Pinellas County
Technical Rescue Team

Policies and Procedures

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MISSION STATEMENT

The mission of the Pinellas County Technical Rescue Team is to contribute in maintaining and improving the quality of life of the community, region, and state we serve by proactive technical rescue services when called to duty. This will be accomplished using highly trained professional personnel with the best technology and equipment in the most expedient manner. Furthermore, it is our duty to protect and promote the health, safety and overall well being of our members. This will be accomplished consistent with the resources provided and available.

ORGANIZATIONAL CHART

Pinellas County Technical Rescue Team Commander
Joseph Ward

Department Representatives
Clearwater Fire Rescue – David Kadau
Largo Fire Rescue – Joseph Ward
Pinellas Park Fire Department – TJ Layfield
St. Petersburg Fire Rescue – Jason Mantay
Pinellas County EMS & Fire Administration – Sandy Brooking

Logistics Officer
Jasen Quinette

Training Coordinator
Aaron Bruckler

PINELLAS COUNTY TECHNICAL RESCUE

The goal of the Team is to respond immediately to an emergency situation that occurs in or near our community. The Team is part of the State Emergency Response Plan, as such, there is a possibility that the Team may be requested to respond outside their local area.

To meet the state's requirements for a Type I Technical Rescue Team the Team must be able to respond immediately with eight members, along with the approved state equipment cache to an incident. Members responding to a no notice incident will be on duty and go directly to the emergency scene. The estimated operational time period of the Team is six hours; this may be extended in an emergency situation.

The Team consists of firefighters from the four agencies. The team training meets NFPA 1670 and 1006 standards. Each member of the Team is trained to the technician level. The specific areas of training are collapse rescue, confined space rescue, high or low angle rope rescue, trench rescue, vehicle/machinery rescue, structural collapse and swift water rescue operations.

Benefits of the Team could be considerable. On major incidents most of the recoveries of viable patients are accomplished within the first hour. An immediate response of the Team provides our members an opportunity to make a substantial impact on rescuing patients.

When the Team is activated for deployment the personnel assignment will be:

2 - Rescue Team Leaders
6 - Rescue Specialists

Additional Team members may be requested.

On a day-to-day basis the departments provide a level of technical rescue coverage. The team is made up of over one hundred members. The minimum staffing is currently the following.

Clearwater 5 personnel
Largo 2 personnel
Pinellas Park 2 personnel
St. Petersburg 5 personnel

The deployment model during day-to-day operations is as follows.

Clearwater S51, T48, TE48
Largo TE42
Pinellas Park TE34
St. Petersburg R4, E4, T4, HR4

A water rescue capability is housed at St. Petersburg TE14 and U4

STANDARD OPERATING GUIDELINES

Rope Rescue

Pinellas County Technical Rescue		
DEPARTMENT STANDARD OPERATING PROCEDURE/GUIDELINE		
TITLE **Special Operations**	**SUBJECT** **Rope Rescue**	**POLICY/GUIDELINE #** **201**

PURPOSE

The following Standard Operating Guideline is established to provide Pinellas County Technical Rescue Team (PCTRT) personnel with guidelines to follow for conducting rope rescue operations. This should not eliminate the team's use of its native intelligence or experience when dealing with unusual situations.

RESPONSIBILITY

It is the responsibility of all personal to understand and follow this guideline

PROCEDURE/GUIDELINE

PHASE I: SCENE PREPARATION AND RECONNAISSANCE.

Step One: Assessment

1. The first arriving Company Officer shall establish Command after arriving on scene.

2. Secure responsible party or witness. Command should secure a witness as soon as possible after arriving on scene. This will help identify the problem and locating the patient(s).

3. Locate the patient(s). In most cases, Command will have to send a recon team to the area of the patient(s) to determine the exact location, number of patients, and nature of injuries. Command must designate a minimum of two personnel as the **Recon Team**. Recon Team should have medical equipment to begin to administer first aid to the patient(s). If there are members of the PCTRT present one member should be assigned to the recon team when practical. If the terrain is greater than 40 degrees inclination, Command may decide to wait until the PCTRT arrives with the proper equipment to reach the patient(s). The decision to wait for PCTRT to arrive should be based on the risk/benefit factor to the operation. Command may also choose to use a helicopter for aerial recon.

Step Two: Manpower and Equipment

1. Assess the need for additional resources. Recon Team should provide Command with enough information or recommend the need for additional resources as soon as possible. Information that will be helpful in determining the need for additional resources would be: Number of patient(s), location and condition of patient(s), estimated angle of terrain, distance of patient(s), and estimated time of evacuation. Command should put in an early call for additional resources. If additional resources are not needed after a call has been put in, Command can return those units to service.

2. Assess the hazards. Command shall designate a Safety Officer to identify all potential hazards to rescuers. Safety Officer will be responsible for securing those hazards or making all members aware of those hazards. Safety Officer shall also be responsible for assuring that all safety procedures are adhered to. Safety officer usually consists of 1 member of PCTRT assigned to this function. A special call for additional personnel may be required.

3. Decide on Rescue or Recovery. Recon Team should advise Command whether the operation will be conducted in the Rescue or Recovery mode. If the operation is to be conducted in the recovery mode, Command may wish to leave patient(s) and any related equipment in place for investigative purposes. Command should coordinate recovery operations with the Sheriff's department.

4. Decide on an Action Plan. With the recommendation from the Recon Team and the TRT operations group officer, command will decide on an Action Plan. TRT Operations Group and Safety Officer shall be aware of the specific Action Plan.

PHASE II: PRE-RESCUE OPERATIONS

1. Make the General Area Safe. Command or his/her designee should begin to make the general area safe. This may include securing the area and not allowing civilian personnel into the area.

2. Make the Rescue Area Safe. Command or his/her designee should make the immediate rescue area safe. This may include removing all civilian personnel and all non-essential rescue personnel from the area. If it is not possible to secure all the hazards in the immediate rescue area, all personnel operating in that area shall be made aware of those hazards.

3. Pre-Rescue/Recovery. Depending on the Action Plan established, Command may want to establish a TRT Group. The TRT Group will be responsible for gathering all equipment and personnel to conduct the rescue, and support personnel to support the rescuers, during the actual rescue phase. TRT Group should have an alternative Action Plan, should the first-choice plan fail. This alternate plan should be communicated to all personnel operating in the rescue area.

PHASE III: RESCUE OPERATIONS

1. After pre-rescue operations are complete, The TRT Operations Group shall put forth the action plan for removal of the patient(s). Rescue operations should be conducted from low risk to high risk. Rescues should be conducted with the least amount of risk to rescuers necessary to rescue the patient(s). Low risk operations are not always possible but should be considered first. If the rescue of the patient(s) is only possible by means of a high-risk operation, TRT Operations Group shall communicate with Command the risk/benefit of the operation.

2. The order of rescue from low risk to high risk would be:

    a. Talk the patient(s) into self-rescue. If the patient(s) is not exposed to a life-threatening situation, it may be possible to talk the patient(s) into self-extrication. If the patient(s) is exposed to a life-threatening situation, it may be best to advise the patient(s) to stay in place until a rope rescue system can be set up.

    b. For terrain less than 40 degrees inclination, (non-technical) most first responders have the equipment and training to assist the patient(s) down. If the patient(s) is ambulatory, he/she can walk down with the assistance of rescuers. If the patient(s) is injured or unable to assist their own rescue, he/she should be packaged properly in a Stokes basket and carried to safety.

3. The Stokes evacuation should be conducted with a minimum of 4 Attendants. Attendants should face the direction of travel during the evacuation. If appropriate, a tag line should be attached to the Stokes basket for assistance through unstable areas.

4. For **terrain of greater than 40 degrees** inclination, the TRT Operations Team shall be called in to assist with the evacuation. If the patient(s) is ambulatory, he/she may be assisted down by rescuers with the use of a belay/tag line. If appropriate, rescuers should set up an anchor system for the belay.

5. If the patient(s) is not ambulatory, rescuers shall build an anchor system and prepare for a steep angle evacuation. The patient shall be packaged properly in a Stokes basket and prepared for the evacuation. There shall be at least 4 litter Attendants assisting with the Stokes basket evacuation. Attendants should face the anchor during the evacuation. A separate raising/lowering line and belay line shall be set up for raising or lowering during steep angle evacuations.

6. For evacuations greater than 60 degrees, the TRT Operations Team shall conduct the evacuation. **Evacuations greater than 60 degrees are considered high angle operations.** The TRT Operations Group, in conjunction with the Safety Officer, should decide on the most appropriate method of evacuating the patient(s). This may include putting the patient(s) in a harness or packaging them in a Stokes basket for raising and/or lowering.

