

Atir Software Development LTD

STRAP - Moving Load

Step by step

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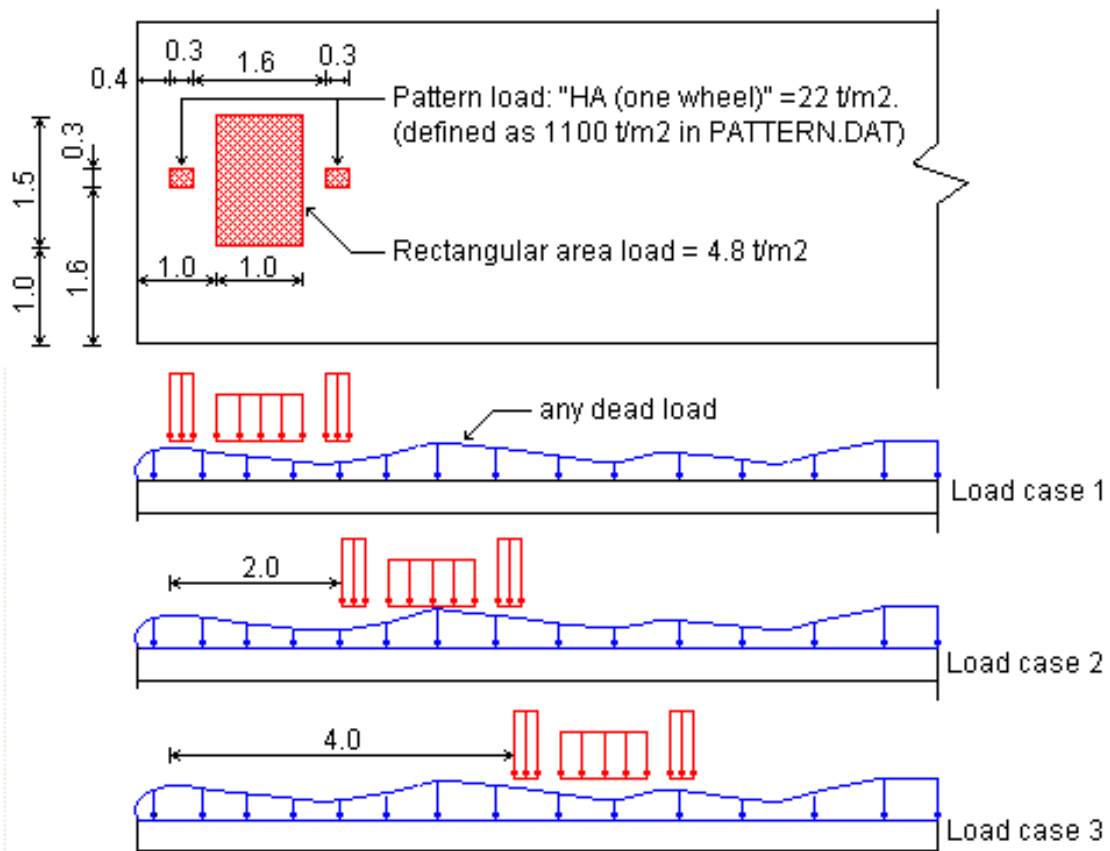
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1. Abstract




Use the Moving Load option to generate a series of load cases where the live load in each case is offset by a constant increment relative to the previous case. Note that the Moving Load option applies only to loads defined as **Global Loads**. The Figure below shows an arbitrary element grid for which three load cases must be defined. In all three cases the loads are identical, but the live load in each case is offset 2.0 m from the live loads in the previous case.

Two types of Global Loads are defined:

- a pressure on a rectangular area defined by the user.
- a pressure on a rectangular area retrieved from the "Pattern" file.



2. Geometry Definition




- Click new model  in the toolbar
- Set the default units to Meter & Ton, Model Type to  Grid and click the  icon



Model properties

Units:




Title:

Model type

Plane frame  Grid  

Space frame  Truss 

Select a method for creating the model:

Display width: to

Display height: to

Model wizard

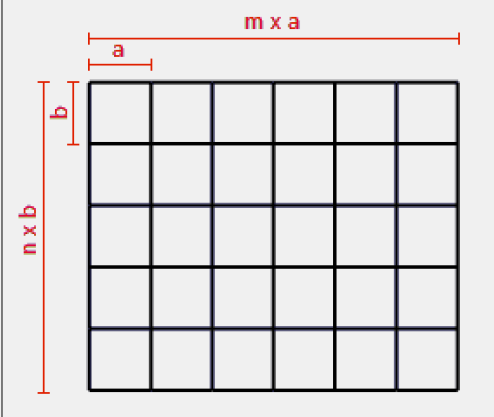
- Click the "Grid with elements" button
- Define a 3m x 7m (minimum) plane grid of elements

number of horizontal bays [m]=

number of vertical bays [n]=

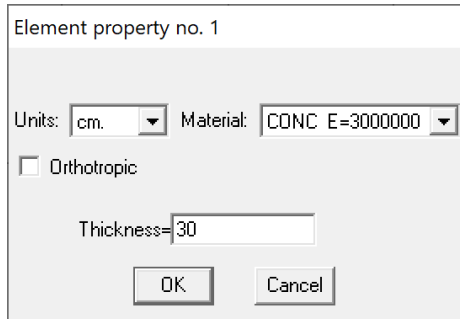
Typical horizontal bay width [a]= m

Typical vertical bay width [b]= m



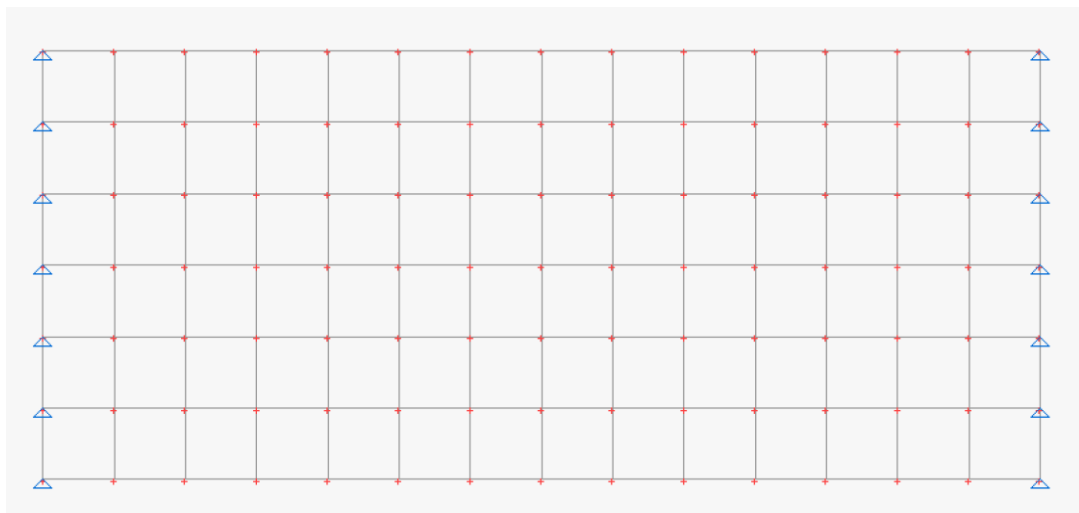
Note: The following parameters can be revised after the model has been created: [m],[n]

- Define the elements property:
 - Material – Concrete
 - Thickness – 30cm



STRAP

- Define pinned supports at the nodes as shown in the following drawing:



3. Loads Definition

- Click the **Loads** tab
- Select **New load** and enter the load case title "Wheel".
- Select **Global loads** and select **Define**

- Define the load parameters as follows:

Global load definition

Load= ton/m**2

Load type

Point load

Line load

Area load

Load pattern

Load direction

Global X1

Global X2

Global X3

Perp. to area

Apply load as:

Joint load

Beam load

Element load

Unidirectional distribution - beams

Apply load to selected beams/elem./joints only

Attach area contour to nodes

OK Cancel

- Define the load location by coordinates:

SELECT LOCATION:

By nodes

By coord.

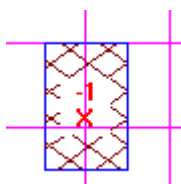
- Define the lower-left corner of the rectangle:

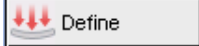
Move the cursor to (1.0, 1.0) and left-click the mouse

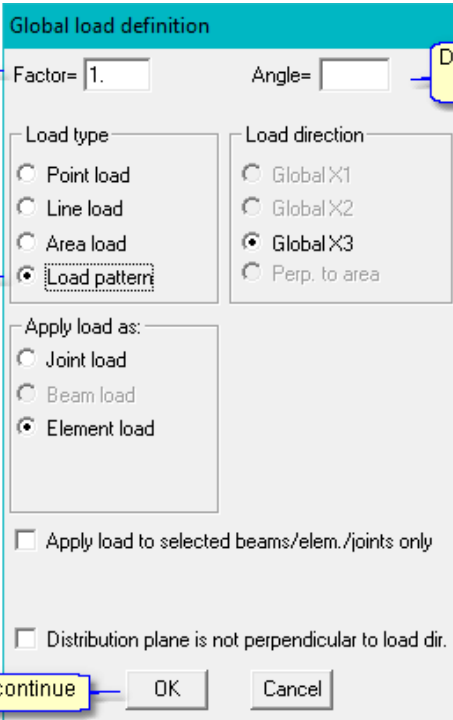
X1= X2= X3=

similarly, define corners at (2.0, 1.0), (2.0,2.5) and (1.0,2.5).

