STRUCTURAL COLLAPSE

SCOPE

This procedure establishes a standard structure and guideline for all fire department personnel operating at incidents involving structural collapse. The procedure outlines responsibilities for first-responders, Technical Rescue Units, Command Officers, and other fire department personnel responding to such incidents. All other Toledo Fire and Rescue procedures shall apply to technical rescue operations where applicable.

PURPOSE

The purpose of this procedure is to establish guidelines for the response of fire department personnel and equipment to structural collapse incidents. Structural collapse operations present a significant danger to fire department personnel; the safe and effective management of these operations require special considerations. This guideline identifies some of the critical issues which must be included in managing these incidents.

TACTICAL CONSIDERATIONS

Structural collapse incidents could present the incident commander and rescue teams with multiple issues, including but not limited to; limited victim information, extended operational periods, overwhelming chaos and limited and/or delayed specialized equipment and trained rescue personnel. A strong COMMAND presence is required from the onset to maintain efficient and effective organization and safe operations. Consider designating a primary and secondary STAGING AREA upon arrival.

Pre-incident planning and training is an important factor in preparing to handle these types of incidents.

Due to the inherent dangers associated with these operations, Toledo Fire and Rescue's Risk Management Profile shall be applied to all structural collapse operations and shall be continuously re-assessed throughout the incident. A phased approach to structural collapse operations which include; **Arrival**, **Pre-entry** operations, **Entry** operations, and **Termination**, can be utilized to safely and effectively mitigate these high-risk / low-frequency events.

UNDER NO CIRCUMSTANCE SHALL ANY PERSONNEL OTHER THAN THE ON-DUTY RESPONDING TECHNICAL RESCUE COMPANIES ENTER THE STRUCTURAL COLLAPSE.

DISPATCH - The following units shall be dispatched for all Structural Collapse incidents: USAR 1 (Station 6), USAR 2 (Station 18), (1) Battalion Chief, (1) Safety Officer, (1) Engine or Engine Co., (1) Heavy Rescue Squad, (1) Tower Ladder

*Notify the Deputy Chief of Operations and the Deputy Chief Special Operations, Public Information Officer (PIO)

PHASE ONE ARRIVAL

I. ESTABLISH COMMAND

A. First arriving TFRD member shall assume Command and begin an immediate size-up of the situation **while isolating the immediate hazard area** and **denying entry to all non-rescue personnel**. Establish Collapse Zones immediately.

B. First arriving Technical Rescue Unit that is staffed with a Technical Rescue Qualified Team Leader should be assigned Rescue Sector.

***Rescue Sector responsibilities include*:**

- Assuming technical rescue operations control.
- Identifying hazards and critical factors.
- Developing a rescue plan and back-up plan.
- Communicating with and directing resources assigned to Rescue Sector.
- Informing Command of conditions, actions, and needs during all phases of the rescue operation.

C. Designate a Safety Officer. Considerations for Safety Officer include:

- Special Operations qualified Battalion Chief or Officer
- Experienced Technical Rescue Company Officer assigned to the incident.
- Experienced Technical Rescue Member assigned to the incident.
- TFRD qualified Safety Officers.

A Safety Officer shall be established prior to the implementation of any rescue plan proposed by Rescue Sector.

D. Following the transfer of Command to a Command Officer, a Technical Rescue Advisor should be assigned as part of the Command Staff at their location, to assist in managing personnel and resources engaged in the technical rescue aspects of the incident. The Technical Rescue Advisor is responsible for ensuring that the rescue plan developed by Rescue Sector and communicated to Command is a sound plan in terms of the safety and welfare of both victim(s) and rescuers. Considerations for the Technical Advisor include:

- Special Operations qualified Battalion Chief or Officer
- Experienced Technical Rescue Company Officer assigned to the incident.
- Experienced Technical Rescue Member assigned to the incident.

The Technical Rescue Advisor position within the Command Staff should be filled prior to the implementation of any rescue plan proposed by Rescue Sector.

II. SIZE-UP

A. Secure a witness or responsible party to assist in gathering information to determine exactly what happened. If no witnesses are present, Command may have to look for clues on the scene to determine what happened.

B. Assess the immediate and potential hazards to the rescuers. (additional collapse, fire/explosion, broken gas and water lines, energized electrical equipment, falling debris)

C. Isolate immediate hazard area, secure the scene, and deny entry for all non-rescue personnel. Establish collapse zones.

