

# Nedjelja 5

## Modeliranje ljuskaste konstrukcije konačnim elementima

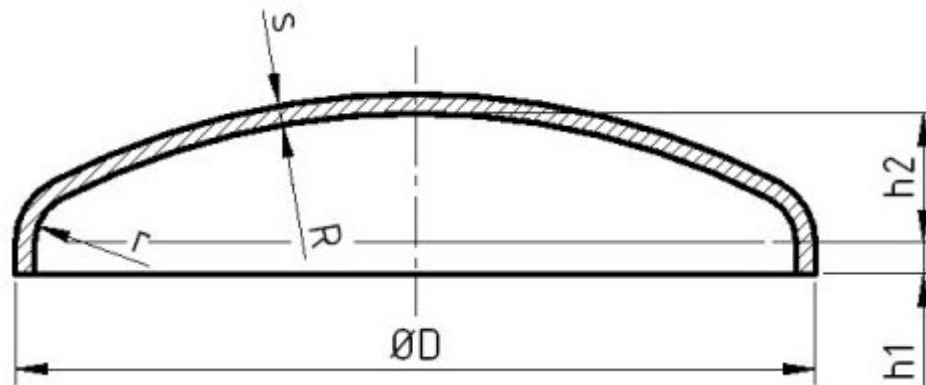
# Postavka zadatka

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Rezervoar za gorivo ukupne dužine  $L=5000$  mm, spoljašnjeg prečnika  $D=1000$  mm je izrađen od čeličnog lima debljine  $s=10$  mm. Gorivo u rezervoaru je pod pritiskom  $p=1$  MPa. Odrediti maksimalna pomjeranja i von Mises-ove napone. Rezervoar je slobodno oslonjen o tlo. Detaljni podaci o geometriji i dimenzijama danca rezervoara su prikazani na slici.

# Postavka zadatka

Detaljni podaci o geometriji i dimenzijama danca rezervora:  $R=1000\text{mm}$ ,  $h_2=190\text{mm}$ ,  $r=100\text{ mm}$



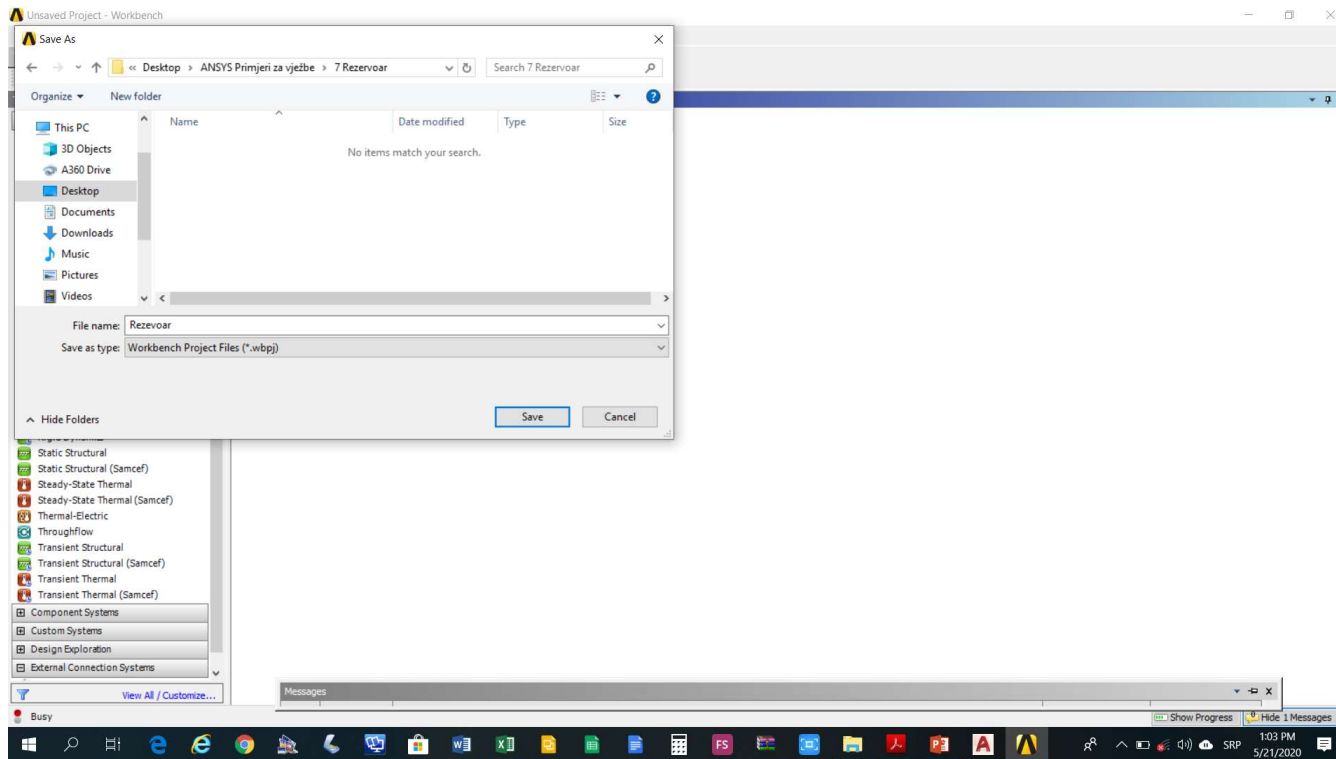
# Posuda pod pritiskom

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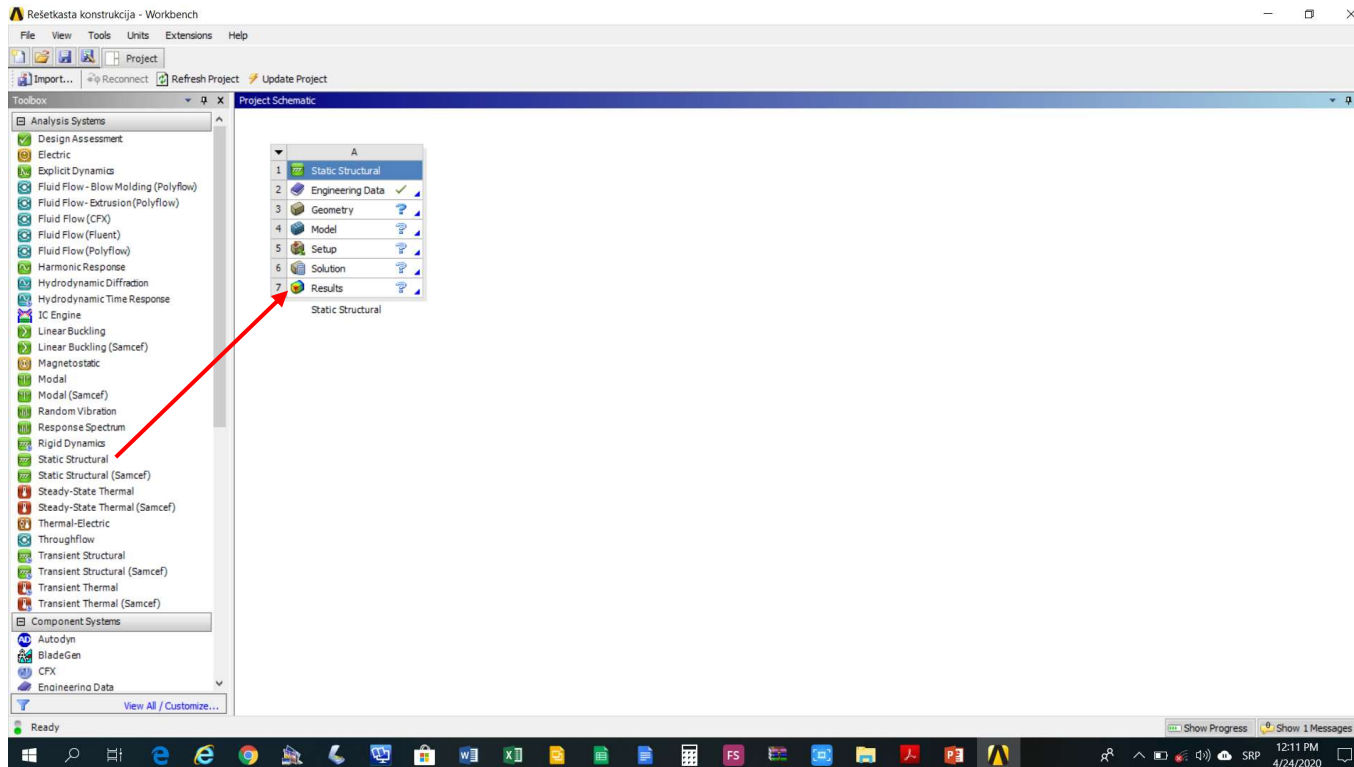
# Modeliranje luskaste konstrukcije

