Shallow Composite Floor Decks

Design information

Composite floor decking design is generally dictated by the construction stage condition, the load and span required for service, and the fire resistance required for the slab. Deck design is also influenced by the composite beam design.

Design Parameters

- **Fire rating** – dictates minimum slab depth.
- **Concrete type** – also dictates minimum slab depth and influences unpropped deck span.
- **Deck span** – (unpropped) usually dictates general beam spacing.
- **Slab span** – (propped deck) dictates maximum beam spacing.

Two Stage Design

All Composite Floors must be considered in two stages.

- **Wet Concrete and construction load**
  – carried by deck alone.
- **Cured concrete**
  – carried by composite slab.

General design aims

Designers generally aim to reduce temporary propping, so the span and slab depth required governs the deck selection. Fire requirements usually dictate slab depth. For most applications, the imposed load on the slab will not limit the design.

Anti-crack mesh

FibreDeck can be used to replace anti crack mesh. Where mesh is used, BS 5950: Part 4 recommends that it comprises 0.1% of slab area. Eurocode 4 recommends that anti-crack mesh should be made up from 0.2% of slab area for unpropped spans and 0.4% of slab area for propped spans. The mesh shown in the quick reference tables complies with EC4 and the design program defaults to these values. You can still use the reduced BS mesh values by overriding this default in the design program. In slabs subject to line loads, the mesh should comprise 0.4% of the cross-sectional area of the concrete topping, propped and unpropped. These limits ensure adequate crack control in visually exposed applications (0.5 mm maximum crack width). The mesh reinforcement should be positioned at a maximum of 30 mm from the top surface. Elsewhere, 0.1% reinforcement may be used to distribute local loads on the slab (or 0.2% to EC4). Mesh laps are to be 300mm for A142 mesh and 400mm for A193, A252 & A393.

Using forklift trucks

If you expect to use a forklift truck - or a similar concentrated loading - then you should use 0.5% minimum percentage reinforcement over the supports and 0.2% elsewhere to control cracking. See SCI AD150 for further information.

Working on exposed floors

Composite floors are usually covered by finishes, flooring or a computer floor, and because cracking is not visible, light top reinforcement is adequate - typically 0.1% of the gross cross sectional area. However where the composite slab is left uncovered - such as for power- trowelled floor finishes - cracking, particularly over the beams, may not be adequately controlled by the light mesh provided. Although the cracking does not have any structural significance, you might see its appearance - and the possibility of the crack edge breakdown under traffic - as problems. To address this, refer to Concrete Society publication, 'Cracking In Composite Concrete/Corrugated Metal Decking Floors Slabs' which provides valid mesh sizing and detailing for specific crack width control.

If you are going to use forklifts you should also refer to Steel Construction Institute advisory note 'AD 150, Composite Floors - Wheel Loads From Forklifts'.

Reduced mesh

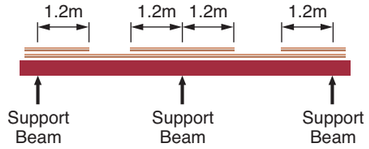


Diagram showing full mesh area over supports

If you are going to use EC4 mesh rules - as recommended by Steel Construction Institute and CMF - the full stipulated mesh applies to the slab 1.2m either side of every support. Elsewhere – such as in the midspan area – you may half the mesh area (to 0.2% for propped and 0.1% for unpropped construction), as long as there are no concentrated loads, openings or similar to be considered. You must also check the reduced midspan mesh for adequacy under fire, for the rating required.

Bar reinforcement

The axis distance of bar reinforcement defines the distance from the bottom of the ribs to the centre of the bar, which has a minimum value of 25 mm, and a maximum value of the profile height. Where used, bar reinforcement is placed at one bar per profile trough.

Transverse reinforcement

MetFloor® composite floor decks contribute to transverse reinforcement of the composite beam, as long as the decking is either continuous across the top flange of the steel beam or – alternatively - it is welded to the steel beam by stud shear connectors. To find out more refer to BS5950:Part 3: Section 3.1.Clause 5.6.4.

Choosing the concrete

Lightweight concrete (LWC) uses artificially produced aggregate such as expanded pulverised fuel ash pellets. This gives LWC considerable advantages in improved fire performance, reduced slab depth, longer unpropped spans and reduced dead load.

However, at the present time, LWC is not readily available in some parts of the country. Normal weight concrete uses a natural aggregate and is widely available. The strength of the concrete must meet the requirements for strength of the composite slab and should not be less than 25N/mm² for LWC or 30N/mm² for NWC. Similarly, the maximum value of concrete strength should not be taken as greater than 40 for LWC or 50 for NWC.

The modular ratio defines the ratio of the elastic modulus of steel to concrete, as modified for creep in the concrete. In design to BS5950 and BS8110, the cube strength is used (in N/mm²). In design to EC3, the cylinder strength is used (in N/mm²). The concrete grade (C30/37) defines the (cylinder/cube strength) to EC3.

Concrete density

Density kg/m³			
	Wet	**Dry**	**Modular Ratio**
LWC	1900	1800	15
NWC	2400	2350	10

Without the precise information you should assume that wet density is used in the design of the profiled steel sheets and that dry density in the design of the composite slab.

Fire Design

Fire insulation

You must take the fire insulation requirements of BS 5950: Part 8 into account in the tables and design software.

Span/depth ratio

Slab span to depth ratio is limited to a maximum of 30 for lightweight concrete and 35 for normal weight concrete.

Shear connectors in fire situation

If shear connectors are provided you can ignore any catenary forces transferred from the slab to the support beams within the fire resistance periods quoted.

Fire Design Methods

There are two requirements here:

- Bending resistance in fire conditions
- Minimum slab depth for insulation purposes

You can calculate the capacity of the composite slab in fire using the **simple method** or the **fire engineering method**:

Simple method

The simple method is most economic and can be used for simply supported decks or for decks continuous over one or more internal supports. The capacity assessment in fire is based on a single or double layer of standard mesh. Any bar reinforcement is ignored.

Fire engineering method

The fire engineering method is for general application and should be used for design to Eurocodes. The capacity assessment in fire is based on a single or double layer of standard mesh at the top and one bar in each concrete rib. For the shallow decks, the program assumes the bar is positioned just below the top of the steel deck. For MetFloor® 60 with a raised dovetail in the crest the bar will be placed below the dovetail.

The quick reference tables for shallow composite floors generally use the simplified fire design method, which utilises the anticrack mesh as fire reinforcement. You can increase load span capability under fire by including bar reinforcement and using the fire engineering design method.

Deflection limits

You would normally agree deflection limits with the client. In the absence of precise information adopt the following limits:

- **Construction stage**
  Le/130 (but not greater than 30mm)
- **Imposed load deflection**
  Le/350 (but not greater than 20mm)
- **Total load deflection**
  Le/250 (but not greater than 30mm)

According to BS5950 Part 4, ponding, resulting from the deflection of the decking is only taken into account if the construction stage deflection exceeds Ds/10. Le is the effective span of the deck and Ds is the slab overall depth (excluding non-structural screeds).

When the ponding of the concrete slab is not taken into account, the deflection under construction load should not exceed the span/180 or 20mm overall – whichever is the lesser.

Where ponding is taken into account the deflection should not exceed the span/130 or 30mm overall. The quick reference tables do take ponding into account, if deflection exceeds Ds/10, or Le/180, and thus use span/130 or 30mm as a deflection limit. We recommend that the prop width should not be less than 100mm otherwise the deck may mark slightly at prop lines.

