

Slab-system moving-load analysis

How are podium slabs subjected to vehicle load?

Answer: To simulate a four-wheel vehicle load traveling along design strip CSA3, two rows of joints are created. Assuming the vehicle travels the 24m length at a rate of 1 m/sec, and remains centered along the layout line, 25 pairs of joints and 24 load patterns represent the possible loading configurations taken at 1sec time steps. Depending on the length of the vehicle, two pairs of joints will be loaded at any given time step, as shown in Figure 1:

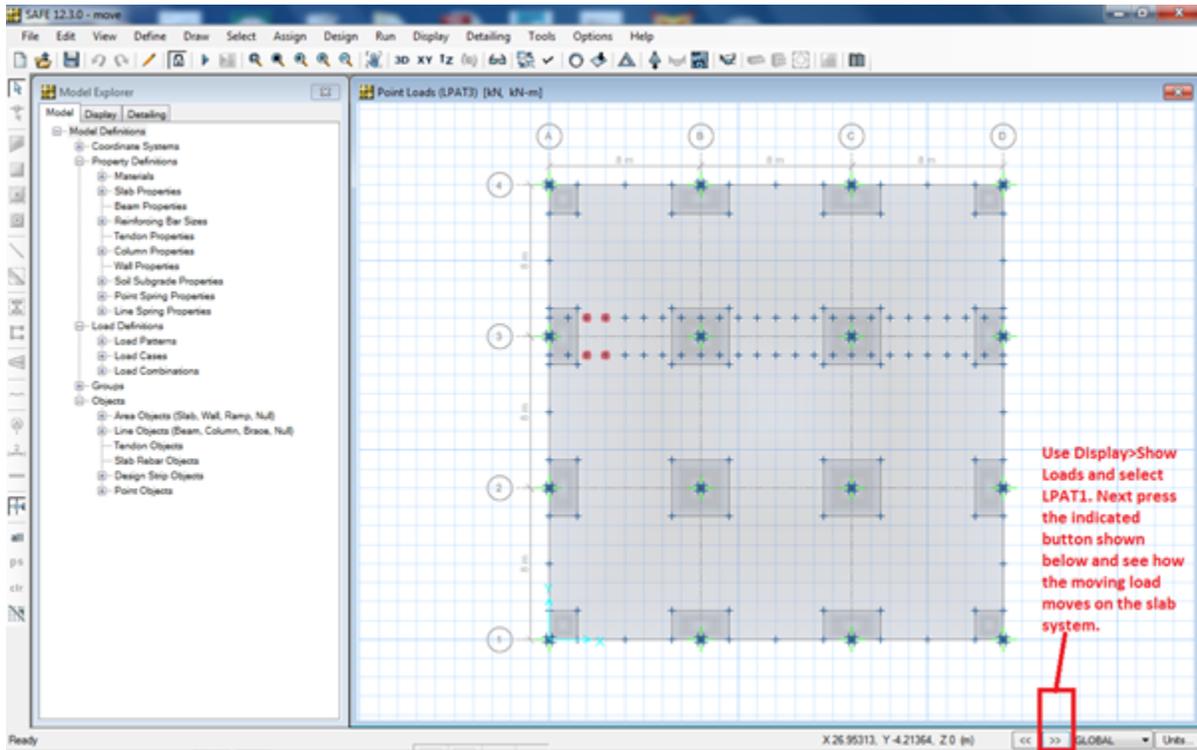


Figure 1 - Define nodes where vehicle response is to be computed

A load combination named Move Comb is defined with an Envelope type, load patterns LPAT1 to LPAT24, and a 1.0 scale factor. A higher scale factor may be specified to include the effect of impact. After analysis is run, strip forces from the enveloped load combination indicate the maximum positive moment, as shown in Figure 2:

