CERTIFICATION CURRICULUM MANUAL

CHAPTER TEN

FIRE DEPARTMENT SAFETY OFFICER

NFPA 1521, 2012 Edition

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Texas Commission on Fire Protection
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FIRE DEPARTMENT SAFETY OFFICER – INCIDENT SAFETY OFFICER

CHAPTER TEN
FIRE DEPARTMENT SAFETY OFFICER
INCIDENT SAFETY OFFICER
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
1002-4.4	Assignment of the Incident Safety Officer	1
1002-4.5	Qualifications of the Incident Safety Officer	2
1002-4.6	Authority of the Incident Safety Officer	1
1002-5.2	Laws, Codes and Standards	1
1002-6.1	General Functions of the Incident Safety Officer	1
1002-6.2	Fire Suppression	4
1002-6.3	Emergency Medical Service Operations	2
1002-6.4	Technical Rescue	3
1002-6.5	Hazardous Materials Operations	3
1002-6.6	Accident Investigation and Review	1
1002-6.7	Post-Incident Analysis	1
1002	Performance Skills*	4
	TOTAL RECOMMENDED HOURS	**24**

*The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

REFERENCE LIST FOR THE FIRE DEPARTMENT SAFETY OFFICER INCIDENT SAFETY OFFICER CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Fire Department Incident Safety Officer (2nd ed.) (2007). Dodson, David D., Clifton Park, NY: Thomson Delmar Learning.

NFPA 1500: Standard on Fire Department Occupational Safety and Health Program (2007 ed.). Quincy, MA: National Fire Protection Association NFPA Publications

NFPA 1521: Standard for Fire Department Safety Officer (2008 ed). Quincy, MA: National Fire Protection Association NFPA Publications

Certification Curriculum Manual for Fire Protection Personnel, Austin, TX: Texas Commission on Fire Protection

Standards Manual for Fire Protection Personnel, Austin, TX: Texas Commission on Fire Protection

SUPPLEMENT TO THE FIRE DEPARTMENT SAFETY OFFICER INCIDENT SAFETY OFFICER CURRICULUM

This supplement is provided as a general guide, for both instructors and students, to locate information pertaining to the specific objectives in the TCFP Curriculum. This supplement is not an all-inclusive list and does not in any way limit the TCFP's development and use of questions to test the objectives of the curriculum.

Objective	Reference	Page Number(s)
1002-4.4.1	Fire Department Incident Safety Officer (2nd Ed.)	49-50, 56-70
1002-4.4.2	Fire Department Incident Safety Officer (2nd Ed.)	67-68, 212-213
1002-4.4.3	Fire Department Incident Safety Officer (2nd Ed.)	196-200, 227, 238-239, 249
1002-4.4.4	Fire Department Incident Safety Officer (2nd Ed.)	63, 260-261, 276-279
1002-4.5.1	Fire Department Incident Safety Officer (2nd Ed.)	50, 79-83
1002-4.5.2	Fire Department Incident Safety Officer (2nd Ed.)	19-38, 79-83, 162-167, 260-262
1002-4.5.3	Fire Department Incident Safety Officer (2nd Ed.)	19-38, 80, 144-158, 260-262, 277-295
1002-4.5.4	Fire Department Incident Safety Officer (2nd Ed.)	87-110
1002-4.5.5	Fire Department Incident Safety Officer (2nd Ed.)	57-58, 115-128, 245-248
1002-4.5.6	Fire Department Incident Safety Officer (2nd Ed.)	214-215, 247, 280
1002-4.5.7	Fire Department Incident Safety Officer (2nd Ed.)	161-175, 216-217, 226-227, 248, 281
1002-4.6.1	*Reserved*	
1002-4.6.2	*Reserved*	
1002-4.6.3	*Reserved*	
1002-4.6.4	*Reserved*	
1002-4.6.5	*Reserved*	
1002-5.2.1	*Reserved*	
1002-5.2.2	*Reserved*	
1002-5.2.3	*Reserved*	
1002-5.2.4	*Reserved*	

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1002-6.1.1	Fire Department Incident Safety Officer (2nd Ed.)	10, 66, 191-193, 200
1002-6.1.2	Fire Department Incident Safety Officer (2nd Ed.)	56-68
1002-6.1.3	Fire Department Incident Safety Officer (2nd Ed.)	72, 184
1002-6.1.4	Fire Department Incident Safety Officer (2nd Ed.)	212-213
1002-6.1.5	Fire Department Incident Safety Officer (2nd Ed.)	133-141, 206-212, 222-239, 267-268, 279
1002-6.1.6	Fire Department Incident Safety Officer (2nd Ed.)	141
1002-6.1.7	Fire Department Incident Safety Officer (2nd Ed.)	141, 194-195, 246-254, 269-270
1002-6.1.8	Fire Department Incident Safety Officer (2nd Ed.)	214-215, 247, 280
1002-6.1.9	Fire Department Incident Safety Officer (2nd Ed.)	104-109, 215, 224-225, 263-264, 280
1002-6.1.10	Fire Department Incident Safety Officer (2nd Ed.)	152-153, 217, 227, 292-294
1002-6.1.11	Fire Department Incident Safety Officer (2nd Ed.)	193-194, 216, 225-226, 280
1002-6.1.12	Fire Department Incident Safety Officer (2nd Ed.)	161-175, 216-217, 223, 248, 265-266, 281
1002-6.1.13	Fire Department Incident Safety Officer (2nd Ed.)	49, 197-201, 238-239, 249, 272-273
1002-6.1.14	Fire Department Incident Safety Officer (2nd Ed.)	217, 254
1002-6.1.15	Fire Department Incident Safety Officer (2nd Ed.)	301-303
1002-6.1.16	*Reserved*	
1002-6.2.1	*Reserved*	
1002-6.2.2	Fire Department Incident Safety Officer (2nd Ed.)	212, 232
1002-6.2.3	Fire Department Incident Safety Officer (2nd Ed.)	104-110, 236-238
1002-6.2.4	Fire Department Incident Safety Officer (2nd Ed.)	115-128
1002-6.2.5	Fire Department Incident Safety Officer (2nd Ed.)	230-232
1002-6.3.1	*Reserved*	
1002-6.3.2	Fire Department Incident Safety Officer (2nd Ed.)	50, 265, 292
1002-6.3.3	Fire Department Incident Safety Officer (2nd Ed.)	161-175, 216-217, 265-266, 281, 301-303

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1002-6.4.1	Fire Department Incident Safety Officer (2nd Ed.)	277-278
1002-6.4.2	Fire Department Incident Safety Officer (2nd Ed.)	63, 260-261, 276-279
1002-6.4.3	Fire Department Incident Safety Officer (2nd Ed.)	211-212, 279-295
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1002-6.5.1	Fire Department Incident Safety Officer (2nd Ed.)	260
1002-6.5.2	Fire Department Incident Safety Officer (2nd Ed.)	260-261, 266
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1002-6.6.1	Fire Department Incident Safety Officer (2nd Ed.)	328
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SECTION 1002

FIRE DEPARTMENT SAFETY OFFICER
INCIDENT SAFETY OFFICER

An incident safety officer is an individual who has met the requirements of Fire Officer Level I specified in NFPA 1021, *Standard for Fire Officer Professional Qualifications* and Chapter 6 of NFPA 1521, *Standard for Fire Department Safety Officer* and has the knowledge, skill, and abilities to manage incident scene safety by having and maintaining a knowledge of:

- Emergency operations,
- Building construction,
- Fire science and behavior relative to predicting hostile fire events,
- The fire department's personnel accountability system,
- Incident scene rehabilitation strategies.

Additional Incident Safety Officer duties include:

- Risk evaluation
- Resource evaluation
- Hazard identification and communication
- Action plan review
- Safety briefings
- Collapse zoning
- Accident investigation
- Postincident analysis
- Safety committee participation

The Safety Officer: An Introduction

A. Safety officer: NIMS definition
B. Safety officer: National Fire Protection Association (NFPA) definition
    1. NFPA defines roles of ISO and HSO in NFPA 1521 standard
    2. Splits role of safety officer for greater specificity
    3. ISO (Incident Safety Officer)
        a. Safety officer command role as defined by NIMS
    4. HSO (Health and Safety Officer)
        a. Manager of the fire department's safety and health program
        b. Assigned and authorized by the fire chief

1002-4.1 Assignment of the Health and Safety Officer

- Reserved

1002-4.2 Qualifications of the Health and Safety Officer

- Reserved

1002-4.3 Authority of the Health and Safety Officer

- Reserved

1002-4.4 Assignment of the Incident Safety Officer

1002-4.4.1 The fire department shall have a predesignated Incident Safety Officer system to ensure that a separate Incident Safety Officer (ISO), independent of the Incident Commander (IC) is appointed and responds automatically to predesignated incidents.

