails were smaller than the manufacture recommendations and could also indicate poor attachment of the band board to the joist flange. Suboptimal nailing could increase the likelihood of the band board pulling away from

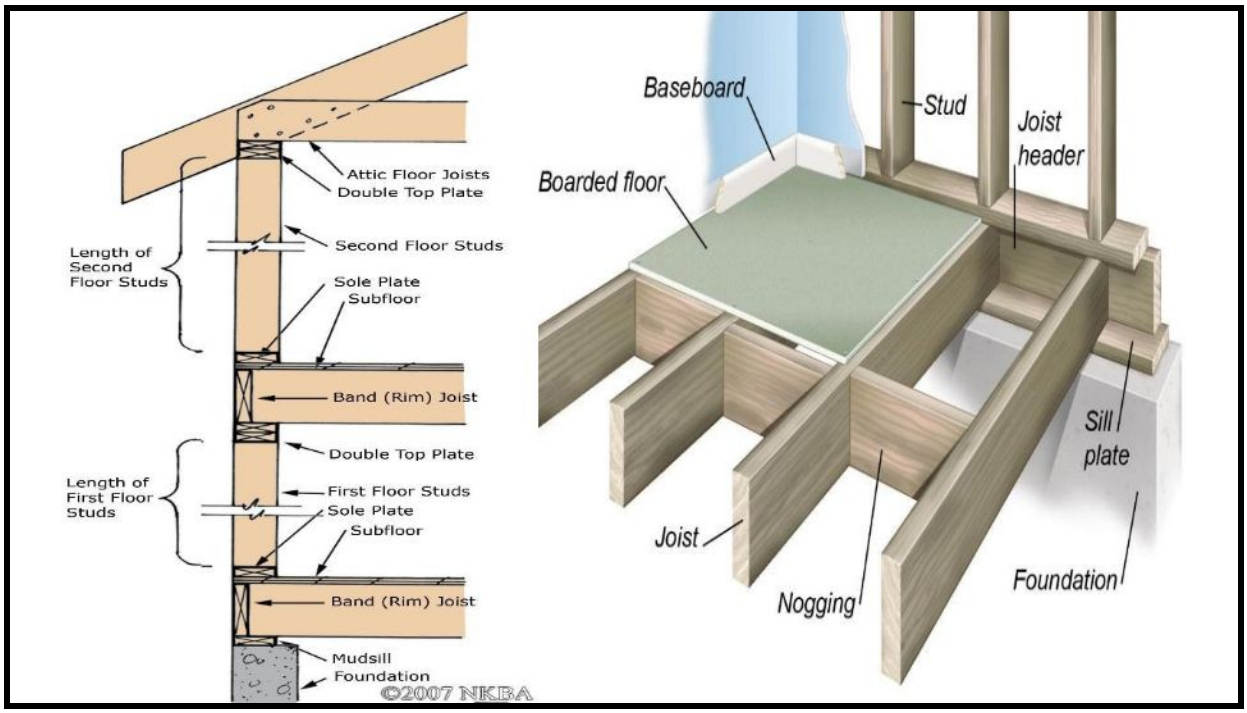
the floor joist when stressed.

Evidence of toe nailing, where the floor joist was affixed to the sill plate

This type of flooring system requires you to “toe nail” the bottom flange of the TJI joist into the sill plate, which is mounted to the top of the foundation wall. In situations where there is no foundation wall, such as the rear wall of Churubusco Lane, then the joists are become fixed to the top plate of the wall framing. Toe nailing is only done to hold the joist in place unit the band board is installed.


sill plate
band board
joist
BAND BOARD FOUNDATION INTERFACE

VIEW FROM BASEMENT OF DELTA EXPOSURE FACING WALL SHARED WITH FIRE BUILDING



The townhouse units in this development were constructed with full length fire wall separation. This system was constructed by use of double ⅝" gypsum fire rated wall panels. Metal studs were used, which aided in limiting the potential for fire extension.

During this fire the fire wall remained intact and appeared to have functioned as designed. While there was minor fire extension noted in the adjacent structures it was likely the result of spread along exterior surfaces.

VIEW OF FIRE WALL FROM INSIDE THE FIRE BUILDING

There are several critical factors that the fire service must consider regarding the construction of an engineered joist.

The bonding agents used to secure the sections of the joist will off-gas when heated and those gases can contribute to fire spread. More importantly, engineered joists have a larger surface to mass ratio than their legacy construction analogs.

When a material is heated to the point that it begins to pyrolyze it loses mass. Because of the surface area to mass ratio of the engineered joist the mass loss is more rapid and the time from initiation of mass loss to failure is much shorter as compared to legacy construction analogs.

Studies have shown that firefighters should have a heightened concern when operating in buildings with this type of engineered joist. Manufactures tend to assert that protected joists, that is those installed following the ASTM E-119 Standard Test Methods for Building Construction and Materials, are safe.

The safety of these joists under this standard require fire protection measures, usually in the form of some type of protective coating or casement. However, the potential for a fire to breach the protective system must be considered. Furthermore it is not uncommon to find exposed and unprotected joist systems especially in unfinished basements.

The following information regarding live fire testing for TJI joist was taken from a Fire Engineering article dated 4/1/2007 and titled “Silent Floors, Silent Killers”:

In 1986, the Illinois Fire Service Institute tested five types of floor systems to determine their structural stability. Included in this testing were wooden I-beams set at 24 inches on center. Of all the floor systems, the wooden I-beams failed first at 4 minutes and 40 seconds. In their report, the authors write:

“At 4 minutes and 40 seconds, the wooden I-beam platform failed completely. There was no sagging or warning noises to indicate a structural problem. The system carried the load level until failure. The failure of a wooden I-beam to sag prevents firefighters from determining if the building is in structural trouble … A wooden I-beam with a 3/8” web is not safe if the gypsum protection is penetrated.”

In May 1981, the Los Angeles City (CA) Fire Department tested several non-protected assemblies, including wooden I-joists with 3/8-inch webs. The fuel load consisted of paint thinner and pallets; no live load was imposed. The test time began at the ignition of the fuel; the time limit was six minutes. The wooden I-joists covered a span of 12 feet, were spaced at 32 inches on center, and were sheathed with 1/2-inch CDX plywood.

The report states the assembly failed in 1 minute and 20 seconds.

Wooden I-joists need to be taken as a serious threat to firefighters when involved in a fire. In “Building Construction for the Fire Service”, Francis Brannigan notes two case studies in which wooden I-beams were involved in early collapses during structure fires.

Because of the great increase in the use of wooden I-joists in new construction in my area over the past several years, I decided to conduct my own non scientific test burns. In the first burn, two four-foot sections of I-joists supported on both ends and with a piece of gypsum board nailed on top were set on fire. The fuel load consisted of cut-up pieces of wooden pallets. Sudden failure of one I-joist occurred approximately 13 minutes after ignition, but this was only 7 minutes and 11 seconds after the flames impinged on the flange of the joist.

A second test burn consisted of four OSB wooden I-joists 10 feet long and 9 1/2 inches deep. The joists were supported on both ends and spanned an opening of 103 inches. The joists were covered with 5/8-inch CDX plywood and fastened using a compressed-gas nail gun; there were no openings in any of the webs. A licensed professional engineer rated the assembly as having the ability to carry 720 pounds. A load of only 171 pounds, consisting of concrete block, was placed on top and spread out over the center bay. Again, a fire load consisting of pieces of wood pallets only was ignited under the assembly. A partial collapse occurred in 7 minutes and 15 seconds after ignition. At the 9-minute mark, a second collapse occurred; and all four web members had burned through.

The failure of this structure was catastrophic and complete collapse of the entire structure. This is consistent with studies into failures of this type.

Units encountered a significant volume of fire upon arrival that appeared to have originated in the basement and extended to the rear of the house. Additionally, the burn time was lengthy because of a delay in fire department notification. It can be safely assumed that the unprotected engineered flooring systems, as well as the supporting mechanisms, were significantly compromised when the fire department arrived.

A company reported a collapse occurs on Side Charlie of the structure. What they saw was a failure of the deck. The deck failed (loosed from the structure) at the first floor band board and collapsed inwards towards the house, while the main beam and posts supporting the deck remained intact.

It is believed that when this occurred the deck pulled the rear wall outwards loosening the rear floor joist connections. This may have also caused poor contact between the top plate of the wall framing and the floor joist since the wall was essentially pulled away

from the area at which the joist rest.

OVERALL ANALYSIS

The turning point of this incident was the decision to commit personnel to an interior, high risk search on the second floor of the fire building. To be clear this search was not risky in the same way any operation in a burning structure is risky. The level of risk the organization accepted that night was a level we don't often face. We chose to commit people to search a building of lightweight construction that had been burning uncontrolled for at least 20 minutes to search for an occupant who was unaccounted for.

We must never become risk averse but being willing to accept extreme risk to save a savable life is a quite different thing from being willing to die. Accepting unnecessary risk contributes nothing to the safe accomplishment of a task or mission. The most logical chOfficeres for accomplishing a mission are those that meet all the mission requirements while exposing personnel and resources to the lowest possible risk.

There was a lady in the front yard and she was frantic. She had to be restrained from going into the burning house. A police officer reported to command face-to-face that "...there might be one occupant unaccounted for." The lady in the front yard was frantic, the officer uncertain, the original three witnesses who reported that everyone was out were nowhere to be found. Accounts vary of what the frantic lady said but 20 minutes into the fire, 20 minutes of extreme thermal insult to the structure, we committed personnel to an interior search on less than certain information.

