

Basic Structural Collapse Operations
 Session 2





Suffolk County Fire Academy

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Course Overview


- Session 2
 - Collapse Operations
 - Void Identification
 - Hazard Evaluation, Marking And Signaling
 - Structural Shoring Concepts
 - Student Exercise.



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Session Objectives

- Understand The Need For Team Operations And Proper Composition Of A Team
- Identify The Various Types of Voids Commonly Found In Structural Collapse Incidents
- Understand the Use and Need of Hazard Evaluation Marking Systems And Signaling.
- Demonstrate A Knowledge Of Basic Shoring Concepts



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Collapse Operations

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**Collapse Operations
5 Stages of Collapse Rescue**

- Remember, F.A.S.T. V.O.I.D.S.
- Survey And Reconnaissance
- Immediate Rescue
- Void Search And Rescue
- Selected Debris Removal
- General Debris Removal.

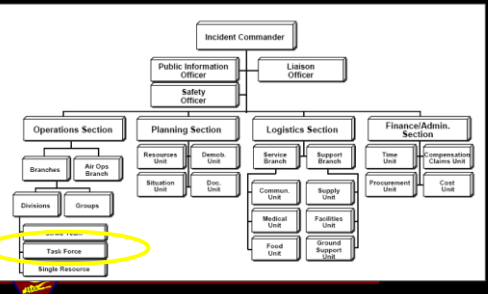
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**Collapse Operations
5 Phases of Rescue**

- Spontaneous Rescues – Surface
- Light, In Place Rescues – Minimal Removal
- Heavy, Careful Removal – Selected
- Body Removal – General
- Demolition.

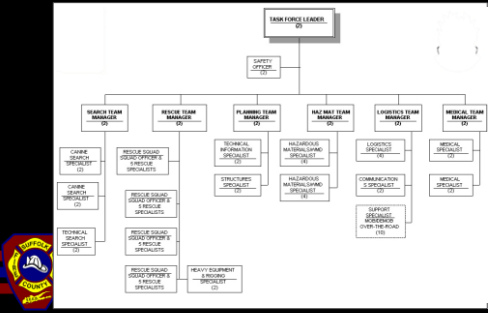
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Collapse Operations NFA Model ICS



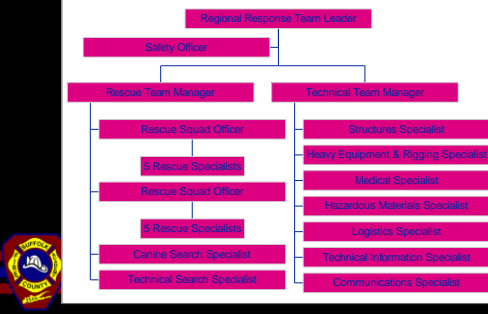
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Collapse Operations FEMA USAR Task Force

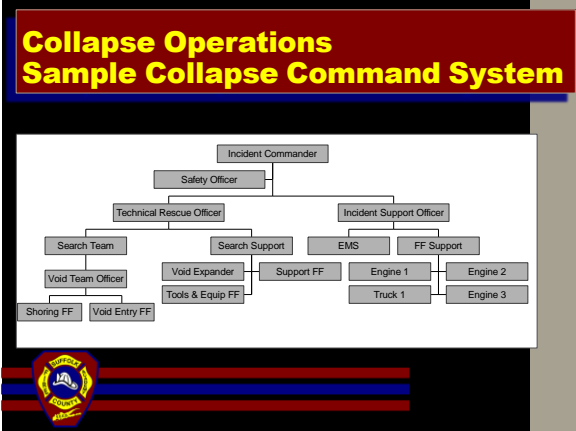


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Collapse Operations NYS Regional Response System



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- ### Collapse Operations 1st To Arrive - IC
- Assume Command
 - Establish Collapse Zone
 - Request T.R.T.
 - Establish Staging Area
 - Control Utilities
 - 6-Sided Approach.
-

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- ### Collapse Operations 1st To Arrive - IC
- Size-up Collapse
 - Establish Incident Command System
 - Five Stages Of Collapse Rescue
 - Ensure Rescuer Accountability.

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Collapse Operations 1st To Arrive – Engine

- Water Supply
- Two Lines – One Front, One Rear
- Attack Fire
- Avoid Positioning In The Front Of The Collapse.



