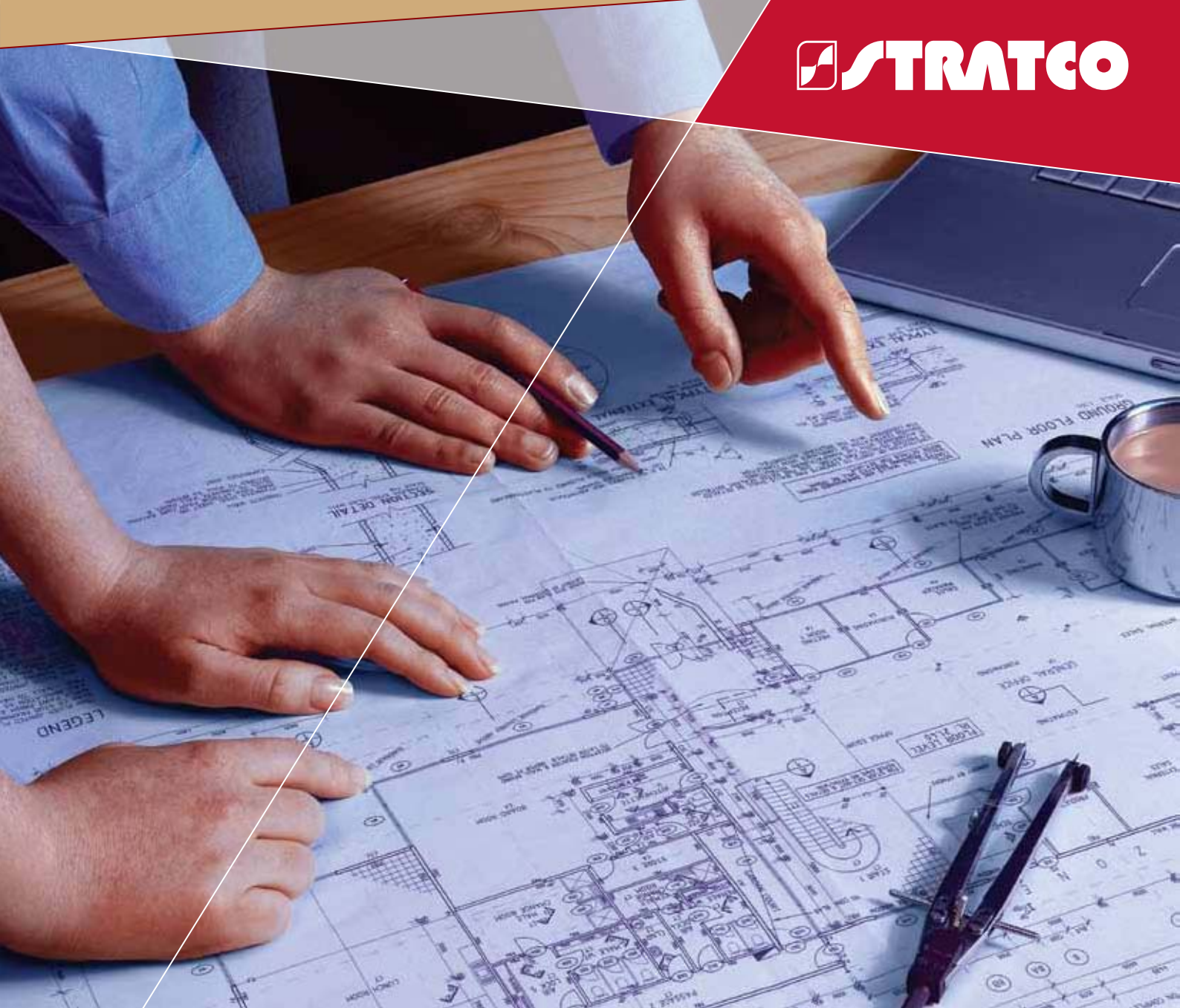




Tufffloor™



WHY YOU SHOULD USE TUFFLOOR

Strong and Easily Installed

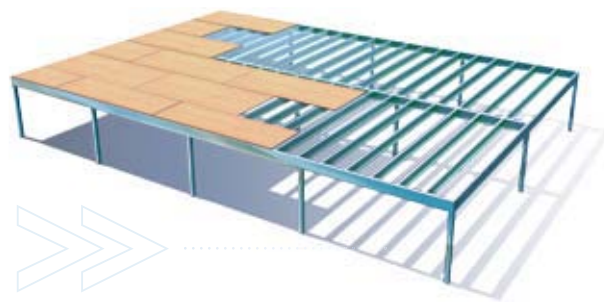
Tuffloor is a steel floor framing system designed for strength and ease of installation, and is an easy and economical alternative to timber subfloors. The system is ideal for domestic house construction and extensions, and suits cladding with either tongue and grooved strip flooring, or a wide range of particleboard, and composite products. It is suitable for commercial and light industrial applications, although you should refer these applications to Stratco to determine allowable spans for these load conditions. Tuffloor is pre-cut to length, eliminating on-site cutting, saving you time and effort.

Suits Your Project

It is particularly suited for use with reactive soils, and sloping sites, and can be installed in remote locations without the need for cartage of extensive installation infrastructure. Offering economical spanning performance, Stratco Tuffloor is adaptable to a variety of building designs and construction methods.

Economical

