

June 7, 2005

Here are some facts about this incident.

The stretch of highway itself:

Six-lane straight, fairly flat

Average speed 75 MPH, posted 65 MPH

The scene of three fatal crossover crashes in the last six years

The scene of many other serious crashes

Approximately 3 miles of south of our crash was a fatal crash that killed a police officer and firefighter in the late nineties. (Another jurisdiction)

The fire engine:

1990 costume; 750-gallon poly water tank; GVW 40,000

Limited rear warning lights (two red rotating beacons)

No amber warning lights

No side warning light

No reflective stripping on the rear

The incident: *Alarm time 13:28 On scene E4 13:38, M2 1344 Crash 13:56*

Engine 4 responded from other incident

Medic 2 responded from out of the city returning from the hospital

Engine 4 on scene approximately 12 minutes when struck

Police cruiser already on scene right behind the patient vehicle

Police officer went to sit in his car once engine crew assumed patient

Engine 4 positioned behind the police cruiser approximately 30 feet

Medic 2 was approximately 50 -70 feet in front of the engine

Tractor-trailer traveling at highway speeds with traffic (70-75MPH) when it struck the engine

Tractor-trailer traveled several hundred feet before coming to rest

Lessons learned:

Positioning apparatus does work (our incident saved ten lives)

Limit time on highway

Have police position upstream in traffic to provide advanced warning

Use big apparatus to provide barrier

Position a spotter whenever possible to monitor traffic

After incident considerations:

What will insurance cover; yours or the other party's

We received \$110,000 replacement cost \$264,000 (\$80,000 apparatus, \$30,000 equipment)

How is your fleet currently insured, do you specify replacement cost (we do not)

What do have in reserve; our replacement time was 13 months

Operational improvements

We now send a safety officer to all crashes on the interstate and major roadways
We provide more rear facing warning lights, red and amber
We continue to block one additional lane of traffic to provide a buffer
Anytime we have an extrication or a working fire we shut the entire roadway / side of highway down until extrication complete or fire extinguished. During overhaul and clean up we allow monitored traffic flow.
We place more safety cones to define the work area

Beavercreek Fire Department Demographics

Combination career and Part-time personnel

45 career personnel

80 part-time personnel

Four stations covering 50 square miles

Responsible for covering 2 jurisdictions

City of Beavercreek 28- square miles

Beavercreek Township 22-square miles

Population just over 50,000

The Beavercreek Township governs Fire Department

Annual budget approximately \$7.2 million

Average response time 5.25 minutes

Annual call 4800 (3800 EMS related)

Apparatus staffing:

4 Engines with 2 personnel

3 Medics with 2 personnel

2 Squad (EMS 1st responder) with 2 personnel

2 Ladders cross-staffed by medic crew when available

1 Rescue cross-staffed by medic crew when available

1 Tanker cross-staffed by engine or squad crew when available

Alarm Assignments

EMS calls medic and squad or engine (4 personnel)

Vehicle crash medic, squad, engine, safety officer and battalion chief (8 personnel)

Vehicle crash (**trap**) medic, squad, engine, rescue, safety officer and battalion chief (10 personnel)

Fire alarms and nuisance fires 1 engine and Battalion chief (3 personnel)

Structure Fire 3 engines, 1 ladder, squad, rescue, mutual aid engine (RIT) battalion chief (15-17 personnel)

Vehicle fire engine, rescue (when available), and battalion chief (3-5 personnel)

Average daily staffing 17 with an allowable level up to 21

Kevin, here are a couple of my thoughts on a few items that I feel helped to protect us.

The fact that the truck struck the rear of the engine may have allowed the water tank to absorb an immense amount of the energy generated from the impact. The poly water tank was disintegrated, and the water was dumped out of the bottom of the

damaged tank. I feel this could have dissipated the energy from the impact. I have nothing scientific to base this on, however look at what the highway department uses to protect immovable objects. Many times they use plastic barrels filled with water. I feel that the poly water tank may have acted in the same manner.

The separation distance between the fire engine and the patient's vehicle provided a buffer when the engine was hit. This distance prevented the engine from encroaching on the incident itself. Essentially the engine identified the outside edge of the cold zone if you want to equate it to Haz-mat zones. The patient's car and the medic were in the hot zone.