7. In any case, a **15:1 Safety factor** shall be maintained, and a double rope technique shall be used if at all possible. If possible, a separate anchor should be used for the main line and the belay line. Proper care shall be taken to assure that the patient(s) will not come out of the harness or Stokes basket used to evacuate him/her. Whichever method of evacuation is used, the TRT Operations Group shall ensure the overall safety of the raising/lowering system. TRT Operations Group shall designate the tasks of individual rescuers during the operation.

8. Helicopter operations are considered high-risk operations. Several factors must be considered before deciding on the use of a helicopter for evacuations. Some of these factors are **time of day, condition of patient(s), difficult access to the patient(s), and the qualifications of the pilot and rescuers.** If Command, in conjunction with the TRT Operations Group, decides to use a helicopter for evacuation, a landing zone (L.Z.) shall be set up and a L.Z. Sector shall be established.

PHASE IV: SAFETY CONSIDERATIONS

1. Assure all rescue personnel are supplied with the proper protective clothing; helmets, gloves, harnesses and eye protection.

2. Secure all utilities, gas, electrical and water supplies.

3. Perform lock-out/tag-out procedures.

4. Provide sufficient illumination when necessary.

5. Issue portable radios to recon, rescue teams and to all sectors.

6. Clear the area of personnel not usefully engaged in rescue operations.

7. Assure a safety belay line whenever possible.

8. Assure that the Incident Commander, Operation Group and the safety Officer are wearing appropriate vests.

9. Pay attention to negative psychological effects to rescuers.

10. Consider the need for critical incident stress debriefing (CISD).

PHASE V: TERMINATION

1. After the patient(s) have been evacuated, he/she shall be turned over to a Medical Group. An ALS evaluation shall be done on the patient(s).

2. Check personnel list and assure all personnel and equipment involved are accounted for. Call for a personnel accountability report (PAR).

3. Decon, inspect, inventory and replace all equipment.

4. Tag and place any equipment damaged or potentially unfit for further rope rescue use out of service until repaired.

5. Assure that all rope and equipment log forms be filled out appropriately.

6. A team briefing /post incident analyses shall be conducted on site or at the station as soon as possible.

7. Rescuers shall go through a psychological "debriefing" on scene or at the station as soon as possible, if deemed necessary.

8. Complete all required TRT logs.

DEFINITIONS

Rope rescue is defined as any rescue attempt that requires rope and related equipment necessary to safely gain access to, and remove patients from, hazardous geographic areas with limited access such as high-rise buildings and/or above or below grade structures.

Non-Technical Evacuations: Those evacuations that are, generally speaking, less than **40 degrees** inclination.

Technical Evacuation: Those evacuations that are greater than **40 degrees** inclination or on such rough terrain that the evacuation requires specific Special Operations training.

REFERENCES

NFPA 1670

NFPA 1006

Confined Space Rescue

Pinellas County Technical Rescue		
DEPARTMENT STANDARD OPERATING PROCEDURE/GUIDELINE		
TITLE **Special Operations**	SUBJECT **Confined Space Rescue**	POLICY/GUIDELINE # **202**

PURPOSE

Confined spaces present one of the most dangerous environments fire service personnel may confront. Well over 60 percent of all fatalities associated with confined space operations are "rescuers".

The following Standard Operating Procedure is established to provide Pinellas County Technical Personnel and the TRT with guidelines to follow in the event of a confined space entry and rescue. This should not eliminate the team's use of its native intelligence or experience when dealing with unusual situations.

RESPONSIBILITY

It is the responsibility of all personal to understand and follow this guideline

PROCEDURE/GUIDELINE

PHASE I: SCENE PREPARATION

Upon arrival at a "confined space", first due Technical Rescue Team personnel should obtain the following information from the first due company officer, battalion chief or job site foreman.

Step One: Assessment

1. What type of space is this?
2. Are there product storage hazards?
3. Locate and secure the job site foreman or a reliable witness?
4. Determine location and number of patients.
5. Obtain blueprints, maps or have on-site personnel draw a sketch of the site.
6. Determine the mechanisms of entrapment or nature of illness.
7. Make a conscious decision as to whether this is a "rescue or recovery".
8. Determine number of entry points and locations.
9. Determine electrical/mechanical/chemical hazards.
10. Assign and start technical rescue documentation sheet.

Step Two: Manpower and Equipment

1. Assure needed response of additional technical team members as required.
2. Assure needed response of a Safety Officer (Technical Rescue Operations trained).
3. Assure a full structural response is assigned.
4. Assure one ALS Rescue unit and ambulance.
5. Assure adequate air supply, cascade truck and cylinders.
6. Assure sufficient rehab area is established.
7. Assure visible Incident Command and operations section is established.

STEP THREE: MAKE THE GENERAL AREA SAFE

1. Establish a perimeter with fire line tape and assign police to assure an access point. Assure that the Incident Commander assigns an access control person, preferably not a technical team member.
2. Monitor Atmospheric conditions prior to ventilation and entry.
3. Ventilate the general area if needed.

4. Ventilate the space with positive pressure. There may be times when positive pressure will not work as needed. Continually assess the effectiveness of your ventilation process by:

    a. Atmospheric monitor readings.
    b. Assessment of type of configuration of the space.

5. If possible open all additional openings into the space to assist with the ventilation process, if positive pressure ventilation is inadequate, i.e.:

    a. Manholes
    b. Hatches.
    c. Natural openings.

6. Assure fire control measures, if needed.

7. Do not allow sources of ignition on site.

PHASE II: ENTRY PREPARATION

1. Assure lock-out, tag-out, blank-out procedures are complete.

    a. All fixed mechanical devices and equipment capable of causing injury shall be placed in a zero-mechanical state (ZMS).
    b. All electrical equipment (excluding lighting) shall be locked out in the open (off) position with a key type padlock. (if practical)
    c. The key shall remain with the person who places his/her lock on the padlock. (if practical)
    d. In cases where lock-out is not possible, equipment shall be properly tagged, and physical security provided.
    e. All locked-out utilities shall also be tagged with an approved Confined Space Tag system.
    f. The exception are large industrial facilities with a sophisticated lockout tag out program (LOTO) where there all multiple steps to locking a system out and requires that assistance of facilities engineers and mechanics. The Safety Officer will coordinate and ensure steps are/were taken to render the machinery safe.

2. Assure that all personnel who will enter the site are equipped with self-contained breathing apparatus (SCBA). If you must remove your SCBA to fit in the opening or move in the space, **Do Not Enter!** If you enter with SCBA, go no more than 25 feet from the entrance. Entrance with SCBA should be limited to reconnaissance only, unless the victim is easily accessible.

3. Assure one backup team for every entry team.

    a. Backup team must be equally attired.
    b. Backup team must be on a separate airline system.

4. No one shall enter a confined space alone; always in teams of two as a minimum.

5. No team shall enter a space with pagers or other "non-intrinsically safe devices" unless approved prior to entry, based on atmospheric monitoring.

6. Each entry team shall be equipped with the following items:

   a. Each member shall have a communication, sound powered system in place, worn with a SCBA.
   b. Hard-wired packaged for communications.
   c. Explosion proof lighting, cyalume or explosion proof light.
   d. Atmospheric monitor, personal units preferred.
   e. Proper protective gear as deemed necessary by the Incident Commander. At the very least, each member shall wear coveralls (flame retardant), Nomex hood, boots and gloves. Helmets should be worn whenever possible.
   f. An entry/egress line shall accompany the first entry team and be anchored at their furthest point of penetration. If this line is equipped with a hard-wire communications line (internal), it may function as a section (b) as well.
   g. Some form of rapid evacuation/retrieval harness for a patient (LSP Halfback).
   h. If the entry team must enter a vertical shaft of greater than 8 feet, each member shall wear a Class III Harness and be attached to a fall-arresting system upon entering.

PHASE III: ATMOSPHERIC MONITORING

1. Atmospheric monitoring shall occur prior to and during all entries into a confined space. It should be stressed that the lack of positive or alarm level readings does not eliminate the requirement for proper respiratory protection.

2. Atmospheric monitoring should be accomplished at high and low areas of the space.

3. All atmospheres shall be tested for:
   a. Oxygen Deficiency.
   b. Oxygen Excess.
   c. Toxicity.
   d. Flammability.

4. The following levels shall be considered as immediately dangerous to life and health (IDLH) environments:

   a. Oxygen Deficient < 19.5%.
   b. Oxygen Enriched > 23.5%
   c. Flammability at 10% of the Lower Explosive Limit (LEL).
   d. Toxicity shall be any limit with numerical value exceeding the Permissible Exposure Limit (PEL) in accordance with the NIOSH table.

5. Atmospheric monitoring shall occur during occupancy at intervals dependent on the possibility of changing conditions, but in no case less than every 15 minutes.