All major structural components are made from high tensile steel providing strength and impact resistance. The efficient strength to weight ratio of high tensile steel minimizes the weight of materials needed to be transported to site, saving money in remote locations. With the increased load bearing capacity of the Tuffloor system, smaller sections can be



used, contributing to cost efficiency. When this is combined with in-line construction, the total height of the building can be reduced, further saving brick and cladding costs. Keeping project costs under control is always a challenge on any building project and choosing Tuffloor for your project makes a lot of sense.

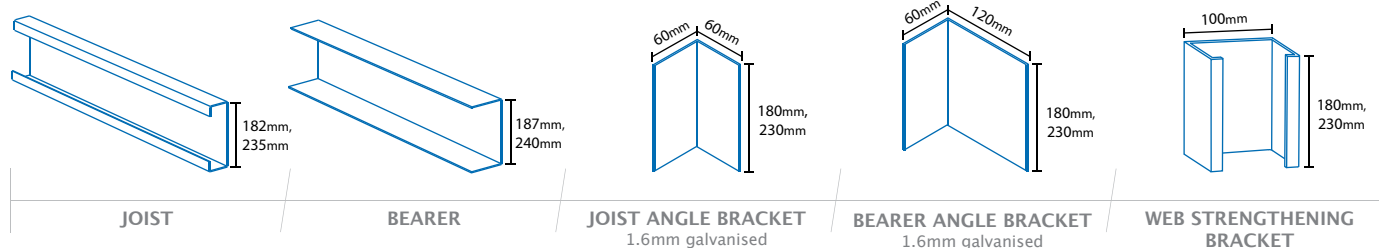
Versatile

235mm sections allow for 115mm pipe penetrations and toilet bends under the floor, and standard joist spacings compatible with a large variety of flooring materials.

Long Life

The galvanised coating offers long term protection against corrosion. As the subfloor is made from steel it is not subject to twisting or warping. Other benefits include termite protection, mould resistance and elimination of wood rot.

COMPONENTS



Sectional Properties

All sections are galvanised to Z350 specifications and are rolled out of high tensile material with a minimum yield Strength of 450MPa.

