



# GENERAL ORDER

## GENERAL ORDER 330.12

### Trench and Excavation Rescue Incidents

#### EMERGENCY SERVICES BUREAU

Issue Date: 4/1/2009

Revision Date: 07/08/2014

#### 1 APPLICABILITY

2 All Personnel

#### 3 POLICY

4 The Howard County Department of Fire and Rescue Services (Department) shall set forth guidelines that  
5 assist the Incident Commander in assessing the hazard, identifying the level of operational capability, and  
6 establishing operational criteria when responding to Trench and Excavation rescue incidents. The  
7 achievement of these objectives will help prevent and reduce the severity of accidents, injuries, and  
8 exposures to both Department members and the citizens served by the organization. The well-being of  
9 members or citizens shall not be risked for any activity that is not essential to the immediate protection  
10 of life. No Department member shall conduct, or participate in, an activity for which he/she is not trained  
11 and/or properly equipped to handle.

#### 12 DEFINITIONS

- 13 ➤ **Cave-in** - the collapse of unsupported Trench walls.
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- 15 ➤ **Excavation** - any man-made cut, cavity, Trench, or depression in an earthen surface, formed by  
16 earth removal.
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- 18 ➤ **Ground Pads** - materials used to distribute weight and forces over their surface area and thus  
19 minimize the possibility of rescuers creating a secondary collapse.
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- 21 ➤ **Secondary Cave-In** - a collapse of another portion of the Trench after the initial collapse has  
22 occurred.
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- 24 ➤ **Sheeting** - the components of a Shoring system that retain the earth in position and in turn are  
25 supported by other components of the Shoring system.
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- 27 ➤ **Shoring** - a structure such as a metal hydraulic, mechanical or timber Shoring system that  
28 supports the sides of an Excavation and which is designed to prevent Cave-ins.
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- 30 ➤ **Trench** - a narrow Excavation (in relation to its length) made below the surface of the ground. In  
31 general, the depth is greater than the width, but the width of a Trench (measured at the bottom)  
32 is not greater than 15 feet.

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- **Incident Commander (IC)** - is the individual responsible and accountable for managing the entire incident. There is one Incident Commander for an incident at any given time.
- **Incident Safety Officer (ISO)** - is responsible for overall incident safety throughout the rescue operation, pursuant to General Order 300.07: Incident Command System. This individual shall report directly to the Incident Commander. The individual assigned as ISO by the IC shall meet the requirements of NFPA 1521: Standards for Fire Department Safety Officer.
- **Technical Safety Officer (TSO)** - a position assigned by the Incident Commander, is responsible for the safe conduct of all operations in the technical rescue group of the Incident Command System. This individual shall be a Special Operations team member or an individual who possesses knowledge, training, and experience pertinent to the type of technical rescue being conducted. The Technical Safety Officer shall report directly to the Incident Safety Officer.
- **Awareness Level** - per NFPA 1670, this level of Trench and Excavation Rescue training requires Department personnel to size-up existing and potential conditions; identify resources necessary to conduct safe and effective operations; implement site control and scene management; recognize general hazards associated with the incident and procedures necessary to mitigate these hazards; determine whether the emergency scene is a rescue or body recovery incident; and initiate a rapid, non-entry extrication of non injured or minimally injured victim(s).
- **Operations Level** - per NFPA 1670, this level of Trench and Excavation Rescue training requires Department personnel to perform all the techniques of the Awareness Level, plus be qualified at the Operations Level for rope rescue, confined space rescue, and vehicle and machinery rescue; size up existing and potential conditions at Trench and Excavation emergencies; recognize unstable areas associated with Trench and Excavation emergencies and adjacent structures; identify probable victim locations and survivability; initiate a one-call utility location service; ventilate the Trench or Excavation; place Ground Pads and protect the “lip” of the Trench or Excavation; and provide entry and egress paths for rescue personnel.
- **Technician Level** - per NFPA 1670, this level of Trench and Excavation Rescue training requires Department personnel to perform all the techniques of the Operations Level, plus be qualified at the Technician Level for confined space and vehicle and machinery rescue; be capable of recognizing hazards, using equipment, and operating at Trench and Excavation emergencies that include the collapse or failure of individual or intersecting Trenches or where severe environmental conditions exist; digging operations involving Sheeting and Shoring (including supplemental Sheeting and Shoring); or manufactured Trench boxes or isolation devices that could be used.
- **Specialist Level** - this is an individual who has technical expertise and practical knowledge with structural engineering experience. This person may augment on-scene activities by providing essential information in their specialized field.