On that night the Duty Chief was convinced the right decision was made to conduct that search. In his mind entry, was made into the last survivable space to search. It was done over a ladder, only a few people were committed and they had the presence of mind to take a handline for protection. But most importantly, as far as the Duty Chief knew that lady was convinced that her son was inside.

What if we had asked the lady where her son slept and she said, "...the basement.." would that have altered our decision? If when the officer had reported to command that an occupant was unaccounted for we had asked him, "...how do you know this?" Would that have altered the outcome? If we had told that lady that three people reported that everyone was out 10 minutes earlier, would that have changed the outcome?

We can never be sure in retrospect what would or would not have changed based on any one piece of information but when we are talking about a decision to commit people

to a situation where death was a real possibility we should take the time to ask one more question.

Just as we must believe the occupant who says everyone is out we must believe the occupant who says that someone is still inside. But in both cases we are obliged to recognize that people under stress may not be reliable. That lady could be wrong.

We place life safety in the highest regard. We are willing to accept extreme risk in order to account for life safety. But we are wrong if we do not at least attempt to determine the validity of information before committing to a situation where the potential loss for life is so real.

It is problematic that the crews who executed the search in the fire buildings did so without permission. It is true that command ordered a search but the units sent by command were not the units that did the search. This must not happen again.

There was sufficient time for those crews to make their intentions clear to command before and during their search. Truck 734 did make a radio transmission to advise they were going in. This report was not acknowledged by command but there was time to ensure that command was certain. There are some things that are so risky, that they must be acknowledged before they are initiated. Truck 734 should have kept calling until command acknowledged what they were doing.

One of the things that complicated the resolution of the Mayday was that command assigned Paramedic Engine 722 and Rescue Squad 729 to search the fire building. Command had no way to know that Paramedic Engine 722 was busy fighting fire on the first floor of Exposure Bravo. Command had no way of knowing that Truck 734's officer and tiller person were searching the fire building. When command assigns a crew the assignment is tied to an objective that command hopes to achieve and tied to a location he/she believes they are in.

Command had no way to know where anyone was before the Mayday because very few people had the operational discipline to be where they should have been. In their own words:

1. "Myself and my driver entered the building while my third had to go back for a spare facepiece (his was stepped on while helping with patient care). I advised him to report to my location."

2. “I knew my crew was OK [alone]..., then I heard the Mayday and ran back to Side A.”
3. “We came from side Charlie to side alpha to assist in any way we could as we had finished our task ...and had not been assigned another task.”

There are rare times when a crew is forced to leave their assigned duty to tend to an immediate critical task, a task so important that if it is left undone people could die. In such cases it is only acceptable to leave your post to handle the task after making a reasonable attempt to inform command of your action. Additionally, the moment the immediate critical task is resolved the only acceptable behavior is to immediately return to your assignment. Even if you are able to accomplish the task and return to your position before command knows you are still obligated to communicate your actions as soon as possible.

The final analysis is that the fire department operations at Churubusco Lane represented operational failure on many levels.

It was a failure because it could have and should have been prevented from happening in the first place. It only happened because our processes were either inadequate or not followed. It was a failure because the inherent predictability of these events, the the initial attack, the confused lady, the building collapse, they were all predictable and preventable.

Firefighters got hurt and there was nothing fundamentally new to be learned. This fire burned no differently than fires tend to burn. The collapse of the structure was only surprising in how long it took to happen. The inefficacy of attacking a basement fire from the first floor was proven, again. The inefficacy of fighting a fire that was running up the back wall into the attic from the front door was proven, again. Nothing new to learn, except perhaps that we are not so good at learning.

Most times we go to fires and no one is trapped inside Most times we go to fires in smaller compartmented spaces. Sometimes we stretch lines poorly but the fire is so small we don’t notice the kinks. Sometimes we move faster than we can think and unfortunately, most times we are successful.

The problem is success narrows perceptions, changes attitudes, reinforces a single way of doing business, breeds overconfidence in the adequacy of current practices, and reduces the acceptance of opposing points of view. (Weick and Sutcliffe 2007). In other words, we failed because we don’t fail often.

Convergence is loosely defined as the tendency for resources to self dispatch to crisis areas. When the Mayday sounded on the Churubusco fire, convergence happened. On this incident multiple unit officers left their assigned posts and headed to the Mayday site. Those personnel who left their posts to assist with the Mayday violated crew integrity and accountability. The easier analysis of this convergence is that those who converged were freelancing. But things are never that easy; but for the actions of the people who converged, the outcome could have been even worse.

It is true that more personnel were needed to manage the Mayday than were immediately available. It is true that many of the personnel who self-dispatched played a critical role in resolving the Mayday. But it is also true that organizationally we cannot condone or make it common practice for personnel to leave their assigned positions, and take up alternate positions in a hazard area just because they think it is a good idea.

One of the officers who self-dispatched to the rescue effort emerged as the focal point of the rescue operation. It is fundamentally difficult to say thank you for doing a great job managing that portion of the incident while also saying, "...but you should have never been there."

Are the current Mayday and rapid intervention policies and procedures adequate for an incident like the one on Churubusco Lane? We can't know because we did not follow them. Would someone else have emerged as the focal point for the rescue operation? Probably, if only because firefighters tend to be people of action. But we can never know because of the way things happened that night.

As one unit officer remarked in his statement about this incident, "We train to do things a specific way but when things happen we don't fall back on our training, we do whatever." That is a brilliant point. Training and reality must be correlated somewhere. We train in steel cans to rescue dummies. At Churubusco we had every reason to believe that three people we know just died before our eyes, how does one train for that?

That no one died and all the injured returned to work, cannot be an excuse to turn a blind eye to the lack of operational discipline and it certainly cannot be taken as evidence that the demonstrated behaviors were appropriate.

The tougher part of this analysis is uncovering the root organizational issues that put us in this situation. But our ability to effectively communicate is likely the first step. Our collective actions at this fire suggests that we don't know when to communicate and further we are not so good at it when we actually try to.

The radio logs from the incident paint a clear picture that there was precious little open radio time. During the initial operations, from the on scene report of Paramedic Engine 729 until the Mayday was resolved there were 116 radio transmissions on 7-Charlie and perhaps more telling, there were 95 rejected transmissions. We have to find a way to be more efficient in our radio communications.

There were 95 times where a person thought that they had something of value to say. In each case they were unable to. Which one of those transmissions could have altered the outcome of the incident? We can't be sure but we should be concerned.

During a structure fire the most critical moments are the first few moments as or after units arrive on the scene. In those moments decisions are made and actions are taken that arguably set the tone and pace for the following few hours. If we must get it right we must get it right at the beginning.

Incident command has some basic functions that are fundamentally different from the basic functions of the unit officer. What tends to happen, because it is policy driven, is that a unit officer assumes command of an incident without having the capacity to manage the function. We do not recognize nor plan for the fact that even with this assumption of command we may have gained nothing in terms of how effective that command can be.

We do not want incident commanders acting as Division Supervisors because they can't oversee direct action and manage the big picture at the same time. But we continue to ask unit officers to manage their crews and the incident command function at the same time. This is inherently unfair and ineffective. The idea of a unit officer acting as the incident commander is flawed unless there are clear delineations of expectations when acting in that role.

We continue to use improvised and inconsistent language on the fireground as if we are engaged in friendly conversation around the campfire instead of a potentially deadly task sequence. Command was no less at fault during this incident than unit officers. There were some less than clear orders, there were transmissions that simply trailed off

instead of being terminated. While it was possible for units officers to derive or infer intent and objectives from certain transmissions it was equally easy to misunderstand.

When questioned about obscure orders, the incident commander replied, “My guys know what I mean when I say that.” We have to find a way to give better, more objective based orders that do not rely on “my guys…” These must be orders that are clear to everyone’s guys, orders where the objective and the intent are crystal clear.

The failure points aside there are positives to take away from this incident. This incident provides evidence that our core task training, the things that we need to be automated at the task level, is working. The people who fell in the collapse were able to maintain their spatial awareness. The Captain kept focused on the way out. One of the firefighters was able to execute a buddy breath maneuver without assistance after his SCBA stopped working. The search team took a hoseline with them. They later used this hose line to protect themselves while they worked free of entanglements and headed out.

You simply cannot execute these types of maneuvers unless you are well trained. You cannot do these things if your couch time is greater than your drill time. Certainly there were physical circumstances, some would even say luck, that aided in those three surviving but the lives saved were saved at the firehouse. Chance favors the prepared.

The people on the scene outside the structure initiated immediate critical actions without waiting for direction. They manually lifted the entire first floor wall off of the fallen team. In short they were "ready" too. They were sufficiently well practiced to put all of the pieces together at the right time to make the right things happen.

Now the challenge is to really learn the lessons that this incident provides and develop more refined approaches to structural fire suppression, all while maintaining core task proficiency.