JOIST	Section	Depth mm	Width mm	Lip mm	Thickness mm	Mass kg/m
	FJO18212	182	51	14	1.2	2.78
	FJO18215	182	51	14	1.5	3.54
	FJO18219	182	51	15	1.9	4.46
	FJO18224	182	51	16	2.4	5.62
	FJO23515	235	62	14	1.5	4.50
	FJO23519	235	64	15	1.9	5.68
	FJO23524	235	64	16	2.4	7.15
BEARER	Section	Depth mm	Width mm	Lip mm	Thickness mm	Mass kg/m
	FBE18219	187	58	0	1.9	4.46
	FBE18224	187	58	0	2.4	5.62
	FBE23519	240	72	0	1.9	5.68
	FBE23524	240	72	0	2.4	7.15

Table 1.0

DESIGN CRITERIA

Stratco Tuffloor flooring conforms with the following Australian standards:

- AS 4100:1998 Steel Structures.
- AS/NZS 4600:1996 Cold-formed Steel Structures.
- AS/NZS 1170:2002 Structural Design Actions.
- AS 3623:1993 Domestic Metal Framing.

Stratco Tuffloor Flooring complies with the static and dynamic response requirements imposed by AS 3623 – Domestic Metal Framing. The maximum serviceability deflection of the floor is limited to $L/360$ but kept to less than a maximum of 12mm.

The Roof Load Width is the effective width of roof that the bearer is supporting. Figure 1.0 shows a simplified method for determining the Roof Load Width.

Refer to Stratco for load conditions and spans outside the limits of these tables. Footings, columns, bracing and the tie down should be designed by an independent engineer.

The following design loads are used in the determination of the span tables:

- Floor loads:
- 2.0 kPa, live load.
 - 0.6 kPa, dead load.
 - 1.8 kN, concentrated load.
- Roof loads:
- 0.9 kPa dead load for a tiled roof.
 - 0.3 kPa dead load for a steel roof.
 - 0.25 kPa live load.
- Wall loads:
- 0.8 kN/m dead load

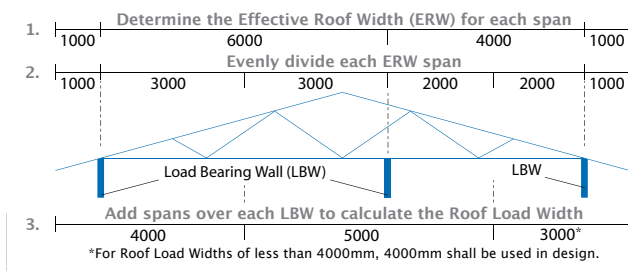


Figure 1.0

JOISTS

Joist members are to be simply supported between bearers and should be used with bearers of the same depth. Spans for joist spacings less than 450mm should be based on 450mm.

- Load bearing walls may be parallel or perpendicular to the joists.
- Ground floor joists shall not support the first floor. Joists are not designed to support additional floor loads from upper level floors.
- When a load bearing wall is parallel to the joists, a joist shall be located directly under the wall.
- A load bearing wall which is perpendicular to joists must end directly over a joist.
- Joists should be fixed to the bearers using one of the methods shown in figures 3.1 to 3.4.
- All joists supporting load bearing walls shall be fixed using angle brackets.
- Angle brackets will need to be fixed using six 12x20 screws.
- An angle bracket must be used where the joist is not perpendicular to the bearer. The joist shall be positioned such that the web is flush with the bearer.
- Note: Load bearing walls refer to timber or steel framed walls only.

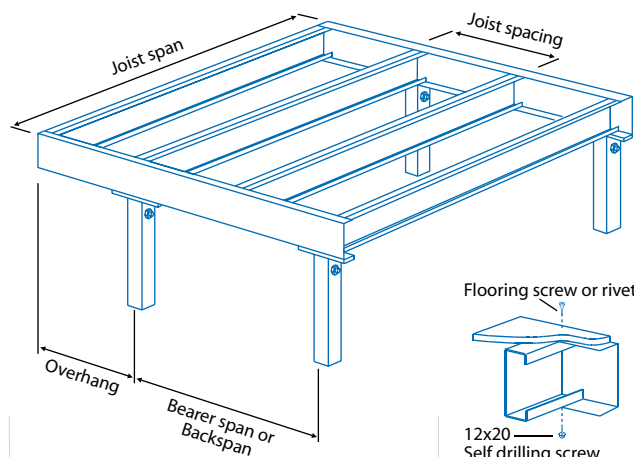


Figure 3.0

Figure 3.1

JOISTS NOT SUPPORTING A ROOF LOAD

MAXIMUM JOIST SPAN mm – Not Supporting Load Bearing Walls

JOIST	JOIST SPACING	
	450mm	600mm
FJO18212	3300	2750
FJO18215	3750	3600
FJO18219	4350	4000
FJO18224	4550	4250
FJO23515	4700	4400
FJO23519	5400	5200
FJO23524	5500	5400