Vibration

Check the dynamic sensitivity of the composite slab by referring to the Steel Construction Institute publication P076: Design guide on the vibration of floors. Calculate the natural frequency using the self-weight of the slab, ceiling and services, screed and 10% imposed loads, representing the permanent loads and the floor.

Where there is no specific information you should ensure that the natural frequency of the composite slab is not greater than 5Hz for normal office, industrial or domestic usage. For applications such as dance floors or those which support sensitive machinery you may need to set the limit higher.

For design to the Eurocodes, the loads considered for the vibration check are increased using the psi-factor for imposed loads (typically 0.5). You can reduce the natural frequency limit to 4Hz, because of the higher load used in the calculation. To determine the vibration response of sensitive floors with greater accuracy look at the calculation methods in the SCI / CMF publication P354 "Design of Floors for Vibration: A New Approach". These figures enable designers to compare the response with the acceptance levels in BS 6472 and ISO 10137 for building designs and in the NHS performance standard for hospitals, HTM 2045.

Shallow Composite Floor Decks

Design information

Loads and load arrangement

Ordinarily you would agree loading information directly with your clients. You should also refer to BS 6399 and to EC1. Factored loads are considered at the ultimate limit state and unfactored loads at the serviceability limit state. Unfactored loads are also considered in fire conditions. Partial factors are taken from BS5950, EC3 and EC4.

Loads considered at the construction stage consist of the slab self weight and the basic construction load. The basic construction load is taken as 1.5 kN/m² or 4.5/Lp (whichever is greater), where Lp is the span of the profiled steel sheets between effective supports in metres. For multi-span unpropped construction the basic construction load of 1.5 kN/m² is considered over the one span only. On other spans, the construction load considered is half this value (i.e. 0.75 kN/m²). Construction loads are considered as imposed loads for this check.

Loads considered at the normal service stage consist of the slab self weight, superimposed dead loads and imposed loads.

Openings

You can accommodate openings easily in composite slabs by boxing out before pouring the concrete and cutting out the deck after the concrete has cured (see the 'Sitework' section on page 39).

The design of openings depends on their size:

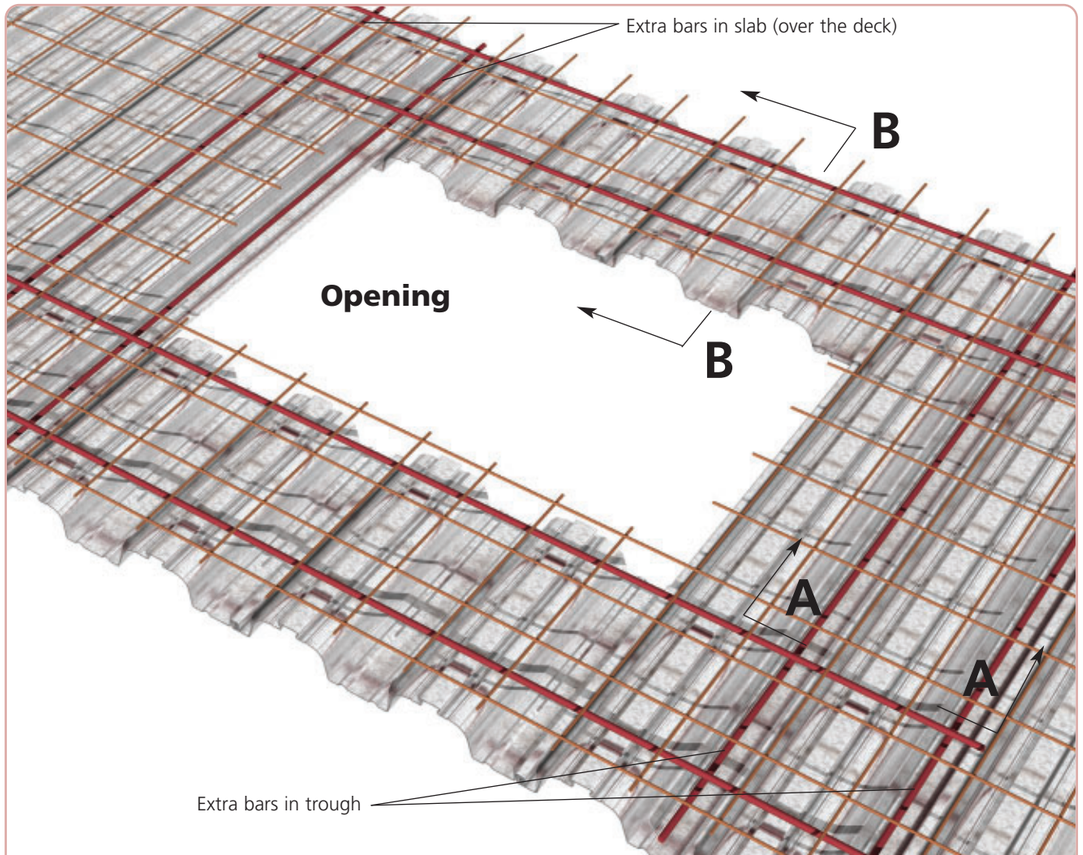
- **Small**
  For openings up to 300 mm square there is normally no need for any additional reinforcement.
- **Medium**
  Openings between 300 mm and 700 mm square normally require additional reinforcement to be placed in the slab. This is also true if the openings are placed close together.
- **Large**
  You should trim openings greater than 700mm square with additional permanent steelwork back to the support beams.

Opening rules

Where W = width of opening across the span of the deck.

1. The distance between the opening and unsupported edge must be greater than 500mm or W, whichever is the greater.
2. Openings must not be closer together than 1.5W (of the largest opening) or 300mm, whichever is the greater. If they are closer they must be considered as one opening.
3. Not more than 1/4 width of any bay is to be removed by openings.
4. Not more than 1/4 width of deck span is to be removed by openings.

Where these rules are not met the openings must be fully trimmed with support steelwork.



Shallow Composite Floor Decks

Design information

If the opening falls within the usual effective breadth of concrete flange of any composite beams (typically span/8 each side of the beam centre line), check the beam resistance assuming an appropriately reduced effective breadth of slab.

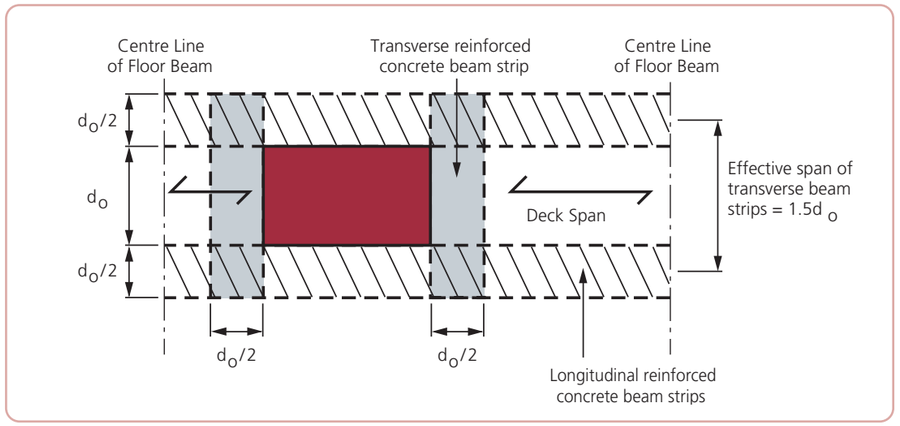
Slab design around openings

You should assume that an effective system of 'beam strips' span the perimeter of the opening. Take the effective breadth of the beam strips to be do/2 where do is the width of the opening in the direction transverse to the decking ribs. Only the concrete above the ribs is effective.

