



National Fire Fighter Near-Miss Reporting System

Carbon Monoxide Reports

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Report Number: 05-0000186
14:10

Report Date: 05/27/2005

Synopsis: I was working as a live fire instructor with fire cadets at a 1403 compliant live burn. I was assigned to the position

Demographics

Department type: Paid Municipal

Job or rank: Lieutenant

Department shift: 24 hours on - 48 hours off

Age: 34 - 42

Years of fire service experience: 11 - 13

Region: FEMA Region VI

Service Area: Urban

Event Information

Event type: Training activities: formal training classes, in-station drills, multi-company drills, etc.

Event date and time: 09/17/2004 16:00

Hours into the shift: 5 - 8

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again? Yes

What were the contributing factors?

- Human Error

What do you believe is the loss potential?

- Life threatening injury

Event Description

I was working as a live fire instructor with fire cadets at a 1403 compliant live burn. I was assigned to the position of Safety for this particular burn. I had not changed my SCBA bottle during the last two burns and my vibralert was activating as the fire was being ignited. My air ran out as the Igniter was lighting the fire. I had to communicate to the Igniter to leave and this took enough time for me to have to remove my regulator. I was down low and the air was not superheated, but I immediately became disoriented and couldn't decide whether I needed to leave. The Igniter had already left. My mind was at battle because I was having trouble convincing my body to leave, but I did crawl my way towards the stairs and was able to get downstairs and outside. Had I not gotten out, I would not have been found until after the burn. This incident was incredibly foolish and unprofessional.

Lessons Learned

1. It's amazing how quickly carbon monoxide will confuse you and make you want to lay down and die.
2. Overconfidence during training, in this case day after day burns with cadets, can make instructors lazy and complacent.

Report Number: 05-0000673

Report Date: 12/27/2005 18:14

Synopsis: Elevated CO levels found in station living quarters after apparatus and equipment checks. CO detectors fail.

Demographics

Department type: Other : PART TIME/POC

Job or rank: Fire Chief

Department shift: 12 hour days, 12 hour nights

Age: 52 - 60

Years of fire service experience: 30+

Region: FEMA Region V

Service Area: Urban

Event Information

Event type: On-duty activities: apparatus and station maintenance, meetings, tours, etc.

Event date and time: 12/27/2005 09:30

Hours into the shift: 0 - 4

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again? No

What were the contributing factors?

- Equipment
- SOP / SOG
- Decision Making
- Individual Action
- Human Error

What do you believe is the loss potential?

- Other

Event Description

A contract service does a monthly calibration of our quad-gas air monitors. This AM he found that he could not zero the CO sensors in the training room. He walked outside and was able to get a zero fresh air reading. He informed the fire chief of this. The on-duty crew was out of the station conducting training at this time. The reading on the apparatus floor was 28ppm, in the living quarters 15ppm CO. Doors were opened and the levels returned to zero within a few minutes.

When the crew returned from training, they stated that they ran the gasoline powered generator as part of the morning equipment checks but did not pull the engine out of the station while the generator ran for ten minutes. The generators are not connected to the vehicle exhaust removal system. The washrooms have exhaust fans that drew the CO into the living quarters. The CO detectors in the station did not register the elevated CO levels. After investigating the incident, it was found that the station CO detectors are past the 5 year service life and they are not the correct type for use in a fire station per the NFCs.

No one exhibited any symptoms from the CO exposure because it was of a short duration and low level, but the potential was there

Lessons Learned

Every detail must be included in SOGs, which have been changed to include taking the vehicle or piece of equipment outside while exercising/checking the generator, saws, PPV, Hurst tools. This incident will be used as a safety meeting topic and discussed at training sessions. The idea that fire fighters have a certain measure of common sense cannot be taken for granted.

The correct type of CO monitor has been ordered to comply with the NIOSH standard for CO detection in workplace settings. The commonly available household CO detector does not meet the requirements. This appears to be a little known fact from what I have found in an informal poll of area FDs.

(Added at the reporter's request after follow-up interview. Visit <http://www.cdc.gov/niosh/carbon2.html> for more information on workplace CO monitoring.)

Report Number: 05-0000685

Report Date: 01/04/2006 15:14

Synopsis: Improper levels of protective clothing worn at a natural gas leak.

Demographics

Department type: Volunteer

Job or rank: Fire Fighter

Department shift: Respond from home

Age: 43 - 51

Years of fire service experience: 14 - 16

Region: FEMA Region V

Service Area: Rural

Event Information

Event type: Fire emergency event: structure fire, vehicle fire, wildland fire, etc.

Event date and time: 12/14/2005 00:00

Hours into the shift: 0 - 4

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again? Yes

What were the contributing factors?

- Situational Awareness
- Individual Action
- Human Error
- Decision Making
- SOP / SOG

What do you believe is the loss potential?