Aktivirati program ANSYS i sačuvati prazan projekat pod nazivom Rezervoar



# Modeliranje ljskaste konstrukcije

Kreirati statičku linearnu analizu (*Static Structural*) na shemi projekta (*Project Schematic*)



# Modeliranje luskaste konstrukcije

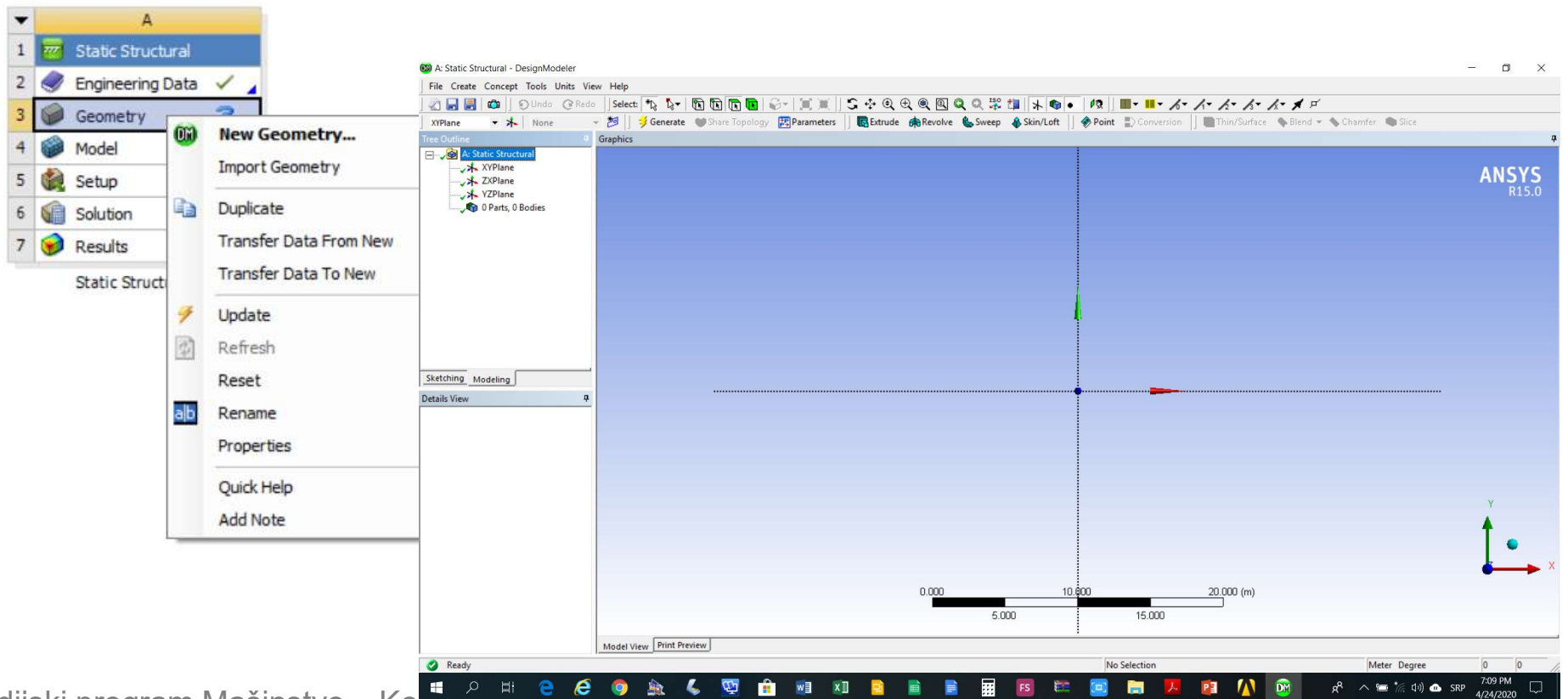
Izvršiti podešavanja modula Design Modeler  
(*Geometry*->*Properties*->*Analysis Type* = 3D)

The screenshot displays the ANSYS Workbench interface. On the left, the 'Project Schematic' shows a tree view with 'Static Structural' selected. A context menu is open over the 'Geometry' component, with 'Properties' highlighted. The 'Properties of Schematic A3: Geometry' dialog is open on the right. The 'Basic Geometry Options' section has 'Surface Bodies' checked. The 'Advanced Geometry Options' section has 'Analysis Type' set to '3D'. The 'Mixed Import Resolution' is set to 'None'.

Property	Value
Component ID	Geometry
Directory Name	SYS
Notes	
Used Licenses	
Last Update Used Licenses	
Geometry Source	
Geometry File Name	
Basic Geometry Options	
Surface Bodies	<input checked="" type="checkbox"/>
Parameters	<input checked="" type="checkbox"/>
Parameter Key	DS
Attributes	
Named Selections	
Material Properties	
Advanced Geometry Options	
Analysis Type	3D
Use Associativity	
Support Coordinate Systems	2D
Import Work Pieces	
Reader Mode Saves Updated File	
Import Using Instances	<input checked="" type="checkbox"/>
Smart CAD Update	
Compare Parts On Update	No
Enclosure and Symmetry Processing	<input checked="" type="checkbox"/>
Decompose Disjoint Geometry	<input checked="" type="checkbox"/>
Mixed Import Resolution	None

