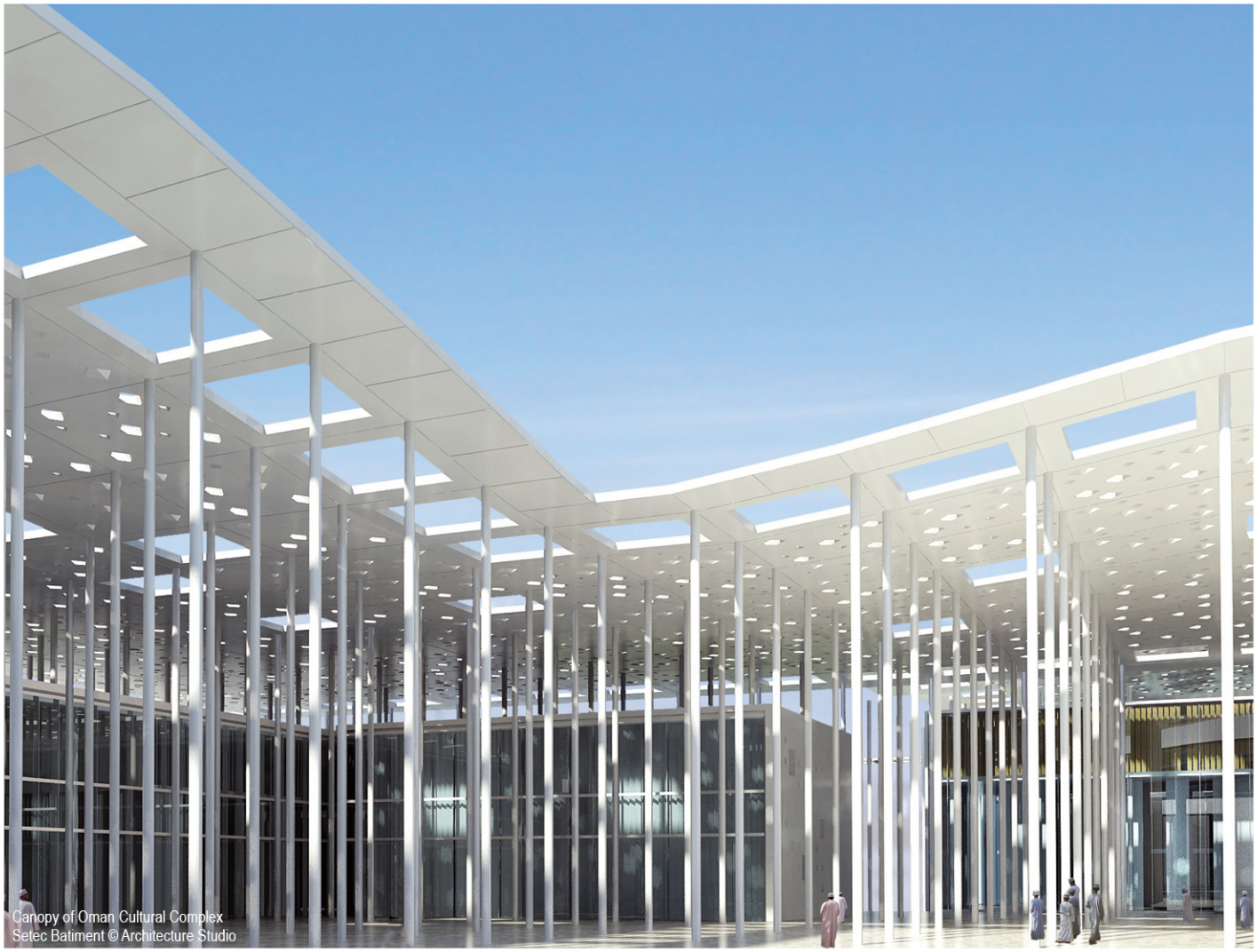
NEMETSCHEK Scia



Canopy of Oman Cultural Complex
Setec Batiment © Architecture Studio

3D Wind Load Generator

Frequently Asked Questions

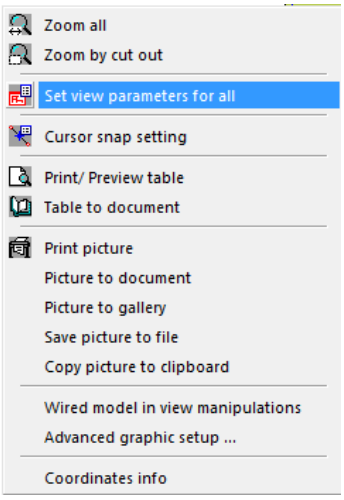
Scia Engineer

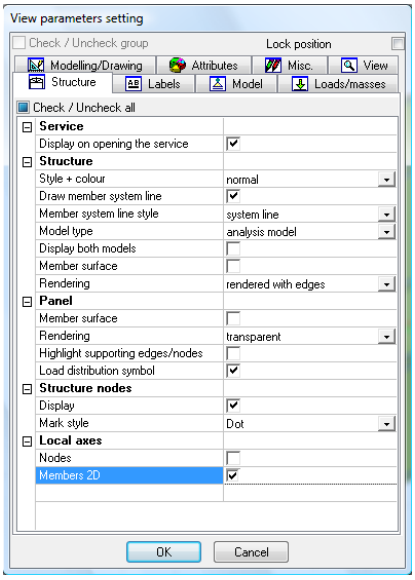
Frequently Asked Questions

1. Why are the generated wind loads not in the correct direction?

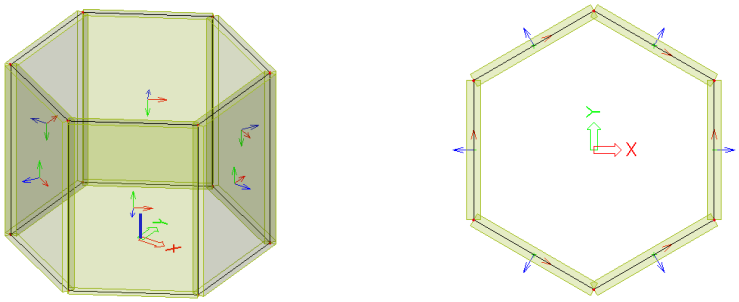
This generally happens if the wall / roof normal axis is not set pointing outside the building.

To display local axis of the wall/roof, right click on the main view and select ‘Set view parameters for all’. In ‘View parameters setting’ under ‘Structure’ tab select 2D Member under ‘Local axes’.



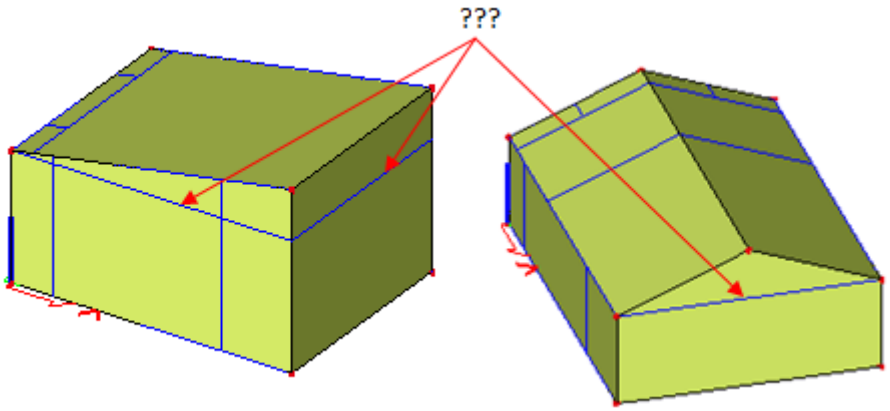


The blue arrow of the local axis shows the outward normal direction in which a positive wind load will be applied. The wind code assumes the load acting towards the building is positive (pressure) and the load