



GALENA FIRE DEPARTMENT  
Standard Operating Guideline  
**STRUCTURAL COLLAPSE**

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**Purpose:** To establish standards for GFD operations during an impending structural collapse, including safety considerations, responsibility, precautions, safety considerations, and resources.

Structural collapse is a leading cause of serious injuries and death to firefighters. The possibility of structural collapse is a major consideration in the development of any tactical plan. This SOG addresses conditions, precautions, and evacuation procedures.

Structural collapse is a possibility whenever a building is subject to intense fire. In fact, if fire is allowed to affect a structure long enough, some structural failure is inevitable. Regardless of the age and exterior appearance of a building, there is always the possibility that a principal supporting structural member has been weakened and may suddenly collapse resulting in injuries to firefighters.

#### Conditions

- In the typical fire involved building, the roof is the most likely candidate for failure.
- Failure of the roof may trigger collapse of one or more wall sections. This is especially true if the roof is flat, arched, or dome type. Collapse of the roof exerts outward pressure against both the bearing and non-bearing walls potentially causing collapse of those walls.
- Structures other than fire protected or heavy timber construction can be expected to fail after approximately twenty (20) minutes of heavy fire involvement. This "20 Minute Rule" specifically applies to ordinary construction or brick, wood joist construction.
- Knowledge of various types of building construction will assist in identifying which types of construction can be expected to fail sooner than others. For example, lightweight truss and bar joist roof construction can be expected to fail after minimal fire exposure.
- The following construction features or conditions may fail prematurely or contribute to early structural failure when affected by fire:
  - Large open, unsupported areas - supermarkets, warehouses
  - Large signs or marquees - may pull away from weakened walls
  - Cantilever canopies - may collapse as the roof fails
  - Ornamental or secondary walls - may pull away and collapse
  - Lightweight truss, bar joist, or bow string truss roofs
  - Unprotected metal beams or columns

#### Warning Signs

- Some structures have been known to collapse without warning but there are usually signs that alert personnel to an imminent hazard.
- Signs of imminent hazard include:
  - Cracks in exterior walls
  - Bulges in exterior walls
  - Smoke or water leaking through walls
  - Structural movement sounds - cracking, groaning, snapping
  - Flexible movement of floors or roofs when walked upon
  - Leaning, twisting, or flexing of interior or exterior bearing walls or columns



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### Safety Precautions

Buildings containing one or more of the above features must be constantly evaluated for collapse potential. These evaluations should be a major consideration in determining an offensive or defensive strategic mode.

- It is a critical Command responsibility to continually evaluate a fire building to determine if it is tenable for interior operations. This evaluation will require communication from Company Officers, and/or the Safety Officer regarding the conditions in their area of operation.
- If after 10-15 minutes of interior operations heavy fire conditions still exists.
- Command should initiate a careful evaluation of structural conditions and be prepared to withdraw interior and roof crews and switch to a defensive operation.
- If structural failure of a building or section of a building appears likely, a perimeter must be established at a safe distance from the area that may collapse.

### Emergency Scene Evacuation

The first and most important priority of the Incident Commander at any incident location is the safety of the personnel responding to and the citizens currently at the scene. To accomplish this task, it may become necessary to evacuate the scene rapidly.

When the Incident Commander deems the situation is unusually dangerous, or in circumstances where this information is provided to the IC by a reliable source, the signal to evacuate will be given and all personnel are to evacuate the scene immediately as follows:

- All fire and public safety personnel, and all civilians within the possible collapse zone are to be moved to a place of safety immediately and without exception.
- The Incident Commander will immediately broadcast 'Emergency Traffic' three times followed by the 'Evacuate' three times.
- The Incident Commander will order the apparatus Driver to strike three - 10-second bursts on the air horn that signals immediate evacuation of the building and the surrounding areas.
- The Incident Commander will again immediately broadcast the words 'Emergency Traffic' followed by the words 'Evacuate' three times.
- All evacuated GFD personnel retreating shall immediately assemble at the Command Post for a personal accountability report, followed by further instruction/assignment by the Incident Commander.