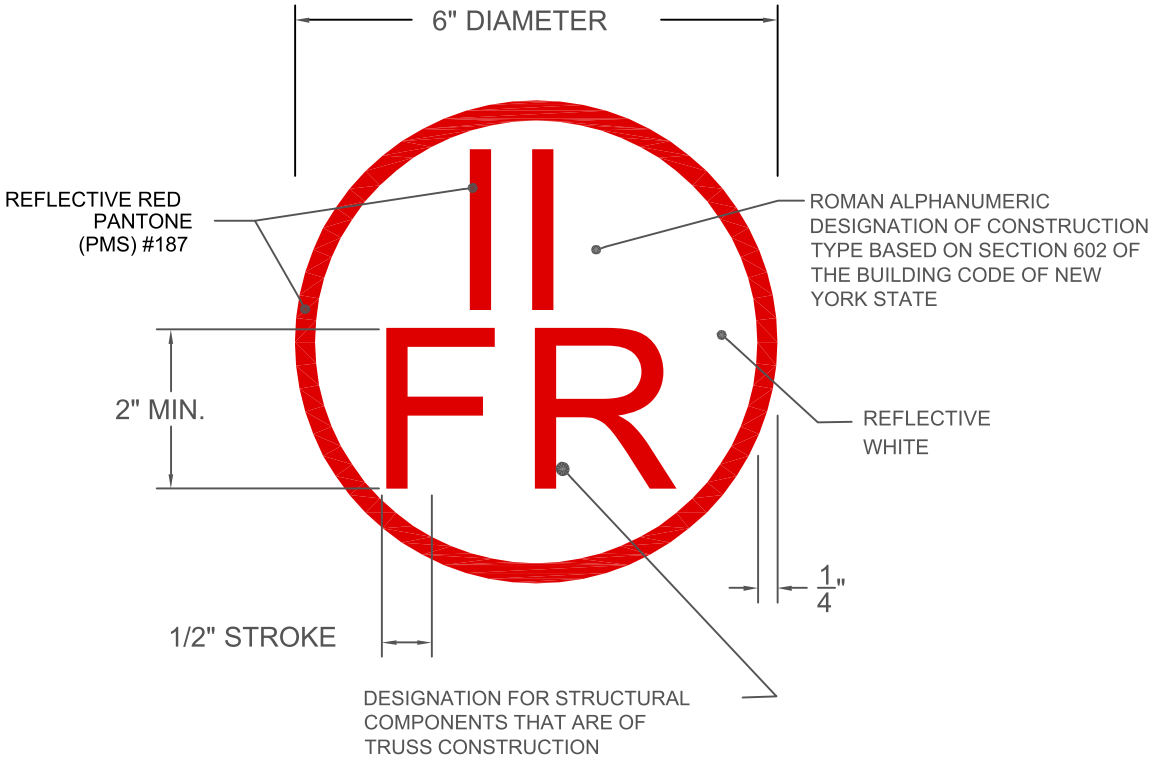
# Board of Instructors - Westbury Fire Dept.

