

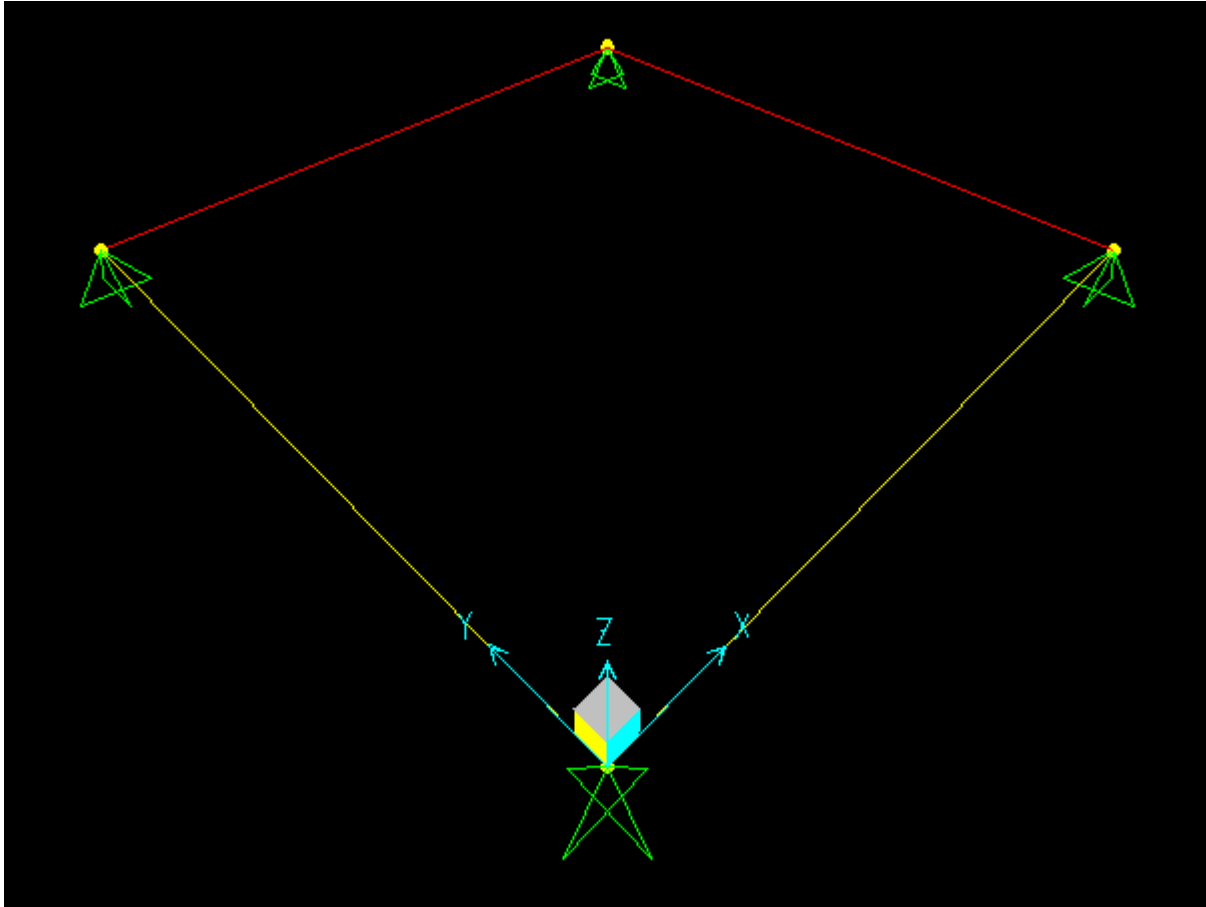
Options for Applying Area Loads

Introduction

This test problem illustrates various options for applying area loads using 3 different models described below:

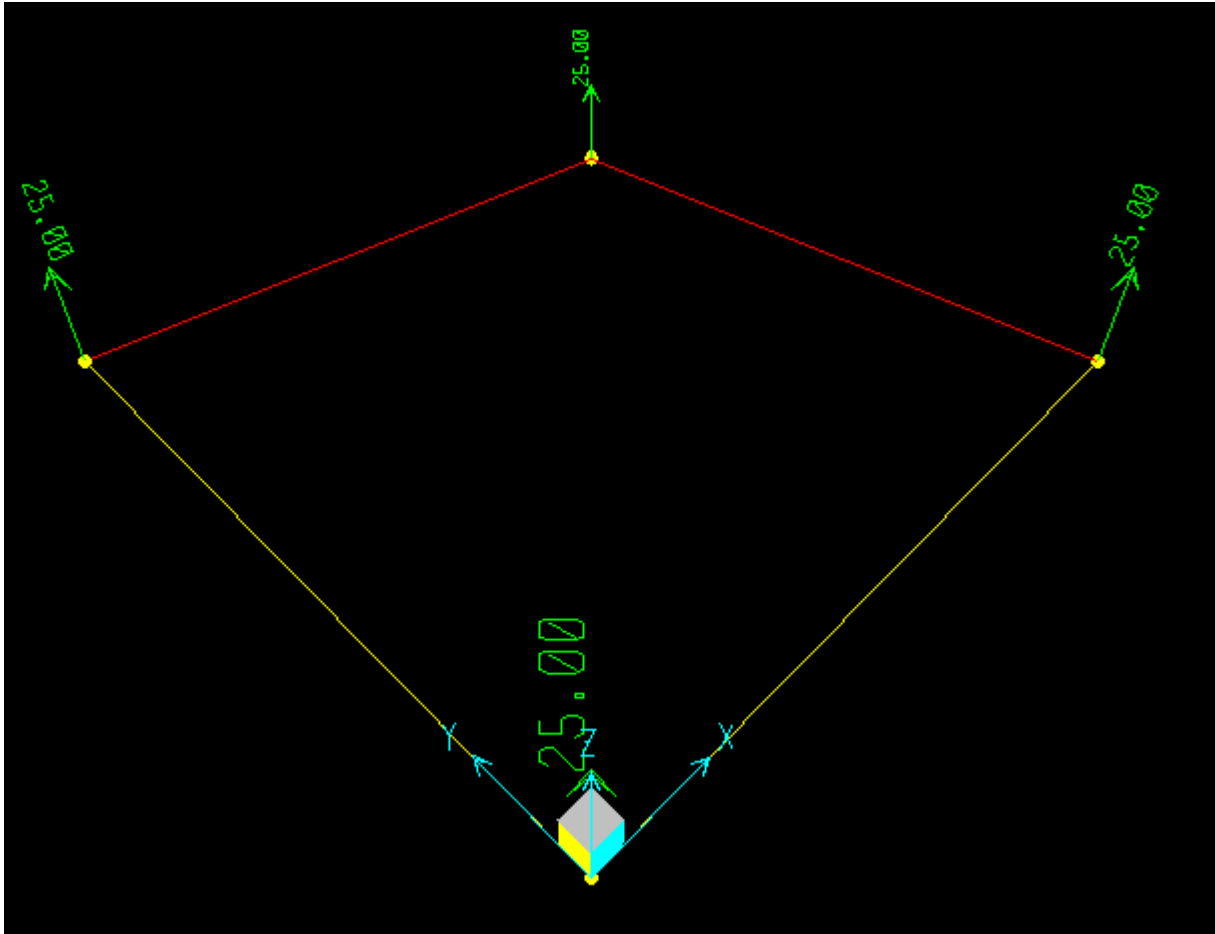
- Model A: Uniform (Shell); Uniform to Frame (Shell) – One Way; Uniform to Frame (Shell) – Two Way
- Model B: same as model A, but frames are divided to 10 segments
- Model C: same as model B, but shell is divided to 10 by 10 segments

