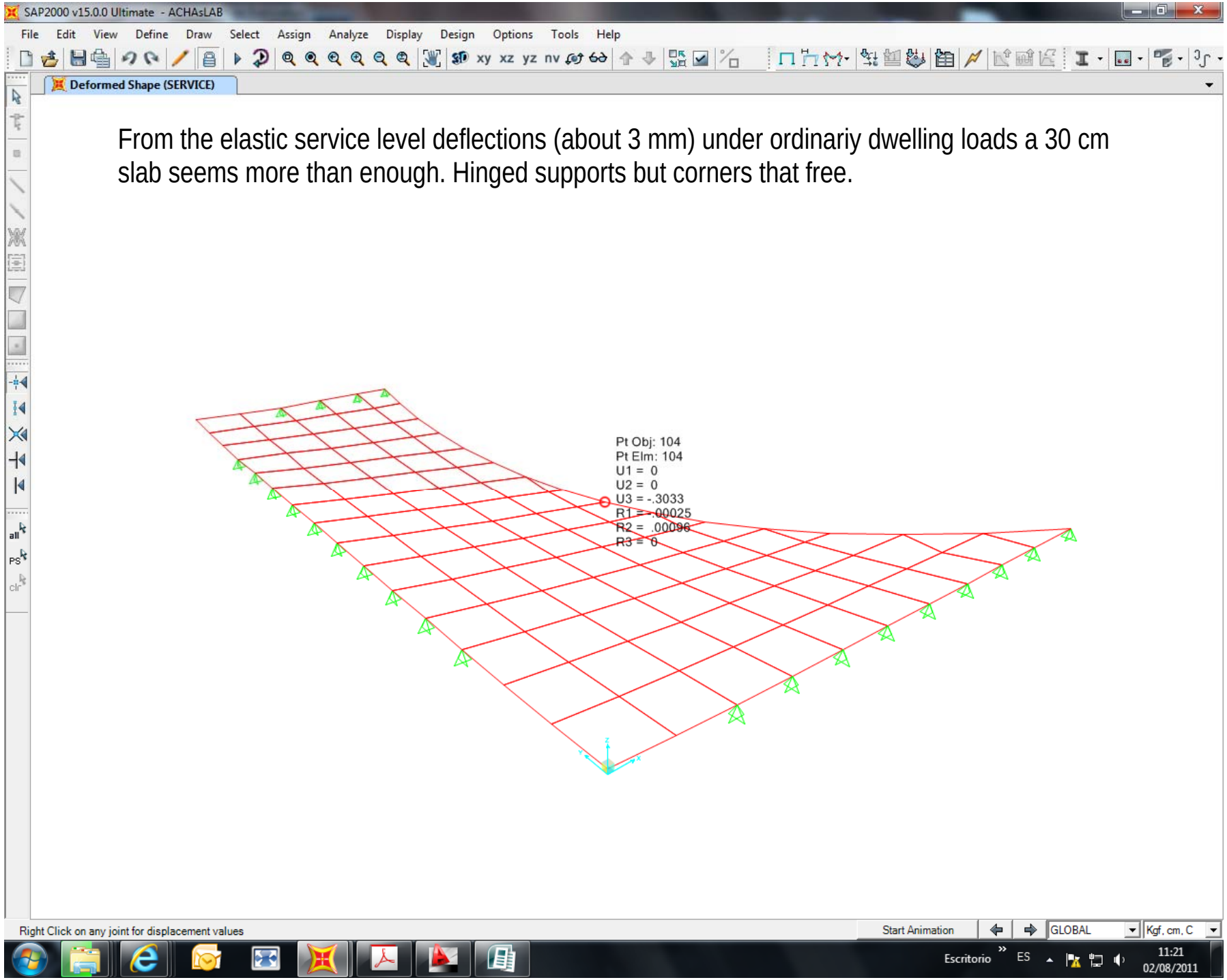
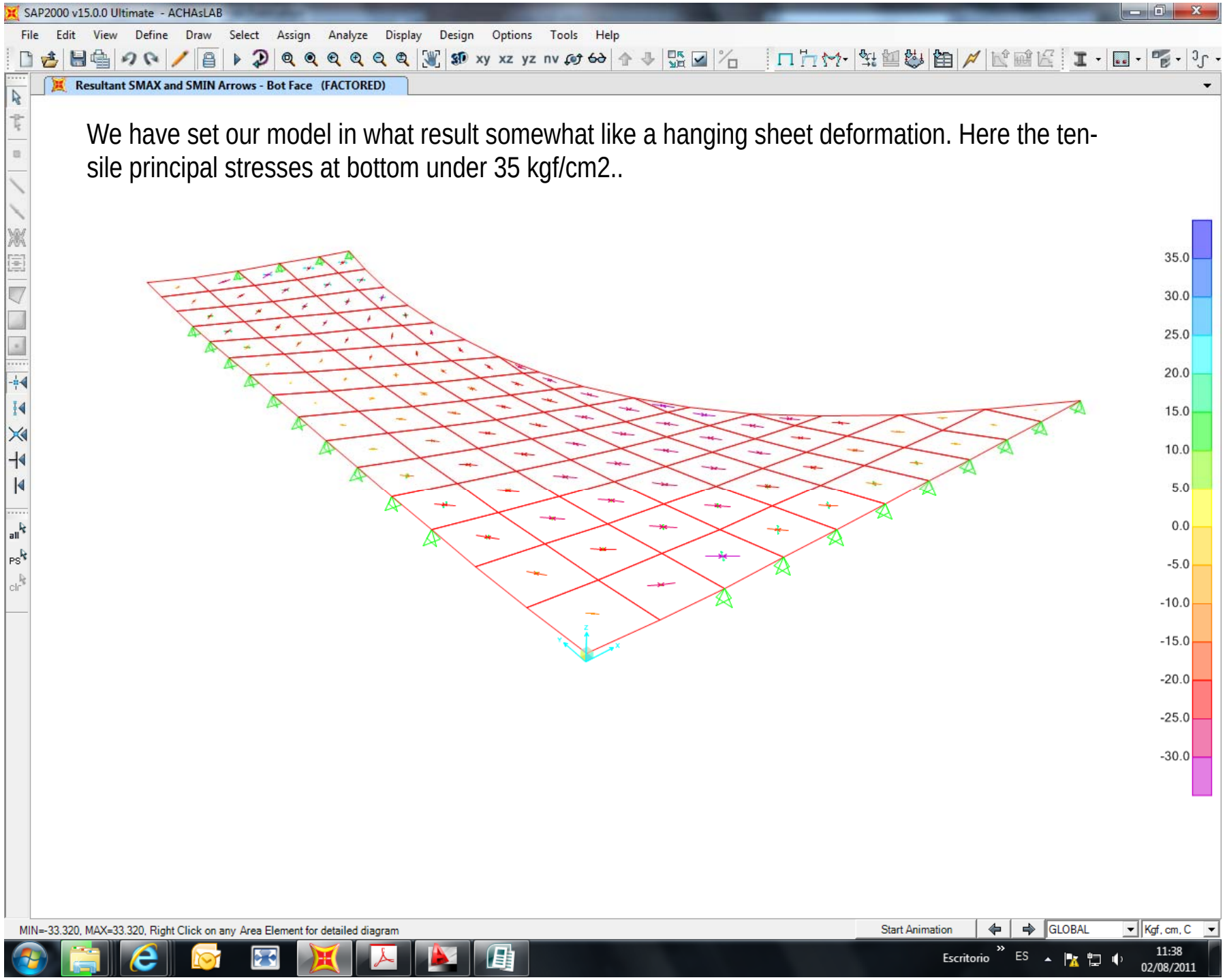
From the elastic service level deflections (about 3 mm) under ordinariy dwelling loads a 30 cm slab seems more than enough. Hinged supports but corners that free.



