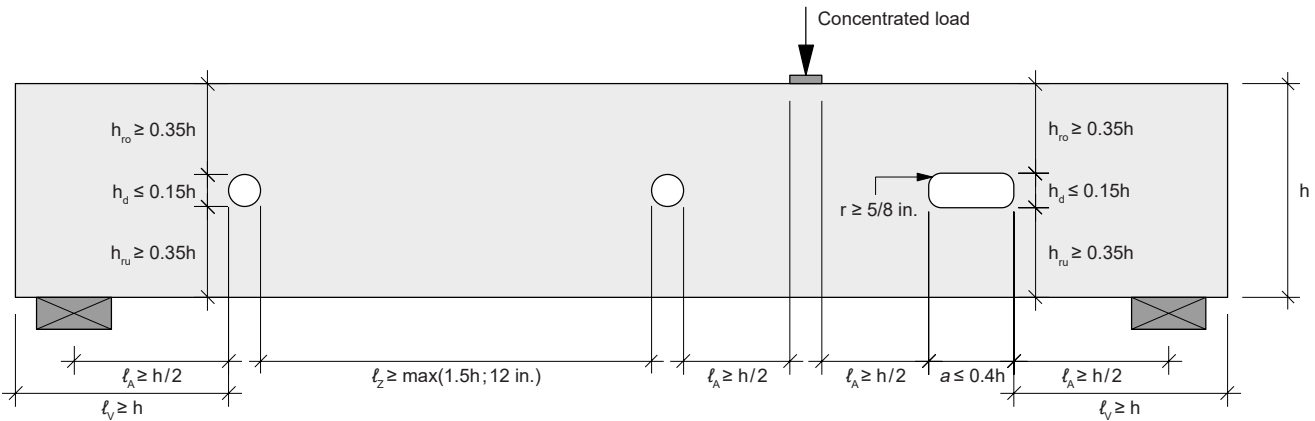


## Openings in Nordic Lam+ Beams

This technical note provides guidance for the design of openings in Nordic Lam+ beams. The beam must be exposed to dry service conditions only and the openings must conform to the geometries indicated below. Note that all openings must be verified by a qualified mass timber design engineer. The following guidelines are based on DIN EN 1995-1-1/NA:2013-08, National Annex – Eurocode 5: Design of timber structures.

### Openings Without Reinforcement

Shear capacity at reduced section, bending stress capacity above and below opening and splitting capacity must be verified.

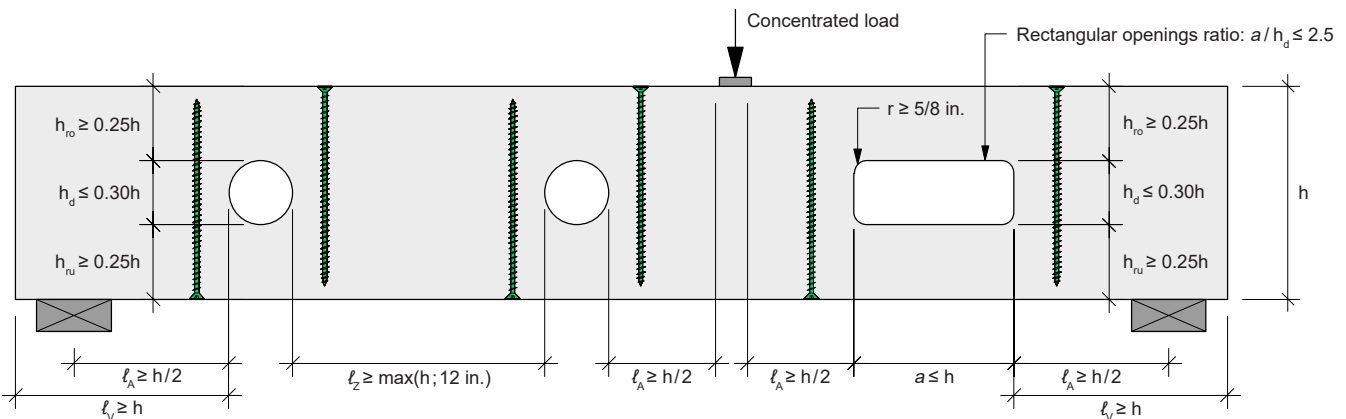


Notes:

- Opening size:** The opening height should not exceed 0.15h, where h is the beam depth. For rectangular openings, the opening width should not exceed 0.4h.
- Opening location:** The opening should have a minimum clear distance, as measured from the edge of the opening, of 0.35h to the top or bottom face of the beam, h to the end of the beam and 0.5h to the center of support. If there is a concentrated load, the opening should have a minimum clear distance of 0.5h, as measured from the edge of the opening to the nearest edge of the load.
- Opening spacing:** The minimum clear distance between any adjacent openings should be 1.5h or 12 inches, whichever is larger.

### Openings with Reinforcement

Shear capacity at reduced section and bending stress capacity above and below opening must be verified. Screw reinforcement preventing wood splitting must be designed by a qualified mass timber design engineer. Minimum one screw is required on each side of opening.



Notes:

- Opening size:** The opening height should not exceed 0.3h, where h is the beam depth. For rectangular openings, the opening width should not exceed h.
- Opening location:** The opening should have a minimum clear distance, as measured from the edge of the opening, of 0.25h to the top or bottom face of the beam, h to the end of the beam and 0.5h to the center of support. If there is a concentrated load, the opening should have a minimum clear distance of 0.5h, as measured from the edge of the opening to the nearest edge of the load.
- Opening spacing:** The minimum clear distance between any adjacent openings should be h or 12 inches, whichever is larger.