



LOADS ON ROOF TRUSSES

Ho, Ho, Ho, Merry Christmas! You better watch out, you better not cry - because Santa Clause is coming to town and we want to discuss if your roof is designed for the weight of Santa and his sleigh? It should be able to carry Santa but probably not his over-flowing bag of presents and potentially not his sleigh! So let's talk about all the variables....



Applying correct loadings to a roof truss design is fundamental and critical. Let's briefly review what loads are being used/applied on roof truss designs.

In general, there are 4 categories of loads in a roof truss design which are Dead load, Live load, Snow load and Wind load. (We won't talk about earthquake loads in this article.)

- Dead load - which is a permanent action that is likely to act continuously throughout the design working life and for which variations in magnitude over time are small. For example: roof tiles, battens, roof bracing, timber trusses, nail plates and ceiling plaster which are all likely to stay on the trusses permanently.
- Live load, which is a variable action resulting from people moving or occupancy of the structure. For example: Workers on the structure, during construction and loads - like rain and hail, which are likely to stay on the trusses for a period of time.
- Snow load, which is variable like live loads but can be on the roof for longer periods.
- Wind load, is also a variable action resulting from wind actions. Based on the house location N1-N6 and C1-C4 are generally used for referencing wind loads for housing. Winds generate forces from all directions upward, downward and sideways.

The most common live loads in a truss design include:

- Distributed Live loads which is 0.25kPa = approximately 25kg/m^2 for residential roofs. For Commercial roofs this distributed Live load is $(1.8/A+0.12)$ with "A" being the surface Area of the member under analysis in metres, but never less than 0.25kPa .
- Point loads at each chord panel 1.1 kN = approximately 110 kg for residential jobs and 1.4kN for commercial jobs. This load represents a person standing on the roof at any location. This point live load is also applied 150mm from the end of overhangs of standard trusses and 300mm from the ends of hip overhangs. (Reference AS1720.5)
- Snow action, depending on the locations and the pitch of the house, variant of distributed load will be applied to the whole top chords. Roof pitches over 60 degrees have no snow load.
- Specified live loads such as hoist lifting, safety anchor point load. Those loads are normally specified by the suppliers and can be manually added into truss designs at specific locations.

Truss design results are usually governed by these categories of actions which may be governed by one category or a combinations of these actions. The picture below is a great case in point... Santa lands on the roof and then shows incredible skill and dexterity to complete his journey to the chimney... The software will add and combine all of the cases based on the users input.

If any loads concern you during design, please contact an engineer to clarify.

So back to our original question - are roof trusses designed for Santa and his sleigh? I'd say they are designed for Santa but possibly not for his sleigh if it was full of presents... I wonder what the weight of his Sleigh would be?

Please have a wonderful and safe Christmas and the happiest of New Years, from the Multinail Team!



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