We have set our model in what result somewhat like a hanging sheet deformation. Here the tensile principal stresses at bottom under 35 kgf/cm2..

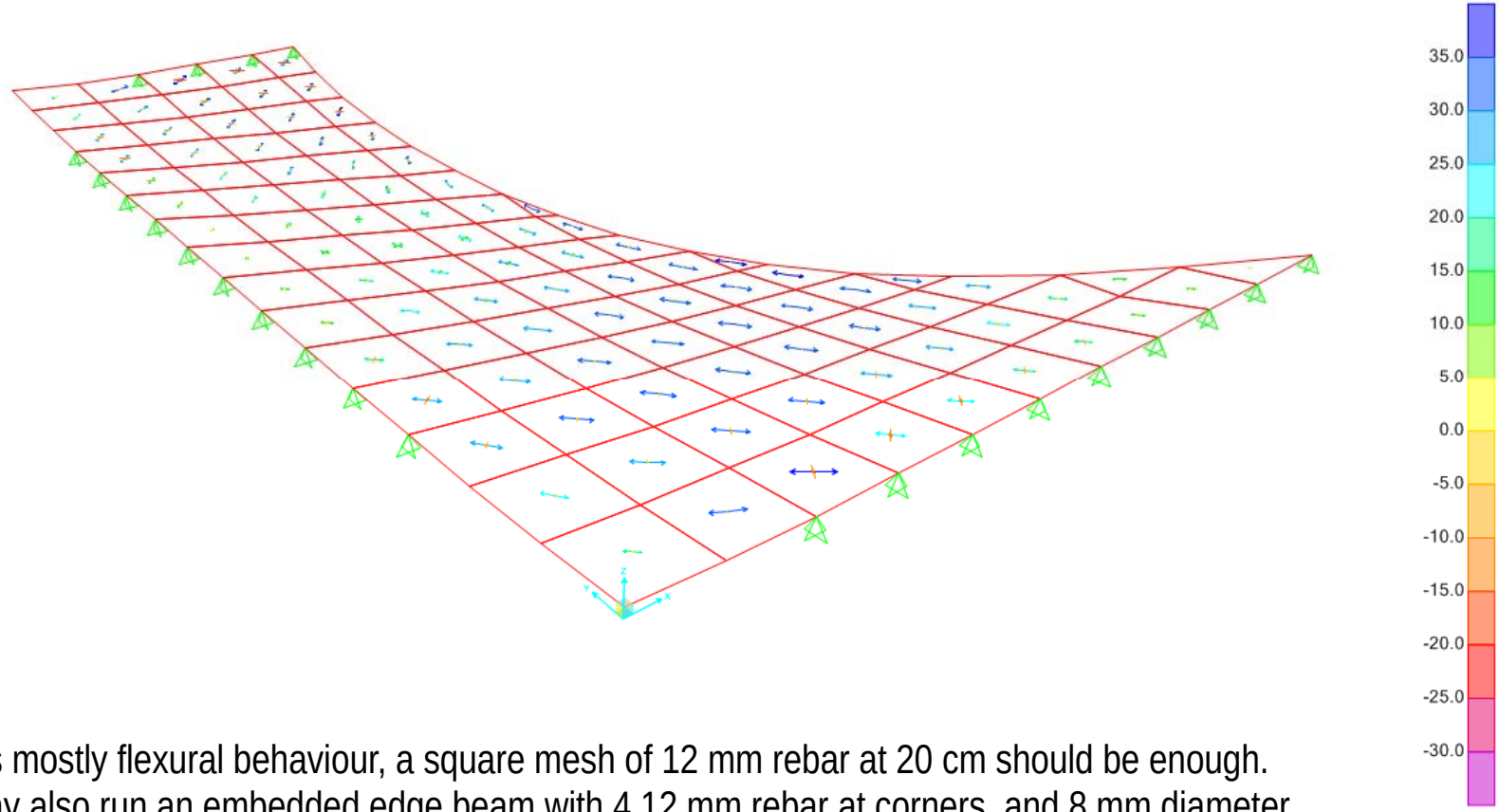


SAP2000 v15.0.0 Ultimate - ACHAsLAB

File Edit View Define Draw Select Assign Analyze Display Design Options Tools Help

Resultant SMAX and SMIN Arrows - Top Face (FACTORED)

We see here that at the top face for the model the stress is mainly compressive, whilst the tensile principal stresses remain under 35 kgf/cm2.

