

Investigator Safety Frank Del Gandio



Investigator Safety

- Good health is a prerequisite
- Sound physical condition for withstanding strenuous outdoor activity
- Control of one's emotions due to the disruptive effect of a disaster
- Calm and competent behavior to preclude frantic or ill-advised action
- Suitable gear for the climate and terrain
- Wearing gloves when handling wreckage

Investigator Safety (Cont.)

- The effects of fatigue on the safety of one's performance starts long before total exhaustion takes place.
- The workload should be adjusted to the circumstances; more may be accomplished in a well organized 6-hour day than in an unorganized 12-hour day.
- The quality of the investigation is best served by an awareness of the need for mental alertness and physical fitness.

Investigator Safety (Cont.)

- At high elevations, portable oxygen and other emergency equipment should be available.
- Unexpected weather or equipment failures may isolate the investigation team in remote area; therefore, provisions for first aid, shelter, food, water, and fuel should be made before the need arises.

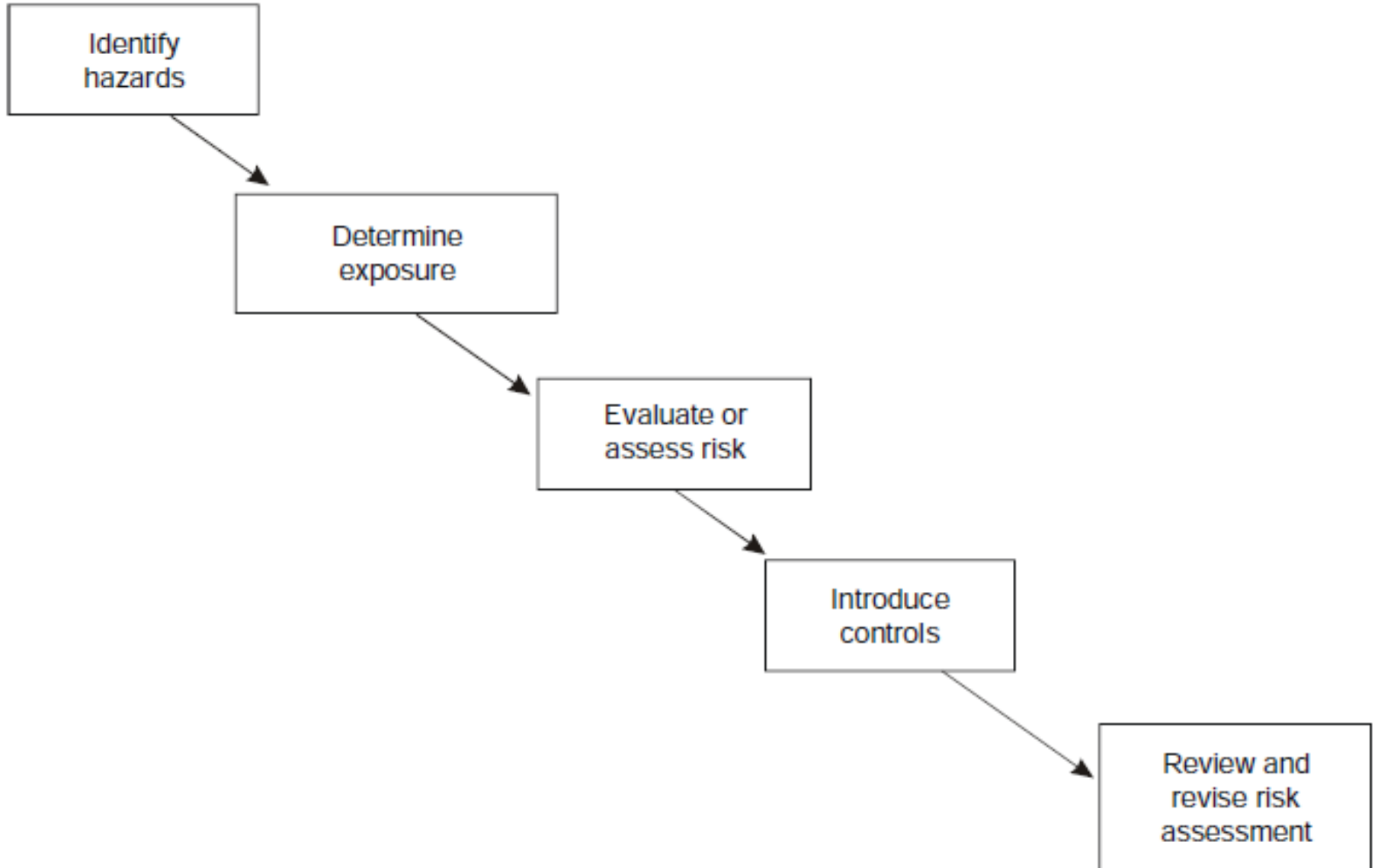
Investigator Safety (Cont.)

- The buddy system and a logging in and out system for personnel for remote area operations.
- Reliable communications between the investigation headquarters and the various activity scenes should be maintained by telephone, walkie-talkie, or long-range radio equipment.