## INSTRUCTOR'S TRAINING BULLETIN

# UNDERSTANDING BUILDING PLACARDS

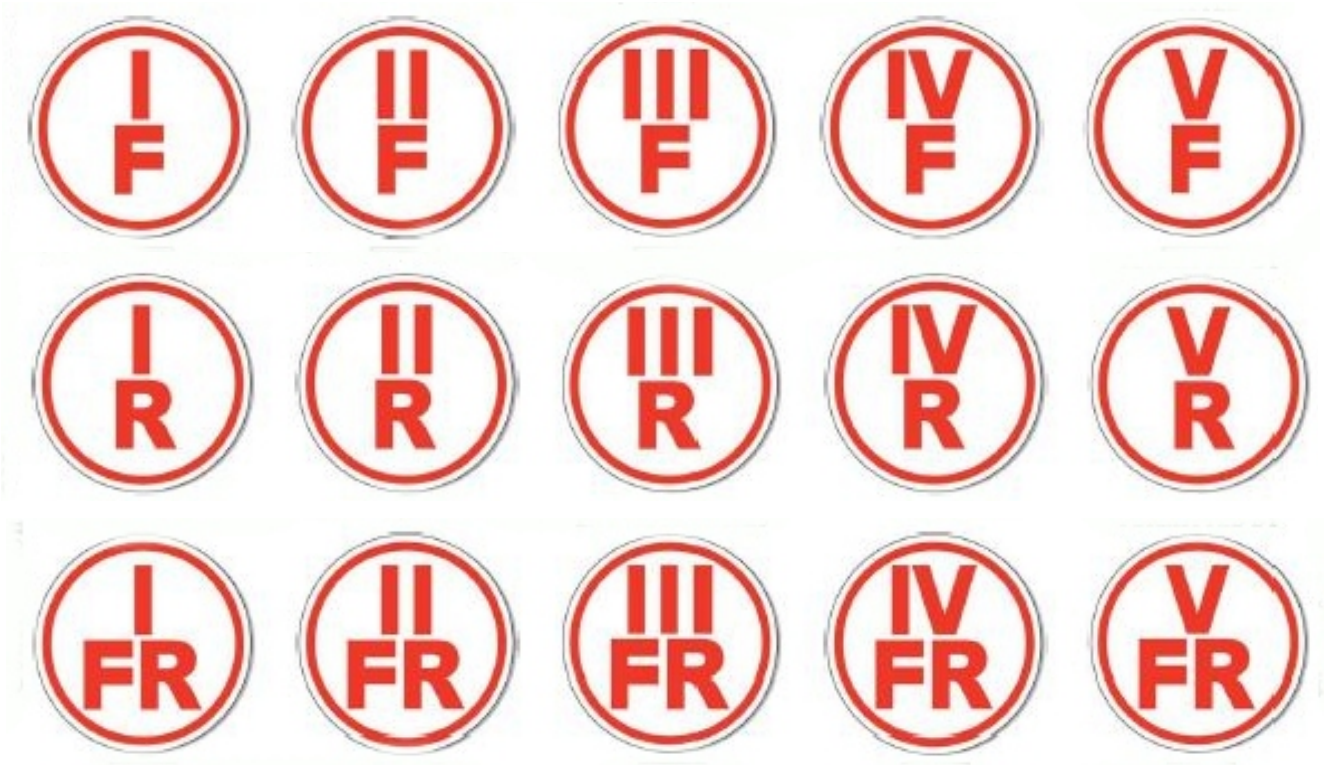



| | |
|---|---|
| "F" | FLOOR FRAMING, INCLUDING GIRDERS AND BEAMS |
| "R" | ROOF FRAMING |
| "FR" | FLOOR AND ROOF FRAMING |

## TRUSS IDENTIFICATION SIGN
## COMPLIANCE WITH 19 NYCRR PART 1264

NOT TO SCALE

# 15 Truss Placards a Firefigher May Encounter




There are 15 different **Truss Identifications Signs**, a firefighter may encounter ( all displayed above ). These signs are made up of 2 components, a **Top Component,** a Roman Numeral: one I, two II, three III, four IV, or five V, which represents the type of building construction the sign is applied to and a **Bottom Component** ( underneath the roman numeral ) which symbolizes where a truss may be found: **F** = Floor, **R** = Roof, **FR** = both Floor and Roof in the building. This information is important for us as firefighters and should certainly play a part in how an Incident Commander creates their Action Plan or deploys resources to bring a fire in one of these structures to a safe conclusion.


Here we know we have Class 3 Construction and a truss floor(s), but what does that mean? Do we know the different in the classes of construction? Do we know the difference in the types of trusses we may encounter? If we don't, we should, it could save your life. We need to recognize, if we encounter any of these 15 Truss Identification Signs, whether we know the differences in the signage or not, we should always be reading them all the same " **WARNING : THIS BUILDING IS NOT SAFE UNDER FIRE CONDITIONS AND A COLLAPSE COULD BE IMMINENT** ". Factors like is there a life hazard outside ours, How much fire is there ( big smoke = big fire ), How long has it been burning, Where is the fire and where is it heading are all very important questions and need to be answered before committing inside fire operations in one of these structures.

# What are the differences in the Classes of Construction:

## TYPE I - FIRE RESISTIVE

These structures are typically "high-rise" and the heaviest bodied (mass) of all construction types, especially when exposed to fire. These tend to be over 5 floors - 50'

**Type I's** are constructed of concrete and protected steel ( *Steel coated with a fire resistant material, most often a concrete type mixture* ) and designed to hold fire for and extended amount of time in order to keep a fire at bay in a room/area and/or floor of the fires origin. - commonly called a "**Fire Proof**"

The primary fire hazard in these types of building is the contents of the structure, **not the structure itself**.