81 **GENERAL:**

82 Each response to a Trench and Excavation Rescue Incident shall be evaluated upon arrival by the Incident  
83 Commander to assess the risk to Department personnel.

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85 The well-being of personnel and/or citizens shall not be risked for any activity that is not essential to the  
86 immediate protection of life.

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88 The priority for rescue/safety shall be:

- 89 • Yourself
- 90 • Other responders
- 91 • The victim(s)

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93 All operations at the scene of a Trench and Excavation Rescue Incident shall be performed in a safe  
94 manner consistent with the identified level of operational capability. No Department member shall  
95 conduct, or participate in, an activity for which he/she is not trained, certified and/or properly equipped  
96 to handle.

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98 When conducting a training exercise, body recovery, evidence search, incident involving animals, or other  
99 operations not essential to the immediate protection of life, the Incident Commander shall utilize the  
100 same procedures employed during an actual rescue operation but at a level of urgency commensurate  
101 with the risk/benefit analysis.

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103 All Department career personnel shall be trained to the Operations Level of Trench and Excavation  
104 Rescue. This will be accomplished by providing career personnel with the current Maryland Fire & Rescue  
105 (MFRI) Seminar – Trench and Excavation Awareness and Operations (or equivalent) course.

- 106 • Training for volunteer personnel may be requested through the Howard County Volunteer  
107 Training Board.

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109 Only Technician and Specialist trained and certified level personnel shall be allowed to participate in high  
110 risk situations.

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112 It is the intent of this policy to follow recommendations contained within:

- 113 • NFPA 1670: Standard on Operations and Training for Technical Rescue Incidents
- 114 • NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials/WMD  
115 Incidents
- 116 • Department General Order 300.02: Accountability
- 117 • Department General Order 300.04: Mayday
- 118 • Department General Order 300.07: Incident Command System
- 119 • Department General Order 300.11: Rapid Intervention Crew
- 120 • Department General Order 330.04: Technical Rescue Incidents
- 121 • Howard County Policy and Procedure 200.11: Confined Space Policy

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123 **GUIDELINES FOR INITIAL OPERATIONS:**

124 The first arriving officer shall establish command pursuant to Department General Order 300.07: Incident  
125 Command System.

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The Incident Commander shall attempt to identify, locate and secure a witness as soon as possible; this will help in identifying the problem and locating the victim(s).

The Incident Commander, or designee, should access maps, pictometry, and all other available information, and have a witness sketch a map, as needed. For Trench and Excavation Incidents, consider any building/site plans that may be available.

Conduct on scene assessment, to include:

- Securing the scene, establish safety and exclusion zones, and announce the appropriate level of personal protective equipment for the operation.
- Determine access points/establish points of entry and accountability.
- Determine location and number of victims.
- Determine activities of victim(s) prior to incident.
- Determine mechanism of entrapment or nature of emergency.
- Assess time of day (project lighting needs) and environmental factors (weather).

The Incident Commander shall assess the risk to Department personnel and communicate the scene size-up and hot zone to response personnel.

- If the Incident Commander determines that the incident is beyond the capabilities of Department personnel currently on the scene, he/she shall immediately request Howard Communications to dispatch the Special Operations team to the scene. Upon arrival, the Special Operations team will assist with the rescue operations as directed by the Incident Commander.
- If the Incident Commander determines that the incident will be a rescue, then operations must be initiated as soon as possible with the proper equipment and qualified Trench rescue trained personnel.
- If the Incident Commander determines that the incident will be a body recovery, then operations are to proceed in a manner that presents minimal risk to Department members.