- Life threatening injury
- Lost time injury
- Minor injury

Event Description

On December 14, 2005, we had a gas leak at a major chain hotel. I was on the rescue squad. We were told to stage out front. Over the 800Mhz radio, I hear they can smell the gas at the front of the building. I see my Chief and Assistant Chief with no gear on and a couple of firefighters with no gear on or packs. I hear on the radio they went into the building to find the leak. The leak was at the back of the building in a utility room. We clear the scene after the gas company shut the building down. They had a reading of CO in the utility room and some major code violations.

Lessons Learned

There are several lessons to be learned here. This incident qualifies as a near miss in my mind for the following reasons:

1. Personnel operating in a hazardous atmosphere need to wear full PPE. Without meters, there is no telling what the gas concentration was in the building.
2. Departments need to have SOPs for handling gas emergencies.

3. Leaders set the example for the rest of the department. With the chief and assistant chief not gearing up, others followed suit. If this action isn't corrected, it will become the norm, a dangerous practice.

Report Number: 06-0000114

Report Date: 02/21/2006 17:14

Synopsis: SCBA use necessary on every fire

Demographics

Department type: Other: POC Department

Job or rank: Lieutenant

Department shift: Respond from home

Age: 34 - 42

Years of fire service experience: 17 - 20

Region: FEMA Region V

Service Area: Suburban

Event Information

Event type: Fire emergency event: structure fire, vehicle fire, wildland fire, etc.

Event date and time: 02/10/2006 14:00

Hours into the shift: 0 - 4

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again?

What were the contributing factors?

- Accountability
- Procedure
- Protocol
- Training Issue
- Situational Awareness

What do you believe is the loss potential?

- Life threatening injury

Event Description

My department is a POC (paid-on-call) department with approximately 60 firefighters. We were toned for a barn/garage fire. At first, I was not exactly sure as to what type of structure (was on fire). An improper NIMS-based size-up was inconclusive at best. Not yet the worst (problem) of the afternoon.

Upon arrival, I saw a larger pole barn with smoke showing "Charlie" Side and our mutual aid department working with our first out engines. I kept my crew intact at the truck, at staging, awaiting orders from IC, typical protocol. I was then asked to bring my crew up for a simple task where I then began to understand we had some major problems. These problems sent me on this mission.

Our mutual aid department had a firefighter in that structure without SCBA. Even though a large door was opened for ventilation, what about flashover, explosive gases, liquids or collapse?

Last time I checked, a structure of this sort potentially contains chemicals, fertilizers and paints; not to mention carbon monoxide, carcinogens and poisons. I state for the record that there was also gas and LP tanks inside.

After further inquiry as to why someone on the fireground would blatantly disregard SOGs and protocols, I was also enlightened to the fact that the firefighter did not tag-in with the IC. NO ACCOUNTABILITY!

Less than one second could have destroyed this firefighter's life and his family's life. I would hope he, and others like him, soon understand the importance and necessity of proper training, understanding and implementing proper protocols, and following safety guidelines. If not, someday it may not be he that falls to trouble and possibly an LODD statistic, but other personnel due to his lack of following best practices.

This omission of responsibility to departmental, interdepartmental protocols and safety guidelines is inexcusable and unacceptable. I will voice my opinion assertively to my chief officers and city fathers. I feel it is certainly a setback to the industry whose goals are to reduce LODDs and firefighter injuries. However, if there is any good out of this, it does certainly fuel my need to work harder in educating and training my departmental staff about safety and progressive fire service operations. My intent is to use this as "another lesson learned." Maybe we can keep another brother/sister safe in the future!

THINK! BE PREPARED AND BE SAFE!

Lessons Learned

Proper PPE and SCBA on fireground are MANDATORY and should be donned accordingly. Accountability is a must and is a tool beneficial in keeping departmental personnel and mutual aid personnel in check. A complacent department running mutual aid should seriously consider its actions. Their actions may cause injury to themselves and to other properly trained personnel as well. The fire service today does not have room for complacency, "good'ol days" and "we always have done this" irresponsible attitudes. To impede the chances of injury or LODDs, a department must look into the future and consider the responsibilities and liability in today's fire service. Training nights should be more than a social event. Proper TRAINING IS A MUST! I believe my corrective actions are three-fold.

One: Override any IC personnel to immediately correct similar situations in the future.

Two: Discuss this situation with department chiefs so it will be resolved and reduce the risk of injury in the future.

Three: Continue to train and educate my department relative to fireground safety.

Report Number: 06-0000312

Report Date: 06/09/2006 00:18

Synopsis: Crews endangered by false reading from uncalibrated CO monitor.

