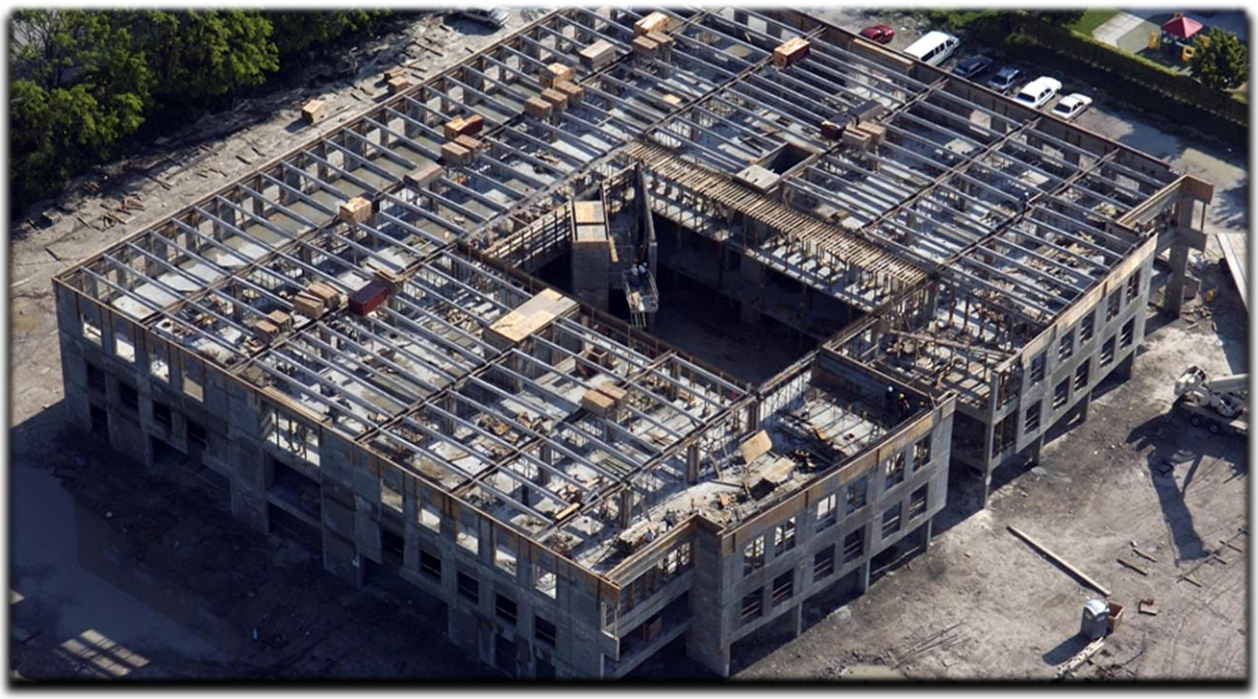
STRUCTURAL PRESTRESSED INDUSTRIES, INC.

11405 N.W. 112th Court
Medley, FL 33178
P: 305-556-6699
F: 305-556-9696

www.spimiami.com

Did you choose the right flooring and roof system for your upcoming project?

Allow Structural Prestressed Industries, Inc. (S.P.I.)
to budget your upcoming projects at our expense
to ensure you have the most economical prestressed concrete system available.



About us

Structural Prestressed Industries, Inc. (S.P.I.), is dedicated to providing many facets of concrete construction to the building industry. S.P.I. has become a leading supplier of prestressed/ precast concrete products, specifically for the commercial and residential construction industry in Florida. Though S.P.I. is diversified with different products such as Hollowcore Planks and Double Tees, our cornerstone is the prestressed concrete Soffit Beam and Keystone Joist floor and roof system. This composite structural floor/ roof system is the perfect solution that combines the speed and requirements for heavily loaded superimposed load (S.I.L.) decks.

Since 1965 the system has been used for various structures from parking garages to office buildings, from schools to residential construction, amongst many other buildings. The prestressed soffit and keystone joist are manufactured at S.P.I.'s own manufacturing facility. Our products are compatible with a wide variety of structures such as tilt-up wall, masonry and cast in place concrete structures.

One of the many benefits the prestressed system offers is the long spans combined with poured-in-place concrete decks that provide a compressive component as a monolithic unit that is light weight, efficient, economical and reduces shoring requirements during construction. In addition, the system creates the flexibility of cast-in-place concrete construction while providing a 2 hour fire rating when used with a 4 ¾" concrete composite topping.

S.P.I. has our own fabrication/carpentry shop facility, which fabricates the specific forms for each job. It owns a large inventory of forming materials and shoring components.

We offer a complete service to the design community from conceptual framing and calculations to cost studies. From the design and manufacturing stages to the installation of our products S.P.I. delivers quality and dependability to all its jobs. The following is a list of our key advantages:

- An experienced prestressed concrete contractor
- Value engineering expertise
- Form fabrication shop
- Design and manufacturing facilities with delivery to construction site
- Installation of prestressed joist and soffit beams, hollowcore planks, and double tees
- Prestressed Concrete Institute (P.C.I.) Certified Plant.

