

DEDM-LR Example

Low-rise building example:

A gable-roofed building with width (B) = 52.493 ft (= 16 m), length (D) = 78.740 ft (= 24 m), height (H) = 26.247 ft (= 8m), and roof angle (β) = 14° under Suburban terrain condition.

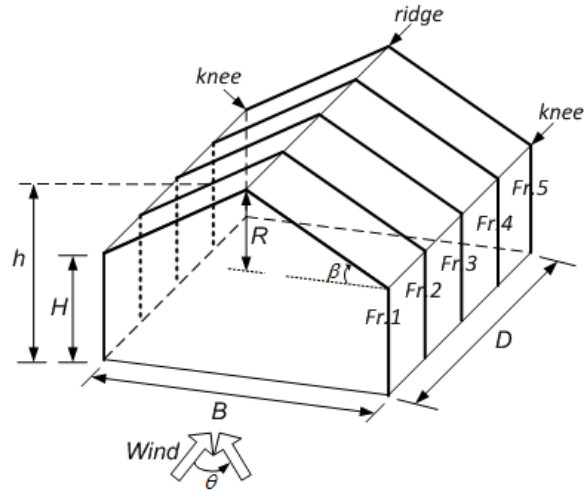


Fig. 1. A gable roof building example with five main wind force resistant frames (MWFRF)

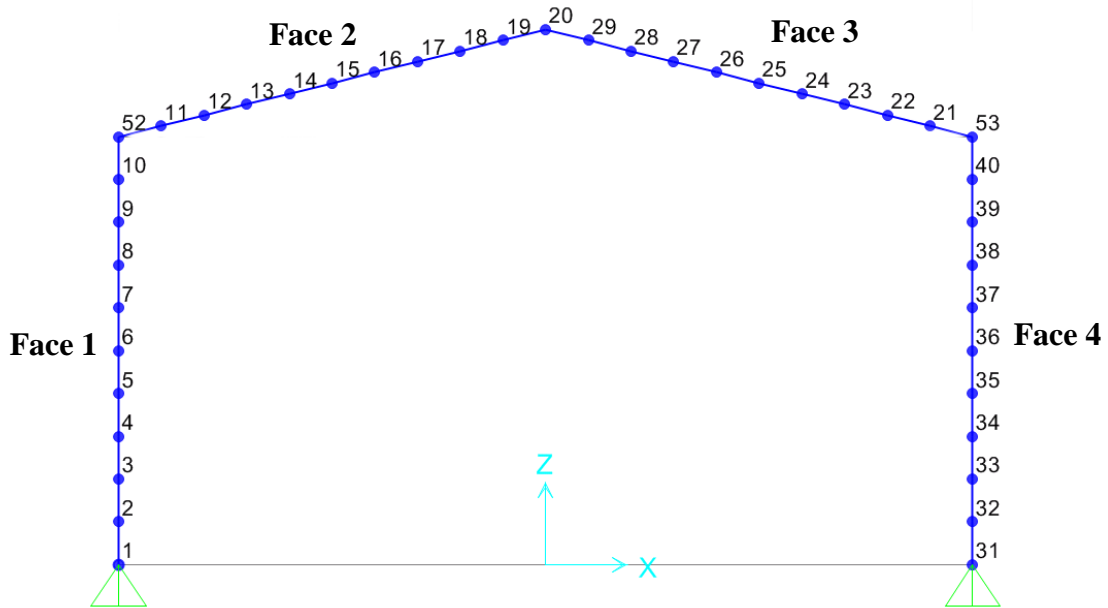


Fig. 2. Node (index) numbers (where girts/purlins are connected to a main frame)

Wind-induced responses:

Bending moment at left knee, ridge, and right knee in the Frame 1, 2, and 3.

User inputs at the "Building Information tab"

* *Roof*:

Gable

* *Building dimensions*:

Width (B) = 52.493

Length (D) = 78.740

Height (H) = 26.247

Roof (R) = 6.562

* *Terrain*:

Suburban

* *Frame Locations*: (assumed 19.685 ft (= 6 m) distance between main frames)

0,19.685,39.37,59.055

* *Attachment locations*: (refer to Fig. 2).

- Note that Face 1 & 4 and 2 & 3 are the same.

Face 1 Attachments:

0,2.6247,5.2494,7.8741,10.4988,13.1235,15.7482,18.3729,20.9976,23.6223

Face 2 Attachments:

2.704948532,5.410000125,8.114948656,10.82000025,13.52494878,16.23000037,18.93494891,21.6400005,24.34494903,27.05000062

Face 3 Attachments:

2.704948532,5.410000125,8.114948656,10.82000025,13.52494878,16.23000037,18.93494891,21.6400005,24.34494903,27.05000062

Face 4 Attachments:

0,2.6247,5.2494,7.8741,10.4988,13.1235,15.7482,18.3729,20.9976,23.6223

* *Responses and Influence Coefficients*

- If input of Attachment locations is done, Face number and coordinate are automatically shown. There are two options to input influence coefficients here. One is to input values one-on-one, and the other is to use "Input Field" (by pressing "Show CVS Input Field") for facilitating multiple values at once, e.g., copy & paste.

- Influence coefficients used in this example is shown in the following: (copy & paste)

0,0,0
1.3,-0.34,-1.32
2.61,-0.67,-2.64
3.93,-0.99,-3.94
5.26,-1.27,-5.22
6.66,-1.51,-6.46
8.08,-1.71,-7.66
9.55,-1.84,-8.82
11.08,-1.9,-9.92
12.67,-1.89,-10.96
2.56,-0.22,-3.8
1.74,0.1,-4.63
1,0.54,-5.36
0.36,1.09,-6.01
-0.19,1.75,-6.56
-0.65,2.53,-7.01
-1,3.44,-7.37
-1.26,4.47,-7.63
-1.42,5.62,-7.79
-1.47,6.91,-7.84
-3.8,-0.22,2.56
-4.63,0.1,1.74
-5.36,0.54,1
-6.01,1.09,0.36
-6.56,1.75,-0.19
-7.01,2.53,-0.65
-7.37,3.44,-1
-7.63,4.47,-1.26
-7.79,5.62,-1.42
-7.84,6.91,-1.47
0,0,0
-1.32,-0.34,1.3
-2.64,-0.67,2.61
-3.94,-0.99,3.93
-5.22,-1.27,5.26
-6.46,-1.51,6.66
-7.66,-1.71,8.08
-8.82,-1.84,9.55
-9.92,-1.9,11.08
-10.96,-1.89,12.67

Detailed DEDM-LR operations for this example can be found in the following video

http://nathaz.nd.edu/documents/DEDM-LR_operation_example01.avi