1002-4.4.2 If the predesignated Incident Safety Officer is not available, the incident commander shall appoint an incident safety officer.

1002-4.4.3 An additional assistant Incident Safety Officer(s) shall be appointed when the activities, size, or need of the incident warrants extra safety personnel.

1) Expanding the Incident Safety Officer (ISO) function with the Incident Management System (IMS)

2) The Incident Safety Officer as part of the National Response Team

3) Need for Incident Safety Officer Assistance:
    a) For large buildings with significant fire involvement
    b) High-rise buildings
    c) For fires that impact a widespread geographical area
    d) When a “plans section” is established at a fire
    e) For fires in buildings with unusual or unique hazards
    f) Anytime the ISO is requested to go into an IDLH environment
    g) For fires that are active for over four hours

1002-4.4.4 Technical specialists shall be appointed by the Incident Commander based on the incident type, technical requirements of the incident, or as recommended by the Incident Safety Officer or other members of the command staff.

1) Automatic ISO response should occur in the following types of incidents
    - Residential or commercial fires
    - Wildland-interface fires
    - Specialty incidents
        - Hazmat/WMD incidents

- Technical rescue incidents
- Target hazard incidents
- Aircraft incidents
- Weather extremes

1002-4.5 Qualifications of the Incident Safety Officer

1002-4.5.1 The Incident Safety Officer shall meet the requirements of Fire Officer Level 1 specified in NFPA 1021, *Standard for Fire Officer Professional Qualifications*.

1002-4.5.2 The Incident Safety Officer shall have the knowledge, skill, and abilities to manage incident scene safety as defined in Chapter 6 of NFPA 1521.

1) Train to the mastery level

2) Incident Safety Officer Knowledge
    a) Fire Officer I level subject areas:
        i) Building construction
        ii) Risk/benefit concepts
        iii) Fire behavior
        iv) Firefighter physiology
        v) Hazardous energy
        vi) Incident management systems

3) Incident Safety Officer Skills
    a) Intellectual tasks such as hazard reduction or problem solving
    b) Organized mental and physical activity
    c) Involves knowledge, sustained effort, and practice

4) Incident Safety Officer attitude
    a) Understanding of firefighter attitudes
    b) Incident Safety Officers use knowledge and skills to shape a positive safety attitude
    c) Values consistent with a positive safety attitude
    d) Beliefs consistent with a positive safety attitude
    e) Three components of attitude
        i) Knowledge = what a person knows or doesn't know about a topic
        ii) Emotion = what a person finds acceptable or unacceptable
        iii) Action = expression of knowledge and emotion
    f) Three questions to nurture a proper attitude
        i) What do I know about this?
        ii) How do I feel about it?

iii) How should I handle it to show a concern for safety?

1002-4.5.3 The Incident Safety Officer shall have and maintain a knowledge of safety and health hazards involved in emergency operations.

1) Based on the type/nature of the emergency scene
   a) Human performance depends on many factors
   b) Overexertion is the leading cause of injuries (and deaths) at incidents
   c) Reading firefighters involves the evaluation of factors that lead to overexertion

2) Types of the emergency operations that the Incident Safety Officer needs to be familiar with or request assistance from appropriately trained personnel
   a) Fire
      i) Structure
         a. Residential
         b. Commercial
         c. High Rise
      ii) Wildland
      iii) Industrial
      iv) Marine
      v) Aircraft
   b) Hazardous Materials Response
   c) Rescue Operations
      i) Technical Rescue
      ii) Search & Rescue
      iii) Extrication
   d) Emergency Medical Response
   e) Other
      i) Civil Unrest
      ii) Criminal/Terroristic Events

1002-4.5.4 The Incident Safety Officer shall have and maintain a knowledge of building construction.

1) Construction Classifications
   a) Type I through V
   b) Other construction types (hybrids)
      i) Lightweight steel
      ii) Insulated concrete forming (ICF)
      iii) Structural Insulated Panels (SIP)

1002-4.5.5 The Incident Safety Officer shall have and maintain a knowledge of fire science and behavior relative to predicting hostile fire events.

1) Key Fire Science/Fire Behavior events
    a) Phases of fire growth
    b) Flameover/rollover
    c) Flashover
    d) Backdraft
    e) Smoke explosion
    f) Industrial fire hazards
        i) Class B fires
        ii) Boiling Liquid Expanding Vapor Explosion (BLEVE)
        iii) Boilover
        iv) Frothover

2) Hostile fire events
    a) Events that can catch firefighters off guard and endanger them
        i) Flashover
        ii) Backdraft
        iii) Smoke explosion
        iv) Rapid fire spread
    b) Incident Safety Officers must know and watch for proactive warning signs of hostile fire events

3) Incident Safety Officer General Duties at Wildland Fires
    a) Grasp potential for firefighters being overrun by fire upon arrival and assignment
    b) General considerations
        i) Weather
        ii) Topography
        iii) Fuels
    c) Hostile events at wildland fires
        i) Blow-up
        ii) Flaring
    d) Wildland flame length interpretations
        i) Less than 4 feet
        ii) 4 to 8 feet
        iii) 8 to 11 feet
        iv) Over 11 feet
    e) Monitoring Issues at Wildland Fires
        i) Risk
        ii) Operational effectiveness

1002-4.5.6 The Incident Safety Officer shall have and maintain a knowledge of the fire department's personnel accountability system.

1) Personnel accountability systems

2) Need for control zones

3) Radio transmissions

4) Rehab effectiveness

1002-4.5.7 The Incident Safety Officer shall have and maintain a knowledge of incident scene rehabilitation strategies.

1) Incident Safety Officer functions
    a) Ensure IC has established a rehabilitation tactical management component during emergency operations
    b) Evaluate rehab efforts to determine effectiveness

1002-4.6 Authority of the Incident Safety Officer

1002-4.6.1 At an emergency incident, the incident commander shall be responsible for the overall management of the incident and the safety of all members involved at the scene. [**1500**:8.1.5]

1002-4.6.2 At an emergency incident where activities are judged by the Incident Safety Officer as posing an imminent threat to fire fighter safety, the Incident Safety Officer shall have the authority to stop, alter, or suspend those activities.

1002-4.6.3 The Incident Safety Officer shall immediately inform the incident commander of any actions taken to correct imminent hazards at the emergency scene.

1002-4.6.4 At an emergency incident where an Incident Safety Officer identifies unsafe conditions, operations, or hazards that do not present an imminent threat to fire fighters, the Incident Safety Officer shall take appropriate action through the incident commander to mitigate or eliminate the unsafe condition, operation, or hazard at the incident scene.

1002-4.6.5 An assigned assistant incident safety officer(s) shall be granted the authority authorized in 4.6.2.

1002-5.1 Risk Management

- Reserved

1002-5.2 Laws, Codes, and Standards

1) Guiding publications
    a) Regulations
    b) Codes
    c) Laws
    d) Standards
    e) Procedures (SOPs, SOGs/UOGs)

1002-5.2.1 Based on health and safety laws, codes, and standards, the health and safety officer shall develop and maintain standard operating procedures (SOPs) or standard operating guidelines (SOGs) pertaining to the fire department occupational health and safety program.