Interpolation may be used for intermediate values

Table 2.0

JOISTS SUPPORTING A ROOF LOAD

MAXIMUM JOIST SPAN mm – Supporting Load Bearing Walls

JOIST	STEEL ROOF	TILED ROOF
	FJO18212	2250
FJO18215	2450	2100
FJO18219	2650	2150
FJO18224	2900	2400
FJO23515	3000	2650
FJO23519	3350	2750
FJO23524	3650	3000

Max 450mm joist spacing, where load bearing walls are not parallel to joists

Table 2.1

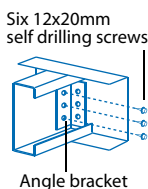


Figure 3.2

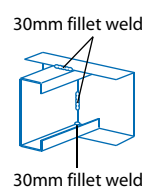


Figure 3.3

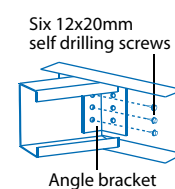


Figure 3.4

BEARERS

Bearers are used to transfer the loads from the floor and roof into the floor support system.

- Only bearers are permitted to be attached to the floor support system.
- There are no requirements for maximum spans when the bearers are supported continuously.
- For back to back bearers with different joist spans either side, the average of the spans shall be used to determine the maximum bearer span.
- When joist spans vary, such as in the case of an angled bearer, the joist span shall be taken as the average length of the joists connected to the bearer.
- To calculate spans for ground floor bearers supporting walls of a two storey construction, the joist span shall be taken as the maximum of second storey and ground floor joist spans. The maximum ground floor bearer spans are then to be reduced by 20 percent.
- Bearers which support a load bearing wall directly or bearers attached to joists supporting a load bearing wall shall be treated as supporting roof loads. These bearers must be of 2.4mm material thickness.
- Bearer overhangs shall not exceed 20 percent of the allowable span under the same loading conditions, or the actual back-span, whichever is lesser.
- If a bearer is supporting roof loads through joists, a Roof Load Width of 8000mm shall be used to determine the bearer spans.
- For supported Roof Load Widths of less than 4000mm the maximum bearer spans for a 4000mm supported width shall be used.
- For a substantial serviceability increase, bearers should be continuous over at least one support.

BEARERS NOT SUPPORTING A ROOF LOAD

Joist Span mm	MAX INTERNAL & PERIMETER BEARER SPAN mm			
	Not supporting load bearing walls or fixed to joists supporting load bearing walls			
	FBE18219	FBE18224	FBE23519	FBE23524
0	4350	4550	5400	5500
1200	3380	3650	4250	4650
1800	2950	3200	3700	4050
2400	2650	2700	3350	3700
3000	2450	2550	3100	3400
3600	2300	2400	2950	3200
4200	2200	2300	2800	3050
4800	2100	2200	2650	2900
5400	—	—	2550	2800
6000	—	—	2450	2700

Interpolation may be used for intermediate values

Table 3.0

BEARERS SUPPORTING A STEEL ROOF

MAXIMUM INTERNAL & PERIMETER BEARER SPAN mm

Supporting load bearing walls or fixed to joists supporting load bearing walls

Joist Span mm	FBE18224 Roof Load Width mm			FBE23524 Roof Load Width mm		
	4000	6000	8000	4000	6000	8000
0	3400	3100	2900	4300	3900	3650
2400	2900	2800	2650	3700	3550	3350
3000	2700	2700	2600	3400	3400	3300
3600	2550	2550	2550	3200	3200	3200
4200	2400	2400	2400	3050	3050	3050
4800	2300	2300	2300	2900	2900	2900
5400	—	—	—	2800	2800	2800
6000	—	—	—	2700	2700	2700