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Collapse Operations 2nd To Arrive – Engine

- Water Supply
- Back-up 1st Engine
- Two Lines – One Front, One Rear
- Cover Exposures.



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Collapse Operations 3rd To Arrive – Engine

- Rear Of Structure
- Water Supply
- Consider Additional Line
- Assess Rescue Access
- Command Post.



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Collapse Operations 1st To Arrive - Ladder

- Position Apparatus For Use If Applicable (Tower Ladder - Front)
- Surface Victims
- Identify Voids
- Identify Hazards.



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Collapse Operations 2nd To Arrive - Ladder

- Position Apparatus For Use If Applicable (Tower Ladder - Front)
- Control Utilities
- Light Void Searches
- Identify Hazards
- Command Post.



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Collapse Operations Heavy Rescue

- Grid Search
- Void Search
- Shoring Operations
- Victim Removal
- Additional Teams.



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Collapse Operations Void Search Operations

- **Search Team**
 - Void team officer
 - Void entry firefighter
 - Shoring firefighter



- **Support Team**
 - Void expander firefighter
 - Support firefighter
 - Tool and equipment firefighter.



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Collapse Operations Search Techniques

- "Round The Clock" Callout
- Vertical Access Through Floors
- Canine Search Potential
- *Avoid Cutting Walls. Why?*
- Roof / Floor Beam Support
- Basement For Access
- Falling Hazards.



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Collapse Operations Initial First Aid

- Follow Local Protocols
- Spinal Immobilization
- Administer Oxygen
- Proper Packaging Techniques
- Crush Injury Syndrome
- Transportation.



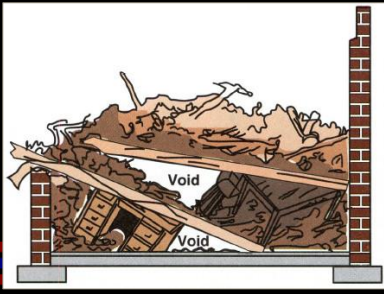
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Void Identification




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Void Identification Pancake Void



The diagram shows a cross-section of a building with a brick wall on the right. A large, flat, horizontal void is formed by a collapsed floor slab resting on a lower level. Two areas are labeled 'Void'.



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Void Identification Pancake Collapse

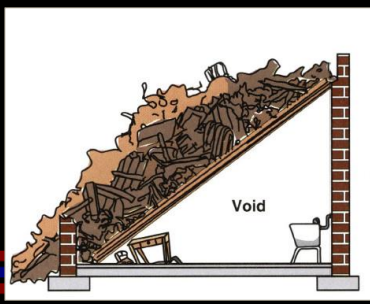


The photograph shows a multi-story building that has undergone a pancake collapse, with the upper floors falling onto the lower levels, creating a large pile of rubble and debris.



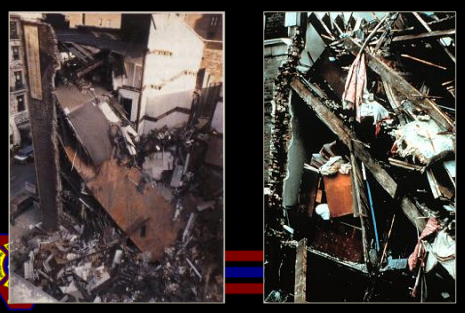
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Void Identification Supported Lean-To Void



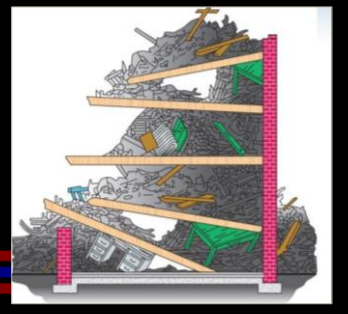
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Void Identification Lean-To Collapse



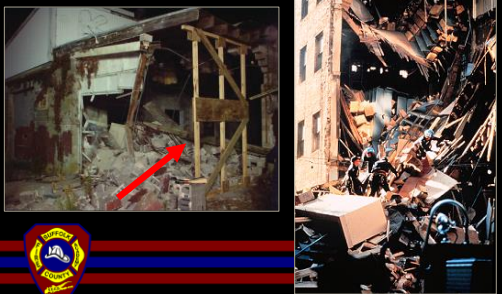
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Void Identification Cantilever Void