1) Regulatory and non-regulatory agencies, associations, and organizations
    a) National Fire Protection Association (NFPA)
    b) Occupational Safety and Health Administration (OSHA)
    c) National Institute of Occupational Safety and Health (NIOSH)
    d) Department of Homeland Security (DHS)
        i) Federal Emergency Management Association (FEMA)
        ii) United States Fire Association (USFA)
    e) Environmental Protection Agency (EPA)
    f) National Institute of Standards and Technology (NIST)
        i) Building and Fire Research Laboratory (BFRL)
    g) Other stakeholders
        i) International Association of Firefighters (IAFF)
        ii) International Association of Fire Chiefs (IAFC)
        iii) National Volunteer Fire Council (NVFC)
        iv) Fire Department Safety Officers Association (FDSOA)

2) Defining the Guiding Publications
    a) Regulations
        i) Outline details and procedures that have the force of law issued by an executive governmental authority
        ii) Example: OSHA CFRs
    b) Codes
        i) Work of law established or adopted by a rule-making authority
        ii) Example: *Uniform Fire Code*
    c) Standards
        i) Can apply to any set of rules, procedures, or professional measurements set by an authority
        ii) Must be adopted by an authority with the legal responsibility to enact the standard as law

d) Laws
    i) Enforceable rules of conduct that help protect a society
    ii) Statutory law
        a. Deals with civil and criminal matters
    iii) Case law
        a. Refers to a precedent established over time through the judicial process
e) Guides
    i) Offer procedures, directions, or standard of care as a reasonable means to address a condition or situation
    ii) Do not have impact of law
        a. Can be used as evidence in negligent cases to provide evidence
    iii) Alerts: form of guide
        a. Issued in response to a disturbing trend of injuries or deaths by a specific cause

3) Publications Providing Guidance for the ISO
    a) NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*
    b) NFPA 1521, *Standard for Fire Department Safety Officer*
    c) OSHA Title 29 CFR
        i) Specific to public sector members who
            a. Engage in rescues
            b. Have exposure to environments that are *immediately dangerous to life and health* (IDLH)
        ii) Emphasizes need for site safety plan
            a. For operations involving hazmats, confined spaces, trenches, and hazardous energy
        iii) Has numerous subtitles
    d) NIOSH Publication 2004-144, *Protecting Emergency Responders*, Volume 3
        i) Available at http://www.cdc.gov/niosh/docs/2004-144/
    e) NIOSH Alert, *Preventing Injuries and Deaths of Firefighters due to Truss System Failures*
    f) NIST Special Publications

1002-5.2.2 The SOP/SOGs developed in 5.2.1 shall be submitted to the fire chief or the fire chief's designated representative by the health and safety officer for issuance.

1002-5.2.3 The health and safety officer shall report semiannually to the fire chief or the fire chief's designated representative on the adequacy of, effectiveness of, and compliance with applicable laws, codes, standards, standard operating procedures, and standard operating guidelines.

1002-5.2.4 The fire chief shall define the role of the health and safety officer in ensuring compliance with the applicable laws, codes, standards, standard operating procedures, and standard operating guidelines.

1) Based on the Authority Having Jurisdiction (AHJ)
    a) Federal Laws (CFR)
    b) State Statutes
        i) Texas Administrative Code
        ii) TCFP Rules & Regulations
        iii) Local Government Code
    c) Local AHJ
        i) Ordinances
        ii) Policies & Procedures
        iii) Rules & Regulations
        iv) SOPs/UOGs

1002-5.3 ***Training and Education***

- Reserved

1002-5.4 ***Accident Prevention***

- Reserved

1002-5.5 ***Accident Investigation, Procedures, and Review***

- Reserved

1002-5.6 ***Records Management and Data Analysis***

- Reserved

1002-5.7 ***Apparatus and Equipment***

- Reserved

1002-5.8 ***Facility Inspection***

- Reserved

1002-5.9 ***Health Maintenance***

- Reserved

1002-5.10 ***Liaison***

- Reserved

1002-5.11 ***Occupational Safety and Health Committee***

- Reserved

1002-5.12 Infection Control

- Reserved

1002-5.13 Critical Incident Stress Management

- Reserved

1002-5.14 Post-Incident Analysis

- Reserved

1002-6.1 General Functions of the Incident Safety Officer

Incident Safety Officer (ISO): is a member of the command staff responsible for monitoring and assessing safety hazards or unsafe situations and for developing measures for ensuring personnel safety.

Assistant Incident Safety Officer (AISO): is an individual appointed to respond or assigned at an incident scene by the incident commander to assist the incident safety officer in the performance of the incident safety officer functions.

1) The Incident Safety Officer must be:
    a) Reactive to the needs of the incident commander
    b) Proactive in the prevention of injuries to firefighters

2) Two most common approaches to addressing Incident Safety Officer incident duties
    a) Checklists
    b) Action models

3) Qualities of good Incident Safety Officer checklists and action models
    a) Flexibility
    b) Cyclicity
    c) Proactive orientation
    d) Reactive orientation
    e) Archive friendliness

1002-6.1.1 The Incident Safety Officer (ISO) shall be integrated with the incident management system (IMS) as a command staff member, as specified in NFPA 1561, *Standard on Emergency Services Incident Management System*.

1) Integrating Incident Safety Officer (ISO) within the Incident Management System (IMS)
    a) FIRESCOPE program (1970s)
    b) IFSTA Incident Command System manual (1983)

c) NFPA 1500 adopted (1987)
d) NFPA 1501
e) NIIMS (National Interagency Incident Management System)
f) DHS NIMS (National Incident Management System) (2005)
    i) ICS fulfills the control function of NIMS
g) NFPA 1521 leading the way in evolution of safety officer role

2) Automatic ISO delegation should occur in the following types of incidents
    a) Working incidents
    b) Mutual aid request
    c) Firefighter down, missing, or injured
    d) Incident commander discretion

3) Working within command systems
    a) Effective and efficient ISOs work within an incident command system (ICS)
    b) Incident command systems
        i) The IC is responsible for overall management at an incident scene and for the safety of responders
        ii) Codependency between ISO's support of IC and IC's faith in ISO
    c) Authority
        i) The ISO must yield to the IC's authority and present requests rationally and professionally
    d) The ISO as part of the national response team
        i) In national incidents, the ICS component and ISO become an area command of NIMS
        ii) A joint field office (JFO) is established
        iii) A safety coordinator is assigned to assist the ICS safety officer and coordinate federal resources

1002-6.1.2 Standard operating procedures (SOPs) shall define criteria for the response of a predesignated incident safety officer.

1) Preplanning the ISO Response
    a) The ISO is most effective when he or she arrives early at an incident
    b) Track Environmental Change
    c) Fireground Activity
    d) Monitor Relative Danger to Firefighters
    e) Critical time - First 20 minutes of an incident
    f) When does the ISO respond?
        i) All working residential fires
        ii) Highly technical or complex incidents

g) Firefighter injury statistics show the need to have a dedicated ISO more often and sooner
h) Automatic ISO response should occur in the following types of incidents:
    i) Residential or commercial fires
    ii) Wildland-interface fires
    iii) Specialty incidents
    iv) Target hazard incidents
    v) Aircraft incidents
    vi) Weather extremes
i) Automatic ISO delegation should occur in the following types of incidents:
    i) Working incidents
    ii) Mutual aid request
    iii) Firefighter down, missing, or injured
    iv) Incident commander discretion

1002-6.1.2.1 If the Incident Safety Officer is designated by the incident commander, the fire department shall establish criteria for appointment based upon 6.1.1.

1002-6.1.3 The Incident Safety Officer and assistant incident safety officer(s) shall be readily identifiable at the incident scene.

1002-6.1.4 Upon arrival or assignment as the Incident Safety Officer at an incident, he or she shall obtain a situation-status briefing from the incident commander that includes the incident action plan.

1) The Incident Safety Officer Arrival Process
    a) Confirm Incident Safety Officer assignment
    b) Collect information
        i) IAP
        ii) Status of situation and resources
    c) Confirm communication links
        i) Radio channels, face-to-face
    d) Don appropriate identification and PPE

2) Monitoring the incident
    a) Observe/Assess
    b) Identify Hazards
        i) Stop life threatening/critical life safety hazards
        ii) Notify the Incident Commander of any changes to the IAP/Standing orders immediately
    c) Develop mitigation strategies
    d) Implement mitigation strategies
    e) Continue to reassess

f) Repeat

1002-6.1.5 The Incident Safety Officer shall monitor the incident action plan, conditions, activities, and operations to determine whether they fall within the criteria as defined in the fire department's risk management plan.