acting away from the building is negative (suction). Hence to get the correct direction for generated wind loads, all the blue arrows should be pointing away from the building as shown in the picture below. This is applicable for both wall and roof.



This will generally give the expected direction for the generated wind loads. If you still wish to change the direction of generated loads, it can be done by using the ‘swap outer surface’.

2. **Why do I see a horizontal line (vertical zones) in a wall?**

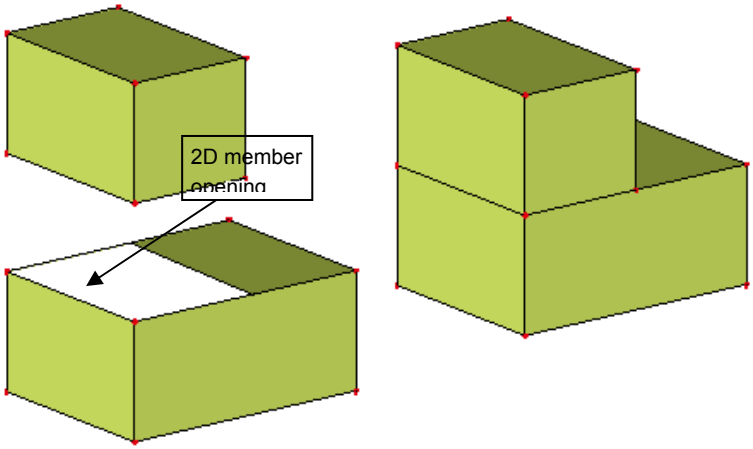


These lines are created because the program will zone the building vertically into levels identifying the change in plan to calculate the in-wind depth and cross-wind breadth appropriate to the level. This is quite useful when we have a stepped structure (see *scaling length*). The external pressure zones and the coefficients will be exactly as recommended in the code. Only the technique used is different.