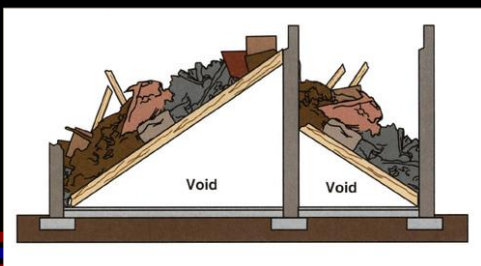
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Void Identification Cantilever Collapse



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Void Identification "A"-Frame Void

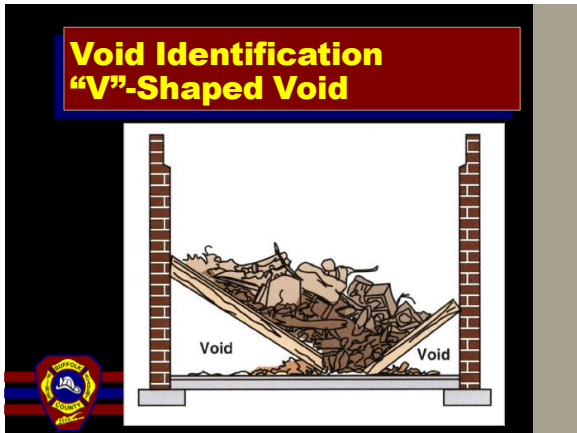


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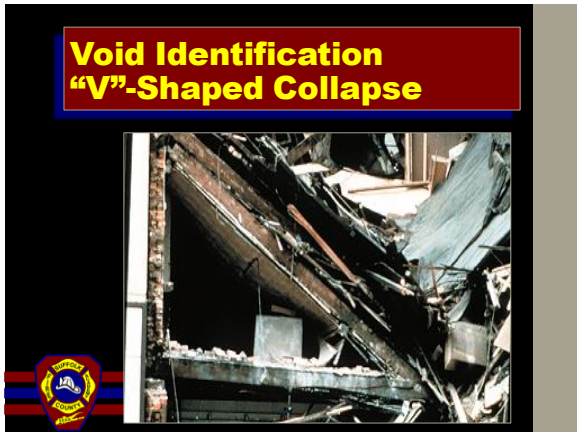
Void Identification "A"-Frame Collapse



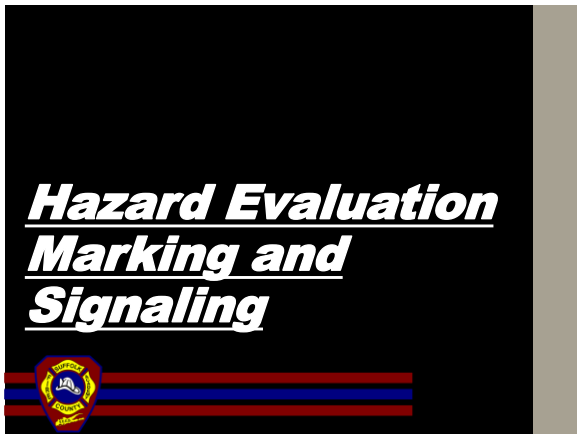
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Collapse Operations Hazard Evaluation Markings


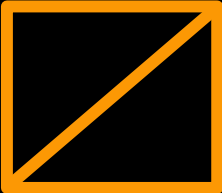
- 2'x2' Box
- Orange Paint
- Structure Is Relatively Safe For USAR Ops.



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Collapse Operations Hazard Evaluation Markings



- Structure Significantly Damaged
- May Need Shoring Or Hazard Removal.



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Collapse Operations Hazard Evaluation Markings

- Structure Is Not Safe For Rescue Operations
- Rescue Ops Can Be Done With Safe-Haven Areas Created.