Structural Prestressed Industries has a proven track record as a reputable organization with a serious commitment to providing timely, top quality concrete structures throughout the state of Florida.

During your next project let our professionally trained staff, with supervisory personnel who each hold over 25 years of experience in the structural prestressed concrete industry, save you both time and money.

Precast/ Prestressed Joist Features

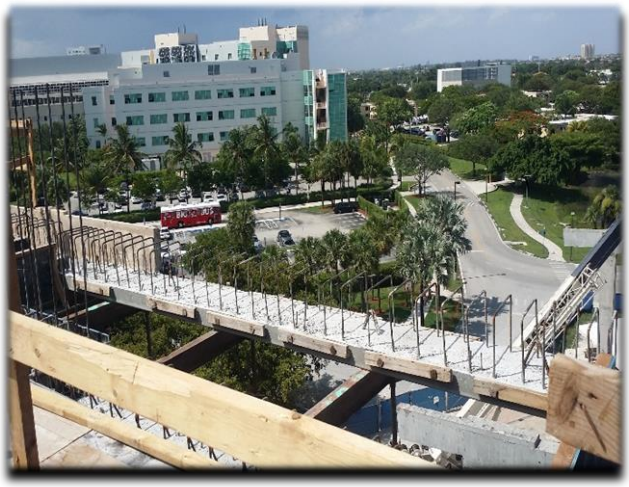
- The ease of incorporation into the structural concept maintains creativity in design
- The joist system is not tied to specific component width, depth or spacing.
- The concrete joist system with the self-supporting deck slab formwork and soffit beams reduces the construction schedule by decreasing the amount of shoring and framework required, when compared to a complete cast-in-place or post tension system. The reduced shoring is ideal for use in areas requiring minimal shoring with long spans.
- When incorporated with cast in place slabs, soffit beams, and columns the joist system provides the advantages of monolithic connections and reduces the amount of welded or bolted connections and minimizing additional building maintenance concerns.
- Concrete joist can be utilized with tilt-up wall precast, cast in place, and masonry construction.
- Smaller and round columns can be used, creating a more open structure while reducing the need for interior or exterior bearing walls.
- Floor openings can be achieved between joists.
- Depth of framing is a function of spans and loads:

    - Additional joist(s) can be added and the floor thickness adjusted for special loading conditions.
    - Dapped Ends (Bottom Notches) decreases total depth heights.
    - Joist is cast integral with the beam as opposed to bearing on top of the beam, reducing height requirements.
    - Double Joists (side-by-side) can support masonry walls above.

- Joints are minimized in a joist floor system, requiring less waterproof joint sealants than a prestressed double tee system. Also, reducing maintenance concerns.
- The Thump-Thump sound associated with the joints of prestressed members is reduced.
- Differential camber which can occur between adjacent prestressed floor components and affecting the floor surface uniformity is reduced with the joist and composite slab system.
- A concrete joist system incorporated with a cast in place slab can reduce differential flexure during dynamic loadings.
- The merging of the joist system with cast in place slabs, beams, and columns improves site congestion by reducing the number of trucks bringing components to the project site.
- Concrete joist and decks can provide less vibration and flexural movements than steel joists with metal decks.
- Concrete joists with a 4¾” concrete deck will provide a 2 hour fire rating without additional work.
- Over 50 years of successful market existence.

Sequence of Installation

1 Shoring is set between columns to Support the precast Soffit Beams.

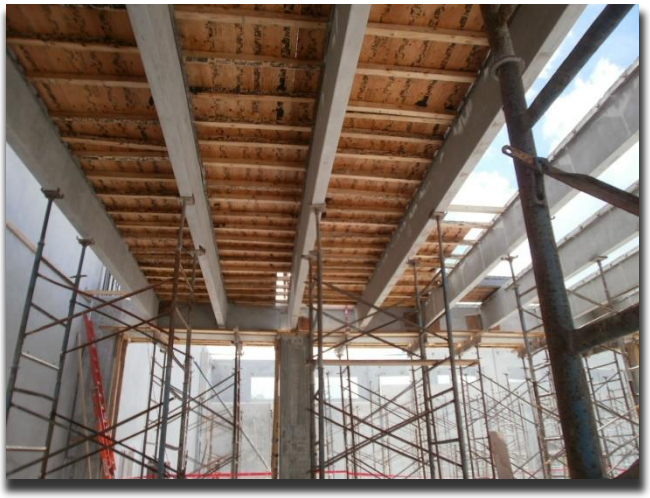


2 Soffit Beams are lowered into place, and shoring or scaffolding is erected to receive the precast/ prestressed joists.

3 Slotted Soffit Beam side forms are attached and joists are then lowered into the slots in the beam form.

4 Steel pins are inserted in joists and angles are attached to support deck formwork. This hardware may be installed before the joist is set to further facilitate erection.

