Sprinkler Loads on Trusses

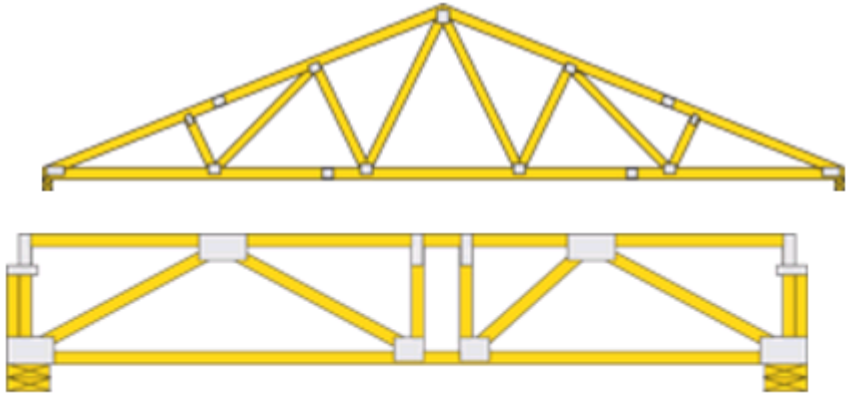
Design Guide

Revised 3/22/2017

SBCA

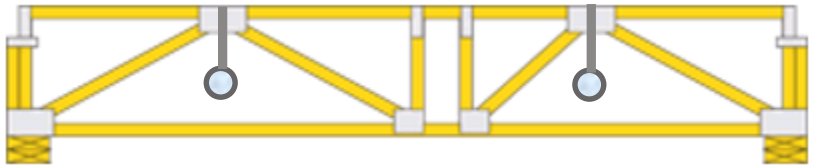
Introduction

- Building Designers must account for the dead and live loads of fire sprinkler systems in the building design.
- Truss Designers must incorporate these additional loads into the truss design.
- This presentation contains general guidance and industry best practices, and applies to both roof and floor trusses.
- Specific designs should be confirmed with the local building authorities.



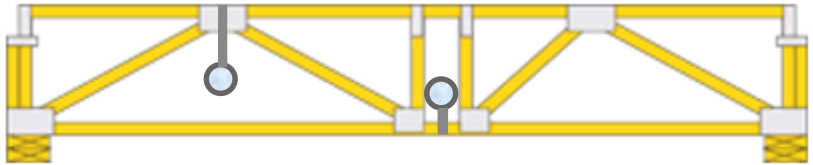
Step 1: Dead Loads

- Trusses must be designed to carry the additional weight of the sprinkler system
- Both the pipes and the water inside are considered a dead load



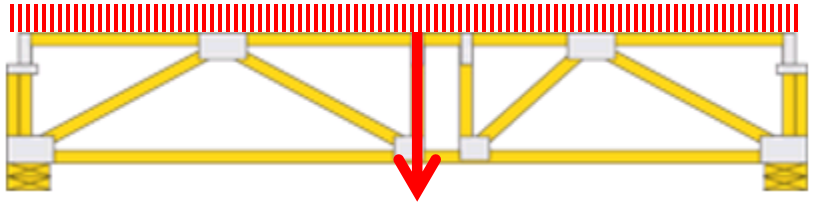
Step 1: Dead Loads

- The fire sprinkler system can be supported from either the top chord or the bottom chord of the truss.



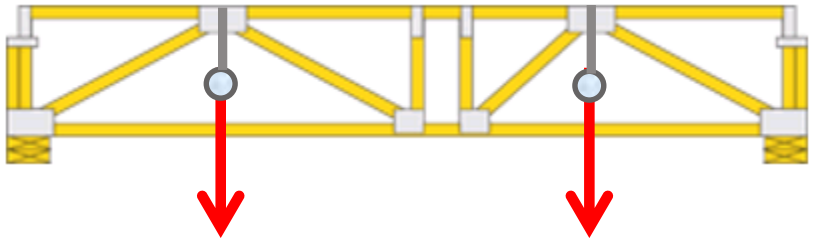
Step 1: Dead Loads

- The Building Designer should provide the following information to the Truss Designer:
  - Uniform dead load to account for the sprinkler system
  - Any concentrated dead loads not included in the uniform load, if applicable