1) Checklists
    a) Advantages
    b) Disadvantages

2) Action Models
    a) Template that outlines a mental or physical process to be followed
    b) Biggest advantage
        i) Furnishes a template in which to process multiple events
    c) A good action model
        i) Reminds Incident Safety Officers to be cyclic in their thinking
    d) Linear thinking
        i) Defined starting point and ending point
        ii) Necessary for IC
    e) Cyclic thinking
        i) Recurring evaluation of multiple inputs
        ii) Maintain a high degree of situational awareness
        iii) Necessary for the Incident Safety Officer
    f) The Incident Safety Officer Action Model
        i) Cyclic four-arena model
        ii) Allows the Incident Safety Officer to mentally process the surveying and monitoring functions of typical incident activities and concerns
        iii) Does not imply a starting place or direction of flow
        iv) Four general arenas: the four Rs
        v) Resources
            a. Time
            b. Personnel
            c. Equipment
        vi) Reconnaissance
            a. Exploratory examination of the incident scene environment and operations
        vii) Risk: is it acceptable?
        viii) Report
            a. Timely appropriate communications
            b. Written reports
            c. Safety briefings
            d. Review of incident action plans

1002-6.1.6 When the perceived risk(s) is not within the fire department's risk management criteria, the Incident Safety Officer shall take action as outlined in section 1002-4.6.

1) Perceived risk(s)
    a) Community expectations
        i) Community expects that firefighters may have to risk their lives to save a life
        ii) Firefighters must:
            a. Balance courage and bravery with prudent judgment
            b. Avoid unnecessary injury
        iii) Media communications have put risk-taking pressure on responders

1002-6.1.7 The Incident Safety Officer shall monitor the incident scene and report to the incident commander the status of conditions, hazards, and risks.

1) General Incident Safety Officer Duties
    a) Monitor the incident
        i) Incident action plan, conditions, activities and operations should fall within risk management criteria
        ii) Perform repeated recon to judge the effectiveness of the incident action plan
            a. Failure to adjust the incident action plan cited as a contributing factor in many firefighter fatality investigations
    b) Address personnel safety systems
        i) Personnel accountability systems
            a. Watch for freelancing
        ii) Control zones identified and communicated to all members
        iii) Radio transmissions
        iv) Rehab effectiveness
            a. Make sure it is functioning and effective
    c) Define other needs
        i) Evaluate motor vehicle scene traffic hazards and apparatus placement
        ii) Survey landing zone and interface with helicopters
        iii) Communicate to IC the need for AISOs due to the need, size, complexity, or duration of the incident

2) The Incident Safety Officers read-risk method

a) Knowledge, sound judgment, experience, and wisdom are paramount in making risk decisions
b) Prepare with vicarious learning
    i) Learn from the mistakes of others
    ii) Read accident investigation reports generated for firefighter duty-deaths

3) Monitoring Issues at Wildland Fires
    a) Risk
        i) Victims are prone to self-rescue
        ii) IAP may change to reduced-risk profile
    b) Operational effectiveness
        i) Use roving AISOs for evaluation over geographical distances and terrain
        ii) Take tour in vehicle or helicopter

4) Personal Safety System Issues at Wildland Fires
    a) Accountability systems
        i) Difficult during initial stages
        ii) Firefighters may disperse during attack
        iii) ISO may need to close up ranks
    b) Control zones
        i) Based on descriptive parts of wildfire or geographical area
        ii) Working between head/flanks and spots could be dangerous
        iii) Burn (or black): portion of wildland where fire is already past
        iv) Threatened structures generally classified as defensible or indefensible
    c) Rehab
        i) Firefighters using structural PPE for wildland incidents are at extreme risk for heat stress: rapid hydration and electrolyte replacement are essential; cardiac monitoring; no releases should be given based on perceived comfort

5) Defining Other Needs at Wildland Fires
    a) Traffic
        i) Smoke obscuration major concern: divert traffic away from smoke areas
        ii) Dispersed small apparatus: use radio safety message to remind drivers to use spotters
    b) Need for ISO assistance:
        i) For fires that impact a widespread geographical area

ii) When a plans section is established: AISOs accomplish ISO field component
iii) For fires that are active for over four hours
iv) Anytime a base camp is established: AISOs communicate action plan and safety briefings to incoming crews

c) Applying the ISO Action Model at Wildland Fires

6) Risk evaluation at a wildland fire
   a) Practice intellectual aggressiveness
      i) Calculated risk-taking that favors firefighter safety while still aggressive in fire control efforts
   b) Judge pace of incident
      i) Making structures defensible against advancing fire could take 20-30 minutes
   c) Help IC with cyclic thinking when fire is progressing faster than crew Effectiveness

7) Recon evaluation at a wildland fire
   a) Utilize vehicles, helicopter, and AISO field reports
   b) Coordination is key
   c) Caution: climbing to high ground to get a good look at the fire can prove fatal
   d) Defining the principal hazard
      i) Rapid fire spread, traffic issues, and physical exertion
   e) Defining environmental integrity
      i) Weather, smoke, flame spread, and hazardous energy
   f) Defining physical surroundings
      i) Trip/fall hazards, animals, snags, power lines
   g) Crew exposure to hazards
      i) Principal hazard +/- Integrity + Physical hazards + Crew activity = crew exposure
      ii) Tools
      iii) Team versus task
      iv) Rapid withdrawal options: LCES (lookout, communication methods, escape routes, safety zones)

8) Resource evaluation at wildland fires
   a) Time
      i) Project on-scene time: advent of nightfall, weather changes
      ii) Travel distances affect reflex time: multiple stages
   b) Personnel
      i) Ensure adequate number of responders, high spirits
   c) Equipment

i) Lengthy hose lays, water supply issues, Class-A foam, pump calculations

9) Report issues at wildland fires
   a) Initial operations: 15-minute rule for face-to-face communications with the IC
      i) Discuss risk, recon, and resources
      ii) Update checklists, forms, diagrams, and other documents
      iii) Amend schedule for prolonged incidents
   b) Safety briefing sheet is routine
      i) Can be passed to staging manager

10) Written safety plans
   a) Development of site safety plan
   b) Safety briefings

1002-6.1.8 The Incident Safety Officer shall ensure that the fire department's personnel accountability system is being utilized.

1002-6.1.9 The Incident Safety Officer shall offer judgment to the incident commander on establishing control zones and no-entry zones and ensure that established zones are communicated to all members present on the scene.

1002-6.1.10 The Incident Safety Officer shall evaluate motor vehicle incident scene traffic hazards and apparatus placement and take appropriate actions to mitigate hazards as described in Section 8.7 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

1) Apparatus and warning devices positioned to take advantage of topography and weather conditions (uphill / upwind)

2) Fire apparatus shall be positioned in a blocking position, so if it is struck it will protect members and other persons at the incident scene.

3) When acting as a shield, apparatus warning lights shall remain on, if appropriate.

4) All additional responding vehicles, when arriving on the scene, shall position beyond the traffic barrier unless their function requires placement before the barrier.

5) One or more of the following warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to members operating at the incident:
    a) Fluorescent and retro-reflective warning devices such as traffic cones
    b) Federal Highway Administration (FHWA)-approved 48 in. by 48 in. retro-reflective signs stating “Emergency Scene Ahead” (with directional arrow overlay)
    c) Illuminated warning devices such as highway flares
    d) Other warning devices appropriate to warn oncoming traffic of the emergency operations

6) Warning devices shall be placed and utilized with proper considerations given to visual obstruction such as hills, curves, blind spots, or unusual localized weather conditions such as fog or rain

7) The first arriving unit shall ensure that traffic is controlled before addressing the emergency operations

8) Members shall position themselves and any victims in a secure area.

9) Members shall park or stage unneeded fire apparatus and personal vehicles off the roadway whenever possible.

10) When members are operating at a traffic incident and their assignment places them in potential conflict with motor vehicle traffic, they shall wear a garment with fluorescent and retro-reflective material visible from all directions.

11) Members used for traffic control purposes shall receive training that is commensurate with their duties and in accordance with any applicable state and local laws and regulations.

1002-6.1.11 The Incident Safety Officer shall monitor radio transmissions and stay alert to transmission barriers that could result in missed, unclear, or incomplete communication.

1) Radio communication: use “Safety” identifier and limit use to safety functions

2) Face-to-face communication: every 15 minutes

1002-6.1.12 The Incident Safety Officer shall ensure that the incident commander establishes an incident scene rehabilitation tactical level management component during emergency operations.

1) Incident Scene Rehabilitation
    a) ISO functions
        i) Ensure IC has established a rehabilitation tactical management component during emergency operations
        ii) Evaluate rehab efforts to determine effectiveness
    b) The Four Rs of Rehab
        i) Rest
        ii) Rehydration
        iii) Rx (medical support in the form of O2 and fluid therapy)
        iv) Refueling

1002-6.1.13 The Incident Safety Officer shall communicate to the incident commander the need for assistant incident safety officers and/or technical specialists due to the need, size, complexity, or duration of the incident.