## TYPE II - NON-COMBUSTIBLE

These structures are typically found in new buildings and remodels of commercial structures. **The walls and roofs are constructed on non-combustible materials**. Walls are usually reinforced masonry or tilt slab, while roofs are metal structural members and decking. The roofs of these structures are often light weight concrete, foam and insulated member or a combination of these materials.

Because most of these building are "newer" buildings, ( built within the last 50 years ) they tend to have some type of fire suppression system. These Non-combustibles, are our: "Big Box Stores" - Home Depots, Price Club, Wal-Mart, Restaurant Depot and Strip Malls ...

These building have a lower degree of fire resistance than our Type I and again our fire load tends to be its contents, not the structure. These type buildings, our fire load tend to be great with plenty to burn and with the large open retail areas, that have no fire stops ( like doors and walls), they can cover large areas, but due to the fire protections systems ( sprinklers ) fires tend to be kept in check.

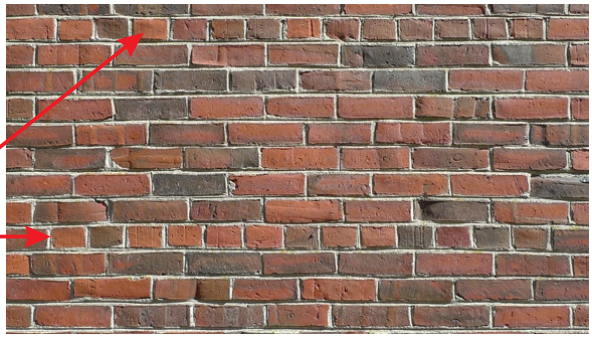
## TYPE III - ORDINARY

These structures can be new or old construction, they have non-cumbustible walls and **wood roofs**. Older construction tend to unreinforced masonry and have a conventional framed roof, while newer structures will be reinforced masonry walls or tilt slab walls with a light weight roof system. One of the most dangerous roofs in a Type III is the panelized roof system. ( displayed below )

Here you can see how a roof team can go to the roof, cut inspection holes, determine they have a safe wood frame roof but are in fact standing on wood frame panels on top of a **bar truss** roof system. A key you have this is when the rafters run the long span opposed to the short span.

There are ways a firefighter can determine if they have an older style or new style Class III: 1. King's rows of Brick, 2. Arched Lintels

King's Rows in the brick is nothing more than rows of bricks of instead of running long side showing, the short side will be showing. This is typically done every 7th or 8th row.



Kings Rows

Today's Brick tend to be pre-made panels.

Another clue we have an older style Class III is by looking above the doors and or windows looking for brick formed arches, called Lintels. These lintels take the weight of the bricks above, so the weigh doesn't crush the window or door below them.

Arched Lintels

If we don't see Arched Lintels or Kings Rows in the bricks we have to be more cautious with our roof operations, we may have some type of Truss.

Type III building are commonly found on "Down Town USA" and our fire district being no different, a good number of downtown Post Ave. are Type III Structures.

## TYPE IV - HEAVY TIMBER

These structures are typically found in older buildings and use heavy dimensional lumber ( over 8” ) as structural members and interior elements. This building due to the mass, hold up well under fire conditions, unless neglected or not properly maintained. Due to the wood mass they are susceptible to termites, water or weather damage, if they are not properly maintained.

Firefighters can identify these buildins by their large mass lumber use for walls and long distance roof spans. Most of these structures were build prior to 1960 and typically found in old warehouses and factories but are more common in our district as churches or stables in Old Westbury.

## TYPE V - FRAMED

These structures are typically found in our residential structures, most commonly our homes. **The walls and roof are made of combustible material,** most commonly wood. This means content isn’t the only fire we’ll have to contend with, as with our Type I and Type II, with Type V we may have to contend with fire on structural components as well . Depending on when the structure was build, Pre World War II, when Balloon Construction was more prevalent, it allowed for rapid vertical fire extension. Post WWII, platform construction became the standard and with modular rooms, our fires remained mostly contained to areas ( kitchen, bedroom... ) In the 1980’s although platform construction was still the norm, people wanted bigger, large open living spaces, and at a lower cost of construction, so light weight building materials like engineered I- beams, Wood Trusses and other light weight material were created to meet this need. These items took fire spread backwards, these newer building items again promoted fire spread but this time the fire spread was not vertically, it horizontal but now we have to contend with a building material that isn’t the mass it once was and fails at a much quicker rate, hurting and even killing firefighters and is why the Truss Identification laws and Signs were created, to give firefighters a warning.