# Modeliranje ljskaste konstrukcije

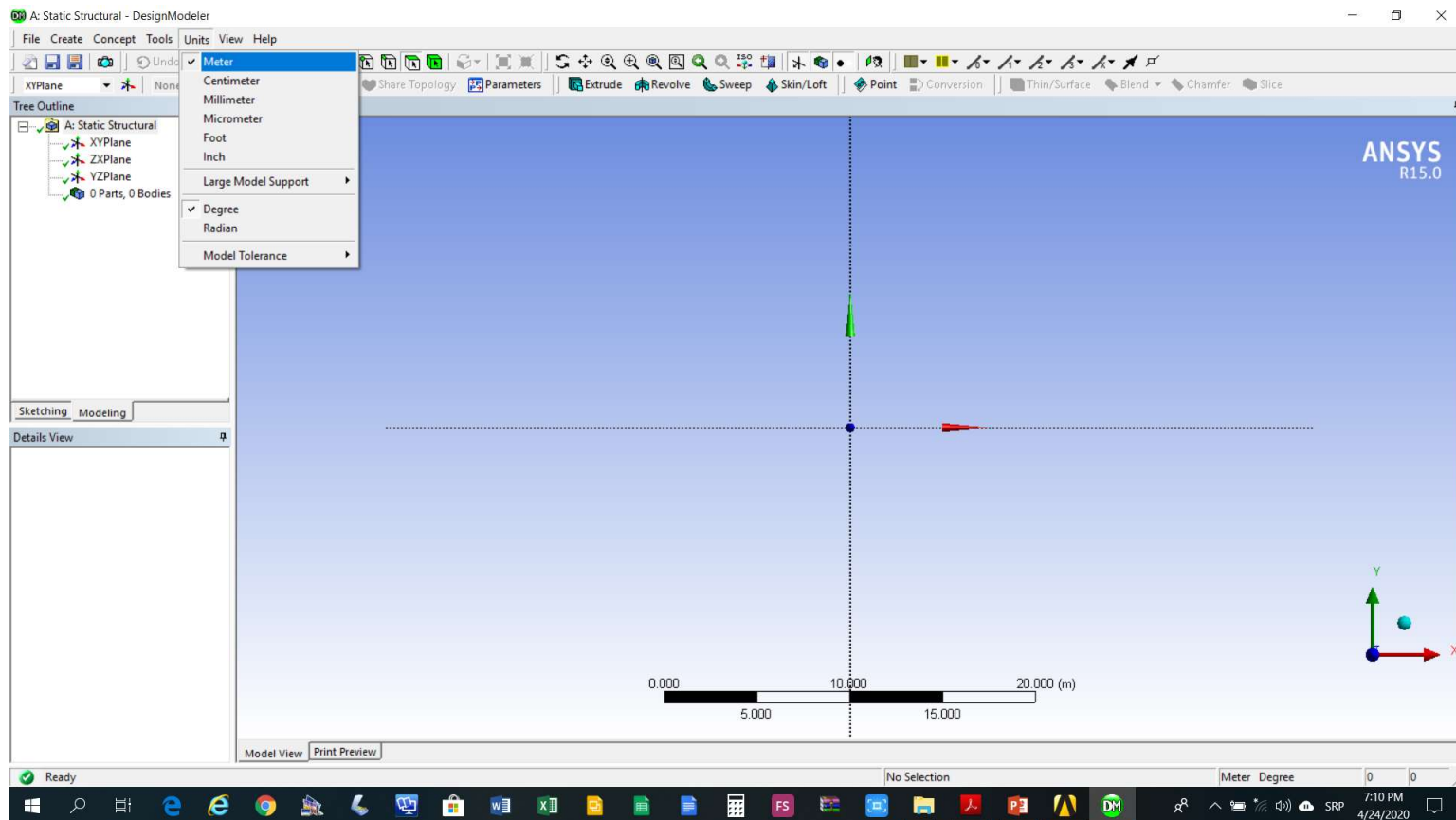
Aktivirati modul Design Modeler (*Geometry->New Geometry*)





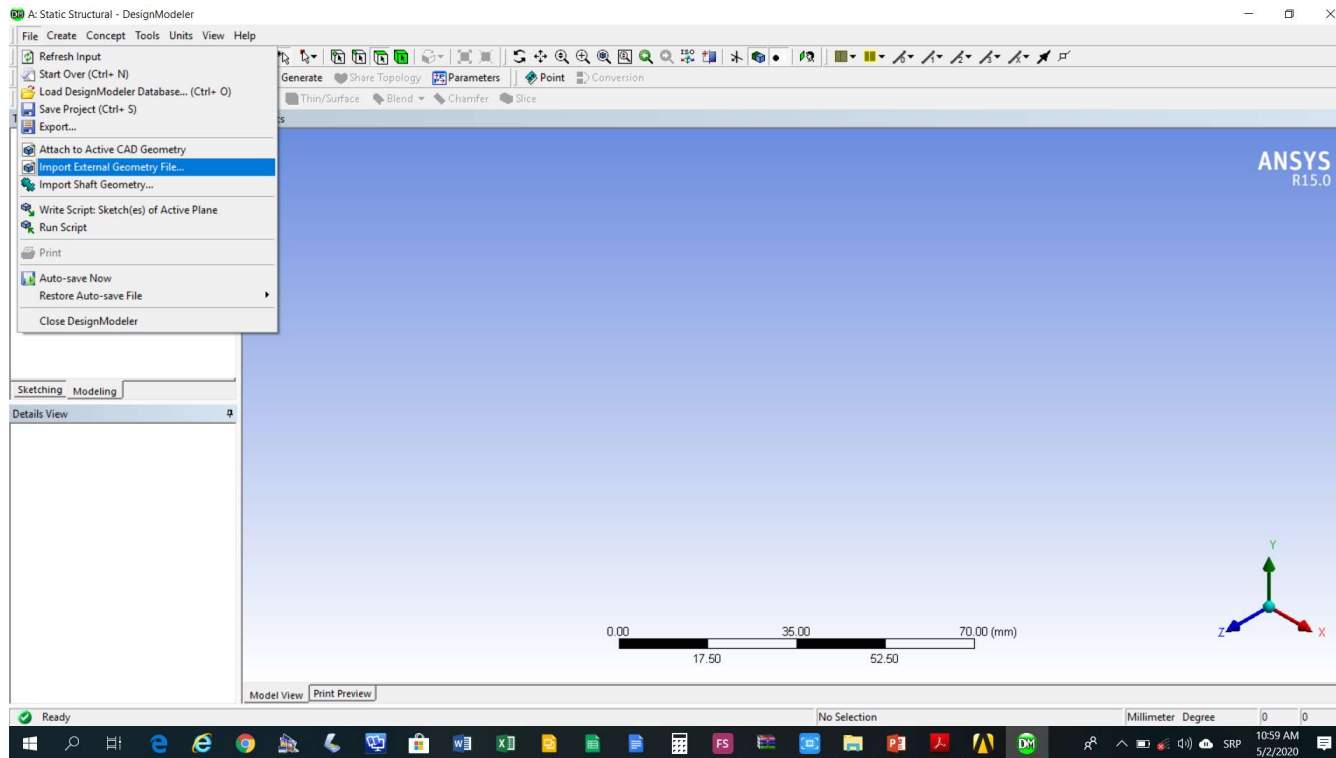
# Modeliranje ljuskaste konstrukcije

Podesiti dužinske jedinice (Units->Meter)