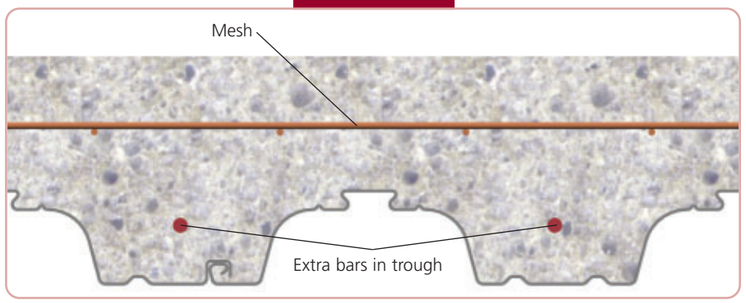
The transverse beam strips are assumed to be simply supported and span a distance of 1.5 do. The longitudinal beam strips are designed to resist the load from the transverse beam strips in addition to their own proportion of the loading.

Reinforcement

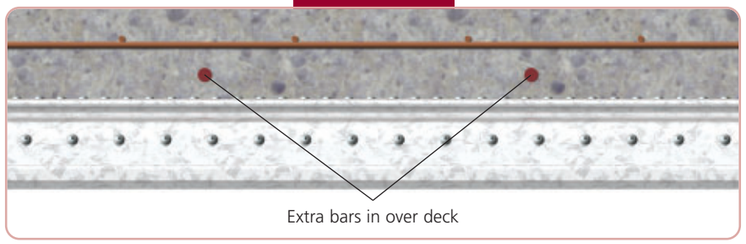
Extra reinforcement is provided within the 'beam strips' to suit the applied loading. This reinforcement often takes the form of bars placed in the troughs of the decking. You can use additional transverse or diagonal bars to improve load transfer around the opening.



Section A-A



Section B-B



Shallow Composite Floor Decks

Design information

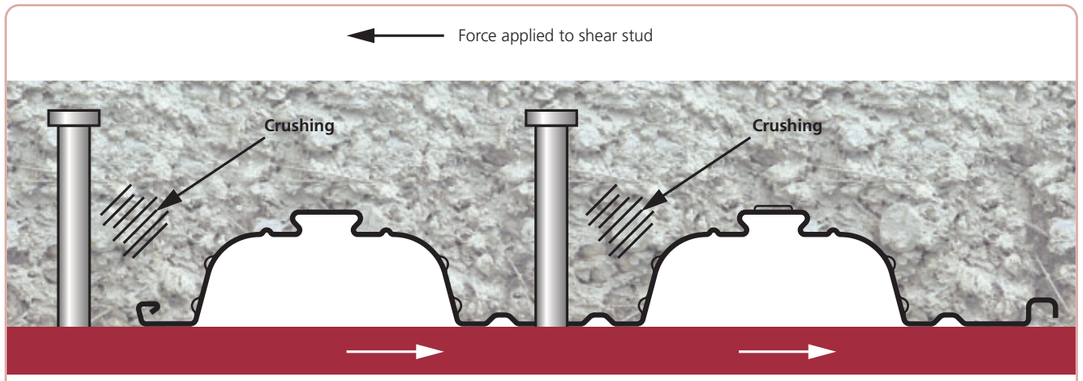
Shear stud design

You can make up to 50% savings in beam weight if composite slab is effectively anchored to the steel beam. The slab will then act as a compression flange to the beam.

The slab and beam are generally connected by through-deck welding of 19mm diameter shear studs of varying height which are fixed to the beam after the decking has been laid.

Shear stud specification

- 19mm x 95mm studs are used with MetFloor® 55 and MetFloor® 60
- 19mm x 125mm studs are used with MetFloor® 80



Shallow Composite Floor Decks

Design information

Headed studs

When deck profile ribs are running perpendicular to the steel beam – that is compositely connected to the composite slab – you should take the capacity of headed studs as capacity in a solid slab but multiplied by the reduction factor "k". The calculation method for "k" differs between BS5950 Part 3 and Eurocode 4.

Deck suitability

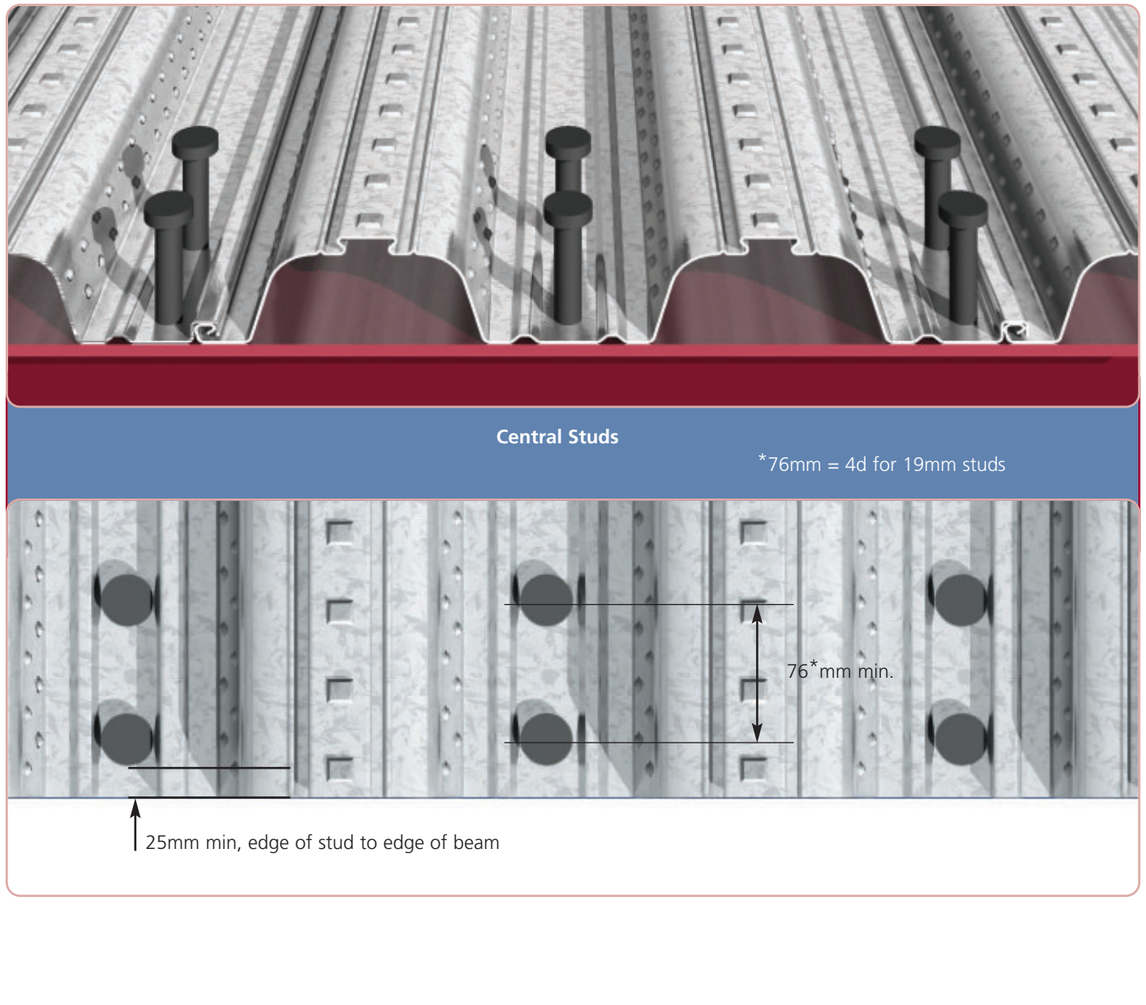
You cannot place shear studs on profile stiffeners. However, with MetFloor® 60 and MetFloor® 80 the position of the stiffeners and side lap lets you place the studs centrally.