Sequence of Installation



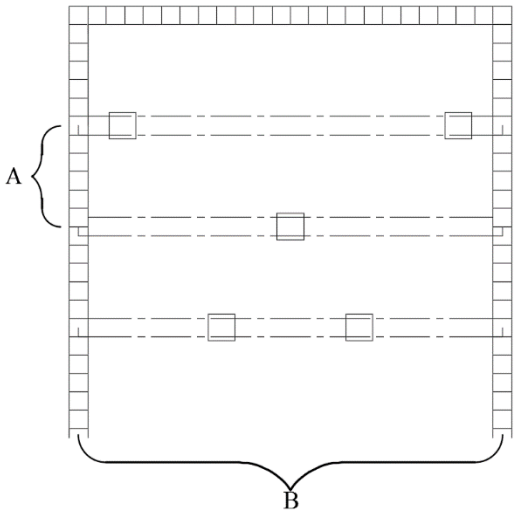
5 Slab formwork material consisting of purlins and plywood decking are placed on these angles.

6 Field-placed reinforcing steel is installed.

7 Concrete is poured, screeded, floated, and troweled to the required finish.

8 After concrete has cured sufficiently, pins, angles, purlins and plywood sheets are removed from the underside of the composite slab system.

Typical Joist and Tie Beam Coordination



POST SHORE

End Shore

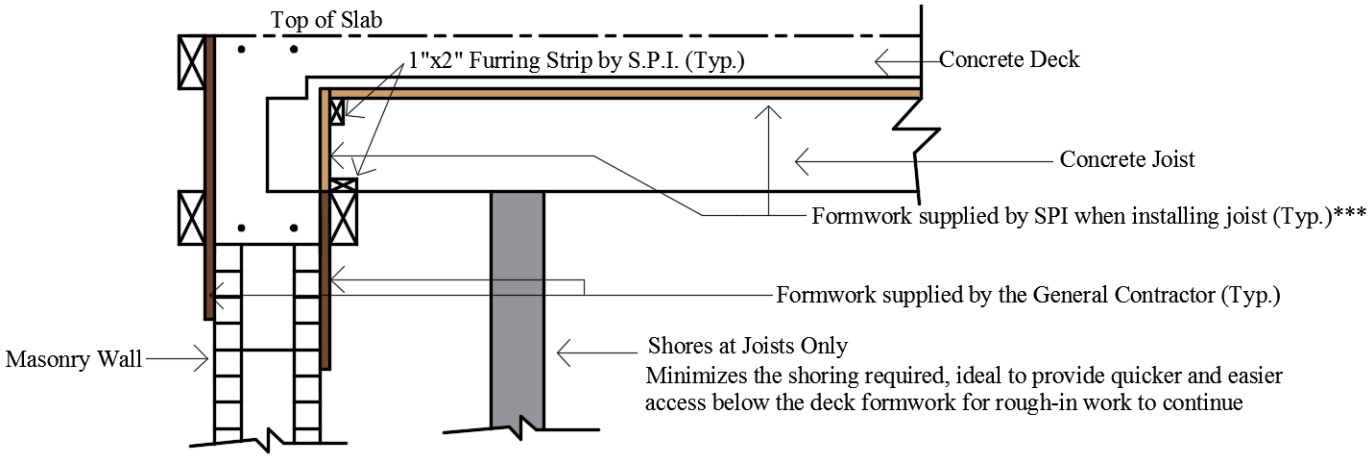
Or

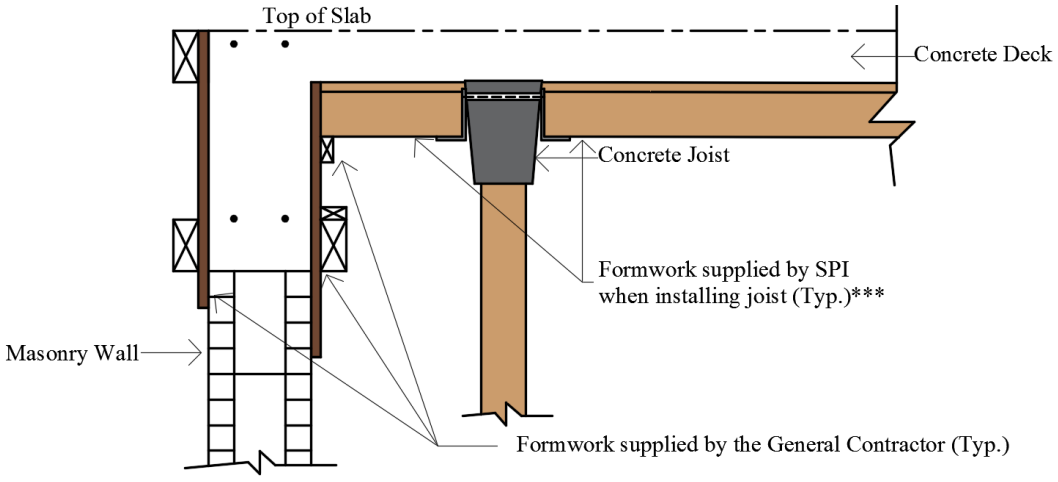
Center Shore

Or

$\frac{1}{3}$ Point Shore