For the same reason it is not advisable to model multiple buildings in a single project as the change in plan of one building will create horizontal zones in adjacent building modelled in the same project.

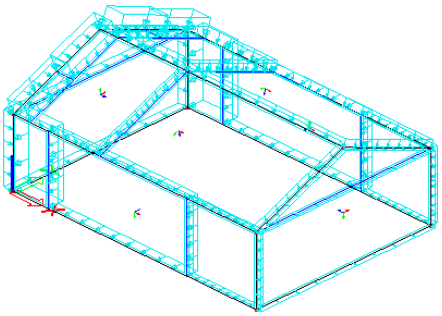
3. **How do I model an inset storey?**

Model the roof of the bottom storey without considering the inset top storey. Define a 2D member opening on the roof corresponding to the inset.

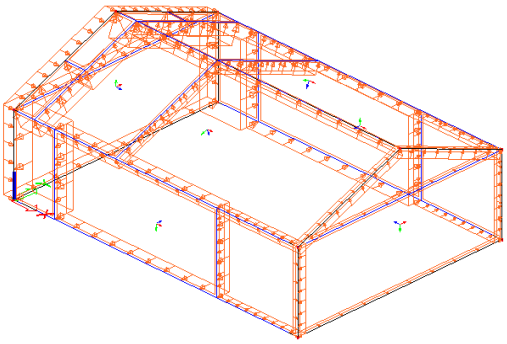


4. **Where can I see the actual wind loads applied to the model?**

Wind loads are applied as ‘free loads’ on the structure hence the actual direction and magnitude of loads will be visible only after analysis calculation.



After ‘run generator’

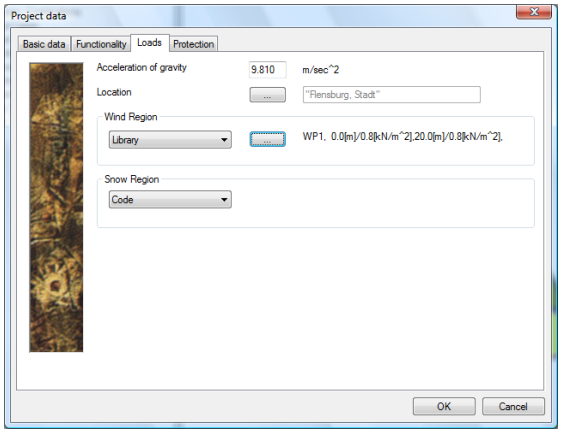


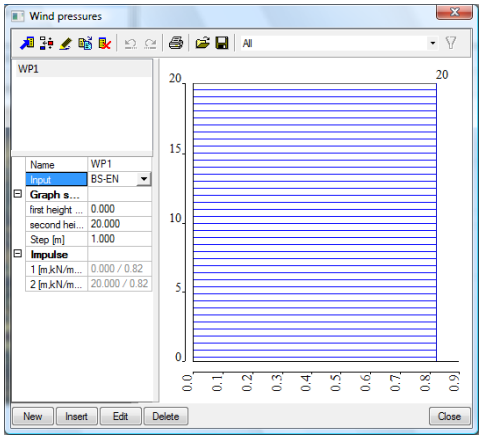
After ‘analysis’

The free loads that are visible after clicking on ‘Run generator’ are the sum of the internal and external pressure coefficients for the selected load case.

