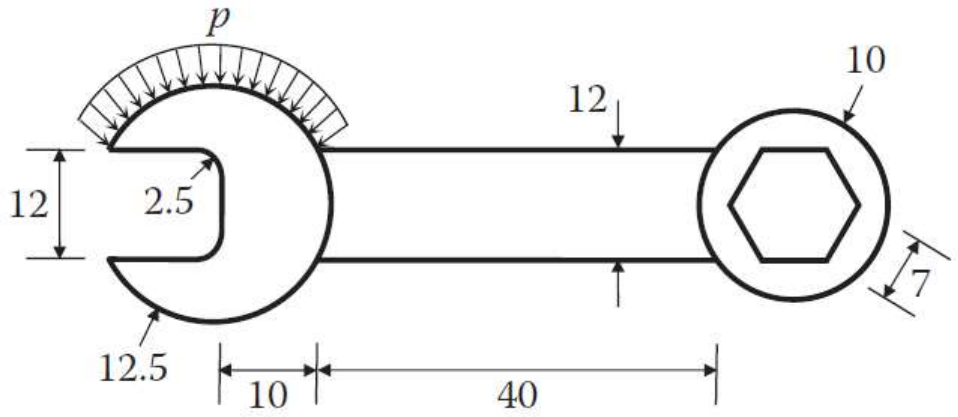
Nedjelja 4
Modeliranje problema ravnog stanja napona konačnim elmentima

Postavka zadatka

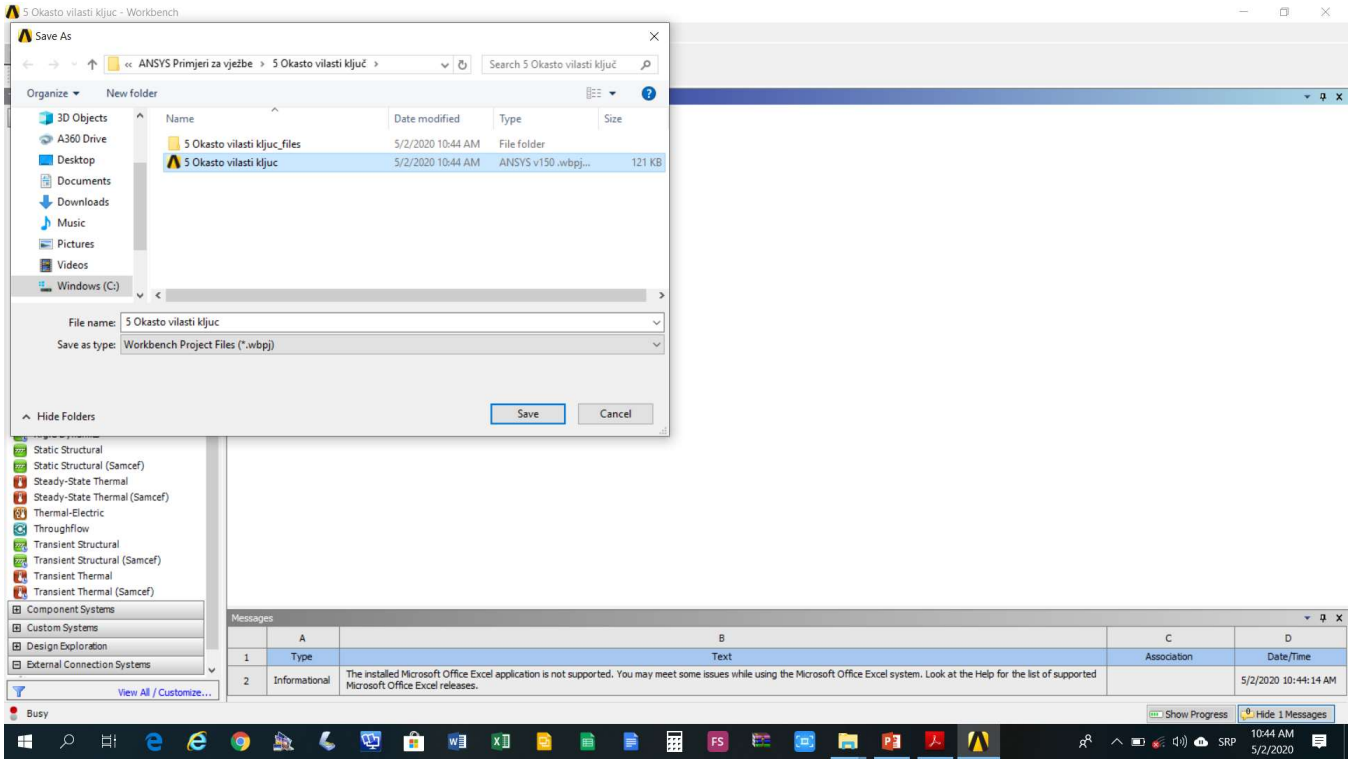
Okasto-vilasti ključ prikazan na slici, debljine 3 mm, izrađen je od nerđajućeg čelika sledećih karakteristika: E=193 GPa i ν=0.27. Odrediti maksimalna pomjeranja i von Mises-ove napone. Granični uslovi: duž ivica šestougaonog otvora su nepokretni oslonci, p=2 MPa.



