

Chapter IV Equipment for Firefighting

Subject 3 Investigation of PPE Failures

403.01 Objective:

1. The objective of this team shall be to thoroughly analyze and document the events leading to the personal protective equipment (PPE) failure and to make recommendations aimed at preventing similar occurrences in the future.
2. To interpret the functionality of the PPE utilized.
3. A secondary objective shall be to obtain, document and secure evidence, which may be a factor in any regulatory actions or litigation resulting from the incident

403.02 Definitions of Personal Protective Equipment:

1. The following equipment shall be designated as PPE for purposes of this procedure:
 - a. Helmet
 - b. Hood
 - c. Fire Protective Coat
 - d. Fire Protective Pants
 - e. Boots
 - f. Gloves
 - g. SCBA (including face piece)
 - h. PASS alarm
 - i. Radio
 - j. Hearing Protection
 - k. Eye Protection (glasses, goggles, face masks)
 - l. Blood borne pathogen equipment (gloves, gowns, face masks, etc.)
 - m. Hazardous Materials suits (level A, B, C)
 - n. HEPA Masks
 - o. EOD Protective Suit
 - p. PFD Life Vest
 - q. High Visibility Raincoat and Vest

403.03 Investigation Team:

1. The investigative team for review of accidents, failures, injuries or deaths in the use of personal protective equipment will include representatives from the Fire Department Administration, Training Bureau, Safety Officer and Local 48 Safety Committee as a minimum. Other department personnel, based on training and experience, may be included at the discretion of the fire chief.
2. SCBA failure or malfunction inspections will be performed by Heavy Rescue mask maintenance technicians at the direction of the Fire Department Health and Safety Officer. All findings will be forwarded to the Investigative Team for review and action. Heavy Rescue will perform testing for functionality, failure, or malfunction only. Heavy Rescue will follow their procedures for investigation of SCBA failures or malfunctions.
3. The Fire Chief shall designate the person in charge of the investigation.
4. In the event of a death, which maybe subsequently investigated by federal agencies, the investigative team from the Fire Department shall work with these federal agencies in determining the cause of the death.
5. The investigative team will assemble at the direction of the assigned Team Leader for review within one week of the incident.
6. The Investigation Team shall be separate and distinct from any fire cause investigation.
7. The Investigation Team shall report to the Fire Chief through the designated Team Leader, who shall be responsible for the management of the investigative process.
8. The duties and responsibilities of the Investigation Team shall include:
 - A. Gathering and analysis of all physical evidence relating to the incident.
 - B. Written interview summaries of all witnesses with direct or indirect knowledge of the circumstances.
 - C. Documentation of radio traffic, telephone conversations, witness statements, photographs, film, videotape and related information.
 - D. Consultation with persons having special knowledge of the factors involved in the incident, including experts and consultants from the private sector.
 - E. Liaison with other agencies involved in investigation of the incident.

- F. Development of a full written report on the incident, including conclusions and recommendations.
- 9. The Investigation Team Leader shall establish and maintain an ongoing liaison with the City Attorney, Employee Safety and Risk Management Department relating to the investigation.
- 10. Other agencies that may be involved in the investigation are:
 - a. United States Fire Administration
 - b. National Institute for Occupational Safety and Health
 - c. Cincinnati Police Department
 - d. Ohio State Fire Marshal
- 11. The Investigation Team shall utilize the resources of individuals and agencies outside the Fire Department to assist in the investigation and/or provide technical consultation when necessary. These resources include:
 - a. National Fire Protection Association
 - b. International Association of Fire Fighters
 - c. Consultants
 - d. Testing Laboratories

403.05 Initial Investigation and Preservation of Evidence:

- 1. All equipment involved in any accident, failure, injury or death resulting from the use of personal protective equipment will be preserved as evidence.
- 2. Members of the Fire Investigation Unit shall secure and preserve the equipment for utilization by the investigation team.
- 3. All preliminary investigation steps taken by company or chief officers shall be forwarded with the preserved evidence to the Fire Department Safety Officer for inclusion in the investigation, this would include:
 - a. pictures
 - b. witness reports
 - c. injury reports
 - d. accident reports
- 4. All evidence shall be forwarded no later than the next business day.