Non-welded shear connectors

You can use Hilti shear connectors. For further information refer to Hilti.

Design notes

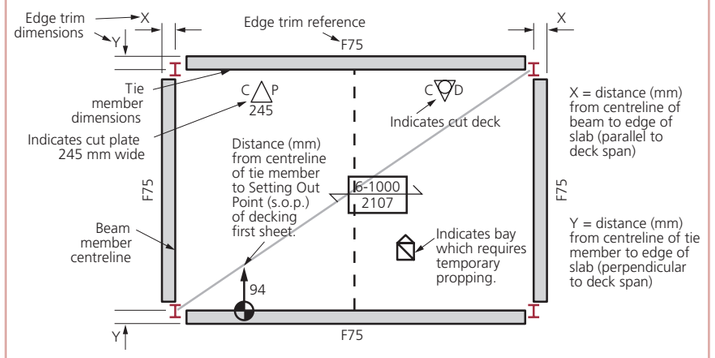
For further reference please see The Steel Construction Institute/Metal Cladding and Roofing Manufacturers Association P300 "Composite Slabs and Beams using Steel Decking: Best Practice for Design and Construction".



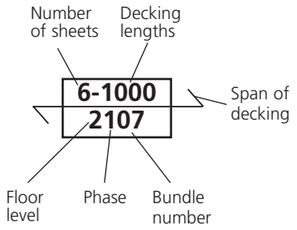
Shallow Composite Floor Decks

Construction details

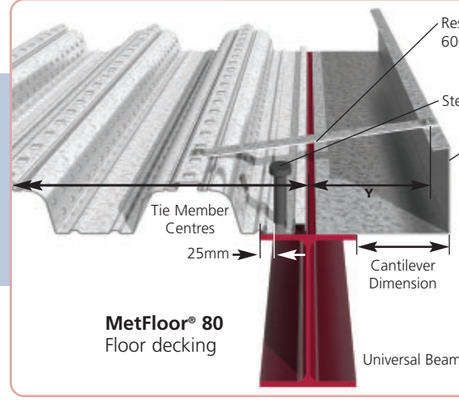
Plan view of typical floor layout



Deck notation



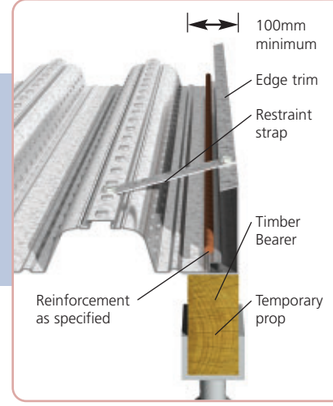
Typical side detail



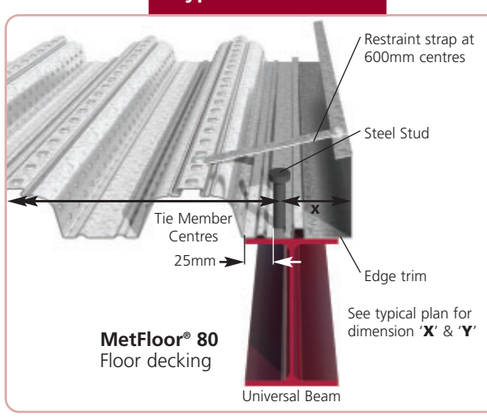
MetFloor® 80
Floor decking

For cantilevers over 150mm, additional reinforcement is required. See table on page 39 for maximum cantilevers without props.

Unsupported edge detail



Typical side detail



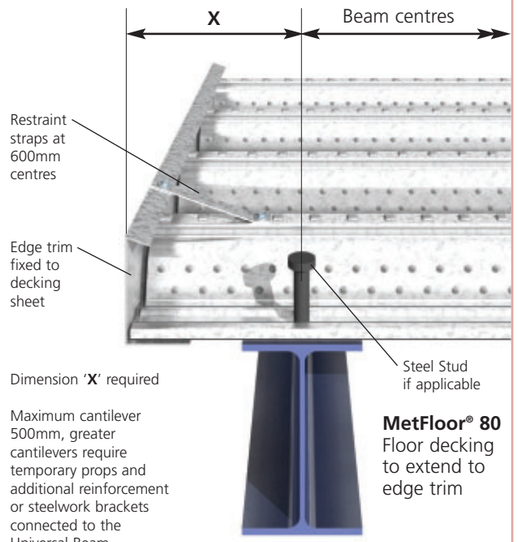
MetFloor® 80
Floor decking

See typical plan for dimension '**X**' & '**Y**'

Shallow Composite Floor Decks

Construction details

Typical end cantilever

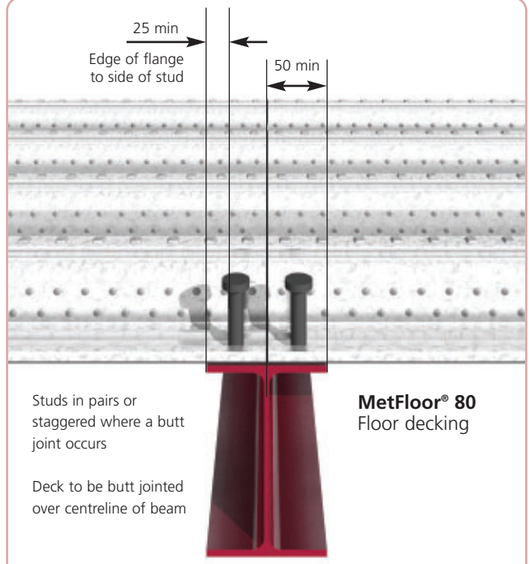


Dimension '**X**' required

Maximum cantilever 500mm, greater cantilevers require temporary props and additional reinforcement or steelwork brackets connected to the Universal Beam

MetFloor® 80
Floor decking to extend to edge trim

Butt Joint

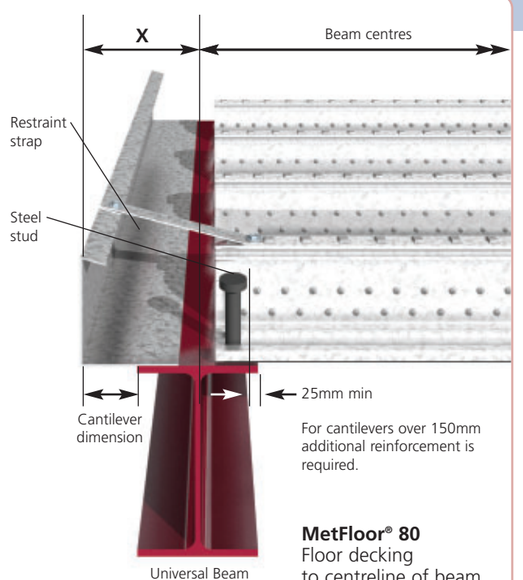


Studs in pairs or staggered where a butt joint occurs

Deck to be butt jointed over centreline of beam

MetFloor® 80
Floor decking

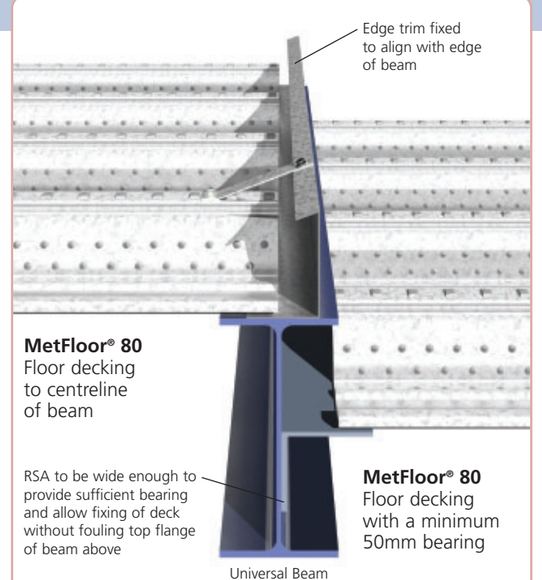
End detail



For cantilevers over 150mm additional reinforcement is required.