Okasto-vilasti ključ

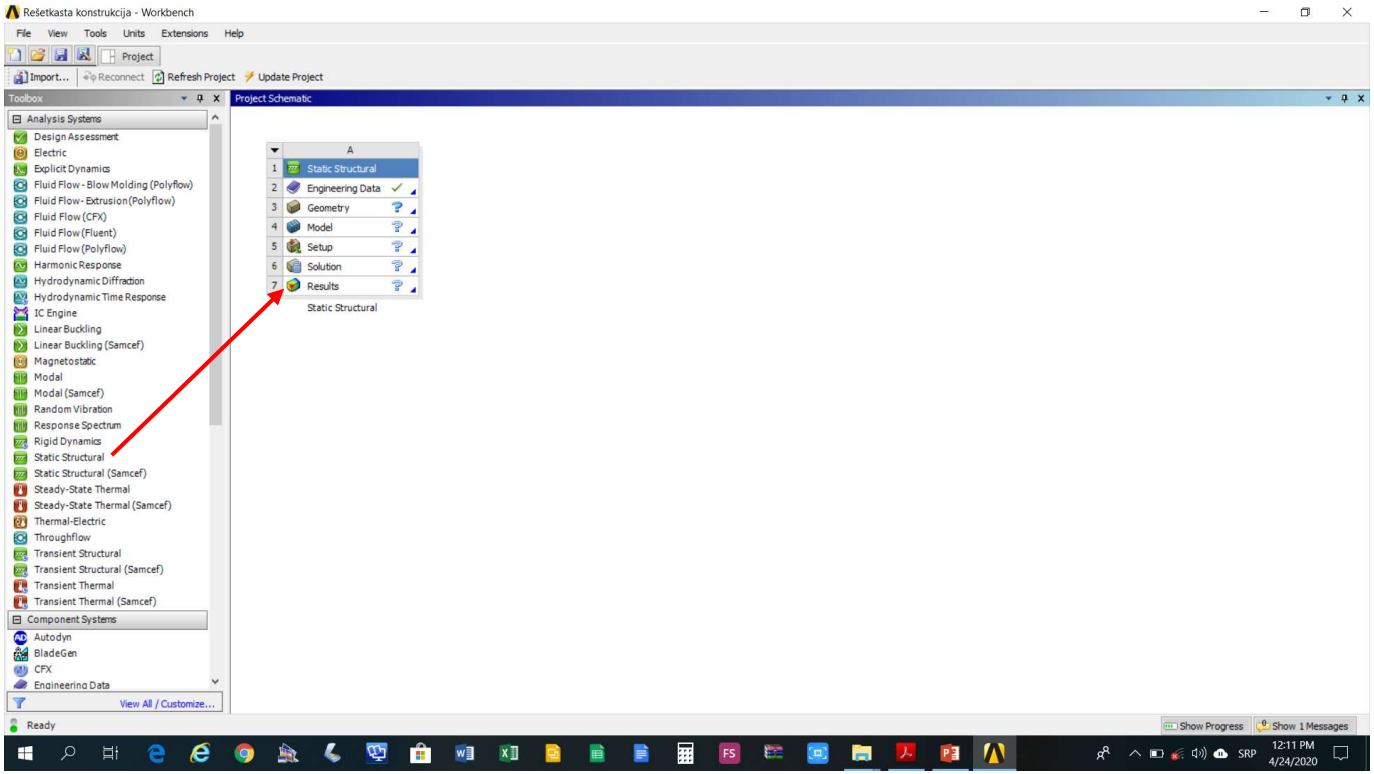
Modeliranje 2D problema

Aktivirati program ANSYS i sačuvati prazan projekat pod nazivom Okasto vilasti ključ