Model A



Model A contains 1 shell element and 4 frame elements on edges of the shell element and is simply supported at its 4 corners.

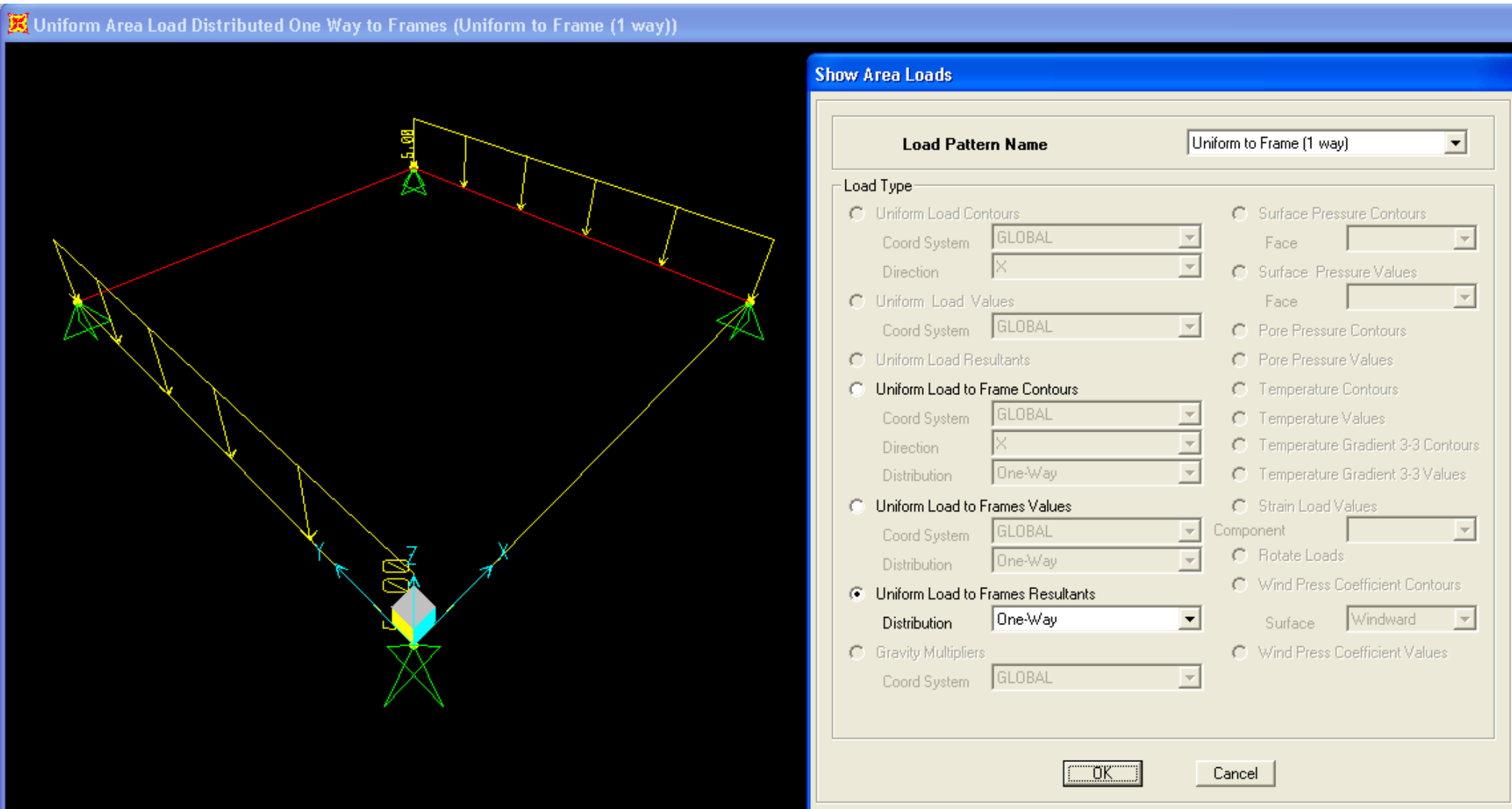
Uniform (Shell) Load



The load gets transferred directly applied to the 4 support joints and no internal forces in the shell or the frames are generated.