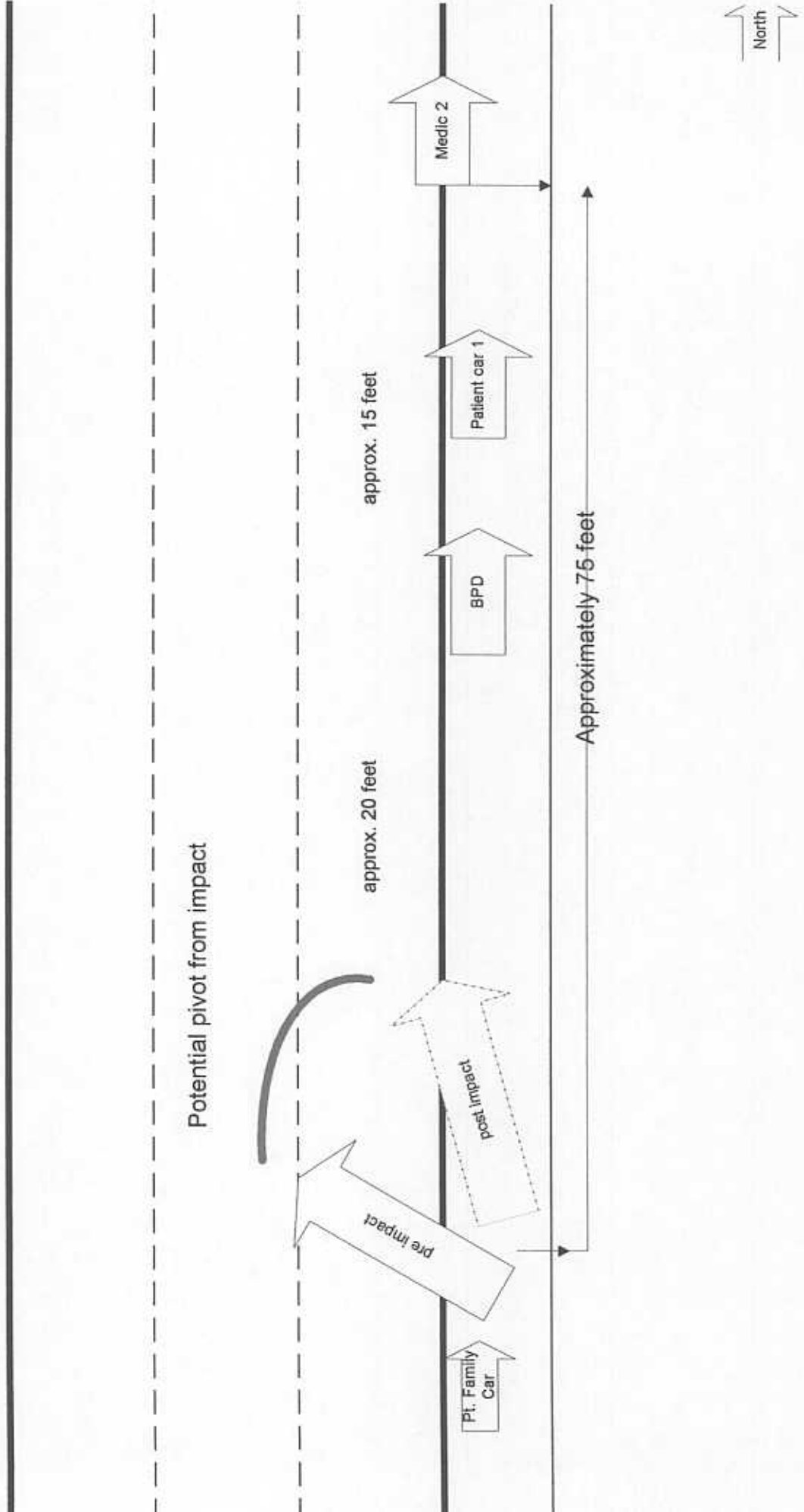
I placed the engine with the cab towards the shoulder. This allowed crews to safely exit the apparatus out of the flow of traffic. I have been told that by positioning this way will funnel and aim traffic into the incident. I think that positioning the cab in a position close to moving traffic places the crew at risk when exiting and reentering the apparatus. Primarily upon arrival and leaving the incident, when other safety precautions are not in place. I have often wondered what would have happened if I position the cab in a manner where the cab was closet to moving traffic when it was struck. The cab is generally lighter and more solid than the rear body and water tank. Had the cab been struck would it have caused the engine to spin into the incident scene? I don't have the answers. I was wondering if these were items you are going to address in your training. I have placed the engine in a fashion that would place the heaviest part to get struck first, thinking that be the best way to absorb the energy of the impact and protect the scene the best.