6. All atmospheric readings shall be recorded on a Technical Rescue work sheet and Confined Space Entry Permit.

7. If, in the opinion of the Incident Commander, and/or Safety Officer, the atmospheric readings become unsafe to continue operations, all entry teams shall be removed from the space immediately until such time as the atmospheric conditions are corrected.

PHASE IV: ENTRY

1. Once the best method and location for entry has been determined, teams shall begin entry and reconnaissance operations in the space.

2. Entry decisions shall be made based on known locations of the patient(s), safety of the opening, atmospheric readings and ease of recovery points.

3. If possible, attempt a two-prong attack to reach the patient(s) if their location is known or suspected.

4. Prior to entry, each team member shall be logged on a Technical Rescue work sheet and Confined Space Entry Permit with their time of entry. This function shall be assigned to one technician who shall keep the Operation's Section appraised of the status of each team.

5. Teams shall be limited to twenty (20) minutes in any space.

6. Each team shall be assigned to rehab upon removal from the space until re-hydrated and vital signs are within normal limits.

7. Once inside the space:

    a. Assure adequate interior team communications.
    b. Assure adequate communications with the operations exterior.
    c. Mark, if necessary, with chalk, cyalume or other method entry or movement patterns to assure egress.
    d. Move towards the suspected patient location as a team.
    e. Beware of elevation differences and unstable footing.

8. Once the patient has been located, decide:
    a. Is this a rescue or recovery?
    b. If a rescue, can a SCBA unit be placed on the patient?
    c. Can the patient be easily moved towards the opening with current equipment carried by the team?
    d. Is an additional team needed to make the move?
    e. Communicate your decision to the outside command.

9. Once the patient has been attached to a removal device and is in the process of being rescued/recovered, if it becomes necessary that the patient

has to be moved through an opening, either vertical or horizontal, which presents the team members with the only way out, that the following guidelines are followed.

a. Whenever possible, assure that all team members are stationed to the egress side of the opening in the event patient becomes lodged.
b. Always try to avoid being blocked in by a patient.

1) When the move is made, assure it is made quickly and smoothly, leaving the time the space is blocked for egress as minimal as possible.

2) Assure that the exterior personnel as well as interior teams are aware of the move and a plan is agreed upon prior to blocking the space.

3) Assure that all air lines and connections are clear of the patient and his movement path to assure that no air line problems develop as a result of the patient becoming entangled or pinching off lines.

PHASE V: PATIENT REMOVAL

1. Once the patient is set for removal, assure the following:

   a. Assure as much C-spine control as possible based on the space and patient's condition.
   b. Use removal system(s) on the exterior which are applicable to the size and weight of the patient.
   c. Mechanical advantage systems, or manual winches are preferred over manual hauling.
   d. Do **not** use electric winches, etc, to remove patients; these allow little control and could result in dismemberment or additional injury.
   e. Decide if the patient is to be removed headfirst or feet first.
   f. Avoid use of wristlets on patients with burns to the extremities.

2. Once the patient is clear from the space, remove all entry team personnel and equipment.

3. Patient shall be turned over to a medical sector, an ALS evaluation shall be conducted on the patient.

4. All entry team personnel and Attendant shall be evaluated by the medical sector.

PHASE VI: SAFETY CONSIDERATIONS

1. If rigging, hauling or use of a rope is needed in the space, assure only aluminum carabineers and hardware are used to avoid sparks.

2. In the event of an air line failure on a SCBA, **the rescuer shall immediately leave the space**, until such problem has been rectified. The rescuer should also:

    a. Notify the exterior immediately of the problem and identify the line and the specific problem.
    b. Never leave a partner in trouble unless you must clear the way for his/her exit.
    c. In the event that the 10-minute bypass bottle runs out before you have exited and the air line problem has not been corrected:

        1) Buddy breathing by passing the mainline (which is still functional) back and forth to each other's system is acceptable.
        2) Do not leave the non-operational line behind.
        3) Exit the space and correct the problem.

3. Assure all rescue personnel are equipped with the proper protective clothing, gloves, helmets, SCBA.

4. Secure all utilities, gas, electrical and water supplies to the confined space.

5. Provide sufficient illumination.

6. Provide sufficient ventilation.

7. Perform lock-out/tag-out procedures where necessary.

8. Issue portable radios to all groups and entry teams where applicable.

9. Assure that the Incident Commander, Operation Section and the Safety Officer are wearing appropriate vests.

10. Clear the area of personnel not usefully engaged in rescue operations.

11. Rescuers should work in pairs with frequent planned relief.

12. Pay attention to negative psychological effects to rescuers.

13. Consider the need for CISD Debriefing.

PHASE VII: TERMINATION

1. Check personnel list and assure all personnel are accounted for. Call for a PAR check as per department SOP.

2. Decon, Inventory and replace all equipment.

3. Tag and place any equipment damaged or potentially unfit for further confined space use out of service until repaired.

4. Have contractor or responsible party seal entry points to assure no additional entry.

5. Rescuers shall go through a psychological "debriefing" after each work period or shift while assigned to the site.

5. A team briefing/post incident analysis shall be conducted on site or at the station as soon as possible.

6. Complete all required Technical Rescue Operations logs.

7. OSHA report

DEFINITIONS

Confined spaces- those areas which are not intended for continual employee occupancy, have limited means of egress, and have the potential for physical, chemical or atmospheric Engulfment.

Attendant - workers who are qualified to be stationed outside one or more confined space(s) who monitor authorized entrants, and who perform all the following duties:

1. Remain outside the confined space during entry operations until relieved by another Attendant
2. Summon rescue and other needed resources as soon as the Attendant determines that authorized entrants might need assistance to escape from confined space hazards
3. Perform non-entry rescues as specified by the rescue procedure listed on the permit.

Competent Person - One who is capable of identifying existing and predictable conditions in the surroundings or in the working area that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate such conditions?

Engulfment - The surrounding and effective capture of a person by a fluid (e.g., liquid, finely divided particulate) substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry Permit - A written or printed document, established by an employer, for non-rescue entry into confined spaces.

Hazardous Atmosphere for Confined Space - Any atmosphere that could expose personnel to the risk of death, incapacitation, injury, acute illness, or impairment of the ability to self-rescue, due to one or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL)
2. * Airborne combustible dust at a concentration that meets or exceeds its LFL
3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent

4. Atmospheric concentration of any hazardous substance that could result in exposure to personnel in excess of its dose or permissible exposure limit (PEL)
5. Any other atmospheric condition that is immediately dangerous to life or health (IDLH)

Rescue Attendant – member of the rescue service who meets all requirements of Attendant as defined within this standard and who acts in that capacity during confined space rescues.

Rescue Mode. A level of operational urgency where there is a chance that a victim will be rescued alive.

REFERENCES

NFPA 1670

Trench Rescue

Pinellas County Technical Rescue		
DEPARTMENT STANDARD OPERATING PROCEDURE/GUIDELINE		
TITLE **Special Operations**	**SUBJECT** **Trench Rescue Operations**	**POLICY/GUIDELINE #** **203**

PURPOSE

The following guideline has been established to give rescue and technical rescue personnel the guidelines to follow in the event of a trench or excavation rescue. This should not eliminate the rescue team's use of its native intelligence or experience when dealing with unusual situations.

RESPONSIBILITY

It will be the responsibility of all Department personnel to be familiar with the guidelines set forth.

PERSONNEL

Personnel shall be classified as awareness level, operations level, or technician level. Each employee should be certain of his or her classification and know his or her limits. Personnel should notify supervisory personnel anytime he or she is placed into a situation that has exceeded his or her training and could result in endangerment not only to the rescuer, the victim, and or the entire operation.

PHASE ONE: SCENE PREPARATION

Upon arrival at a trench or excavation emergency, the first due personnel should obtain the following information:

Step One: Assessment

1. Perform a 360-degree safety survey and size-up of the excavation or trench.

2. Establish a safety zone.

3. Determine if rescue operations are currently under way and by whom? Order any persons in the trench out immediately.

4. Depth and width of the excavation and/or trench.

5. Determine any electrical/mechanical/chemical hazards.

6. Locate and secure the job site foreman or a reliable witness.

7. Determine location and number of victims.

8. Obtain blueprints, maps or have on-site personnel draw a sketch of the site.

9. Determine the mechanisms of entrapment or nature of illness.

10. Make a conscious decision as to whether this is a "rescue or recovery".

11. Determine the amount of soil that has collapsed.

12. Depth of soil covering the victim(s).

13. Potential for secondary collapse.

    a. Fissures in the soil.
    b. Chunks of soil falling off.
    c. Free seeping water causing erosion.