1) Need for Incident Safety Officer Assistance:
    a) For large buildings with significant fire involvement
    b) When a “plans section” is established at a fire
    c) For fires in buildings with unusual or unique hazards
    d) Anytime the ISO is requested to go into an IDLH environment
    e) High-rise buildings
        i) Request one or more AISOs
        ii) ISO should take position at command post
        iii) AISOs work with operations on: physical demands of firefighters; internal traffic control; compartment integrity; establishing no-entry zones around lost windows; safety briefings; outside issues
    f) For fires that impact a widespread geographical area
    g) When a plans section is established: AISOs accomplish ISO field component
    h) For fires that are active for over four hours
    i) Anytime a base camp is established: AISOs communicate action plan and safety briefings to incoming crews

1002-6.1.14 The Incident Safety Officer or assistant Incident Safety Officer shall survey and evaluate the hazards associated with the designation of a landing zone and interface with helicopters.

1) Landing Zones and Interface with Helicopters
    a) Survey landing zone and interface with helicopters
    b) Communicate to IC the need for AISOs due to the need, size, complexity, or duration of the incident
    c) Interface with aircraft
        i) Used for water and retardant drops

1002-6.1.15 The Incident Safety Officer shall recognize the potential need for critical incident stress interventions and notify the incident commander of this possibility.

1002-6.1.16 If the Incident Safety Officer or an assistant safety officer needs to enter a hot zone or an environment that is immediately dangerous to life or health (IDLH), the Incident Safety Officer or assistant safety officer shall be paired up with another member and check in with the entry control officer.

1002-6.2 Fire Suppression

1002-6.2.1 The Incident Safety Officer shall meet the provisions of Section 1002-6.2 during fire suppression operations.

1) Incident Safety Officer General Duties at Structure Fires
    a) Structure fires considered the most risky incident type
        i) Compressed time window
        ii) Must rapidly read structure fires
            a. Smoke, building, risk
    b) Monitor general issues
    c) Evaluate personal safety system issues
    d) Define other needs
    e) Monitoring Issues at Structure Fires
        i) Risk
            a. Tactical priorities and incident benchmarks - Do risks taken match preestablished criteria?
        ii) Operational effectiveness
            a. Read smoke
            b. Read buildings
            c. Determine adequate ventilation
    f) Personal Safety System Issues at Structure Fires
        i) PAR (personal accountability report)
            a. Organized reporting activity for all personnel working an incident
            b. Radio communications should include assignment, location, and number of people in the assignment
            c. Accomplished periodically (every 15 minutes at high-risk environments)
            d. Triggered during changes or reporting situations
        ii) Control zones (NFPA 1521)
            a. Hot zone: IDLH atmosphere
            b. Warm zone: limited access area
            c. Cold zone: establishes clean zone
            d. No-entry zone: no entry for anyone

iii) Radio transmissions
a. Listen for unanswered calls
b. Determine radio message priority
iv) Rehab
a. Focus on heat, physical exertion, and weather exposure
b. Encourage mandatory rehab after every air cylinder use or equivalent work period
g) Defining Other Needs at Structure Fires
i) Traffic
a. Be aware of arriving or moving apparatus, especially with water-tender shuttle operations underway
b. Communicate traffic flow plan
c. Evaluate apparatus placement and traffic lanes
ii) Need for Incident Safety Officer assistance:
a. For large buildings with significant fire involvement
b. When a “plans section” is established at a fire
c. For fires in buildings with unusual or unique hazards
d. Anytime the Incident Safety Officer is requested to go into an IDLH environment

2) Applying the Incident Safety Officer Action Model at Structure Fires
a) Risk evaluation at a structure fire
i) Determine the rescue profile of the incident
a. Probability that victims will survive the environment
b. Classifications: high, moderate, or zero
ii) Evaluate pace of incident
b) Recon evaluation at a structure fire
i) Repeat often during an incident
ii) Define environment in three dimensions
a. Principle hazard: what is likely to kill firefighters?
b. Environmental integrity: judge the potential rate of change
c. Physical surroundings: sloping grades, foliage, fences, barriers, antennae, etc.
iii) Evaluate crew exposure to hazards
c) Resource evaluation at structure fires
i) Time
ii) Personnel
iii) Equipment
d) Report issues at structural fires
i) Incident Safety Officers should follow the 15-minute rule

for face-to-face communications with the IC
    a. Discuss risk, recon, and resources
    b. Update checklists, forms, diagrams, and other documents
ii) Consider developing a safety briefing sheet
    a. Helps responders get dialed in

3) Unique Considerations at Structure Fires
    a) Residential versus commercial fires
        i) Traps of classifying a building as either residential or commercial
        ii) Classify according to building size and use
        iii) Buildings with central hallways and stairwells
            a. Ventilation is number one tactical priority
        iv) Strip malls
            a. High-fire load, common ceiling spaces, long open-span trusses, decorative facades, inexpensive materials
        v) High-rise buildings
            a. Request one or more AISOs
            b. Incident Safety Officer should take position at command post
            c. AISOs work with operations on: physical demands of firefighters; internal traffic control; compartment integrity; establishing no-entry zones around lost windows; safety briefings; outside issues

1002-6.2.2 The Incident Safety Officer shall ensure that a rapid intervention team meeting the criteria in Chapter 8 of NFPA 1500, is available and ready for deployment.

Rapid Intervention for Rescue of Members. Rapid Intervention Crews may be referred by several different names depending on the AHJ. All have the same purpose and responsibilities.

- RIC – Rapid Intervention Crew
- RIC – Rapid Intervention Company
- RIT – Rapid Intervention Team
- FAST – Firefighter Assist and Search Team

1) The fire department shall provide personnel for the rescue of members operating at emergency incidents.

2) A rapid intervention crew/company (RIC) shall consist of at least two members and shall be available for rescue of a member or a crew.

a) Each RIC shall be fully equipped with protective clothing, protective equipment, SCBA, and any specialized rescue equipment that could be needed given the specifics of the operation under way.
b) The RICs at an incident where any SCBA being used are equipped with a RIC universal air connection (UAC) shall have the specialized rescue equipment including a fully charged breathing air cylinder with a NIOSH-certified rated service time of at least 30 minutes and compatible pressure and capacity with the SCBA being used at the incident, or a high-pressure air line of sufficient length to reach the location of the entrapped or downed fire fighter(s) and supplied by a pressurized breathing air source that can provide at least 3.5 ft^3 (100 L) of air per minute at the RIC UAC female fitting and at a pressure compatible with the SCBA being used at the incident.
c) Both the breathing air cylinder and the high-pressure air line described in NFPA 1981 shall be equipped with a RIC UAC filling hose assembly equipped with a RIC UAC female fitting.
d) The RIC UAC filling hose assembly shall meet the requirements specified in 6.4.7 of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services*.
e) The RIC UAC female fitting shall meet the requirements specified in 6.4.6 of NFPA 1981.
f) The RIC UAC female fitting shall mate with the RIC UAC male fitting to form a RIC UAC coupling that meets the requirements specified in 6.4.8 of NFPA 1981.

3) The composition and structure of a RIC shall be permitted to be flexible based on the type of incident and the size and complexity of operations.

4) The Incident Safety Officer should advise the Incident Commander and make suggestions regarding the situation and the risks to operating crews and make recommendations concerning the establishment of one or more RICs commensurate with the needs of the situation.

5) In the early stages of an incident, which includes the deployment of a fire department's initial attack assignment, the RIC shall be in compliance with with the above requirements and be either one of the following:
    a) On-scene members designated and dedicated as a RIC
    b) On-scene members performing other functions but ready to re-deploy to perform RIC functions

c) The assignment of any personnel shall not be permitted as members of the RIC if abandoning their critical task(s) to perform rescue clearly jeopardizes the safety and health of any member operating at the incident.

6) As the incident expands in size or complexity, which includes an incident commander's requests for additional resources beyond a fire department's initial attack assignment, the dedicated RIC shall on arrival of these additional resources be either one of the following:
   a) On-scene members designated and dedicated as RIC
   b) On-scene crew/company or crews/companies located for rapid deployment and dedicated as RICs
   c) During fire fighter rescue operations each crew/company shall remain intact.