Uniform to Frame (Shell) – One Way

Uniform Area Load Distributed One Way to Frames (Uniform to Frame (1 way))



Show Area Loads

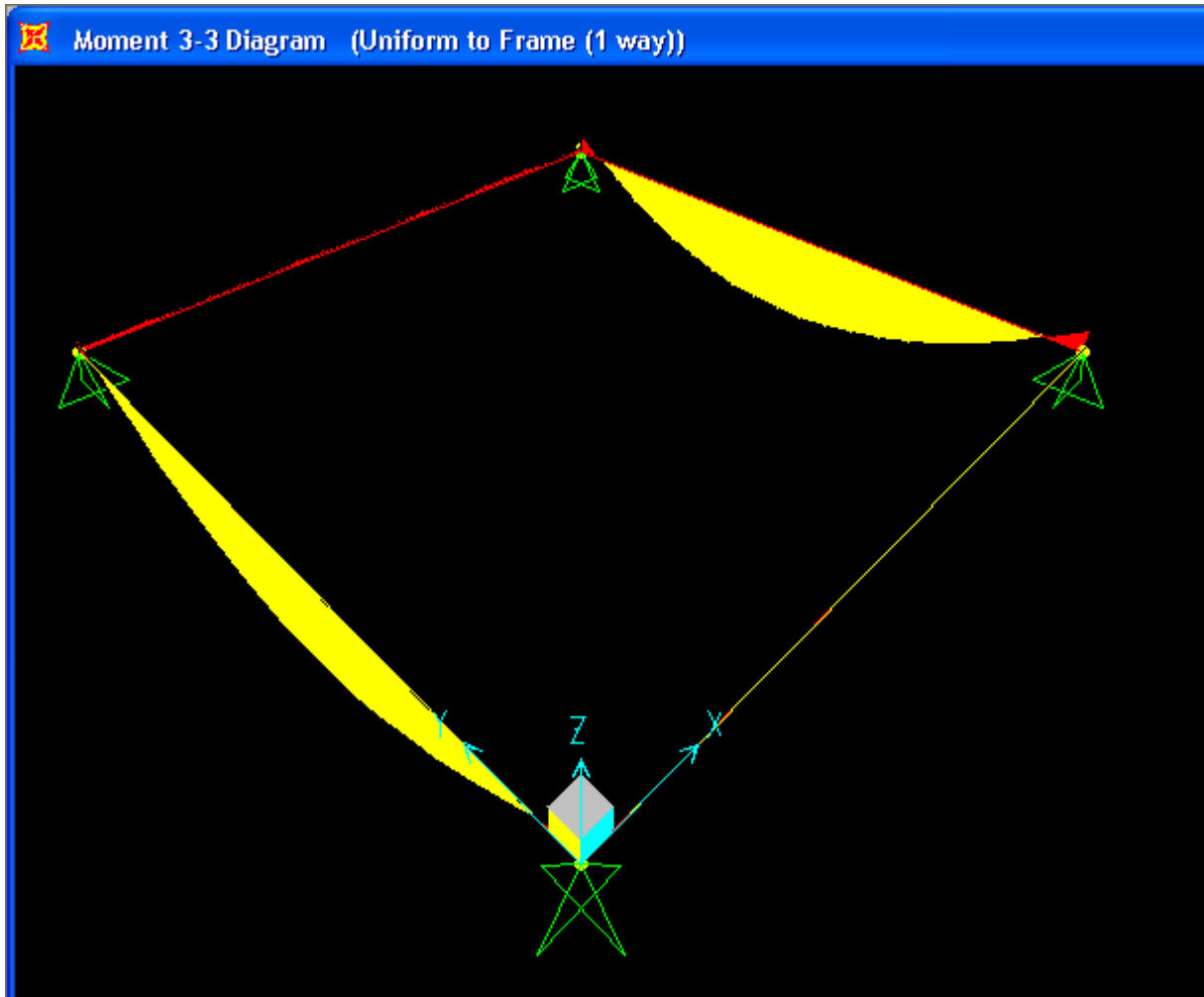
Load Pattern Name: Uniform to Frame (1 way)

Load Type:

- Uniform Load Contours
 - Coord System: GLOBAL
 - Direction: X
- Uniform Load Values
 - Coord System: GLOBAL
- Uniform Load Resultants
- Uniform Load to Frame Contours
 - Coord System: GLOBAL
 - Direction: X
 - Distribution: One-Way
- Uniform Load to Frames Values
 - Coord System: GLOBAL
 - Distribution: One-Way
- Uniform Load to Frames Resultants
 - Distribution: One-Way
- Gravity Multipliers
 - Coord System: GLOBAL
- Surface Pressure Contours
 - Face: []
- Surface Pressure Values
 - Face: []
- Pore Pressure Contours
- Pore Pressure Values
- Temperature Contours
- Temperature Values
- Temperature Gradient 3-3 Contours
- Temperature Gradient 3-3 Values
- Strain Load Values
 - Component: []
- Rotate Loads
- Wind Press Coefficient Contours
 - Surface: Windward
- Wind Press Coefficient Values