14. Determine the type of soil.

15. Assign and start technical rescue documentation sheet.

Step Two: Manpower and Equipment

1. Assure needed response of additional technical team members and/or regional technical rescue teams as required

2. Assess and assure the need for multiple agency responses: water, gas, sewer, and/or electrical representatives.

3. Assure needed response of Safety Officer (TRT Trained).

4. Assure needed response of Hazardous Materials Unit.

5. Assure sufficient rehab area is established.

6. Assure visible Incident Command is established.

7. Assure adequate emergency shoring equipment and supplies are available.

PHASE TWO: MAKE THE GENERAL AREA SAFE

1. Establish a perimeter with fire line tape and assign police to assure an access point. Assure that the battalion chief assigns an access control person, preferably not a technical team member.

2. Create a staging and logistics area. Recommend tiered staging no closer than 150 feet to the excavation.

3. Order all heavy equipment to be turned off.

4. Place ground pads around the face and sides of the excavation. Limit the number of personnel around the trench performing this task.

5. Place ladder(s) in the excavation, must be 3 feet above lip of trench and within 25 feet from workers.

6. Monitor atmospheric conditions prior to entry and ventilation.

7. Ventilate the excavation and or trench with positive pressure. There may be times when positive pressure will not work as needed. Continually assess the effectiveness of your ventilation process by, atmospheric monitor readings.

8. Use protective sheeting and or shoring:

    a. Trench shield or box.
    b. Pneumatic and/or hydraulic shores.
    c. Appropriate benching.

9. Assure fire control measures, if needed. Place an ABC fire extinguisher near trench or excavation. Do not allow sources of ignition on site.

PHASE THREE: ENTRY PREPARATION

1. Assure lock-out, tag-out, blank-out procedures are complete.
    a. All fixed mechanical and devices capable of causing injury to be placed in zero mechanical state.
    b. All electrical equipment (excluding lighting) shall be locked out in the off position with key type padlock.
    c. All locked-out utilities shall be tagged with an approved tag system.

d. If utilities cannot be secured, they shall be secured by physical means.

2. Assure that all personnel who will enter the site are properly equipped and trained including helmets and class three harnesses attached to lifelines.
3. Assure one back up team for every entry team. Back up team must be equally equipped.

4. No one shall enter an excavation or a trench alone; always in teams of two as a minimum.

5. Each team member shall be equipped with the following items:
   a. One member shall have a communications device.
   b. Atmospheric monitoring equipment.
   c. Proper protective gear as deemed necessary by the Incident Commander. At minimum each member shall wear boots, gloves, class three harness, and helmets. Flame retardant clothing will be considered.
   d. A lifeline shall accompany each member and be affixed to a ladder.
   e. Some form of rapid evacuation harness for a patient (LSP Halfback).

PHASE FOUR: ATMOSPHERIC MONITORING

1. Atmospheric monitoring shall occur prior to and during all entries into an excavation or trench.

2. Atmospheric monitoring should be accomplished at high and low areas of the excavation.

3. All atmospheres shall be tested for:

   a. Oxygen Deficiency.
   b. Oxygen Excess.
   c. Toxicity.
   d. Flammability.

4. The following levels shall be considered as immediately dangerous to life and health (IDLH) environments:

   a. Oxygen Deficient < 19.5%.
   b. Oxygen Enriched > 23.5%
   c. Flammability at 10% of the Lower Explosive Limit (LEL).
   d. Toxicity shall be any limit with numerical value exceeding the Permissible Exposure Limit (PEL) in accordance with the table.

6. Ventilate the excavation and/or trench with positive pressure. There may be times when positive pressure will not work as needed. Continually assess the effectiveness of your ventilation process by atmospheric monitor readings.

6. Atmospheric monitoring shall occur during occupancy at Intervals dependent on the possibility of changing conditions, but in no case less than every 15 minutes.

7. All atmospheric readings shall be recorded on a Technical Rescue work sheet.

7. If, in the opinion of the Incident Commander, Operations, and/or Safety Officer, the atmospheric readings become unsafe to continue operations, all entry teams shall be removed from the trench or excavation immediately until such time as the atmospheric conditions are corrected.

PHASE FIVE: ENTRY

1. Once the best method and location for entry has been determined, teams shall begin entry and recon operations in the excavation or trench.

2. Entry decisions shall be made based on known locations of the patients, safety of the opening, atmospheric readings and ease of recovery points.

3. Prior to entry, each team member shall be logged on a technical rescue worksheet with their time of entry. This function shall be assigned to one technician who shall keep the operations sector appraised of the status of each team.

4. Teams shall be limited to thirty minutes in any excavation and or trench.

5. Each team shall be assigned to rehab prior to and upon removal from the excavation or trench until re-hydrated and vital signs are within normal limits.

6. One inside the excavation or trench:
    a. Assure adequate shoring and sheeting as deemed necessary.
    b. Assure adequate interior team communications.
    c. Assure adequate communications with the operations sector.
    d. Mark, if needed, entry or movement patterns to assure egress.
    e. Move toward the suspected location of the patient as a team.
    f. Beware of elevation differences and unstable footing.

7. Need to search all areas for victims who may still be alive and effecting their release before any attempt is made to rescue victims with less chance of survival.

8. Before deciding which victims should be rescued first, the victim's condition, position and the difficulty in extricating them should be considered.

9. When working close to a victim, debris should be removed by hand or a small trowel to avoid injury. Recognition of a human body in a soil pile is difficult.
    a. Soil shall be removed in buckets and placed on a tarp in a designated area.
    b. Save all debris and soil for later inspection by OSHA.
    c. Shore and sheet around product.

10. Once the patient has been located, decide:
    a. Is this recovery or rescue?
    b. Can the patient by easily removed?
    c. Is an additional team needed to make the move?

d. Communicate your decision to the outside command.

PHASE SIX: PATIENT REMOVAL

1. Patient shall be turned over to a medical sector and an ALS evaluation shall be conducted on the patient.

2. All entry team personnel shall complete gross decontamination.

3. All entry team personnel shall be evaluated by the medical group.

PHASE SEVEN: SAFETY CONSIDERATIONS

1. Assure all rescue personnel are equipped with the proper protective clothing, gloves, helmets, safety glasses or goggles, and hearing protection.

2. Secure all utilities, gas, electrical and water supplies to the excavation or trench.

3. Provide sufficient illumination.

4. Provide sufficient ventilation.

5. Perform lock-out/tag-out procedures where necessary.

6. Issue portable radios to all groups and entry teams.

7. Assure that the Incident Commander, Operation Section and the Safety Officer are wearing appropriate vests.

8. Perform a safety analyses every 30 minutes. Survey for weakened walls, tension cracks and fissures. Maintain constant watch for signs of further collapse.

9. Shore excavation or trench prior to rescuers entry.

10. Clear the area of personnel not usefully engaged in rescue operations.

11. Rescuers should work in pairs with frequent planned relief.

12. Remove equipment in reverse order. Recommend using the minimum number of rescuers during this operation.

13. Pay attention to negative psychological effects to rescuers.

14. Consider the need for CISD Debriefing.

PHASE EIGHT: TERMINATION

1. Check personnel list and assure all personnel are accounted for. Call for a PAR.

2. Remove all equipment in reverse order. Sometimes it is necessary to leave equipment in place for OSHA investigation.

3. Have contractor or responsible party backfill excavation or trench, if possible, to assure no additional collapse and entry.

4. Decon, inventory, and replace all equipment on technical rescue units.

5. Tag and place any equipment damaged or potentially unfit for further technical rescue operation use out of service until repaired.

6. Rescuers shall go through a psychological "debriefing" after each work period or shift while assigned to the disaster site.

7 A team briefing/post incident analysis shall be conducted on site.

8. Complete all required TRT logs.

9. Complete an OSHA report.

DEFINITIONS

Assessment Phase (Size-up) – The process of assessing the conditions, scene, the subject's condition and ability to assist in his or her own rescue.

Competent Person – One who is capable of identifying existing and predictable conditions in the surroundings or in the working area that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate such conditions.

Emergency Incident - A specific emergency operation.

Environment – A collection of characteristics such as weather, altitude, and terrain contained in an area that are unique to a location.
Hazard Analysis – The process of identifying situations or conditions that have the potential to cause injury to people, damage to property, or damage to the environment.

Immediately Dangerous to Life or Health (IDLH) – Any condition that would do one of the following:

a. Pose an immediate or delayed threat to life
b. Cause irreversible adverse health effects
c. Interfere with an individual's ability to escape unaided from a hazardous environment

Imminent Hazard – An act or condition that is judged to present a danger to persons or property and is so immediate and severe that it requires immediate corrective or preventative action.

Incident Commander – The person responsible for all decisions relating to the management of the incident. The incident commander is in charge of the incident site.

Rescue – Those activities directed at locating endangered persons at an emergency incident, removing those persons from danger, treating the injured, and providing for transport to an appropriate health care facility.

Risk/Benefit Analysis – A decision made by a responder based on the hazard and situation assessment that weighs the risks likely to be taken against the benefits to be gained for taking those risks.

Safety Officer – An individual qualified by the authority having jurisdiction to maintain a safe working environment.