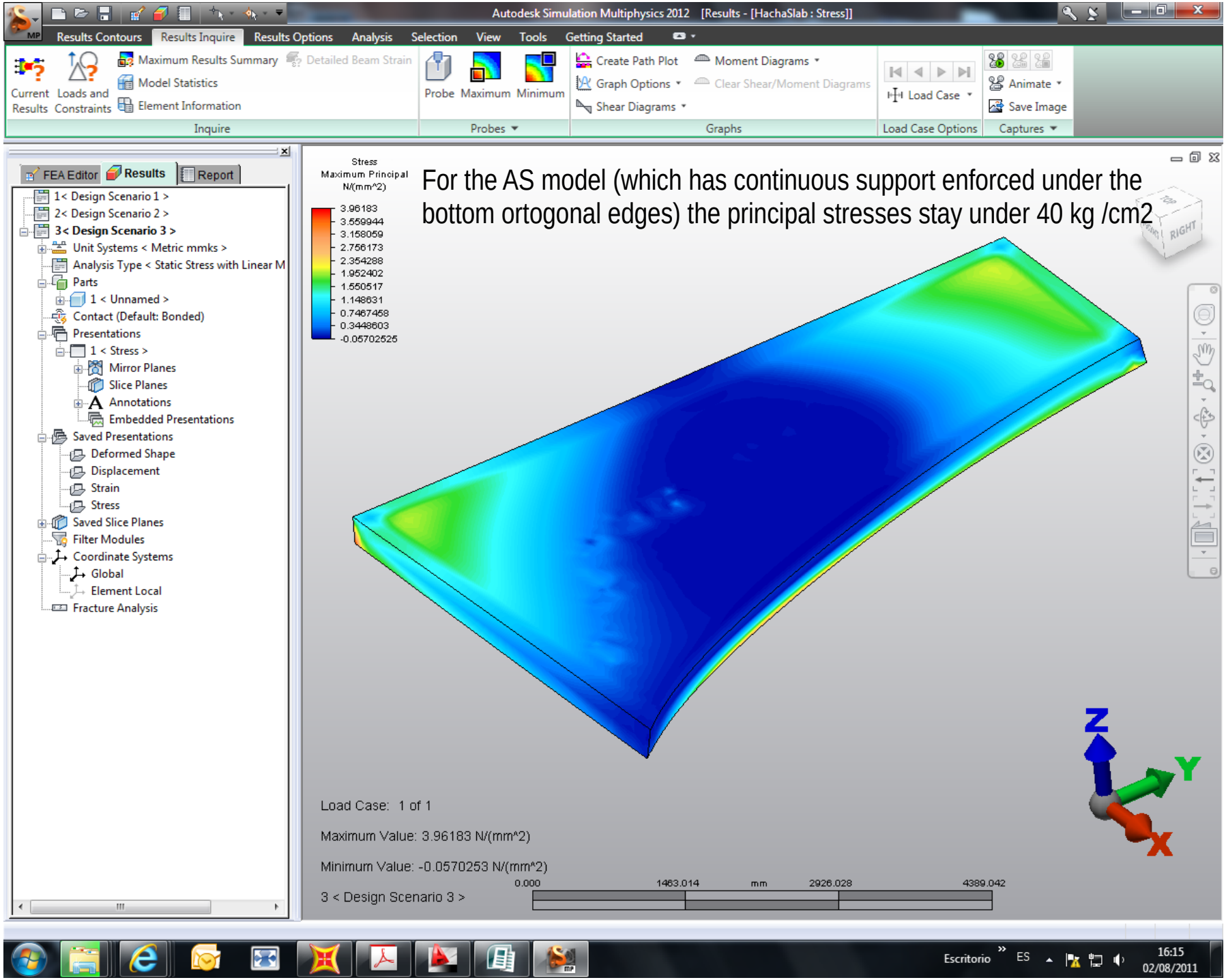


For this mostly flexural behaviour, a square mesh of 12 mm rebar at 20 cm should be enough. You may also run an embedded edge beam with 4 12 mm rebar at corners, and 8 mm diameter stirrups at 15 cm.