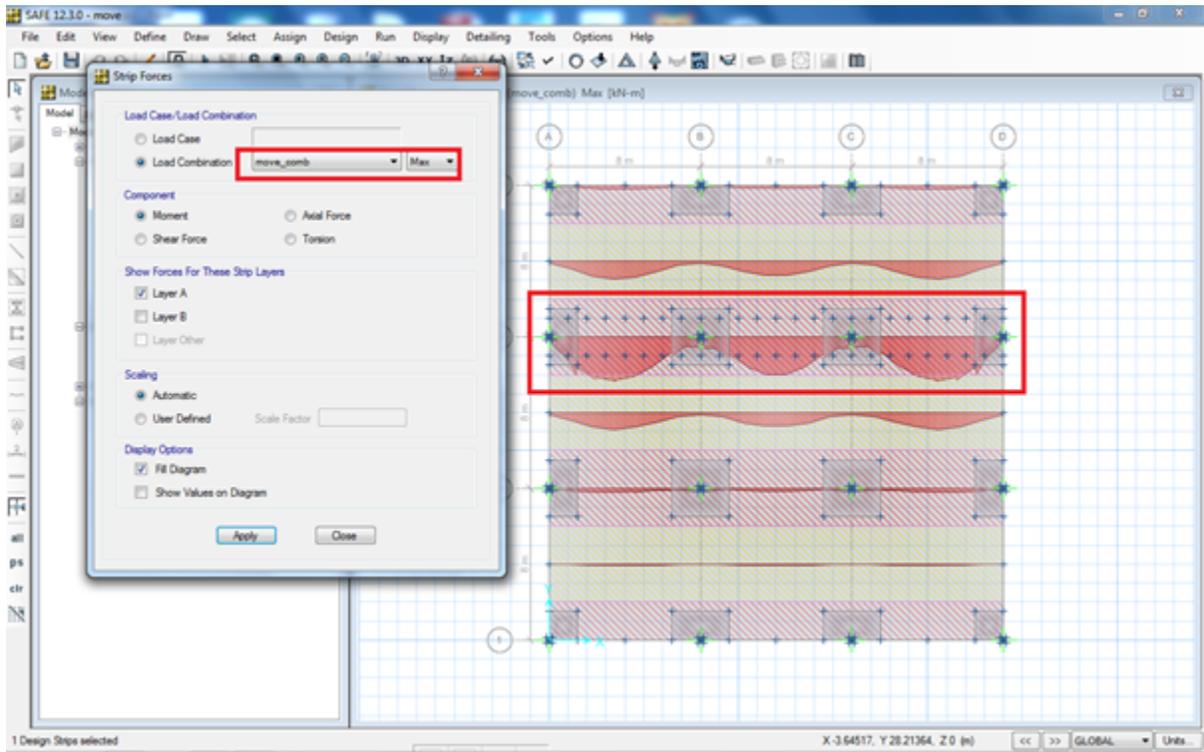


Figure 2 - Envelope strip moments

Minimum values indicate the maximum negative moment, as shown in Figure 3:

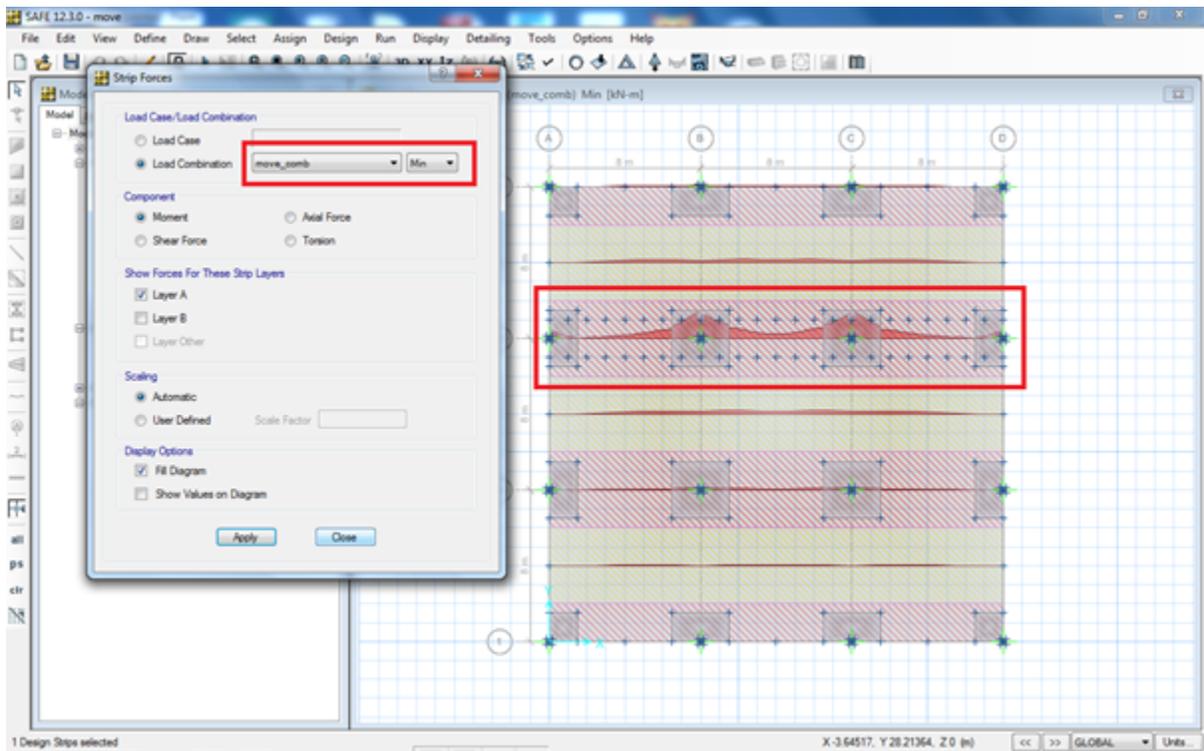


Figure 3 - Negative moment

Design should consider both the maximum positive and negative response.

Modeling considerations

- Please note that the slab should be **meshed** at the specified joint locations to provide for analysis. To mesh these load-pattern points, select each joint, then select Assign > Include/Exclude Point in Analysis Mesh > Include Selected Point Objects in Mesh > OK, as shown in Figure 4:

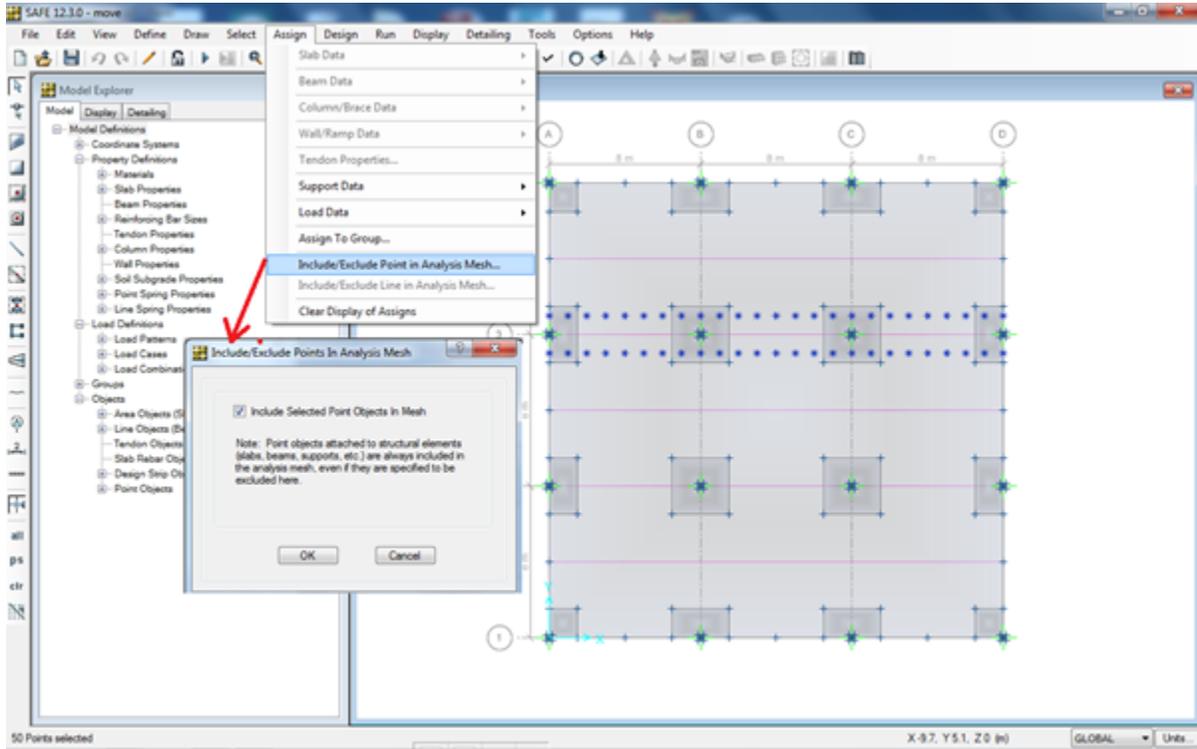


Figure 4 - Mesh the slab at defined points

- To refine analysis results, define more load-pattern points at a closer spacing before the load combination is defined.
- To consider a different vehicle path, replicate the set of points to a new location, then delete the previous set.

The next major release of **SAFE** will feature a fully-automated moving-load analysis.