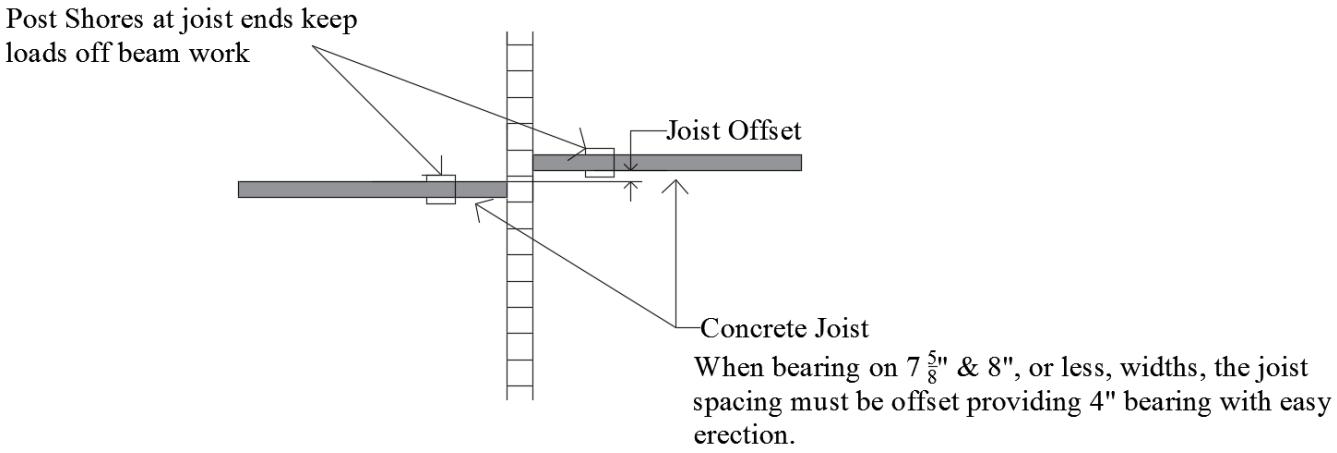
A & B For joist spacing up to 6'-6"
And clear span up to 50'-0"
minimal shoring is required

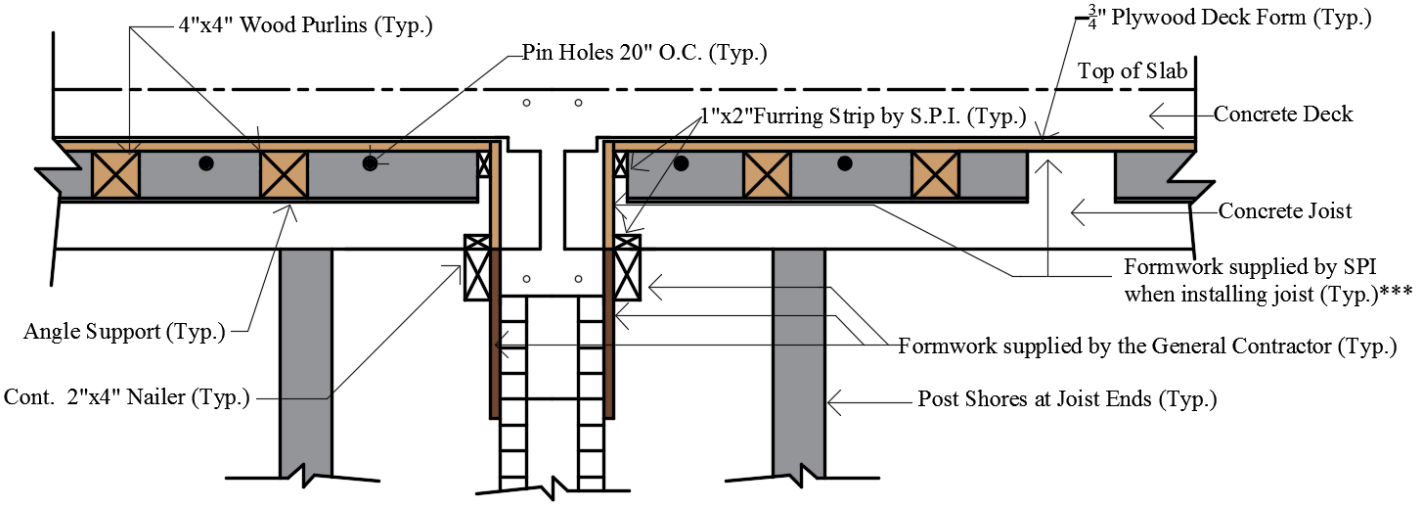




******* Formwork and hardware – All formwork and hardware is by the General Contractor if S.P.I. is supplying the joist to the jobsite and installation is by others.

Typical Joist and Tie Beam Configuration





With the shoring at the joist only, there will be less congestion in the work area, allowing the follow up trades early access to work areas.

The joist can be also be lowered or raised to accommodate slab steps and or different slab thicknesses.