Interpolation may be used for intermediate values

Table 3.1

BEARERS SUPPORTING A TILED ROOF

MAXIMUM INTERNAL & PERIMETER BEARER SPAN mm - Supporting load bearing walls or fixed to joists supporting load bearing walls

Joist Span mm	FBE18224 Roof Load Width mm			FBE23524 Roof Load Width mm		
	4000	6000	8000	4000	6000	8000
0	2900	2600	2400	3650	3250	3000
2400	2650	2450	2250	3350	3100	2850
3000	2600	2400	2250	3300	3050	2850
3600	2550	2350	2200	3200	3000	2800
4200	2400	2350	2200	3050	2950	2700
4800	2300	2300	2150	2900	2850	2650
5400	—	—	—	2800	2750	2600
6000	—	—	—	2700	2700	2500

Interpolation may be used for intermediate values

Table 3.2

CONNECTIONS

Subfloor

Stratco can supply column caps and base plates to suit 65, 75 and 100mm SHS steel columns. The caps shall be fixed to the bearer using two M10 bolts or four 12x20mm self drilling screws and to the column using one M12 bolt or eight 12x20mm self drilling screws, see figure 4.0. For back to back bearers two bolts or four screws per bearer are required.

For masonry or concrete piers an M12 starter rod shall be installed into the pier and fixed through the bearer, refer to figure 4.1. When back to back bearers are used over a masonry or concrete pier, only one bolt is required.

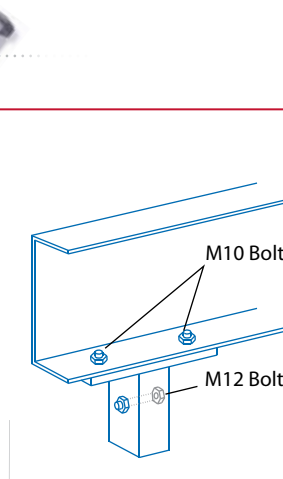


Figure 4.0

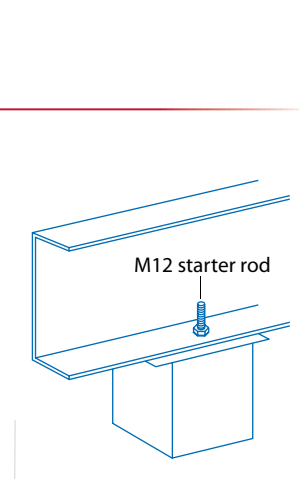


Figure 4.1

Concentrated Load

Concentrated loads will occur when the bearers are not supported continuously along their full length, such as at the location of a post. In this situation a web strengthening bracket shall be installed to transfer the load into the beam, as shown in figure 5.0.

Web strengthening brackets will need to be fastened to 182mm bearers, with six 12x20mm screws and to 235mm bearers with eight 12x20mm screws.

For back to back bearers over a support only one bracket is required. Where a joist interferes with the positioning of a web strengthening bracket, the web strengthening bracket may be omitted and the joist fixed with a joist angle bracket, refer to figure 5.1. All brackets shall be positioned to be flush with the bottom flange of the bearer.

Joining Bearers

Where bearers are joined, the join shall occur directly over a support. In the case where bearers are inline, they shall be fixed over the support using the web strengthening bracket as shown in figure 5.2. Screws are to be located on either side of the join.

Where bearers are connected at a corner, a bearer angle bracket shall be used, as shown in figure 5.3. Each bracket shall be fixed using four 12x20mm self drilling screws per bearer, at 40mm centres. Where an angle bracket is used there is no requirement for a web strengthening bracket. Back to back bearers will need to be fixed together with three 12x20mm screws at the location of each joist. For perimeter bearers it may be necessary to install the screws from the outside in for a neater finish.