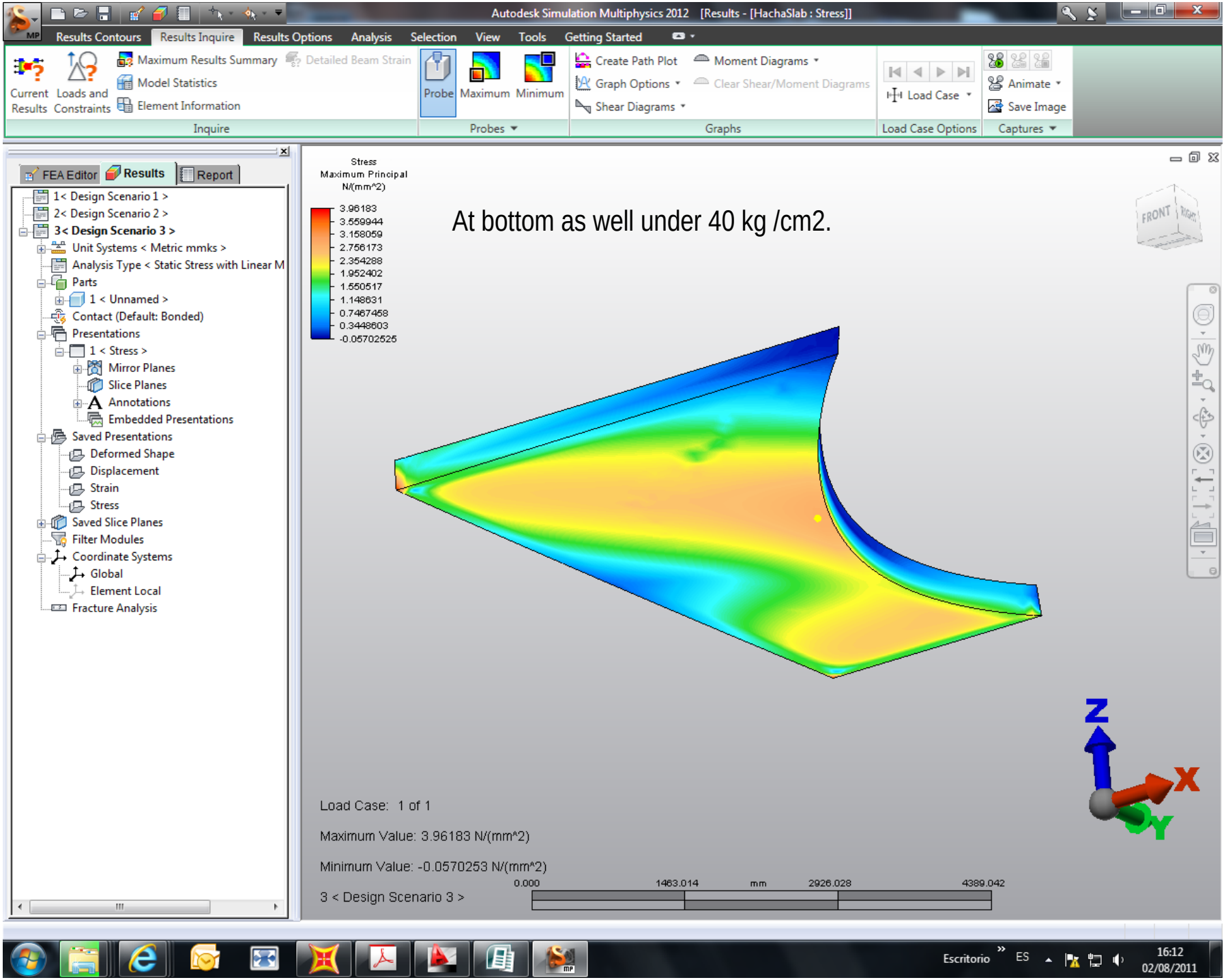
MIN=-33.320, MAX=33.320, Right Click on any Area Element for detailed diagram