Investigator Safety (Cont.)

- The use of helicopters at inaccessible accident scenes is extremely dangerous; coordination between the helicopter crew and the investigating team is a must.
- When the crash scene is in water, only fully qualified and properly equipped personnel will be assigned to missions such as underwater recovery and photography.

There is always a risk!





Types of Hazards at Accident Sites

- Environmental
- Physical
- Materials
- Psychological
- Biological



Environmental Hazards

- Location
- Climate
- Fatigue
- Insects
- Wildlife
- Security

Environmental Location & Climate



Environmental – Wildlife



Deer ticks : Lyme disease



Dog ticks : Rocky Mt. spotted fever



Lone Star ticks : Ehrlichiosis

Fig. 1 Most common human biting ticks encountered in the U.S. & disease association

Physical Hazards

- Sharp, jagged pieces of metal. Wreckage may shift.
- Fuel and other flammable agents. Toxic agents may be present with a fire.
- Hazardous materials from the aircraft or at the scene.
 - Radioactive
 - Explosive
 - Corrosive liquids
 - Poisons
 - Human Remains/samples

Physical Hazards (Cont.)

- Still-loaded aircraft systems, including: fuel and oil, pneumatic, hydraulic, electrical, and oxygen. Remember that controls may move.
- When involved with a military aircraft be cautious for unexpected ordinance and other ballistic devices such as ejection seats, flares, and jettisoning systems.

Physical Hazards (Cont.)

- Aircraft with ballistic recovery (parachute) system and ejection systems.
- Composite Fibers – Biohazard Equipment does not provide proper protection. Floor wax can be sprayed on the area to contain the fibers.
- On frozen water, ice may give under wreckage.
- Possibility of snakes and other dangerous insects.
- Terrorists

Material Hazards

- Ignition Sources
 - Hot Metal
 - Battery
 - Ignition Wires
 - Electrical Wires
 - Grass/Wood Fire
 - Tires may explode

Material Hazards (Cont.)

On Site Hazards from Combustion:

- Fuel
- Oil
- Hydraulic fluid
- Aircraft Components
- Aircraft Structure
- Interior Furnishings

Material Hazards

Fire, BRS, and Stored Energy

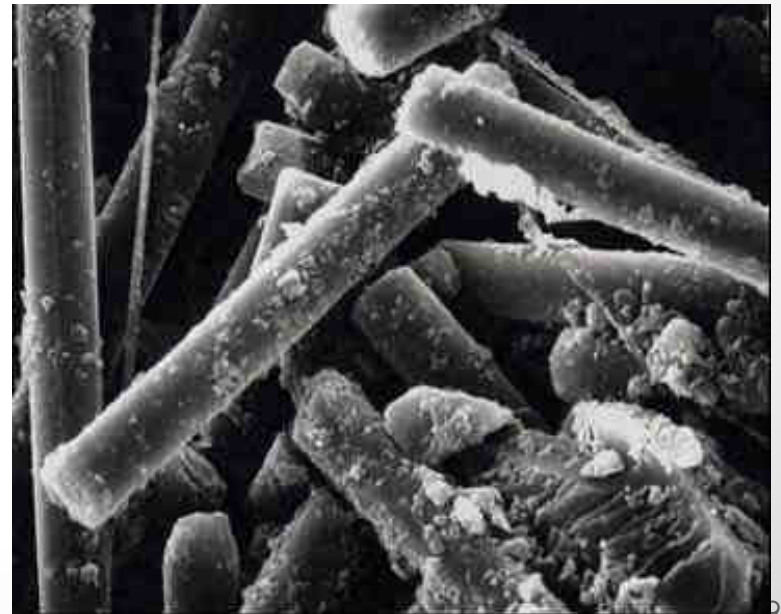




Material Hazards (Cont.)

- Metals and oxides
- Composite Materials
- Chemicals and substances
- Radioactive materials

Material – Metals & Composites



Material Hazards (Cont.)–

Chemicals and Cargo

- Batteries (Lithium)
- Hydraulic fluid
- Aircraft Components
- Aircraft Structure

Material Hazards (Cont.)

- Aircraft Structures
 - Composed of mostly aluminum alloy with other metals.
 - Example: Lithium is also found in batteries.
 - Example: Lead sheeting is found on the nose cone of the Boeing 747.

Material Hazards (Cont.)

Beryllium

- The most dangerous threat to investigators.
- Beryllium is found in gyroscopic parts, inertial guidance systems, heat sinks, and many electronic components.
- It is also found in springs, washers, and some electronic boxes.

Material Hazards (Cont.)

- **Beryllium (cont.)**

- When beryllium is heated it forms corrosive and toxic gases. If beryllium dust or gas is inhaled, ingested, or forms a skin contact, it may cause severe injury or death. It is twenty times more poisonous than arsenic.

Material Hazards (Cont.)

- **Cadmium**

- Cadmium is found in antirust plating, paints, solder, and some electrical components.

Material Hazards (Cont.)