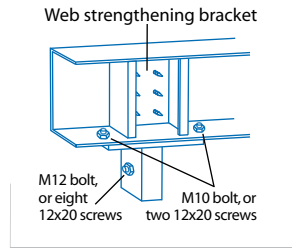


Figure 5.0

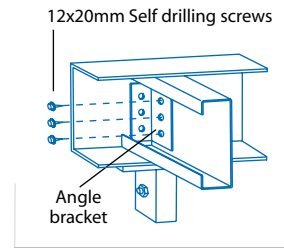


Figure 5.1

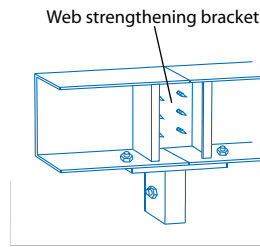


Figure 5.2

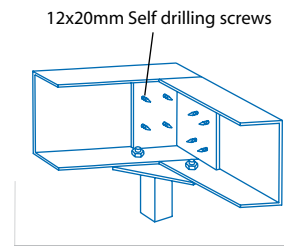


Figure 5.3

Wall Framing

Load bearing walls which run in the same direction as bearers or joists must be positioned directly above the bearers or joist. Walls shall be fixed in accordance with the designer of the wall frames. The ends of the load bearing walls which are perpendicular to joists shall finish over a joist or bearer.

There are no requirements for positioning non load bearing walls on the floor panels except where they act as bracing walls, which are treated as load bearing walls.



SERVICES

Service Holes

The bearer and joists are designed so holes may be cut to enable services to pass. The table below shows the maximum hole diameters and the minimum distance from a support or the end of a member a hole can be drilled (see figure 6.0). No services shall pass through the flange. For brass or copper piping, rubber gromets are required.

Member Size	Maximum Hole Diameter	Minimum Support & End Distance
FBE182XX FJO182XX	90mm	370mm
FBE235XX FJO233XX	115mm	470mm

The minimum spacing between holes is three times the diameter of the holes.

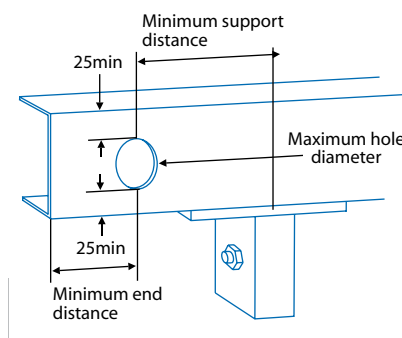


Figure 6.0

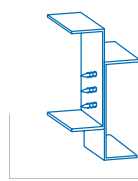


Figure 6.1

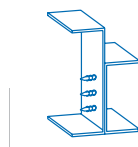


Figure 6.2

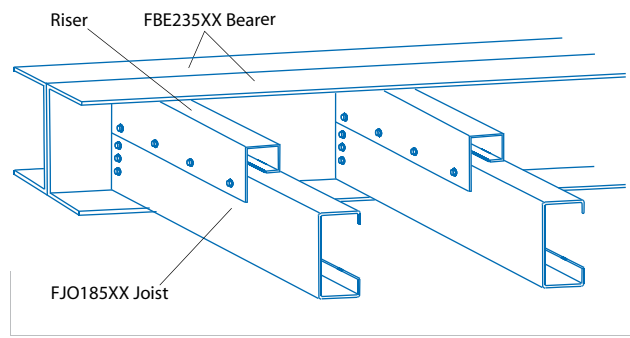


Figure 6.3

Wet Areas

For set down areas, bearers can be offset a maximum of 50mm. Bearers shall be fixed together using three 12x20mm screws at each joist as shown in figure 6.1. In this configuration only the higher bearer needs to be fixed to a support. If it is unsuitable to have bearers at the edge of wet areas, 182mm joists can be used in conjunction with 235mm bearers to obtain the set down.