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Collapse Operations Hazard Evaluation Markings

23 FEB 19
1000 hrs
HM-Gas
SCTF-1

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Collapse Operations Search Marking System

DATE AND TIME TASK FORCE LEFT

23 FEB 19
1000

TASK FORCE: **SCTF-1** PERSONAL HAZARDS: **RATS**

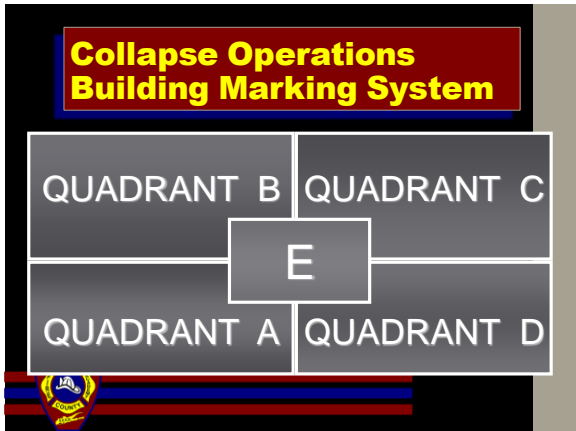
FIRST SLASH MADE WHEN ENTERING: **1 DOA** CROSSING SLASH MADE AS TASK FORCE EXITS: **2 LIVE**

VICTIM NUMBER

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Collapse Operations Search Marking System

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Collapse Operations Emergency Signaling

- **Essential For Safe Operation**
- **Procedure Must Be Clear**
- **Understood By All Rescue Personnel**
- **Understood By Other Civilians Helping In The Rescue Effort.**

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Collapse Operations Emergency Signaling

- **1 Long Blast (3 Seconds)**
 - **Cease operations / all quiet**
- **3 Short Blasts (1 Second Each)**
 - **Evacuate the area**
- **1 Long And 1 Short Blast**
 - **Resume operations.**

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Structural Shoring Concepts



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**Structural Shoring Concepts
Rescue Shoring**


- The Temporary Support Of A Partially Collapsed Structure For The Search And Rescue Of Trapped Victims.




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**Structural Shoring Concepts
Principals**

Shoring Is Performed In Order To Reduce The Risk Of Potential Secondary Collapse To Give Victims And Rescuers Some Degree Of Safety During Rescue Operations.



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Structural Shoring Concepts Principals



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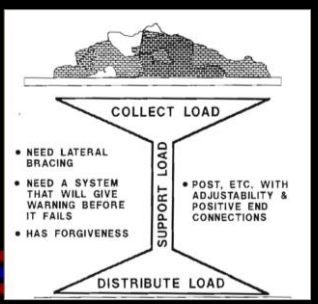
Structural Shoring Concepts Consideration

**Shore
Mitigate
Avoid.**

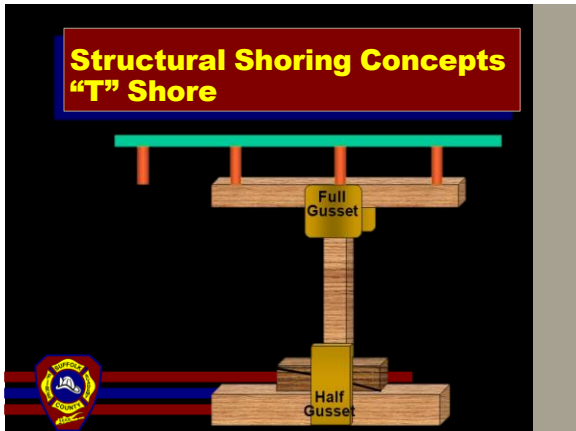


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Structural Shoring Concepts Double Funnel Principle



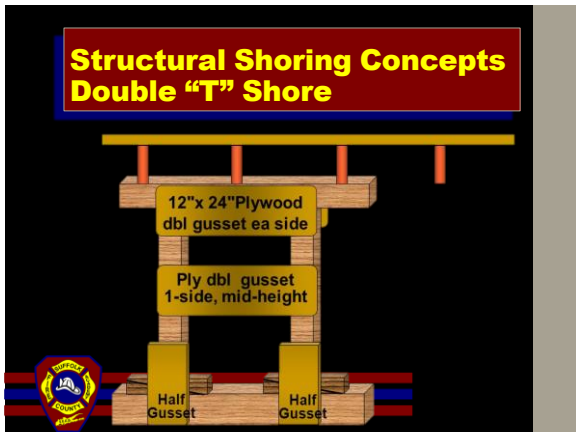
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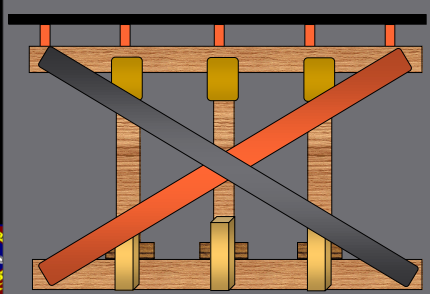
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**Structural Shoring Concepts
Double "T" Shore**