One thing I have found to work well at gaining control of the traffic flow on the highway is to shut it down in your direction of travel for a few minutes, get a slight back up and then release the traffic. This slows the speed of traffic as they pass by the scene. This is a way of allowing the traffic to continue in a manner that provides the crews a safer working environment. We don't do this all of the time only when we need to get control of the traffic flow.

I throw these question and thoughts out solely as food for thought and things to think about. Please refer to the attached diagram for some explanation.

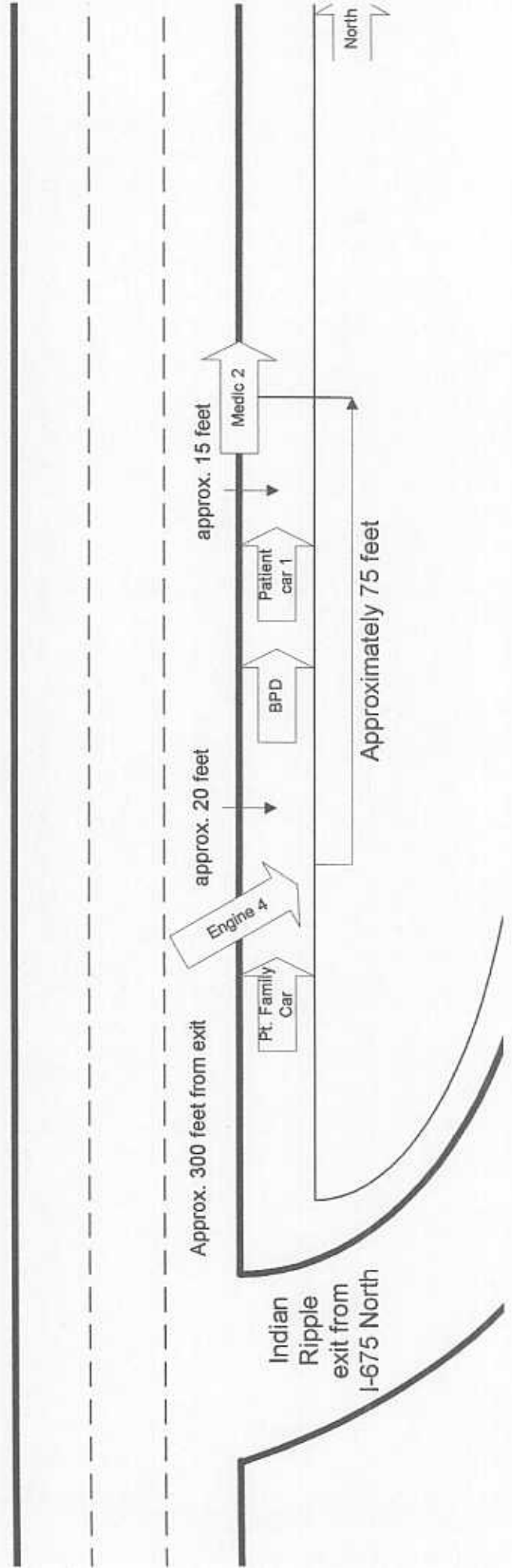
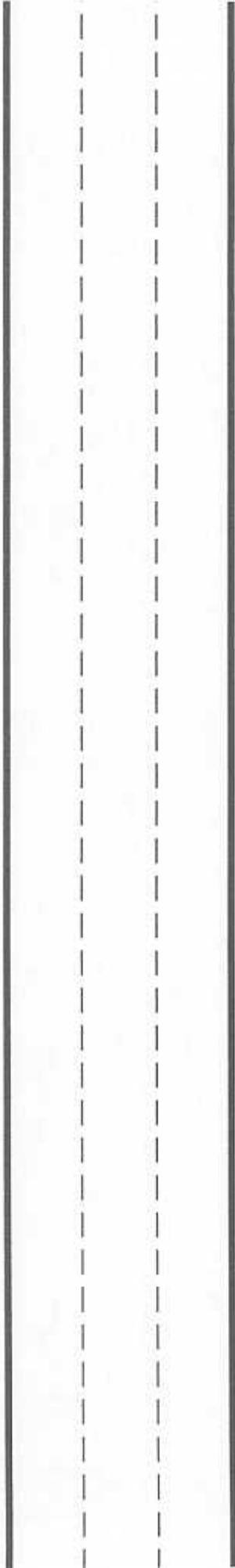
Possible apparatus movement with impact to the cab. When cab is placed in a position closest to the flow of traffic.