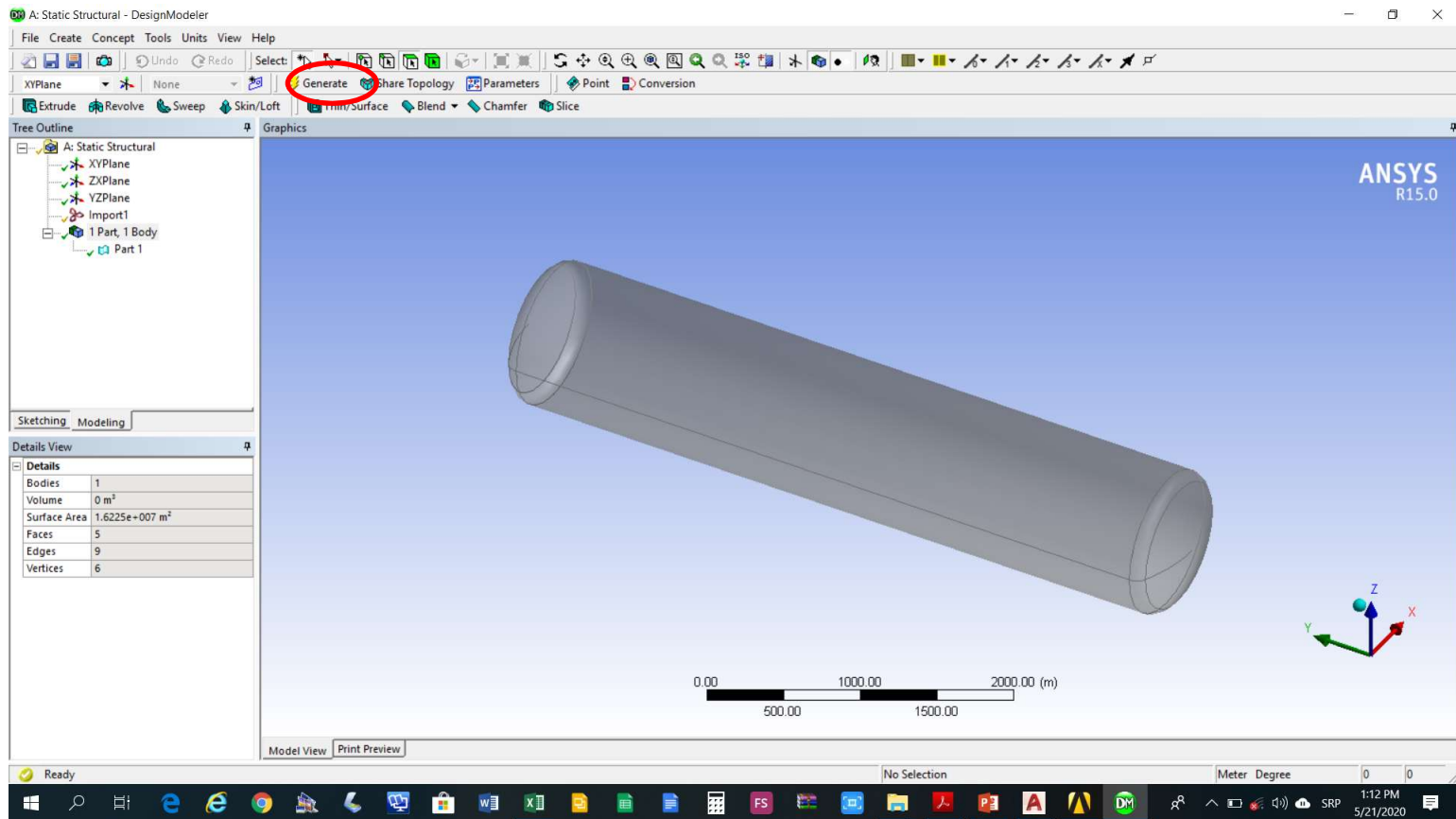
# Modeliranje ljuskaste konstrukcije

Učitavanje eksterno generisane geometrije (File->*Import External Geometry File*) \*.sat format



