



# **SUPER FLOOR**

## **Super Floor System Site Installation Methodology**



## Introduction

On behalf of Super Floor USA, we are pleased to introduce you to the Super Floor Concrete Composite floor system.

Super Floor is a suspended composite concrete floor system using a roll-formed high tensile steel joists as part of the final concrete and steel composite floor.

The Super Floor system has been developed combining tried tested building techniques. These include light gauge roll-formed steel floor joists, tray or pan and a consumable support system together with concrete providing a fast, easy to install, lightweight, concrete/steel composite floor at a cost-effective price that is able to be installed by anyone.

The Super Floor system is manufactured from pre-galvanized high tensile steel. The joists are placed on the primary support then the Super Floor support system secures the joists into the correct position. The tray/pan is laid into across the support and the system is now ready for reinforcing steel is placed. The floor is now ready for the concrete to be poured. Generally Super Floor uses a 4" reinforced concrete topping.

The Super Floor USA composite floor system is suitable for use in all types of construction including ICF structures, Steel frame building, masonry buildings, poured in-situ or precast concrete frames. From single family detached housing to multi-story residential, commercial office complexes, hotels industrial buildings and parking garages.

## Health & Safety

The Super Floor USA Safe Work Procedure was developed to provide:

1. A general overview associated with the properties of Super Floor together with;
2. The handling methods of the product associated with its installation and use.

The methodology put forward within this Procedure assumes coverage of general issues and conditions encountered on the building site. However, when the actual site conditions vary from the Procedure, then a JSA (Job Safety Analysis Worksheet) must be completed.

## Work Method Statement

Within the Safe Work Procedure for the Installation of Super Floor Composite Floor System, an installation method has been included, which is as follows:

The method of installation of the Super Floor joists, Support bars, plywood or Super Floor permanent tray/pan should be carried out to ensure safety and quality:

## Delivery

Super Floor delivers the System to site, usually on a flatbed tray truck or semi-trailer. Joists, tray/pan and support bars are strapped in bundles or loaded on pallets and are clearly identifiable.

## Installation

The Super Floor joists are kept in bundles, ready to be seated on the primary support system (beams, steel, block work etc). The joists are craned into position by either the delivery vehicle or by mobile crane, depending on reach and site access conditions. If the work area is within an existing building, then duct lifters are advised to raise joists onto primary support structure.

Once the joists are in position, the strapping is removed, and the joists are easily slid into position from below. The work is carried out from mobile aluminium scaffold platforms or mobile scissor lifts. In the process of locating the Super Floor joists, support bars are installed at each end to properly position and locate to joist and the Z Flashing (if required) is installed at each end of each bay to neatly close out the end of the tray/pan.

***The support bar is pre notched at either end, with a 1/4" x 1/4" slot. The location of this slot is set at the predetermined spacing of the joists, that being; 2', 3', 4' and 5' centers. When installing the support bar, it is important to note that the notch is always to be facing up.***

***Z Flashing are Z shaped flashing used to finish the end of the tray/pan to the wall or steel support. These are not used to finish the tray to ICF walls. When using ICF walls the tray/pan should be made to fit on top of the foam. The foam is usually notched out at the top of the wall by 5/8" to accommodate the tray/pan.***

When all joists are in place, install all support bars within the **first** bay (typically at 2' centres if using the Super Floor tray/pan system or 1' centres if using form ply). The lock bars are pre notched to suit the required spacing of the joists. The joists have (below the S flange) a series of penetrations where the support bars are inserted. The size of the penetrations and the design of the support bar allows for the support bar to be inserted into the slotted hole in the joist and rotated into the keyway on the support bar locking the support bar and joist into position. Once all support bars are rotated or twisted into position, install the shuttering system (Tray/pan or Ply) into the first bay. It is important to square up the first bay to allow for the following areas to flow evenly.

Once the **first** bay is installed and squared up the remainder of the lockbars can be installed from below.

After installing the support bars to the construction area, the shuttering system should be installed from above.