Demographics

Department type: Paid Municipal

Job or rank: Captain

Department shift: 24 hours on - 24 hours off

Age: 43 - 51

Years of fire service experience: 24 - 26

Region: FEMA Region IX

Service Area: Suburban

Event Information

Event type: Non-fire emergency event: auto extrication, technical rescue, emergency medical call, service calls, etc

Event date and time: 06/04/2006 18:24

Hours into the shift: 9 - 12

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again? Uncertain

What were the contributing factors?

- Situational Awareness

What do you believe is the loss potential?

- Life threatening injury

Event Description

At 1824 hrs, our rescue was dispatched to a reported cardiac arrest. As Captain in the station, it is my policy to respond with our rescue from quarters on cardiac arrest call to assist them with EMS and scene safety. The rescue arrived ahead of us with the local ambulance company, with my engine following behind. The rescue and ambulance crews entered the home through the garage, which was open. The engine crew lagged behind while grabbing extra EMS equipment. As we came into the garage, we noticed a gas powered generator running, which we shut down, with two extension cords stretched into the house through a partially closed door. The power was off in the home and we found the rescue crew assessing a patient on the floor who was unconscious, unresponsive with pulses and respirations, lying supine on the floor with minor facial injury. Her friend who had found her could give us no medical history, but did say he had seen her earlier, about 5 hrs prior, and she had been fine. As the medics ran through their algorithm, I began to open the blinds for light and windows for air circulation. The outside temp was above 100 degrees and the interior of the home was stifling. I also began to run an algorithm in my head and called to my engineer outside to bring in one of our 4 gas monitors. My station is the Technical Rescue Team for our department and the 4 gas monitor is carried on all the TRT units there. He also brought with him the standard department issued Carbon Monoxide monitor found on all of our engine and truck companies. At this time, I informed my rescue crew that I felt she had been overcome by Carbon Monoxide and there was an urgency to vacate the house. As they were fitting her for a c-collar, my engineer began reporting his readings. The first from the garage was 35ppm. As he entered the house from the garage, it rose to 350ppm. These reading were from our 4 gas monitor with the standard monitor reading "000"ppm. At that time, I ordered every one out with the medics rapidly placing the patient on a flat

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and carrying her out. My engineer, knowing that with the monitor in hand that he was to be wearing his SCBA, began to open all windows in the house with the master bed room having a reading exceeding 500ppm. This reading overloaded the sensor and disabled the monitor. The standard monitor continued to read "000"ppm. I called over the radio to dispatch our heavy rescue to assist with PPV. They carry a portable generator and electric blower as well as gas monitoring equipment. Our patient was transported from the scene in critical condition but beginning to regain some consciousness. We remained on scene with CO levels lowering below 25 ppm. after 1 hour of continues PPV.

Lessons Learned

I had become tunnel visioned by our initial dispatch of cardiac arrest aided by the "friend" calmly sitting in the home with no signs or symptoms of Carbon Monoxide exposure. I also was late realizing that a response we had gone on 5 hours earlier, just down the street, which involved a pick up truck crashing into a electrical transformer had caused an area wide black out. This was the reason for the friend being there. He had brought over the generator and set it up in the garage. I took for granted that the raised door of a 2 car garage left enough opening for carbon monoxide to escape and that the partially closed door help keep CO inside the home. Only until I heard "she had a pulse" from my medics that I began to add up all the clues that I had passed entering the house. Worse of all, the standard Carbon Monoxide monitor used throughout our department was giving false readings. If it were not for my unit having the 4 gas monitors my crew may have been exposed further to a toxic environment causing possible life threatening injury. That shift we sent out an email to our Chief of Special Operations, the department Safety Committee, Chief of training and Support Services asking the following.

When was the last time these monitors were calibrated and by whom?

When, if ever, are they checked out, and by whom?

How are they checked out?

Regrettably, I have received no answers as of this writing. In addition, the following day I worked an overtime shift at another station and found that the Captain there had been using the CO monitor from their unit to determine safe levels of Co during over haul. They had never calibrated or tested it during those times. It read "000" leading the Captain to believe the room level of CO was safe to work in with out SCBA. These generic monitors were purchased for our department by our PIO. Who purchased them at some fire conference he attended. My recommendation for mine and other departments is to purchase any equipment through an R&D process with SOP/SOG issued with them.

[Reviewers note: Further investigation revealed the CO monitor failed due to a need for regular calibration. The personnel involved in this report are now aware of this maintenance issue. CO monitors should be calibrated on a regular schedule, usually monthly, or as recommended in the user manual.]

Report Number: 06-0000412

Report Date: 08/11/2006 05:43

Synopsis: Generator, found in bedroom, cited for occupant death.

Demographics

Department type: Volunteer

Job or rank: Fire Fighter

Department shift: Respond from home

Age: 25 - 33

Years of fire service experience: 7 - 10

Region: FEMA Region I

Service Area: Rural

Event Information

Event type: Non-fire emergency event: auto extrication, technical rescue, emergency medical call, service calls, etc

Event date and time: 08/01/2006 16:45

Hours into the shift: 0 - 4

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again? Uncertain

What were the contributing factors?

