

# PROKON Support Portal

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## Corresponding forces from Frame and Sumo to Base Design.

Joep - 2019-04-17 - [0 Comments](#) - in [C15:Concrete base design](#)

When exporting Reactions from Frame or Sumo to Concrete Base Design using the design link, one will notice that the corresponding moment reactions are not entered at corresponding applied moments in Base Design. This article will explain why the above applies.

How forces are exported from Frame Analysis and Sumo to Base Design model.

Frame Analysis and Sumo use a coordinate system where the X- and Z-axes are on the horizontal and the Y-axis is in the vertical as shown in figure 1.

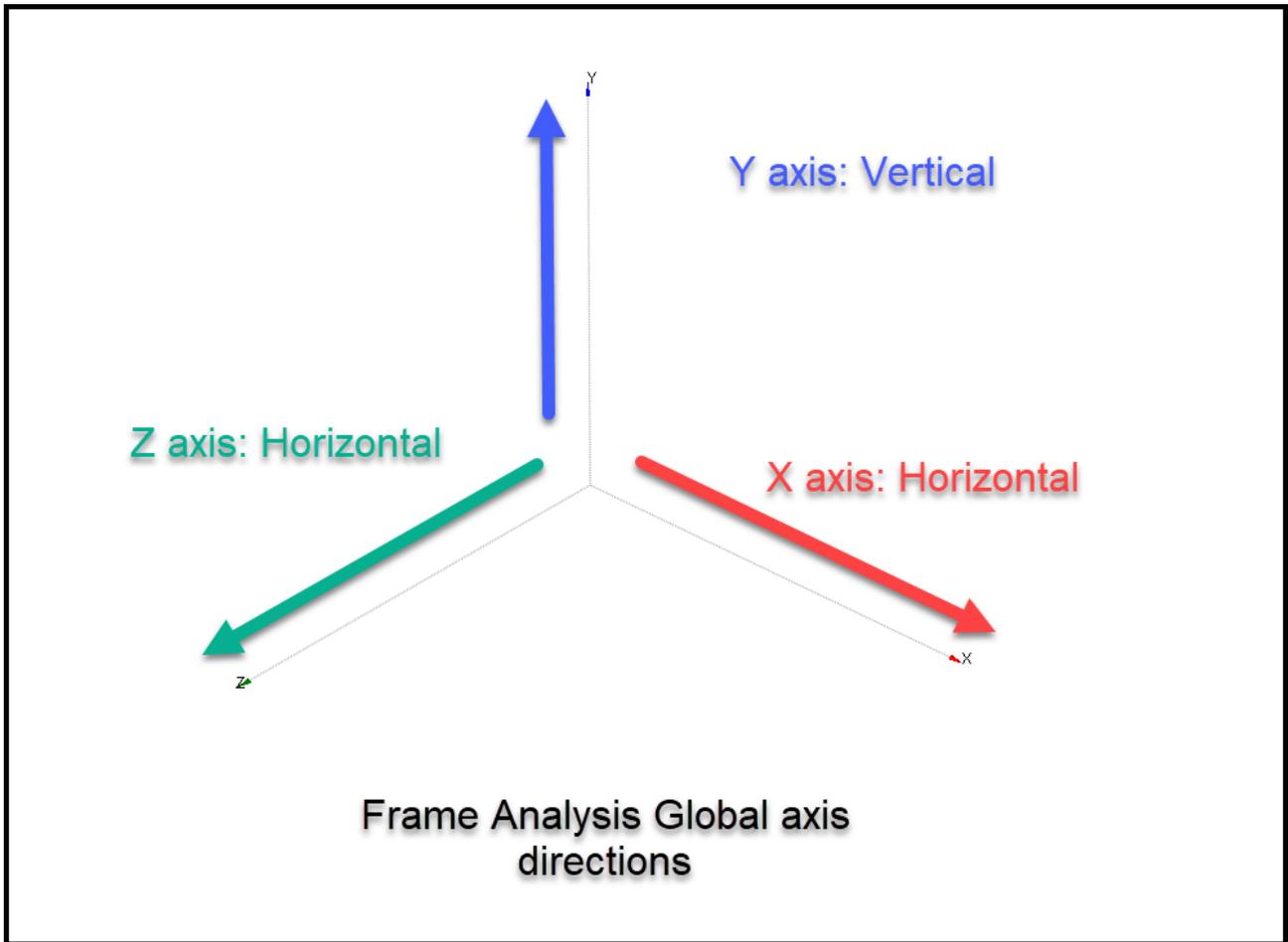


Figure 1. Frame Analysis Global Axis direction.

