

Real structures contain defects, zones of partial yielding and residual stresses that are not taken into account in the numerical models. For these reasons, and also others, several design codes require the addition of a fictitious minimum horizontal load (notional load) that creates a horizontal deformation of the structure which causes an amplification of the forces and deformations. Note that this load is not a minimum load; it is added to existing horizontal loads (wind, seismic load, etc.).

The horizontal notional load (H_f) is proportional to the factored vertical load (C_f). The proposed intensity of H_f depends on the design code and varies between 0.2% and 0.5% of the vertical load (C_f). In the program, the notional load is applied to each joint and is proportional to the factored vertical load acting on this joint. The use of horizontal notional loads is prescribed in the CSA S16-09 code (cl. 8.4) as well as AISC LRFD-05 and AISC ASD-05 (chapter C).

The notional load applies to all static and seismic analyses, not only to P-Delta analysis and the analysis of one-way elements. The notional load is added to the actual loads at all times when the option is activated.

The example below is taken from Example 8.2 of the reference *Limit States Design in Structural Steel, Ninth Edition, Kulak Grondin, CISC*.

- Total factored vertical load distributed on the two levels: $30.5 \text{ m} \times (45 + 55) = 3050 \text{ kN}$
- Initial total horizontal load: $15 \text{ kN} + 35 \text{ kN} = 50 \text{ kN}$
- Notional load of 0.5% of the factored vertical loads: $0.005 \times 3050 \text{ kN} = 15.25 \text{ kN}$
- Total horizontal load including effect of the notional load: $50 \text{ kN} + 15.25 \text{ kN} = 65.25 \text{ kN}$