Trench- A narrow excavation (in relation to its length) made below the surface of the earth. In general, the depth is greater than the width, but the width of a trench is no greater than 15 feet.

REFERENCES

N.F.P.A.1500, *Standard on Fire Department Occupational Safety and Health Programs*
N.F.P.P. 1561, *Standard on Fire Department Incident Management Systems*
N.F.P.A. 1670, *Standard on Operations and Training for Technical Rescue Incidents, 1999 Edition*.

Structural Collapse Rescue

Pinellas County Technical Rescue

DEPARTMENT STANDARD OPERATING PROCEDURE/GUIDELINE

TITLE	SUBJECT	POLICY/GUIDELINE #
Special Operations	**Structural Collapse**	**204**

SCOPE:

Structural collapse operations cover a wide range of incident scenarios. These scenarios will vary in difficulty from incident to incident. Therefore, it becomes necessary to implement a standard but flexible plan of action that can be used for rescue operations at all structural collapse incidents. Difficult collapse rescue operations will require the combination of specialized tools and techniques for effective mitigation.

In an effort to minimize risk to both personnel and victims, the following guidelines are established for entry and rescue for structural collapse operations.

PURPOSE:

The following Standard Operating Procedure is established to provide Pinellas County Technical Rescue personnel with guidelines to follow in the event of a structural

collapse incident. This should not eliminate the team's use of its native intelligence or experience when dealing with unusual situations.

RESPONSIBILITY

It is the responsibility of all personnel to be familiar with this guideline.

PROCEDURE/GUIDELINE

A. STRUCTURAL FAILURE CAUSES:

1. Structural collapse or failure may occur for several reasons.

    a. Natural occurrences such as hurricanes, tornados, high wind conditions, earthquakes, floods, snow, ice, rain loads and mud or land slides or movement.

    b. Fire or explosion. Fire weakening structural components. Blast loading; interior or exterior, due to natural gas explosion, rupture of hazardous building contents and terrorist bombings.

    c. Human factors. Accidental undersigned impact on the building due to airplane crash and/or vehicle crash. Intentional malicious damage to the building.

    d. Engineering errors. Poor design, poor detailing at connections of major elements and poor construction methods or materials used due to lack of codes or enforcement.

PHASE I: SCENE PREPARATION AND RECONNAISSANCE

Upon arrival at a "structural collapse", the first due Technical Rescue Team Officer shall obtain the following information from the first due company officer, battalion chief, structural engineer or job site foreman.

Step One: Assessment

1. Perform a 360-degree safety survey and size-up of the damaged area.

2. Establish a safety zone, two times the height of the building.

3. Locate and secure the job site foreman or a reliable witness?

4. Building occupancy and use?

5. Determine the number of occupants.

6. Determine location and number of victims trapped.

7. Obtain blueprints, maps or have on-site personnel draw a sketch of the site.

8. Determine if rescue operations currently under way and by whom?

9. Determine the nature and extent of damage, mechanisms of entrapment and the danger of fire travel in confined spaces.

10. Determine electrical, mechanical and/or chemical hazards. The location of live electrical wires and main electrical panels

11. Determine the possibility of flooding from burst mains, plumbing and sewers.

12. Determine the possibility of additional collapse of the building and or adjoining structures.

13. Make a conscious decision as to whether this is a "rescue or recovery".

14. Determine number of entry points and locations.

15. Assure first due engine companies stretch hose lines to the collapse site to protect exposures in case of fire or explosion.

16. Assign and start Technical Rescue Documentation sheet.

Step Two: Manpower and Equipment

1. Assure needed response of additional technical rescue team members, regional or local technical rescue teams and/or US&R Task Forces i.e., (FL TF3 Tampa Bay and/or FL TF4 Orlando).

2. Assure needed response of a Safety Officer (TRT trained).

3. Assure needed response of structural, water, gas and/or electrical engineers.

4. Assure a full structural response is assigned.

5. Assure needed response of hazardous material unit.

6. Assure multiple ALS Rescue units and ambulances.

7. Establish a treatment and triage area.

8. Assure adequate air supply, cascade truck and cylinders.

9. Assure sufficient rehab area is established.

10. Assure visible Incident Command and/or Operations section is established.

11. Assure adequate emergency building shoring equipment and supplies.

Step Three: Make the General Area Safe

1. Establish a perimeter with fire line tape and assign police to assure an access point. Assure that the battalion chief assigns an access control person, preferably not a technical rescue team member.

2. Identify and secure or control the following hazards:
    a. Utilities. Control of the utilities in and around a structural collapse is critical to ensure the safety of responding personnel and victims. The following utilities should be considered:
        1. Electrical services (primary and secondary)
        2. Gas, propane, fuel oil, or other alternative energy sources (primary systems)
        3. Water
        4. Sanitary systems
        5. Communications
        6. Secondary service systems (i.e., compressed, medical, or industrial gases)

    b. Hazardous Materials. Collapsed structures might include various materials unique to an occupancy that, when released during a structural collapse, could pose a hazard to victims and responders. Request a Hazmat team.

    c. Personal Hazards. At the site of any structural collapse, there are many dangers that pose personal injury hazards to the responders. Hazards such as trips, falls, blows, punctures, impalement, and so forth.

    d. Confined Space. Some structural collapses necessitate a confined space rescue. Responding personnel should be familiar with and trained in confined space rescue requirements and techniques.

2. Monitor atmospheric conditions prior to entry, rescue operations if hazardous conditions exist.

3. Ventilate the general area if needed.

4. Ventilate the space with positive pressure. There may be times when positive pressure will not work as needed. Continually assess the effectiveness of your ventilation process by:

    a. Atmospheric monitor readings.
    b. Assessment of type of configuration of the space, void and crevice.

5. Assure fire control measures, if needed.

6. Do not allow sources of ignition on site.

7. If, in the opinion of the Incident Commander, Structural Engineer and/or Safety Officer, the structure and/or atmospheric readings become unsafe to

continue operations, all entry teams shall be removed from the space or void immediately until such time conditions are corrected.

Step Four: Structure/Hazard Evaluation Marking System

1. A Search and Reconnaissance Team shall evaluate each building and to determine if search and rescue operations are viable.

2. **Structure/hazard evaluation** marking should be performed during this phase and prior to the initiation of rescue operations.

3. Emergency personnel conducting structure searches shall outline a **2' x 2'** square box at any accessible entrance into any compromised structure.

4. Aerosol cans of spray paint (orange color only) shall be used for this marking system.

5. Specific markings shall be clearly made inside the box to indicate the condition of the structure, and any hazards at the time of this assessment.

    a. A blank box indicates that the structure is accessible and safe for search and rescue operations. Damage is minor or the structure is completely pan-caked with little danger of further collapse.

    b. A single slash indicates that the structure is significantly damaged. Some areas are relatively safe, but other areas may need shoring, bracing, or removal of falling and collapse hazards.

    c. A crossing slash indicates that the structure is **not safe for search and rescue operations** and may be subject to sudden additional collapse. Remote search operations may proceed at significant risk.

6. An arrow located next to a marking box indicates the direction to the safe entrance, should the marking box need to be made remote from the indicated entrance.

7. This initialed symbol **HM** indicates that a hazardous material condition exists in or adjacent to the structure. Consideration for operations should be made in conjunction with hazardous materials technicians.

Step Five: Entry Preparation

1. Assure that all personnel who will enter the site are properly equipped and trained.

2. Assure at least one paramedic per each entry, rescue team.

3. Assure one backup team for every entry team, backup team must be equally attired and trained.

4. No one shall enter a structural collapse space or void alone; always in teams of two as a minimum.

5. Each entry team shall be equipped with the following items:

    a. One member from each entry team shall have a portable radio in place.
    b. Explosion proof lighting, cyalume or explosion proof light.
    c. Atmospheric monitor, personal units preferred.
    d. Proper protective gear as deemed necessary by the Incident Commander. At the very least, PPE shall consist appropriate footwear, hearing and eye protection, helmet and gloves. coveralls (flame retardant), and Nomex hoods should be considered as necessary.

PHASE II: EXPLORATION AND SEARCH

Step One: Search Assessment Marking

1. Members performing the search function will draw an **"X" that is 2'x 2'** with orange color spray paint. This "X" will be constructed in two operations.

    a. Single slash drawn upon entry into structure or area indicates search operations are currently in progress.
    b. Crossing slash will be drawn upon search and rescue members completing the search and upon exit of structure or area.

2. Distinct markings will be made inside the four quadrants of the "X" to clearly denote the search status and findings **at the time of this assessment.**

    a. **Left Quadrant** - Identifier of rescue team completing search.
    b. **Top Quadrant** - Time and date rescue team members left the structure.
    c. **Right Quadrant** - Personnel hazards, (i.e., rats, etc.)
    d. **Bottom Quadrant** - Number of live and dead victims inside the structure (i.e., "0" = No victims, "L" = live, "D" = deceased.)