- **Cadmium (cont.)**
 - Dust when heated – oxidized
 - Symptoms occur 4-10 hours after exposure
 - Includes respiratory distress, pulmonary edema, and kidney toxicity; accumulates in liver and kidneys.
 - Possibly associated with testicular, lung, and prostate cancer.

Material Hazards (Cont.)

- **Thorium 232**

- Certain engine casings and helicopter main gear boxes contain thorium 232 alloy with magnesium.

Material Hazards (Cont.)

- **Thorium (cont.)**

- Accumulates in liver and spleen
- Radioactive $\frac{1}{2}$ life 1.4×10 years
- Prolonged exposure during investigation may lead to malignant disease and blood disorder.
- 30 years after exposure.

Material Hazards (Cont.)

- **Tritium**

- Tritium light sources are found in emergency exit lights on civil aircraft and instrument lights on some military aircraft. Each exit light has about one curie each and there are about 20 per aircraft. The exposure to one light of tritium is 1/10th the maximum annual dose level.

Material Hazards (Cont.)

- **Titanium and Asbestos**
 - Titanium is found in aircraft under carriage parts.
 - Asbestos is found in insulation on board the aircraft.

Material Hazards (Cont.)

- **Viton**

- Viton is synthetic rubber found in gaskets, o-rings, seals, etc., but mostly in turbine engines.
- When viton is heated above 400 degrees centigrade (752 F) it forms hydrofluoric acid, which is used to etch glass.

Material Hazards (Cont.)

- Carbon Fiber Components
- If heated above 500 Degrees C (932 F), and with plenty of oxygen present, there will be no residue left. The carbon fibers convert to carbon dioxide. Below this temperature or if there is a poor oxygen supply, free carbon fibers exist.

Material Hazards (Cont.)

- **Carbon Fiber Components (Cont.)**
 - The fibers range in size from large enough to puncture the skin as splinters, through those that enter the lungs causing coughing and chest discomfort but are flushed out by the mucus to those that are so small that they enter the Alveoli and stay.

Material Hazards (Cont.)

Carbon Fiber Composite Components

Aircraft	
B757	Fairings and panels
B767	Wing spoilers
B777	Moving trailing edge surfaces and spoiler panels, tail surfaces, except leading edges, fixed wing leading edge, cabin floor beams, engine nacelles, wing root fairings, and main landing gear doors.
MD11	Lower winglet tail plane, trailing edge, and elevator

Material Hazards (Cont.)

Carbon Fiber Composite Components (cont.)

A300	Spoilers, outer flap deflector doors, fin box, nose wheel doors, main wheel leg fairing doors.
A310	Outer shrouds, spoilers, wing access panels, nose wheel doors, main wheel leg fairing doors, engine cowling panels, elevator and fin box.
A320	Some wing panels, flap track fairings, spoilers, aileron fins, rudder, tail plane elevators, nose/main wheel doors, main gear fairings
A330-A340	Tail plane

Psychological Hazards



Psychological Hazards (Cont.)

During the investigation:

- Employer Pressure
- Air Carrier
- Regulator
- Airport Authority
- Fatalities
- Survivors
- Family Members
- News Media

Psychological Hazards (Cont.)

After On-Scene Investigation:

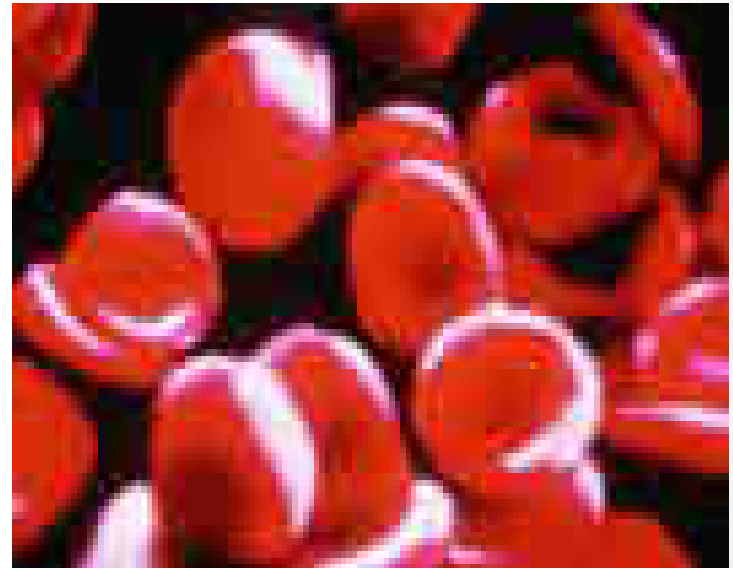
- Get Counselling
- Flashbacks
- Post Traumatic Stress Disorder (PTSD)

Investigator Safety

Investigator Burnout

Biological Hazards

- *Pathogenic organisms* that are present in human blood and can cause disease in humans.
 - Hepatitis
 - HIV
 - Malaria
 - Syphilis



Personal Protection



Repellant



First Aid



Water



Sunscreen

Proprietary to Legend Aviation

● Services

Investigator Protection



Investigator Safety

STAY SAFE

STAY CLEAN

STAY ALIVE