- Move the cursor to the first corner (0,0.) and click the mouse to close the rectangle; the program displays the load:



- Define the "Pattern" load. Select **Global loads** and select 
- Define the pattern load parameters as follows:



Global load definition

Factor= 1. Angle=

Load type: Point load, Line load, Area load, Load pattern

Load direction: Global X1, Global X2, Global X3, Perp. to area

Apply load as: Joint load, Beam load, Element load

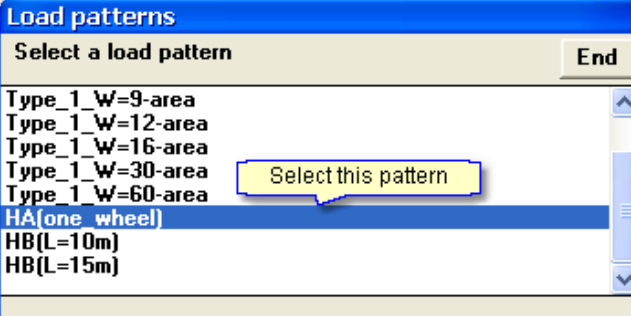
Apply load to selected beams/elem./joints only

Distribution plane is not perpendicular to load dir.

OK Cancel

Annotations:
 - Multiply the loads by any factor (points to Factor=1)
 - Do not rotate the load (points to Angle=)
 - Define a pattern load (points to Load pattern)
 - Click to continue (points to OK)

- Select the pattern:



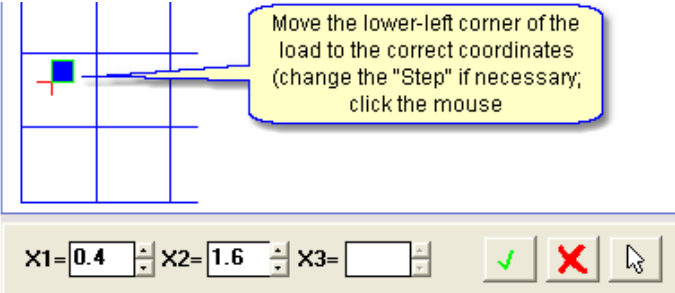
Load patterns

Select a load pattern End

Type_1_W=9-area
 Type_1_W=12-area
 Type_1_W=16-area
 Type_1_W=30-area
 Type_1_W=60-area
HA(one wheel)
 HB(L=10m)
 HB(L=15m)

Select this pattern (points to HA(one wheel))

- Locate the pattern on the drawing:

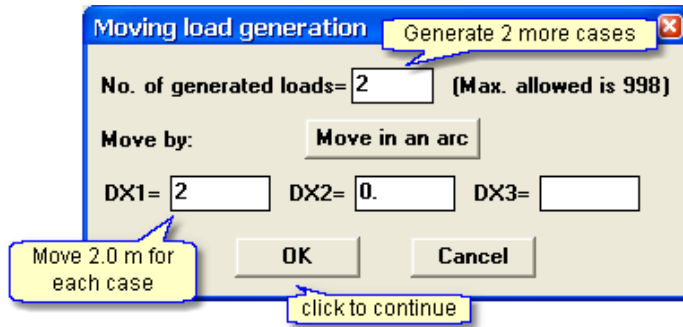


Move the lower-left corner of the load to the correct coordinates (change the "Step" if necessary; click the mouse)

X1= 0.4 X2= 1.6 X3=

✓ ✗ ⏶

- Repeat for the second wheel load and place the pattern load at X1=2.3m and X2=1.6m.
- Select **End load case**
- Select **Moving load** and select the load case just defined named "Wheel".
- Define the moving load parameters as follows:



- Click *End* in the load case list.
- To check that the cases were generated, select **Existing load**; the load case list displayed is:

View/revise a load

Select load case to view/revise

NO.	Title
1	Wheel
2	Wheel #2
3	Wheel #3

Revise Cancel

** Note that all three load cases contain the dead loads.*