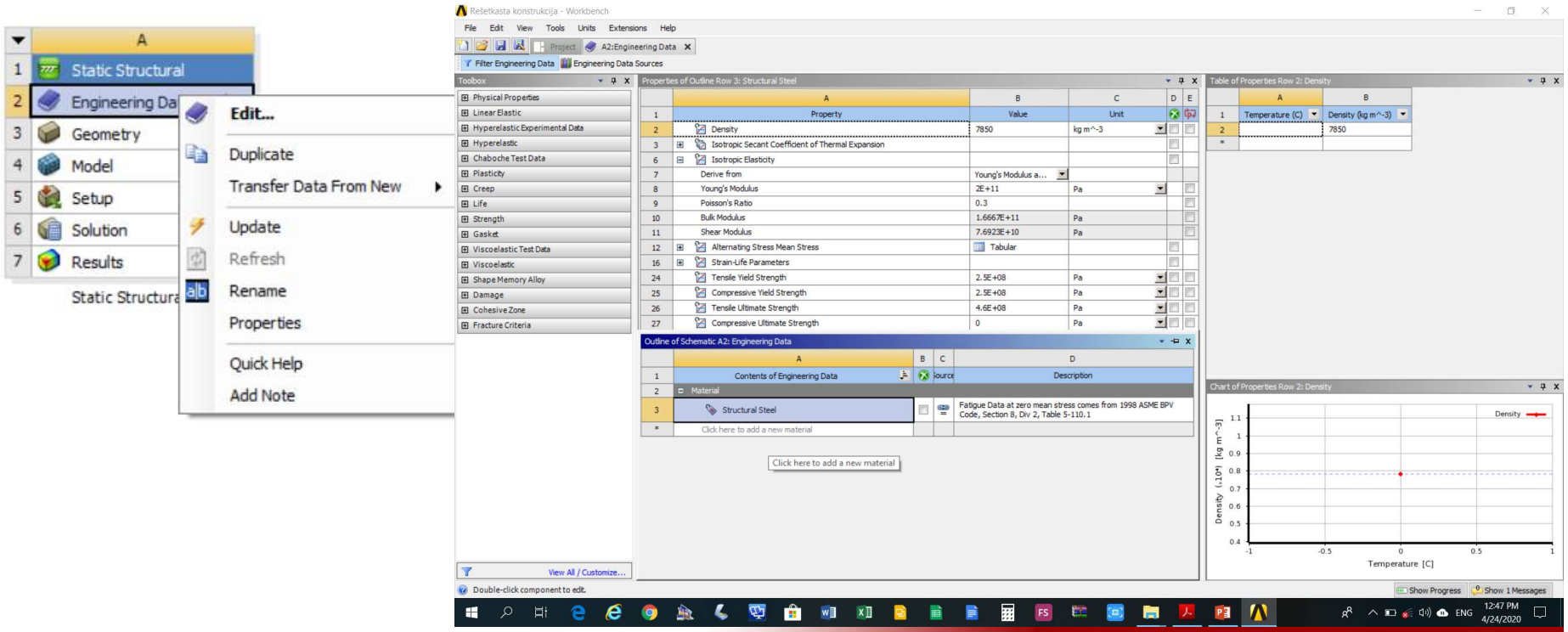
Modeliranje 2D problema

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



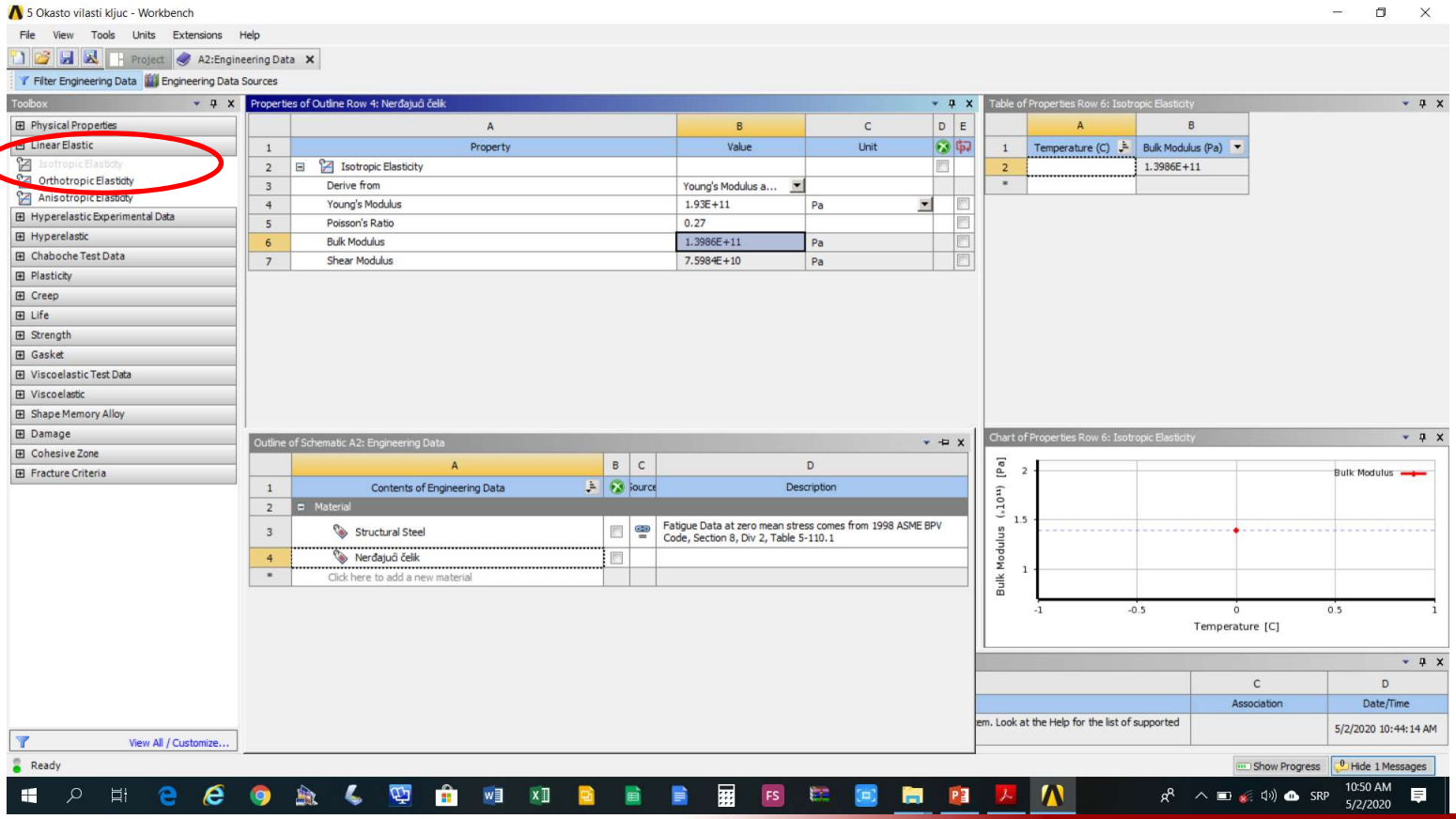
Modeliranje 2D problema

Aktivirati modul Engineering Data (*Engineering Data->Edit*) i dodati novi materijal *Click here to add new material*