OK Cancel

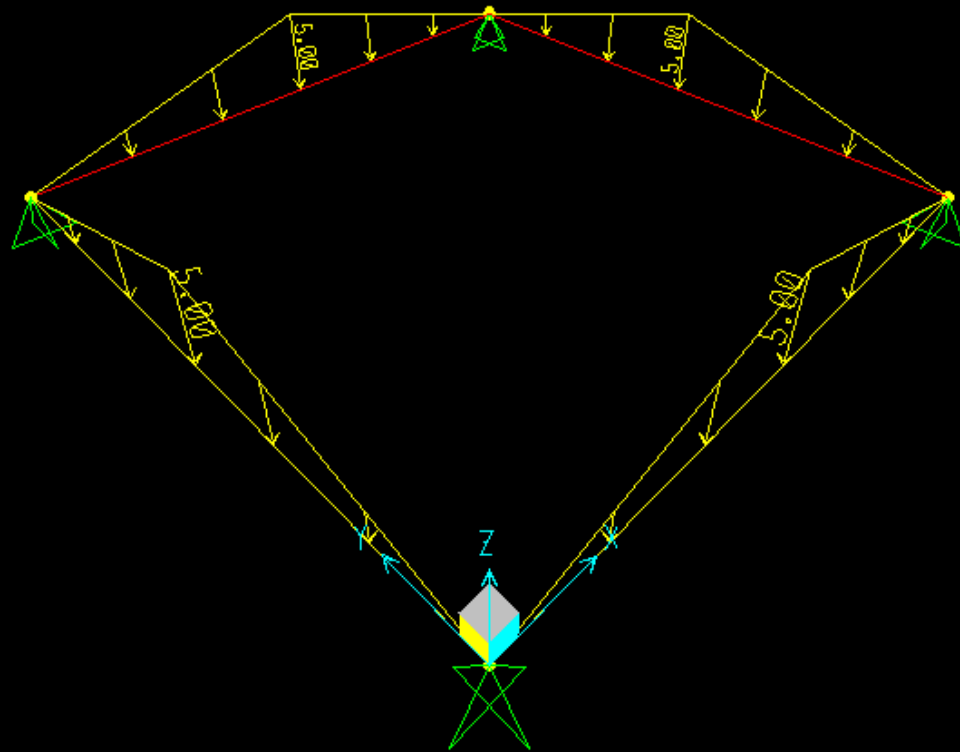
Use “Display > Show Load Assigns > Area” to display frame resultants.



Frame moments are consistent with the one-way load distribution.

Uniform to Frame (Shell) – Two Way

Uniform Area Load Distributed Two Way to Frames (Uniform to Frame (2 way))



Show Area Loads

Load Pattern Name

Uniform to Frame (2 way)