- Training Issue
- Situational Awareness

What do you believe is the loss potential?

- Life threatening injury
- Minor injury

Event Description

Our department responded to a call for a question of an unresponsive person. The first Firefighter on scene determined it was a possible DOA of a middle aged man lying in bed in a bedroom. The Chief also entered the room and concurred with that assessment. The first EMT on scene was requested by the Chief to the room to make the official determination that CPR was not indicated because of obvious signs of death. While making that determination an out of place odor was smelt causing him to look around the room. It was at that point that he observed a large portable generator at the foot of the bed that was not running. This was immediately pointed out to the Chief and all personnel exited the structure. On taking CO readings, the bedroom was approx 100ppm. This number was more concerning because the bedroom was near the front door that was open since the original 911 caller found the person approx 20 minutes before the actual CO reading was taken. The scene was determined to be unsafe, further entry was accomplished on SCBA for active ventilation. Readings in other parts of the house were greater than 200ppm while the building was being ventilated.

Lessons Learned

Never assume that the scene is safe. Just because the 911 caller, another firefighter, and the Fire Chief had all entered the scene does not make it safe. Regardless of time of arrival and your role, always do your own "360" and determine scene safety. Incidents may result in tunnel vision or worse complacency. Always use all of your senses and if something does not feel right, there is probably something wrong. In this case, the EMTs sense of smell triggered him to take a full and complete look at the room, which found a

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generator that two previous people had missed. Never assume that someone else knows or is aware of the hazard. Immediate communication with command that the scene was potentially unsafe prevented additional personnel from exposure. Situational awareness was key, had the generator and the victim been in the garage CO poisoning might not have been considered. A generator in a bedroom with power to the home is very unusual. Always determine scene safety, continuously look for hazards, size up every scene, and look for possible causes to all injuries/illness/accidents.

Report Number: 06-0000476

Report Date: 09/19/2006 02:02

Synopsis: No SCBA used on vehicle fire.

Demographics

Department type: Paid Municipal

Job or rank: Fire Fighter

Department shift: Stand-by (in-station)

Age: 25 - 33

Years of fire service experience: 0 - 3

Region: FEMA Region V

Service Area: Suburban

Event Information

Event type: Fire emergency event: structure fire, vehicle fire, wildland fire, etc.

Event date and time: 09/07/2006 02:00

Hours into the shift: 5 - 8

Event participation: Involved in the event

Weather at time of event:

Do you think this will happen again? Yes

What were the contributing factors?

- Human Error
- Command
- Decision Making

What do you believe is the loss potential?

- Minor injury
- Lost time injury
- Life threatening injury

Event Description

Our Engine was dispatched at approximately 0200hrs for a brush fire. The brush fire was located in the forest preserves. We arrived on scene in 5 minutes to find a fully involved car fire. At the beginning of my shift I had been assigned to the tools, my partner was assigned the nozzle. We both have 3 years of experience. We had full turnout gear, and SCBA, I had a halligan and axe. We pulled the 1 3/4" trash line off the front bumper and proceeded to flake out the line. We staged about 15-20 feet away from the driver's door at a 45 degree angle to the door, while waiting for the engineer to charge the line. We advanced with the charged hose line and proceeded to attack the interior and driver's rear corner. The attack had used a 1/4 of the 500gal tank with no progress. We switched to a foam application to save water supply in the remote area. As the attack progressed on the rear, my officer ordered me to open the trunk and search for a possible victim. I was able to gain entry to the trunk using my halligan. The officer then ordered me to open the hood to complete the fire attack. The vehicle was just smoldering at this time. As I got the hood opened and began to fold it back, I realized that my partner and I were not wearing our masks. Mine was hanging at my side filled with foam and my head was surrounded by smoke/steam from the engine compartment.

At no time did command, my officer, engineer, or partner remind us to use our SCBA. We have trained multiple times on car fires; we always wear SCBA and have it on! One thing does stick in my head; most times the instructors are not wearing their SCBA.

We had a few other calls that night back to back and it was quite a few hours before we finally returned to quarters. I had to wash out my mask, which thankfully I did not need

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on those other calls. I was experiencing a pounding headache. I administered myself O₂ which cleared the headache. The headache was CO poisoning. We never did an incident debrief so this was never brought up; I did speak to the officer later. His response was that I got my chance to "eat some smoke".

Lessons Learned

Always mask up, even during overhaul. If you experience a problem, document it. Never leave the scene with unserviceable equipment; it may be needed on the next call.