3. Search and Rescue Team members shall use **orange colored** spray paint to mark the exact location of a victim.

4. It is important that markings are made specific to each area of entry or separate part of the building; this will reduce needless duplication of search efforts.

Step Two: Entry

1. Once the best method and location for entry has been determined, teams shall mark entry point and begin reconnaissance operations in the space or void.

2. Entry decisions shall be made based on known locations of the victim(s), safety of the opening, atmospheric readings and ease of recovery points.

3. If possible, attempt two separate points of entry to reach the victim(s) if their location is known or suspected.

4. Prior to entry, each team member shall be logged on a Technical Rescue Documentation sheet with their time of entry. This function shall be assigned to one technician who shall keep the Operation's Section appraised of the status of each team.

5. Teams shall be rotated frequently depending on physical activity, stress, fatigue, and weather conditions.

6. Each team shall be assigned to rehab upon removal from the space until re-hydrated and vital signs are within normal limits.

7. Once inside the void or space:

    a. Assure adequate interior team communications.
    b. Assure adequate communications with the operations exterior.
    c. Mark entry points or movement patterns with chalk, spray paint, lumber crayons to assure egress.
    d. Move towards the suspected victim location as a team.
    e. Beware of elevation differences and unstable footing.

8. Need to search all areas for victims who may still be alive and effect their release before any attempt is made to rescue victims with a less chance of survival

9. Before deciding which victims should be rescued first, the victim(s) condition, position and the difficulty in extricating them should be considered.

10. When working close to a victim, debris should be removed by hand to avoid further injury. Recognition of a human body in a pile of rubble or debris is difficult.

11. When a buried victim is discovered alive in a collapse after hours of work, **do not remove them unless secondary collapse, fire, electrocution or drowning is imminent!**

12. Once the victim has been located, decide:

    a. **Is this a rescue or recovery?**
    b. If a rescue, is victim trapped, buried, pinned?
    c. Can the victim be easily extricated with current equipment carried by the team?
    d. Are additional personnel needed to make the rescue?
    e. Communicate your decision to the outside command.

Step Three: Search and Removal of Surface Victims

1. Victims found on top of debris and those partly or lightly buried. 50% of people rescued from collapse structures are found here.

2. Victims who can be heard or seen.

3. Victims whom exact location is known, even if they can't be seen or heard.

Step Four: Locating Casualties using the Hailing System

1. Place rescuers in calling and listening positions, concentrate on listening for the faintest sound from victims buried in the rubble.

2. Going “round-the-clock," each rescuer calls out or taps some object. All others listen to determine a "fix" on any sound they may hear.

3. After sound has been picked up, at least one additional "fix" should be attempted from another angle.

4. Once communication has been established with a victim, it should be continually maintained.

5. Signals for quiet, listening, resuming work, and immediate withdraw are as follows:

    a. **1 Long blast (three seconds)** - Cease operations/All quiet, personnel listen for sounds of victims.
    b. **3 Short blasts (one second each)** - Evacuate the area.
    c. **1 Long and 1 short blast** - Resume operations.

Step Five: Void Searches

1. As identified by victims, rescuers, search dogs, listening devices, fiber-optic video cameras, infrared video cameras, sonic and heat sensing devices.

2. Collapse patterns and potential victim locations include the following:

    a. Lean-to. A lean-to is formed when one or more of the supporting walls or floor joists breaks or separates at one end, causing one end of the floor(s) to rest on the lower floor(s) or collapse debris. Potential areas where victims might be located are under the suspended floor and on top of the floor at the lowest level.

    b. V. A “V” is formed when heavy loads cause the floor(s) to collapse near the center. Potential areas where victims might be located are under the two suspended floor pieces and on top of the floor in the middle of the V.

    c. Pancake. A pancake is formed when the bearing wall(s) or column(s) fails completely and an upper floor(s) drops onto a lower floor(s), causing it to collapse in a similar manner. Potential areas where victims might be located are under the floors and in voids formed by building contents and debris wedged between the floors.

d. Cantilever. A cantilever is formed when one end of the floor(s) hangs free because one or more walls have failed and the other end of the floor(s) is still attached to the wall(s). Potential areas where victims might be located are on top of or under the floors.

e. A-frame. An A-frame occurs when flooring separates from the exterior bearing walls but still is supported by one or more interior bearing walls or nonbearing partitions. The highest survival rate for trapped victims will be near the interior partitioning. Other victims will be located in the debris near both exterior walls.

3. Need to search strong or sheltered parts of a structure. Search spaces under stairways, basement and cellar areas, locations near chimneys or fireplaces, voids under floors, un-demolished rooms having exits barred by debris and voids created by heavy furniture or machinery.

4. Consider all possible entrances into the void. Basement entrances may be utilized to enter an above grade void from below.

5. Identify secondary escape routes for rescuers. Pre-plan these prior to placing personnel in voids.

6. Consider normal transportation corridors as survivable voids. Utilize them to your advantage.

7. During void exploration maintain good accountability of personnel.

8. Work from the least damaged into the most damaged area as you progress into voids.

Step Six: Breaching

1. Always utilize inspection holes when forcing blindly through a wall, roof or floor assembly.

2. Avoid breaching solid wall components such as columns, beams, and filled cells. Reinforced concrete columns or filled cells are typically found at corners and adjacent to window and door openings.

3. If possible, breach block where it is not load-bearing, such as panels inside a structural frame of steel or reinforced concrete.

4. Note where utilities enter a building, (such as meters, valve pits, plumbing stacks and service wires), for indications of where not to breach.

5. Try to determine the height of the floor inside a building in relation to where a hole is to be opened in an exterior wall.

Step Seven: Emergency Shoring

1. Shores shall be relatively strong, lightweight and adjustable.

2. Always allow a large margin of safety. Use more shores than you need rather then fewer.

3. The size of shores and the types of shoring system will be dependent on the weight to be supported and the condition of the element to be supported.

    a. Concrete/masonry weight is 125-150 Lbs. per cubic foot.
    b. Normal concrete floor is 100-150 Lbs. per square foot.
    c. Wood floor is 10-20 Lbs. per square foot.

4. Check base, foundation and ground conditions for stability prior to shoring. These may have been compromised during the collapse and may need reinforcement.

5. Shoring systems should act like a **double funnel,** collecting the load into the funnel, passing it thru the struts and distributing it out into the supporting structure and eventually into the ground.

6. Shores should be installed to support the structure, not designed to restore structural elements back to their original positions.

7. Keep shores as short as possible. **The maximum length of a shore should be no more than 50 times its width.**

8. Cribbing can be arranged to support cross beams and/or be diagonally braced.

    a. Limitations are based on 500 psi cross-grain bearing.
    b. Failure due to crushing of cross-grain of wood is slow and noisy giving warning to rescuers.
    c. Lateral stability dependent on width to height ratio. Maintain wide box arrangement during application. **Rule of thumb; you can build your crib box three times as high as the box is wide, (i.e., 3' long equals 9' high).**
    d. Utilizing wood cribbing laid flat, if at all possible, use three members per layer to double the capacity:

        4x4 crib capacity (2 per layer) = 24,000 lbs.
        4x4 crib capacity (3 per layer) = 48,000 lbs.
        6x6 crib capacity (2 per layer) = 60,000 lbs.
        6x6 crib capacity (3 per layer) = 135,000 lbs.

9. All values given have a 2 to 1 safety factor for Douglas fir and southern pine with good grain and no defects. **Remember that wood strength can vary greatly depending on species, closeness of grain, knots, wane, checks, etc.**

PHASE III: PATIENT REMOVAL

1. Perform a patient survey, C-spine immobilization, O2, treat for crush syndrome, run an E.K.G., and package the patient for transport.

2. Once the patient is set for removal, assure the following:

    a. Assure as much C-spine control as possible based on the space and patient's condition.
    b. If possible, package patient in a Stokes basket. This will allow for easy transfer from rescuers to rescuers.
    c. Use removal systems on the exterior which are applicable to the size and weight of the patient.
    d. Mechanical advantage systems, or manual winches are preferred over manual hauling.
    e. **Do not** use electric winches, etc, to remove patients; these allow little control and could result in dismemberment or additional injury.

3. Once the patient has been packaged and is in the process of being rescued/recovered, assure that if the patient is moved through an opening, either vertical or horizontal, which presents team members the only way out that the following guidelines are followed.

    a. Whenever possible, assure that all team members are stationed to the egress side of the opening in the event patient becomes lodged.
    b. Always try to avoid being **blocked in** by a patient.
    c. If this is not possible assure the following.

