TPIC Technical Bulletin #8
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FLAT ROOF TRUSS DESIGN

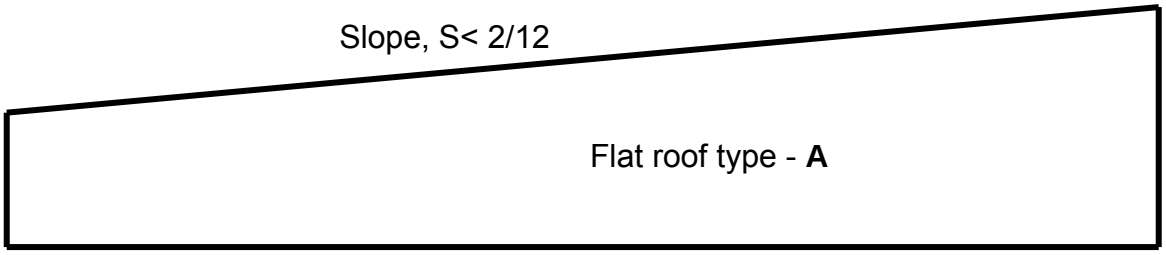
For many years, roof trusses that met the Housing / Small Building requirements of Part 9 of the NBCC but had top chord profile slopes less than 2/12 were designed using the loading requirements of Part 4 NBCC. This was because the simplified snow load calculation for Part 9 buildings could not be justified to account for possible overloads from ponding.

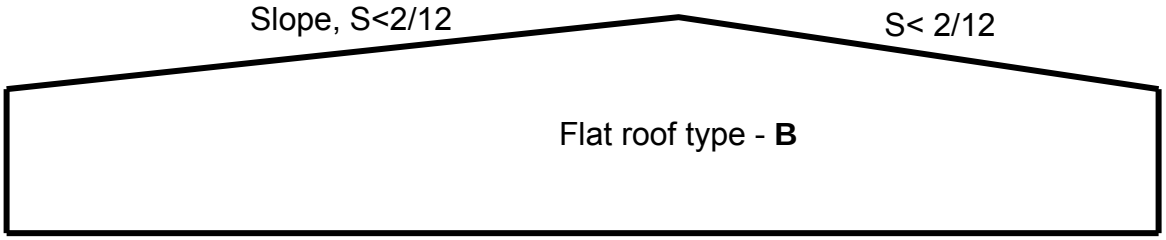
TPIC 2011 and TPIC 2014 further clarified these trusses as components framing part of a flat roof and the design procedure was amended. Thus the above standards now permit these trusses to be designed using Part 9 loading, under the condition that all factored material resistances (excluding bearing resistance) are reduced by 25% in the analysis (Flat roof factor K_F=0.75).

Therefore, trusses framing roof planes that are flat or almost flat (S< 2/12 – flat roof type A or B shown below) or trusses that are framing a partial flat roof plane (type C shown below, where the ratio of flat top length, L1 to total span, L greater than or equal to 50%) shall be designed with the aforementioned strength reductions.

The minimum top chord dead load for these trusses shall be 10 PSF per TPIC 2011 Table 3.3.1 and TPIC 2014 Table 5.3.1. The modified formula used to design short span trusses (clear span ≤ 40 ft) does not apply to flat roof truss designs (as per 4.4.13 TPIC 2011 and 6.5.12.2 TPIC 2014)

FLAT ROOF PROFILE TYPES:





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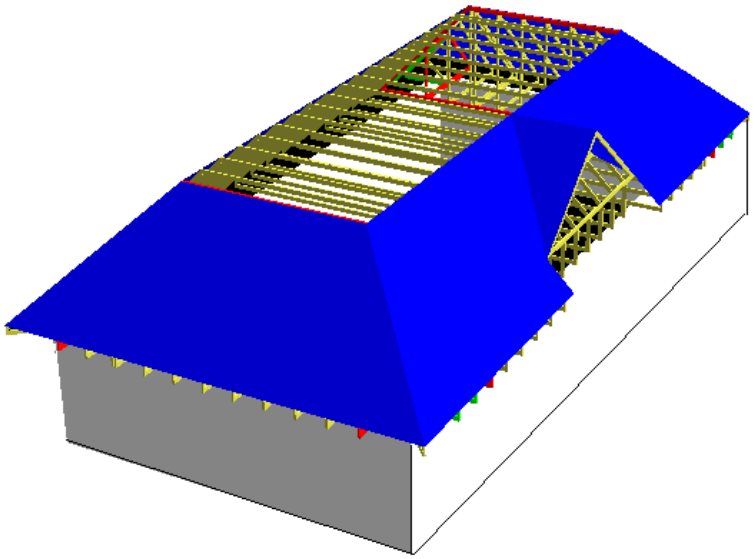

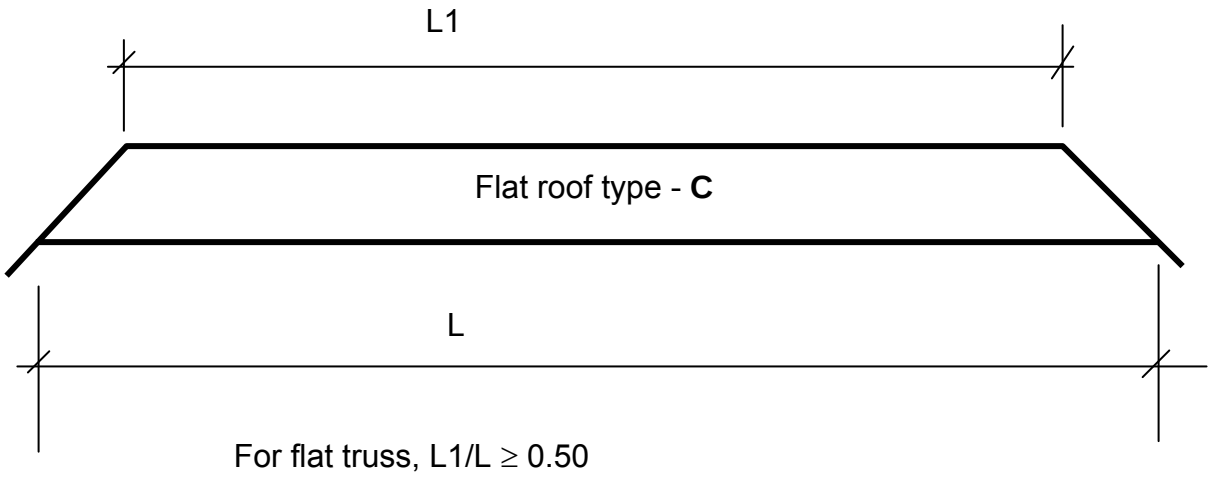

For flat truss, L1/L ≥ 0.50

When a hip truss in a hip-end system has a slope ≥2/12, it is not considered to be part of a flat roof and hence flat roof factor does not apply even when L1/L≥0.5. This is reasonable because the hip-end system is sloped enough to allow for proper drainage of water. However, the modified formula shall not be used to design a hip truss in a hip-end system with a slope ≥2/12 and L1/L≥0.5.