5. Can I view the wind pressure curve applied to the model?

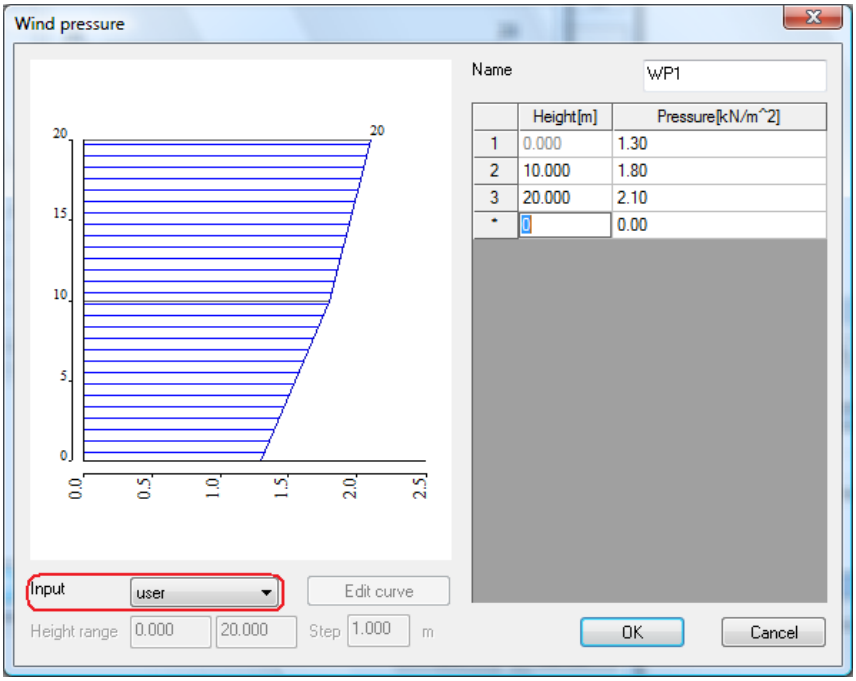
The pressure curve used for wind load generation can be viewed only when you have used the User defined option in ‘Project data > Load > Wind Region’.





6. Can I edit the pressure curve used for wind load generation?

The actual pressure values can be edited only if you specify a user based input in the wind pressure library.

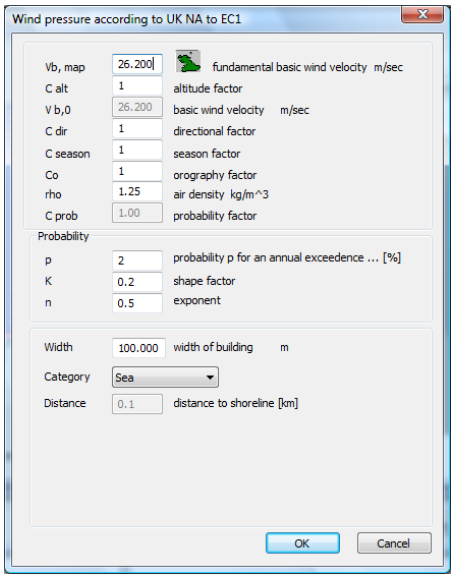


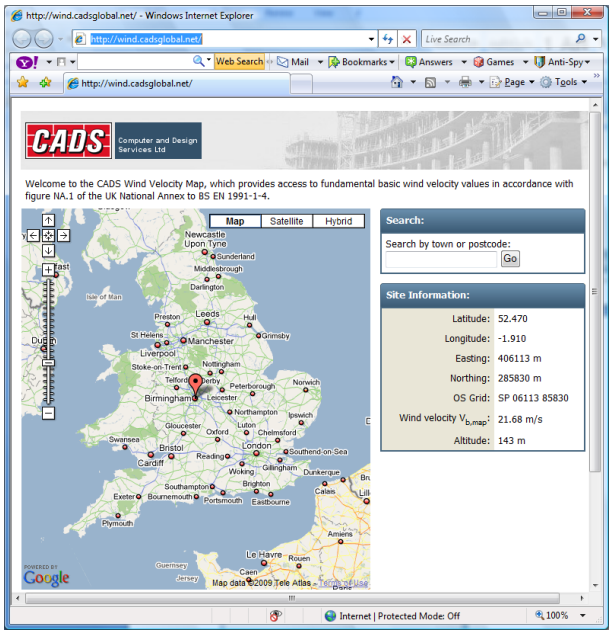
7. Can I apply different pressure curves to different wind direction?

Yes, multiple pressure curves can be generated and assigned to each wind direction. This feature is available from Scia Engineer 2011 onwards.

8. Where can I get the basic wind speed from?

The basic wind speed displayed in the dialog is just a default value. The basic wind speed for a particular location in UK can be obtained from the *CADS wind velocity map*