        1) When the move is made, assure it is made quickly and smoothly, leaving the time the space is blocked for egress as minimal as possible.
        2) Assure that the exterior personnel as well as interior teams are aware of the move and a plan is agreed upon prior to blocking the space.
        3) Assure that all equipment and debris are clear of the patient(s) and their movement path to assure that no problems develop as a result of the patient becoming entangled.

        4. Once the patient is clear from the space, remove all entry team personnel and equipment.

            a. Patient shall be turned over to a medical sector.
            b. All entry team personnel shall be de-coned and evaluated by the medical group.

PHASE IV: GENERAL DEBRIS REMOVAL

1. Utilized after all other methods are exhausted.

2. Done with heavy machinery, cranes, bulldozers, etc. after all accessible victims have been removed.

3. Identify the areas where victims are potentially located, where no voids exist that can be searched.

4. Each pile of debris removed must be systematically inspected and the area searched.

5. Use the Incident/Unified Command to control the scene. The operation should be organized and directed.

PHASE V: SAFETY CONSIDERATIONS

1. Assure all rescue personnel are provided with the proper protective clothing, turnout clothing or flame-retardant jumpsuits, gloves, helmets, safety glasses or goggles, hearing protection and masks.

2. Secure all utilities; gas, electrical and water supplies to the building or to the section of the building where collapse is located.

3. Provide sufficient illumination.

4. Provide sufficient ventilation.

5. Perform lock-out/tag-out procedures.

6. Issue portable radios to all Sectors and entry teams.

7. Assure that all Sections, Groups, the Safety Officer and the Incident Commander are wearing appropriate vests.

8. Perform a safety analysis every 30 minutes. Be sure to survey for weakened walls, floors and roofs. Maintain constant watch for signs of further collapse. If possible, shore or demolish. Indications of potential for secondary collapse include the following:

    a. Leaning walls
    b. Smoke or water seeping through joints
    c. Unusual sounds (e.g., creaking, groaning)
    d. Recurring aftershocks
    e. Sagging floor or roof assemblies
    f. Missing, strained, or damaged points of connection of structural elements
    g. Excessive loading of structural elements
    h. Sliding plaster and airborne dust
    i. Separating walls
    j. Lack of water runoff
    k. Racked or twisted structure
    l. Building vibration

9. Shore large objects to prevent secondary collapse.

10. Clear the area of personnel not usefully engaged in rescue operations.

11. Avoid cutting timbers that appear to support debris. If necessary, cut, brace and shore the immediate area and use the minimum number of rescuers during this operation.

12. Rescuers should work in pairs with frequent planned relief.

13. Pay attention to negative psychological effects to rescuers.

14. Consider the need for CISD debriefing.

PHASE VI: TERMINATION

1. Check personnel list and assure that all personnel are accounted for. Call for a PAR.

2. Decon, inventory, and replace all equipment on squad.

3. Tag and place any equipment damaged or potentially unfit for further structural collapse use out of service until repaired.

4. Have contractor or responsible party seal entry points to assure no additional entry.

5. Rescuers shall go through a psychological "debriefing" after each work period or shift while assigned to the disaster site.

6. A team briefing/post incident analyses shall be conducted on site or at the station as soon as possible.

7. Complete all required special operations logs.

APPENDIX A – TEAM FORMS

Pinellas County Technical Rescue Team
Florida US&R HTRT
Responder Information Sheet

Name: _____ Date: _____

Personal Address: _____

Department Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ SS #: _____ D.O.B. _____

Cell #: _____ USAR / Dept. Pager #: _____

Primary Specialty: _____

Secondary Specialty: _____

Boonie Hat Size: _____

Shirt Size: S ☐ M ☐ L ☐ XL ☐ XXL ☐

Sweatshirt Size: S ☐ M ☐ L ☐ XL ☐ XXL ☐

BDU Pant Size: S ☐ M ☐ L ☐ XL ☐ XXL ☐

Jacket Size: S ☐ M ☐ L ☐ XL ☐ XXL ☐

Glove Size: S ☐ M ☐ L ☐ XL ☐

Emergency Response Qualifications:

☐ Structural Collapse Operations	☐ Rope Operations	☐ Task Force Leader
☐ Structural Collapse Technician	☐ Rope Technician	☐ Squad Officer
☐ Confined Space Operations	☐ Trench Operations	☐ Rescue Specialist
☐ Confined Space Technician	☐ Trench Technician	☐ Heavy Rig / Equip
☐ Vehicle Machinery Operations	☐ Hazmat Tech	☐ Planning Officer
☐ Vehicle Machinery Technician	☐ Safety Officer	☐ Logistics Officer
☐	☐	☐

Other technical Expertise / Skills: _____

Other Languages Spoken: _____

Pinellas County Technical Rescue Team
Florida US&R HTRT
Medical Information Sheet

Name: _____ Date: _____
Personal Address: _____
Department Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ SS #: _____ D.O.B. _____
Department: _____ Station: _____ Shift: _____
Religion: _____
Workers' Comp Name: _____

Emergency Contact Name / Relationship: _____
Address: _____
Phone: _____ Cell / Pager: _____

Blood Type: _____
Allergies: _____
Medications & Dosages: _____
List Medical History / Problems: _____

_____

Distinguishing Physical Features:

☐ Contact Lenses ☐ Hearing Aid ☐ Tattoos
☐ Removable Dentures ☐ Glasses ☐ Organ Donor
☐ List Other _____

Hospital Preferred: _____
Personal Physician: _____ Phone: _____
Specialist: _____ Phone: _____

Basic Immunizations:	**Yes**	**Date:**
Tetanus / Diphtheria (DP)	☐	
Hepatitis "B" (Recombinant)	☐	
Measles / Mumps / Rubella	☐	
Polio (OPV)	☐	
Hepatitis "A"	☐	

Pinellas County Technical Rescue Team
Florida US&R HTRT
Equipment Usage Form

Date: _____ Incident # _____ State Activation # _____ Time: _____

Owner's Name: _____ Phone # _____
Renter's Name: _____ Phone # _____
Address: _____
City: _____ State _____ Zip _____

Insurance Name: _____ Policy# _____
Agent Name: _____ Phone # _____
Address: _____
City: _____ State: _____ Zip: _____

Units Responded	Driver	Lt.	FF1	FF2	Personnel Hours

Supplies Used		Hazmat Supplies	Size/Qty	Other	Damaged
2x4's	Ft	Level A (size?)			
2x6's	Ft	Level B (size?)			
2x8's	Ft	Tyvek Suits (size?)			
2x10's	Ft	Flash suits (size?)			
2x12's	Ft	Boots (size?)			
4x4's	Ft	Gloves (Butyl)			
6x6's	Ft	Gloves (disposable)			
12" gussets		Gloves silver shields			
18" gussets		Scrubs			
½" plywood		Chem. Tape			
¾" plywood		Duct tape			
8d Nails	Lbs	Oil dry			
16d Nails	Lbs	Absorbent Pads			
Tarps		Absorbent Dry powder			
Ellis jacks		Over pac drums (size?)			