Establish control zones in the hot/warm/cold format and keep unauthorized personnel away from the hazard area. Prohibit entry of untrained personnel (and citizens) into the warm and hot zones. All observers, citizens and media representatives are to be kept far enough away from the incident as to not interfere with the ever expanding operation or responding units.

Witnesses should be identified and segregated until each can be interviewed. The responsible party should be kept at the Incident Command Post for the duration of the incident. All information gathered should be written down to ease the exchange of information and to reduce the possibility of inaccurate or incomplete information being passed on. At a minimum, the following information should be obtained:

- Soil type, size and depth of Trench
- Reason for initial entry
- Contents and hazards of the Trench
- Number and location of victims before collapse occurred
- Nature of injury, illness, or entrapment of victims
- Length of time the victims have been in the Trench
- Safety precautions in place (lockout, tag-out, isolation)
- Are communications with the victim(s) possible?

173 After evaluating the information received during the scene assessment and developing an effective  
174 incident action plan, review the resources on location and en route to determine if any additional  
175 resources are needed. Consider the following options:

- 176 • Additional medical units
- 177 • Activation of additional Special Operations companies or members
- 178 • A mutual aid Special Operations Hazmat/Trench Rescue Team for a Rapid Intervention Crew
- 179 • A canteen for extended operations
- 180 • A bus for shelter during extreme weather conditions
- 181 • Police for scene security

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183 Ensure all non-trapped personnel and would-be rescuers are out of the Trench.

- 184 • Department personnel shall not enter an unprotected Trench or Excavation.

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186 Position units a minimum of 250 feet from the Excavation/rescue site.

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188 Eliminate any sources of vibration including construction equipment and traffic.

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190 **SCENE SAFETY:**

191 The Incident Commander shall assign an Incident Safety Officer (ISO) for the duration of the incident. The  
192 ISO responsibilities shall be pursuant to Department General Order 330.04: Technical Rescue Incidents,  
193 *Guidelines for Scene Safety at Technical Rescue Incidents*.

- 194 • The ISO shall be responsible for identifying hazards and mitigating them if at all possible.  
195 Information regarding hazards that cannot be mitigated shall be communicated to the Incident  
196 Commander and to all personnel operating at the scene.
- 197 • All personnel working in the hot zone, or supporting logistical functions in the warm zone, shall be  
198 properly dressed with appropriate Personal Protective Equipment (PPE). This includes, but is not  
199 limited to: technical rescue helmet (or other approved hard-hat), steel toed/shanked work boots,  
200 long-sleeved pants and duty shirt (or Department issued coveralls), eye protection and work  
201 gloves. Hearing/respiratory (dust mask) protection should be readily accessible.

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203 A Technical Safety Officer (TSO) shall be assigned to assist the ISO whenever technical resources are being  
204 utilized (i.e., the rescue operations are beyond Awareness Level techniques), this shall be pursuant to  
205 Department General Order 330.04: Technical Rescue Incidents.

- 206 • The TSO or ISO will closely monitor personnel working within the hot zone for signs of fatigue,  
207 dehydration or other environmental exposures. Generally, time allowed working in an excavation  
208 will be limited to 20 minutes, at which time crews will “recycle” and a standby crew will take over  
209 operations.
- 210 • The IC shall establish a rehab area to provide the rescuers with medical assessment, nutrition and  
211 hydration during the extended rescue operation.

212 **GUIDELINES – AWARENESS LEVEL TRAINED PERSONNEL:**

213 Recognize and identify hazards specific to Trench rescue. Hazards can include, but are not limited to, the  
214 following:

- 215 • Secondary collapse
- 216 • Hazardous atmosphere
- 217 • Temperature extremes
- 218 • The presence of underground or surface laid utilities i.e. gas, electric, and water

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220 When possible, initiate a rapid, **non-entry** extrication of non-injured or minimally injured victim(s). Non-  
221 entry extrication may be accomplished by positioning a ladder in the Trench for the victim(s) to self-  
222 rescue.

