



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

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Page: 1 of 2

Purpose: To establish standards for GFD operations during a structural collapse, or 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, and the possibility of structural collapse should be a major consideration by all GFD members, and particularly by the Incident Commander and Officers during the development of any tactical plan.

Structural collapse is a possibility whenever a building is subject to intense fire or other significant impact. In fact, if fire is allowed to affect a structure long enough, some degree of 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.

Establish Incident Command and select a Safety Officer, and other assignments as needed.

#### **Conditions**

In a typical fire involving a building, the roof is the most likely component to fail.

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 impingement. 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 impacted by fire:

- Large open, unsupported areas such as supermarkets, warehouses etc.
- 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.



## STRUCTURAL COLLAPSE

Signs of imminent hazard and real potential collapse include:

- Cracks in exterior walls.
- Bulges in exterior walls.
- Smoke or water leaking through walls.
- Structural movement sounds including cracking, groaning, snapping.
- Flexible movement of floors or roofs when walked upon.
- Leaning, twisting, or flexing of interior or exterior bearing walls or columns.

### 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 principal Command responsibility, upon advice from an Officer, a Safety Officer, or any member of the department, 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 exist; 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.