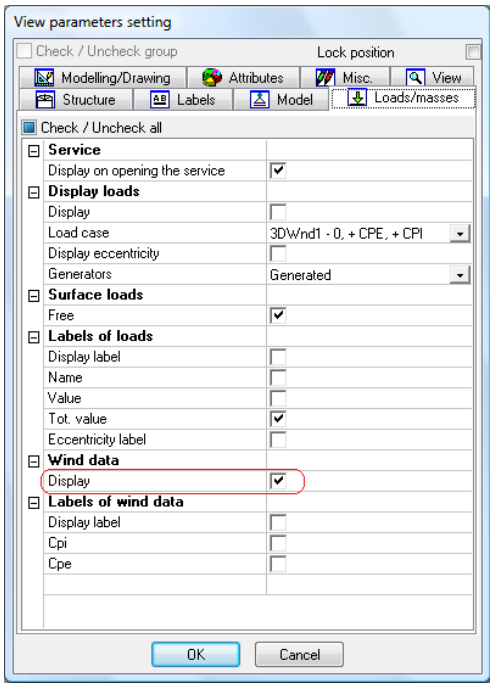


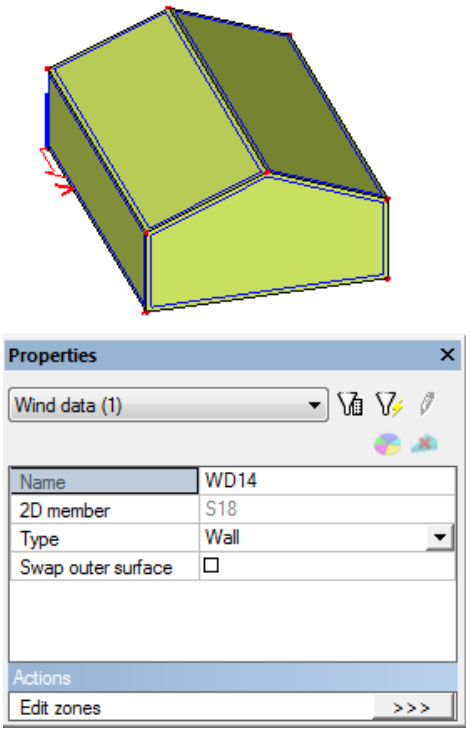


9. How do I make the wind data visible in the model?

Wind data is added when you select ‘3D wind’ in 2D member/panel properties. The blue lines representing the wind data are visible by default in the model. This is controlled through the ‘View parameter setting’ ‘Loads/masses’ tab.

Hence if the blue line is not visible select ‘wind data’ from view parameters.





10. Can I see the distributed wind load on the frame members?

Yes, you can see the actual wind load after analysis when using ‘load panel’. For ‘2D members’ you can see only the net pressure applied across the member.

11. What types of structures are supported for the 3D wind load generator?

Scia Engineer currently supports only 3D closed buildings. The calculations are applicable for land-based building structures based on pressure coefficients. Structures like tower, chimney, bridges etc., are not supported.

Protruding roof is not supported in the current version.

12. Which elements in ‘Scia Engineer’ are supported for the 3D wind load generator?

Walls, Plates and Panels (load to panel edges, load to panel edges and beams, load to panel node, panel with parallel beams).

13. Can I use it for portal frame structures (steel halls)?

Yes, panel - load to beams can be used to model the wind load on the purlins and wind load on gable frame from cladding.

14. **Can I use it for scaffolding?**

Unclad scaffolds are not supported but sheeted/netted scaffolds are supported.

15. Are openings taken into account?

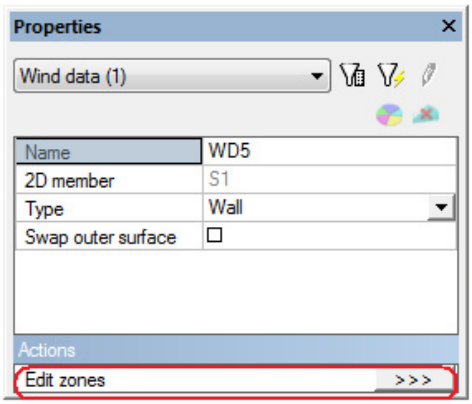
No, you have to enter the internal pressure coefficients manually for openings.

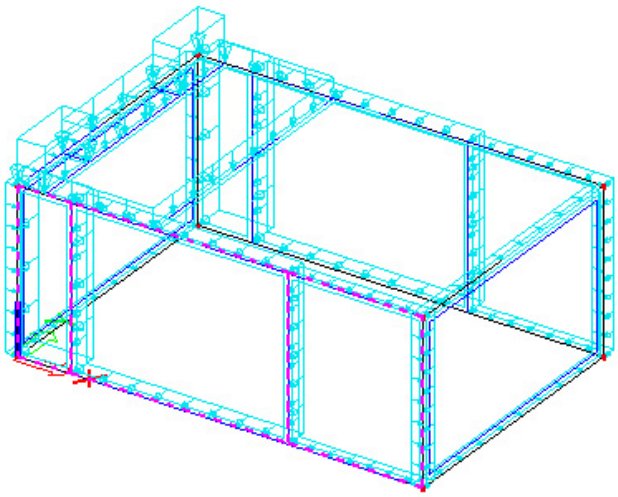
16. Are wind coefficients calculated automatically?