LESSONS

1. We are all human: Firefighting is, at its core, a human endeavor. Humans have limited bandwidth, their cognitive abilities have limits, their physical abilities have limits, and sometimes they make mistakes. The system should work towards more robust and resilient systems that not only resist failure, but expect it and are able to recover from it.
2. Gravity always wins: We fight fires in structures. Structures are built within the narrowest of tolerances to resist gravity. It is possible to build structures that resist collapse when they are burning but the cost of that is prohibitive. We must accept the fact that when structures are exposed to heat and flame they are going to come down. We must accept this, plan for this, and endeavor to not be in the way when gravity finally does win, as it must.
3. Scene size up (assessment) is important: It is impossible to take the appropriate action without having a basic understanding of what the operational environment looks like. There is no way possible to know all there is to know about a particular fire in a particular structure but that fact does not absolve firefighters and especially officers of the obligation to get as much information as possible before committing to an action. We have to get better at doing comprehensive assessments.
4. Crew integrity is important: There is no accountability policy or passport system or RIT team or paper document that can replace a unit officer being accountable for their crew or for the crew being accountable to their officer. When it becomes acceptable for crew integrity to dissolve it has become impossible to have any meaningful fireground safety.
5. Operational discipline is important.
    a. There are times where personnel have to go outside the box of policy and do what is right. Perhaps that time is when a wall collapses on top of five firefighters, while the concurrent floor collapse traps three more inside. However, it cannot be acceptable for units to routinely leave their assigned area of operation, or conduct operations not sanctioned or known of by command.
    b. The policy is designed to provide multiple layers of redundancy, multiple chances to catch errors and hopefully prevent any one error from propagating a series of additional errors. And this system cannot function if personnel cannot or continually fail to demonstrate operational discipline.

6. Not all fires are SOP driven.
    a. The SOP is a starting point, it is the primary operational reference or anchor it is not the incident action plan. The SOP is designed to provide a set of reasonable expectations for unit behavior. That said not all fires are SOP fires and more importantly when an incident commander provides a unit with orders, those order supercede the SOP.
    b. Non SOP driven incidents are a weakness that needs to be explored through additional training, education, and mentoring. This easily can be messaged through the next generation of Command Competencies driven down to the unit officer level. This concept must also become part of the promotional process. What is tested, is institutionalized.
7. Our search risk analysis needs to be refined. Before we commit personnel to a high risk search we owe it to ourselves to ask one more question. One more question means that we ask enough questions to verify the validity of the information about occupant status. Sometimes that takes multiple questions.
8. Our communications framework is inefficient:
    a. We talk when we should be listening. We fail to pass on important information. Many times there is so much talking that we cannot get through. There is a lot of talking but very little communication going on.
    b. We must figure out a way to allow critical or important transmissions the space they need while respecting the mandate of the incident commander to set the tempo of the incident.
9. We need to improve the way we communicate strategy, objectives, and intent: What we say and what is heard are often different. Both the listeners and the talkers must be active participants in the communication process. But beyond that supervisors must get better at defining and disseminating incident objectives.

A view of the aftermath from Side Charlie note the basement level exterior wall leaning outwards.

REFERENCES

Dekker, S. (2011). *Drift into failure: From hunting broken components to understanding complex systems*. Burlington, VT: Ashgate Publishing Company.

Earls, A.R. (2009). Lightweight Construction. NFPA Journal. NFPA. http://www.nfpa.org/news-and-research/publications/nfpa-journal/2009/july-august-2009/features/lightweight-construction

Lagadec, P. Electronically retrieved (5/14/16) from http://www.patricklagadec.net/fr/pdf/Preventing_Chaos.pdf

Renaud, Cynthia.(2012). “The Missing Piece of NIMS: Teaching Incident Commanders How to Function in the Edge of Chaos.” *Homeland Security Affairs* 8, Article 8 (June 2012). https://www.hsaj.org/articles/221

Not Listed. (2007). “Silent Floors, Silent Killer.” Fire Engineering. http://www.fireengineering.com/articles/2007/04/silent-floors-silent-killers.html

APPENDIX A- MANAGING THE INJURED ON SCENE

Emergency Medical Services (EMS) Duty Officer 703 responded for the working townhouse fire after hearing the on scene report from Paramedic Engine 729. Upon arrival EMS Duty Officer 703 positioned his vehicle behind Battalion Chief 705.

As he was leaving the vehicle he saw a white vehicle with approximately four occupants that seemed to be leaving the scene. A police officer advised that the occupants of the white vehicle were the occupants of the affected townhouse. He then informed the occupants of the white car to drive out to Waring Station Road and that he would meet them there.

EMS Duty Officer 703 walked out to Waring Station Road and met up with the occupants of the white vehicle. It did not take long to realize that everyone was ok and that all of the occupants were accounted for. He attempted to relay this information to the incident commander but there was too much radio traffic. He then proceeded to gain additional information Red Cross for assistance from the occupants. As he was finalizing this process, he heard the Mayday transmission.

After hearing the Mayday transmission EMS Duty Officer 703 ran from Waring Station Road to Side Alpha of the townhouse. Once at the front he saw to find many firefighters working on an injured firefighter.

While working on the injured fire fighter it was determined that there were still three firefighters unaccounted for in the collapse. It took a bit of time to package up the injured firefighter because personnel had to go get and return with the necessary spinal immobilization equipment.

While finalizing the transport for the first firefighter, the remaining three firefighters were removed from the townhouse and the Mayday was over. EMS Duty Officer 703 met up with the Duty Operations Chief and he advised that six other firefighters were injured and needed to be evaluated for transport. All of the injured firefighters had moved over to the treatment area. The Duty Operations Chief decided that all of the fire fighters physically affected by the collapse were going to be transported to area hospitals regardless of their condition.

The incident commander designated EMS Duty Officer 703 as the EMS Group Supervisor on radio talkgroup 7- Hotel.

As all of the firefighters were being triaged and treated EMS Duty Officer 703 was able to contact Holy Cross Hospital- Germantown via phone. All of the Montgomery County

Hospitals were very busy that night and most of them were on some sort of diversion. EMS Duty Officer 703 requested Holy Cross Germantown to accept multiple firefighters that were injured.

Initially, the charge nurse requested if we could break up the firefighters to multiple hospitals. EMS Duty Officer 703 informed her of the situation and she immediately accepted all of the firefighters.

EMS Duty Officer 703 spent the remaining time during the EMS incident coordinating all of the transports for our injured fire fighters. He spent a considerable amount of time assuring that every firefighter was accounted for. Once the EMS incident was complete, he conducted a face to face with the incident commander, updating him on the situation.

The role of EMS Duty Officer 703 then transitioned to coordinating incident rehabilitation.

EVENT	TIME	UNIT	DESTINATION
Dispatch	0055	N/A	N/A
Arrival	0102	N/A	N/A
Collapse	0126	N/A	N/A
First Transport	0141	Medic 708	Medstar *Orthopedic injuries after fall*
Second Transport	0143	Medic 731 (2 patients)	Holy Cross Hospital Germantown *No medical complaints for either patient*
Third Transport	0150	Medic 729	Medstar *Orthopedic injuries after fall*
Fourth Transport	0159	Ambulance 722	Holy Cross Hospital Germantown *Soft tissue injuries, later transferred to Medstar for minor burn evaluation.*
Fifth Transport	0201	Medic 735	Holy Cross Hospital Germantown *Orthopedic injuries after fall*
Sixth Transport	0211	Ambulance 734	Holy Cross Hospital Germantown *Orthopedic injuries after fall*
Seventh Transport	0220	Medic 713	Medstar *Orthopedic injuries after fall*
Eighth Transport	0308	Medic 731	Holy Cross Hospital Germantown *No medical complaints*

THINGS DONE WELL

- All of the injured firefighters were transported to the hospital safely.
- The EMS Group Supervisor was able to account for all of the firefighters that were transported to the hospital.
- The EMS Group Supervisor limited the amount of hospitals utilized which helped with accountability.
- No ambulance or medic unit transported a without the EMS Group Supervisor being aware.
- There is an electronic patient care report for each firefighter that was transported.
- All of the firefighters on the scene assisted in some way with the loading and transportation process (including some of the injured firefighters).
- The EMS Group Supervisor was able to evaluate and obtain a refusal from one of the occupants that was inside the structure when the fire started.
- All members on the scene remained calm to assure everything got accomplished.

AREAS FOR IMPROVEMENT

- There was no declaration of a mass casualty incident.
- Not enough resources to initially handle the eight injured firefighters and still maintain the operations on the fireground.
- Too many tasks were being handled by a minimal amount of people.
- No triage unit leader was designated. Duty Operations Chief 700 performed a quick triage of the eight firefighters that were injured and communicated that information to EMS Duty Officer.
- No treatment unit leader designated. EMS Duty Officer 703 became the treatment leader.
- No transport/disposition unit leader designated. EMS Duty Officer 703 was the unofficial transport officer.
- No communications officer was designated. EMS Duty Officer 703 became the communications leader and contacted Holy Cross Hospital- Germantown to inform them of the situation.
- Personnel did not utilize any of the dedicated Mass Casualty Incident resources (ribbons, tags, EMRC notification, documents, etc.).
- In hindsight, the EMS Duty Officer should have used MEDSTAR and Suburban Hospital, both trauma centers as the transport destination since the mechanism of injury alone was sufficient for a trauma evaluation.

LESSONS LEARNED

- This was an emotionally charged event that tested the capabilities of MCFRS during an already significant incident.

- A Mass Casualty Incident continues to be difficult to manage. It is an incident within an incident and that adds to the complexity.
- MCFRS needs to conduct county wide standardized mass casualty incident training to assure we are prepared for the worst case scenario.

