

Resistance of I-joist Cantilevers for Vertical Building Offset

Design Criteria

| | |
|------------------------------|--|
| Cantilever length: | From I-joist depth to 2 feet |
| Reinforcement on one side: | 2-1/2-inch nails at 6 inches on centre |
| Reinforcement on both sides: | 2-1/2-inch nails at 6 inches on centre offset by 3 inches on the opposite side |
| Reinforcement type: | Wood structural panel with a minimum thickness of 23/32 inch (for OSB, panel mark 48/24) |
| Reinforcement back span: | 2 feet minimum |

Design Properties

| Joist depth | Joist series | Unreinforced I-joist | | I-joist reinforced on one side | | I-joist reinforced on both sides | |
|-------------|--------------|----------------------|-----------------------|--------------------------------|-----------------------|----------------------------------|-----------------------|
| | | $V_r^{(a)}$ (lbf) | $IR_r^{(b)}$ (lbf) | $V_r^{(c)}$ (lbf) | $IR_r^{(d)}$ (lbf) | $V_r^{(c)}$ (lbf) | $IR_r^{(d)}$ (lbf) |
| 9-1/2" | NI-20 | 1,770 | 4,060 | 2,080 | 5,160 | 2,400 | 6,250 |
| | NI-40x | 1,890 | 4,150 | 2,200 | 5,270 | 2,520 | 6,390 |
| | NI-60 | 1,890 | 4,160 | 2,200 | 5,280 | 2,520 | 6,410 |
| | NI-80 | 1,890 | 4,240 | 2,200 | 5,060 | 2,520 | 5,880 |
| 11-7/8" | NI-20 | 2,240 | 5,070 | 2,730 | 6,440 | 3,220 | 7,810 |
| | NI-40x | 2,340 | 5,590 | 2,830 | 7,100 | 3,320 | 8,610 |
| | NI-60 | 2,340 | 5,600 | 2,830 | 7,110 | 3,320 | 8,630 |
| | NI-80 | 2,340 | 5,790 | 2,830 | 6,910 | 3,320 | 8,030 |
| | NI-90 | 3,040 | 5,790 | 3,530 | 6,910 | 4,020 | 8,030 |
| 14" | NI-40x | 2,730 | 5,570 | 3,410 | 7,080 | 4,090 | 8,580 |
| | NI-60 | 2,730 | 5,590 | 3,410 | 7,100 | 4,090 | 8,610 |
| | NI-80 | 2,730 | 6,030 | 3,410 | 7,190 | 4,090 | 8,360 |
| | NI-90 | 3,350 | 6,030 | 4,030 | 7,190 | 4,710 | 8,360 |
| 16" | NI-60 | 3,110 | 5,570 | 3,820 | 7,080 | 4,530 | 8,580 |
| | NI-80 | 3,110 | 6,250 | 3,820 | 7,460 | 4,530 | 8,660 |
| | NI-90 | 3,680 | 6,250 | 4,390 | 7,460 | 5,100 | 8,660 |

a) Factored shear resistance, V_r , of the unreinforced I-joist.

b) Factored intermediate reaction resistance, IR_r , of the unreinforced I-joist without bearing stiffeners. Minimum bearing length shall be 5-1/2 inches for bearings adjacent to cantilever.

c) Factored shear resistance, V_r , of the reinforced I-joist.

d) Factored intermediate reaction resistance, IR_r , of the reinforced I-joist without bearing stiffeners. Minimum bearing length shall be 5-1/2 inches for bearings adjacent to cantilever.

Notes:

- The tabulated design values are for standard-term duration of load ($K_D = 1.0$).
- Design of I-joists shall be in accordance with CSA O86.
- All nails are assumed to be common nails unless otherwise noted. Nails shall have a diameter not less than 0.128 inch for 2-1/2-inch nails.

Design Criteria

| | |
|------------------------------|--|
| Cantilever length: | Up to the I-joint depth |
| Reinforcement on one side: | 2-1/2-inch nails at 6 inches on centre (total of 8 nails per joist) |
| Reinforcement on both sides: | 2-1/2-inch nails at 6 inches on centre offset by 3 inches on the opposite side (total of 8 nails per side) |
| Reinforcement type: | Wood structural panel with a minimum thickness of 23/32 inch (for OSB, panel mark 48/24) |
| Reinforcement back span: | 2 feet minimum |

Design Properties

| Joist depth | Joist series | Unreinforced I-joint | | I-joint reinforced on one side | | I-joint reinforced on both sides | |
|-------------|--------------|----------------------|-----------------------|--------------------------------|-----------------------|----------------------------------|-----------------------|
| | | $V_r^{(a)}$ (lbf) | $ER_r^{(b)}$ (lbf) | $V_r^{(c)}$ (lbf) | $ER_r^{(d)}$ (lbf) | $V_r^{(c)}$ (lbf) | $ER_r^{(d)}$ (lbf) |
| 9-1/2" | NI-20 | 1,770 | 1,770 | 2,480 | 2,250 | 3,190 | 2,730 |
| | NI-40x | 1,890 | 1,890 | 2,600 | 2,400 | 3,310 | 2,910 |
| | NI-60 | 1,890 | 1,890 | 2,600 | 2,400 | 3,310 | 2,910 |
| | NI-80 | 1,890 | 1,890 | 2,600 | 2,250 | 3,310 | 2,620 |
| 11-7/8" | NI-20 | 2,240 | 2,240 | 2,950 | 2,850 | 3,660 | 3,450 |
| | NI-40x | 2,340 | 2,340 | 3,050 | 2,970 | 3,760 | 3,600 |
| | NI-60 | 2,340 | 2,340 | 3,050 | 2,970 | 3,760 | 3,600 |
| | NI-80 | 2,340 | 2,340 | 3,050 | 2,790 | 3,760 | 3,240 |
| | NI-90 | 3,040 | 2,980 | 3,750 | 3,560 | 4,460 | 4,130 |
| 14" | NI-40x | 2,730 | 2,450 | 3,440 | 3,110 | 4,150 | 3,770 |
| | NI-60 | 2,730 | 2,450 | 3,440 | 3,110 | 4,150 | 3,770 |
| | NI-80 | 2,730 | 2,450 | 3,440 | 2,920 | 4,150 | 3,400 |
| | NI-90 | 3,350 | 2,980 | 4,060 | 3,560 | 4,770 | 4,130 |
| 16" | NI-60 | 3,110 | 2,450 | 3,820 | 3,110 | 4,530 | 3,770 |
| | NI-80 | 3,110 | 2,450 | 3,820 | 2,920 | 4,530 | 3,400 |
| | NI-90 | 3,680 | 2,980 | 4,390 | 3,560 | 5,100 | 4,130 |

a) Factored shear resistance, V_r , of the unreinforced I-joint.

b) Factored end reaction resistance, ER_r , of the unreinforced I-joint without bearing stiffeners. Minimum bearing length shall be 5-1/2 inches for bearings adjacent to cantilever.

c) Factored shear resistance, V_r , of the reinforced I-joint.

d) Factored end reaction resistance, ER_r , of the reinforced I-joint without bearing stiffeners. Minimum bearing length shall be 5-1/2 inches for bearings adjacent to cantilever.

Notes:

- The tabulated design values are for standard-term duration of load ($K_D = 1.0$).
- Design of I-joists shall be in accordance with CSA O86.
- All nails are assumed to be common nails unless otherwise noted. Nails shall have a diameter not less than 0.128 inch for 2-1/2-inch nails.