Load Type

Uniform Load Contours

Coord System GLOBAL

Direction X

Uniform Load Values

Coord System GLOBAL

Uniform Load Resultants

Uniform Load to Frame Contours

Coord System GLOBAL

Direction X

Distribution Two-Way

Uniform Load to Frames Values

Coord System GLOBAL

Distribution Two-Way

Uniform Load to Frames Resultants

Distribution Two-Way

Gravity Multipliers

Coord System GLOBAL

Surface Pressure Contours

Face

Surface Pressure Values

Face

Pore Pressure Contours

Pore Pressure Values

Temperature Contours

Temperature Values

Temperature Gradient 3-3 Contours

Temperature Gradient 3-3 Values

Strain Load Values

Component

Rotate Loads

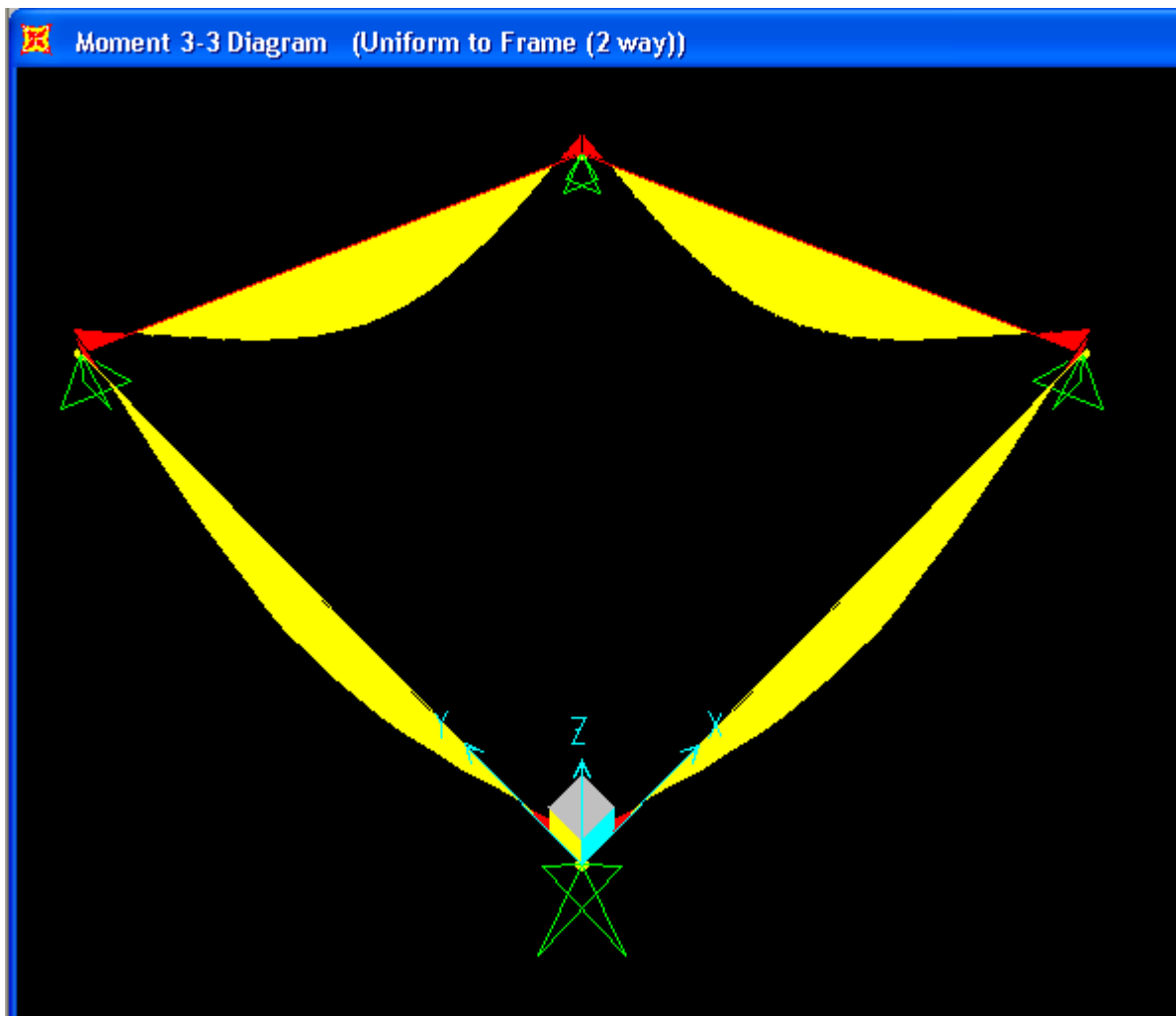
Wind Press Coefficient Contours

Surface Windward

Wind Press Coefficient Values

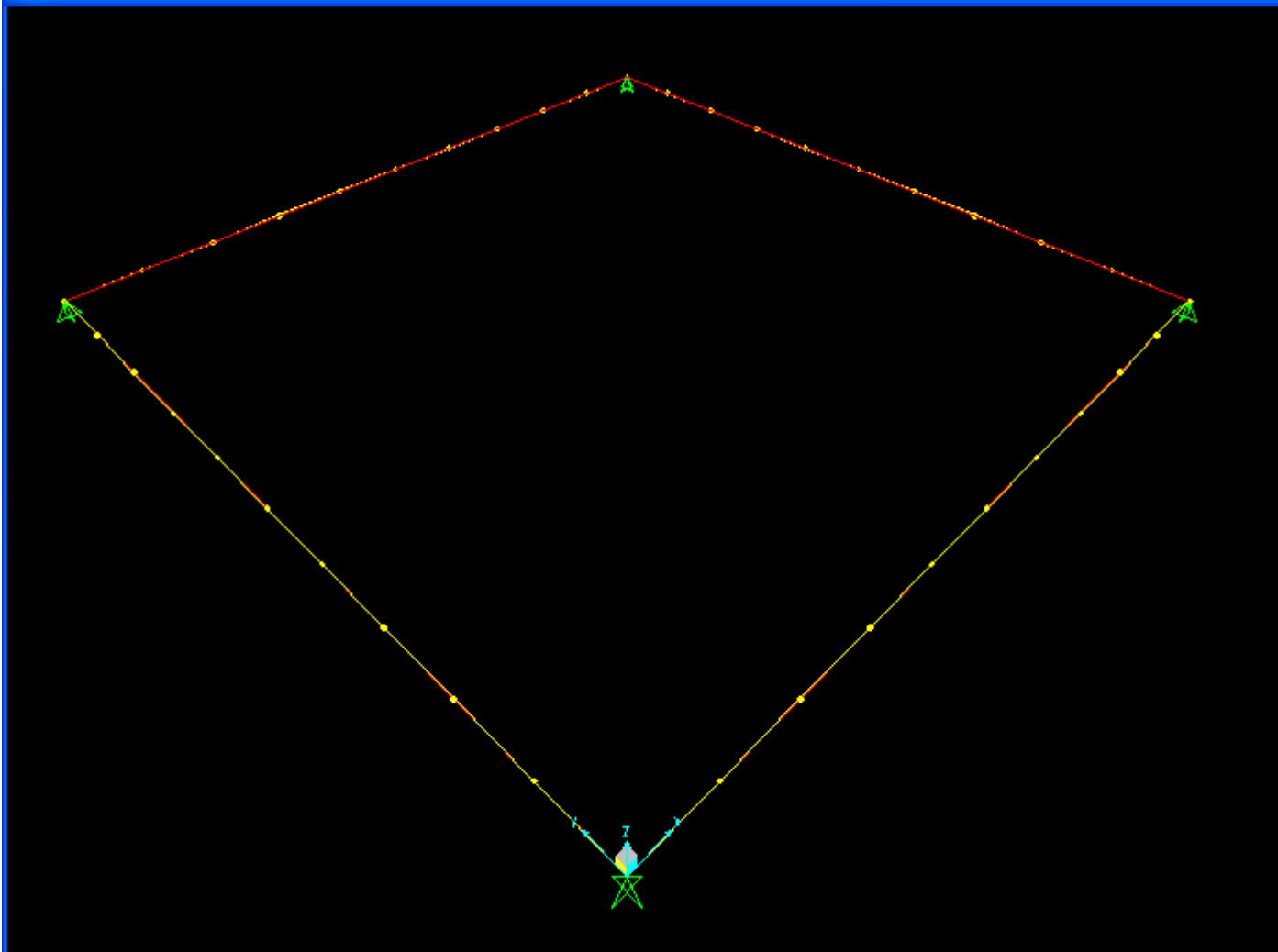
OK

Cancel



Frame moment diagram is consistent with the two-way load distribution.