MetFloor® 80
Floor decking to centreline of beam

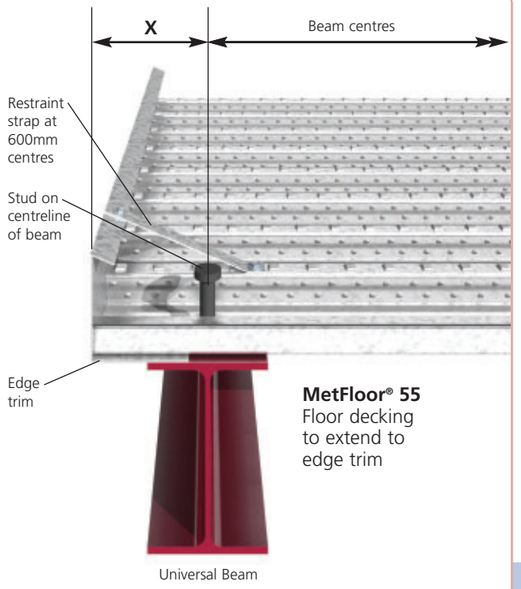
Step in floor



Shallow Composite Floor Decks

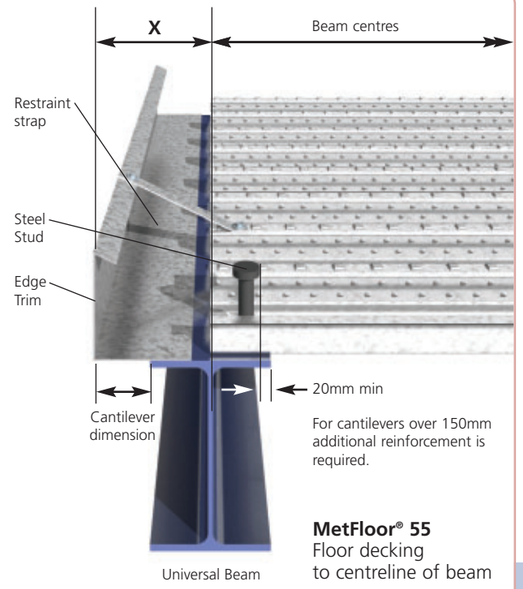
Construction details

End detail alternative 1



MetFloor® 55
Floor decking to extend to edge trim

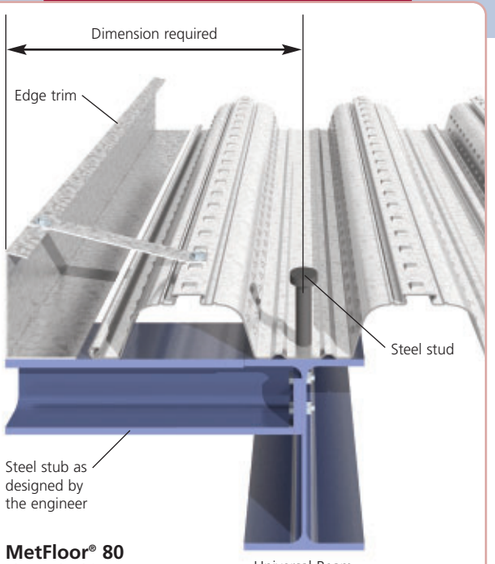
End detail alternative 2



For cantilevers over 150mm additional reinforcement is required.

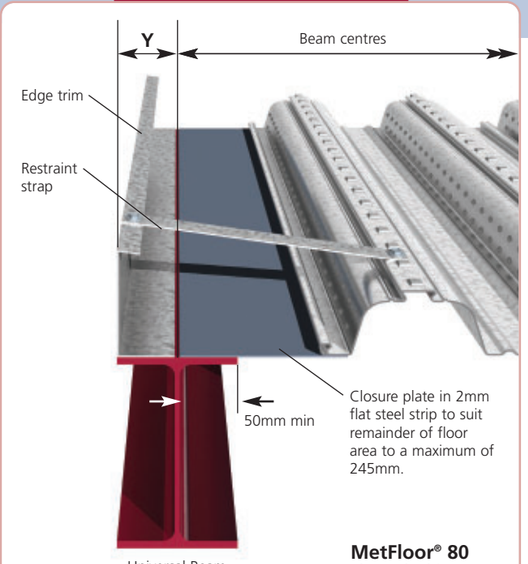
MetFloor® 55
Floor decking to centreline of beam

Side cantilever with stub bracket



MetFloor® 80
Floor decking

Typical edge with plate



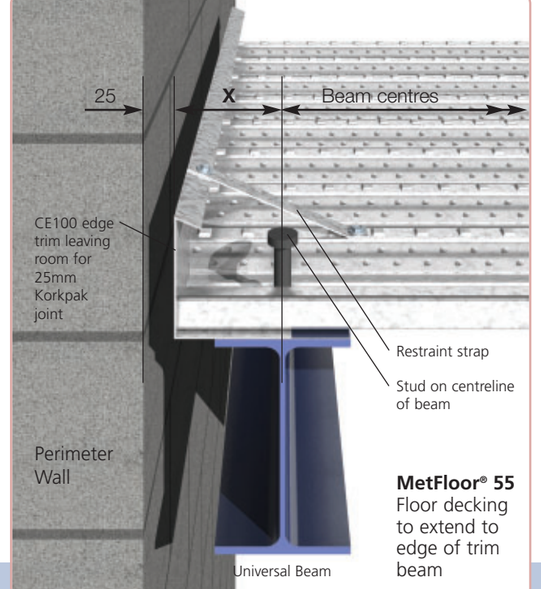
Closure plate in 2mm flat steel strip to suit remainder of floor area to a maximum of 245mm.