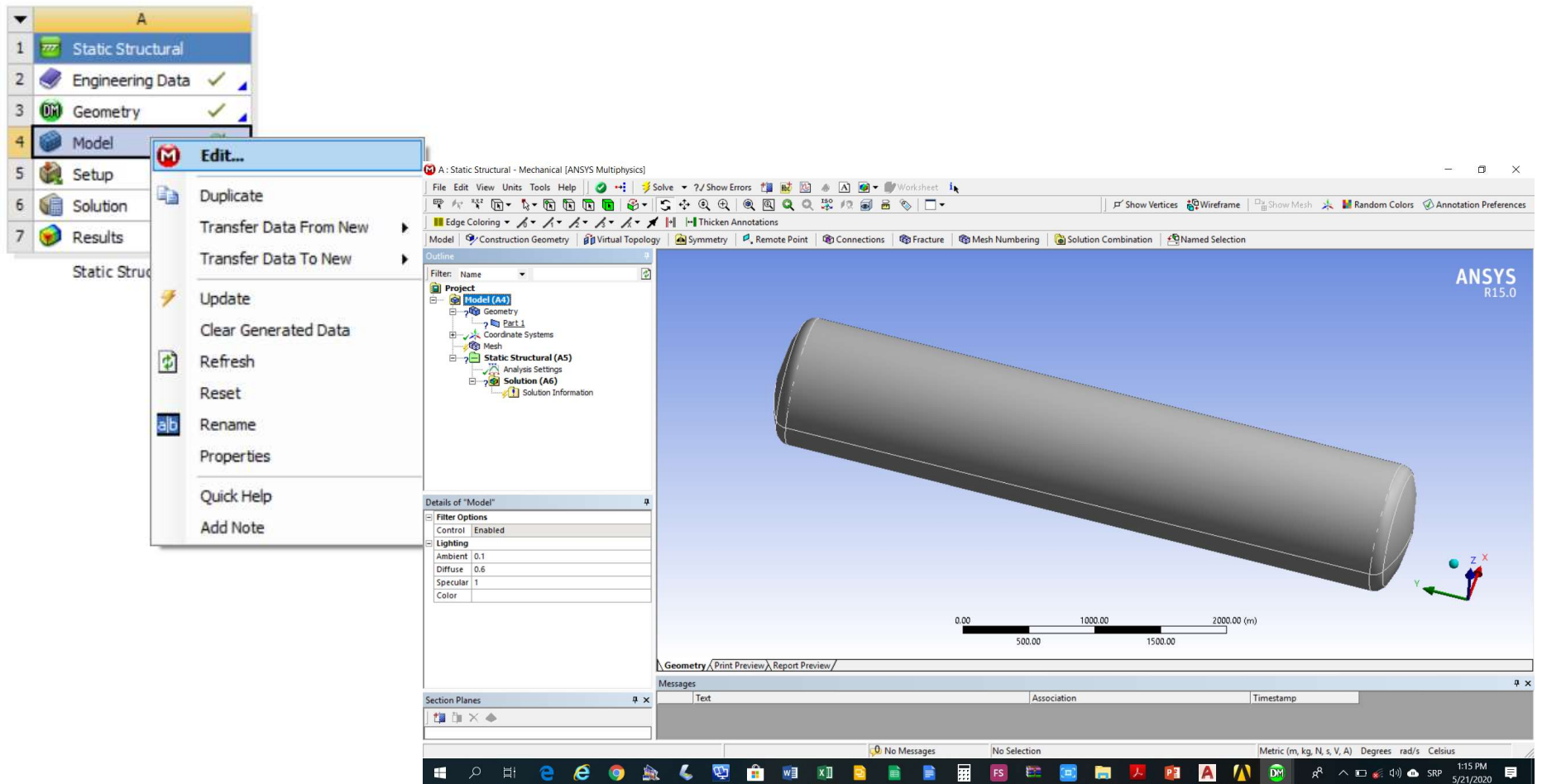
# Modeliranje ljuskaste konstrukcije

Učitavanje eksterno generisane geometrije  
okončati komandom *Generate*



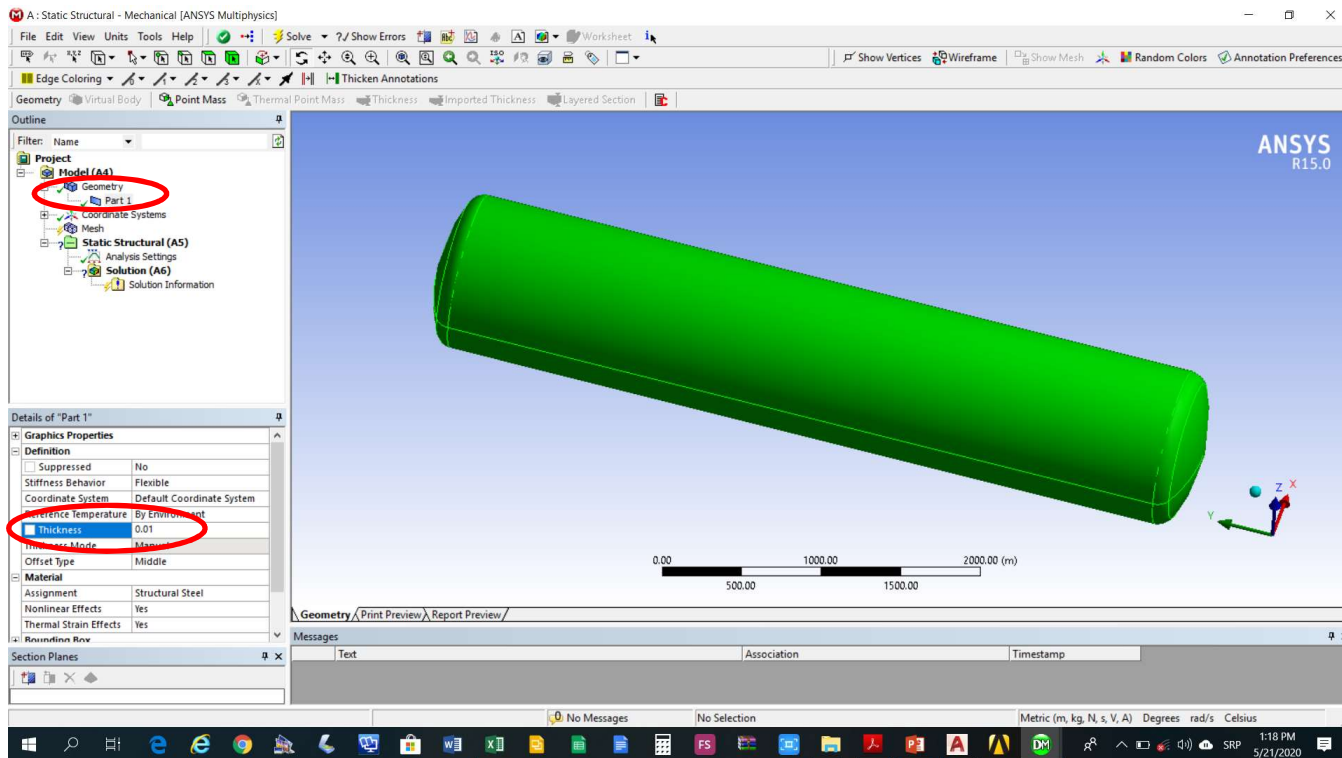
# Modeliranje luskaste konstrukcije

Aktivirati modul Static Structural (*Model*->*Edit*)



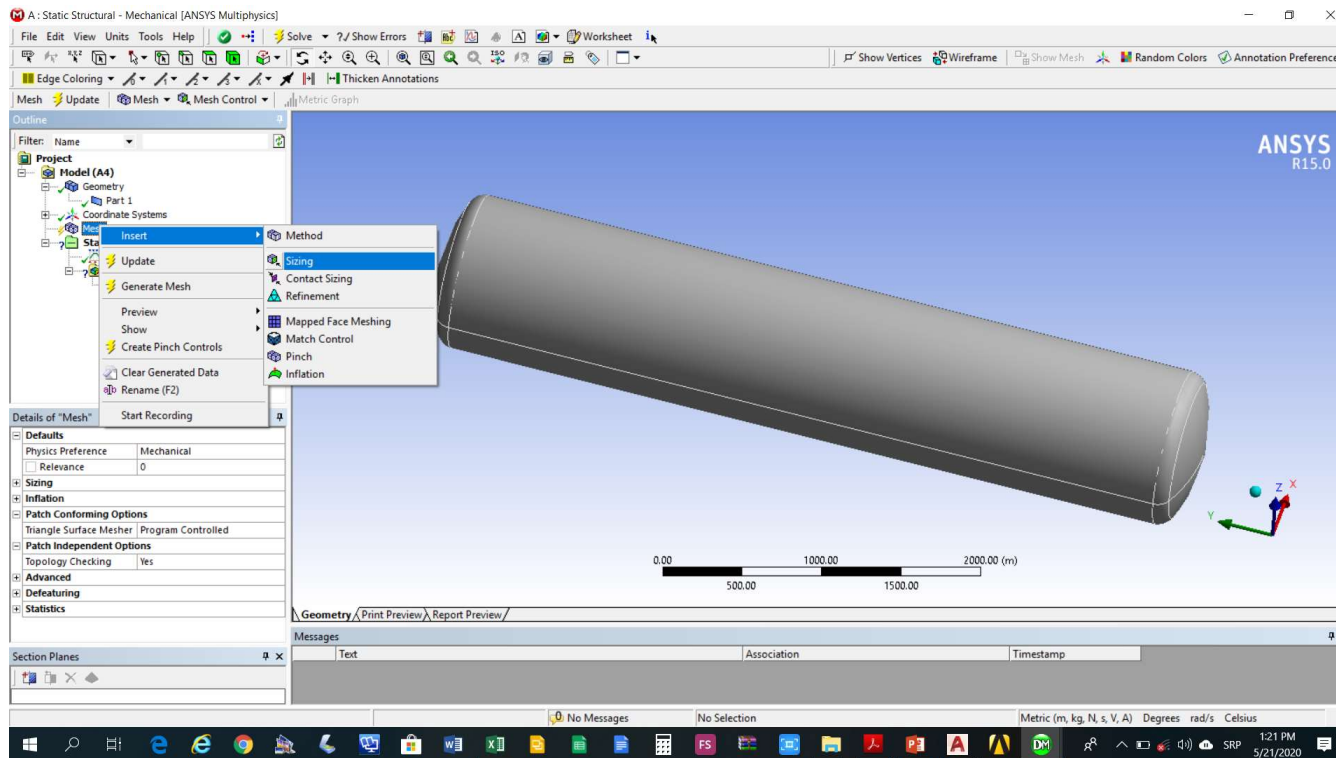
# Modeliranje ljskaste konstrukcije

Podesiti debljinu zida rezervoara *Details of Geometry->Definition->Thickness* na 0.01m