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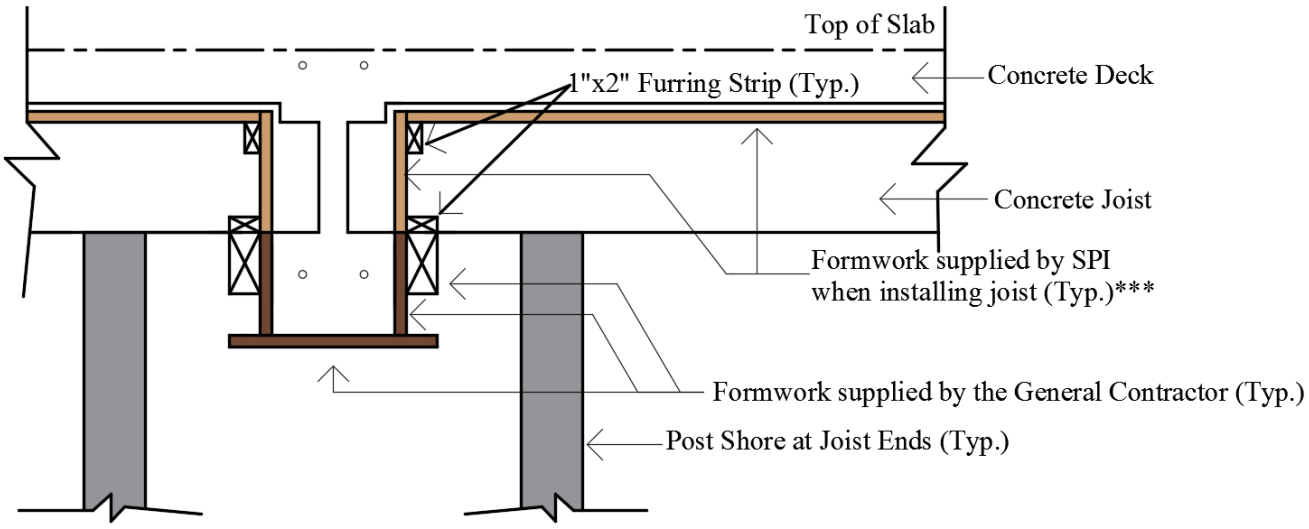
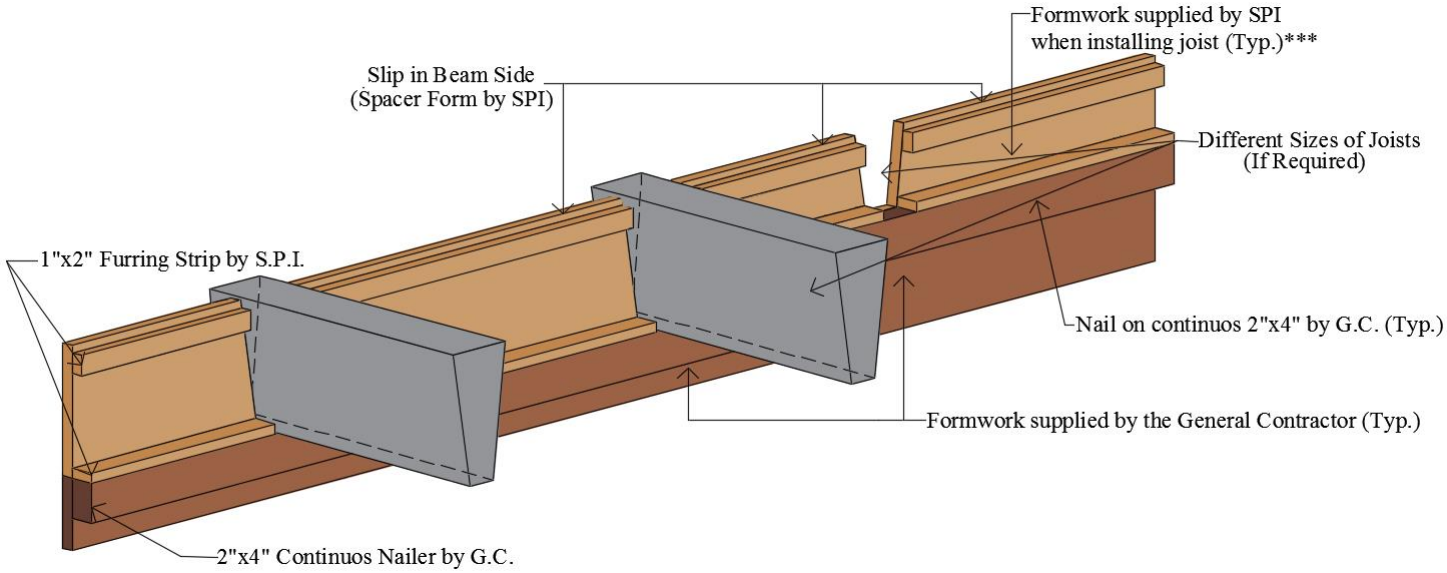
Typical Joist and Cast-In-Place Beam Configuration



Joist can be used with cast in place beams or with prestressed soffit beams. Soffit beams can add even greater construction efficiencies by further reducing the formwork and shoring required.