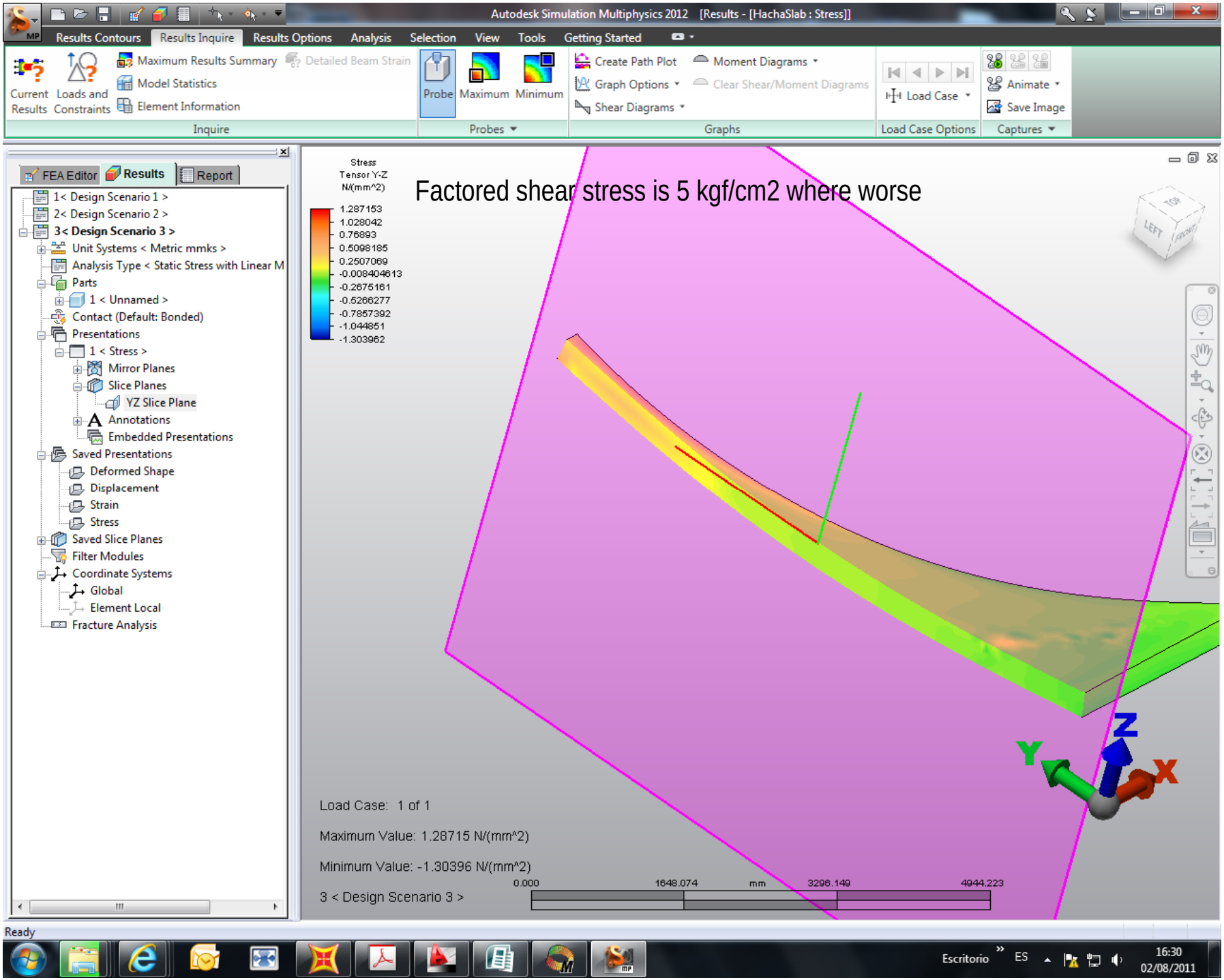
Start Animation GLOBAL Kgf, cm, C

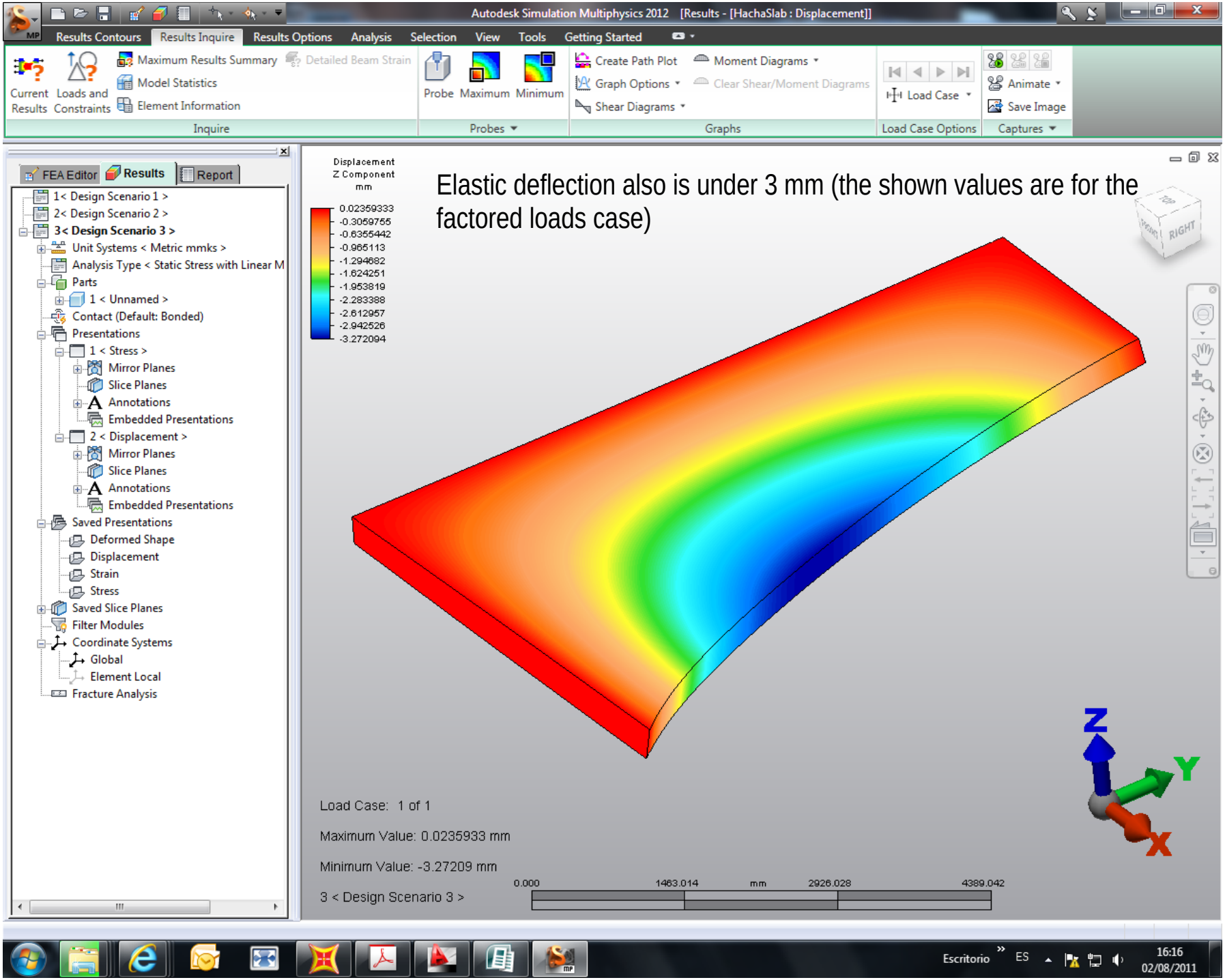
Escritorio ES 11:41 02/08/2011



For the AS model (which has continuous support enforced under the bottom ortogonal edges) the principal stresses stay under 40 kg /cm2


Autodesk Simulation Multiphysics 2012 [Results - [HachaSlab : Stress]]
Results Contours
Results Inquire
Results Options
Analysis
Selection
View
Tools
Getting Started
Current Results
Loads and Constraints
Maximum Results Summary
Model Statistics
Element Information
Detailed Beam Strain
Probe
Maximum
Minimum
Create Path Plot
Graph Options
Shear Diagrams
Moment Diagrams
Clear Shear/Moment Diagrams
Load Case
Animate
Save Image
Inquire
Probes
Graphs
Load Case Options
Captures
FEA Editor
Results
Report
1< Design Scenario 1 >
2< Design Scenario 2 >
3< Design Scenario 3 >
Unit Systems < Metric mmks >
Analysis Type < Static Stress with Linear M
Parts
1 < Unnamed >
Contact (Default: Bonded)
Presentations
1 < Stress >
Mirror Planes
Slice Planes
Annotations
Embedded Presentations
Saved Presentations
Deformed Shape
Displacement
Strain
Stress
Saved Slice Planes
Filter Modules
Coordinate Systems
Global
Element Local
Fracture Analysis
Stress
Maximum Principal
N/(mm^2)
3.96183
3.559944
3.158059
2.756173
2.354288
1.952402
1.550517
1.148631
0.7467458
0.3448603
-0.05702525
At bottom as well under 40 kg /cm2.
FRONT
RIGHT
Z
X
Y
Load Case: 1 of 1
Maximum Value: 3.96183 N/(mm^2)
Minimum Value: -0.0570253 N/(mm^2)
3 < Design Scenario 3 >
0.000
1463.014
mm
2926.028
4389.042
Escritorio
ES
16:12
02/08/2011