MetFloor® 80
Floor decking

Shallow Composite Floor Decks

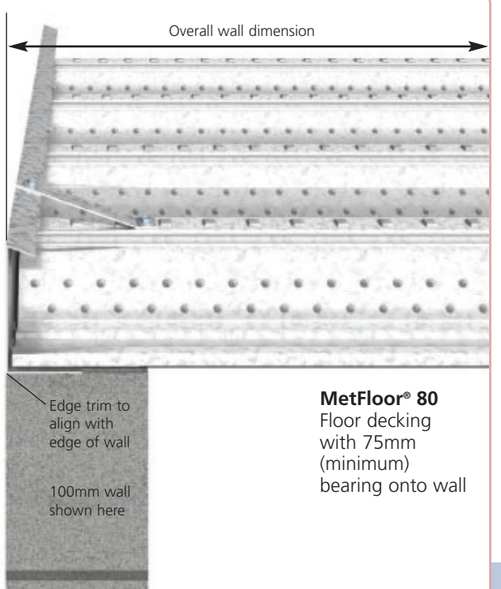
Construction details

Beam at perimeter wall



MetFloor® 55
Floor decking to extend to edge of trim beam

Typical wall end detail

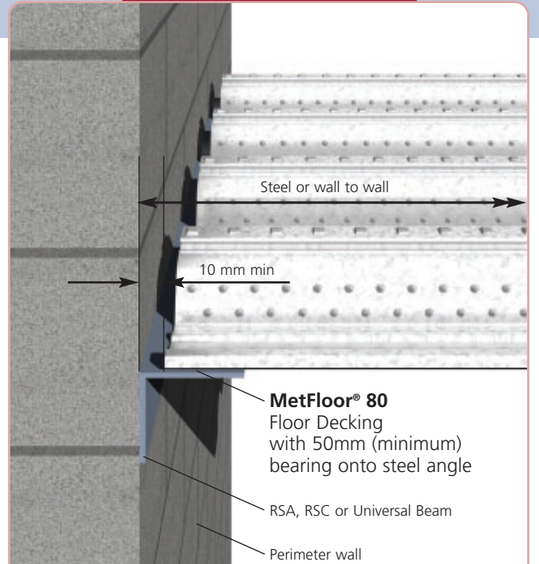


MetFloor® 80
Floor decking with 75mm (minimum) bearing onto wall

Typical wall side detail

MetFloor® 80
with 75mm (minimum) bearing onto wall

Typical Side Detail



MetFloor® 80
Floor Decking with 50mm (minimum) bearing onto steel angle

Shallow Composite Floor Decks

Sitework

Deck fixing

As soon as you lay the deck fix it through its trough to the top of the supporting structure using powder actuated pins or self-drilling screws. Use side lap fixings at 1000mm centres for MetFloor® 60 and MetFloor® 80. Where shear studs are being used the deck needs two fixings per sheet per support at sheet ends and one fixing per sheet at intermediate supports.

Fixing Information for Shallow Decking	
To Steel	Heavy duty powder actuated fixings - Hilti ENP2 X-ENP-19 L15 nail/Spit SBR14 or equivalent. For temporary fixing (i.e. where weld through shear studs are to be used) - Hilti PINDAK16*
	Self-drilling screws. To steel up to 11mm thick - SFS SD14 - 5.5 x 32 / EJOT HS 38 or equivalent. To steel up to 17mm thick SFS TDC-T-6.3 x 38 or equivalent
To Masonry or Concrete	Pre drill hole - use self tapping fixing suitable for masonry/ concrete - SFS TB-T range/EJOT 4H32 or equivalent
To side laps or closures etc.	Self drilling stitching screw typically SFS SL range / EJOT SF25 or equivalent

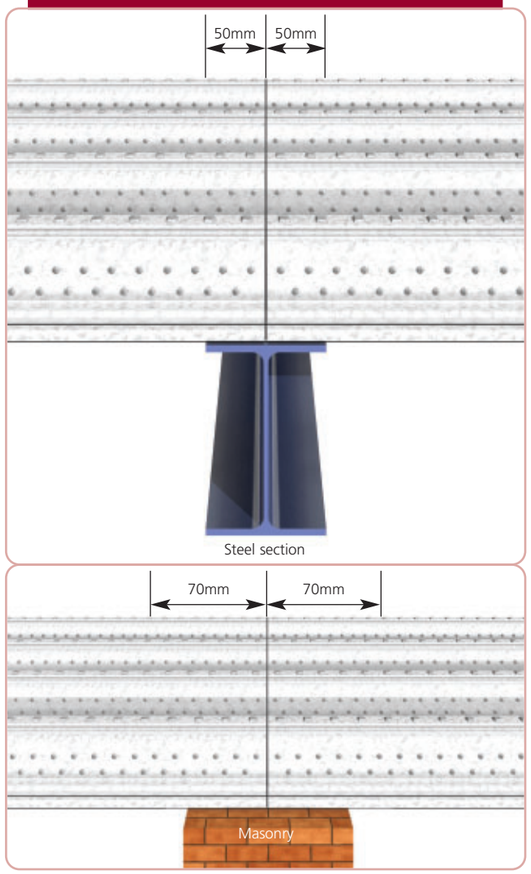
Deck fixing on MetFloor® 80

Shallow Composite Floor Decks

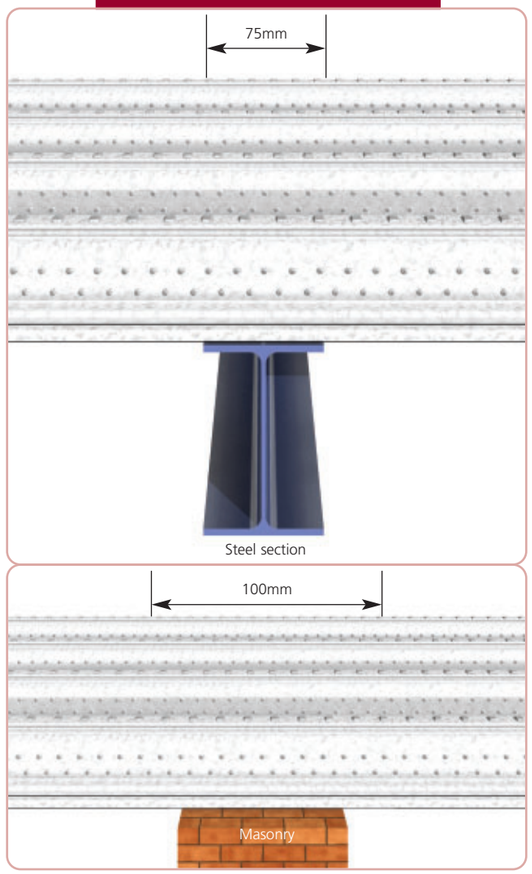
Sitework

Bearing requirements

End bearing and shared bearing (minimum)



Continuous bearing (minimum)

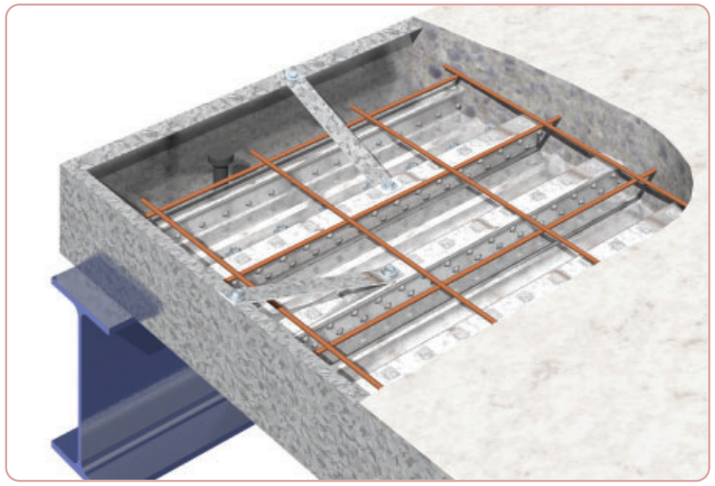


Edge trim

You should use edge trim to maintain the wet concrete at the correct level at the decking perimeters. Fix it to the supports in the same manner as the deck and restrain the top by straps at 600mm centres fixed to the top of the deck profile with steel pop rivets or self-drilling screws.