What are the chances of this occurring?



Indian Ripple on ramp to
I - 675 South

Tractor trailer
final position



Approx. 300 feet from exit

approx. 20 feet

approx. 15 feet

Approximately 75 feet

North

Indian
Ripple
exit from
I-675 North

Pt. Family
Car

Engine 4

BPD

Patient
car 1

Medic 2

**BEAVERCREEK FIRE DEPARTMENT
SAFETY COMMITTEE
CRASH INVESTIGATION REPORT**

Date:.....3/19/03
Safety Committee No.:.....03-017
Location of Crash:.....North Bound 675 Just South of Indian Ripple Rd. Bridge
Apparatus Involved:.....Engine 4/41, Simon-Duplex/Allegheny
(Vin No. 1D91D61E6L1008170)
Medic 2, International 4700/Wheeled Coach
(Vin No. 1HTSLAAK3YH248880)
Civilian Vehicle Involved: Volvo Semi Tractor
Freight Trailer, (Make Not Reported)
Owner: Baylor Trucking
Other Vehicles at Crash
Scene, but not Involved:.....Beavercreek Police Cruiser
2 Civilian Vehicles
Personnel Involved:.....Engine 4 (Lt. Scott Dorsten #39, F.F. Ryon Cook #410)
Medic 2 (F.F. Greg Sanders #311, F.F. John Howard #424)
Date of Crash:.....3/17/03
Time Crash Reported:.....1356 Hours
Incident No. for Crash:.....03-0951
**Incident No. for Call That
Engine 4 and Medic 2 were
On When Crash Occurred:** 03-0950

Description Of Incident:

On Monday (03/17/03) at 1328 hours, Engine 2 and Medic 2 were dispatched to South Bound 675 South of Indian Ripple Road for an infant having a seizure in a car, (See Incident Report and Medic Report 03-0950). Engine 4 and Medic 3 were on an incident at 3218 Indian Ripple when the incident on 675 came in, (See Incident Report 03-0949). Engine 4 was getting ready to clear scene at their incident when the incident at 675 was dispatched. Engine 4 cleared the scene on Indian Ripple Rd. and advised dispatch that they would take the call on 675 because they were closer. Engine 2 was canceled and went in service.

Engine 4 arrived on the scene on 675 first and positioned their Engine at an angle (Cab in burm area and back part of Engine in the right lane of South Bound 675) to create a safe and secure area on the scene to work in. Engine 4 was approximately 30 ft. from the vehicle that the patient was in. (Note: There was a

Beavercreek Police Cruiser between the patient's car and Engine 4 on the berm and an additional family members car behind Engine 4 parked on the berm). Engine 4 started patient care.

Upon Medic 2's arrival they positioned in front of the patients car on the berm approximately 30 ft. from Engine 4. Medic 2 took over patient care and loaded the patient on to their cot by securing the patients car seat on to the cot. While Medic 2's crew was treating the patient and Engine 4 was gathering their medical equipment to take back to their Engine, a Tractor Trailer Truck struck the left rear area of Engine 4. The Tractor Trailer Truck struck the left rear area of the Engine causing it to move forward towards the berm approximately 15 to 20 ft.

The Tractor Trailer Truck (While the Tractor was hitting Engine 4) lost its Saddle Fuel Tank on the right side and then the entire vehicle veered to the left. It then went across the center and left lanes of North Bound 675 in to the Medium and then across the left lane, center lane and right lane of South bound 675. It then went over the paved berm and in to the ditch and embankment between South Bound 675 and the ramp from East Bound Indian Ripple to South Bound 675 were it stopped on the embankment. The Tractor Trailer Truck went approximately 150 feet before stopping on the embankment. The Saddle Tank spun down North Bound 675 spewing fuel on to the highway (Both sides), Medic 2 and the Medium were it finale stopped.