Autodesk Simulation Multiphysics 2012 [Results - [HachaSlab : Stress]]
Results Contours
Results Inquire
Results Options
Analysis
Selection
View
Tools
Getting Started
Current Results
Loads and Constraints
Maximum Results Summary
Model Statistics
Element Information
Detailed Beam Strain
Inquire
Probe
Maximum
Minimum
Probes
Create Path Plot
Graph Options
Shear Diagrams
Moment Diagrams
Clear Shear/Moment Diagrams
Graphs
Load Case
Load Case Options
Animate
Save Image
Captures
FEA Editor
Results
Report
1< Design Scenario 1 >
2< Design Scenario 2 >
3< Design Scenario 3 >
Unit Systems < Metric mmks >
Analysis Type < Static Stress with Linear M
Parts
1 < Unnamed >
Contact (Default: Bonded)
Presentations
1 < Stress >
Mirror Planes
Slice Planes
YZ Slice Plane
Annotations
Embedded Presentations
Saved Presentations
Deformed Shape
Displacement
Strain
Stress
Saved Slice Planes
Filter Modules
Coordinate Systems
Global
Element Local
Fracture Analysis
Stress
Tensor Y-Z
N/(mm^2)
1.287153
1.028042
0.76893
0.5098185
0.2507069
-0.008404613
-0.2675161
-0.5266277
-0.7857392
-1.044851
-1.303962
Factored shear stress is 5 kgf/cm2 where worse
Load Case: 1 of 1
Maximum Value: 1.28715 N/(mm^2)
Minimum Value: -1.30396 N/(mm^2)
3 < Design Scenario 3 >
0.000
1648.074
mm
3296.149
4944.223
Z
Y
X
Ready
Escritorio
ES
16:30
02/08/2011


Autodesk Simulation Multiphysics 2012 [Results - [HachaSlab : Displacement]]
Results Contours
Results Inquire
Results Options
Analysis
Selection
View
Tools
Getting Started
Current Results
Loads and Constraints
Maximum Results Summary
Model Statistics
Element Information
Detailed Beam Strain
Probe
Maximum
Minimum
Create Path Plot
Graph Options
Shear Diagrams
Moment Diagrams
Clear Shear/Moment Diagrams
Load Case
Animate
Save Image
Inquire
Probes
Graphs
Load Case Options
Captures
FEA Editor
Results
Report
1< Design Scenario 1 >
2< Design Scenario 2 >
3< Design Scenario 3 >
Unit Systems < Metric mmks >
Analysis Type < Static Stress with Linear M
Parts
1 < Unnamed >
Contact (Default: Bonded)
Presentations
1 < Stress >
Mirror Planes
Slice Planes
Annotations
Embedded Presentations
2 < Displacement >
Mirror Planes
Slice Planes
Annotations
Embedded Presentations
Saved Presentations
Deformed Shape
Displacement
Strain
Stress
Saved Slice Planes
Filter Modules
Coordinate Systems
Global
Element Local
Fracture Analysis
Displacement
Z Component
mm
0.02359333
-0.3059755
-0.6355442
-0.965113
-1.294682
-1.624251
-1.953819
-2.283388
-2.612957
-2.942526
-3.272094
Elastic deflection also is under 3 mm (the shown values are for the factored loads case)
Load Case: 1 of 1
Maximum Value: 0.0235933 mm
Minimum Value: -3.27209 mm
3 < Design Scenario 3 >
0.000
1463.014
mm
2926.028
4389.042
Z
Y
X
Escritorio
ES
16:16
02/08/2011