

Sizing iLevel® Trus Joist® Products for Multi-Family Projects

Considerations when using TJ-Beam® Software for the Design of iLevel® Trus Joist® Products into Multi-Family Projects

Uniform Loading - Select **Residential – Living Areas** from the “Primary Load Group” on the Load Information page as shown in Figure 1. (The “Structure/Building Class” must be set to **Residential** and “System” to **Floor** on the Span and Support Information page for this selection.) This loading applies to private rooms per the International Building Code (IBC). Often light weight concrete topping is applied to the floor which requires the designer to increase the default dead load as required (usually 20 to 25 psf). If the floor area supports public rooms and corridors serving them, the required live load must be increased to 100 psf. This can be done by changing the Live Load of the primary load group or by clicking on the Special Loading tab and adding vertical loads that replace the 40 psf with 100 psf in the required location along the joist length. Note that the primary load group applies to the full length of the member being sized. Other areas within multi-family projects that may require the live load to be increased include office areas (50 psf) or balconies (100 psf).¹

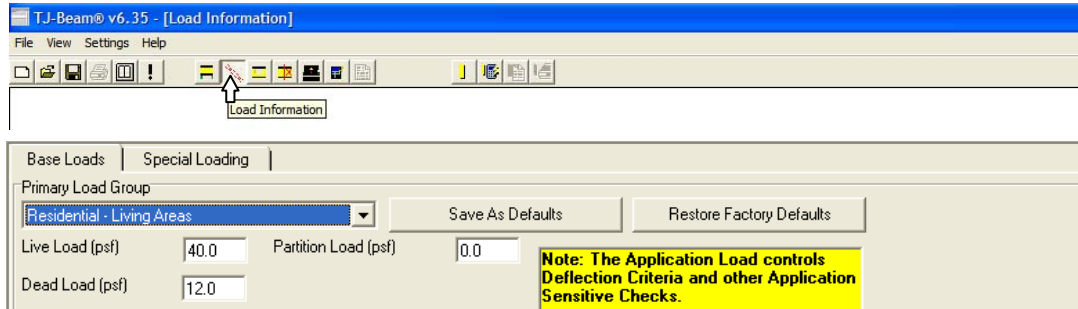


Figure 1

Concentrated Loading - The Special Loading tab (Figure 2) allows for the input of concentrated loads such as load bearing walls. Flat roof areas may have concentrated loads from parapets or mechanical equipment. Select **Point, plf** for line loads perpendicular to the joist or beam such as a perpendicular load bearing wall. The software will multiply the load by the joist on center spacing or the beam tributary width to develop the concentrated load to the member being sized. Select **Point, lbs** when designing joists supporting mechanical units or other single concentrated loads.

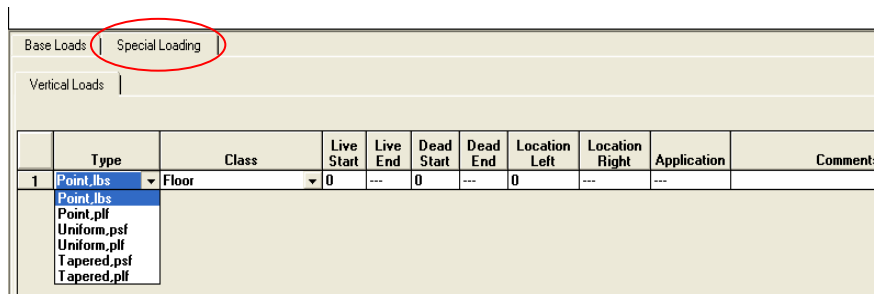


Figure 2

TJ-Pro™ Rating –This allows a designer to go beyond deflection criteria and evaluate floor joists based on floor performance. See Figure 3 to access the TJ-Pro Rating System. TJ-Pro Ratings allow a designer to evaluate the relationship between the “feel” of the floor and the cost. The Ratings and Decks tab allows the user to set a minimum TJ-Pro Rating level and input the floor sheathing thickness. The Ratings Modifier tab allows the user to select if the floor system has a poured topping, perpendicular partitions, or a direct applied ceiling². Consult your iLevel Trus Joist TJI® Specifier’s Guide TJ-4000 for additional information.

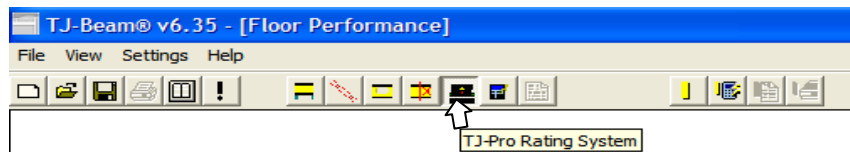


Figure 3

Holes - Another critical consideration when designing multi-family projects is the items that must penetrate the floor assembly such as sprinkler lines, mechanical ducts, and plumbing. TJ-Beam® software can be utilized to check holes in TJI® joists for the specific job conditions, often allowing holes to be closer to the bearing locations than stated in published hole charts. Simply click on the **Hole Information** icon in the upper menu bar (Figure 4), and then click on the **Add** button below. Select the type of hole from the drop down box, then enter the hole dimensions and location from the left support. When wanting to find the maximum size hole allowed at a specific location, select Maximum

from the Type list and enter the location. The software will produce the maximum diameter, height and length allowed in the detailed output.