Model B

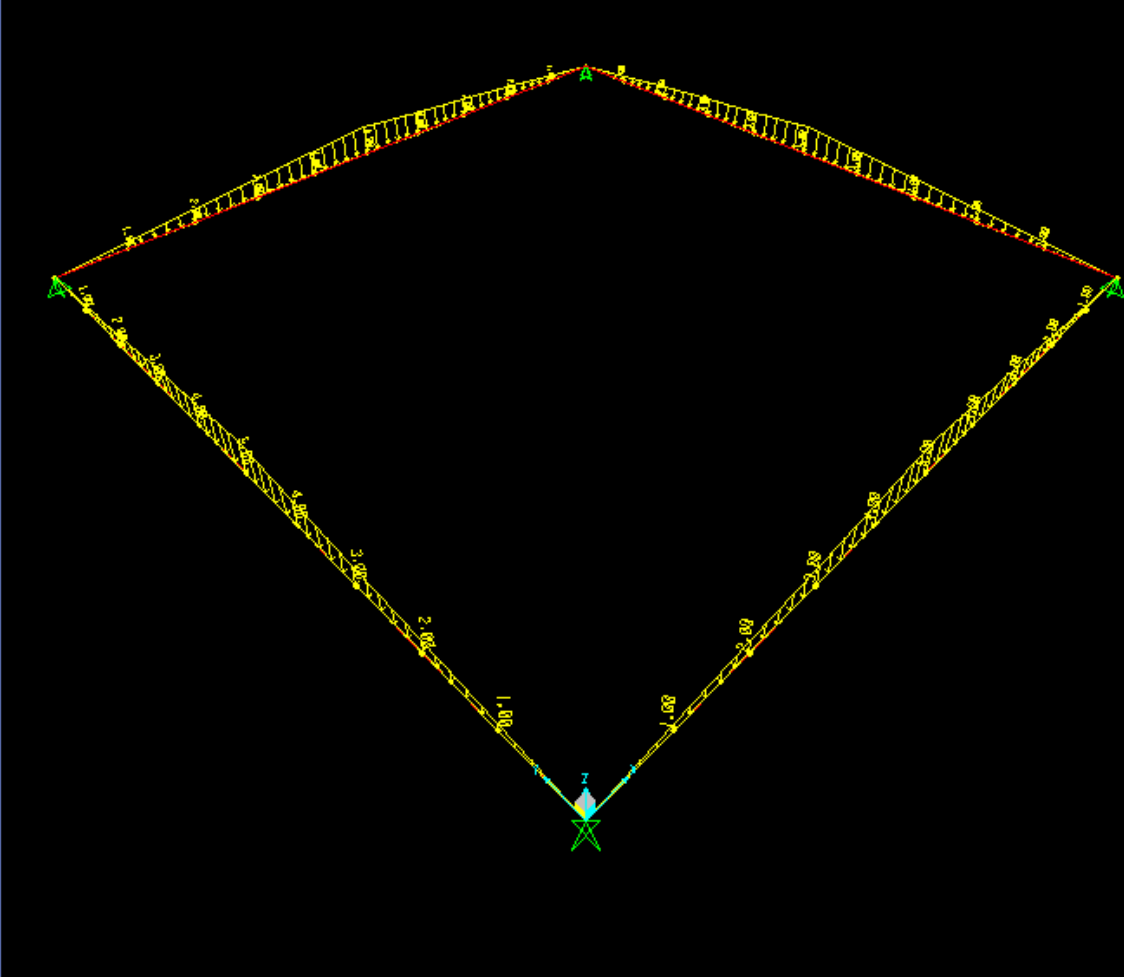


Model B contains 1 shell element and 40 frame elements (10 elements along each edge) and is supported at the 4 corner joints.

For this particular model, we will review only the “Uniform to Frame (Shell) – Two Way” load distribution.

Uniform to Frame (Shell) – Two Way

Uniform Area Load Distributed Two Way to Frames (Uniform to Frame (2 way))



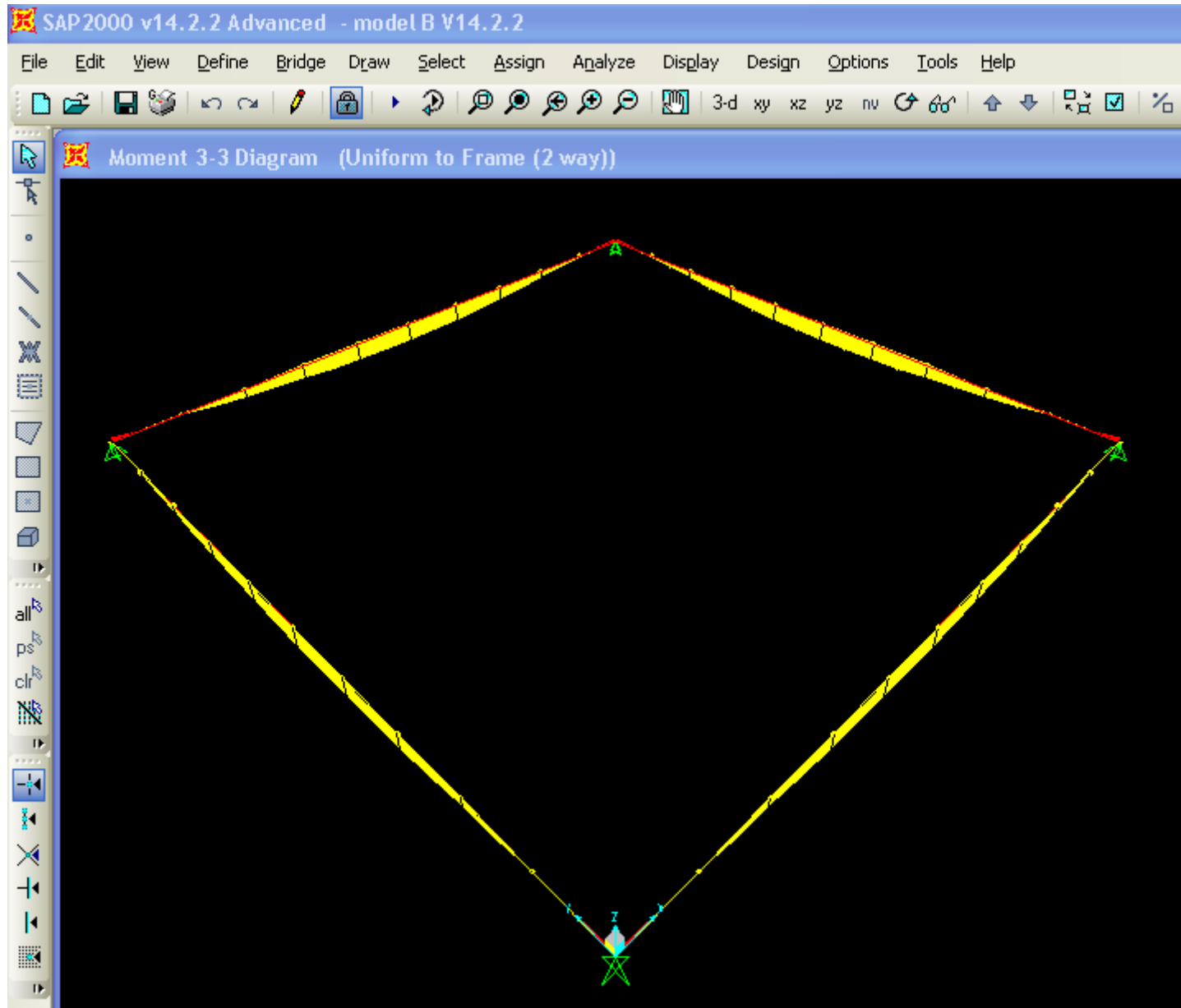
Show Area Loads

Load Pattern Name: Uniform to Frame (2 way)