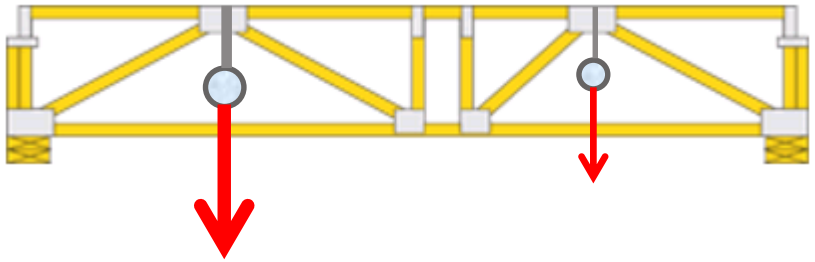
Step 1: Dead Loads

- Where attachment locations are known, concentrated dead loads for the sprinkler system may be given instead of uniform loads



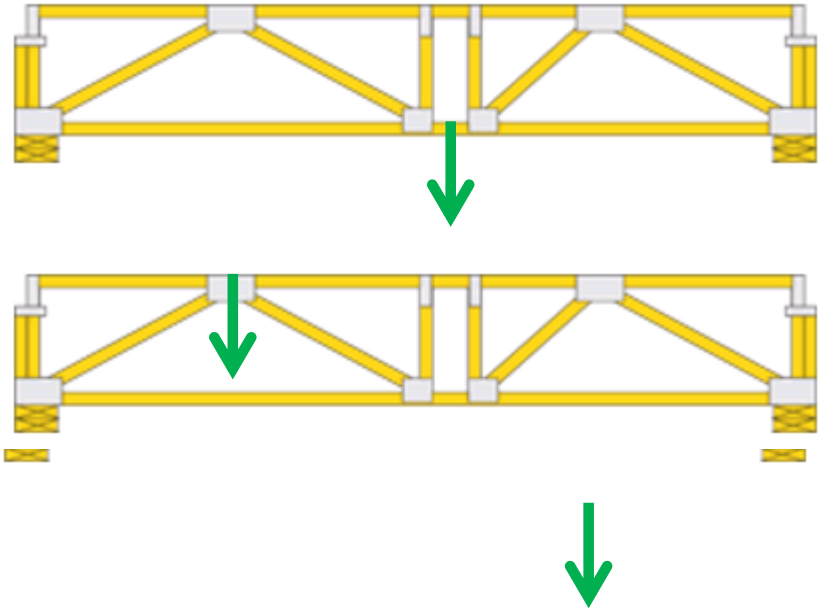
Step 1: Dead Loads

- Typical values range from 1.5 to 6 PSF, depending on the nominal size of the pipe and the hanger spacing.
- Consult the Building Designer or sprinkler system Engineer to obtain exact values



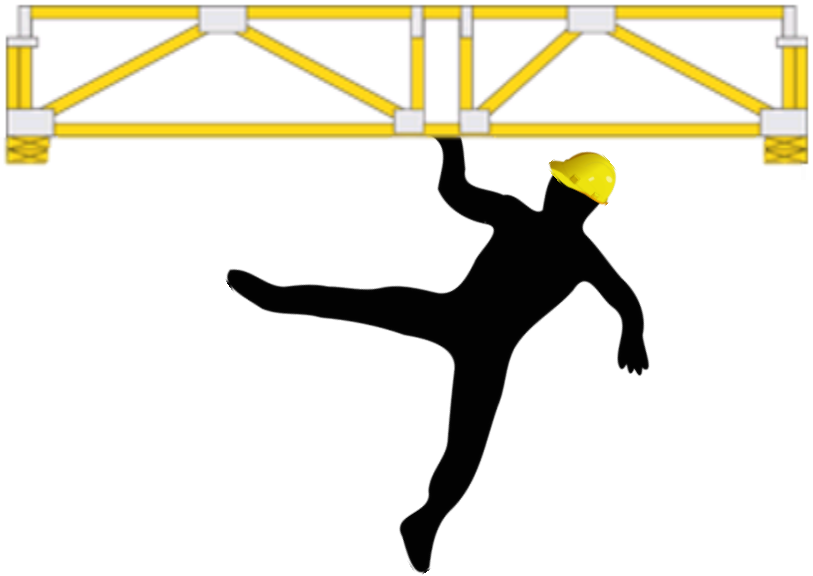
Step 2: Live Loads

- The trusses should also be designed for a 250-lb concentrated live load
- This is applied to any single support point, but not simultaneously to all support points.