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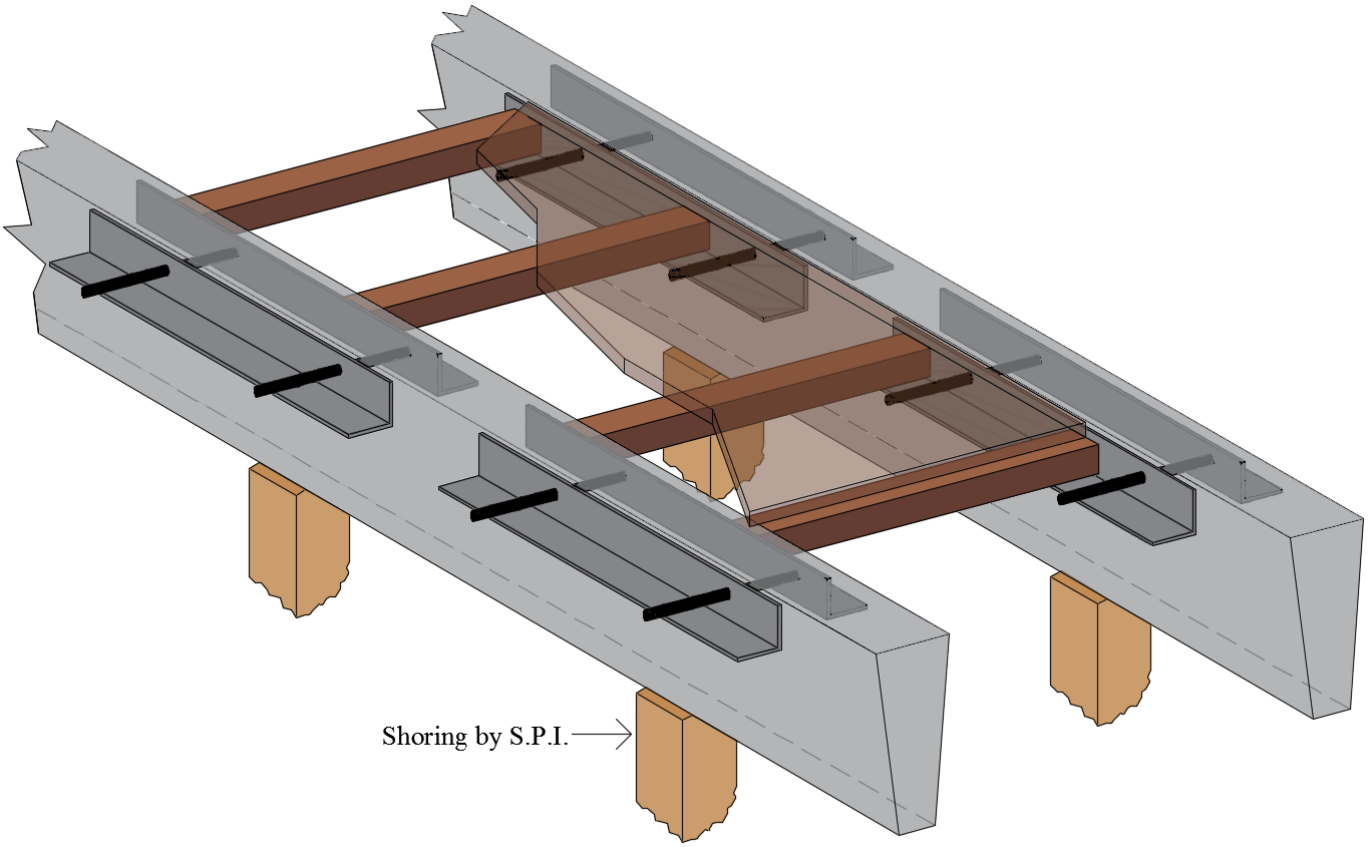
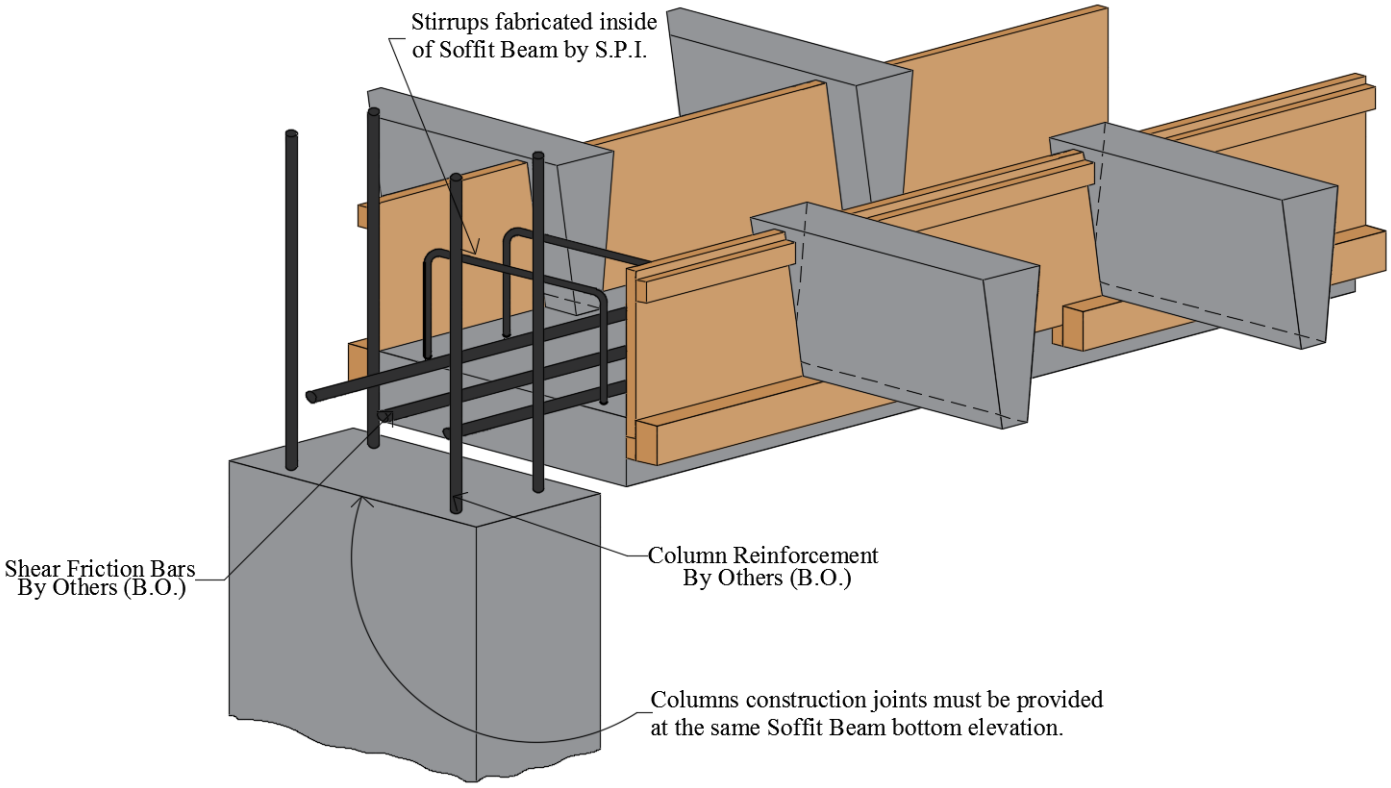
Typical Joist and Decking Formwork