The shuttering systems used are either Super Floor permanent form tray or 5/8" film-faced form ply.

When placing the **ply** shuttering into position, it is important to ensure that the ends of the ply are butting neatly together.

When installing support bars at 2' centres (Tray/Pan) it is recommended to place the tray/pan onto the support bars after each bay of support bars is completed (the tray/pan does not need to be clipped together at this stage, this action is purely for fall arrest) this will insure there is no opening greater than 1' providing a low risk of falling from the deck when working above. If this practise is not used, then it is recommended to use a catch net firmly fitted below the joists using the Super Floor service holes or primary structure to secure the catch net. This is not necessary if installing support bars at 1' centres.

It is important to have at least **two full bays** of support bars and tray placement positioned beyond the working or live edge.

Once the Super Floor system is completely installed it is recommended to complete the checklist before commencing the installation of reinforcement mesh etc.

Reinforcing mesh is placed directly onto the top flange of the Super Floor joists, with the top "S" flange acting as bar chairs. Additional reinforcing bar is typically required over structural support members (similar to top steel over band beams). The sizing and location of the reinforcing mesh and bar is subject to the design engineer's requirements.

Concrete is then placed and finished.

## Stripping (For reusable support bars and ply only)

After the concrete has been placed for typically three days the support bars and form ply (If used) can be removed. It is recommended to carry out concrete testing for all concrete pours and check test results to ensure that the concrete has reached the required strength. Should the engineer require additional time prior to stripping, then the engineer's instructions are to be followed.

These works are undertaken from mobile aluminium scaffold or mobile scissor lifts from below the formed concrete slab. The support bars are twisted, which disengages the cam action of the support bar and allows for the support bar to be removed from between the Super Floor joists. The form ply (if used) is readily removed from the concrete soffit once all the support bars are removed.

A majority of the work associated with the installation of the Super Floor system can be carried out from below the working platform, and all people working associated to the installation/removal and others in the area must wear approved safety equipment, including hard hats.

## Installation

### Pre-Work Checking

Prior to any work being started on site, the installer shall be required performing a review of paperwork associated to the individual project to confirm all the joists and materials delivered to site are in order.

The documents should include:

1. The approved shop drawing for the layout of the Super Floor joists with individual identification marking.
2. Delivery Note(s) carrying the quantities of joists (with description of types and lengths), Support bars, and Tray/Pan.

Please note that the length of the Super Floor joist is manufactured approx. 1" shorter than the opening it is to sit in, thus it is important that the walls and supporting structure are constructed in accordance with the Architectural and shop drawing dimensions.

In general, the tools required for installing Super Floor system shall be normal carpentry tools. They shall include:

<b>General Equipment</b>	<b>Personnel Protective Equipment (PPE)</b>
▪ Hammer	▪ Safety Gloves
▪ Shifting Spanner	▪ Hard Hat
▪ Grinder	▪ Steel Capped Shoes
▪ Circular Saw	▪ Safety Vest
▪ Mobile scaffold	▪ Ear Protection
▪ Crowbar	
▪ Ladder	
▪ Ramset gun (or equivalent)	
▪ Welder (optional)	

Review site specific conditions, in particular to:

- a. Location of where the suspended floor is to be constructed in relation to vehicle and crane access.
- b. Checking condition of primary support walls/beams that are to be used.
- c. Checking actual on-site dimensions with shop drawing dimensions
- d. Other trades working on site or in close proximity.

Decide which direction the top S flange is to be positioned, as they must be the same within each bay or work area.

If the S flange is not consistent within each bay, then the form ply or Tray/Pan will not be able to be installed properly.