RECOMMENDATIONS

- Add an EMS Task Force dispatch to all Rapid Intervention Dispatches. This will aid in resources available for such events that could occur. Although the EMS task force will drain MCRS of its resources temporarily, more likely than not the incident commander will disband it when everything calms down. History will prove that most issues occur during the first 10 – 15 minutes into a working fire dispatch.
- The incident commander should develop an EMS group for all working fire incidents. The tasks can include (but not limited to):
  - Designate and operate a rehab section.
  - Check on and assist the occupants with all of their needs (medical and information needed for the incident commander).
  - Be in a ready mode for any firefighters or citizens that are in need of medical attention. All of the units and personnel operating at the working fire are dedicated to certain functions. It is not practical to pull a crewmember from his/her function to medically tend to others.

APPENDIX B- HOSPITAL LIAISON - MEDSTAR

Battalion Chief 701 was contacted by Duty Chief 700 via cell phone and advised to go to MedStar Hospital (Burn Unit and Trauma Center) to attend to the needs of the injured firefighters and to provide updates about their condition.

Battalion Chief 701 attempted to gather as much information as possible regarding patients arriving at MedStar. Duty Chief 700A was notified by the Fire Chief and arrived at the hospital to assist. Shortly thereafter, Union representatives and the Operations Chief arrived at the hospital and placed Battalion Chief 701 in service.

THINGS THAT WENT WELL

1. Battalion Chief 701 was able to get to the hospital prior to patients arriving. This is important. One of the patients noted that it was nice to see a familiar face in an unfamiliar place when they arrived at the hospital.

2. Battalion Chief 701 was able to make contact with scheduling for notification and replacement purposes via telephone while he was enroute to the scene. This saved time on the phone for the Command Officers on the scene, who were extremely taxed at the time.

3. Union Representation was notified and arrived as patients were being brought into the hospital.

4. Battalion Chief 701 was able to communicate via text messaging with the command team. The only downside to this was Battalion Chief 701 was unsure as to whether the messages were received.

5. Battalion Chief 701 was able to make and keep in contact with the scheduler.This assisted with the relay of information regarding some injured persons.

AREAS FOR IMPROVEMENT

1. Battalion Chief 701 and Duty Chief 700A were both unable to reach the command team via radio talkgroup 76 Alpha to communicate updates, as requested. Aside from the fact that the Battalion Chiefs do not have access to

this channel, we were out of range at MedStar and unable to make contact from either portable radio.

2. Information in telestaff was not accurate to notify family members of the patients.

3. Battalion Chief 701 and Duty Chief 700A were unsure of, and not updated on, the number of patients, their identity, and which units were transporting to the hospital prior to patient arrival. It would be helpful to either have a living document to share for updates regarding patients once the Command Bus is in place, or have contact with a designee on the scene to ensure that all information is passed to the waiting liaison about who the patient is and what their condition is. The hospital staff were also looking to Battalion Chief 701 to answer questions about how many patients were due to arrive and the extent of their injuries, so that the staff could prepare appropriately for patient arrival.

RECOMMENDATIONS

1. Update the Policy and Critical Illness / Injury Guide - to include Hospital Liaison - This should be a Battalion Chief or above. The Hospital Liaison is separate from the Family Liaison, but will work in conjunction with the Family Liaison in the beginning of the incident.
    a. The Hospital Liaison should contact family members and the Family Liaison.
    b. Work with Family Liaison to ensure immediate needs are met.
    c. Keep scheduling / command informed of patient name and progress.
    d. All personnel should have listed an emergency contact and a family liaison (this would be the person that you want working with your family in case of injury or illness)
    e. If the person lives out of County, consider using another jurisdiction or personnel who live near family to contact and/or bring family to hospital, make notifications, etc. (depending on the circumstances).
2. A designated person on the scene, whether it be Emergency Medical Service Duty Officer or other designee should keep in contact with hospital liaison to:
    a. Advise how many patients.
    b. Advise name and station assignment of patients.
    c. Advise about extent of injuries.

   d. Advise estimated time of arrival of patients and which units are transporting

3. Radios - Have a pre-determined channel within the local area to be able to talk to the hospital liaison or command, or determine a different means of communications.
4. Create a platform of sharing information so that all have real time updated information regarding patient needs, status, etc.
   a. This could be as simple as sharing a google doc, but not everyone has google
   b. Group texts

APPENDIX C- RADIO TRANSCRIPT

WHO	WHAT
E729	Command Montgomery
	long pause
E729	Churubusco command to Montgomery.
ECC	Go ahead command.
E729	Initial report- all occupants out - two story middle of row townhouse- got smoke showing side alpha- got heavy fire from side charlie go ahead and start me a task force.
ECC	Montgomery is ok 0106?
E722	Paramedic Engine 722 to command we are available at the station on that.
E708	Montgomery, with 22 could you adjust the order please so we can get hydrants.
	Pause
ECC	Ok the new order is going to be Paramedic Engine 729, Paramedic Engine 734, Paramedic Engine 722, Paramedic Engine 708, and Engine 753... if you like we can place Paramedic Engine 731 in service
	long pause
Command	Battalion 705 on scene I'm on side alpha. We have heavy fire from side charlie... **Do not** place another Engine in service. Keep everybody coming I'll have command post on side alpha behind Truck 734...
ECC	Montgomery's ok 0108.
E708	Eight to fifty-three, I am going to lay out from 19300 you got me?
E753	Direct 19300.
Command	Command to Engine 729.
E729	Go ahead chief.
Command	Were you able to get around to the backside with a line or drag the blitzfire around there: yes or no?
E729	Not at this point Chief we are making it through the front door. We were going have the second due take a line to side charlie.
Command	Ok, we need a master stream on side charlie...command to Battalion 703...
	pause pause pause
Command	Battalion 703 bye
Command	Ok, when you arrive on the scene I want you to set up an operation on side charlie out on Middlebrook Road you can see it from there and uh...standby for a second...

	pause
BC703	Battalion 703 is ok.
Command	Command to Engine 753.
E708	Engine 708 to command I am fourth due fifty-three is fifth due.
Command	Ok, what I want you to do is to take a position out on Middlebrook Road road you can see... you have room to position back there see if you can hit it with a deck gun from on Middlebrook Road... lay a line there and have Engine 753 supply you...command to Engine 753..
E753	Go ahead Montgomery.
Command	You supply Paramedic Engine 708 on the side charlie side. Um, they are going to pick a line out the off of Middlebrook Road ...hit it with a deck out out there i want you to be their water supply, Acknowledge.
E753	I'm direct.
Command	Command to Battalion 703 I want you to manage the side charlie postion from out there and uh supervise that operation I want a master stream on it from side charlies Middlebrook Road
E708	Paramedic Tower 708 you want us to set up back there we just drove by side charlie has two three stories the whole back was fully involved?
Command	Yeah, I saw that when I came by, yeah set up on the backside prepare for ladder pipe operations there.
Command	COMMAND TO ALL UNITS, all units on the fireground. We are going ahead to initiate from side alpha the best as we can however the main attack on this fire will come from side charlie side from Middlebrook Road with master streams from Middlebrook with master streams from Engine 708, Tower 708, Engine 753 all units prepare that's what we are doing (*last few words not clear*)
E734	Paramedic Engine 734 to command...I 'm in position to pull a line through the bravo exposure to the charlie side if you are ok with it?
Command	Yeah, I want water on this thing from side charlies fast as we can go ahead and do that.
RS729	Rescue Squad 729 to command all three residents are right now reported out of the house one is trying to go back in.
	background noise
Command	ok the unit calling that was Rescue Squad 729 correct?
RS729	Affirmative
Command	...ok
VDOC	Volunteer Duty Chief to command...
Command	Go ahead
	garbled transmission from ???

VDOC	Volunteer Duty Chief- I am on side charlie now I'll go ahead and take that position for ya...
Command	Ok, you are ok on what we have going on there, what units you have, I want to give those units to you that will be the side charlie attack side...it will be Engine 708, Engine 753, Tower 708 that's who you have working with you.
VDOC	I copy they, got a deck gun in operation now.
	garbled transmission from ???
VDOC	Side charlie to Paramedic engine 708 be advised where my vehicle is there is a path back to the townhouse.
PE708	Ok, I don't have a hydrant anywhere around here we are trying to locate one now it is going to be an extremely long lay.
Command	Command to Montgomery who is my sixth due engine?
ECC	That's Paramedic engine 731
Command	Standby...command to side charlie...need another engine back there?
E731	I am going to try to lay them a line off of Hottinger Circle
Command	Ok, go ahead to help them with water supply you are assigned to side charlie...Duty Chief you ok?
VDOC	Volunteer Duty Chief, that's correct.
E708	Alright 31... 53 is going to start laying out from the intersection I am going to need you to pick it up and bring it back down to us. we are going to lay out from waring station. Ya copy.
PE731	I'm going to come down the hill from Hottinger Circle.
PE731	Hang on a second.
E734	Paramedic engine 734 to command we stretched a line through the bravo exposure. We are hitting it now we have heavy fire we are going to need another line back here.
Command	Ok, they're hitting side charlie with a deck gun...can you see that from where you are...is that not sufficient?
E734	There is nothing being hit over here except by our line.
Command	Ok, command to side charlie.
VDOC	Side charlie- I am not sure the deck gun is making it but they are laying more supply line at this time ...from the look of it eight''s out of water.
Command	Ok i just want to try to determine,,,you can reach it with the deck gun from where you are is that correct...once you get a water supply.
VDOC	Looks like 34's got a better knock on it and I am not sure a deck gun is going to have sufficient penetration with the trees.
E708	Engine 708 to side charlie as you can see we got it knocked down. Yes we are out of water, 53 just laid all the way up I gonna need 31 to help them at the intersection we are going to lay a 300 foot supply, uh attack line and we are going to also try to get up the path where you are.