Now we know what the top portion of the Truss Identification Sign means, what about the bottom. How are these truss components in the floor, roof or both going to effect us?

## Floor Truss


When we see an **F** under one of our 5 building types, this means we have floor(s) that are constructed using a Truss system

Wood Floor Truss

Metal Floor Truss

## Roof Truss


When we see an R under one of our 5 building types, this means we have a roof that is constructed using a Truss system

Wood Roof Truss

Metal Roof Truss

# Floor & Roof Truss


When we see an **F and R** under one of our 5 building types, this means we have both the floor(s) and the roof constructed using a Truss system

Bar Truss
used in supporting
both Floors and Roofs

Wood Floor Truss

Metal Floor Truss

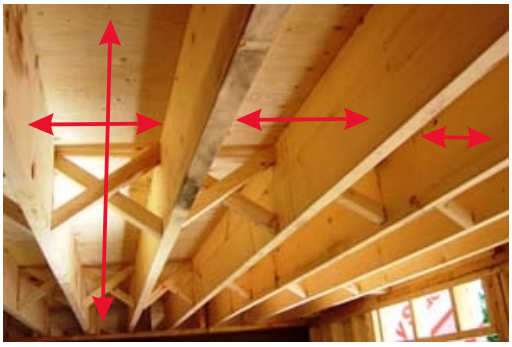
Wood Roof Truss

Metal Roof Truss

## Why are these Trusses so dangerous to Firefighters:

As stated earlier with Type V, trusses promote fire extension horizontal, unlike with any other type building systems. Prior to Trusses, these supports were mass, not open, so fire needed to burn through each support to get to the next area, taking some time to accomplish.

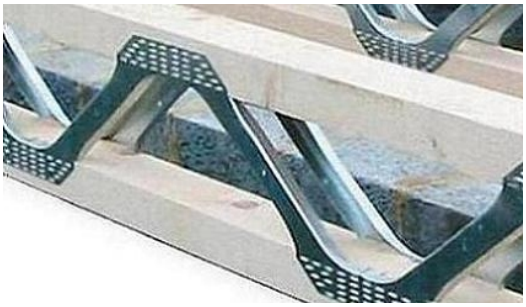
Fire can easily extend horizontally the entire span of the truss system with nothing to stop its spread length or width.



Fire can easily extend horizontally but **only within that one bay**, it will have to burn the joist through in order to jump to the next bay... this hampers fire extension.

The next issue with Trusses are there construction. Remember these were made to save builders money, keep building cost down. Metal Truss are low gauge metals that are getting their strength from their bends. What happens when we apply heat to low gauge metals? The bend doesn't matter, it no longer has its strength because the metal will soften. With the wood type we may have mass with 2"x4" wood but the Truss itself is put together using a gusset plate with 1/4 -1/2" staple plates:

Gusset plate holding 2"x4" truss system together



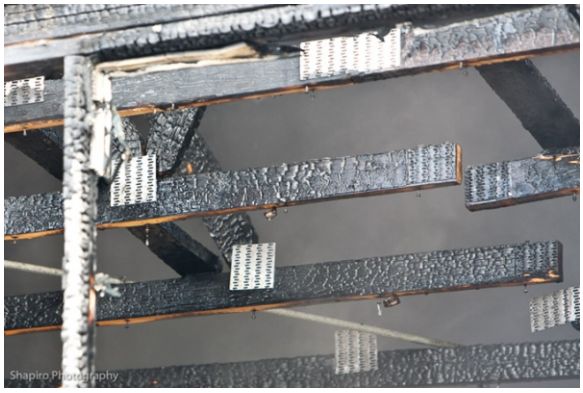
Gusset plate is actually the webbing of the truss - giving it the strength


Gusset plate - you can see the depth they actually go into the wood - 3/8"

What do you think happens when the wood is subjected to fire conditions ? Remember is there going to be a small amount of fire in this open, well ventilated area, with plenty of fuel to burn in the wood trusses themselves ? **NO** - heavy fire !

When subjected to fire, the surface of the wood will begin to burn, which alligators the wood making these gusset plates fall out, or the wood to fall from the gusset plate. When they fall out, there is nothing holding the truss together and the truss fails.