7) At least one dedicated RIC shall be standing by with equipment to provide for the rescue of members that are performing special operations or for members that are in positions that present an immediate danger of injury in the event of equipment failure or collapse.

1002-6.2.3 Where fire has involved a building(s) the Incident Safety Officer shall advise the incident commander of hazards, collapse potential, and any fire extension in such building(s).

1002-6.2.4 The Incident Safety Officer shall evaluate visible smoke and fire conditions and advise the incident commander, tactical level management component's (TLMC) officers, and company officers on the potential for flashover, backdraft, blow-up, or other events that could pose a threat to operating teams.

1002-6.2.5 The Incident Safety Officer shall monitor the accessibility of entry and egress of structures and its effect on the safety of members conducting interior operations.

1) Incident Safety Officer general duties at structural fires
   a) Monitor risk and operational effectiveness
   b) Apply reading skills to determine fit
   c) Ask the IC for a PAR when accountability issues arise
   d) Label zones
   e) Evaluate traffic
   f) Determine need for AISOs

2) The Incident Safety Officer Action Model at structural fires
   a) Risk: rescue profile

b) Recon
c) Rehab
d) Report: utilize safety briefings

3) Classify buildings according to building size and use
   a) Central-hallway/stairwells, strip malls, and high-rise buildings present unique challenges
   b) Incident Safety Officers should request assistance at high-rise fires

1002-6.3 Emergency Medical Service Operations

1002-6.3.1 The Incident Safety Officer shall meet the provisions of Section 1002-6.3 during emergency medical service (EMS) operations.

1002-6.3.2 The Incident Safety Officer shall ensure compliance with the department's infection control plan and NFPA 1581, *Standard on Fire Department Infection Control Program*, during emergency medical service operations according to the authority having jurisdiction (AHJ).

1002-6.3.3 The Incident Safety Officer shall ensure that incident scene rehabilitation and critical incident stress management are established as needed at emergency medical service operations, especially mass casualty incidents (MCIs) according to AHJ.

1002-6.4 Technical Rescue

1002-6.4.1 The Incident Safety Officer shall meet the provisions of Section 1002-6.4 during technical rescue operations.

1) Tech-rescue incidents: many categories and sub-categories
   a) Fire department is called upon to find a positive solution regardless of rescue type or training
   b) Mandatory Incident Safety Officer assignment for confined space, trench, and hazmat incidents
   c) Incident Safety Officer should be familiar with tech-rescue CFRs
   d) If the Incident Safety Officer does not have required competencies (NFPA 1670 or NFPA 1006), an AISO-RT should be appointed

2) Assistant safety officer - rescue tech (AISO-RT)
   a) Meets or exceeds NFPA 1670 requirements
   b) Meets or exceeds NFPA 1006 requirements
   c) Trained in Incident Safety Officer responsibilities as they relate to specific rescue incident

d) Fulfills safety functions for technician-level components
e) Works with the Incident Safety Officer, rescue branch directors, and technical specialists

1002-6.4.2 In cases where a designated Incident Safety Officer does not meet the technician-level requirements of NFPA 1006, *Standard for Rescue Technician Professional Qualifications*, the incident commander shall appoint an assistant Incident Safety Officer or a technical specialist who meets the technician-level requirements of NFPA 1006 to assist with Incident Safety Officer functions.

The general duties of an Incident Safety Officer at a Tech-Rescue Incident include:

1) Gain a strong sense of the Situation Status (SITSTAT)
    a) Victim location and predicament
    b) Rescue likelihood
    c) Integrity of surrounding environment

2) Understand committed resources (RESTAT)

3) After SITSTAT and RESTAT
    a) Take position at command post and rove occasionally

4) Monitoring Issues at Tech-Rescue Incidents
    a) Risk
        i) Evaluate rescue profile of victims: onlookers may jump in when effort switches to recovery mode
    b) Operational effectiveness
        i) AISO-RT evaluates technician operations
        ii) Other AISOs evaluate support activities
        iii) Constantly evolving and shifting efforts require reevaluation

5) Personal Safety System Issues at Tech-Rescue Incidents
    a) Accountability systems
        i) Potential for freelancing and self-deployment:
            a. Firefighters rush to save victims
            b. ISO/AISO-RT should address issue when risks outweigh benefits
        ii) Track assigned resources following established procedures
    b) Control zones
        i) Differences between IDLH, no-entry, and support zones may be measured in inches

ii) AISO-RT can establish, relay, and monitor the delineation of zones
iii) Incident Safety Officer should verify appropriate level of PPE in each zone based on worst-case scenario: AISO-RT may monitor compliance

c) Radio Transmissions
i) Tech-rescues may require constant communication/instructions
a. Use small talk-around radios to free up tactical channels: monitored by AISO-RT
b. May also use backup communication systems: hand signals, message boards, tag-line signals
c. Create cheat sheet so responders do not miss important signals

d) Rehab
i) May span hours or days
ii) Do not allow rehab decisions to be based on perceived comfort
iii) Practice “on-deck” system
iv) Energy replacement – use efficient fueling strategies

6) Defining Other Needs at Tech-Rescue Incidents
a) Traffic
i) Congestion due to media coverage
a. Firefighters may become distracted
i) Safety hazards associated with railways, air traffic, and waterways
a. Maintain travel corridor for incident purposes
b. Ensure air landing zone is separated from rescue location and crowds (AISO function)

b) Need for Incident Safety Officer assistance
i) AISO-RT
ii) One or more AISOs
iii) Technical specialists
iv) Risk managers
v) Process experts
vi) Consultants for planning functions
vii) May need critical incident stress management procedures

1002-6.4.3 The Incident Safety Officer shall attend strategic and tactical planning sessions and provide input on risk assessment and member safety.

Considerations at Specific Tech-Rescue Incidents include:

1) Tech-rescue incidents are classified into categories that may have guiding documents
    a) Be aware of guiding documents
    b) Front-load: peruse document content
    c) Retrieve critical information at incident as necessary

2) Building collapse
    a) Basic/surface collapse
        i) Victims easily accessible
        ii) Minimal loads
    b) Light collapse
        i) Light-frame (wood partition)
        ii) Common fire department can be used for search and extrication
        iii) Secondary collapse can be mitigated easily
    c) Moderate collapse
        i) Masonry, heavy wood, open spaces
        ii) Significant void space concerns; secondary collapse
        iii) Victim rescue may involve heavy-load equipment
    d) Heavy collapse
        i) Stressed or reinforced concrete; steel girders
        ii) Requires USAR team response; heavy equipment
        iii) Significant secondary collapse; threats to other structures
    e) AISO-RT should be appointed for moderate and heavy collapses
    f) Additional AISOs may be required to address collapse hazards
    g) Hazards may include:
        i) Falling/loose debris
        ii) Instability
        iii) Secondary collapse
        iv) Poor air quality/dust
        v) Unsecured hazardous energy
        vi) Weather exposure
        vii) Blood-borne pathogens
        viii) Difficult access/escape options
        ix) Sharp or rugged debris
        x) Poor footing
    h) Technical assistance
        i) Respiratory specialist, public health specialist, HSO
    i) Air monitoring
        i) Four-gas monitors, natural and propane gas detectors
    j) Improvisation monitoring
        i) Evaluate to identify when responders are pushing the envelope

3) Industrial entrapment
    a) Hazards may include:
        i) Heavy machinery
        ii) Complicated access
        iii) Unsecured hazardous energy
        iv) Hazmat
        v) Noise
        vi) Interfaces and/or automated systems
        vii) Security system impediment
        viii) Mega sized equipment
        ix) Pinch hazards
        x) Equipment congestion
        xi) Exotic materials
        xii) Material stockpiling
    b) Incident Safety Officer should double-check lockout/tag-out measures
    c) Watch for load stress and snaps/springs

