

The Load Combination Reductions option in Loading dialog box is intended to allow the user to control how these reductions are applied to a truss design. Load combination reductions can be used when different types of live loads are applied to a truss design in the same load case, and they account for the reduced probability that all of the maximum live loads will occur on the truss at the same time. When these reductions were first introduced into the IBC code, they were specified as optional reductions that the designer was permitted to use. In the 2006 IBC, these reductions were combined into the specified load combinations, and were no longer shown as optional. Because of changes to wind loading in ASCE 7-2012, these reductions are always applied when using design codes that use this standard, i.e. the 2012 IBC and the 2013 FBC.

There is set of general load cases required when designing a structure and they can be found in the design standard ASCE -7, "Minimum Design Loads for Buildings and Other Structures", and there is a similar set of load cases within the International Building Code (IBC). In truss design, loads can be considered either Dead or Live. Dead (D) loads are representative of the actual weights of the building materials that the truss will be supporting, including the weight of the truss itself. The term Live load (L) is used as a general term that includes Occupancy Use which includes Storage, Roof Live load (L_r), which considers Construction/Maintenance loads including equipment and material. There are also Environmental loads, mainly Snow (S) and Wind (W).

Within the general load cases that need to be considered is the basic Dead + Live, no matter what type of Live load. This could include load case(s) with Snow and load case(s) with Wind, for example. There are also general load cases that are required that have multiple Live loads within the same load case. For example, Attic trusses designed for human occupancy have both Occupancy and Environmental loads that need to be considered. When considering one of these load cases, there is a reduction factor that is applied to each Live load in the load case. One example is the load case of Dead (D) + Occupancy (L) + Construction (L_r) for which the equation actually looks like $(D + 0.75L + 0.75L_r)$. The reduction factor of 0.75 is applied to each Live load to account for the lower probability that each of the full Live loads will be on the truss at the same time.

When designing under ICC-06 or 09 building codes you will have to select when to use this reduction, see figure 1. You will find three options that are available.

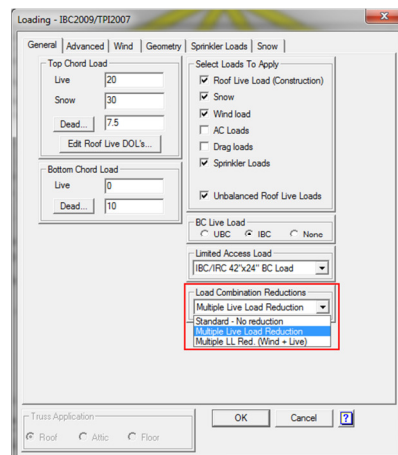


Figure 1 – Loading Dialog ICC-06 and 09



Load Combination Reductions

- **Standard – No Reduction** – With this option, no reduction factor will be applied to any of the Live loads. The design will consider the full Live loads in any and all the load cases.
- **Multiple Live Load Reduction** – With this option, any general load case that contains L, L_r and or S type of Live loads will be checked as follows: one load case where the multiple Live loads will be adjusted by the appropriate factor, then additional load case(s) where each Live load type will be checked, on its own, using the full magnitude of Live load.
- **Multiple LL Red (Wind + Live)** – With this option, any general load case that contains L, L_r, S and or W type of Live loads will be checked as follows: one load case where the multiple Live loads will be adjusted by the appropriate factor, then additional load case(s) where each Live load type will be checked, on its own, using the full magnitude of Live load.

The ICC-2012 and FBC-2013 codes will automatically use the Multiple LL Red (Wind + Live) reduction and this selection box will be greyed out. If you have any questions concerning the use of the “Load Combination Reductions” contact MiTek Engineering.