

LOAD DEVELOPMENT

LOAD DEVELOPMENT FOR RFPI-JOIST WITH UNIFORM LOAD

STEP ONE: Calculate the Tributary Width

Tributary Width (or Trib width) = Half of the distance to the next supporting member on both sides of the joist. It represents the width of the floor the joist is responsible to support.

Trib Width = $(O.C. \div 2) + (O.C. \div 2) = O.C.$ (expressed in units of feet)

In the diagram below, if the o.c. spacing equals 16", the Trib Width = $16"/12 = 1.33'$

Trib Area = Area of the floor the joist is responsible to support.
Trib Area = (Trib Width) x (Joist Span)

STEP TWO: Calculate the PLF on the joist

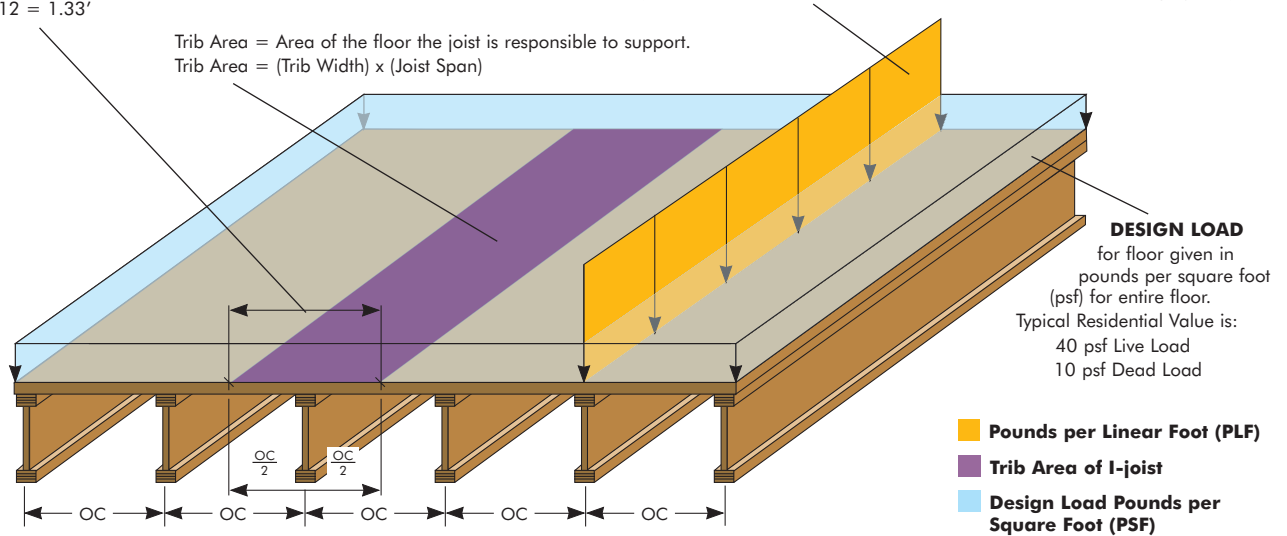
Pounds per Linear Foot (or "PLF") = (PSF Load) x (Trib Width).

This is the loading that the joist "feels" being applied along the top flange.

$PLF_{Live Load} = (40 \text{ psf}) \times (1.33') = 53 \text{ PLF Live Load}$

$PLF_{Total Load} = (50 \text{ psf}) \times (1.33') = 67 \text{ PLF Total Load}$

(Use these numbers to size the RFPI-Joist from the PLF table on page 13)



DESIGN LOAD
for floor given in pounds per square foot (psf) for entire floor.
Typical Residential Value is:
40 psf Live Load
10 psf Dead Load

- Pounds per Linear Foot (PLF)
- Tributary Area of I-joist
- Design Load Pounds per Square Foot (PSF)

LOAD DEVELOPMENT FOR RFPI-JOIST WITH LOAD BEARING WALL

STEP ONE

Calculate the portion of the wall load carried by each joist. This is also determined by the joist o.c. spacing and is given by:

$PL_{Live Load} = (PLF)_{Wall Live Load} \times (O.C.)$

$P_{Total Load} = (PLF)_{Wall Total Load} \times (O.C.)$

Where: O.C. = Joist on-center spacing (feet)

PLF = Wall loading (pounds per linear foot)

P = Concentrated load supported by joist (pounds)

As far as each joist is concerned, it feels the wall as a concentrated load (units of pounds). The greater the on-center spacing, the greater the portion of wall it must support.

STEP TWO

Calculate the equivalent uniform plf load due to this concentrated wall load. This equivalent plf load will allow you to safely size the joist using the plf table to the right no matter where the wall is located over the joists. It is given by:

$PLFEQ_{Live Load} = 2P_{Live Load} \div L$ $PLFEQ_{Total Load} = 2P_{Total Load} \div L$

For example, assume the wall was applying a 400 plf total load on the joists to the left. If the joists are spaced at 16" o.c. and span 20 ft, then:

$P_{Live Load} = \frac{4}{5} (400 \text{ plf}) \times (1.33') = 426 \text{ lbs.}$

$P_{Total Load} = (400 \text{ plf}) \times (1.33') = 532 \text{ lbs.}$

$PLFEQ_{Live Load} = \frac{2 \times 426 \text{ lbs.}}{20'} = 43 \text{ plf}$

$PLFEQ_{Total Load} = \frac{2 \times 532 \text{ lbs.}}{20'} = 54 \text{ plf}$

(Assuming a 40/10 loading from above)

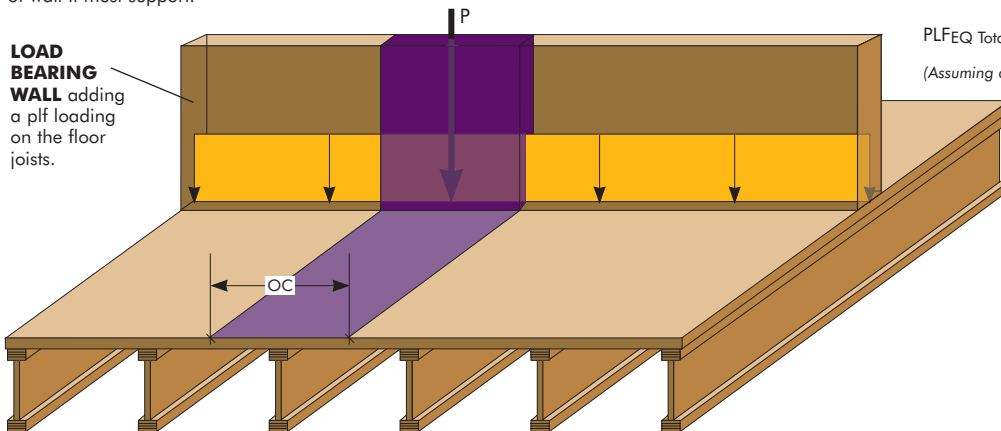
These PLF loads are in addition to the original PSF Design Loads and must be added before using the table. Using the example from above, these joists should be sized to carry:

Live Load PLF:
 $53 \text{ plf} + 43 \text{ plf} = 96 \text{ plf Live Load}$

Total Load PLF:
 $67 \text{ plf} + 54 \text{ plf} = 121 \text{ plf Total Load}$

If a joist could not be sized, redo this with a smaller on-center spacing or use RFP-KeyBeam® to size the joist more accurately.

LOAD BEARING WALL adding a plf loading on the floor joists.



- PLF Wall Load
- Portion of plf wall load carried by joist
- Tributary Area of I-joist