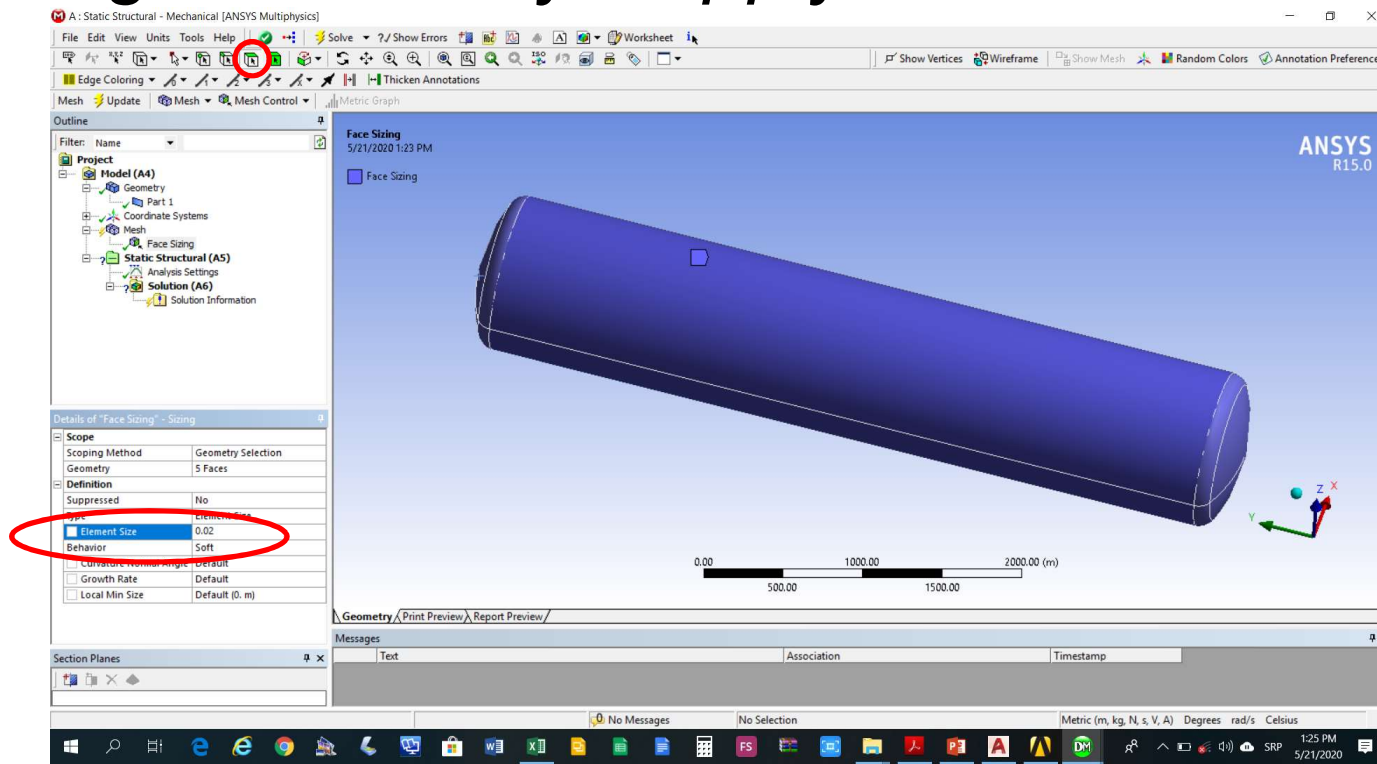
# Modeliranje luskaste konstrukcije

Definisati veličinu konačnih elemenata *Mesh*-  
>*Insert*->*Sizing*



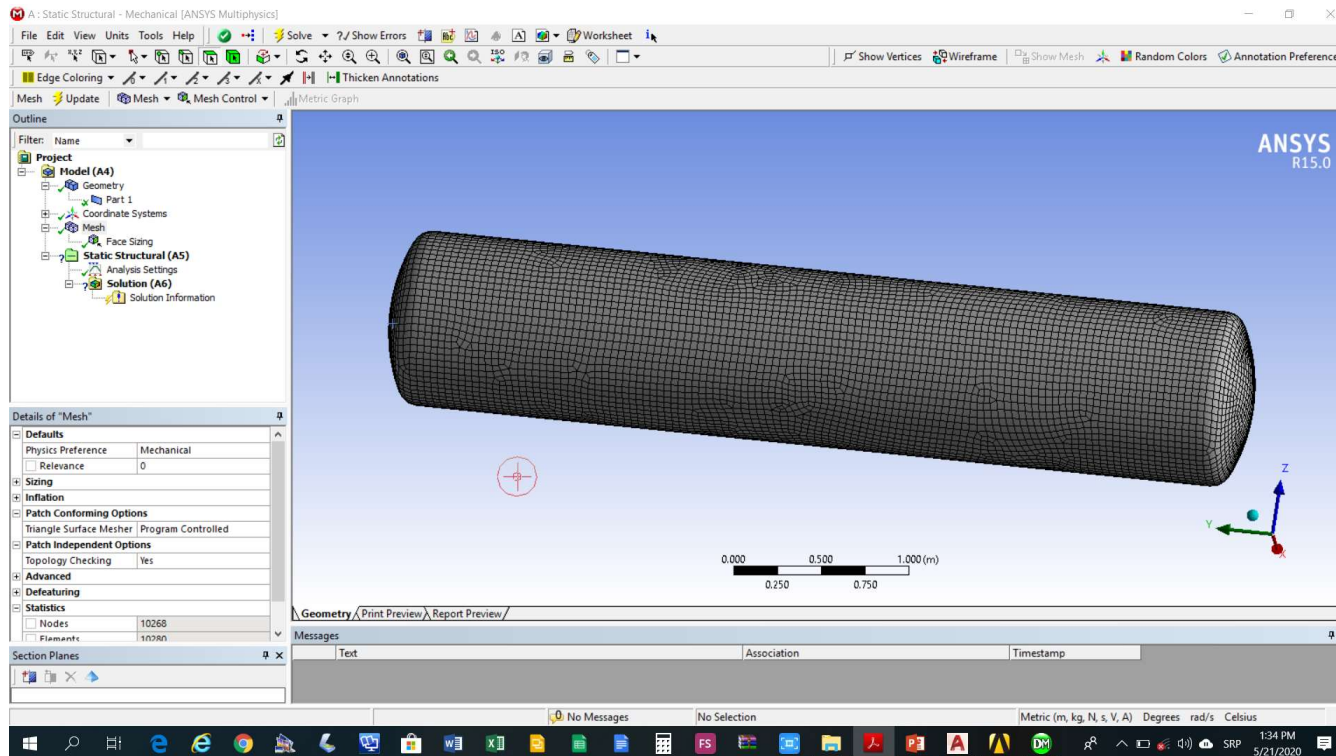
# Modeliranje ljuskaste konstrukcije

U polje *Details of Sizing*->*Element Size* unijeti 0.04 m. Izabrati svih 5 površina i aktivirati *Details of Sizing*->*Geometry*->*Apply*



# Modeliranje luskaste konstrukcije

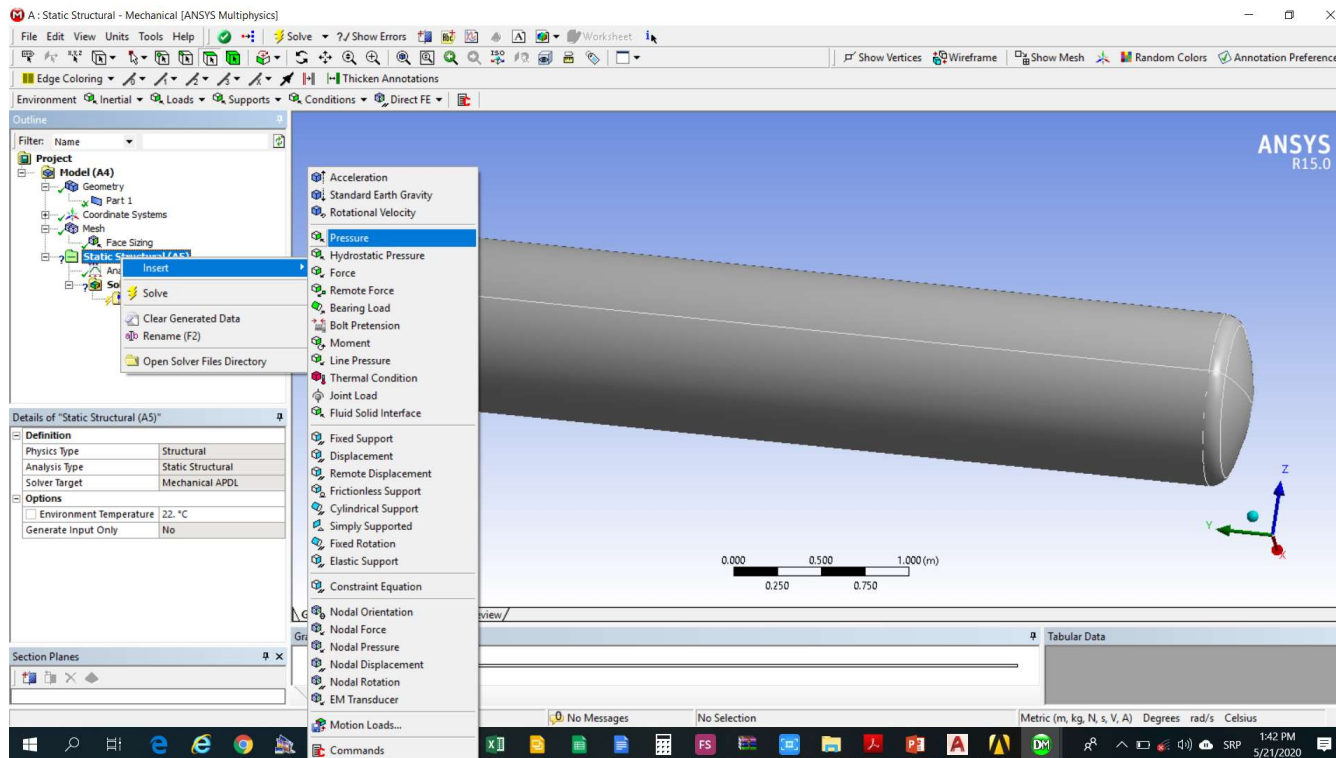
Generisati mrežu konačnih elemenata *Mesh*-  
>*Generate Mesh*