Command	Ok, there should be enough engine companies back there to complete the water supply for Engine 708.
Command	Volunteer Duty Chief let me know if that is going to be sufficient let me know yes or no?
VDOC	That will be sufficient 31 is actually bringing a supply line through the path now.
Command	Ok, very good...command to rescue squad 729.
RS729	Go ahead Montgomery.
Command	Ok, report from County Police on side alpha. There are three people inside the house only two are accounted for and one is missing. Does that conflict or is that consistent with what you know about the interior search?
	We are not (muffled) yet...
PE735	Paramedic engine 735 to command, has anyone picked up 31's line that they laid?
Command	Command to Engine 731
E731	Yeah we're laying down from Hottinger Circle
Command	Ok, do you have someone do you need someone on the hydrant do have that covered?
E731	Were on the plug.
Command	You say you are on the plug,,,that correct?
DC700	Yes, he is on the hydrant.
Command	Ok.
T735	Tower 735 to command, task force- you want us on Middlebrook or on the dispatched address?
Command	Ok, command to all units resp to the scene. With the exception of the units that we have already assigned to the Middlebrook Road side due to trees and density and stuff I want everybody else to come to side alph.
Command	Command to Engine 722.
E722	Engine 722 go ahead.
Command	Have you committed to anything yet?
E722	Uh we're RIC, we are set up on the alpha side unless you need something else?
Command	Yeah we still have somebody possibly unaccounted for uh... from your side can you gain access to the fire apartment to from your side to assist with res...
E722	Yeah, you want us to search 19350 the fire... (*unintelligible*)
Command	Ok, I am going to assign you to the search group with the rescue squad. Command to Rescue Squad 717 I want you to be in charge of the RIT section on side alpha. Resc 717 acknowledge.
E708	Eight's officer to driver charge the 300... charge the 300.
PE731	731 charge the supply line.

VDOC	53, 53 do not charge your line.
E734	Paramedic engine 734 to command.
	pause
RS717	Rescue 717 is ok.
Command	Command to res...Paramedic engine 734 go ahead
E734	**YES SIR,** be advised we have a collapse on side charlie looks like the deck and the backside of the wall just came down nobody's in the path also be advised from our vantage point it looks like the fire has extended into bravo and delta exposure.
Command	Ok, you still need a backup line for where you are? You ok where you are with the lines that you have?
E734	We're ok right. Looks like they are hitting from the other side as well the bulk of the fire is knocked... but like I said it looks like it walked in the attic of both exposures.
Command	Mont...command's ok...,mont go ahead and fill out the second alarm...please
ECC	Montgomery ok 0122
DC700	Duty Chief to command.
Command	Duty Chief go ahead.
DC700	We need to declare a strategy...there's operations from the outside in and the inside. So we are going to have to pick one of those and go with it.
Command	Ok, I already declared that we going [a]head attack with master stream exterior from side charlie-and we have units on the inside understanding that and holding their position on the interior of the building.
VDOC	Side charlie to Paramedic engine 708 are you ready for the deck gun?
???	We're in the area
E708	Eight's Engine charge the 300.
???	Repeat your message.
T734	Truck 734 command we are operating a hoseline side alpha second floor through the front window.
	pause
VDOC	Side charlie to command...
Command	Side charlie go ahead.
VDOC	Most of your visual fire on side charlie has been knocked you do have pretty good fire in the attic on side bravo and you can start seeing that from the exterior.
SA700	Safety to command, uh, I have units operating on division 2 of the fire struct...**WE GOT.**..a may...
SA700	...collapse...
SA700	...safety...

SA700	Mayday, Mayday, Mayday I have a collapse on side alpha the primary fire structure has collapsed completely...firefighters trapped.

APPENDIX D- MAYDAY TIMELINE

TIME	UNIT	STATUS/ TRANSMISSION	TX LENGTH IN SECONDS/WHO WAS TALKING WHEN BONK HAPPENED	ELAPSED TIME IN MINUTES
12:47:00	FIRE START (***Best Guess)			0
12:53:25	911 CALL			~0:06:25
1:02:40	Medic 729	ONSC		
1:03:06	Paramedic Engine 729	ONSC		~0:16:00
1:03:06	Paramedic Engine 729	IOSR- on radio talk group 7-Bravo	23.1	Start Time
1:03:10	BOX	DISP		0:00:04
1:04:50	Rapid Intervention Dispatch	DISP		0:01:44
1:06:40	Task Force	DISP		0:03:34
1:08:03	Battalion Chief 705	ONSC		0:04:57
1:09:34	Rescue Squad 729	ONSC		0:06:28
1:11:50	Paramedic Engine 729	ONSC		0:08:44
1:15:31	Battalion Chief 703	ONSC		0:12:25
1:16:11	Safety 700	ONSC		0:13:05
1:16:45	Truck 731	ONSC		0:13:39
1:17:35	Paramedic Engine 735	ONSC		0:14:29
1:22:11	2nd Alarm	DISP		0:19:05
1:24:54	Safety 700	MAYDAY	13.5	0:21:48
1:24:54	Battalion Chief 705	BONKED	Safety 700	
1:24:55	Truck 734 Officer	BONKED	Safety 700	0:03:20
1:24:55	Truck 734 Driver	BONKED	Safety 700	
1:25:09	Battalion Chief 705	INAUDIBLE	3.4	
1:25:10	Duty Chief 700	BONKED	Battalion Chief 705	
1:25:12	Volunteer Duty Chief	INAUDIBLE	2.9	
1:25:13	Battalion Chief 705	BONKED	Volunteer Duty Chief	
1:25:15	Duty Chief 700	ASSUMING COORDINATION OF MAYDAY	25.6	
1:25:28	Chief 729	BONKED	Duty Chief 700	
1:25:29	Chief 729	BONKED	Duty Chief 700	
1:25:41	Battalion Chief 705	ANNOUNCES COLLAPSE CALLS Paramedic Engine 729	11.2	
1:25:52	Paramedic Engine 729 Officer	INAUDIBLE	4.3	
1:25:56	Battalion Chief 705	PAR ON YOUR CREW, YOU OK?	4.5	
1:26:01	Truck 734 Officer	INAUDIBLE	5	
1:26:02	Paramedic Engine 729 Officer	BONKED	Truck 734	
1:26:04	Paramedic Engine 729 Officer	BONKED	Truck 734	

1:26:09	Battalion Chief 705	WE HAVE A MAYDAY, RADIO SILENCE- CALLS Rescue Squad 717	15.6
1:26:10	Duty Chief 700	BONKED	Battalion Chief 705
1:26:11	Duty Chief 700	BONKED	Battalion Chief 705
1:26:15	Truck 734 Tillerperson	BONKED	Battalion Chief 705
1:26:25	Rescue Squad 717	Rescue Squad 717 IS STILL TWO MINUTES OUT	4.7
1:26:26	Rescue Squad 729 Officer	BONKED	Rescue Squad 717
1:26:26	Duty Chief 700	BONKED	Rescue Squad 717
1:26:31	Battalion Chief 705	Paramedic Engine 735/Truck 735 ASSIGNED TO SIDE A//Medic 729 & Medic 708 EMS GROUP//	28.3
1:26:31	Rescue Squad 729 Officer	BONKED	
1:26:34	Duty Chief 700	BONKED	Battalion Chief 705
1:26:41	Duty Chief 700	EB ACTIVATED	
1:26:59	Safety 700	INAUDIBLE	0.7
1:27:00	Duty Chief 700	PRIORITY TRAFFIC	7.2
1:27:07	Battalion Chief 705	GO AHEAD	3
1:27:10	Duty Chief 700	WE HAVE THREE UNACCOUNTED FOR//STILL GOOD FIRE IN THE BSMT//ONE OUTSIDE//THREAT OF SECONDARY COLLAPSE SIDE A	20.1
1:27:30	Battalion Chief 705	OK	4
1:27:34	Duty Chief 700	START ME THREE ALS UNITS	4.7
1:27:39	Truck 734 Officer	INAUDIBLE	4.4
1:27:43	Battalion Chief 705	Medic 708 AND Medic 729 GO TO SIDE ALPHA	11.1
1:27:54	Medic 729 Officer	WE ARE WITH THEM RIGHT NOW CHIEF	5.6
1:28:05	Medic 729 Officer	THAT'S CORRECT	4
1:28:09	Battalion Chief 705	OK, YOU ARE ON SIDE ALPHA CORRECT	4.4
1:28:??	Battalion Chief 705	THIRD ALARM REQUESTED	1
1:28:14	Duty Chief 700	WE HAVE A VISUAL ON ALL THREE	25
1:28:40	Duty Chief 700	WE NEED TO DO AN ACCOUNTABILITY	8.2
1:28:48	Battalion Chief 705	GETTING READY TO DO THAT NOW	4.6
1:28:52	Paramedic Engine 735 LFT	ALL PEOPLE ACCOUNTED FOR	22.9
1:28:54	Battalion Chief 705	BONKED	
1:29:03	Rescue Squad 717	ONSC	
1:29:14	3rd Alarm	DISP	
1:29:34	Duty Chief 700		32.7
1:30:39	Battalion Chief 705		10.4
1:31:11	Duty Chief 700		15.7

1:31:16	3 Advanced Life Support units	DISP		

APPENDIX E:
SAFETY OFFICE SIGNIFICANT INCIDENT INVESTIGATIVE REPORT

Personal Protective Equipment

The MCFRS Property & Supply section issues standard PPE to career and volunteer personnel with safety specifications that reflect and adhere to the NFPA 1971 Structural Firefighting Standard[1]. The local fire and rescue departments (LFRD) are authorized by policy[2] to purchase and issue their members appropriate PPE that meets or exceeds NFPA and ANSI standards. Career personnel are authorized, once approved, to purchase and wear a NFPA approved helmet and 14-inch structural firefighting boots.