Nodal loads are applied parallel to the global axes. Positive moments will be entered as rotational forces parallel to the global axis using the right-hand rule. Negative moments will be in the opposite rotation. Please refer to figure 2.

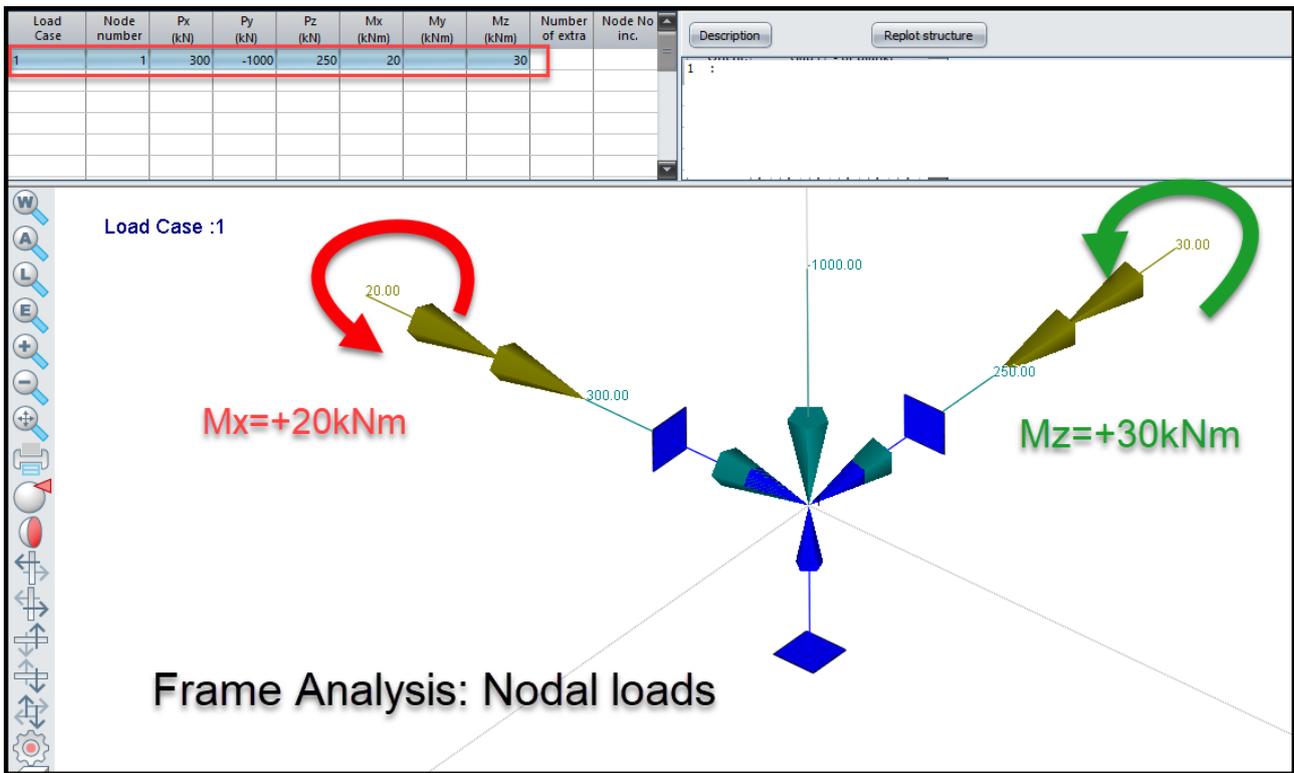


Figure2. Frame Analysis: Nodal loads

The Ultimate Limit State (ULS) reactions will be in the opposite direction of the applied loads. In figure 3, the X-Moment is a rotational reaction about the X-axis. The Z-moment is a rotational reaction about the Z axis.