Edge Trim Selector				
Edge trim depth	Maximum Cantilever (mm) Galv. Steel Edge Trim Thickness (mm) 0.9	1.2	1.6	2.0
130	100	125	160	195
150	50	115	150	185
200	x	100	130	160
250	x	50	100	135
300	x	x	50	100
350	x	x	x	50

x - not recommended



Shallow Composite Floor Decks

Sitework

Shear connectors

The most commonly used shear connectors are 19mm diameter headed studs which are welded to the support beam through the deck by specialist stud welding contractors.

Make sure the site conditions are suitable for welding then carry out bend tests as necessary. The spacing and position of the shear connectors is important and must be defined by the design engineer on the deck set-out drawings.

Minimum Spacing: Ensure that the minimum centre-to spacing of stud shear connectors are 5d along the beam and 4d between adjacent studs, where d is the nominal shank diameter. Where rows of studs are staggered the minimum transverse spacing of longitudinal lines of studs should be 3d. The shear stud should not be closer than 25mm to the edge of the beam. See page 37.

More information

To find out more about shear studs in The Steel Construction Institution publications: P300 Composite Slabs and Beams Using Steel Decking: Best Practice for Design and Construction, P055 Design of Composite Slabs and Beams with Steel Decking.

Placing the mesh

You can utilise FibreFlor in place of anti-crack mesh, which eliminates all mesh position issues. If you use reinforcing mesh ensure that you position it towards the top of the slab.

The top cover to the reinforcement mesh must be \a minimum of 15mm and a maximum of 30mm. Support stools are required to maintain the correct mesh height.

The mesh must be lapped by 300mm for A142 and A193 mesh, and by 400mm for A252 and A393 mesh.

Casting concrete

As dirt and grease could adversely influence the performance of the hardened slab, you should clear the decking before you pour the concrete (the oil left on the decking from the roll forming process may stay). Pour the concrete evenly, working in the direction of span. Take care to avoid heaping concrete in any area during the casting sequence. Construction and day joints should occur over a support beam, preferably also at a deck joint.

Ceilings and services hanger systems

The dovetail shaped re-entrant rib on MetFloor® 55 and the raised mini-dovetail re-entrant stiffener on MetFloor® 60 and MetFloor® 80 profiles let you suspend the ceiling and services quickly and easily.

There are two suspension systems:

(a) Threaded wedge nut fixings

Wedges are dovetail shaped steel blocks threaded to take metric bolts or threaded rods. The wedge nut hanger system is installed after the concrete of the composite slab has been poured and is hardened.

MetFloor® 55

MetFloor® 80

How to install the system

To install the system insert the wedge nuts into the raised re-entrants of the profile before being rotating 90 degrees, after which the dovetail shaped wedge nuts will lock into the dovetail re-entrants under vertical loading. Finger-tighten the bolts or threaded rods up to the roof of the re-entrants and then mechanically tighten.

(b) GTD-clip hangar fixings

GTD-clip hangar fixings are cold formed thin steel hangers with circular openings in the soffit to take metric bolts, threaded rods or further pipe clamp hangers. Install the system after pouring the composite slab and the concrete is sufficiently hardened.

How to install the GTD-clips

To install the GTD-clips compress the two dovetail shaped ends by hand and insert into the dovetail re-entrant of the profile before rotating by 90 degrees. After releasing the two ends the clip will snap into position – make sure it is tightly connected. Finally connect the bolts, threaded rods or pipe clamps into the soffit opening of the GTD-clip.

Shallow Composite Floor Decks

Sitework

Sitework Openings for Shallow Composite Floor Decks

Where openings are greater than 300mm, the engineer must design them and provide extra reinforcement around the opening. Openings can be accommodated up to 700mm in composite slabs by boxing out before pouring concrete and cutting out the deck after the concrete has cured. Larger openings require support trimming steel and these must be installed prior to the decking. Cut the decking away immediately and treat the opening edges like any other perimeter with edge trim.

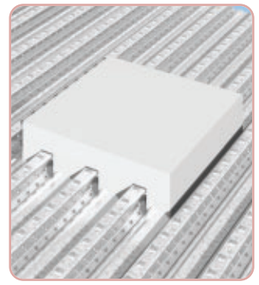
Do not cut the opening in the steel deck before concreting or before the concrete has cured.

Temporary supports

The contractor or designated sub-contractor is responsible for the safe design and installation of temporary props. Where the design calls for temporary supports, these must provide continuous support to the profiled sheeting. Spreader beams (timbers) should be used and supported by temporary props at one metre centres.

- The timbers and props must be of adequate strength and construction
- The temporary supports are placed at midspan or at other suitable centres if more supports per span are required.
- The spreader beams or timbers should provide a minimum bearing width of l00mm.
  The spreaders must not deflect more than 10mm and should be placed narrow edge up, see diagram.
- The propping structure is not to be removed until the concrete has reached at least 70% of its characteristic strength. The horizontal bearer timbers must be at least 100mm wide and should be propped at no more than 1m centres. Sometimes the specification may call for 150mm wide bearers, as determined by the structural engineer or concreting contractor.

Timber Shutter



Dense polystyrene block

The props should be stable without relying on friction with the deck for laterial stability. The end props in a row should be self supporting, and braced to the internal props.

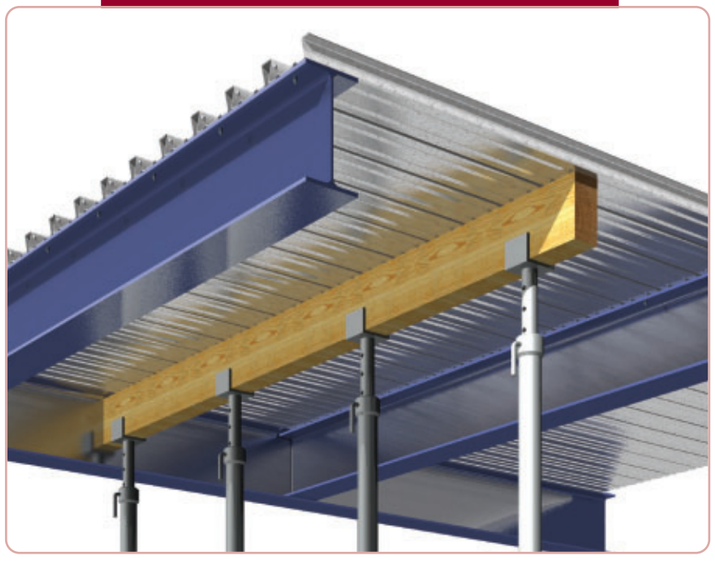
Temporary Props

Timber Bearer Guide (shallow decks) All to be min. 100mm wide	
Slab depth (mm)	**Bearer depth(mm)**
up to120	150
130 - 160	200
170 - 200	250

Percussive drilling

We do not recommend percussive drilling into composite concrete slabs although small-scale rotary hammer drills are fine.

Temporary support using an 'Acrow' type prop



Transport and Handling

MetFloor®

The following instructions are designed to help composite flooring contractors.

Receiving the decking

When you receive the composite floor decking it will be packed into bundles of up to 24 sheets and the sheets secured with metal banding. A single bundle may be up to 950mm wide (the overall width of a single sheet) by 750 mm deep, and may weigh up to 2.5 tonnes, depending on sheet length (average weight is about 1.5 tonnes). The loads will normally delivered by articulated lorries approximately 16m long with a maximum gross weight of up to 40 tonnes and a turning circle of approximately 19m. The main contractor should ensure that there is suitable access and appropriate standing and off-loading areas.