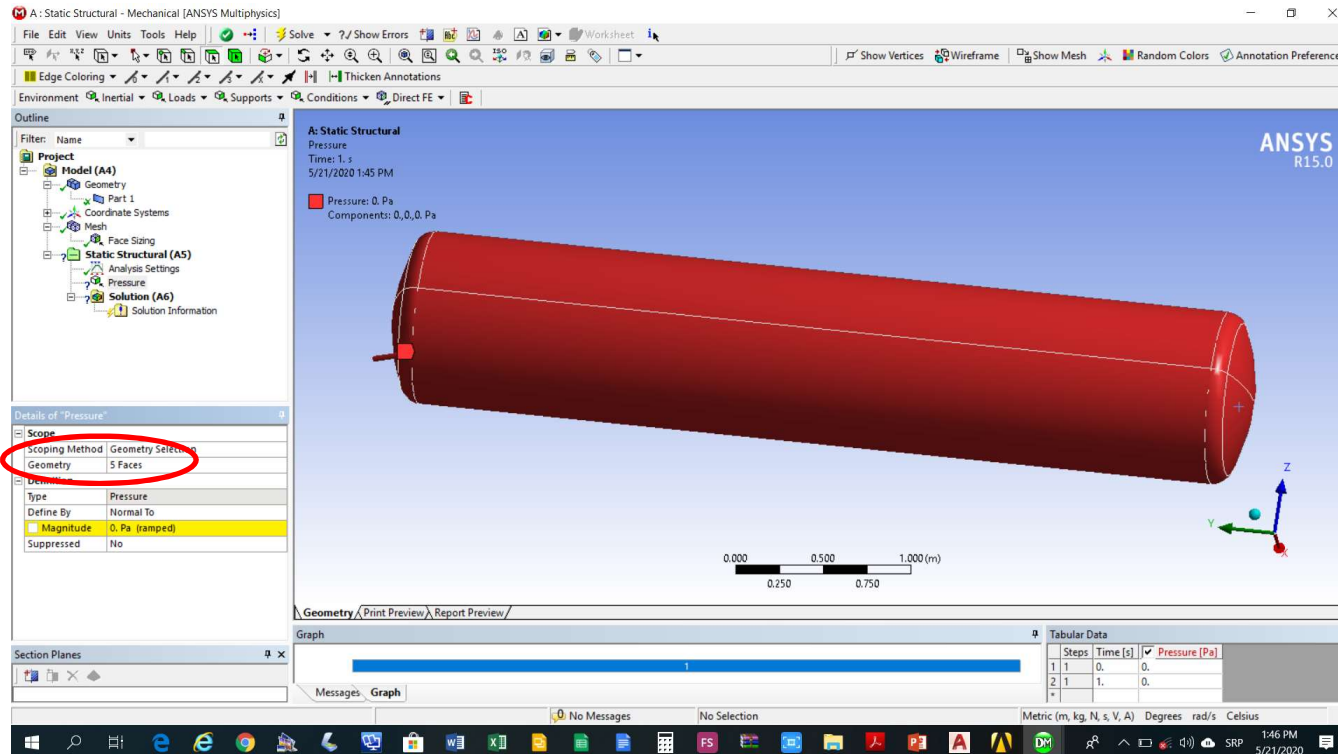
# Modeliranje luskaste konstrukcije

Dodati opterećenje od pritiska *Static Structural*-  
>*Insert*->*Pressure*



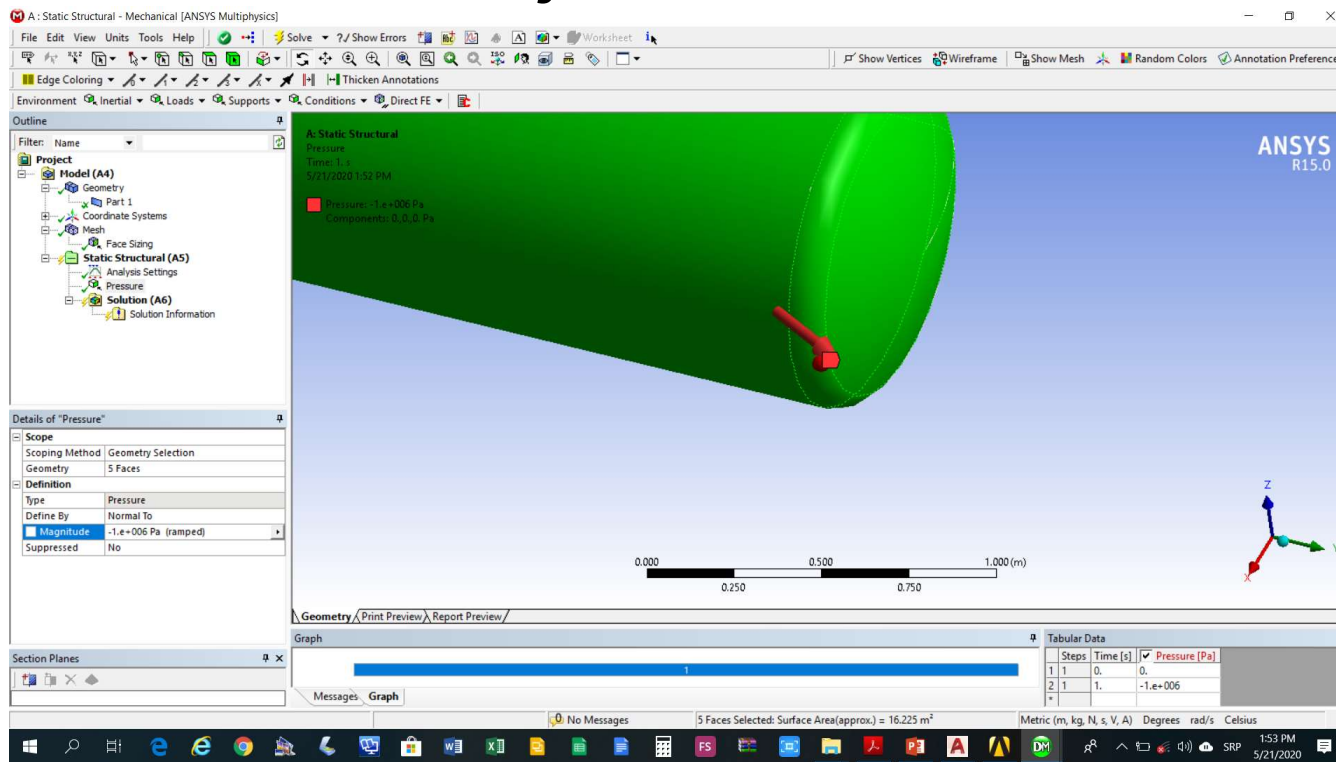
# Modeliranje luskaste konstrukcije

Izabrati svih 5 površina i aktivirati *Details of Pressure*->*Geometry*->*Apply*



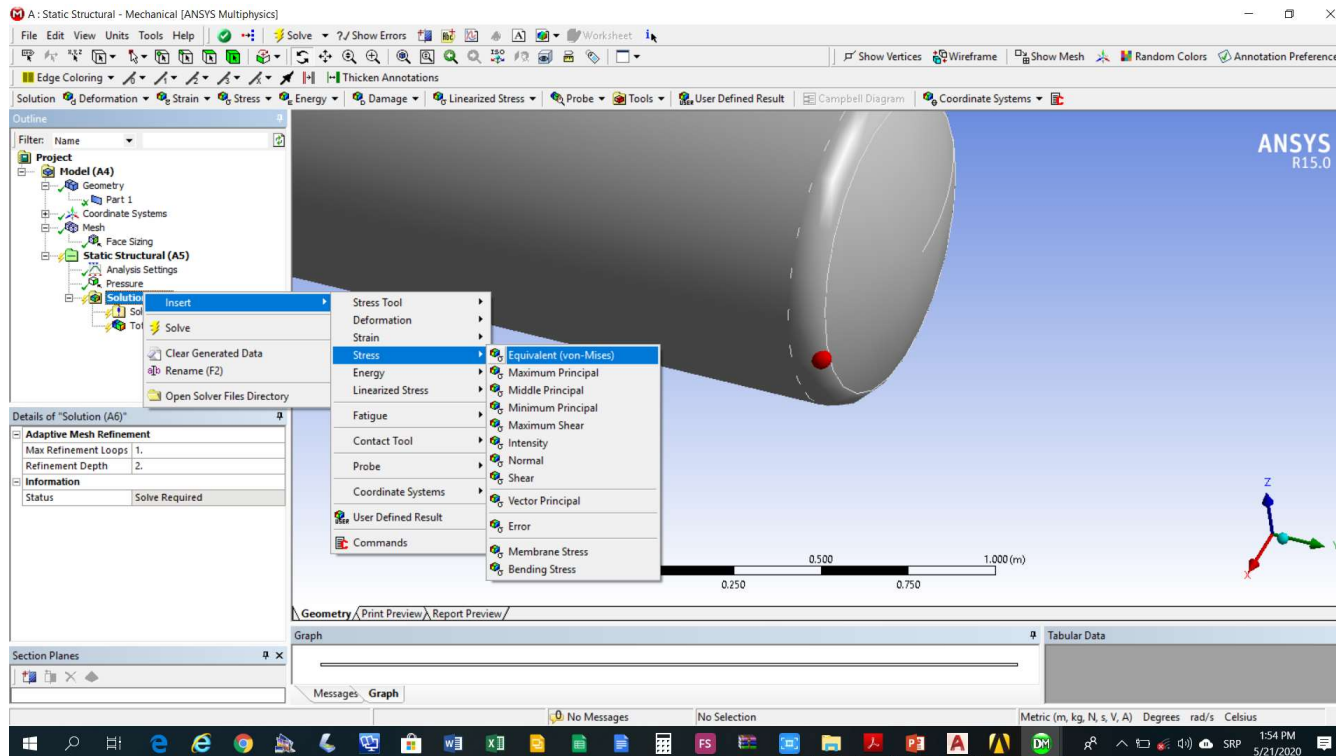