In 2006, MCFRS obtained approval for an Urban Area Security Initiative (UASI)[3] grant to purchase a second set of PPE for members of the department. Both career and volunteer personnel were issued a second set of Globe G-Xtreme design PPE. MCFRS has been replacing the aging grant funded PPE with new Globe G-Xtreme design PPE.

MCFRS by policy[4] requires personnel to wear all their protective equipment when engaged in an immediately dangerous to life or health (IDLH) environment. Six of the eight injured personnel involved in this incident wore their PPE and had the items properly in place. Two of the injured personnel failed to wear their structural firefighting pant suspenders as required by Fire Chief General Order (FCGO) 05-03.[5]

Recommendation: Consider rescinding FCGO 05-03, Mandatory Use of Turnout Pant Suspenders. The latest revision of NFPA 1971, states that suspenders are considered an accessory item, with no performance or design requirements provided[6]. However, if suspenders are voluntarily part of the PPE pants, they must be worn by personnel.

Immediately after treatment and transport of the injured personnel, all PPE, including SCBA, and portable radios were collected and bagged by the MCFRS Safety Officers. The PPE was documented, inventoried, and delivered to Maryland Fire to conduct an

[1] MCFRS – Protective Clothing and Equipment – Policy Number 804 (8/3/1995)
[2] MCFRS - Personal Protective Equipment and On-Duty Apparel Policy for LFRD Volunteer Personnel – Policy Number 06-10 (4/1/2013)
[3] MCFRS - Urban Area Security Initiative – UASI PPE – FCGO number 06-04 (7/5/2006)
[4] MCFRS – SOP For Safe Structural Firefighting Operations – Policy & Procedure Number 24-07AMII
[5] MCFRS – Mandatory Use of Turnout Pant Suspenders - Fire Chief General Order Number 05-03 (3/25/2005)
[6] Globe – Globe Manufacturing Company Memo, NFPA Requirements – Suspenders – Technical Services Department (11/11/2013)

inspection, cleaning, and repair of the PPE[7]. All personal items contained in the garments were inventoried at the scene and returned to the affected personnel. As soon as Maryland Fire returned the PPE, the Safety Officer notified the employee and their supervisor concerning the post incident inspections and any deficiencies requiring action.

Recommendation: The Safety Officers should adhere to Directive 03-15, Handling Personal Protective Equipment Following an Injury (11/18/2003). The Safety Officer should acquire and use the required "Evidence" tag from FEI in accordance with the Directive. Consider updating the workflow to better define process when handling confiscated property.

Post incident PPE evaluation revealed deficiencies with all injured personnel's PPE. These deficiencies range from minor, missing manufacturer tags, to major, purposefully attempting to pass a non-NFPA compliant helmet as an approved NFPA compliant helmet. Of the PPE inspected at Maryland Fire, it was discovered that 50% of the helmets worn by the injured firefighters were deemed deficient in some area. These deficiencies were classified as non-NFPA compliant, not meeting the NFPA reflective requirements, physical damage to the helmet itself, or exceeding the 10-year acceptable life period of a NFPA approved helmet. Of the non-issued helmets 80% were found to have deficiencies, while 100% of the issued helmets passed the inspection without noticeable deficiencies. The average age of the issued helmets worn by the injured firefighters is 4 ½ years, while the non-issued helmets averaged 8 years of service. The youngest helmet was 2 years old, while the oldest helmet was 13 years old.

There is no clear evidence that the noted deficiencies occurred as a result of the incident or if the deficiencies were present prior to the collapse. Nor is there a relationship to the PPE deficiencies and the injuries that were incurred during this incident. What is clear is that the noted deficiencies mirror the deficiencies found during the Safety Officer's annual station PPE inspections.

Recommendation: Reiterate the importance of adhering to FCGO 15-02, Helmets (1/22/2015). All personnel must adhere to the minimum standard requirements when purchasing their own helmets prior to requesting approval to wear in the field.

[7] MCFRS – Handling PPE Following an Injury – Directive 03-15 (11/18/2003)

Recommendation: Station Officers need to be compliant and enforce Policy Number 804, Protective Clothing and Equipment (8/3/1995)[8]. Specifically, station officers are responsible for conducting safety inspections of protective clothing used by personnel in their command; are responsible for ensuring that protective clothing used by personnel is cleaned annually; and leather helmets must be properly maintained in accordance with the manufacturer's instructions. Consider updating Policy 804.

Recommendation: Consider developing a training program focused on performing a NFPA 1851 compliant PPE inspection. The standard addresses requirements that apply to structural firefighting protective ensembles and individual ensemble elements, including garments, helmets, gloves, footwear, and interface components. Criteria cover selection, inspection, cleaning and decontamination, repair, storage, retirement, disposition, special incident procedures, verification, and test procedures.

SCBA

All involved SCBA units including facepieces were sequestered, inventoried, documented and sent to the MCFRS SCBA shop manager. The shop manager performed a post incident inspection, testing, and if necessary, repair of the affected units. All the SCBA units were found to be operating within factory specification as they each passed a functional flow test at the facility in the condition the units were found. The SCBA have been cleaned, dried, and tested again after making some harness repairs and returned to their stations. An inspection of the facepieces revealed no abnormalities[9]. The facepieces were cleaned and returned to their respective owner.

During the incident, one firefighter experienced an SCBA emergency which required the firefighter to initiate a buddy breathing procedure. During this period, and while the building was failing, the firefighters VIBRALERT activated and after two breaths stopped alerting, the Heads-Up Display (HUD) lights flashed red within the facepiece and then went blank. A total air depletion was never experienced. The firefighter understanding that an SCBA emergency was taking place, initiated an emergency buddy breathing procedure with the officer. Both firefighters exited the collapsed structure together while buddy breathing. It must be noted this firefighter's normal donning procedure was interrupted while having to reposition a piece of apparatus prior to completing the donning of the SCBA to begin fireground operations.

[8] MCFRS – Protective Clothing and Equipment – Policy Number 804 (8/3/1995)
[9] MCFRS – MEMO – SCBA Evaluation from Churubusco Incident – Buddy Rogers (3/18/2016)

Recommendation: Continue recruit and in-service mayday training for firefighter self-rescue, safety, and survival techniques.

MCFRS treated this SCBA emergency as a near miss event within this incident. Extensive discussions emerged concerning the current Scott 4.5 Air Pak and its reliability. Key MCFRS organizational leaders and subject matter experts met regarding this issue. The group reflected over the last ten years of reported SCBA issues. It was determined that most, if not all of the reported issues have been engineered out of the product. Two of the most recent issues centered on the Rapid Intervention Company Universal Air Connection (RIC UAC) leaking at the assembly. This issue is being addressed by replacing the UAC assembly as the units rotate through their scheduled flow test. A best practice memo was developed and disseminated to the MCFRS personnel addressing immediate practices to eliminate potential failures in the field. It must be emphasized, MCFRS SCBA are highly reliable, and are inspected, tested, and maintained to the highest professional standards[10].

An immediate limited field test was conducted in attempts to recreate the SCBA failure requiring the firefighter to initiate the buddy breathing procedure. The problem could not be recreated based on the parameters described by the firefighter. The MCFRS shop manager reached out to partnering certified Scott repair facilities as well as Scott Safety to see if similar failures have been reported. Based on the shop manager's research, it was discovered that Loudoun County Fire, Rescue, and Emergency Management was aware of the issue and was able to replicate the problem.

Using the Loudoun County findings as a framework, the SCBA shop manager designed a test sequence on the Posi Chek test machine, utilizing the same SCBA that experienced the failure on the incident. Below is the memo from the MCFRS SCBA shop manager outlining the initial baseline testing, scenarios, results, and the conclusions:

[10] MCFRS – MEMO – SCBA Best Practices – Chief Stephen Jones (3/31/2016)

MONTGOMERY COUNTY FIRE AND RESCUE SERVICE

SCBA Shop

M E M O R A N D U M

April 27, 2016

TO: Assistant Chief John Gallo

FROM: Buddy Rodgers, SCBA Shop Manager

SUBJECT: Summary of Churubusco Fire SCBA#0087

This is a post injury summary of my findings of SCBA # 0087 in which a firefighter buddy breathed with his officer after a building collapse to exit the building. Based on the information I was given, I created the following situations on the Posi Chek test machine in the SCBA Shop using SCBA #0087 and cylinder OM 32140, the SCBA and cylinder that were involved.

Initial Inspection and Test
Facepiece-passed, Cylinder had 1900 psi of air remaining; the regulator purge knob was operational but somewhat hard to turn. The SCBA passed functional flow test and visual inspection with no adjustments.

All scenarios were completed using SCBA#0087 and cylinder OM 32140 starting at approx. 2000 psi on Posi Chek test bench. In all this SCBA was on the breathing machine at different breathing rates for some 45 minutes with no abnormalities.

