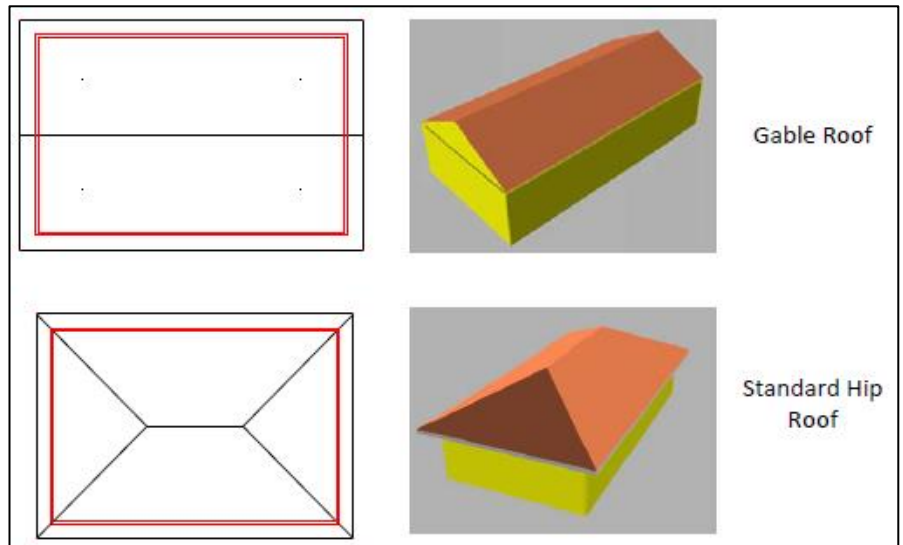


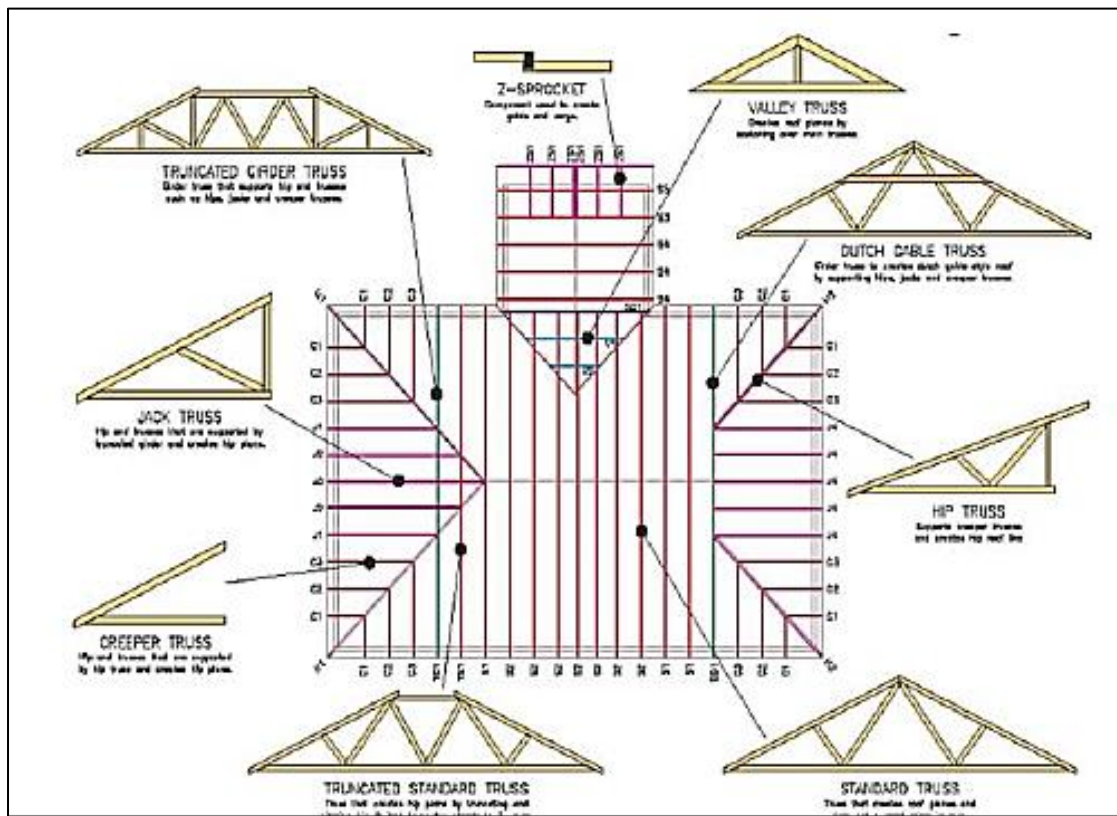
## Week 3 Lecture 2- Examples of Trusses in Construction

Content:

- Roof Trusses:
  - Terminology
  - Timber Roof Truss Examples
  - Steel Roof Truss Examples
- Trussed Floor Joists:
  - Terminology
  - Timber Trussed Floor Joists Examples
  - Steel Trussed Floor Joists Examples



2 common roof types for residential property →  
- hip roof angles = 45°



No need for a truss on the very end/edge

Truncated truss = flat top = stronger

Long straight vertical lines = standard truss

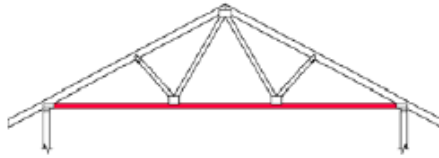
Jack truss = right angle triangle, attach to truncated trusses

Crepper trusses = fill in gaps – right angled triangle with no vertical component

## Truss Terminology

### Bottom Chord

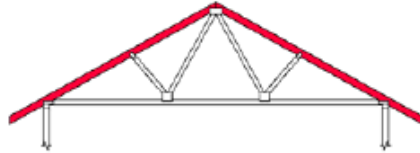
Defines the bottom member of the truss, usually horizontal, and carrying a combined tension and some bending stress (from gravity loads).