## Commence Installation

1. The Super Floor joists is to be lifted into position with the assistance of a crane (truck mounted or hydraulic). The joists are to be lifted (in bundles), with the installer situated under the working area on a mobile scaffold. Once the Super Floor joist is placed on the primary support, the installer can simply push or move the joist into position. At no point does Super Floor USA condone walking on primary support beams/walls without appropriate handrails or harness.
2. Once the joists have been placed onto the primary support structure, they are located in their designed positions with the assistance of support bars. The support bars perform 3 major roles in the Super Floor system, these being:
  - a. Accurately locating the joists at the various design centres, at each end of the support bar is a small notch which locks the support bar onto the Super Floor joist. (5', 4' 3' and 2')
  - b. Allows the installer to be able to square the joists in line with the parallel joists and perpendicular walls.
  - c. Acting as the support system, holding the form ply or Tray/Pan in position during construction, and thus eliminating the need to back prop the suspended floor to the floor below.

The installer is to refer to the shop drawing in relation to the spacing of the joists required. The closer the spacing of the joists indicates a large span or load is required for the floor. Directly under the S flange of the Super Floor joist is a series of slotted holes, which has been designed to receive the support bar slot. When installing the support bar into the penetrations, pass the lock bar through one joist then back into the other and rotate the support bar vertically to lock into position. The lock bars should be placed at either 2' or 1' centres depending on shuttering system used. This work should be carried out from below, working off a mobile scaffold or access equipment. ***The support bar notch is always to face up in installation.***

3. When the installation of the Super Floor joists is parallel with a solid wall, the 1<sup>st</sup> joist will be located the appropriate distance from the wall (subject to the joist spacing required), a Super Floor wall plate section can be fixed to the wall. The support bars are placed directly into the wall plate allowing for the correct location of the joist.
4. As the joists are set in their locations the Super Floor Z flashing should be placed between the joist end pieces to prevent concrete slurry during the concrete pour.
5. Once the support bars have been installed to the first bay, and support bars and Super Floor Z flashings at the ends of the other joist bays (associated to placement of joists in the correct position), then the shuttering system is ready to be installed to the first bay. This can be done from the mobile scaffold or access equipment below the deck.
6. The shuttering is to be lifted over the joists and pushed in under the top S flange and is to be pushed hard up against all corners/edges. This is to be continued till the space between the joists is filled.
7. Continue steps listed installing the lockbars and shuttering until the construction area is completed.

Depending on the site conditions and Occupational Health and Safety requirements, the shuttering system can be installed from the working deck, using the same principals as conventional formwork installation. This method is considerably faster than working from below, but confirmation is required if your site health and safety officer will allow this. It is important to note when installing support bars at 2' centres (Tray/Pan) it is

recommended to use a catch net firmly fitted below the joists using the Super Floor service holes or primary structure to secure the catch net. This is not necessary if installing lockbars at 1' centres, as the support bars allow for any fall arrest.

## Installation of Accessories

Super Floor USA has been developed a number of accessory items to assist in the speed of installing the floor system. These accessories include.

- Slotted hanging angle
- Slotted wall plate
- Edge formwork

The slotted hanging angle and slotted wall plate is used when the primary support system is structural steel or some form of load bearing wall system. It is installed by either fixing a pin through the angle into the primary support or by welding it into position. The slotted hanging angle/wall plate is to run parallel with the first and last joists within that bay. The slots within this angle are similar to the slots under the S flange where the lock bars are connected to.

The edge formwork angle comes in 2 depths, 3.5" and 4", to match the concrete depth of the structural floor. The edge forms can be directly fixed to the perimeter of the slab, either directly fixed to form ply, Tray/Pan or nailed/welded onto structural steel or drilled and screwed/nailed. The edge formwork angle can also modify to other depths based upon site and customer specific requirements.

## Forming set downs

2" set downs can be achieved in several ways and by lowering the seating height of the joist. The individual joists do not necessarily have to be level, therefore set downs are achievable.

- Parallel to the joists
- Perpendicular to the joists
- Refer to our standard details for options.

## Working with other trades

All Super Floor installers should co-ordinate with other trades to ensure all the penetrations and embedded items are to be properly installed prior the placement of concrete in an effective and efficiency manner. Trades include but not limited to:

- Electrical.
- Plumbing including drainage and fire services.
- Heating / cooling.
- Mechanical.