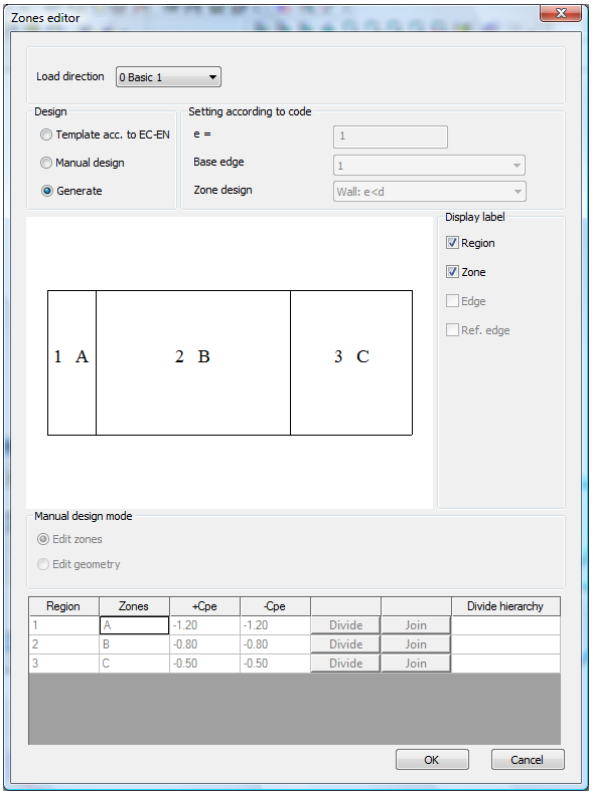
Yes, the external pressure coefficients (Cpe) are calculated automatically but internal pressure coefficients (Cpi) has to be input manually.

17. How can I edit the zones?

This is possible from the property dialogue of the wind data. On editing the generated zone, all the calculated zone data will be deleted allowing you to enter your own zones for selected wall or roof and selected wind direction.





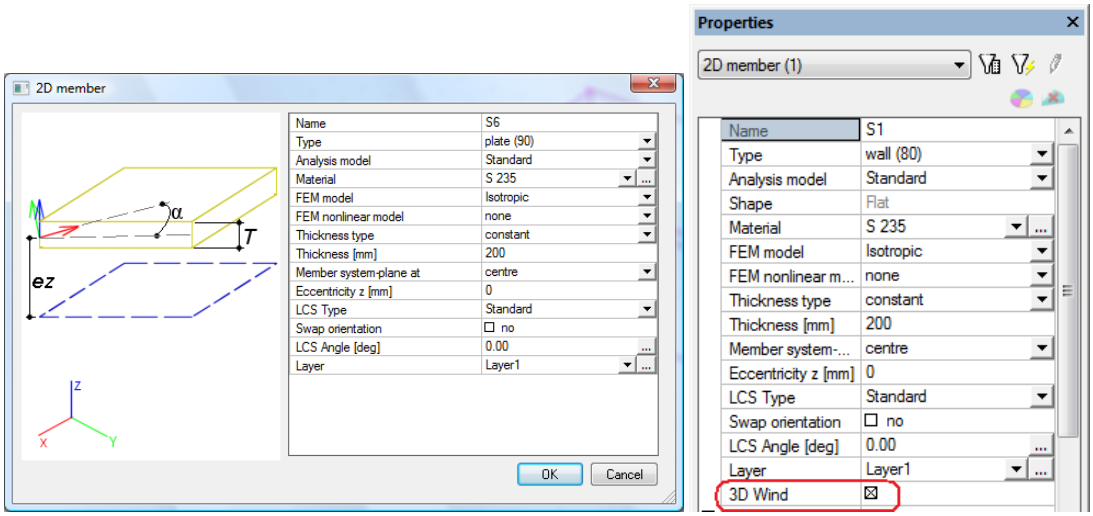


18. Where do I enter the type of 'flat roof' to be used for the calculation?

You will not be able to change the type with the current version of the program. 'Flat roof type' is assumed to be sharp eaves. Other types will be added soon.

19. Whilst I insert a member, I cannot see the option 'Wind data'?

Wind data option is available only after you insert the member.

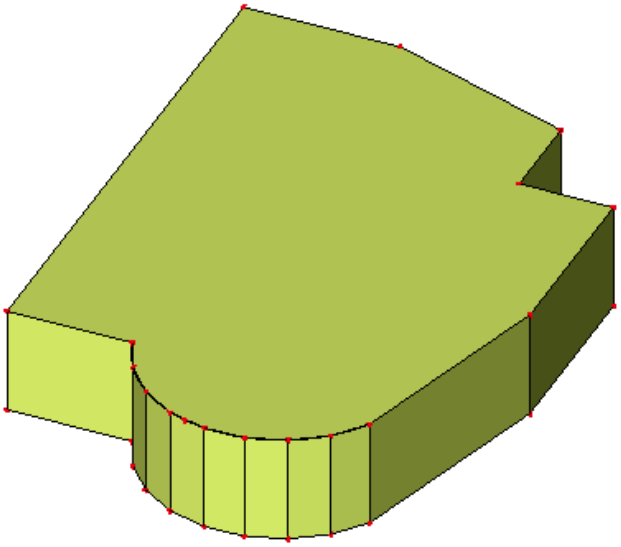


20. Is wind friction (drag force) taken into account?

Not in this version, but will be improved in later releases. Currently this can be applied as additional point force in the model.