Report Number: 06-0000521

Report Date: 10/20/2006 15:09

Synopsis: SCBA Misuse

Demographics

Department type: Paid Municipal

Job or rank: Lieutenant

Department shift: 24 hours on - 72 hours off

Age: 34 - 42

Years of fire service experience: 17 - 20

Region: FEMA Region II

Service Area: Urban

Event Information

Event type: Fire emergency event: structure fire, vehicle fire, wildland fire, etc.

Event date and time: 09/15/2006 22:00

Hours into the shift: 0 - 4

Event participation: Told of event, but neither involved nor witnessed event

Weather at time of event:

Do you think this will happen again?

What were the contributing factors?

- Protocol
- Individual Action
- Decision Making
- SOP / SOG

What do you believe is the loss potential?

Event Description

An Engine Company was preparing to operate at an interior structural fire. One member of the unit removed the regulator from the facepiece to conserve air while waiting for water. Once the hoseline was charged, he reconnected the regulator but was unable to obtain an airflow from the SCBA. The member activated the regulator purge valve in order to receive an airflow and the continued to operate.

Lessons Learned

The SCBA facepiece should be donned prior to entering the IDLH area. The inhalation of smoke or toxins can decrease the members lung function capacity inhibiting the members ability to exert enough force to release the regulator manual shutoff switch to start airflow.

The cylinder valve must be fully opened. Activation of the vibra alert is not an indication that the valve is fully open. The valve handle must be turned counter clockwise until it reaches the open stop position. If the cylinder is not fully opened, it will restrict airflow, possibly causing an extremely dangerous condition similar to mask shutdown.

Whenever a member is confronted with a situation where they have to operate using the purge valve, the member must notify the Officer and immediately leave the contaminated area, accompanied by another member.

Exposure to 1.3% of carbon monoxide will cause unconsciousness in two or three breaths and will cause death in a few minutes. Exposure to small concentrations for only a few

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seconds inhibits ones ability to think clearly, rapidly causes disorientation, and gives a feeling of euphoria compounding the risk hazard.

Report Number: 07-0000634

Report Date: 01/03/2007 18:06

Synopsis: CO monitor warns crew.

Demographics

Department type: Paid Municipal

Job or rank: Lieutenant

Department shift: 24 hours on - 72 hours off

Age: 34 - 42

Years of fire service experience: 17 - 20

Region: FEMA Region II

Service Area: Urban

Event Information

Event type: Non-fire emergency event: auto extrication, technical rescue, emergency medical call, service calls, etc

Event date and time: 11/01/2006 18:00

Hours into the shift: 0 - 4

Event participation: Told of event, but neither involved nor witnessed event

Weather at time of event: Not reported

Do you think this will happen again? Yes

What were the contributing factors?

- Teamwork
- Situational Awareness
- Command
- Decision Making

What do you believe is the loss potential?

Event Description

Members of an engine company responded to a medical emergency for an unconscious female. Arriving simultaneously was an EMS ambulance unit; they entered the building to find the unconscious female on the 2nd floor staircase. While both units initiated patient assessment, the engine officer's CO meter [brand name withheld] activated. The levels were in excess of 100 PPM and increased rapidly to 500 PPM. The officer ordered the members to remove the patient and immediately evacuate the building. A request for additional assistance was transmitted over the department radio.

With reports of occupants still in the basement, the officer and members donned proper PPE with SCBA and re-entered the building to perform a search. At the top of the basement stairs, the level of CO was now in excess of 999 PPM. The officer notified incoming units of the conditions and operations in progress. Concerned for the members' safety, the officer ensured that members did not operate alone. While searching the basement, members discovered two unconscious victims. They were removed from the building in respiratory arrest. Once outside, patient care was administered and both victims required rescue breathing. All three victims would go on to survive this ordeal.

Lessons Learned

1. As per Department procedures, the officer conferred with the EMS unit on the scene. The engine companies will remain on-scene and assist until determined that assistance is no longer needed. The officer at this particular incident conferred with the EMS unit

on scene and provided assistance. They were able to warn the EMS unit of the life threatening environment (High CO) possibly saving their lives.

2. Immediate and appropriate actions were taken to prevent loss of life. Procedures regarding operations within an IDLH were followed. Members utilized all PPE and their SCBA's while performing a search of the basement.

3. CO is a colorless, odorless, tasteless, and non irritating toxic gas. When responding to reports of unconscious victims it is a good idea to carry the CO meter to ensure a safe environment.

4. A key component of any operation is communications. Notifying incoming units to conditions while they are responding helps members prepare for necessary actions prior to arrival.

Report Number: 07-0001097

Report Date: 10/19/2007 23:05

Synopsis: Fire Marshal suffers from CO

Demographics

Department type: Paid Municipal

Job or rank: Other : Fire Inspector

Department shift: Straight days (8 hour)

Age: 34 - 42

Years of fire service experience: 7 - 10

Region: FEMA Region I

Service Area: Urban

Event Information

Event type: Other

Event date and time: 02/22/2005 18:00

Hours into the shift:

Event participation: Involved in the event

Weather at time of event: Cloudy and Snow

Do you think this will happen again?

