NORDIC STRUCTURES

Cantilever I-Joist Capacities for Vertical Building Offset

Design Criteria

Cantilever length:	From half the I-joist depth to 2 feet
Minimum bearing length:	3-1/2 inches
Reinforcement on one side:	Nail with 8d nails at 6 inches on center, top and bottom flange.
Reinforcement on both sides:	Nail with 8d nails at 6 inches on center, top and bottom flange, offset by 3 inches on the opposite side.
Reinforcement type:	APA Rated Sheathing 48/24 or APA Rated Sturd-I-floor 24 oc (minimum 23/32 Performance Category)
	Depth shall match the full height of the joist. Install with face grain horizontal.
Reinforcement back span:	2 feet minimum

Design Properties

Joist depth	Joist series	Unreinforced I-joist		Reinforcement on one side		Reinforcement on both sides	
		V [a]	R [b]	$V_{increase}$ [c]	$R_{increase}$ [d]	$V_{increase}$ [c]	$R_{increase}$ [d]
		(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
9-1/2"	NI-40x	1,200	2,410	270	650	540	1,300
	NI-60	1,200	2,415	270	655	540	1,310
	NI-80	1,200	2,415	270	465	540	930
11-7/8"	NI-40x	1,480	3,000	420	810	840	1,620
	NI-60	1,570	3,005	420	810	840	1,620
	NI-80	1,590	3,005	420	580	840	1,160
	NI-90	1,925	3,355	420	650	840	1,300
14"	NI-40x	1,750	3,130	545	845	1,090	1,690
	NI-60	1,750	3,140	545	850	1,090	1,700
	NI-80	1,835	3,330	545	645	1,090	1,290
	NI-90	2,125	3,355	545	650	1,090	1,300
16"	NI-60	2,000	3,265	545	880	1,090	1,760
	NI-80	2,070	3,640	545	705	1,090	1,410
	NI-90	2,330	3,640	545	705	1,090	1,410

a) Shear capacity, V, of the unreinforced I-joist.

b) Reaction capacity, R, of the unreinforced I-joist.

c) Shear capacity increase, $V_{increase}$, due to cantilever reinforcement on one or both sides.

d) Reaction capacity increase, $R_{increase}$, due to cantilever reinforcement on one or both sides.

Notes:

1. The tabulated design values are for normal duration of loading (C_D = 1.0).

2. Design of I-joists shall be in accordance with the NDS.

3. All nails are assumed to be common nails and shall have a diameter not less than 0.131 inch.

Design Criteria

Cantilever length:	Up to half the I-joist depth
Minimum bearing length:	3-1/2 inches
Reinforcement on one side:	Minimum 12-inch-long sheathing reinforcement, attach to top and bottom flanges with 8d nails at 4 inches on center (total of 6 nails per reinforcement).
Reinforcement on both sides:	Minimum 18-inch-long sheathing reinforcement, attach to top and bottom flanges with 8d nails at 6 inches on center, offset nails on opposite side (total of 6 nails per side)
Reinforcement type:	APA Rated Sheathing 48/24 or APA Rated Sturd-I-floor 24 oc (minimum 23/32 Performance Category) Depth shall match the full height of the joist. Install with face grain horizontal.

Design Properties

Joist depth	Joist series	Unreinforced I-joist			Reinforcement on one side		Reinforcement on both sides	
		V [a]	R [b]		$V_{increase}$ [c]	$R_{increase}$ [d]	$V_{increase}$ [c]	$R_{increase}$ [d]
			ER	IR_{90}				
		(lbf)	(lbf)	(lbf)	(lbf)	-	(lbf)	-
9-1/2"	NI-40x	1,200	1,194	2,169	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-60	1,200	1,194	2,174	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-80	1,200	1,200	2,174	325	$0.193 \cdot R$	650	$0.386 \cdot R$
11-7/8"	NI-40x	1,480	1,434	2,700	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-60	1,570	1,489	2,705	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-80	1,590	1,506	2,705	325	$0.193 \cdot R$	650	$0.386 \cdot R$
	NI-90	1,925	1,777	3,020	325	$0.193 \cdot R$	650	$0.386 \cdot R$
14"	NI-40x	1,750	1,500	2,817	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-60	1,750	1,504	2,826	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-80	1,835	1,568	2,997	325	$0.193 \cdot R$	650	$0.386 \cdot R$
	NI-90	2,125	1,789	3,020	325	$0.193 \cdot R$	650	$0.386 \cdot R$
16"	NI-60	2,000	1,519	2,939	325	$0.270 \cdot R$	650	$0.541 \cdot R$
	NI-80	2,070	1,589	3,276	325	$0.193 \cdot R$	650	$0.386 \cdot R$
	NI-90	2,330	1,811	3,276	325	$0.193 \cdot R$	650	$0.386 \cdot R$

a) Shear capacity, V, of the unreinforced I-joist.

b) Reaction capacity, R, of the unreinforced I-joist, calculated as follows:

$R = ER + (IR_{90} - ER) \cdot (2 \cdot L_o / d)$

Where:

ER = Reaction capacity of the unreinforced I-joist without a cantilever (lbf)

IR_{90} = Reaction capacity of the unreinforced I-joist with a cantilever length equal to half the I-joist depth (lbf)

L_o = Cantilever length (in.)

d = Joist depth (in.)

c) Shear capacity increase, $V_{increase}$, due to cantilever reinforcement on one or both sides.

d) Reaction capacity increase, $R_{increase}$, due to cantilever reinforcement on one or both sides.

Notes:

1. The tabulated design values are for normal duration of loading (C_D = 1.0).

2. Design of I-joists shall be in accordance with the NDS.

3. All nails are assumed to be common nails and shall have a diameter not less than 0.131 inch.