

# Appendix 3

## **Personal Safety During Accident Investigations**

Accidents create unpredictable working conditions for personnel conducting on-scene investigations. Investigators must be prepared to immediately switch from a sedentary office environment to strenuous labor under trying circumstances, in all extremes of climate and conditions prevailing at various waterfront facilities.

Although the hazards inherent in this type work are self evident to experienced investigators, it is beneficial to summarize what past experience has taught with respect to personal safety in accident investigations. The desire to get the job done expeditiously, thoroughly, and economically can easily lead to disregard for personal risks. Perseverance, dedication, and initiative are the trademarks of Safety Board investigators. These are precious commodities that have to be preserved by the judicious application of risk controls.

### **Physical Condition**

The sudden transition from a sedentary life to strenuous activity can be hazardous, and some cautionary remarks are appropriate.

Taking a yearly physical exam is strongly recommended but it does not necessarily ensure that you are in top-notch shape with regard to the demands of an on-scene investigation. Do not expect to switch from an 8-hour office day to a 12-or more-hour day in the field without suffering some ill effects or even endangering yourself. The deleterious effect of such an endeavor can be lessened by performing regular moderate to vigorous exercise. Investigators generally agree that regular mild exercise is beneficial in warding off weight gain, and enhancing muscle tone.

Sports such as bowling and golf, while somewhat beneficial, are usually neither sufficiently strenuous nor regular enough to provide adequate conditioning effects. Instead, mild calisthenics and activities such as tennis, cycling or short periods of jogging - which can be done in place almost anywhere - can be much more beneficial. Walking also provides many of these same benefits, but must be engaged in for considerably longer periods in order to derive a comparable conditioning effect.

Contradictory as it may sound, the investigation will probably be completed quicker, and more efficiently, when the lead investigator sees to it that everybody adheres, as much as possible, to a regular working day, as soon as the investigation is in hand. This not only makes for controlled expenditure - and restoration - of energies, but it provides the opportunity to consolidate and document the day's work and to coordinate the activities

for the next one.

### **Psychological Factors**

A catastrophic accident can have a disruptive effect on the composure of those who have never been exposed to the confusion and emotions of a true disaster. One of the common defenses against the associated traumatic experiences is the irresistible urge to act, even when human lives are no longer at stake. This need for activity may seek expression without regard for endurance, personal safety, or the safety of others, and sometimes without apparent rationale. The greatest discretion should be used when attempting to guide the activities of those persons into proper channels. The calm and competent behavior of each team member and the firm but understanding leadership of the lead investigator are sufficient, in most cases, to preclude frantic or ill-advised action.

### **Protective Clothing**

Although it is impossible to plan for all conditions that may exist at a particular accident site, it is expected that every investigator will arrive at the scene equipped with basic and suitable gear. Hardhats, work gloves, safety glasses and steel toed shoes should be worn when working in shipyards, and at vessel repair facilities, inside buildings having overhead equipment, and generally, around wreckage. The use of other safety equipment, as the circumstances require, should always be made mandatory by the lead investigator.

### **Climate and Working Conditions**

The quickness of our response to a call for action precludes the chance to get acclimated to conditions that vary widely from those we are accustomed to. There is no need to elaborate on the health hazards associated with physical labor in extreme temperatures on either end of the thermometer. It might be important, however, to remind ourselves of the effects of fatigue on the safety of our performance long before total exhaustion takes place. Here again, is an area where supervisors must adjust the workload of their personnel to the circumstances. More specifically, they must be on their guard for the uncontrolled use of overtime for the sole purpose of expediting the return to the home office. The quality of the investigation is best served by management awareness of the need for mental and physical fitness until the job is done.

### **Hazards At the Site**

Our familiarity with vessels and the hazards at an accident site may make us overlook the lack of experience of those who assist us. For this reason, it is highly desirable that the lead investigator as well as each team member brief non-governmental personnel assisting in the investigation on all known hazards and established safety practices.

The possibility that the cargo may contain or consist of hazardous material must be recognized. Although these materials when carried in containers generally are properly

protected against rough handling and moderate impact conditions, it is possible that their integrity may have been compromised by the accident. The best protection against any hazards is timely coordination with shippers and vessel personnel responsible for the dangerous cargo manifest. When appropriate, and particularly in case of doubt, the manufacturers of the material involved should be consulted regarding exposure hazards and protective measures.