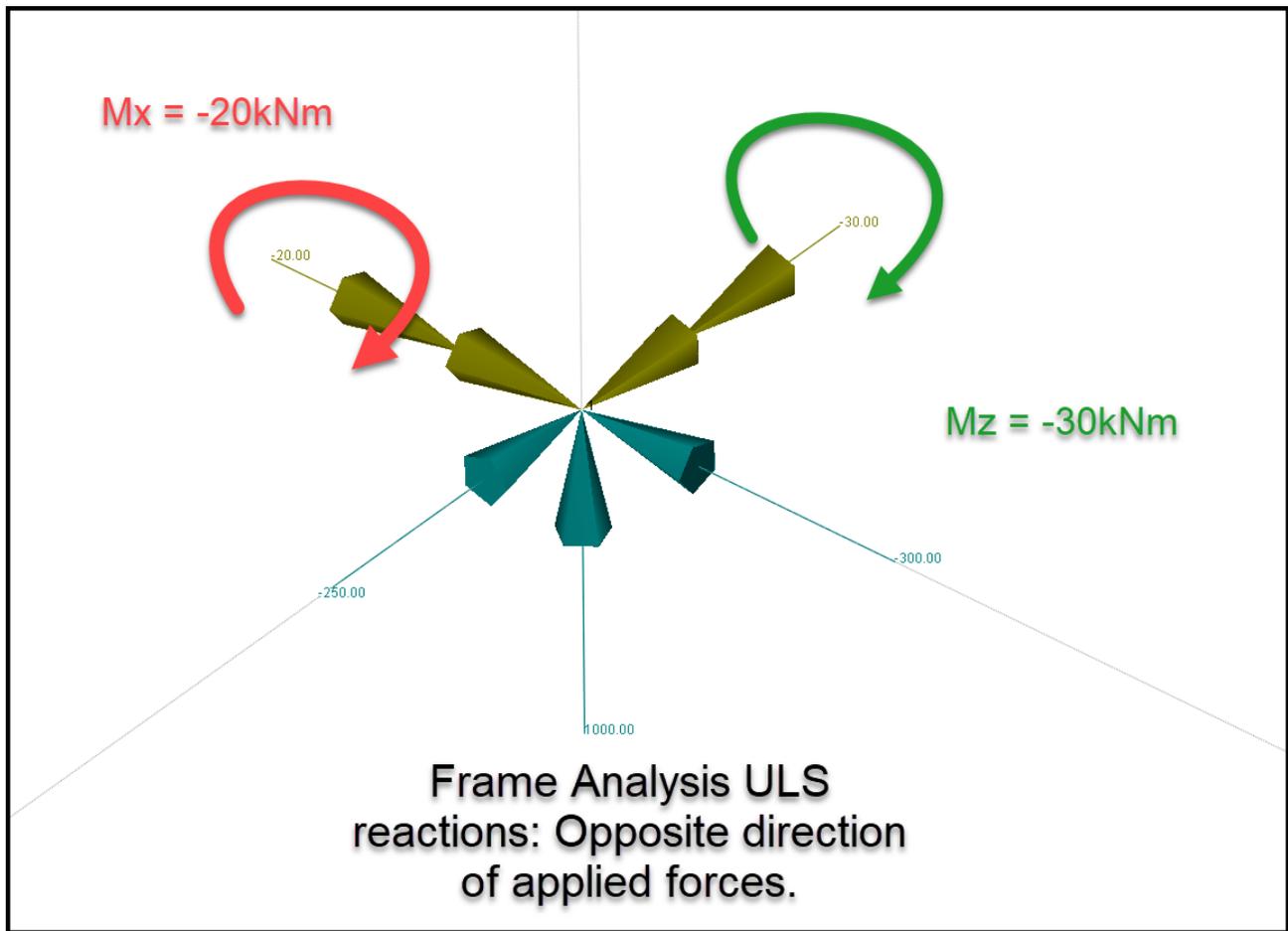


Figure3. Frame Analysis ULS reactions: Opposite direction of applied forces.

From Frame Analysis or Sumo, one will export the ULS reactions to Base Design. The results will be imported as applied forces. The Base Design module does not take into consideration the torsion exerted from columns, hence the Y-moments from Sumo and Frame will not be imported.

**Base Design uses a different coordinate system than Frame or Sumo.**

The X and Y axes are in the horizontal plane and vertical forces will be applied as P at a height of N (Stub column Height).