Scenario #1
Cylinder valve turned on just enough to maintain a 100 lpm breathing rate with test bench inlet pressure and cylinder gauge pressure remain equal during breathing cycle. Then the cylinder valve was closed only as much as the valve ratchet mechanism would allow (approximately 1/3 turn) simulating a situation where the wearer would fall back and strike the cylinder valve hand wheel.

Result #1
SCBA maintained normal conditions breathing at 100 lpm until cylinder was turned just 1/3 toward closed then pressure decreased at reducer and test bench causing low cylinder condition with vibralert sounding and red flashing HUD LED displayed eventually resulting in zero air pressure with pressure trying to rebuild on exhalation while cylinder pressure was at 1800 psi.

Scenario #2
Cylinder valve turned on just enough that vibralert stops then set breathing rate at 100 lpm. The cylinder pressure and SCBA remote gauge pressure remained equal during breathing cycle. Then breathing rate is increased to 130 lpm.

Montgomery County Fire & Rescue Service
SCBA Service & Repair Center

14935B Southlawn LN STE B205 Rockville, MD 20850 Shop 240-777-2221, Fax 301-840-2340

Result #2

Increasing the demand for additional air volume caused a low cylinder condition with vibralert sounding and red flashing HUD LED displayed eventually resulting in near zero air pressure with pressure trying to rebuild on exhalation cycle while cylinder pressure was at 1800 psi.

Conclusion

The SCBA and its components were functioning as designed as the wearer was alerted to a low pressure situation. The significant factor that remains is to what extent was the cylinder valve open. The results of the scenarios seemed similar to what the wearer reported leading to the possibility that the cylinder valve was not opened fully.

I understand that the individual reported that he did not experience a loss of air pressure to his facepiece.

Montgomery County Fire & Rescue Service
SCBA Service & Repair Center

14935B Southlawn LN STE B205 Rockville, MD 20850 Shop 240-777-2221, Fax 301-840-2340

Once considering all the dynamics regarding the need for this crew to recognize and successfully complete the buddy breathing emergency procedure, it appears the two causal factors triggering this event relate to breathing rate and the cylinder valves position in relationship to being fully open. Failure to fully open the valve when using the SCBA can result in one or more of these malfunctions:

1. Lights in the heads-up display (HUD) may change rapidly.
2. Remote gauge readings may change rapidly with inhalation.
3. Vibralert may falsely and intermittently activate.
4. Cylinder gauge may provide a false pressure reading.
5. Purge valve may not offer additional air flow.
6. Air flow to the facepiece may be sufficient while at rest, but not during strenuous work.
7. Full or partial air loss due to freezing of the cylinder valve.

Recommendation: Continue recruit and in-service training for firefighters regarding SCBA emergency procedures with specific focus regarding this issue.

Recommendation: Consider developing and disseminating a "Did You Know" communique[11] related to SCBA operations.

***The "Employee #" found in PPE status reports on the following pages is an arbitrary reference point specific only to the PPE status report.*

[11] MCFRS – Did You Know – SCBA Operations – "All the way on or not at all" – PSTA (4/4/2016)

Employee #1		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Minor stitches on shells to both coat and pants.
	Model: XTREME	
	Serial #: 4955578	
	Size: 42	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: September 20, 2015	
Structural FF Pants	Manufacturer: Globe	Missing suspenders
	Model: XTREME	Snap replaced at hem of pant liner
	Serial #: 4950519	Small patch to repair hole on pant shell
	Size: 38/30	Minor stitches on shells to both coat and pants.
	NFPA Standard & Edition: 1971	
	Manufacturer Date: August 20, 2015	
Structural FF Hood	Manufacturer: Life Liners	Greater than 10-years old
	Model: 9723S	Hood retired
	Serial #: 218	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: September 2005	
Structural FF Boots	Manufacturer: Pro Warrington	Condition Good
	Model: 3009	
	Serial #: 41326G	
	Size: 10 EEE	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: Unknown	
Structural FF Helmet	Manufacturer: MSA	Helmet was intentionally mis labeled to appear to be an NFPA approved Sam Houston N6A helmet. Helmet removed from service.
	Model: N5A Yorker Leather	
	Serial: 44180161301	
	Size: Medium	
	NFPA Standard & Edition: No	
	Manufacturer Date: Unknown	
SCBA Harness	Manufacturer: Scott	Good visual inspection
	Model: AP50	Passed functional flow test
	Regulator: 0502010390AF	Purge Knob somewhat difficult to turn
	Harness #: 0087	
	Reducer: 0502008688AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2005	
SCBA Cylinder	Manufacturer: Luxfer	Condition Good
	Model: L65M-2	
	Manufacturer Date: September 2004	
	Pressure Found In Cylinder: 1900psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Employee #2		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Replaced storm flap velcro; C; reseal portions of the seam seal tape; Minor stitching to coat
	Model: XTREME	
	Serial #: 3972569	
	Size: 44/35	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: March 2010	
Structural FF Pants	Manufacturer: Globe	Minor stitches to pants
	Model: XTREME	Missing suspenders
	Serial #: 3970715	repair 4 small patches to pant shell
	Size: 38/30	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: March 20, 2010	
Structural FF Hood	Manufacturer: Life Liners	No date; hood retired
	Model: KL23	
	Serial #: Unknown	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: Unknown	
Structural FF Boots	Manufacturer:	Employee using department sponsored study boot.
	Model:	
	Serial #:	
	Size:	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: Unknown	
Structural FF Helmet	Manufacturer: Cairns	No eye protection; Condition good
	Model: N6A Houston	
	Serial: 4609446101/00183159	
	Size: 7 5/8	
	NFPA Standard & Edition: No 1971	
	Manufacturer Date: April 20, 2014	
SCBA Harness	Manufacturer: Scott	Condition Good
	Model: AP50	Passed functional flow test.
	Regulator: 0202010029AF	
	Harness #: 0354	
	Reducer: 0502008572AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2005	
SCBA Cylinder	Manufacturer: Luxfer	Condition Good
	Model: L65M-2	
	Manufacturer Date: September 2004	
	Pressure Found In Cylinder: 1000psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Employee #3		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Minor stich repair to coat shell
	Model: XTREME	
	Serial #: 4778459	
	Size: 44/35	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: October 20, 2014	
Structural FF Pants	Manufacturer: Globe	Condition Good
	Model: XTREME	
	Serial #: 4681912	
	Size: 36/30	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: April 2014	
Structural FF Hood	Manufacturer:Lifeliner	Condition Good
	Model: N/A	
	Serial #: N/A	
	Size: N/A	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: Unknown	
Structural FF Boots	Manufacturer: Warrington Pro	Condition Good
	Model: 3009	
	Serial #: Unknown	
	Size: 10.5 D	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: Unknown	
Structural FF Helmet	Manufacturer: Cairns	Helmet is thirteen years old and crack found in shell, front brim. Helmet retired.
	Model: 1010	
	Serial: MC16031401	
	Size: Large	
	NFPA Standard & Edition: No 1971	
	Manufacturer Date: March 2003	
SCBA Harness	Manufacturer: Scott	HUD malfunctioning constant amber LED flashing , Large tear in left shoulder harness, Crack in console lens. Past functional flow test.
	Model: AP50	
	Regulator: 0502009321AP	
	Harness #: 0097	
	Reducer: 0502008142AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2005	
SCBA Cylinder	Manufacturer: Luxfer	Condition Good
	Model: L65M-2	
	Manufacturer Date: January 2005	
	Pressure Found In Cylinder: 1100psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Employee #4		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe Model: XTREME Serial #: 4534031 Size: 44/35 NFPA Standard & Edition: 1971 Manufacturer Date: April 20, 2013	Large patch to repair hole in coat shell. Small patch to repair hole in coat. Minor stitch repair to coat shell. Reseal portion of seam seal tape.
Structural FF Pants	Manufacturer: Globe Model: XTREME Serial #: 3488104 Size: 40/30 NFPA Standard & Edition: 1971 Manufacturer Date: October 2007	Minor stitch repair on pants. Reseal potion of seam seal tape.
Structural FF Hood	Manufacturer: Lifeliner Model: KL23 Serial #: N/A Size: N/A NFPA Standard & Edition: 1971 Manufacturer Date: N/A	Hole in hood; Hood retired
Structural FF Boots	Manufacturer: Warrington Pro Model: 3009 Serial #: N/A Size: 10.5 E NFPA Standard & Edition: 1971 Manufacturer Date: Unknown	Condition Good
Structural FF Helmet	Manufacturer: Metro Model: 660C Serial: 23004681167 Size: Large NFPA Standard & Edition: 1971 Manufacturer Date: November 2006	No problems found. Helmet due to retir in November 2016. Ok to return to service.
SCBA Harness	Manufacturer: Scott Model: AP50 Regulator: 0502010404AF Harness #: 0088 Reducer: 0502008669AB NFPA Standard & Edition: 1981/2002 Manufacturer Date: February 2005	Harness straps cut to remove firefighter. Cylinder hanger bracket severly bent Passed functional flow test.
SCBA Cylinder	Manufacturer: Luxfer Model: L65M-2 Manufacturer Date: February 2005 Pressure Found In Cylinder: 3200psi	Condition Good
Facepiece	Manufacturer: Scott Safety Model: AV3000HT Manufacturer Date: May 2014	Condition Good

