

Structural Planning & Design

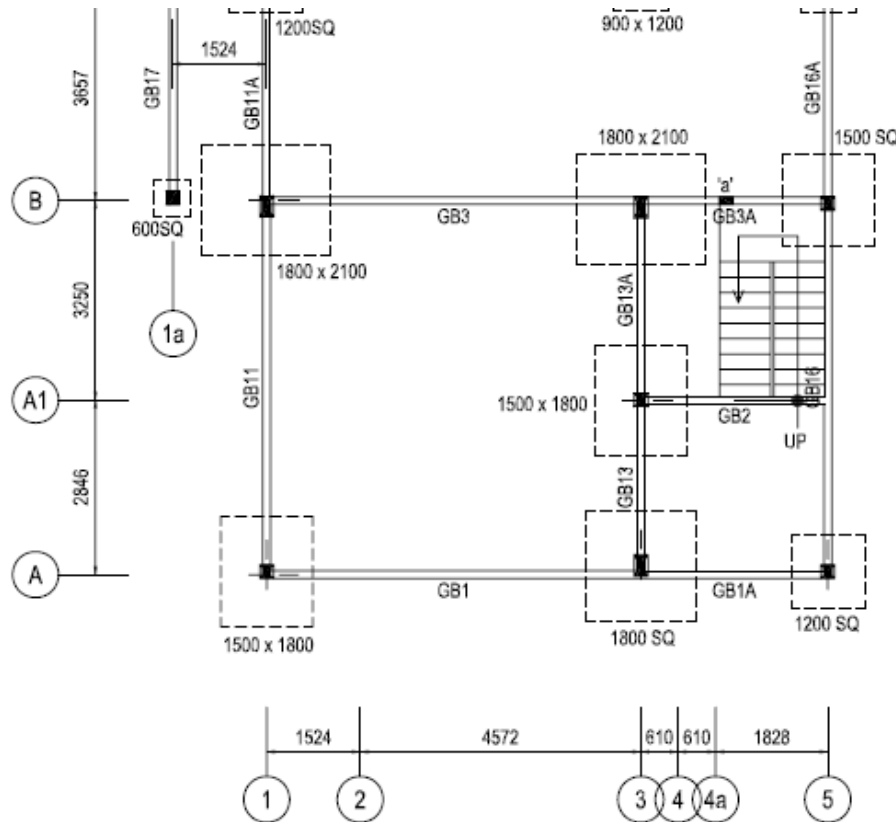
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Good Structural Layout / Key Plan

- Reliable structural system / Safety
- Utility
- Economy
- Aesthetic
- Constructability
- Durability
- Building By-Law

Structural Layout / Key Plan (Example 1)



Non-suspended
ground floor
system

GROUND FLOOR PLAN

NOTE:

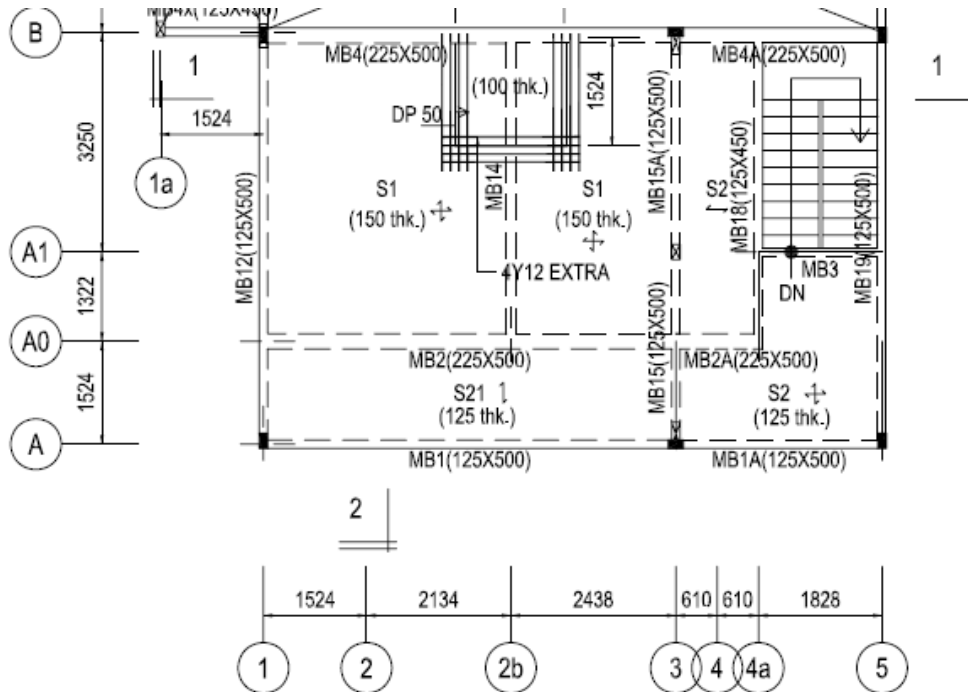
UNLESS OTHERWISE SPECIFIED:

1) ALL GROUND FLOOR BEAM TO BE 125 X 450

2) MARK 'a' TO BE 125 X 225 RC STIFFENER

MAIN BAR: 4Y12, LINK: R6-125

Structural Layout / Key Plan (Example 2)



Suspended Slab

FIRST FLOOR PLAN

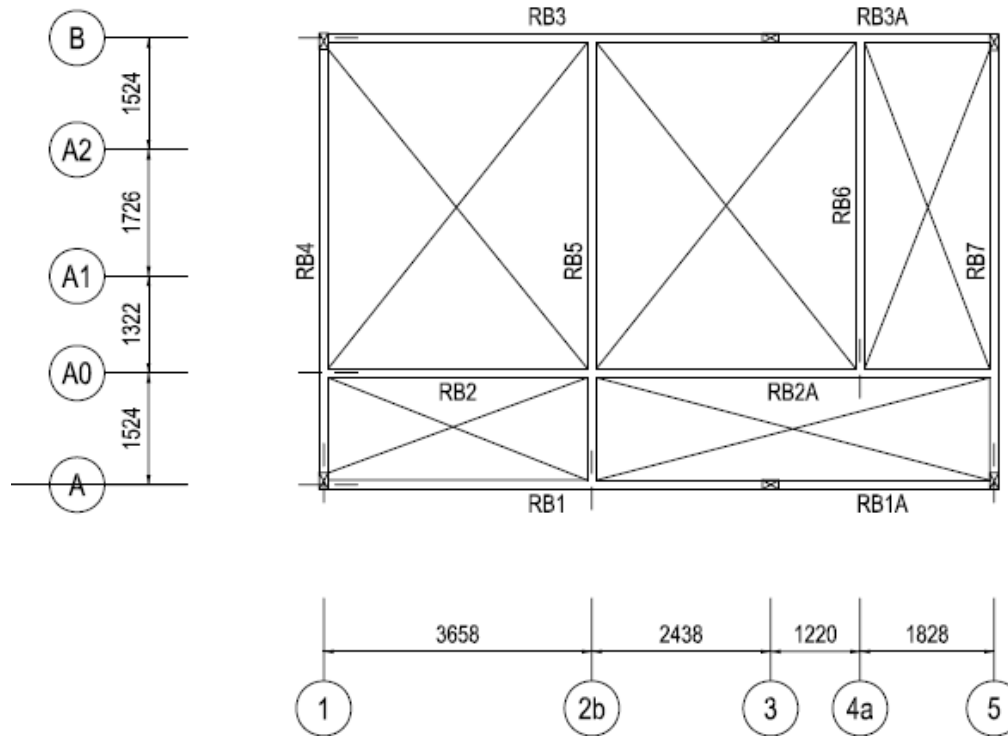
NOTE:

UNLESS OTHERWISE SPECIFIED:

1) ALL FIRST FLOOR BEAM TO BE 125 X 450

2) ALL FIRST FLOOR SLAB TO BE 125 MM THK.

Structural Layout / Key Plan (Example 3)