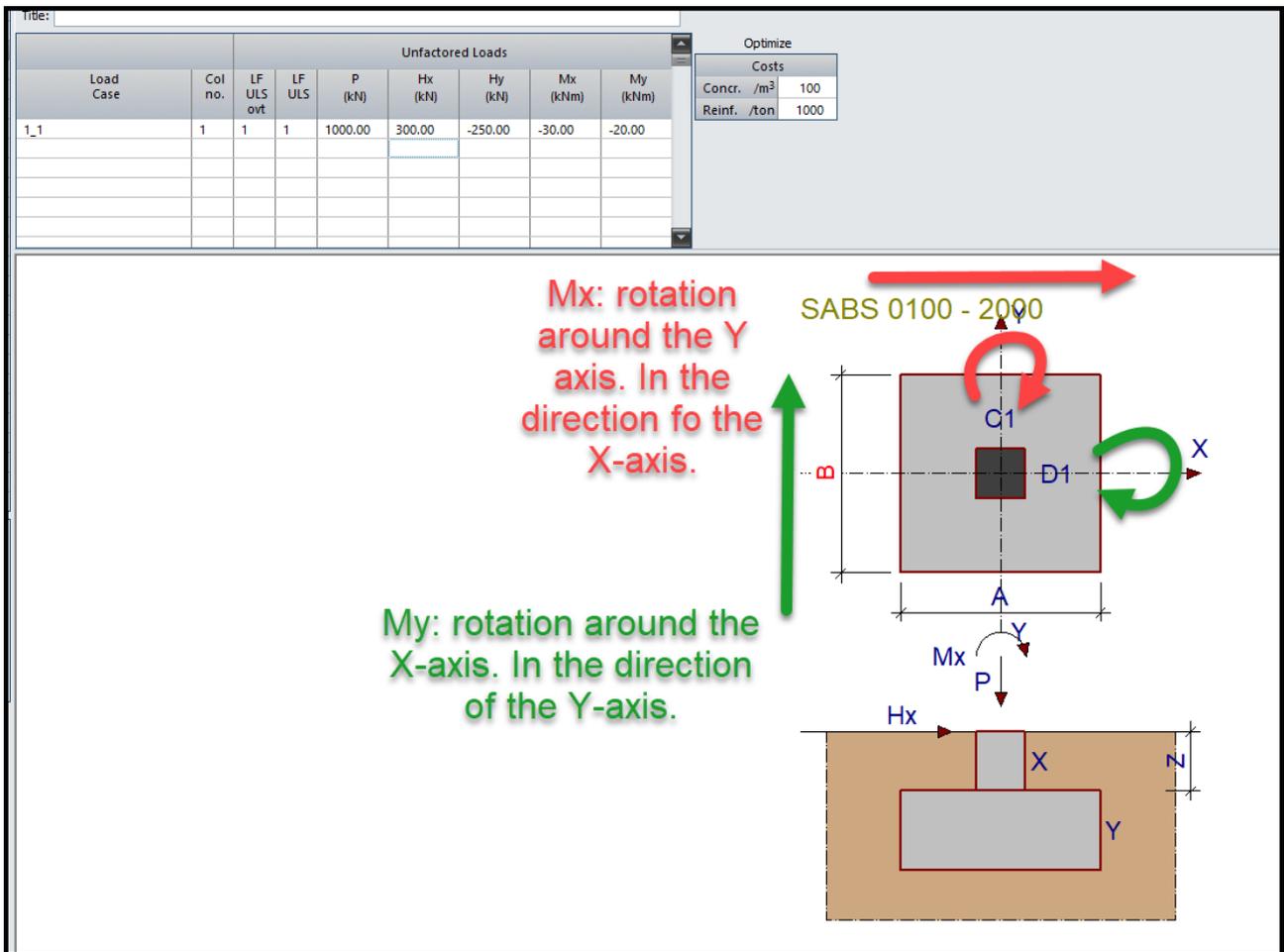


Figure4. Base Design sign convention.

Base Design uses finite elements to analyse the Wood & Armour moments for the base slab. Thus, the X moments are applied in the direction of the X-axis (rotation about the Y-axis). The Y moments are applied in the direction of the Y-axis (rotation about the X-axis).

ULS reaction in Frame or Sumo	Unfactored load in Base Design
X-force	Hx
Y-force	P
Z-force	Hy
X-moment	My
Y-moment	N.A.
Z-moment	Mx

Table 1. Shows the Unfactored loads from Base Design against the corresponding ULS

reaction from Frame or Sumo.