Employee #5		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Condition Good
	Model: XTREME	
	Serial #: 4784025	
	Size: 44/32	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: November 2014	
Structural FF Pants	Manufacturer: Globe	Condition Good
	Model: XTREME	
	Serial #: 4673426	
	Size: 34/28	
	NFPA Standard & Edition: 1971	
	Manufacturer Date:	
Structural FF Hood	Manufacturer: Life Liners	Hood retired
	Model: 9723ES	
	Serial #: N/A	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: N/A	
Structural FF Boots	Manufacturer: Warrington Pro	Condition Good
	Model: 3009	
	Serial #: N/A	
	Size: N/A	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: N/A	
Structural FF Helmet	Manufacturer: Mornin Pride	Helmet 11 yearls old, found crack on right side of brim, helmet is to be retired.
	Model: Ben Franklin 2	
	Serial: mph0168937	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: September 2004	
SCBA Harness	Manufacturer: Scott	Passed functional flow test.
	Model: AP50	
	Regulator: 0502010360AF	
	Harness #: 0359	
	Reducer: 0502008420AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2004	
SCBA Cylinder	Manufacturer: Luxfer	Condition Good
	Model: L65M-2	
	Manufacturer Date: February 2004	
	Pressure Found In Cylinder: 3700 psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Employee #6		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Repair Velcro to neck of coat shell liner. Repair Velcro Pockets. Minor stitches to coat. Reseal portion of seam seal tape.
	Model: XTREME	
	Serial #: 3768218	
	Size: 42/35	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: February 2009	
Structural FF Pants	Manufacturer: Globe	Minor stitch repair to pants.
	Model: XTREME	
	Serial #: 3850142	
	Size: 38/30	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: July 2009	
Structural FF Hood	Manufacturer: Life Liners	Condition Good
	Model: 9723ES	
	Serial #: 037904	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: January 2014	
Structural FF Boots	Manufacturer: Pro Warrington	Condition Good
	Model: 3009	
	Serial #: N/A	
	Size: 9.5 E	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: N/A	
Structural FF Helmet	Manufacturer: Mornin Pride	Reflective trim not NFPA compliant.
	Model: Ben Franklin 2	
	Serial: 1104006272	
	Size: Large	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: April 2011	
SCBA Harness	Manufacturer: Scott	Condition Good.
	Model: AP50	Passed functional flow test.
	Regulator: 0502009085AF	
	Harness #: 0162	
	Reducer: 05002008533AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2005	
SCBA Cylinder	Manufacturer: Luxfer	Damage to valve bumper
	Model: L65M-2	
	Manufacturer Date: February 2005	
	Pressure Found In Cylinder: 2200 psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Employee #7		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Minor stitches to shell of coat. Small patch repair in coat shell.
	Model: XTREME	
	Serial #: 4699303	
	Size: 46/35	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: May 2014	
Structural FF Pants	Manufacturer: Globe	Minor stitches to shell of coat.
	Model: XTREME	Large patch to repair hole in pants.
	Serial #: 46999415	Small patch to repair hole in pant shell.
	Size: 38/30	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: May 2014	
Structural FF Hood	Manufacturer: Life Liners	No Date. Hood Retired
	Model: 97223ES	
	Serial #: N/A	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: No date present	
Structural FF Boots	Manufacturer: Pro Warrington	Condition Good
	Model: 3009	
	Serial #: N/A	
	Size: 11.5 E	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: N/A	
Structural FF Helmet	Manufacturer: Metro	Condition Good
	Model: 660C	
	Serial: 45727061016	
	Size: Large	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: January 2014	
SCBA Harness	Manufacturer: Scott	Passed function flow test
	Model: AP50	
	Regulator: 0502009899AF	
	Harness #: 0233	
	Reducer: 0502008281AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2005	
SCBA Cylinder	Manufacturer: Luxfer	Condition Good
	Model: L65M-2	
	Manufacturer Date: February 2005	
	Pressure Found In Cylinder: 500 psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Employee #8		
Component	**Item Description**	**Findings**
Structural FF Coat	Manufacturer: Globe	Condition Good
	Model: XTREME	
	Serial #: 4699245	
	Size: 46/32	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: May 2014	
Structural FF Pants	Manufacturer: Globe	Minor stitches on pant shell.
	Model: XTREME	2 small patches to repair hole in pant shell.
	Serial #: 4699480	
	Size: 36/30	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: May 2014	
Structural FF Hood	Manufacturer: Life Liners	Condition Good
	Model: 9723ES	
	Serial #: N/A	
	Size: Regular	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: N/A	
Structural FF Boots	Manufacturer: Warrington Pro	Condition Good
	Model: 3009	
	Serial #: N/A	
	Size: 9.5 D	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: N/A	
Structural FF Helmet	Manufacturer: Metro	Condition Good
	Model: 660C	
	Serial: 457270610117	
	Size: Large	
	NFPA Standard & Edition: 1971	
	Manufacturer Date: January 2014	
SCBA Harness	Manufacturer: Scott	Passed functional flow test.
	Model: AP50	Condition Good
	Regulator: 0502009922AF	
	Harness #: 0234	
	Reducer: 0502008755AB	
	NFPA Standard & Edition: 1981/2002	
	Manufacturer Date: February 2005	
SCBA Cylinder	Manufacturer: Luxfer	Condition Good
	Model: L65M-2	
	Manufacturer Date: July 2005	
	Pressure Found In Cylinder: 2000 psi	
Facepiece	Manufacturer: Scott Safety	Condition Good
	Model: AV3000HT	
	Manufacturer Date: May 2014	

Firefighter Injuries

Eight firefighters were injured on the fireground while conducting active firefighting duties. The injuries were caused by several events. There was an initial fall as a result of a catastrophic second story floor collapse at 19350 Churubusco Lane. This collapse exposed firefighters to significant heat and free burning fire from the basement level. The initial collapse simultaneously dropped the front of the structure onto crews operating on the Alpha side of the building. Three of the injured firefighters were on the second floor of the fire building conducting a Vent-Enter-Isolate-Search (VEIS) operation.

VEIS is a strategic operational modality, the aim of which is to provide for a rapid search of areas remote from fire in a given structure. The argument is that it is faster to ladder and enter many times than it is to work through a house to locate the victim[12]. Five of the injured firefighters were operating on the exterior of the Alpha side of 19350 Churubusco Lane. Two of these injured firefighters were supporting the VEIS operation by placing themselves on a ground ladder at the second floor window where crews entered the building. The remaining three injured firefighters were operating a hoseline on the Alpha side at the front door of the main fire building.

Figure 1 -19350 Churubusco Lane Moments Prior To Collapse

All eight of the injured firefighters were evaluated and treated on the scene and were transported by ambulance to area hospitals. One of the firefighters was later transferred from an area hospital to a referral center for better treatment of a small burn. Below is a summation categorizing the nature of injuries, their organizational impact, experience level, and their original riding position:

[12] Fire Rescue Magazine – Bread and Butter Basics – The Dangers of Vent-Enter-Search – Charles Bailey (12/7/2011)

Service Rank	FF3	**Service Rank**	Captain
Years of Service	15	**Years of Service**	26
Apparatus Position	Truck 734 Tiller	**Apparatus Position**	Truck 734 Officer
Nature of Injuries	Orthopedic/soft tissue injuries	**Nature of Injuries**	Orthopedic/soft tissue injuries
Receiving Hospital	HCH - Germantown	**Receiving Hospital**	HCH - Germantown
Lost Time	~ 6 hours	**Lost Time**	~102 hours
Service Rank	Captain	**Service Rank**	FF3
Years of Service	41	**Years of Service**	8
Apparatus Position	Rescue Squad 729 Officer	**Apparatus Position**	Rescue Squad 729 Right
Nature of Injuries	Orthopedic/soft tissue injuries	**Nature of Injuries**	Orthopedic/soft tissue injuries
Receiving Hospital	MedStar	**Receiving Hospital**	MedStar
Lost Time	~48 hours	**Lost Time**	~102 hours
Service Rank	FF3	**Service Rank**	Lieutenant
Years of Service	17	**Years of Service**	14
Apparatus Position	Rescue Squad 729 Driver	**Apparatus Position**	Paramedic Engine 729 Officer
Nature of Injuries	Orthopedic/soft tissue injuries	**Nature of Injuries**	Orthopedic/soft tissue injuries
Receiving Hospital	MedStar	**Receiving Hospital**	Holy Cross Hospital - Germantown
Lost Time	~6 hours	**Lost Time**	~30 hours
Service Rank	FF2	**Service Rank**	FF2
Years of Service	2	**Years of Service**	3
Apparatus Position	Paramedic Engine 729 Left	**Apparatus Position**	Paramedic Engine 729 Right
Nature of Injuries	Orthopedic/soft tissue injuries	**Nature of Injuries**	Minor burns
Receiving Hospital	Holy Cross Hospital - Germantown	**Receiving Hospital**	MedStar
Lost Time	~30 hours	**Lost Time**	~30 hours

Except for the suspender use, all interior operating personnel wore their PPE and had it correctly in place while performing VEIS and firefighting operations. All exterior

operating personnel wore their PPE and had it correctly in place while supporting VEIS and suppression efforts. MCFRS PPE is of high quality and is designed when worn correctly to allow firefighters to better withstand a sudden extreme thermal insult and the exposure protection to minimize injuries when extreme circumstance are encountered. This and the ability of personnel to properly wear their PPE limited the severity of injuries during this incident.