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224 Members trained to the Awareness Level will be assigned to or closely supervised by Technician Level  
225 trained responders during active Trench rescue incidents.

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227 **GUIDELINES – OPERATIONS LEVEL TRAINED PERSONNEL:**

228 Perform functions at the Awareness Level, and:

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- Perform ventilation of the Trench/Excavation.

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- Conduct atmospheric monitoring with at least a “four-gas” meter. Readings will be taken to  
231 determine the following (in order):

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- Oxygen enriched or deficient

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- Flammability/LEL (Lower Explosive Limit)

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- Toxic gases (Carbon Monoxide, Hydrogen Sulfide)

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- Consider radiation sources

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- Consider corrosives

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- Movement of the spoil pile away from the Trench. This should be started as far away from the  
239 Trench lip as possible. Place Ground Pads around the “lip” of the Trench or Excavation. Care must  
240 be used not to cause a secondary collapse of the Trench.

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- Members trained to the Operations Level will be assigned to or closely supervised by Technician  
242 Level trained responders during active Trench rescue incidents.

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244 **GUIDELINES – TECHNICIAN LEVEL TRAINED PERSONNEL:**

245 Technician trained Department members may be required to supervise Operations and Awareness Level  
246 trained members performing non-entry tasks.

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248 Only Technician trained Department members shall be allowed to attempt a rescue in a Trench and/or  
249 Excavation.

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251 Once all of the appropriate/applicable tasks listed on the Special Operations Trench Rescue Tactical  
252 Operation Guide have been completed and the members of the operation have been briefed, a rescue  
253 may commence.

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255 Once supplemental Shoring has been set and the Trench has been determined safe to enter, Technicians  
256 shall assess the victim(s) medical condition and provide the highest care possible.

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258 **GUIDELINES – POST RESCUE OPERATIONS:**

259 Upon exiting the Trench or Excavation, the rescuers and the victim(s) shall be evaluated for the need to  
260 be decontaminated by the TSO.

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262 As soon as the victim is brought to safety and decontaminated, an assessment shall be completed by  
263 Advanced Life Support personnel.

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265 Personnel involved in the rescue operations shall proceed to the rehab area for medical assessment,  
266 nutrition, hydration and/or environmental temperature control.

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268 **TRENCH AND EXCAVATION RESCUE TRAINING AND DOCUMENTATION:**  
269 Special Operations team personnel shall be expected to perform at the Technician Level and shall be  
270 trained and certified accordingly.  
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272 Annual performance evaluations (re-certifications) for Trench Rescue Technicians shall be conducted on  
273 all Special Operations personnel and equipment, pursuant to the guidelines of NFPA 1670: Standard on  
274 Operations and Training for Technical Rescue Incidents.  
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276 Master documentation for all initial training, certifications and annual re-certification shall be maintained  
277 by the Bureau of Education and Training.  
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279 Documentation regarding training and certification for each member shall be available for inspection by  
280 that member and his/her authorized representatives.

## 281 REFERENCES

- 282 • Department General Order 300.02: Accountability
- 283 • Department General Order 300.04: Mayday
- 284 • Department General Order 300.07: Incident Command System
- 285 • Department General Order 300.11: Rapid Intervention Crew (RIC)
- 286 • Department General Order 330.04: Technical Rescue Incidents
- 287 • National Fire Protection Agency (NFPA) 1670: Standard on Operations for Technical Rescue  
288 Incidents
- 289 • National Fire Protection Agency (NFPA) 472: Standard for Professional Competence of Responders  
290 to Hazardous Materials Incidents
- 291 • Howard County Policy and Procedure 200.11: Confined Space Policy
- 292 • Special Operations Trench/Excavation Tactical Operations Guides
- 293 • Applicable local, state and federal laws

## 294 SUMMARY OF DOCUMENT CHANGES

295 Updated to include NIMS terminology and reference list. No operational changes made. SMH 1832

## 296 FORMS/ATTACHMENTS

## 298 APPROVED

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301 Deputy Chief John S. Butler  
302 Operations Command  
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