21. Can I apply wind loading on a curved wall?

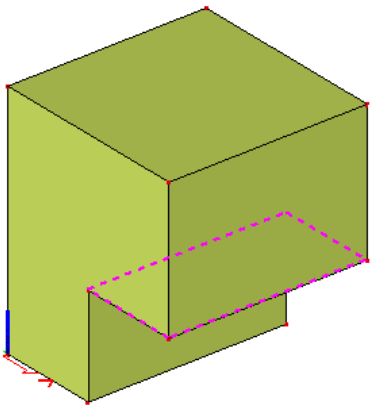
The curved wall must be modelled by a series of straight walls for the automatic wind loading to work. 3D wind data cannot be directly specified on the curved wall.



22. Can I generate wind loading on an overhang building?

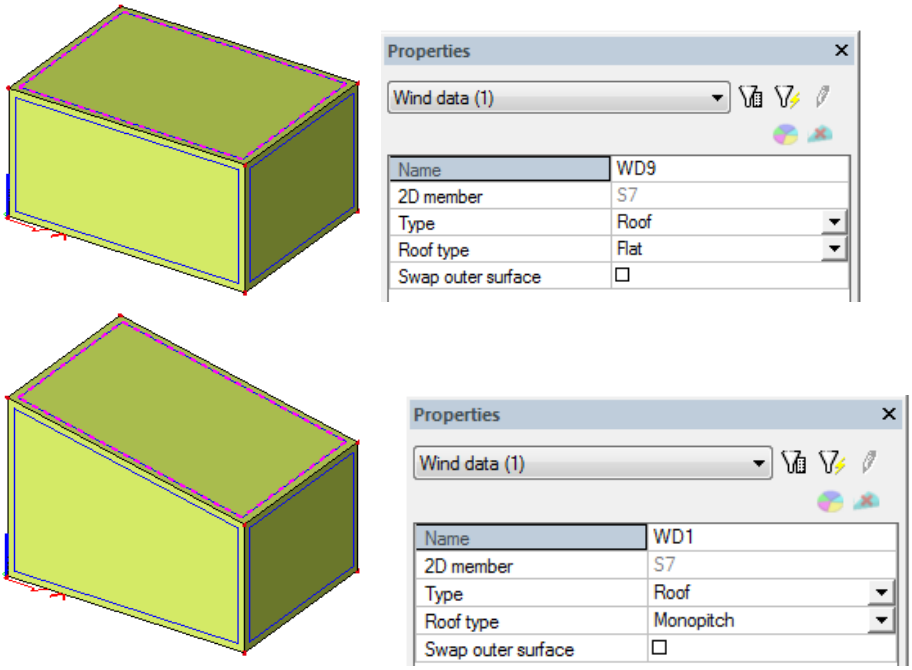
Yes, it is possible to automatically generate wind loading on a building which is overhanging although some precaution needs to be taken while modelling.

In creating the wind surface for such a building the floor of the overhang part should also be modelled as a wind surface and an opening created for the same to exclude the effect of wind loads during analysis (see pick rectangle in the below picture). If the floor is not modelled the software will report an error “The structure is open near the 2D member(s) ... Current version supports only closed buildings.”



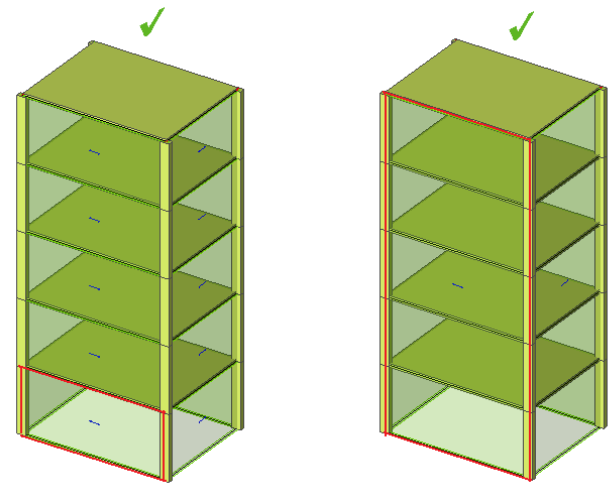
23. What happens to the wind data when I edit the geometry?

On geometry change the 'wall/roof' and 'roof type' input are automatically updated by the program.