4) Cave-ins
    a) Include trench collapses, earthen slides, avalanches, and material entrapments
    b) Hazards may include:
        i) Shifting/unstable material
        ii) Hidden infrastructure
        iii) Oxygen deficiency
        iv) Weather exposure
        v) Difficult slope or grade
        vi) Poor footing
        vii) Sink potential
        viii) Secondary collapse
        ix) Crush potential
    c) Incident Safety Officer develops site safety plan, emergency procedures, and safety briefings
        i) Use LCES approach for safety briefings
    d) LCES
        i) *Lookouts*: AISOs, soil engineers, briefed support personnel
        ii) *Communications*: visual, voice, “all-evac” signal, IAP
        iii) *Escape routes*: escape ladders, boarded footpaths, technician-level assistance for tethered rescue
        iv) *Safe zones*: separate shore or refuse area using natural and structural barriers
    e) Other unique hazards
        i) Exhaust fume accumulation
        ii) Ground vibration

iii) Specialized hydrovac equipment
iv) Gravity

5) Water rescues
   a) Include swift water, lake, oceanic, flood, and ice situations
   b) Hazards may include:
      i) Swift/hidden currents
      ii) Low-head dams
      iii) Submerged entrapment hazards
      iv) Floating debris
      v) Electrocution
      vi) Hypothermia
      vii) Reduced visibility
      viii) Fragile and/or shifting ice
      ix) Marine life
      x) Frightened animals
      xi) Distance to solid ground
      xii) Crushing wave forces, undertows, or riptides
   c) Incident Safety Officer concerns
      i) Protection from elements
      ii) Appropriate PPE
      iii) Rapid rescue intervention
      iv) Overtaxed resources, particularly in flood incidents
      v) Health hazards from flooding
   d) Incident Safety Officers can seek assistance from:
      i) Dive-rescue certified responders, public health and environment professionals

6) High-angle rescues
   a) Amazingly challenging and daring
   b) Hazards may include:
      i) Limited access
      ii) Dizzying heights
      iii) Limited escape routes
      iv) Slip/fall hazards
      v) Lightning/wind
      vi) Limited anchor options
      vii) Electrocution
      viii) Heights beyond equipment capabilities
      ix) Use of helicopters
      x) Equipment failure
      xi) Falling debris
      xii) Dropped equipment
   c) Incident Safety Officer concerns
      i) Are rescuers training and *willing* to engage?

ii) Firefighter fear and stress
iii) Proper anchor and rigging: AISO-RT monitoring
iv) Prehydration and energy intake
v) Unsuspecting hazards: be their wingman
vi) Nighttime operations: use of artificial light
vii) Crowds and media

7) Confined spaces
   a) Incident Safety Officer is mandatory (29 CFR 1910.146)
      i) ISO/AISO-RT
      ii) Site safety/emergency plan
      iii) Safety briefings
   b) Hazards may include:
      i) Limited access/escape options
      ii) Toxic/flammable atmospheres
      iii) Oxygen deficiency
      iv) Hazardous energy
      v) Communication difficulties
      vi) Collapse
      vii) Cramped quarters, limited mobility
      viii) Distance that exceeds airlines, ropes, etc.
      ix) Rust and mold, residues

8) Roadway/transportation incidents
   a) Incident Safety Officer should consider discretionary response to MVA when warranted
      i) Multiple vehicles involved
      ii) Long response time
      iii) Involvement hazardous energy
      iv) Extreme weather
      v) Involvement of buses, hazmat, high-angle, etc.
   b) Hazards may include:
      i) Other traffic and congestion
      ii) Threat of nearby/secondary crash
      iii) Limited access or escape options
      iv) Hazmat/munitions
      v) Fuels ignition/alternative fuels
      vi) Damaged infrastructure
      vii) Hazardous energy
      viii) Heavy entanglement
      ix) Weather exposure
      x) Instability
      xi) Vehicle hazards
      xii) Bloodborne pathogens
   c) Roadway incidents

i) Number one safety consideration: threat of being hit by other traffic Incident Safety Officer tactics
    a. Traffic barriers: absorb impact of secondary crash
    b. Work zones: created by barrier
    c. Traffic-calming strategies: slow down approaching traffic with cones, spotters, lights, signs, etc.
    d. Minimize use of white lights/strobes at night

d) Railway/subway incidents
    i) Expect the worse
        a. Confined space, hazmat, industrial entrapment, and structural collapse incident rolled into one
    ii) Rely on AISOs to monitor rescuers
    iii) Follow tactics from relevant preceding sections

e) Aircraft incidents
    i) Classification dependent on:
        a. Size of aircraft
        b. Size/type of building that was hit
    ii) Establish rescue profile
        a. Recovery profile indicates risk-reduction strategies
        b. Minimize destruction of potential evidence
    iii) Concerns at catastrophic crashes
        a. Bloodborne pathogens
        b. Jet fuel vapors
        c. Burnt plastics
        d. Composite metal dusts
    iv) Do not be quick to allow responders to doff SCBA during aircraft incident operations

1002-6.4.4 The Incident Safety Officer shall ensure that a safety briefing is conducted and that an incident action plan and an incident safety plan are developed and made available to all members on the scene.

1) Incident Safety Officers have significant issues at tech-rescue incidents
    a) Firefighters' "can do" attitudes can lead to traps
    b) Several regulations require:
        i) Coordination with AISO-RT
        ii) Safety plan and safety briefings
    a) Rescue/recovery profile and risk reduction
    b) Rehab
        i) Energy replacement and mental breaks

2) Classifications of tech-rescue incidents
    a) Collapse
    b) Industrial entrapment
    c) Confined space

d) Roadway/transportation: numerous types and challenges
e) Water
f) High-angle

3) Each tech-rescue classification presents unique hazards

4) LCES: helps Incident Safety Officer develop meaningful safety briefings for most tech-rescue incidents
   a) Lookouts
   b) Communications
   c) Escape routes
   d) Safe zones

1002-6.5 Hazardous Materials Operations

1002-6.5.1 The Incident Safety Officer shall meet the provisions of Section 1002-6.5 during hazardous materials operations.

1) Hazmat incidents: most regulated of all incidents to which fire departments respond
   a) Incident Safety Officer assignment at a hazmat technician-level incident is mandatory
   b) Incident Safety Officer should be aware of CFRs regarding hazmat incidents
   c) If Incident Safety Officer does not have required technician competencies (NFPA 472), an AISO-HM should be appointed

2) Assistant safety office-hazmat (AISO-HM)
   a) Meets or exceeds NFPA 472 requirements for Hazardous Materials Technician
   b) Trained in Incident Safety Officer responsibilities as they relate to hazmat response
   c) Fulfills safety functions for technician-level components of incident
   d) Works with Incident Safety Officer, hazmat directors, technical specialists, and industry representatives

1002-6.5.2 In cases where a designated Incident Safety Officer does not meet the technician-level requirements of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, the incident commander shall appoint an assistant Incident Safety Officer or a technical specialist who meets the technician-level requirements of NFPA 472 to assist with Incident Safety Officer functions.

The general duties of an Incident Safety Officer at a Hazmat Incident include:

1) Be familiar with *NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*

2) Ensure initial zone and isolation efforts are in place upon arrival and assignment

3) Take a strategic approach
    a) Interface with other command staff members
    b) Maintain position at command post

4) Monitoring Issues at Hazmat Incidents
    a) Risk
        i) Liability: is hazmat team entry warranted?
        ii) Risk communication: established risk guidelines
    b) Operational effectiveness
        i) Rely on AISO-HM to evaluate technician operations
        ii) Other AISOs evaluate support activities
        iii) Preplan action plan prior to operations

5) Personal Safety System Issues at Hazmat Incidents
    a) Accountability systems
        i) Two systems: hazmat team and support responders
        ii) Encourage cross-communication
        iii) Incident Safety Officer deals with strategic accountability
        iv) AISOs deal with tactical accountability
    b) Control zones
        i) IDLH zone
        ii) No-entry Zone (including collapse zone)
        iii) Support Zone
        iv) Contamination Reduction Zone (Decon Corridor)): decontamination takes place; Safe Refuge Area (Safe Haven) for contaminated persons who have left the IDLH zone
        v) Use simple diagrams that include travel pathways and gateways between zones
        vi) AISO-HMs should verify appropriate level of PPE in each zone
        vii) Personnel moving from one zone to another should follow prescribed pathway
        viii) Check personnel before leaving contamination zone
    c) Radio Transmissions
        i) Multiple radio types and frequencies

ii) Backup communication systems: hand signals, message boards, tag-line signals, spontaneous system on-scene for specific needs

d) Rehab
   i) Medical monitoring: establish baseline before technician stabilization efforts
   ii) Sanitation needs: best hazard mitigation approach is separation
   iii) Food service: distance from working areas, cleanliness (further decon)

6) Defining Other Needs at Hazmat Incidents
   a) Traffic
      i) Roadway, railway, air, and waterway: basic approach to traffic issues is to get rid of them
      ii) For people, define specific shuttle pathways, escape zones, and zone transition gateways
   b) Need for Incident Safety Officer assistance
      i) AISO-HM
      ii) One or more AISOs
      iii) Technical specialists
      iv) Corporate risk managers
      v) Process experts
      vi) Public health representatives
      vii) Department HSO or infection control officer

1002-6.5.3 The Incident Safety Officer shall attend strategic and tactical planning sessions and provide input on risk assessment and member safety.