## Forming penetrations to concrete slab

Depending on site requirement, to form large openings for ducts to pass vertically through the Super Floor deck can be simply boxing out the slab with the additional reinforcement to the corners in accordance to Engineer's instruction. Please note that the location of the opening is that does not encroach 6" from the edge of the top flange of the joist.

## Reinforcement Fixing

All reinforcing steel bars and welded mesh for the Super Floor slab shall be supplied and fixed strictly in accordance with the approved Engineer's drawings and approved site practice. As mentioned previously, bar chairs are normally not required, the reinforcing bars or mesh will sit directly on the S flange of the joists to provide 1.5" cover. However, it is still require checking and ensuring adequate cover to all areas.

Typically, only one layer of reinforcing mesh is required, the size of mesh varying with different applications (fire ratings, excessive loads, external elements). Additional loose reinforcing bar is required over the primary support structure. (Refer standard details).

Additional reinforcing steel may be required associated to deep rebates or penetrations. This must be designed, checked and approved by the design engineer.

## Pre-Pour Inspection

Upon completion of the installation of the Super Floor joists, support bars, shuttering and reinforcing steel, the deck area needs to be inspected and approved by the relevant authority. Before contacting the Principal Contractor (usually the Building Contractor) the Super Floor Installer should review the works performed and complete the Safety and Quality Plan. Once this has been completed, the Head contractor should be contacted and advised that the suspended floor area is ready for a Pre Pour Inspection.

As part of Super Floor's Quality Control and in-house Quality Assurance Procedures, each project is documented including the Super Floor production checklists, Raw material Test certificates, Installation Safety & Quality checklists and a final Warranty certificate which is to be completed and signed off by Super Floor USA the Installer is provided to the client based on the installation as well as the manufacture of the Speedfloor System.

## Concreting

The concrete strength and mix design should be obtained from the design engineer, typical mix designs are also available from Super Floor USA to assist.

It is the responsibility of the concreter and builder/Head Contractor to ensure all the concrete used on site meets the required strength and fulfil the testing requirement stipulated by the engineer.

Concrete placing and finishing workmanship shall be in proper manner according to acceptable tradesman practice and perform the entire testing requirements as specified. All concrete shall be placed from the outsides of each bay (i.e. closest to the primary support) and then poured towards the centre of the span.

Due to the Super Floor joists being manufactured with a pre camber, it is important that the concrete is placed to thickness using a depth stick, do not use a laser level to place the concrete, as this can create inconsistent loading or concrete thickness which could create differential loading on each joist and vary the deflection of the joist(s). During the concrete placement, allow to use a thickness gauge to place the concrete to appropriate levels. Once the concrete is loaded over the joists then a laser level can to used to obtain the finish level.

## Stripping of shuttering and support bars (For reusable support bars and ply sheeting only)

Typically, three days after placement of concrete, according to the concrete test result, the Super Floor slab is ready to be stripped. This work is carried out from mobile scaffold or access equipment below the deck. All

workers undertaking the stripping process are to wear (at all times) a hard hat. It is also advised to wear safety gloves and goggles.

Appropriate tools that can be used in the stripping process are the following:

- Hammer
- Shifting Spanner
- Support Bar tool
- Crowbar

It is recommended to carry out concrete testing for all concrete pours and check test results to ensure that the concrete has reached the required strength. Should the engineer require additional time prior to stripping, then the engineers instructions are to be followed.

These works are undertaken from mobile aluminium scaffold or mobile scissor lifts from below the formed deck. The support bars are twisted, which disengages the cam action of the support bar and allows for the support bar to be removed from between the Super Floor joists. The form ply (if used) is easily removed from the concrete soffit once all the support bars are removed. The Tray/Pan system remains as part of the finished slab system and is not removed.

Most of the work associated to the installation of the Super Floor system can be carried out from below the working platform, and all people working associated to the installation/removal and others in the area must wear approved safety equipment, including hard hats.

Visit [www.superfloorusa.com](http://www.superfloorusa.com) for further information on the Super Floor system.

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