Vessels also carry a great number of dangerous cargoes (hazardous materials) and petroleum products. No tank or compartment that contained such products will be entered until the atmosphere has been tested for toxicity and flammable vapors and for sufficient oxygen for breathing. Vessels are required to have portable test equipment to enable the crew (normally the Chief Mate) to conduct such tests. However, when a vessel is in port the testing is required to be conducted by a certified marine chemist. No compartment should be entered until it has been certified as "safe for men."

### **Accidents Involving Hazardous Materials**

Hazardous Materials are substances which can produce injury during accidents in any of the following ways:

- o Chemical injury--whenever the substance is ingested, inhaled or comes in contact with the skin.
- o Thermal injury--whenever the substance freezes or burns tissue.
- o Asphyxiation--whenever the substance displaces oxygen needed to sustain life.
- o Radiation injury--whenever a radioactive material emits radiant energy or particles that can damage living organisms.
- o Disease--from microbiological agents.
- o Mechanical injury- when you are injured by explosive fragments, rocketing containers, explosive over-pressures and the like.

To avoid such injuries to investigators, the following four steps are suggested.

1. EXPECT
2. WAIT
3. FOLLOW
4. DON'T

1. **EXPECT** that hazardous materials (HM) may be present in any accident involving cargo damage until you have ruled out their presence. An investigator should always search for indications of the possible presence of hazardous materials in any accident. These materials may be indicated by warning placards or signs, labels on packages, shipping papers, or verbal information from people at the scene. You should recognize the warning placards and labels described in the regulations. Hazardous materials may be dangerous while they are still in their containers or if they have escaped from their containers. The principle is to scan the wreckage to rule out their presence: assume that hazardous materials can be present until you have conclusively established that they are not.
2. **WAIT** until potential energy transfers such as fires, explosions, vapors, breached radioactive materials containers, etc., have been eliminated. Hazardous materials can be emitted in many ways for many reasons. Even worse, it is almost impossible to tell precisely when they will react and envelop the danger zone with you in it.

Unless you have a compelling reason to go aboard the vessel or enter the accident site while the hazardous materials containment systems are under mechanical or thermal stress, wait for those potential energy transfers to be eliminated. Alternative methods for acquiring evidence can be utilized. For example, aerial photographs, interviews with witnesses whose duties require them to go into the wreckage area, and subsequent examination of physical debris may provide the evidence you need. Consider the tradeoff between the value of the data you need now from the accident site, and the risks to your safety. Stressed containers should be considered to have the potential for abrupt rupture. The contents should be considered to have the potential for an explosion until you have clear and convincing evidence to the contrary from informed experts.

3. **FOLLOW** others into the wreckage rather than leading others into the wreckage. A good rule of thumb is to stay away from the vessels or accident site containing hazardous materials until a certified competent expert has certified the area as safe to enter. Check his/her credentials, and ask questions regarding the behavior of the hazardous materials in the accident to satisfy yourself that he/she is truly knowledgeable. From his/her predictions, satisfy yourself that any expected problems pose no threat to your personal safety. In those circumstances, you may wish to follow him/her into the wreckage area. Your ability to predict how the hazardous materials will behave is poor, because this is not your role in an accident investigation. (In the US if assistance or information is requested of you, refer the person making the inquiry to the CHEMTREC emergency toll free telephone number (800-424-9800) for expert advice and assistance. Obey evacuation instructions of police and firemen.) In no event should any investigative personnel follow firemen or other emergency or rescue personnel into the wreckage area. A rule of thumb is to stay at least 2,000 feet away from any fires burning in wreckage where hazardous materials are present.

4. **DON'T** take chances. If you have any uncertainty about potentially destructive hazardous materials behavior in an accident area, don't take chances by entering the wreckage. There is very little to be gained and much to be lost if you risk your own safety. Remember, your role is to determine what happened, and not to be a part of what is happening.

### **Wreckage Involving Radioactive Materials**

Shipment of radioactive materials may create hazards requiring special precautions and procedures in the course of accident investigations.

Where there is damage to cargo, it should be determined as soon as possible whether or not radioactive materials were involved in the accident. The vessel involved should have a manifest that shows whether radioactive materials are involved. Deck Officers should be contacted immediately to determine if radioactive materials were involved.

When it is determined that radioactive material is in the damaged cargo, the lead investigator is responsible for assuring that all investigative personnel are so informed and that adequate precautionary measures are taken to avoid exposure to contaminated areas. Seek expert advice before entering or allowing anyone on the investigative team to enter an area of suspected contamination.