5. All members of the Fire Department shall give their full and complete cooperation to the Investigation Team.

403.06 Investigation Report:

1. The Team shall attempt to determine the result of the personal protective equipment failure and complete a report of their findings within 90 days of the failure.
2. Investigative reports shall be distributed to all fire companies and bureaus for training purposes to aid in prevention of future occurrences.
3. The report shall include facts surrounding what happened, how it happened, and actions taken to prevent future occurrences.

403.07 Prevention of Future Occurrences:

1. If problems are discovered in personal protective equipment as a result of the investigation, prompt action should be taken to prevent future occurrences.
2. If any PPE is found to be defective it will be removed from service. Affected gear shall be modified, repaired, or replaced at the earliest possible time to prevent future occurrences.
3. The Fire Department will make notification to all personnel via special notice and department e-mail of the results of the investigation that could affect their safety (i.e.: to return old style gloves) and the steps to be taken to resolve similar issues involving their personal protective equipment.
4. Review the application of standard operating procedures to the incident, the observance of procedures, their effect on the situation, and make recommendations for changes, additions or deletions.
5. If the failure was due to human error or omission then the affected members shall receive remedial training on the occurrence that caused the failure.

403.08 SCBA Inspection Procedures

1. A minimum of two Heavy Rescue mask technicians shall be involved in the entire investigation process.
2. Heavy Rescue shall begin their investigation of the SCBA at the scene by impounding the SCBA along with the face piece and obtain a statement of events from the user of the SCBA. A Form 47 stating all pertinent facts related to the incident shall be submitted prior to going off-duty.
3. The SCBA must be preserved in the exact same condition and arrangement as at the time of the suspected failure.
4. Question the user on exactly what he/she believes the apparatus did or did not do at the time of the suspected failure. The ICM 2000 and a Form 47 can be used to determine functionality.
 - a. Did the Audi-alarm or low-pressure warning device activate?
 - b. Did your face-piece collapse onto your face while in use?
 - c. Did you experience “blow-by” at the perimeter of your face-piece?
 - d. How long had you been on air prior to malfunction?
 - e. Did the system bleed down when you removed your face-piece?

Ask any and all pertinent questions that may aid in leading to the cause of the suspected failure.

The SCBA should be left in the operating position at the time of the malfunction. The bottle, doffing button and by-pass valve should be left in the identical position as at the time of the failure.

A fully opened bottle takes 4 complete revolutions to close. Mark the position of the hand-wheel on the bottle in relation to the valve shaft. If at all possible do not change the hand-wheel position on the bottle. Record the bottle serial number at this time.

5. Inspect the equipment for any visible defects or abnormalities. No invasive examination of the apparatus should take place in the field.
 - a. Check the bottle gauge. Note bottle pressure and time of use to possibly explain the suspected malfunction.
 - b. Check the outer cover off all hoses; look for abrasions, burns, cracks, and obvious holes. Check for separation at each fitting and connection.
 - c. Check the face-piece for obvious defects or damage. Make note of any upgrades and retrofits that have been made to the face-piece.

6. Based on the information obtained about the reported failure, the PosiCheck preliminary flow test may indicate whether a complete or partial test is appropriate.
 - a. Check and compare the previous PosiCheck record for the SCBA.
 - b. Test results and other information may indicate the necessity to perform a Fit Test of the member that was wearing the SCBA at the time of the failure.

7. A Chief's Report (Form 47) should be submitted to the Health and Safety Officer giving a complete and concise overview of the incident facts and findings of the investigation. All PosiCheck results and Fit Testing results should be forwarded with this report.
 - a. Include documentation that aided in the discovery or exclusion of repeatable failures.
 - b. The SCBA technicians should include a consensus of their conclusions as to the cause for the failure and any possible remedies to prevent any such failure in the future.
 - c. If the failure cannot be reproduced and there is no evidence to support that a failure did occur, the technicians should include their explanation of all possible reasons why the failure was reported.