As noted, the joist support the deck formwork, with less shoring than a cast-in-place or post-tensioned structure, this speeds up the construction schedule while providing long spans with cost competitiveness. The reshores to the deck below are also minimal, thereby providing access.

Typical Joist and Soffit Beam Formwork



Just like a cast in place beam the soffit beam is poured with the column providing continuity between the beam, and the slab. Beam Stirrups are cast into the Soffit Beam by S.P.I. and the longitudinal reinforcing is placed on the field by others.

Superimposed Load Capacity 1 – 1.5 Hr. (Fire Rating)

SUPERIMPOSED LOAD CAPACITY																			
		JOIST		SPAN															SYSTEM WEIGHT
FIRE	DECK	SIZE	SPACING	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	PSF
1 HOUR	3 1/4"	8"	2'-6"	170	150	120	200	165	140	115	95	65							57
			3'-6"	120	105	80	95	120	105	85	75	45							51
			4'-6"	105	100	135	115	95	80	65	50								48
		12"	2'-6"						165	170	190	170	150	115	95	80	55		66
			3'-6"						135	200	160	140	125	105	85	60			57
			4'-6"			200	190	200	185	165	155	125	95	75	50				53
		16"	3'-6"				220	190	160	200	175	200	180	160	140	120	100	90	65
			4'-6"						170	200	180	160	140	120	110	95	85	75	59
1.5 HOUR	4"	12"	5'-6"			180	200	170	145	125	105	85	65	55					63
			6'-6"			135	120	110	100	90	80	70	60						61
		16"	5'-6"						200	180	160	140	120	105	95	85	75	65	67
			6'-6"						170	140	120	105	95	85	75	65	55	45	65
SPAN				**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	

Notes: -Spans shown are clear spans (Face-to-face of supports)

-For Design conditions not addressed, contact S.P.I.

-Designer can use 20", 24",and 28" joists for 1 hour & 1.5 hour fire rating. Contact S.P.I for load tables.

The information presented is meant to assist the user in the preliminary determination of the approximate size, spacing, and connection of the elements in floors and roofs. The data is illustrative and does not reflect individual consideration for unusual loadings and stresses. It is assumed that those using the tables and details have the ability and understanding to properly design for specific moments, shears, reinforcing and connections.