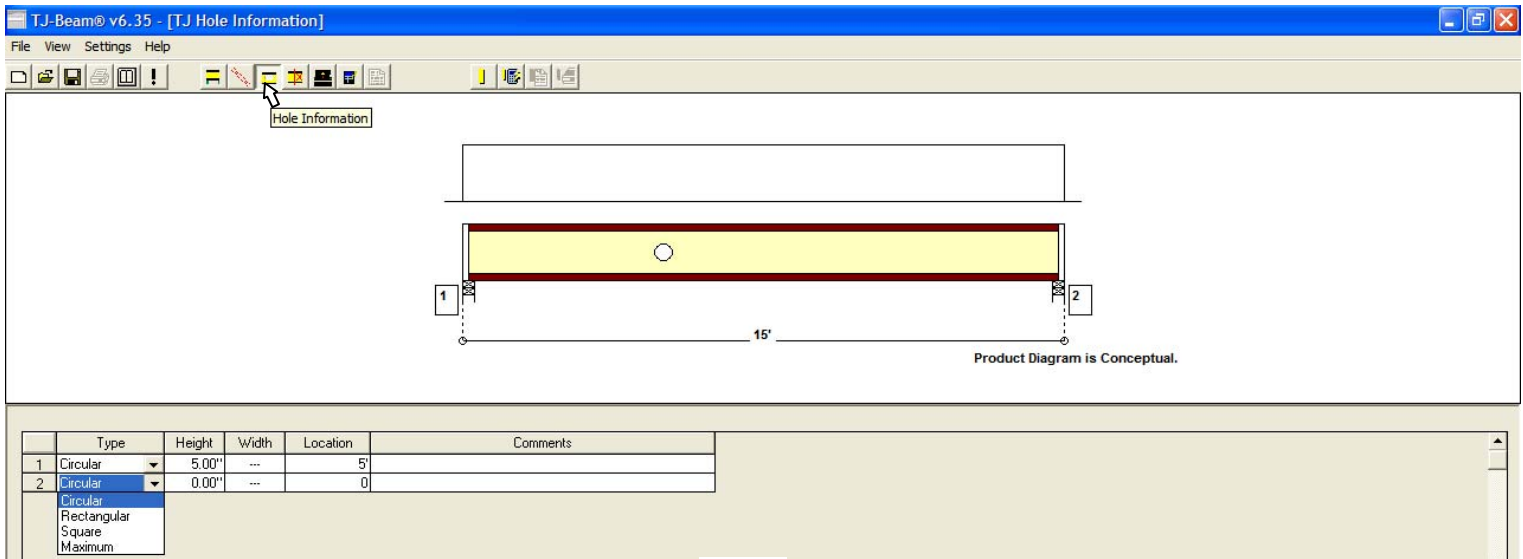


Figure 4

Other Considerations when using iLevel Trus Joist Products in Multi-Family Projects

Fire Assemblies - Multi-family projects often require one-hour fire resistive floor-ceiling assemblies. Typically, the most cost effective assembly is Assembly B which requires a two layer gypsum board ceiling (as listed in ESR-1153, either two layers of ½" Type C or two layers of ¾" Type X gypsum board can be used). Single layer systems are available but require more labor and expense due to larger flange requirements, mineral wool insulation batts, or setting strips. Consult iLevel Trus Joist Fire Facts Guide 1500 for additional fire information, including fire-resistance-rated construction for walls.

Sound – Multi-family projects must meet the sound transmission requirements of the IBC, section 1207. Assembly B, noted above, will achieve a STC rating of 50 (58 with gypsum concrete topping) and an IIC rating of 50 or higher depending upon the floor covering used. iLevel's code evaluation report ESR-1153, publishes sound test results for several floor coverings used in conjunction with assembly B. Resilient channels must be installed between the bottom flange and the ceiling in order to isolate the ceiling from the structural member and achieve the sound ratings. Installation of the resilient channels does not affect the one-hour fire ratings. Where allowed by the local code jurisdiction, STC and IIC ratings can be estimated using Table M16.1-9 of The ASD/LRFD Manual for Engineered Wood Construction published by the American Forest & Paper Association.

Holes in Beams - To ease the design of the floor system and placement of beams, iLevel marks TimberStrand® LSL beams with an allowable hole zone that allows round holes to be placed through these members. The maximum diameter of the hole is approximately ⅓ the beam depth. The location of the hole must be between the beam markings which is the middle ⅓ of the beam depth and at least 8" from the end of the beam. Holes can be placed in beams with uniform loads and/or concentrated loads. Refer to iLevel Trus Joist Beam, Header and Column Specifier's Guide TJ-9000 for specific allowable hole diameters base on the beam depth and more information.

Lateral Design - The iLevel Shear Brace (iSB) is a prefabricated shear panel that can provide a solution for wall areas too narrow to allow a site built shear wall. For multi-family projects built over garages, the iSB is the perfect product for the narrow garage front walls. Creating a portal frame by installing a garage door header above the iSB allows for higher lateral loads than a stand alone shear brace. The iSB is constructed using TimberStrand® LSL which allows for field trimming unlike steel prefabricated walls. For more information regarding the iSB, refer to iLevel Shear Brace Specifier's Guide TJ-8620.

iLevel has expert technical support teams located through out the U.S. to answer your questions when specifying iLevel TJI® joists, beams, columns, studs or shear braces into multi-family applications. TJ-Beam® software is available as a free download at www.ilevel.com to assist the specifier in sizing iLevel products. In addition, our dealer network can provide placement plans using software developed by iLevel. If required, iLevel engineers can provide sealed calculations or shop drawings to compliment the project plans and assist the designer of record. Use the contact information at the bottom of the page to reach your local iLevel representative and technical support team. Download literature, technical bulletins and find your nearest dealer at www.ilevel.com.

1. With the adoption of the 2009 IBC, balcony loading requirements are reduced to the same loading as the occupancy served.
2. Poured toppings on longer spans (over ±16 ft) will decrease the TJ-Pro Rating. Check the Perpendicular Partitions box when perpendicular partitions fall within the middle third of the span. Both perpendicular partitions and direct applied ceiling will increase the TJ-Pro Rating.