What were the contributing factors?

- Equipment

What do you believe is the loss potential?

- Life threatening injury

Event Description

This incident took place two years ago. We had received a new (used) vehicle to the Fire Department and the vehicle was to be used by the Fire Prevention Bureau. Over a two-week period of time, I developed a headache which unfortunately is not an uncommon thing. I get migraines a couple of times a year so I did not think anything about this headache. As the days passed, I started to become confused and disoriented. I eventually lost of consciousness and slipped into a semi-coma for 3-4 days. I passed out at home and was transported to the hospital. The day prior to passing out, I knew something was wrong and went to the Emergency Room. They marked the treatment paper as contact with Toxic substance, Carbon Monoxide and discharged me. I spent a total of one month in the hospital which unfortunately was misdiagnosed and it took a year to determine that I had become poisoned with carbon monoxide from an interior leak within the vehicle. I still receive medical treatment for what was a stroke and also have some liver and lung damage. I am extremely lucky that I regained most cognitive reasoning and thought.

Lessons Learned

The vehicle was taken out of service.

Report Number: 07-0001176

Report Date: 12/22/2007 21:41

Synopsis: Generator fills dorm with CO at station.

Demographics

Department type: Paid Municipal

Job or rank: Other: Dispatcher

Department shift: 10 hour days, 14 hour nights (2-2-4)

Age:

Years of fire service experience:

Region:

Service Area: Urban

Event Information

Event type: Other: Carbon Monoxide

Event date and time: 12/21/2007 00:00

Hours into the shift: 5 - 8

Event participation: Involved in the event

Weather at time of event: Cloudy and Snow

Do you think this will happen again? Yes

What were the contributing factors?

- Command
- Equipment
- Human Error
- Other
- Decision Making

What do you believe is the loss potential?

- Other
- Lost time injury
- Life threatening injury

Event Description

The Ladder Company in a two company fire station returned from a mutual aid incident. The Engine Company had remained in quarters. Pulling up to the station, the crew noticed smoke or vapor coming from the roof and threw the stick to investigate. The Ladder Company Officer ordered the Box transmitted for a possible fire in the attic of the firehouse. A normal full structural response of 3 Engines, 1 Ladder, 1 Division Chief, and Duty Safety Officer were dispatched. (This included the 2 companies at the incident location) While investigating the situation, members observed one of the firefighters who had not responded to the mutual aid call not feeling well. An ALS Ambulance was requested. While the first was being treated, a second was noted experiencing problems. Subsequent investigation found both firefighters with CO poisoning. Both Firefighters were transported to hospitals for treatment. One required several hours of treatment in a hyperbaric chamber before being released. CO levels in excess of 600 PPM were found in the dormitory area. During renovations, a new membrane roof had been installed over the summer. Contractors had removed a roof vent to install the roofing. The vent was not replaced and the area was sealed over. The stack ventilated the emergency generator for the station. During a period of snowy, wet weather, the generator activated. The exhaust fumes had no vent, backed up into the dormitory area, and could have ignited the roofing materials.

Lessons Learned

1. Firehouses require the same safety as other structures. There were no smoke or CO alarms installed in the station.
2. When renovations are performed at fire department facilities, inspections must be at least as thorough as any other building. In this case, jurisdiction is split between the fire dept. and the City Inspection Services Dept.
3. The situational awareness of the firefighters who had the presence of mind and courage to notice the condition of their fellow firefighters and address it promptly cannot be stressed strongly enough. It undoubtedly saved lives.
4. The actions of the initial Incident Commander, the Ladder Company Officer, in recognizing the situation, acting promptly by treating the condition like any other structure with an apparent fire and requesting a full response are exemplary. This provided adequate resources when members at the incident became victims.
5. All too often emergencies at fire stations are treated as "Big Secrets" and covered up. Had this been treated as a secret, there would have been a preventable delay in the firefighters receiving proper treatment and additional firefighters may have been injured.

Report Number: 08-0000066

Report Date: 02/04/2008 23:05

Synopsis: Car left running in the garage.

Demographics

Department type: Combination, Mostly volunteer

Job or rank: Fire Chief

Department shift: Respond from home

Age: 34 - 42

Years of fire service experience: 24 - 26

Region: FEMA Region VII

Service Area: Suburban

Event Information

Event type: Non-fire emergency event: auto extrication, technical rescue, emergency medical call, service calls, etc

Event date and time: 01/20/2008 03:30

Hours into the shift: 0 - 4

Event participation: Told of event, but neither involved nor witnessed event

Weather at time of event: Clear with Frozen Surfaces

Do you think this will happen again? Yes

What were the contributing factors?