For sections where the floor is not set down, 50mm risers can be fixed to the top of the joists using 12x20mm screws at 250mm spacing, as shown in figure 6.3. The joists will need to be fixed to the bearers using an angle bracket. Joist risers are manufactured from 1.6mm galvanised material.

CONTACT

1300 165 165

This example goes through a basic design for the floor of a steel roofed house with no eaves, using 185mm deep sections, with joists spaced at 450mm centres (figure 7.0).

The plan is divided up into rectangular areas. These areas are indicated below. Each area is then examined to determine the joists and bearers required. The column positions can also be calculated at this stage.

Area One and Two

Joists that are not supporting load bearing walls, have a joist span of 2700mm, with a joist spacing of 450mm, use FJO18212 (refer to table 2.0). Bearer under a load bearing wall, with a supported roof load width of 3500mm, (worst case for area one), and 2700mm (worst case for area two). In both cases use an FBE18224 bearer with a maximum support spacing of 2800mm (refer to table 3.1). Side bearer that is supporting a load bearing wall with a joist span of 0mm, use an FBE18224 bearer (refer to table 3.1).

Area Three

Joists that are not supporting load bearing walls, have a joist span of 4300mm, with a joist spacing of 450mm, use FJO18219 (refer to table 2.0). Bearer under a load bearing wall, with a supported roof load width of 3500mm (worst case), use an FBE18224 bearer with a maximum support spacing of 2800mm (see table 3.1). Side bearer that is supporting a load bearing wall with a joist span of 0mm, use an FBE18224 bearer (see table 3.1).

Area Four

Joists that are supporting load bearing walls, have a joist span of 2700mm, with a joist spacing of 450mm, use FJO18224 (refer to table 2.1). Bearer under a load bearing wall, with a supported roof load width of 1050mm, use an FBE18224 bearer, with a maximum support spacing of 2800mm (refer to table 3.1). Side bearer that is supporting a load bearing wall with a joist span of 0mm, use an FBE18224 bearer (refer to table 3.1).

Internal Bearer

Bearers are fixed to joists that are supporting load bearing walls, with an average joist span of 3500mm (worst case). Using a roof load width of 8000mm, use FBE18224 bearers with a maximum support spacing of 2550mm (refer to table 3.1).

A bearer is not required for separating areas two and three as it would be parallel to the joists and there are no load bearing walls in this location. To simplify the installation of floor panels it is recommended that joists are all running in the same direction.

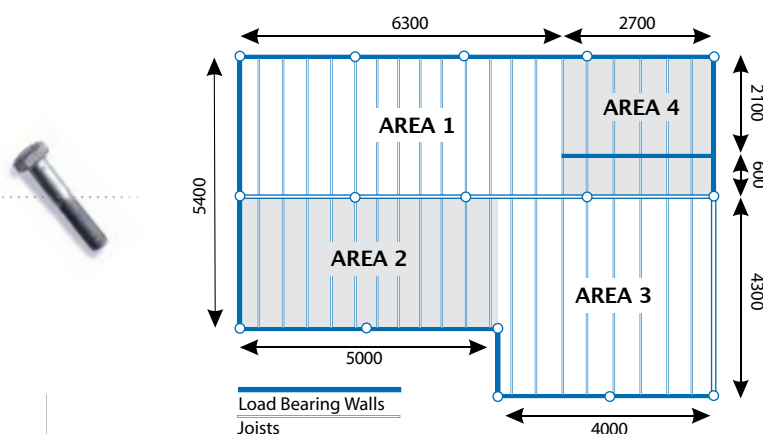


Figure 7.0

MAINTENANCE REQUIREMENTS

Whilst all sections of the Stratco Steel Flooring System are galvanised to minimise corrosion, adequate ventilation should be provided where the system is subjected to humid conditions, e.g. close to the ground.

If joists are used externally, especially in corrosive environments such as coastal or industrial areas, paint protection is recommended. The floor frame will need to be electrically grounded. Refer to a qualified electrician for more information.

It is recommended that this brochure is read with the "Selection, Use and Maintenance" brochure.