When the Tractor Trailer hit Engine 4, it sent the contents of the rear compartment, left rear compartment, pump operators compartment, both high side compartments and part of the contents of the hose bed on to the highway. The Debris Field on the highway from Engine 4 was approximately 60 ft. wide by 100 ft long. (Note of a couple of items thrown from Engine in impact: Gas Positive Pressure Fan, SCBA Cylinder and CO2 Extinguisher were thrown approximately 100 ft. to the North of Engine 4 and landed on 675). (See diagram of Debris Field).

Heavy damage occurred to the rear of the Engine, left side of body, water tank and hose bed area. It is not known at this time if the frame is bent. The pump was displaced in its compartment behind the cab; (Pump was pushed forward toward the front of the Engine, damage to pump not known at this time. Damage to the motor and transmission is not known at this time.

Damage occurred to equipment carried on the Engine. (Example of some damaged equipment: Rescue tool, hose, appliances, hand tools, extinguishers and SCBA's and their cylinders). The majority of the equipment carried on the engine will need to either be fixed or tested before they are returned to service.

Damage to equipment was not just limited to impact damage. Some of the equipment was damaged due to exposure to diesel fuel and other fluids from the Engine and Tractor Trailer Truck. These items will need to be decontaminated and possibly tested. The body of Engine 4 also received damage from diesel fuel from the Saddle Tank and ruptured fuel tank on E4.

Damage did occur to the medic in the form of contamination from diesel fuel being sprayed onto the top of the box, left side of box, rear of box, right side of box and the left side of cab and hood. Some of the diesel fuel leaked into the left side compartments and a very small amount was sprayed into the rear inside of the box. The medic also received some damage to hood from falling debris in the form of scratches.

No damage was reported to the Civilian vehicles or Police Cruiser. It should be noted that when the Police saw what was happening he drove his Cruiser into the ditch to avoid being hit.

No Injuries occurred to any Fire Department Personnel. Lt. Dorsten and F.F. Cook ran away from the flying debris by running up a hill. F.F. Sanders and F.F. Howard were inside of the medic. No injuries occurred to any Civilians from the original call (03-0950). One Civilian received minor injuries from the crash, the driver of the Tractor Trailer Truck. Injuries were minor and he was transported to Miami Valley Hospital by Medic 4.

After the crash occurred, Lt. Dorsten advised dispatch of what had happened and called for a Trapped Response due to the damage he could see to the Tractor of the Tractor Trailer Truck. Dispatch sent Engine 2, Tactical 1, Medic 4 and Battalion Chief 1. After Lt. Dorsten found out that the driver only had minor injuries and was not trapped, he advised dispatch but kept the response coming.

A Safety Committee member was on the scene shortly after the crash occurred. After checking on crews and civilians for injuries, the Safety Committee, Acting Battalion Chief 1 (Lt. Dave Young) and Chief Thomas met briefly and discussed what needed to be done. The investigation was then started.

The following took place during the investigation:

- Initial investigation started by Lt. Mallonee
- Lt. Rob Young handled Haz Mat problems (Ex. Diesel fuel leak, damaged cylinders)
 - Inspector Henley from Prevention assisted Lt. Rob Young with Haz Mat
- Battalion Chief Smith and Inspector Grogan from Prevention photographed entire scene for the Safety Committee
- Safety Committee members Lt. Weimer and F.F. Ed Miller diagramed scene; took statements and conducted interviews
- Township Maintenance Department assisted with clean up of scene and removal of the Engine after Police and Fire Department investigations were done at the scene

Engine 4 and all of its equipment were taken to the Maintenance Garage for storage and security. Chief Thomas and Maintenance handled insurance personnel and adjusters.

Safety Committee, Chief Thomas and Acting Battalion Chief Dave Young discussed wellness of crews involved in the accident. Crews involved in the crash all stated they were fine and wished to stay at work and finish their shift. Crews were allowed to stay and finish their shift.

Statements: (Copied from the statements)

Lt. Dorsten stated:

'Engine 4 & Medic 2 were called on a Seizure pt. While on the scene approx 12 minutes, Patient & crew were at medic 2. While at medic 2 I heard a "Boom" looked back Towards the Engine and saw a large amount of debris flying towards the medic. It was then I Realized that the engine was struck.