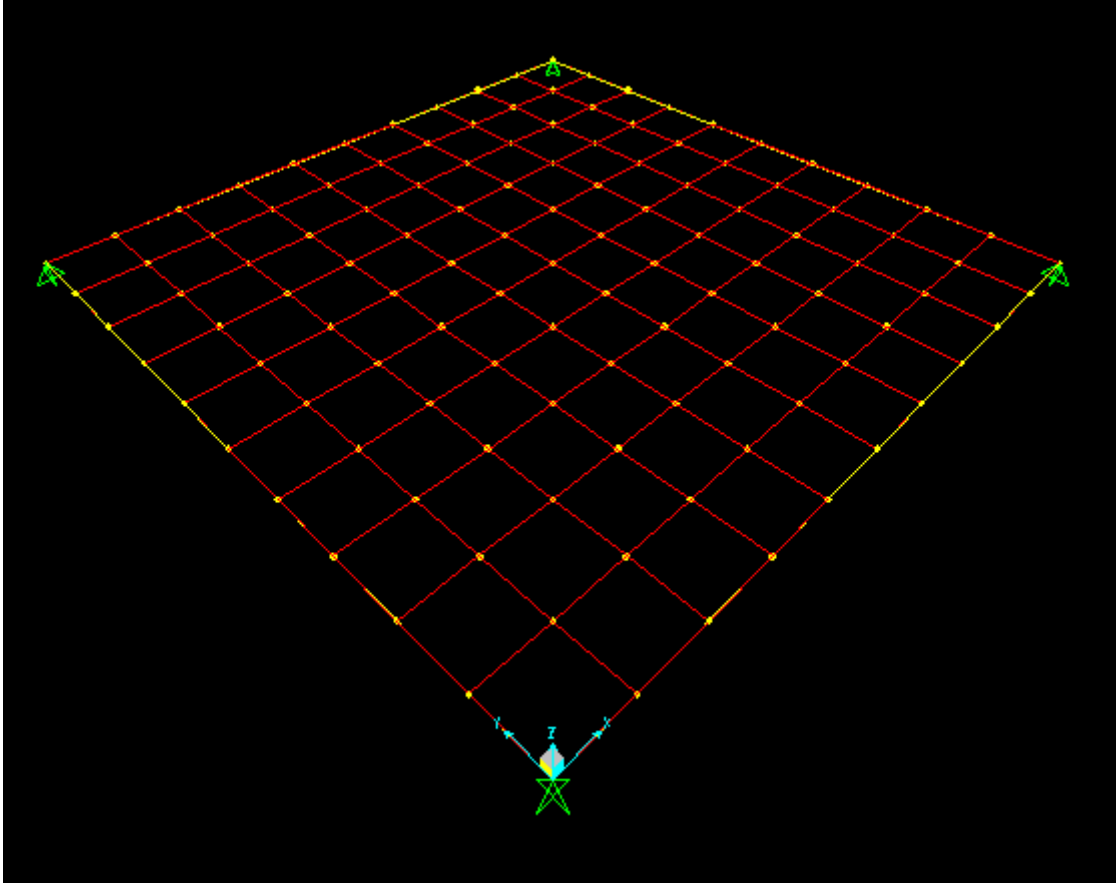
Load Type:

- Uniform Load Contours
 - Coord System: GLOBAL
 - Direction: X
- Uniform Load Values
 - Coord System: GLOBAL
- Uniform Load Resultants
- Uniform Load to Frame Contours
 - Coord System: GLOBAL
 - Direction: X
 - Distribution: Two-Way
- Uniform Load to Frames Values
 - Coord System: GLOBAL
 - Distribution: Two-Way
- Uniform Load to Frames Resultants
 - Distribution: Two-Way
- Gravity Multipliers
 - Coord System: GLOBAL
- Surface Pressure Contours
 - Face: []
- Surface Pressure Values
 - Face: []
- Pore Pressure Contours
- Pore Pressure Values
- Temperature Contours
- Temperature Values
- Temperature Gradient 3-3 Contours
- Temperature Gradient 3-3 Values
- Strain Load Values
 - Component: []
- Rotate Loads
- Wind Press Coefficient Contours
 - Surface: Windward
- Wind Press Coefficient Values

OK Cancel



Model C

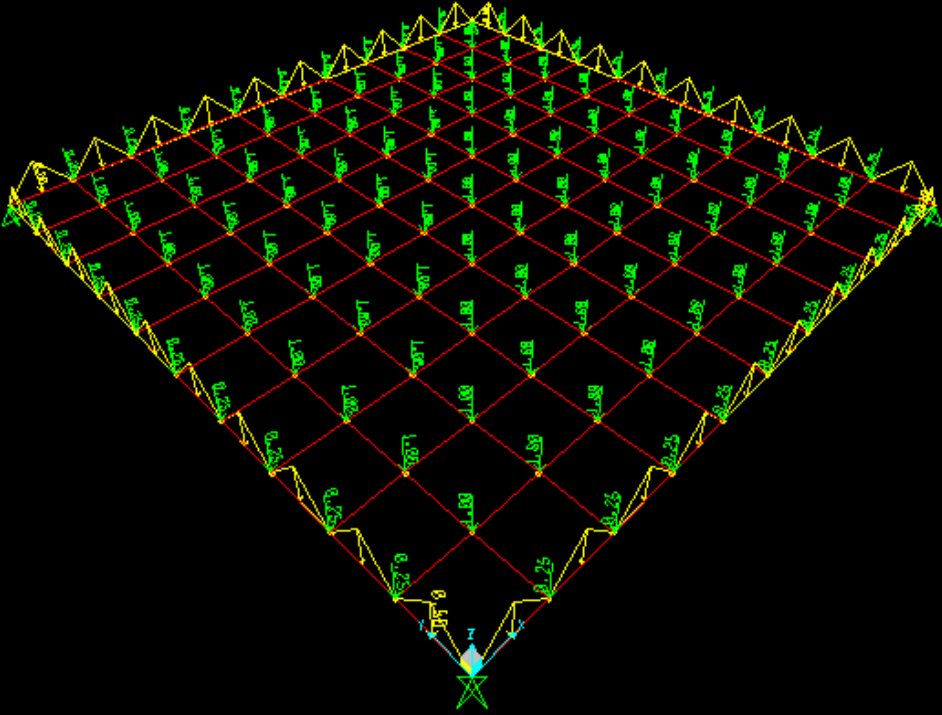


Model C has 100 shell elements (10 by 10) and 4 frame objects along the edges of the resulting slab. The model is simply supported at its four corners.

