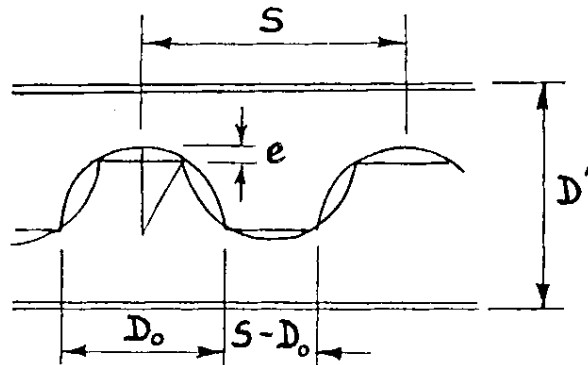


Technical Note on Openings in Cellular Beams



The user must define the opening diameter D_o and the c/c Spacing S .

D_o can be either in mm or as a ratio of the overall depth of the section (if less than 1.95)

S can be either in mm or as a ratio of D_o (1.2 to 1.94)

Optionally the user can define the top distance in mm (Top of top flange to top of opening)

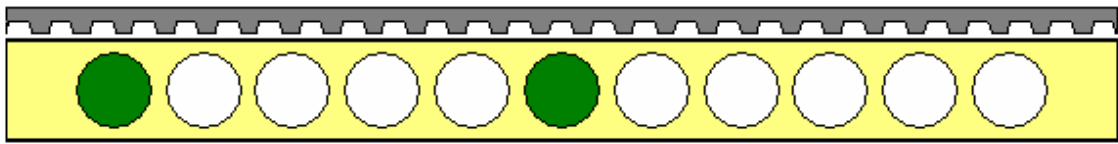
For “Built-Up” sections the program will not alter the depth:

For “Rolled Sections” the program will automatically calculate the new depth ensuring that:

1. The opening diameter is not excessive.
2. The tee stem above the opening, “dt”, is not less than the greater of:
 - 0.1 the increased value of distance between flanges, 0.1 D_o and 25 mm
3. The tee-stem below the opening, “db”, is not less than the greater of:
 - a. When the top distance is specified by the user
 - 0.67 dt, 0.1 D_o and 25 mm
 - b. Otherwise
 - 1 dt, 0.1 D_o and 25 mm

A cellular beam is assumed only if $S \geq 1.05 D_o$ And $S < 1.95 D_o$.

By default the openings are placed symmetrically allowing for a minimum clear distance to support equal to half the overall depth of the section.

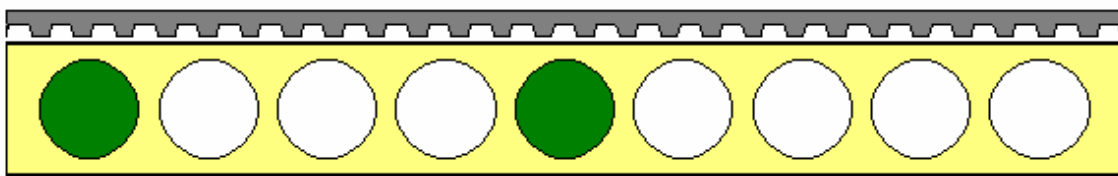


Note:

The green colour indicates opening for which full output is provided as it contains the most critical values.

The above minimum distance can be changed by entering values in the Fill @ m; m input box as follows:

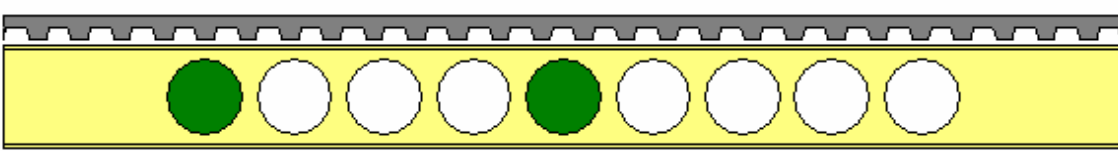
1. A positive distance which less that 0.5 (D+Do);



Note:

Changing the minimum distance

- or
2. The maximum distance to the outer edge of the last opening entered as a negative value.