- Situational Awareness

What do you believe is the loss potential?

- Life threatening injury

Event Description

One engine responded to a new residence for a medical call and report of a patient who had fallen with a possible head injury. The patient had fallen and was confused with an altered LOC. There was nothing to indicate it was anything other than a fall with head injury as dispatched. After the patient was loaded into the ambulance for transport (after about 20 minutes on scene and as the engine company was leaving) the spouse mentioned to the law enforcement officer on scene (a firefighter with a different department) that he also felt ill. The officer/neighbor firefighter became suspicious and asked personnel to test for Carbon Monoxide. The meter pegged at 999 ppm (its highest available reading) almost immediately. Personnel immediately evacuated the spouse and 4 sleeping children. All had neurological signs and symptoms once they were awake. The home was ventilated and further testing identified that one household member had left a vehicle running in the garage when they got home from running errands - 8 hours before. Nothing in the call had indicated it to be other than a "normal" medical for a fall and the spouse had failed to mention feeling ill until the primary patient was loaded. All personnel were on scene over 20 minutes in a very toxic atmosphere. No personnel developed any symptoms as a result. The initial patient was flown to a hyperbaric chamber and others recovered with lower blood levels. No one could smell anything at the scene and no one could hear the car running in the garage or otherwise identify that anything was unusual. Had the police officer on scene not also been a sharp firefighter and stayed long enough to visit with the husband after transport, this likely would have been a multiple fatality incident. Levels were high enough that fire and law enforcement personnel easily could have become incapacitated as well.

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Lessons Learned

Situational Awareness is critical. Maintaining a high index of suspicion for CO even on calls where it may not be involved. We have had previous medicals where something just "didn't fit". We tested and discovered CO. We have done a thorough After Action Review on this incident and personnel will be much quicker to test for CO. We are also working with our transport EMS agency and one or both of us will soon purchase a pulse oximeter with CO capabilities which would have immediately clued personnel in when applied. Additionally, the use of SCBA should have been immediately implemented once the toxic levels were identified. By that time, after twenty to thirty minutes of exposure, crews felt it was more urgent to get the kids out and stay out.

Report Number: 08-0000600

Report Date: 11/13/2008 23:59

Synopsis: CO explosion blows FFs out of structure.

Demographics

Department type: Combination, Mostly paid

Job or rank: Captain

Department shift: 24 hours on - 24 hours off

Age: 25 - 33

Years of fire service experience: 7 - 10

Region: FEMA Region III

Service Area: Suburban

Event Information

Event type: Fire emergency event: structure fire, vehicle fire, wildland fire, etc.

Event date and time: 04/03/2007 16:00

Hours into the shift: 9 - 12

Event participation: Involved in the event

Weather at time of event: Clear and Dry

Do you think this will happen again? Yes

What were the contributing factors?

- Situational Awareness
- Decision Making

What do you believe is the loss potential?

- Life threatening injury

Event Description

The engine and ambulance were dispatched for burn injuries from a flash fire. A homeowner was working on a motorcycle. Just before arrival, communications notified the engine OIC of a possible rear deck fire and asked if he wanted to send additional units. The OIC advised, "We'll be there in a minute and I'll let you know." Upon arrival, we found a two-story single family with deck fire that was running up the vinyl siding into the attic. The homeowner was running around the yard naked with his skin hanging off. The engine OIC directed his medic to assist medic crew with the patient. The OIC and bucket person pulled a line. They made a quick knock on the fire; however, gases and fire had built up in the attic. The OIC was in the foyer on the second floor and now his engine medic and firefighter were at the top of the stairs. As the OIC poked a hole in the ceiling to check for fire extension, a low order carbon monoxide explosion occurred, blowing all three firefighters down the stairs and out the front door. All three were sent to the hospital for evaluation.

Lessons Learned

Decision making - should not have been inside without other crews on scene.

Situational awareness - The OIC should have been cognizant of the gases and fire that built up in the attic.

Report Number: 09-0000172

Report Date: 02/13/2009 14:17

Synopsis: Sick call turns into CO poisoning emergency.

Demographics

Department type: Combination, Mostly volunteer

Job or rank: Fire Fighter

Department shift: 12 hour days, 12 hour nights

Age: 34 - 42

Years of fire service experience: 0 - 3

Region: FEMA Region X

Service Area: Suburban

Event Information

Event type: Non-fire emergency event: auto extrication, technical rescue, emergency medical call, service calls, etc

Event date and time: 11/07/2008 13:41

Hours into the shift:

Event participation: Involved in the event

Weather at time of event: Clear and Dry

Do you think this will happen again?

What were the contributing factors?

- Situational Awareness
- Human Error
- Decision Making

What do you believe is the loss potential?