I saw a Tractor Trailer crossing the Hwy with a fuel Tank Spinning down the Hwy into the medium.

I checked on all crews & civilians on the scene & call for additional Resources.

We then checked on the driver of the tractor trailer and downgraded the response as required.

Engine 4 was parked in Right lane & Berm.

F.F. Cook stated:

Lt. Dorsten and I were getting ready to clear the scene. I had just gathered our equipment and was beginning to walk towards the engine. At this time we were still between the medic and the pt's car, approx. 80-90 feet in front of engine. I turned back towards the Medic and at that time heard a loud "bang". I turned back towards the Engine and saw debris flying. Lt Dorsten and myself then turned to get away from the flying debris. After moving away about 60 feet uphill we turned and surveyed scene. Engine 4 had been struck and there was a large debris field across 675.

F.F. Sanders:

M2 Had 1 Rear Door open And Side PT Compartment Door open, Was Starting IV on Infant When Heard Loud Popping Sound. Original Thought Louder Than Gunshot. Infiltrated Vein pulled Needle / Disposed Look out Back Door Seen Debris Every Where And E4 Wrecked. Pt Mother Attempted To Go Toward Incident Due T another other Child Still At Her Car Waiting W/BPD For Grand Mother. Had Her Get Back Inside Medic Seat Belted Down Closed Doors Left Scene Taking Infant To Childrens Hospital. Through Out Transport Smelled Diesel.

F.F. Howard:

As paramedic Sanders began assessing Pt. For an IV Location, I heard a loud bang. Then Saw through the open door of the medic I saw the saddle tank of a vehicle spewing diesel fuel. I looked at E-4 and It had been rear ended by a semi truck.

Interviews:

Lt. Dorsten and F.F. Cook, were interviewed at Station 4. Their interview statements were the same as their written statements. (See attached written statements)

Diagrams:

--See witness statements of 4 employees involved. All put diagrams of crash scene on their statements --
--Also see diagrams made by Safety Committee Investigators of debris field and vehicle locations at the scene of the crash

Additional Information:

- Witness Statements
- Manufacturer's Record of Pumper Construction Details/Title to Vehicle
- Damaged Equipment Report for Engine
- Apparatus Check Off Sheet
- Run Reports
 - NiFERS 03-0949
 - NiFERS/EMS 03-0950
 - NiFERS/EMS 03-0951

Pictures:

- Digital
 - Hard Copy/CD-R
- 35mm
 - Hard Copy/CD-R

Contributing Factors:

- Human Error
- Unassured Clear Distance by Driver of Tractor Trailer Truck.

Conclusion:

This crash was not the fault of Lt. Dorsten or the way that Engine 4/41 was positioned on the scene at the scene. The crash was caused and is the fault of the Tractor Trailer Truck and it's driver.

Lt. Dorsten positioned the Engine correctly at the scene to protect Fire Department personnel, the Police Officer, the Patient and 4 Civilians (Family members). This correct positioning of the Engine at the scene with out question prevented serious injuries or death from occurring at this scene.

Recommendations:

The following recommendations are made to help protect Personnel working at scenes on highways and roadways in the future:

Reevaluate and update:

- Guidelines for scene safety at crash's, other medical incidents and Fires on highways and roadways
- Guidelines for positioning of apparatus on scenes of highways and roadways

- Guidelines for staging apparatus for incidents on highways and roadways
- Guidelines for positioning of staff vehicles that arrive on scene of incident on highways and roadways
- Look into the need for the possibility of upgrading emergency warning lights and directional lights on all Fire Apparatus, EMS Apparatus, Staff Vehicles and Support Vehicles
- Look into the need to carry more safety cones on Fire Apparatus (large and medium size)
- Look into carrying safety cones on Staff vehicles, Medics and Support vehicles
- Look into including the response of a Shift Commander or Safety Officer on all Highway and Major Roadway responses
- Establish a guideline for response of equipment for the following incidents:
 - Crash involving Fire Department vehicles with injuries
 - Crash involving Fire Department vehicles without injuries
 - Include Safety Committee in responses on both
- Update Crash Procedure Guidelines for Apparatus and Shift Commanders

Submitted by,

Lt. Mallonee
Safety Committee