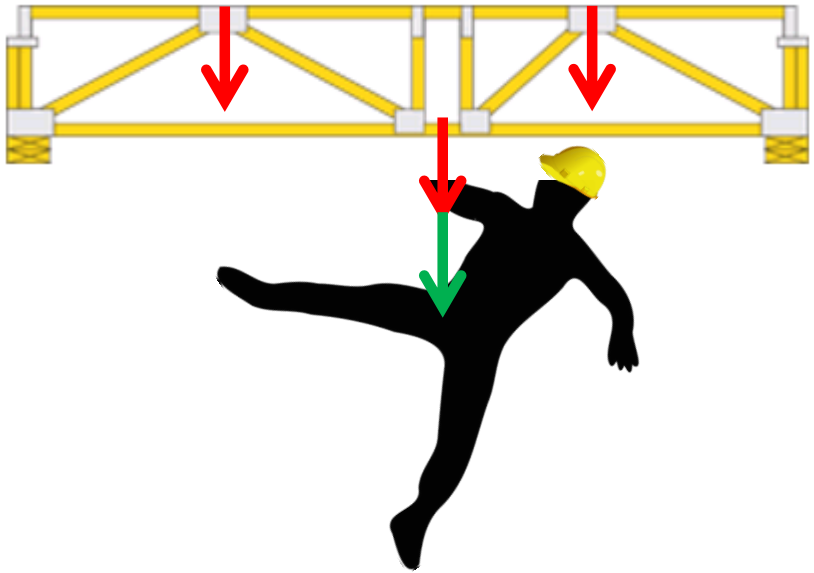
Step 2: Live Loads

- The intent of the 250-lb live load provision is to accommodate the weight of sprinkler installation personnel for a very short time during installation



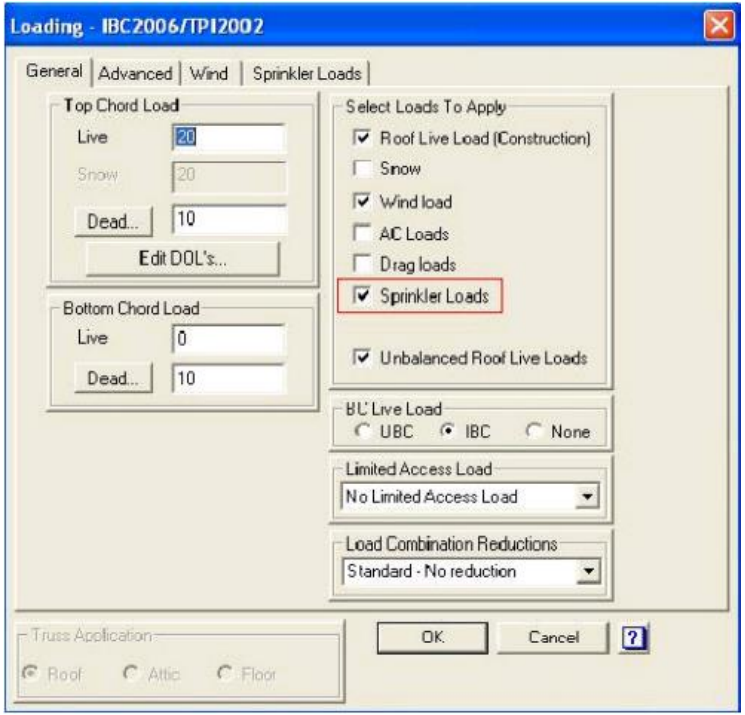
Step 2: Live Loads

- If multiple sprinkler lines are attached to the same truss, the 250-lb load should be applied at only one location at a time, representing only one worker per truss
- The 250-lb live load need not be considered simultaneously with other live loads (i.e., roof, snow, wind, etc.).