- Life threatening injury
- Minor injury
- Lost time injury

Event Description

Our Engine was dispatched to a report of an ill female with syncope. En-route we were updated that the patient had vomited, was unresponsive, and had seizure activity. We arrived to find a small warehouse (approx. 50'x50') at a floor-covering store. The warehouse had lots of carpet and linoleum on racks. A forklift was parked in the middle of the warehouse. The patient was in a corner on the floor behind a desk, and being attended by 2 ambulance personnel who had arrived a couple minutes before us. There were two other workers in the warehouse, and a man from the business next door.

I noticed a strange smell, which I attributed to the off-gassing from new carpet and linoleum. My driver said later that he recognized the smell of forklift exhaust since he used to drive a forklift for his job. Another worker said the patient had been driving the forklift in the warehouse before she collapsed. There did not appear to be any ventilation in the warehouse currently. My officer then asked the driver to get the four gas monitor from the engine. He returned a minute later and the monitor was still going through the start-up process. Seconds later, the unit went into alarm and my driver said it was showing 320ppm CO and climbing. The driver asked the bystander from the business next door to open the warehouse roll-up door.

At that point, the patient's female CO-worker stated, "I feel sick. I think I'm going to pass out" or something to that effect. I assisted her out of the warehouse and put her on O2

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while the rest of my crew assisted the ambulance personnel with evacuating the other patient.

The man from the business next door re-entered the building to get a dog out that was still in the building. We were busy with patient care but should have secured the scene to prevent this.

My co-workers and 2 ambulance personnel were complaining of headache and/or dizziness. This incident resulted in 10 people being seen at the hospital with 2 of them getting hyperbaric O₂ treatment.

We called our state department of Labor & Industry immediately after the incident, per our department SOG. Their investigation revealed a poorly maintained forklift that produced 6% CO exhaust (roughly 60,000 ppm.). They said the business would be fined and a lawsuit would require the business to reimburse the medical costs of everyone involved.

Lessons Learned

Review CO procedures regularly. Keep a CO detector handy that has been calibrated recently (we bump test ours daily). Multiple patients with similar symptoms should be a HUGE red flag. Don't ignore strange smells. Assign someone to secure the scene immediately to prevent additional exposure. We also could have searched the building again for any other possible occupants before we left (like another dog or person unconscious behind a roll of carpet.) Carry a personal CO detector attached to your aid kit (\$200 bucks for an "always-on" electronic detector or \$1 each for reactive cards that work like ladder heat sensor stickers).

Report Number: 09-0000099

Report Date: 02/02/2009 08:53

Synopsis: CO accumulates and explodes in phone vault.

Demographics

Department type: Paid Municipal

Job or rank: Lieutenant

Department shift: 24 hours on - 72 hours off

Age: 43 - 51

Years of fire service experience: 21 - 23

Region: FEMA Region II

Service Area: Urban

Event Information

Event type: Non-fire emergency event: auto extrication, technical rescue, emergency medical call, service calls, etc

Event date and time: 09/15/2008 16:00

Hours into the shift:

Event participation: Told of event, but neither involved nor witnessed event

Weather at time of event: Not reported

Do you think this will happen again?

What were the contributing factors?

- Situational Awareness

What do you believe is the loss potential?

- Lost time injury
- Environmental
- Life threatening injury

Event Description

Units responded to an alarm where carbon monoxide was being produced in a smoking manhole and entering an occupancy through the meter room. Units requested the utility company to respond. It took 4 hours to cut the cables due to a delay in the arrival of a vacuum truck, which was used to make the manhole safe to enter. Units monitored CO readings in all exposed properties during this 4 hour wait. After the cables were cut, the utility company determined additional cables had to be cut in another manhole 150 feet away. It was also determined through meter readings that it was unsafe to enter this manhole due to high CO readings. To make it safe to enter, the utility company used fans to remove the CO from the manhole. Either as a result of fan use or natural movement, CO entered into a telephone company vault under the sidewalk 15 feet away from this manhole. Approximately 5 hours into this operation, there was an explosion in this phone company vault. The sidewalk was uprooted and a 100 pound vault cover hurled 50 feet in the air. A utility worker received injuries from the explosion.

Lessons Learned

1. Members shall establish safety zones, use full PPE, SCBA, and initiate FD SOP.
2. Try to anticipate as many underground and above ground locations as possible where CO may accumulate and include these locations in the exclusion zone.
3. When establishing safety zones, request law enforcement to keep civilians out of hazardous areas.

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4. All potential explosive areas shall be reported to operating units and all members shall be under close supervision to prevent them from accidentally entering a dangerous area.
5. Officers should consider timely relief of members to avoid exhaustion or complacency.
6. When workers from other agencies are working in potentially hazardous areas, don't assume it is safe. Continue to monitor with meters.
7. Always expect the unexpected. CO can travel to unexpected places and explode.