Each bundle has an identification tag. Decking contractor operatives should check the information on each tag - or, if they are not on site, the main contractor - as soon as they have arrived. In particular, the stated sheet thickness should be checked against the requirement specified on the contract drawings. Operatives should also make a visual inspection to ensure there is no damage.

Lifting bundles

Lift bundles directly from the lorry. You should never off-load by tipping, dragging, dropping or any other improvised means.

Take special care when lifting the decking bundles - we recommend using protected chain slings, as unprotected chain slings can damage the bundle during lifting. When synthetic slings are used there is also a risk of severing them on the edges of the decking sheets.

If you use timber packers ensure that they are secured to the bundle before you lift them so that when the slings are released they do not fall to the ground. You must never lift the bundles using the metal banding.

Positioning the decking

Prepare the support steelwork to receive the decking before you life the bundles onto it. Make sure the top surface of the underlying beams is reasonably clean. When through-deck welding of shear studs is specified, you should ensure that the tops of the flanges are free of paint or galvanising.

Use the identification tags to ensure that the bundles are positioned on the frame at the correct floor level and in the nominated bay shown on the deck layout drawing. Position the bundles so that the interlocking side laps are on the same side. This will enable you to lay the decking progressively without having to turn the sheets. The bundles should also be positioned in the correct span orientation, and not at 90° to it. Take care to ensure that the bundles are not upside down, particularly with trapezoidal profiles. The embossments should be oriented so that they project upwards.

Placing the decking

Break open bundles and install decking only if all the sheets can be positioned and secured. You will need adequate time as well as good weather. Check the decking layout drawing to make sure that any temporary supports that are needed are in place before. You will normally get access for installation by using ladders connected to the steel frame. Once they have started laying out the sheets, the erectors will build their own working platform by securely fixing the decking as they progress. Start laying out the sheets at the locations indicated on the decking layout drawings. These are normally at the corner of the building at each level; to reduce the number of 'leading edges' (that is, the unprotected edges where the decking is being laid).

When you have properly positioned the bundles there should be no need to turn the sheets manually, and no doubt which way up the sheet should be fixed. Slide the individual sheets and, where possible, fix to the steelwork before moving onto the next sheet – this will minimise the risk of an accident as a result of movement of a sheet when it is being used as a platform. (However, for setting-out purposes, it may be necessary to lay out an entire bay using a minimum number of temporary' fixings before fully securing the sheets later). Position the sheets to provide a minimum bearing of 50 mm on the steel support beams. Butt the ends of adjacent sheets together – a gap of up to 5 mm is normally considered effective in not allowing excessive seepage but, if necessary, you can tape the ends of the sheets together. When end gaps are greater than 5 mm, it is normally fine to seal them with an expanding foam filler. The longitudinal edges should be overlapped, to minimise concrete seepage.

Cutting sheets

Where necessary, you can cut the sheets using a grinder or a nibbler. However, you should keep field cutting to a minimum (it is only really necessary where a column or other obstruction interrupts the decking). Ensure that gaps adjacent to the webs of columns are filled in with off-cuts or thin strips of steel.

Decking sheets shown as continuous on the decking layout drawing should never be cut into more than one length. Also, sheets should never be severed at the location of a temporary support, and the decking should never be fastened to a temporary support.

As you progress, you should dispose of unwanted scraps and off-cuts in a skip placed at the right level to where you are working. Position the skip carefully over a support beam to avoid overloading the decking. If you do not have a skip, gather the scraps for collection by the main contractor as soon as possible. Secure partially used bundles to avoid individual sheets moving in strong winds.

References - Health and Safety

MetFloor®

British Standards compliant

The following instructions are designed to help composite flooring contractors.

Composite Floor Deck

1. BS 5950: Part 4 1994. Structural use of steelwork in building: Code of practice for design of composite slabs with profiled steel sheeting.

Composite Steel Beams

2. BS 5950: Part 3: 1990. Design in composite construction: Section 3.1: 1990. Code of practice for design of simple and continuous composite beams.

Profiled Steel Deck

3. BS 5950: Part 6 1995. Structural use of steelwork in building: Code of practice for design of light gauge profiled steel sheeting.

Fire Resistance

4. BS 5950: Part 8 2003. Structural use of steelwork in building: Code of practice for fire resistant design.

Concrete

5. BS 8110: Part 1: 1997 Structural use of concrete: Code of practice for design and construction.
6. BS 8110: Part 2: 1985 Structural use of concrete: Code of practice for special circumstances.

Reinforcement

7. BS 4483: 2005 Specification for steel fabric for the reinforcement of concrete.
8. BS 4449: 2005 Specification for carbon steel bars for the reinforcement of concrete.
9. BS 4482: 2005 Steel wire for the reinforcement of concrete products specification.

Eurocode 3 and 4

10. EC3 ENV 1993 - 1 - 3: 2001 Design of steel structures. Supplementary rules for cold formed thin gauge members and sheeting.
11. EC4 ENV 1994 - 1 - 1: 1994 Design of Composite steel and concrete structures. General rules for building.
12. EC4 ENV 1994 - 1 - 2: 2001 Design of composite steel and concrete structures. Structural fire design.
13. SCI - P - 076 : Design guide on the vibration of floors. SCI in association with CIRIA (1989).

Health and Safety

Handling Hazards

Handle Zinc coated steel decking with care as it may be delivered with soluble protective layer of oil which can cause contamination to lacerated skin. You should also wear adequate protective gloves and clothing when handling decking as it will have sharp edges and corners.

Eye Hazards

Always wear eye protectors conforming to the specification in BS 2092:1987 when breaking the strapping around bundles as the sudden release of tension creates can be very hazardous. You should also wear eye protection when cutting steel as flying particles of metal can also be very dangerous.

Noise Hazards

Make sure you wear adequate ear defenders when handling or cutting decking and shot firing as the noise levels can be hazardous.

Respiratory Hazards

Fumes containing oxides of iron and zinc are produced during welding or flame cutting and if inhaled these may cause metal fume fever; this is a short-lasting condition with symptoms similar to those of influenza. In conditions of exposure to such hazards, the use of respiratory equipment is recommended.

Explosives and Fumes

Take extra care when using shot fired fixings as explosives and fumes can create hazards.

Occupational Exposure Limits

Limits for iron and zinc oxides are 5g/m≥ (8 hours TWA) and 10mg/m≤ (10 minutes TWA). (OE recommendation)

Summary of Protective Measures

Make sure that you wear adequate protective gloves and clothing and safety goggles. Ensure adequate ventilation and use personal protective equipment. Follow the instructions for safe handling, use, disposal and control of cartridges issued by equipment supplier. Ensure adequate ventilation and/or use personal respiratory protective equipment. Use appropriate ear defenders or earplugs.

General Safety Points

Make sure you follow the good practice outlined here and in SCI publications:

- Always fix deck securely before using as a working platform
- Steel end diaphragms made by CMF are essential for deep deck systems to ensure the structural integrity of the deck
- Always employ personal safety measures such as hard hats and protective clothing
- Always employ all site safety measures such as safety lines, edge protection, and properly tied ladders
- **Don't** heap concrete or drop from any height
- **Don't** leave any unfixed decking sheets
- **Don't** cut holes/voids in the deck before concreting
- **Don't** place props on uncured concrete
- **Don't** put heavy loads on unprotected deck

www.cmf.uk.com

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