Despite tension, has bending stress too due to roof batons on top with sheeting or tiles on top = force downwards

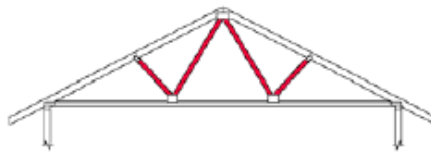
### Top Chord

Defines the top members of the truss, usually sloping, and carrying combined compression and some bending stress (from gravity loads)



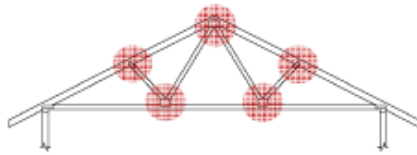
### Web

Webs are members joining top and bottom chords to form a truss. They may be in tension or compression depending on the truss design and the direction of the prevailing loads.



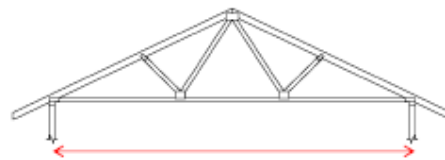
### Panel Points

The points where web members and chord members meet



### Span

The distance between the outer edges of the load bearing walls supporting the trusses (usually heel to heel)



Clear distance between outside walls

### Overhang

Standard trusses conform to an outer triangular shape typically resembling an isosceles triangle. Many web layouts within the outer triangle are used to address spanning ability, as follows:

**King Post** – has only one central vertical web. Used for small spans e.g. spans up to 5.0m.



**Queen Post** - two additional webs fanning outwards from the base of the central web and connecting to the middle of the top chords. Used for spans up to 6.0m.



**A-Type** - most common truss type but has no central web. Instead, the truss span is divided into three equal panel lengths with webs fanning outwards from each. Spans up to 9.0m.

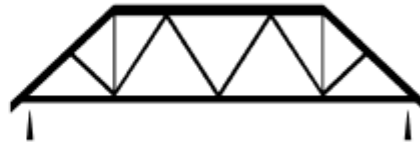


**B-Type** – compared to the **A-Type** has 2 extra webs. The panels points are also equally spaced. Spans up to 14.0m



**Standard girder** – can be based on any of the previous types but is designed to be stronger to support other trusses.

**Truncated Girder Truss** - is the main truss in a hip end. It occurs below the standard truncated trusses and takes the load of the outer hip trusses including the hip, jack and creeper trusses. It is made stronger than the standard truncated trusses to take these loads.



Has to be stronger to support more load = has to be made of stronger timber e.g. kiln dried hardwood

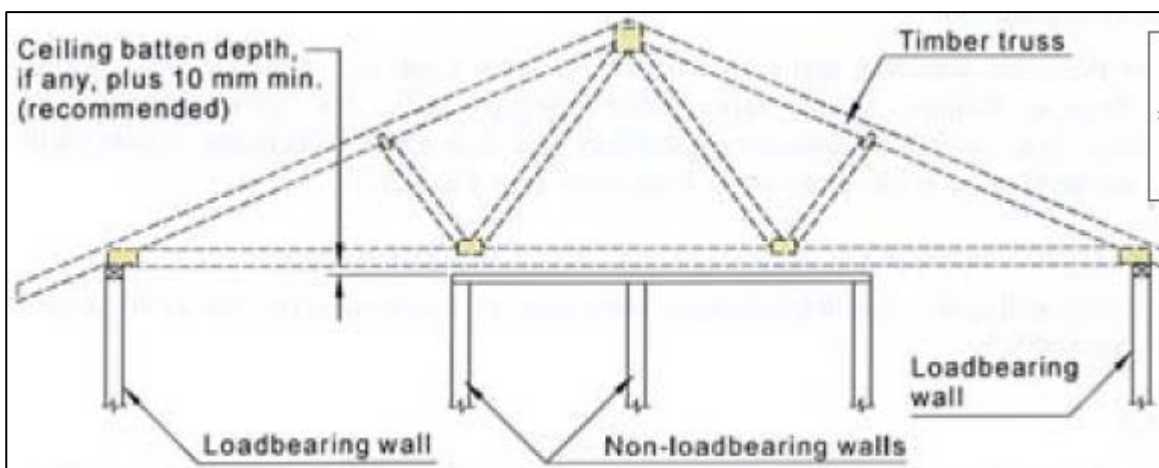
Joined together by **nail plates** = done by a press = squashes down nails in plate into timber = **engineered joint**

### Pre-Fabricated Truss Benefits

- Trusses provide stiffness by depth without using a lot of material, and by assembling elements that are shorter than the span they cover.
- Timber roof member sags under bending and keep on sagging over the years. Sagging problems increase with the span. Trusses minimise this problem by using lighter and more **economical** members.
- The timber truss industry as we know it would not be possible without nail plate connectors. The plates are used in pairs - identical plates are pressed into each side of the joint using special equipment in a factory
- Quicker and cheaper to put up = **more economical**

### Non load-bearing walls

- Roof trusses have to be connected only to load bearing walls.
- Non load bearing wall must be kept clear and unpacked from the underside of the bottom chord to allow sufficient tolerance for deflection.
- ^ still attached just with a nail to keep upright
- **External Walls** = extra top plate on top so internal walls don't touch the truss – if they do then the roof will collapse



## **Roof Bracing**

- Truss top chords try to buckle under compression
- Battens prevent buckling
- Speed brace restrains battens
- Battens must be continuous in shaded area