# Modeliranje ljuskaste konstrukcije

Podesiti intezitet pritiska *Details of Pressure->Definition->Magnitude* na  $-1e6$  Pa da bi pritisak djelovao sa unutrašnje strane rezervoara



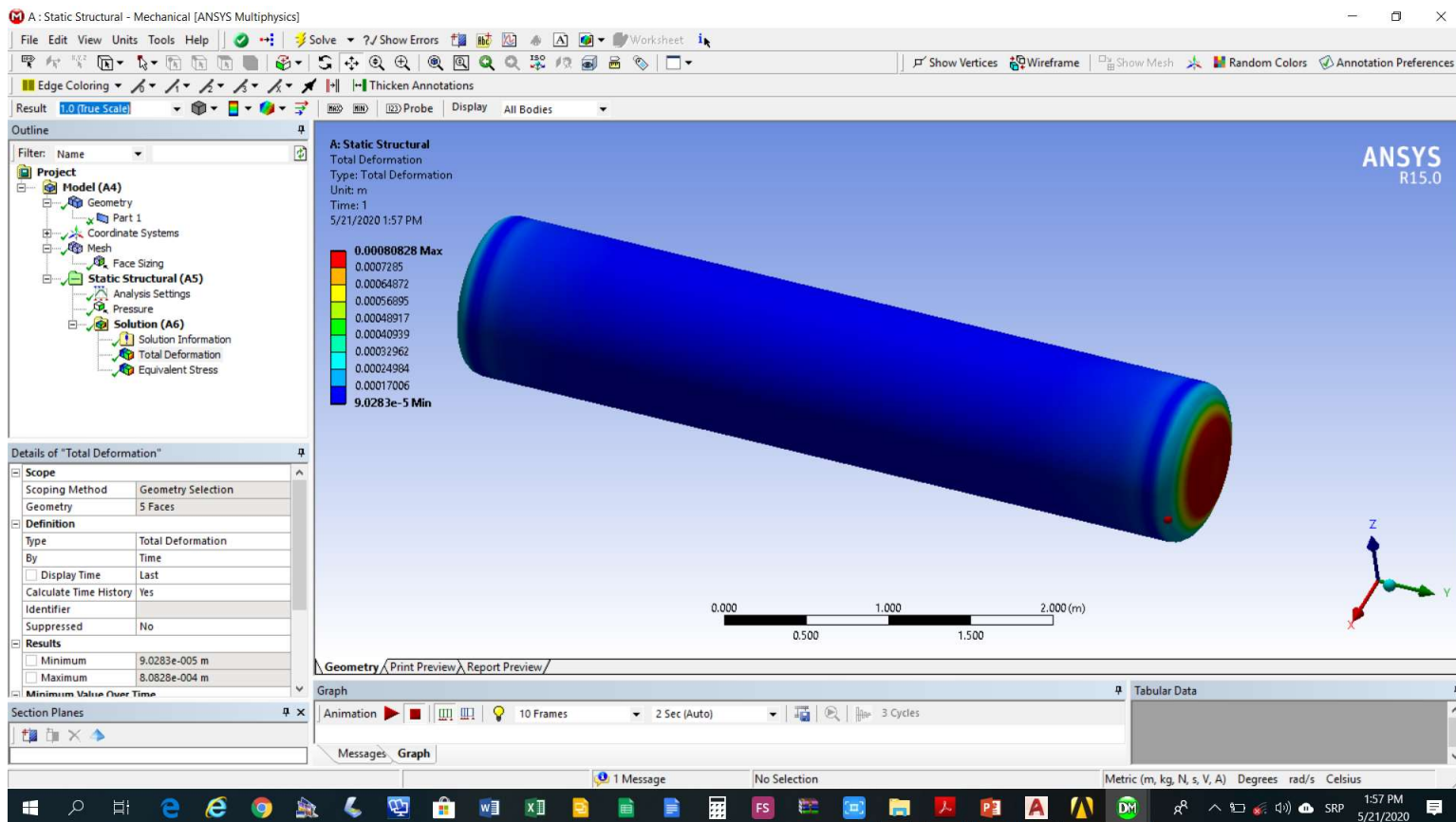
# Modeliranje ljskaste konstrukcije

Izabrati analizu koja se želi realizovati *Solution->Insert->Total Deformation / Equivalent Stress*



# Modeliranje ljuskaste konstrukcije

## Polje pomjeranja



# Modeliranje ljuskaste konstrukcije

## Polje napona