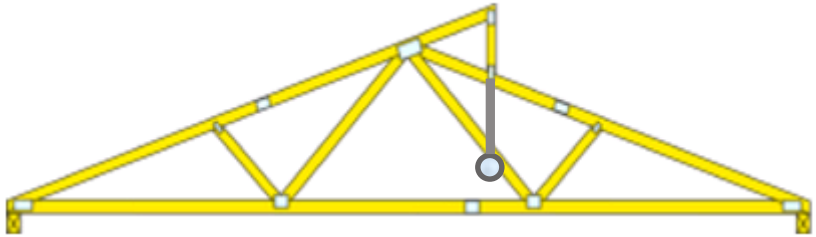
Step 2: Live Loads

- Most truss design software can automatically apply a specified “sprinkler load” to each panel and mid-panel point in separate load cases
- This approach is conservative, but allows for variance in the installed location



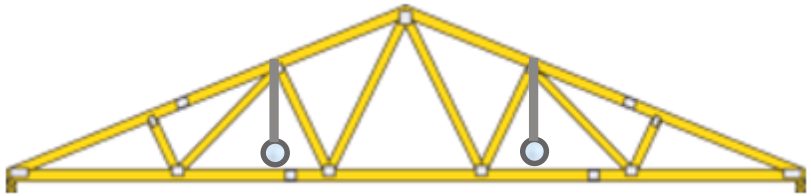
Step 3: Truss Layout and Webbing

- Truss construction is highly compatible with sprinkler systems.
- The truss designs and sprinkler system design need to be coordinated to eliminate conflicts



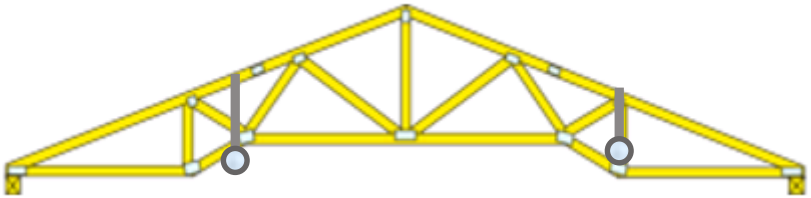
Step 3: Truss Layout and Webbing

- Ideally, sprinkler system water lines run through open webbing, and attachment points coincide with panel points
- If coordinated in advance, panel lengths and webbing configurations can easily be modified to accommodate



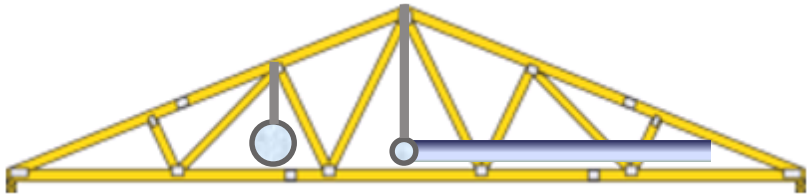
Step 3: Truss Layout and Webbing

- Truss construction along with advance planning can safeguard the builder against issues such as:
  - Drilling through structural members for pipe runs
  - Loss of headroom due to piping



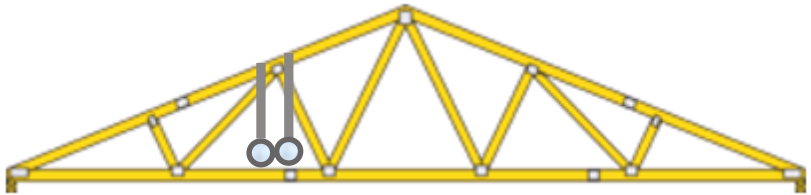
Step 4: Special Engineering

- Additional engineering design may be required if any of the following conditions are present:
  - Large diameter (>4”) pipe lines
  - Significant risers
  - Pipe lines running parallel to trusses



Step 4: Special Engineering

- A maximum of one sprinkler system support may be attached to each truss panel.
- If more than one support is needed in any panel, special engineering is required, and a Registered Design Professional should be contracted.



Step 4: Special Engineering

- Lateral loads resulting from sprinkler systems, where required, should be evaluated separately by a Registered Design Professional.