For this particular model, we will review only the “Uniform to Frame (Shell) – Two Way” load distribution.

Uniform to Frame (Shell) – Two Way

Uniform Area Load Distributed Two Way to Frames (Uniform to Frame (2 way))



Show Area Loads

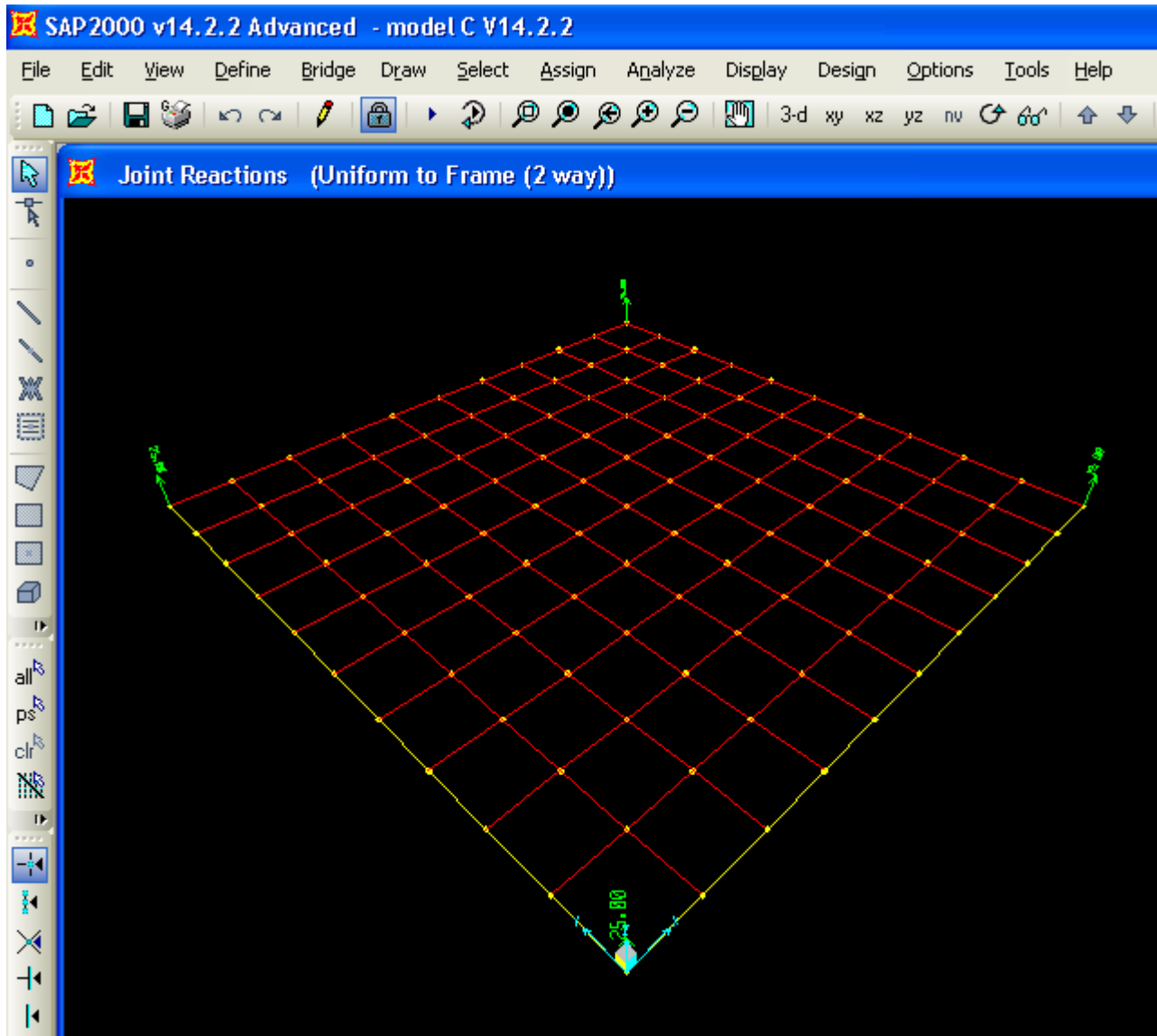
Load Pattern Name: Uniform to Frame (2 way)

Load Type:

- Uniform Load Contours
 - Coord System: GLOBAL
 - Direction: X
- Uniform Load Values
 - Coord System: GLOBAL
- Uniform Load Resultants
- Uniform Load to Frame Contours
 - Coord System: GLOBAL
 - Direction: X
 - Distribution: Two-Way
- Uniform Load to Frames Values
 - Coord System: GLOBAL
 - Distribution: Two-Way
- Uniform Load to Frames Resultants
 - Distribution: Two-Way
- Gravity Multipliers
 - Coord System: GLOBAL
- Surface Pressure Contours
 - Face: []
- Surface Pressure Values
 - Face: []
- Pore Pressure Contours
- Pore Pressure Values
- Temperature Contours
- Temperature Values
- Temperature Gradient 3-3 Contours
- Temperature Gradient 3-3 Values
- Strain Load Values
 - Component: []
- Rotate Loads
- Wind Press Coefficient Contours
 - Surface: Windward
- Wind Press Coefficient Values

OK Cancel

Note that loads also get applied to internal joints so that no load gets lost.



Reaction of 25kN is obtained at each joint which is expected – no load is lost.

 Moment 3-3 Diagram (Uniform to Frame (2 way))