D. Establish communications with victim(s) and determine if non-entry retrieval can be made.

E. Assess on-scene capabilities and determine the need for additional resources.

F. Consider establishing PRIMARY and SECONDARY Staging

PHASE TWO PRE-ENTRY OPERATIONS

It must be determined if this will be a **RESCUE** operation or a **RECOVERY** operation based on the survivability profile of the victim(s) which include factors such as the location and condition of the victim(s), and elapsed time since the accident occurred***. Collapsed structures create multiple voids that survivable victims can be trapped that may not be initially detectable by first responders***.

Pre-entry operations shall be conducted under the direction of Rescue Sector by trained Rescue Technicians.

I. Shoring Operations Guidelines for Planning

A. Contact lumber companies for logistical assistance with large volumes of shoring materials that may be needed

B. Set-up cut stations and establish power supply for cutting equipment, lighting/generators

C. Develop Primary and Secondary Shoring Plan

D. Shutdown all machinery and equipment in immediate area

E. Assemble collection point for tools/equipment and shoring supplies

F. Consult Structural Engineer, FEMA FOG, and other shoring guides

G. Place Escape Ladder(s)

H. De-Watering pumps

Develop" best practices" shoring plan and calculate material forces prior to conducting shoring operations.

II. MAKE THE GENERAL AREA SAFE

A. Establish a perimeter determined by factors such as structural stability, atmospheric conditions, etc.

- Minimum Collapse Zone 1½ times the structure height

B. Consider establishing a sector to control rescue personnel entering the hazard zone

C. Keep all non-essential personnel out of the HOT Zone

D. Consider evacuation of adjacent structures

III. MAKE THE RESCUE AREA SAFE

A. Secure all hazards, when possible; all rescue personnel shall be advised of any unsecured hazards

B. Scan the area possible secondary collapse issues

C. Consider establishing a sector to control rescue personnel entering the HOT Zone

D. Place primary shoring

E. Secure all utilities in the immediate area

F. De-Watering operations

G. Atmospheric monitoring adjacent to and within multiple levels collapse area

H. Ventilation (if applicable)

I. Consider harness/tether for rescue personnel

J. Establish Teams: *RECON, SEARCH, RESCUE, TRIAGE/MEDICAL, MONITORING/DECON*

K. Establish Support Sectors: *Logistics, Medical Treatment, Structural Engineering, Rehab*

L. Establish transportation routes into the Staging areas

M. Establish transportation routes from Staging into the HOT Zone

C. Equipment

- Personal Protective Equipment (PPE) shall include helmet, gloves, proper footwear, goggles, turnouts / Nomex or PBI or cotton jumpsuit, and a class III harness (if applicable) at a minimum. Additional PPE may be indicated by the hazard and atmospheric assessment.
- Supplied Air Breathing Apparatus (SABA) or Self-Contained Breathing Apparatus (SCBA) if applicable
- Air monitoring device that monitors oxygen levels, flammability, and toxicity for rescue/recovery operations.
- Lighting equipment
- Struts (pneumatic, hydraulic, manual or wood)
- Rigging (chains, slings, come-a-longs, Griphoist, shackles, anchors)
- Lifting (high pressure air bags, low pressure air bags, hydraulic jacks, pry bars, cribbing)
- Ropes
- Hand Tools/Power Tools

PHASE THREE ENTRY OPERATIONS

Entry operations shall be conducted under the direction of Rescue Sector by trained Rescue Technicians.

Rescue Sector shall be responsible for entry operations. The rescue plan will be discussed by Rescue Sector, Safety, Command and the Technical Rescue Advisor. Rescue Sector shall ensure that all personnel operating in the collapse and the area immediately surrounding the collapse are accounted for and wearing appropriate PPE.

I. RECON

RECON Operations will be immediately conducted by Rescue Technicians prior to shoring operations. FEMA experience has shown that following the initial collapse of a structure. Stability is maintained for a period of time that allows careful RECON of a structure without primary shoring, as long as no breaching, breaking or lifting operations are conducted.