Note:

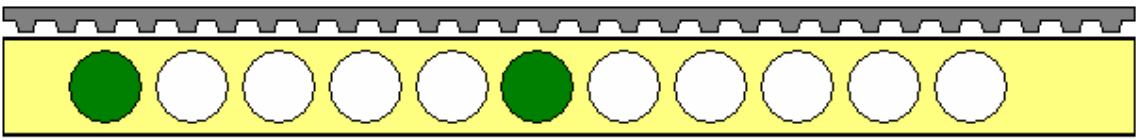
For a beam span of 8 m the minimum clear distance is 1 m

$$8 - \text{abs}(-7) = 1 \text{ m}$$

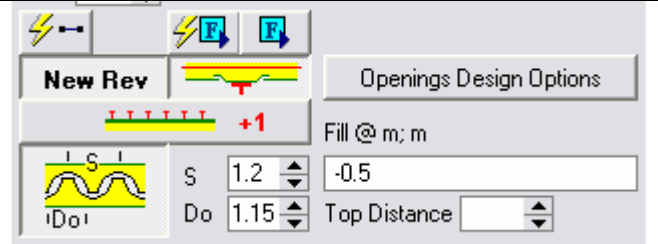
In 2 above the minimum clear distance is calculated as:

Beam span – Absolute (Specified Distance)

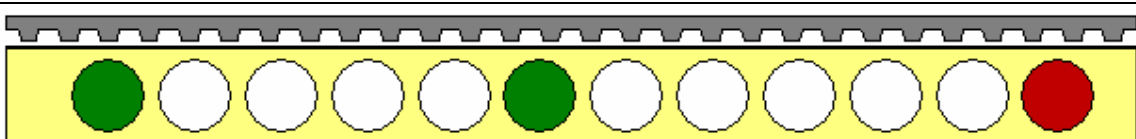
You can also dictate the exact value of the clear distance between the left hand support and the first opening by entering a negative value (less than half the beam span).



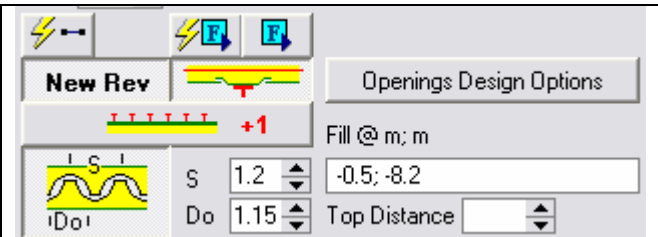
Note:
The clear distance between the left hand support and the first opening is 0.5 m. The default minimum distance applies on the right hand support.



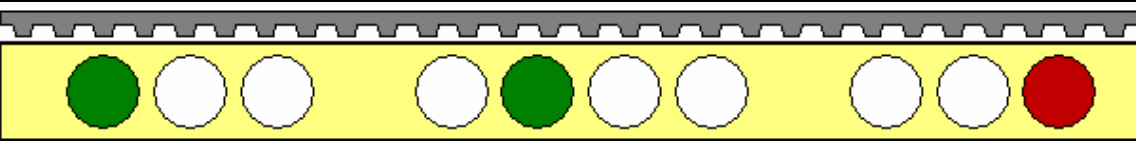
This can be used in conjunction with the negative distance in 2 above to control the minimum clear distance between the last opening and the right hand support.



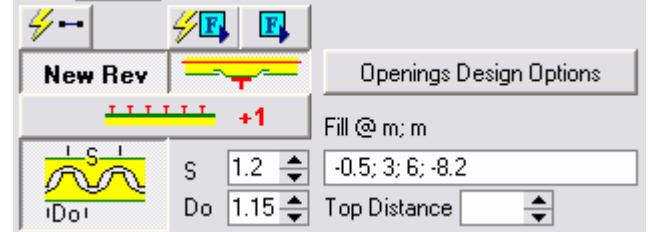
Note:
Control the minimum clear distance between the last opening and the right hand support. For a beam span of 8.45 m the minimum clear distance is $8.45 - \text{abs}(-8.2) = .25 \text{ m}$



You can block openings in other locations by entering positions in the Fill @ m; m input box. All values must be separated by “;”.



Note:
Blocking openings in other locations



Design Reference:

Design of Composite and Non-Composite Cellular Beams – SCI-P-100 - ISBN 1 870004 51 5