24. How should I model the wind surface - storey by storey and bay by bay?

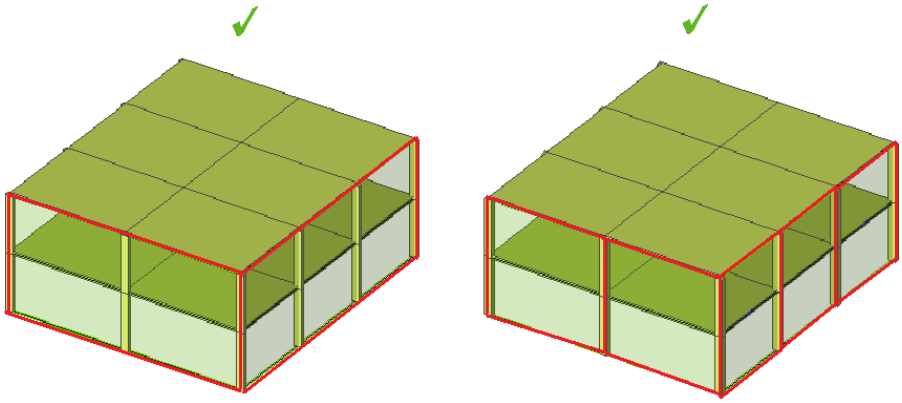
If you have a building spanning multiple stories with the same plan shape you can model just one wall for all the stories or create walls for each storey individually. Modeling either wise you get the same results.



Wall per storey Wall across stories

Scia Engineer 2010.1 has an improvement over the earlier versions where the wind surface representing the wall can be modeled either as one surface or split across bays.

When the wall is split across bays the software will automatically join them into one surface for zoning **as long as their local axes (LCS) are in the same direction**.

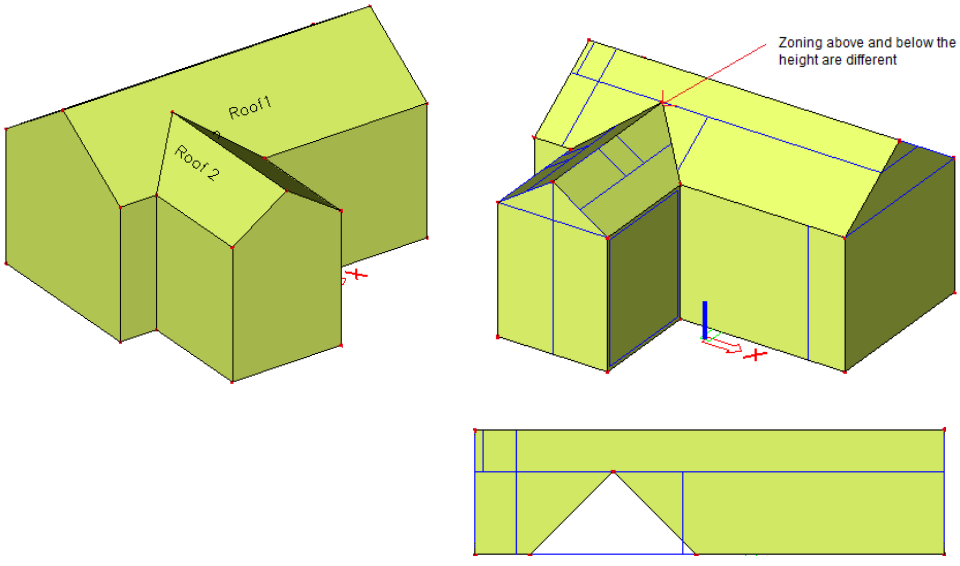


Wall across bays

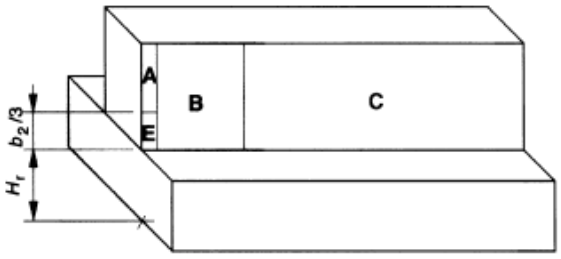
Wall per bay

25. Current limitations / known issues:

i. When part of the inclined roof (say roof1) is connected to another roof (say roof2), zoning for roof1 is affected by height of roof2. Scaling length for portion of roof1 above the point of connection to roof 2 is different from the portion below hence different set of zones are produced instead of uniform zoning. The work around for this problem is to edit the zones manually.



ii. The special zone E for inset storey when edge of face flush with edge of lower storey as per figure 15 of BS 6399-2 is not considered for BS national annex. The work around for this is to edit the zones manually for the wall.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