Alligatored Wood
aka - Charring of the Wood



Truss failure due to fire (alligatored wood)

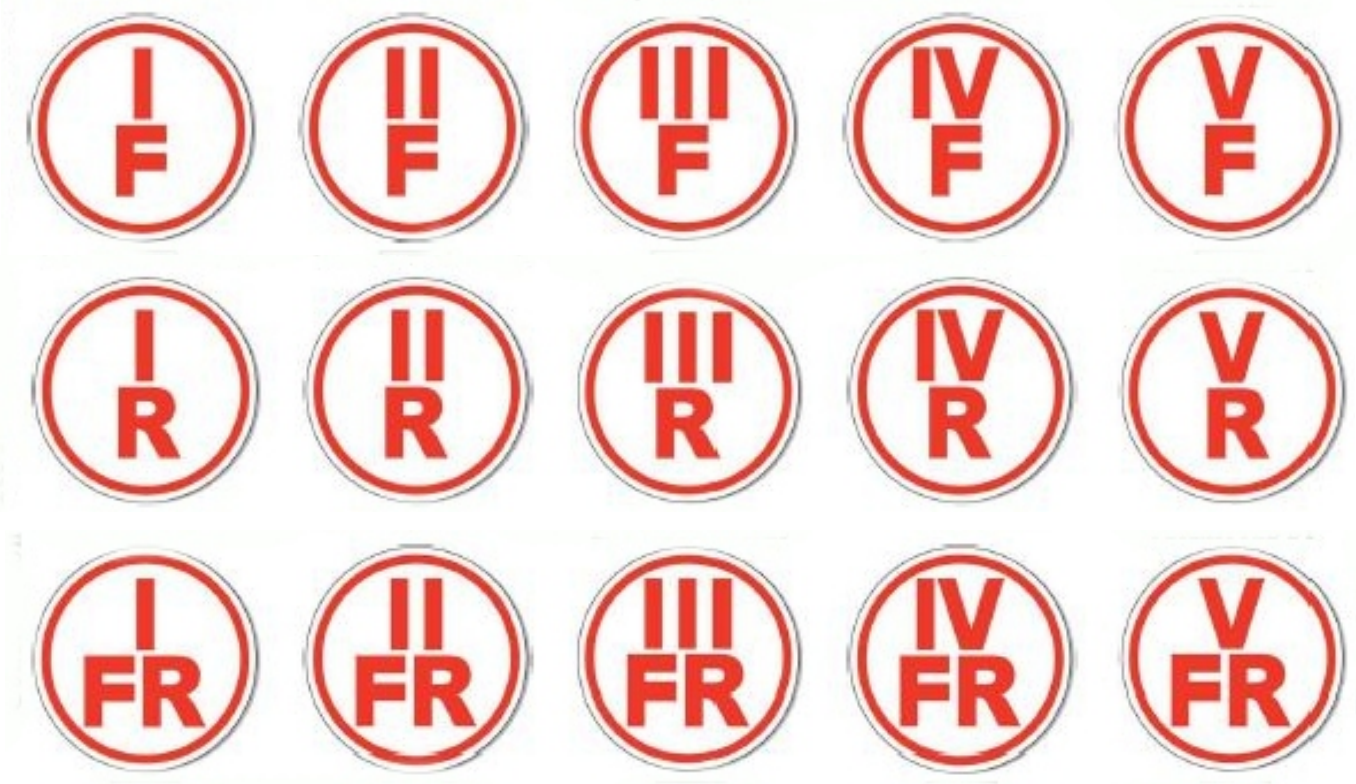
The last issue, most trusses are outside our view, especially floor trusses.
Floor truss will have a floor and sub floor on top of then and sheet rock or a ceiling below them and roof trusses will tend to have a ceiling below them, all outside our view. There could be a fire in these areas and we are unaware it is occurring until it's too late. Use the clues presented us - heavy smoke with no visible fire ( where is the fire - it very well could be in these hidden truss spaces, especially if not quickly detected ) Use TIC, most firefighter tend to scan eye level and above, scan the floor. Heat rises, if you have high heat at ground level, there is a problem.

Use the Truss Identification Signs as your " **Proceed with Caution** " sign if at all.

**Ask Yourself:**
Are we as firefighters the Only Life Hazard ?
What is Burning? Did it come in an AFA, Kitchen fire, Attic Fire, Appliance fire ...
How long has the fire been burning? Was it immediately noticed & reported ?
How quick did it take to get us on scene - ( was it AFA - to signal 32 ... )
How long has it been from Time noticed to us getting our line ready to go at the door?
What do I have showing ? ( Big Smoke = Big Fire )
What is the smoke telling us ? Volume, Velocity( pressure) Density & Color
Do we have the A team, who will get to seat of fire quickly or the B or even C Team ?