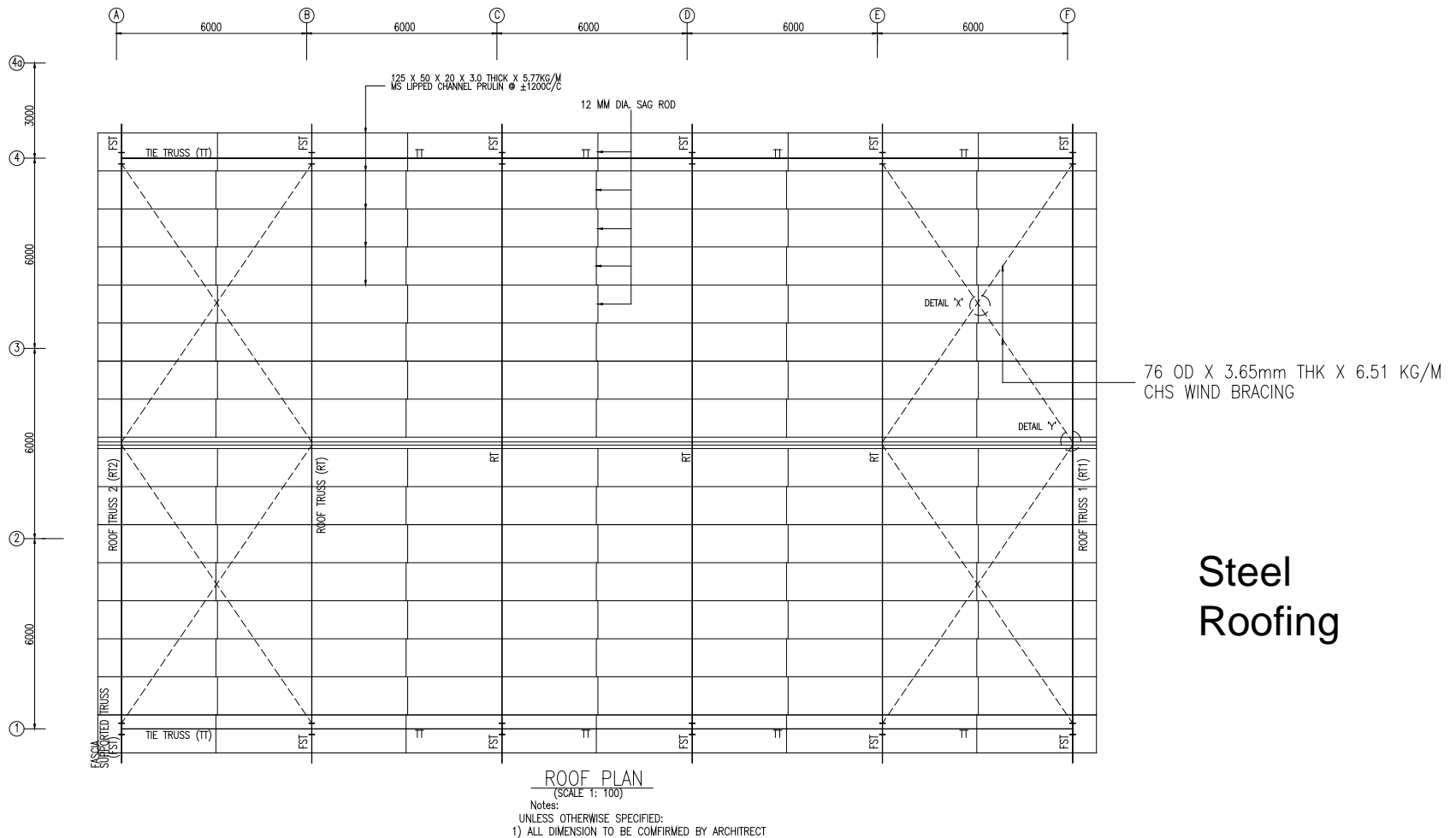
ROOF PLAN

NOTE:

UNLESS OTHERWISE SPECIFIED:

1) ALL ROOF BEAM TO BE 125 X 450

Structural Layout / Key Plan (Example 4)



Steel
Roofing

Structural Layout Planning

- Study & understand the architectural drawings (floor plans, elevations, cross sections, isometric view (if any), specific details and etc..).
- Structural layout planning is always started from the lowest floor.
- Identify location and orientation of columns.
- Identify location and position of beams.

Structural Layout Planning (Cont'..)

- Sketch the structural plans.
- For a simple layout, structural key plan can be sketched on the architectural drawing by using colour pencil.
- For a complex layout, structural key plan can be sketched on the butter paper by tracing from the architectural drawing.

Location, Orientation & Dimension of Columns

- Some are stated in the architectural drawings.
- At the corner and intersection.
- The distance between column and column is not too far and too close. Typically about 3 to 6 m.
- Flush with brickwall.

Location, Position & Dimension of Beams for RC Frame System

- Location of brickwall.
- To brace the columns.
- To flush and brace the brickwall.
- Dimension of beam is governed by:
 - Thickness of brickwall
 - Types of building
 - Ground or upper floor
 - Upper floor with or without ceiling
 - Head room
 - Span
 - Architectural drawing

Task

Week	Task	Remark
5	<ul style="list-style-type: none">- Distribution of building layouts among team members.- Study and understand the building layout.- Preliminary structural key plan planning.	<ul style="list-style-type: none">- Minimum 1 building layout/member- Brief explanation by lecturers.- Discussion between students and lecturers.
6	<ul style="list-style-type: none">- Finalised of structural key plans.- Amendment of structural key plans.- Dimensions / sizes of structural elements.- Loadings	<ul style="list-style-type: none">- Submission of draft structural key plans for approval.- Introduction of structural analysis and design software by lecturers.- Discussion between students and lecturers.
7	<ul style="list-style-type: none">- Structural analysis and design.- Design of staircase.- Structural detailing.	<ul style="list-style-type: none">- Scale and arrangement of structural detailing.- Discussion between students and lecturers.
8	<ul style="list-style-type: none">- Verification of outputs.- Compilation of structural drawings.- Report for submission.- Brief presentation.	<ul style="list-style-type: none">- Format of report will be given.- Comment by lecturers in-charge.

Summary

- Good structural design came from a sound structural layout planning.
- Structural layout planning is the MOST important step in the structural design.
- Structural planning has to be done by the structural engineer.
- Computer software is just a design tool. A good fundamental in structural analysis and design is required for a structural engineer to verify the outputs from the computer software.