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**Structural Shoring Concepts
Vertical "Dead" Shore**



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**Structural Shoring Concepts
Vertical "Dead" Shore**



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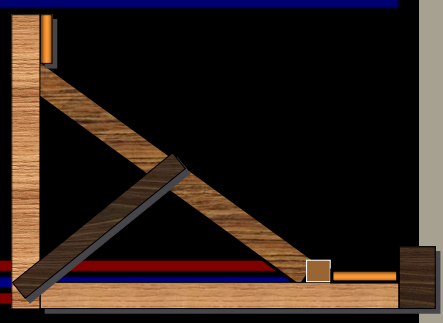
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**Structural Shoring Concepts
Window / Door Shore**



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**Structural Shoring Concepts
Solid Sole Raker**



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**Structural Shoring Concepts
Solid Sole Raker**



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Structural Shoring Concepts Flying Raker



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Student Exercise



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Scenario

- Monday 2pm – Clear, no wind
- FD arrives – building collapse, 2 story ordinary construction, private dwelling
- Building was under construction
- 6 workers in the building
- 1 unaccounted.



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Scenario



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Scenario

- Your department is the responding agency:
 - 1 Chief
 - 2 Engines
 - 1 Ladder
 - 1 Heavy Rescue
- Your group is responsible for all operations at the incident.



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Scenario

- 20 minutes
- Each group identify and spokesperson
- Report on your operational considerations.



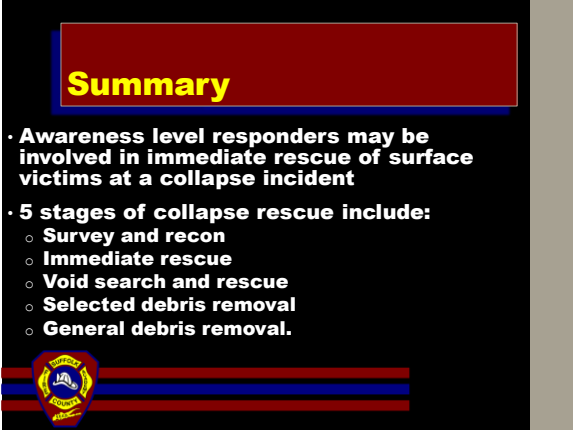
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Summary




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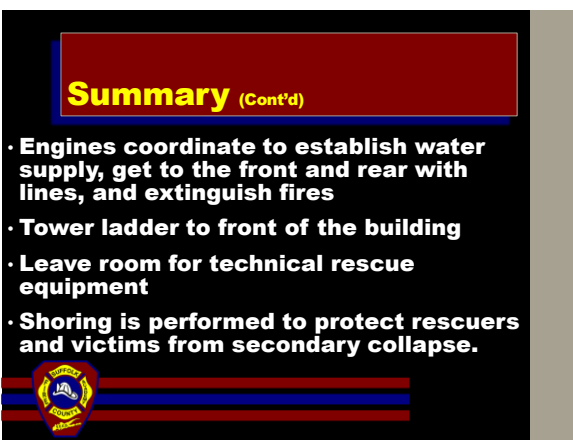


Summary

- Awareness level responders may be involved in immediate rescue of surface victims at a collapse incident
- 5 stages of collapse rescue include:
 - Survey and recon
 - Immediate rescue
 - Void search and rescue
 - Selected debris removal
 - General debris removal.




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Summary (Cont'd)


- Engines coordinate to establish water supply, get to the front and rear with lines, and extinguish fires
- Tower ladder to front of the building
- Leave room for technical rescue equipment
- Shoring is performed to protect rescuers and victims from secondary collapse.



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Summary (Cont'd)

- **Emergency signaling must be understood by all responders:**
 - **1 long blast** – cease operations
 - **3 short blasts** – evacuate
 - **1 long / 1 short blast** – continue work



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Questions???



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