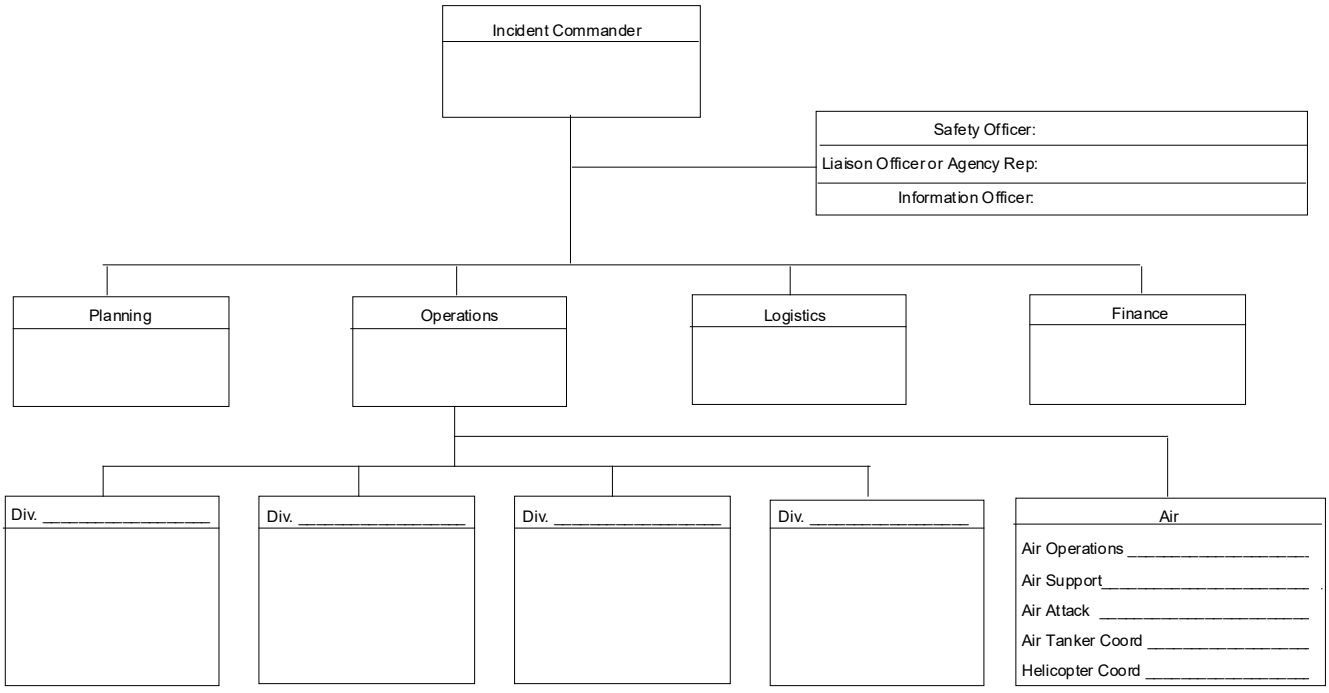
APPENDIX A - ICS FORMS

ICS 201

INCIDENT BRIEFING	1. Incident Name	2. Date	3. Time

4. Map Sketch

5. Current Organization



Page 41 of 2	6. Prepared by (Name and Position)

6. Resources Summary			
Resources Ordered	Resource Identification	ETA On Scene	Location/Assignment

7. Summary of Current Actions

ICS 202

INCIDENT OBJECTIVES	1. Incident Name	2. Date	3. Time

4. Operational Period

5. General Control Objectives for the Incident (include alternatives)

6. Weather Forecast for Period

7. General Safety Message

8. Attachments (mark if attached)

- ☐ Organization List - ICS 203
- ☐ Div. Assignment Lists - ICS 204
- ☐ Communications Plan - ICS 205
- ☐ Medical Plan - ICS 206
- ☐ Incident Map
- ☐ Traffic Plan
- ☐ (0ther)
- ☐

9. Prepared by (Planning Section Chief)	10. Approved by (Incident Commander)

INCIDENT OBJECTIVES	1. Incident Name	2. Date	3. Time

4. Operational Period

5. General Control Objectives for the Incident (include alternatives)

6. Weather Forecast for Period

7. General Safety Message

8. Attachments (mark if attached)

- ☐ Organization List - ICS 203
- ☐ Div. Assignment Lists - ICS 204
- ☐ Communications Plan - ICS 205
- ☐ Medical Plan - ICS 206
- ☐ Incident Map
- ☐ Traffic Plan
- ☐ (0ther)
- ☐

9. Prepared by (Planning Section Chief)	10. Approved by (Incident Commander)

ICS 206

MEDICAL PLAN	1. Incident Name	2. Date Prepared	3. Time Prepared	4. Operational Period

5. Incident Medical Aid Station

Medical Aid Stations	Location	Paramedics Yes	Paramedics No

6. Transportation

A. Ambulance Services

Name	Address	Phone	Paramedics Yes	Paramedics No

B. Incident Ambulances

Name	Location	Paramedics Yes	Paramedics No

7. Hospitals

Name	Address	Travel Time Air	Travel Time Ground	Phone	Helipad Yes	Helipad No	Burn Center Yes	Burn Center No

8. Medical Emergency Procedures

Prepared by (Medical Unit Leader)	10. Reviewed by (Safety Officer)

ICS 213

GENERAL MESSAGE		
TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:
MESSAGE:		
SIGNATURE:	POSITION:	
REPLY:		
DATE:	TIME:	SIGNATURE/POSITION:

ICS 214

UNIT LOG ICS 214		Incident Name:	
ICS Name/Designation:	*Preparer's Name/Title*	*Where Work Performed*	*Today's Date:*

PERSONNEL ROSTER ASSIGNED

NAME	*HOURS*	*ICS POSITION*	*HOME UNIT/RADIO SIGN*

VEHICLE INFORMATION

VEHICLE NUMBER	TYPE EQUIPMENT	BEGINNING MILEAGE	ENDING MILEAGE	GASOLINE/DIESEL/OIL PURCHASE		
				OIL	GALLON	COST

TIME	ACTIVITY LOG

TIME	MAJOR EVENT

ICS 221

DEMOBILIZATION CHECKOUT		
1. Incident Name/Number	2. Date/Time	3. Demob. No.
4. Unit/Personnel Released		
5. Transportation Type/No.		
6. Actual Release Date/Time	7. Manifest? ☐ Yes ☐ No Number	
8. Destination	9. Notified: ☐ Agency ☐ Region ☐ Area ☐ Dispatch Name: Date:	
10. Unit Leader Responsible for Collecting Performance Rating		

11. Unit/Personnel
You and your resources have been released subject to sign off from the following: *Demob. Unit Leader check the appropriate box*
Logistics Section ☐ Supply Unit ☐ Communications Unit ☐ Facilities Unit ☐ Ground Support Unit Leader
Planning Section ☐ Documentation Unit
Finance Section ☐ Time Unit
Other ☐ ☐
12. Remarks
13. Prepared by (include Date and Time)

DEMOBILIZATION CHECKOUT		
1. Incident Name/Number	2. Date/Time	3. Demob. No.
4. Unit/Personnel Released		

5. Transportation Type/No.	
6. Actual Release Date/Time	7. Manifest? ☐ Yes ☐ No Number
8. Destination	9. Notified: ☐ Agency ☐ Region ☐ Area ☐ Dispatch Name: Date:
10. Unit Leader Responsible for Collecting Performance Rating	

11. Unit/Personnel

You and your resources have been released subject to sign off from the following:
Demob. Unit Leader check the appropriate box

Logistics Section

- ☐ Supply Unit
- ☐ Communications Unit
- ☐ Facilities Unit
- ☐ Ground Support Unit Leader

Planning Section

- ☐ Documentation Unit

Finance Section

- ☐ Time Unit

Other

- ☐
- ☐

12. Remarks

13. Prepared by (include Date and Time)

DEMOBILIZATION CHECKOUT

1. Incident Name/Number	2. Date/Time	3. Demob. No.
4. Unit/Personnel Released		
5. Transportation Type/No.		
6. Actual Release Date/Time	7. Manifest? ☐ Yes ☐ No Number	
8. Destination	9. Notified: ☐ Agency ☐ Region ☐ Area ☐ Dispatch Name: Date:	
10. Unit Leader Responsible for Collecting Performance Rating		

11. Unit/Personnel

You and your resources have been released subject to sign off from the following:
Demob. Unit Leader check the appropriate box

Logistics Section

- ☐ Supply Unit
- ☐ Communications Unit
- ☐ Facilities Unit
- ☐ Ground Support Unit Leader

Planning Section

- ☐ Documentation Unit

Finance Section

- ☐ Time Unit

Other

- ☐
- ☐

12. Remarks

13. Prepared by (include Date and Time)

Instructions for completing the Demobilization Checkout (ICS form 221)

Prior to actual Demob Planning Section (Demob Unit) should check with the Command Staff (Liaison Officer) to determine any agency specific needs related to demob. and release. If any, add to line Number 11.

Item No.	Item Title	Instructions
1.	Incident Name/No.	Enter Name and/or Number of Incident.
2.	Date & Time	Enter Date and Time prepared.
3.	Demob. No.	Enter Agency Request Number, Order Number, or Agency Demob Number if applicable.
4.	Unit/Personnel Released	Enter appropriate vehicle or Strike Team/Task Force ID Number(s) and Leader's name or individual overhead or staff personnel being released.
5.	Transportation	Enter Method and vehicle ID number for transportation back to home unit. Enter N/A if own transportation is provided. *Additional specific details should be included in Remarks, block # 12.*
6.	Actual Release Date/Time	To be completed at conclusion of Demob at time of actual release from incident. *Would normally be last item of form to be completed.*
7.	Manifest	Mark appropriate box. If yes, enter manifest number. *Some agencies require a manifest for air travel.*
8.	Destination	Enter the location to which Unit or personnel have been released. *i.e. Area, Region, Home Base, Airport, Mobilization Center, etc.*
9.	Area/Agency/ Region Notified	Identify the Area, Agency, or Region notified and enter date and time of notification.
10.	Unit Leader Responsible for Collecting Performance Ratings	Self-explanatory. *Not all agencies require these ratings.*
11.	Resource Supervision	Demob Unit Leader will identify with a check in the box to the left of those units requiring check-out. Identified Unit Leaders are to initial to the right to indicate release. Blank boxes are provided for any additional check, (unit requirements as needed), i.e. Safety Officer, Agency Rep., etc.
12.	Remarks	Any additional information pertaining to demob. or release.
13.	Prepared by	Enter the name of the person who prepared this Demobilization Checkout, including the Date and Time.