All question we need to be asking before committing inside a structure marked with a Truss Identification Sign.

**TRUSS IDENTIFICATION SIGNS**:
Know them - Study Them - Know What They Mean - It Could Save Your Life !



# NYS Unsafe Building Placard

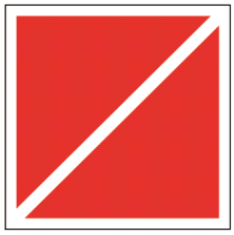
New York State - Unsafe Building Placard Building Code Section 311 states: any building or structure determined to be unsafe pursuant to section 107 of this section shall be marked as follows:

**Placard Location**: a placard shall be applied on **Front of the structure and visible from the street**. Additional placards shall be applied to the **side of each entrance to this structure.**

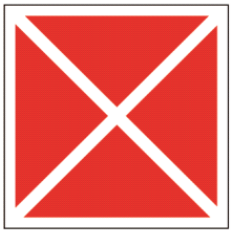
**Placard Size:** 24” x 24” with red background - white reflective stripes and a white reflective border, both 2” wide

**Placard Date:** the placard must bear the date it was applied to the structure and the date of any and all recent inspections.

This Placard means the structure had normal conditions at the time of the marking.



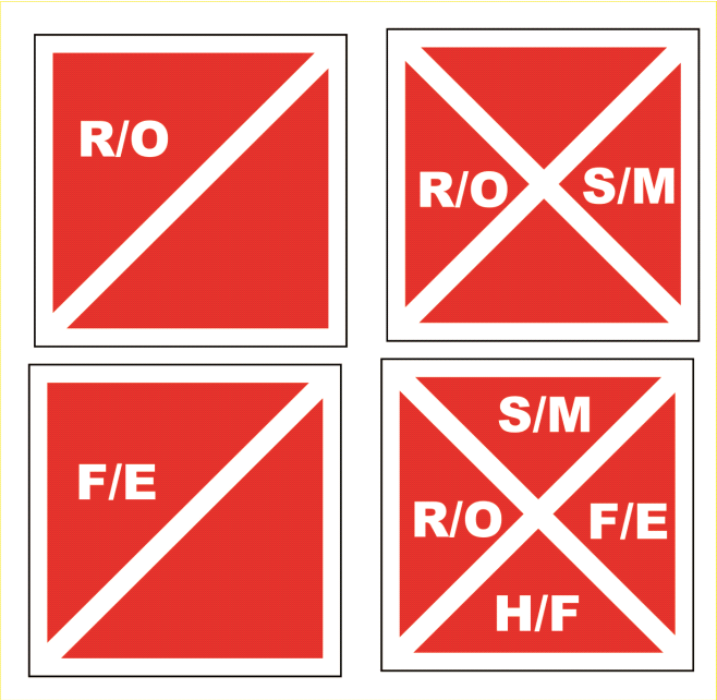
This Placard means the structure or interior hazards exist and interior firefighting or rescue operations should be conducted with EXTREME CAUTION.



This Placard means the structure or interior hazards exist to a degree that consideration should be given to **limit firefighting to exterior operations only**, with entry only occurring for a known Life Hazard

We as firefighter may come across Unsafe Building Placards with additional letter on the Placard, R/O, S/M, F/E. H/F or F/O.

**What does this Mean**:
These placards not only let us know we have a structure that is unsafe for entry but these additional letter are letting us know why:




**R/O** = ROOF OPEN

**S/M** = STAIRS, STEPS or LANDINGS MISSING

**F/E** = AVOID FIRE ESCAPE

**H/F** = HOLES IN FLOOR
or
**F/O** = FLOORS OPEN

Firefighters should not only consider the placard and the additional letters when making a determination if they should enter a specific structure, the **Date** listed on this placard also needs to be considered.

What conditions can we expect if we see this placard:


We have a placard that says use extreme caution when entering and it has an open roof. We can also see it was posted on July 10 of 2011. Now that it is over 4 years later, what can we expect this open roof has done to the structure, being exposed to weather elements for 4 years. Has it make conditions inside worst then when it was posted, absolutely !

We need to understand this when making our determination.

Like with the Truss Placards, do you assessment, **consider all factors** presented to you before making your determination to enter one of these structures. Remember the only life hazard we my be to us as firefighter and these hazards only put on to ourselves by the decisions we make. RISK vs REWARD