1002-6.5.4 The Incident Safety Officer shall ensure that a safety briefing is conducted and that an incident action plan and an incident safety plan are developed and made available to all members on the scene.

1) Applying the Incident Safety Officer Action Model at Hazmat Incidents
   a) Risk evaluation at the hazmat incident
      i) Incident Safety Officer and AISO-HM must strive to agree on overall risk profile
      ii) Incident Safety Officer may need to communicate an acceptable risk profile to nonfire service personnel
      iii) Pace: slow, methodical, and intellectual approach
   b) Recon evaluation at the hazmat incident
      i) Confirm initial zoning and isolation upon arrival and assignment
      ii) Verify that defined zones and gateways are appropriate

iii) AISO-HM should consult a technical reference specialist as necessary
iv) Define the principal hazard
    a. Dictated by the chemical involved
v) Define environmental integrity
    a. Weather, infrastructure stability, container condition, hazardous energy
vi) Define physical surroundings
    a. Location defines impact of surroundings
vii) Crew exposure to hazards
    a. Physical hazards +/- Chemical properties + Crew mitigation efforts = Crew hazard exposure
    b. AISO-HM in best position to evaluate tools, teams, and rapid withdrawal factors
    c. Rapid intervention is far from rapid at hazmat incidents: ensure clear direction for activation

c) Resource evaluation at the hazmat incident
    i) Time
        a. On-scene time may not be practical: manage impacts of time passage
        b. Reflex time for any unplanned event is delayed
    ii) Personnel
        a. Determine adequate training for task
    iii) Equipment
        a. May need on-the-spot training for specialized equipment
d) Report issues at the hazmat incident
    i) Tech-level stabilization effort requires formal delivery and development of
        a. Written site safety plan
        b. Safety briefings
    ii) 15-minute rule for face-to-face communication is impractical
        a. Keep unit log for documentation
        b. Hazmat documentation not subject to statute of limitations
    iii) Federal requirements for site safety plan include:
        a. Safety, health, and hazard risk analysis
        b. Site organization
        c. Identification of PPE type required for task
        d. Medical monitoring procedures
        e. Environmental monitoring and sampling procedures
        f. Site control measures
        g. Decontamination procedures

h. Predefined responder emergency plans
i. Confined space entry and escape procedures
j. Spill containment and handling procedures

iv) ISO/AISO-HM may also have to sign off on numerous other hazmat incident plans

2) Unique Considerations at the Hazmat Incident
   a) Clandestine drug labs
      i) Hazards may include:
         a. Poor ventilation
         b. Flammable/toxic atmospheres
         c. Incompatible chemicals
         d. Chemical reactions in progress
         e. Unidentified chemicals and/or containers
         f. Unstable and/or leaking containers
         g. Booby traps
   b) Weapons of Mass Destruction
      i) Develop local WMD plan that addresses Incident Safety Officer functions until IMT takes over
      ii) Incident Safety Officer initially coordinates:
         a. Quick in/quick out approach for immediate rescues
         b. Adopt a back off posture after rescue
         c. Isolation of victims and exposed firefighters
         d. Staging out of sight as much as possible
      iii) Strategic goals of ISO and AISOs
         a. Gather RECON and threat information
         b. Analyze options: lean towards the worst case
         c. Develop a safety action plan across organizational boundaries
         d. Expand role into manageable parts
         e. Address health and safety issues prior to IMT arrival

1002-6.5.5 The Incident Safety Officer shall ensure that control zones are clearly marked and communicated to all members.

1) Hazardous materials incidents require specialized training
   a) Incident Safety Officer oversees and addresses general duties
   b) AISO-HM focuses on technician-level issues

2) Issues at hazmat incidents
   a) Proper training
   b) Communication to nonfire service responders
   c) Control zones: contamination reduction zone
   d) Medical evaluation before operations

e) Separation of sanitation and food areas

3) Incident Safety Officer action model at hazmat incidents
   a) Reporting is a significant effort: federally mandated site safety plan

4) Unique Hazmat considerations
   a) Clandestine labs
   b) WMD incidents

1002-6.6 Accident Investigation and Review

1) Lessons learned from any near miss incident:
   a) Should be folded into training
   b) Can be used for ongoing efforts to void similar situations in the future

2) The Incident Safety Officer has duties during:
   a) Postincident activities
   b) Postincident analysis
   c) Accident investigation

1002-6.6.1 Upon notification of a member injury, illness, or exposure, the Incident Safety Officer shall immediately communicate this information to the incident commander to ensure that emergency medical care is provided according to the authority having jurisdiction (AHJ).

1002-6.6.2 The Incident Safety Officer shall initiate the accident investigation procedures as required by the fire department.

1) Incident Safety Officer duties according to NFPA 1521
   a) Initiate accident investigation procedures as required by fire department
   b) Request assistance from the Health & Safety Officer in the event of serious injury, fatality, or other potentially harmful occurrence

2) Investigation is first step to avoiding future injuries and deaths
   a) Look at fatalities and close calls

3) Introduction to accident investigation
   a) Accident chain:
      i) A series of events or conditions leading to an unsafe condition that
      ii) Results in injury and/or property damage

b) Ideally, the Incident Safety Officer should stop a potential incident by eliminating one of the elements in the chain *during* the incident
c) Five components of accident chain
    i) Environment: physical surroundings
    ii) Human factors: procedure use (or lack of), fatigue, fitness, and attitudes
    iii) Equipment: use and maintenance, PPE
    iv) Event: intersection of first three components
    v) Injury: includes close calls

4) Investigation issues
    a) The Incident Safety Officer must consider liability issues
    b) Use due diligence
    c) Recognize discretionary functions
    d) Be aware of involvement of outside agencies in a significant injury or death investigation
5) The investigative process
    a) Step 1: Information collection
        i) Incident data
        ii) Witness statements
        iii) Scene sketches/diagrams
        iv) Photographs/video
        v) Physical evidence
        vi) Existing records
    b) Step 2: Analysis and reconstruction
    c) Step 3: Recommendations

1002-6.6.3 In the event of a serious injury, fatality, or other potentially harmful occurrence to a member, the Incident Safety Officer shall request assistance from the health and safety officer.

1002-6.7 Post-Incident Analysis

1002-6.7.1 The Incident Safety Officer shall prepare a written report for the post-incident analysis that includes pertinent information about the incident relating to health and safety issues.

1002-6.7.2 The Incident Safety Officer shall participate in the post-incident analysis.

1) Formal or informal reflective discussions after an incident

2) Used to summarize successes and improvement areas discovered from incident

3) Requires Incident Safety Officer involvement (NFPAs 1500 and 1521)
    a) NFPA 1521 requires Incident Safety Officer to prepare a written report regarding health/safety issues

4) PIA philosophy
    a) Positive reinforcement for safe habits
    b) Honest, open desire to prevent future injuries
    c) Discovery from fact-finding point of view
    d) Avoidance of confrontation
    e) Looking forward to the future

5) Incident Safety Officer PIA issues
    a) Incident Safety Officer should comment on key issues:
        i) General risk profile of an incident: get crew perceptions
        ii) Effectiveness of crew tracking and accountability: freelancing
        iii) Rehabilitation effectiveness
        iv) PPE use: discuss controversial decisions
        v) Close calls: reserve judgment
        vi) Injury status: keep medical confidentiality

6) PIA process
    a) Can be formal or informal: discuss with IC
    b) Formal PIAs should be prepared for significant incidents
    c) Incident Safety Officer should take following steps for effective PIA
    d) On-scene
        i) Check-in with responders and ask about injuries
    e) Documentation
        i) Write quick summary of hazard issues: buildings, incident timeline
    f) Trend spotting

7) Incident Safety Officer postincident duties
    a) Monitor postincident activities
    b) Provide information for postincident analysis reports
    c) Begin an accident investigation - Reconstruct accident chain