Superimposed Load Capacity 2 Hr. (Fire Rating)

SUPERIMPOSED LOAD CAPACITY																				
		JOIST		SPAN																SYSTEM WEIGHT
FIRE	DECK	SIZE	SPACING	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	PSF
2 HOUR	4.75"	20"	4'-8"	290	250	220	185	165	150	130	120	105	90	80							91
			5'-8"	230	200	175	150	130	120	105	90	80	70	60							85
			6'-8"	190	170	145	125	110	95	85	75	65	55								81
			7'-8"	165	140	120	100	90	80	65	55	50									78
			8'-8"	150	130	110	95	80	70	60	55										76
		24"	6'-8"			265	240	225	195	180	145	125	105	95	80	70	65				85
			8'-8"			200	165	135	125	110	100	90	80	70	60	55	50				80
			10'-8"			120	105	95	85	80	75	70	60	55	50						76
		28"	8'-8"										125	105	85	75	65	60	55	50	84
			10'-8"										100	90	80	70	60	50			79

Notes: -Spans shown are clear spans (Face-to-face of supports).

-For Design conditions not addressed, contact S.P.I.

-Designer can use 8", 12",and 16" joists for 2 hour fire rating. Contact S.P.I for load tables.

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Typical Loading Conditions

TYPICAL LOADING CONDITIONS				ECONOMY								
OCCUPANCY OR USE	S.I. LOADS (PSF)			JOIST SPAN								
	TOTAL	LIVE	DEAD	18'	24'	30'	36'	42'	48'	54'	60'	FIRE
ROOF	40	20	20	12 J @ 6'-6"			16 J @ 6'-6"	4'-6"	N/A			1
ROOF	50	30	20	12 J @ 6'-6"			16 J @ 6'-6"	16 J @ 4'-6"	N/A			1
PARKING	50	50	--	12 J @ 6'-6"			16 J @ 6'-6"	4'-6"	24 J @ 8'-8"			2
APARTMENT/ CLASSROOM	60	40	20	8J/12J @ 4'-6"			16 J @ 4'-6"		N/A			1
				12 J @ 6'-6"			16 J @ 6'-6"	4'-6"				2
OFFICE (MINIMUM)	70	50	20	12 J @ 4'-6"			16 J @ 4'-6"		N/A			1
				12 J @ 6'-6"			16 J @ 6'-6"	16J @ 4'-6"	24 J @ 8'-8"	24J @ 6'-8"		2
OFFICE (NOMINAL)	80	50	30	12J @ 4'-6"			16 J @ 4'-6"	3'-6"	N/A			1
				12 J @ 6'-6"			16 J @ 6'-6"	16J @ 4'-6"	24J @ 8'-8"	24J @ 6'-8"		2
OFFICE (HEAVY)	100	80	20	12 J @ 4'-6"			16 J @ 4'-6"	3'-6"	N/A			1
				12 J @ 6'-6"		16 J @ 6'-6"	4'-6"	3'-6"	24 J @ 6'-8"		N/A	2
CORRIDOR	100	80	20	SAME AS OFFICE (HEAVY)								
PUBLIC AREA/ FILES	120	100	20	12 J @ 6'-6"		16J @6'-6"	16 J @ 4'-6"		24 J @ 6'-8"		24J @ 4'-8"	2
LIBRARY/ KITCHEN	140	125	15	12 J @ 6'-6"		16 J @ 6'-6"	16J @4'-6"		24 J @ 6'-8"		24 J @ 4'-8"	2
MECHANICAL	160	150	10	12 J @ 6'-6"	16J @6'-6"		16J @4'-6"	3'6"	24 J @ 6'-8"		24 J @ 4'-8"	28J	2
PLANTER	200	200	--	12 J @ 4'-6"		16 J @ 4'-6"	24 J @ 4'-8"			28J @4'-8"		2

Notes: Verify Joist sizes and spacings meet project loading requirements (See Joist Load Tables). Verify deck capacity is adequate for load and spacing selected.

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Quality Control

Design/ Quality Assurance

All units shall be designed in accordance with ACI 318 and applicable building codes to provide a composite structural floor and/or roof system capable of supporting the specified design loads. Concrete shall attain a compressive strength of 6000 psi in 28 days. Producer shall be certified by the Precast/ Prestressed Concrete Institute (PCI) plant certification program in the category C4 at the time of bidding.

Shop Drawings

Shop Drawings shall be prepared under the direction of a Registered Professional Engineer and shall include a layout plan with member identification marks, fabrication details, estimated camber, connection and anchorage details, installation details, and procedures. Signed and sealed calculations shall also be submitted for approval.

Manufacture

All units are to be cast in steel forms per approved shop drawings. Manufacturing procedures shall be in general compliance with the PCI manual. Any tolerances exceeding these limits shall be clearly marked on shop drawings for approval by Architect-Engineer. Prior to the transfer of prestress, the concrete shall attain adequate strength to control stresses at release.

Storage, Delivery, and Handling

Precast/ prestressed concrete members shall be lifted and supported during manufacturing and erection only at the lifting or supporting points as shown on the approved shop drawings.

Installation

Installation of precast/ prestressed concrete joists, soffit beams, and slab form shall be performed by a qualified erector. Shoring and bracing shall be designed by a registered Professional Engineer. The shoring and bracing forms may be removed when the field-placed concrete achieves seventy-five percent (75%) of design strength, unless there are multiple floors above being built.