RECON will conduct:

- Hasty Search Operations
- Identify probable victim location(s)
- Structural Triage and Damage Assessment
- Identify transportation corridors
- Establish initial atmospheric and hazard monitoring

II. RESCUE PLAN

Rescue Operations should be conducted with the least level of risk to the rescuers as possible. Low risk operations are not always feasible but should be considered and prioritized from lowest to highest risk. The risk vs. benefit model should be assessed prior to all operations. The Rescue Plan shall be developed through consultation with the Rescue Team Leader, Safety, Command and the Technical Rescue Advisor. The Rescue Plan should include a primary and secondary plan. The plan shall be communicated to all rescue personnel.

III. SEARCH

A. Remove surface victims

B. On-going structural hazard assessment

C. Locate Victim(s)

D. Utilize the FEMA Marking System

IV. RESCUE

A. Remove surface victims

B. On-going structural hazard assessment

C. Extricate Victim(s)

D. Breaching, Breaking, Burning, Lifting Operations

E. General Debris Removal

F. Select Debris Removal

G. Select Debris containment and stabilization

V. VICTIM REMOVAL

A. Create a safe zone around the victim.

B. Upon reaching victim, conduct a primary survey and initiate C-spine precautions. NOTE: due to the configuration of the collapse, optimum C-spine precautions may not be possible and should be addressed as soon as possible.

C. When possible, provide respiratory protection for the victim(s). Rescuers shall not administer pure oxygen to a victim(s) in a collapse area that has a potentially flammable atmosphere and rescuers shall not remove their breathing apparatus and give it to the victim(s).

V. VICTIM REMOVAL *continued*

D. Conduct a secondary survey of the victim(s) looking for immediate life threatening injuries. If conditions permit, entry personnel should attempt to treat serious injuries prior to removal, while considering that it may be more appropriate to remove the victim(s) from danger prior to treatment.

E. Properly package the patient for removal from the trench. This may include using a backboard, stokes basket, KED board, LSP Halfback, or similar device designed for extrication. Secure any loose webbing buckles or straps prior to moving the victim.

VI. TREATMENT

A. Immediately upon egress, the victim(s) shall be transferred to treatment personnel for ALS level examination.

B. If the victim has been contaminated from product inside the collapse, a thorough decontamination of the victim should be conducted prior to transporting to the hospital. Haz Mat DECON should be coordinated with the Haz Mat Unit.

C. Provide ALS level treatment and transportation to a hospital as indicated.

PHASE FOUR TERMINATION

A. Ensure personnel accountability.

B. Remove all tools and equipment used in the rescue/recovery and return to proper apparatus. Leave all shoring in place.

C. If entry personnel and/or equipment have been contaminated, proper decontamination procedures shall be followed prior to returning to service.

D. Conduct a Post Incident Critique.

E. Return companies to service after turning the scene over to the responsible party and ensuring the scene is secure.

F. Inspect and Log any rope equipment utilized in the collapse incident.

G. Any equipment found to be damaged shall be removed from service and Special Operations shall be electronically notified.

H. Complete a 214 and forward an electronic copy to Special Operations.

ADDITIONAL CONSIDERATIONS

- Air monitoring within Rescue Sector should be assigned to the Haz Mat Unit.
- DECON Operations, when required, should be assigned and /or coordinated with the Haz Mat Unit.
- Treatment Sector should be assigned to any ALS company assigned to the incident.
- Consider the effects of inclement weather on the hazard profile, the victim(s), and the rescuers.
- Maintain awareness of the time of day and ensure sufficient lighting is available on the scene if operations extend into the night.
- Many collapse zones contain confined spaces and/or trenches by OSHA definition, only qualified rescue personnel may enter those areas
- Consider early activation of the Ohio Response System to request additional USAR teams
- Consider establishing separate Incident Safety Officer(s) and Collapse Rescue/Recovery Area Safety Officer(s) who are Collapse Rescue qualified
- Consider LOGISTICS Sector to track equipment usage and return
- Technical Rescue incidents attract the news media; request the P.I.O.
- **When a collapse area is also determined to contain Hazardous Materials, Haz Mat IQ will be utilized. The atmosphere or product shall be made neutral prior to rescue operations, or the proper level of PPE shall be utilized by a personnel certified in Collapse, CSR and HM at the Technician Level. A thorough Risk Assessment by the Rescue and Haz Mat sectors shall be conducted before determining possible operations.**