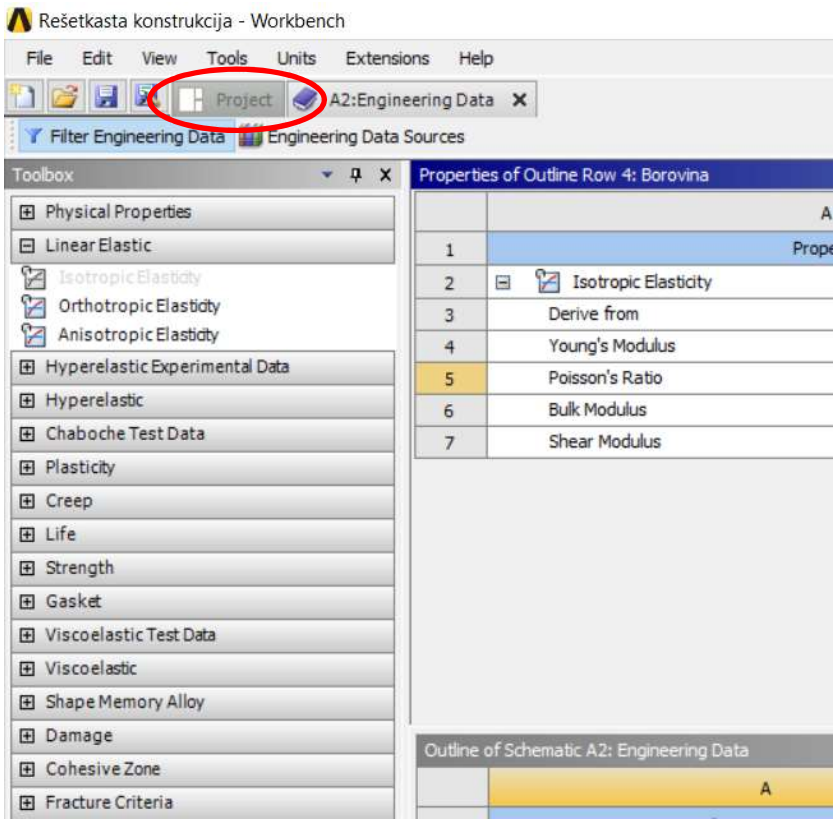
Modeliranje 2D problema

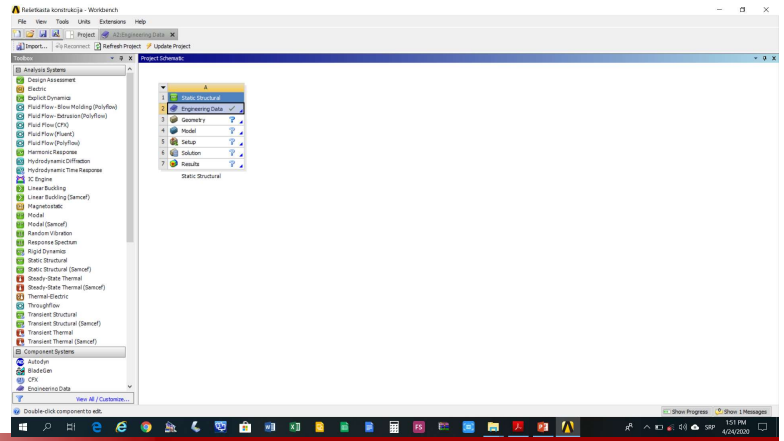
Unijeti karakteristike novog linearno elastičnog i izotropnog materijala (*Isotropic Elasticity*)



Modeliranje 2D problema

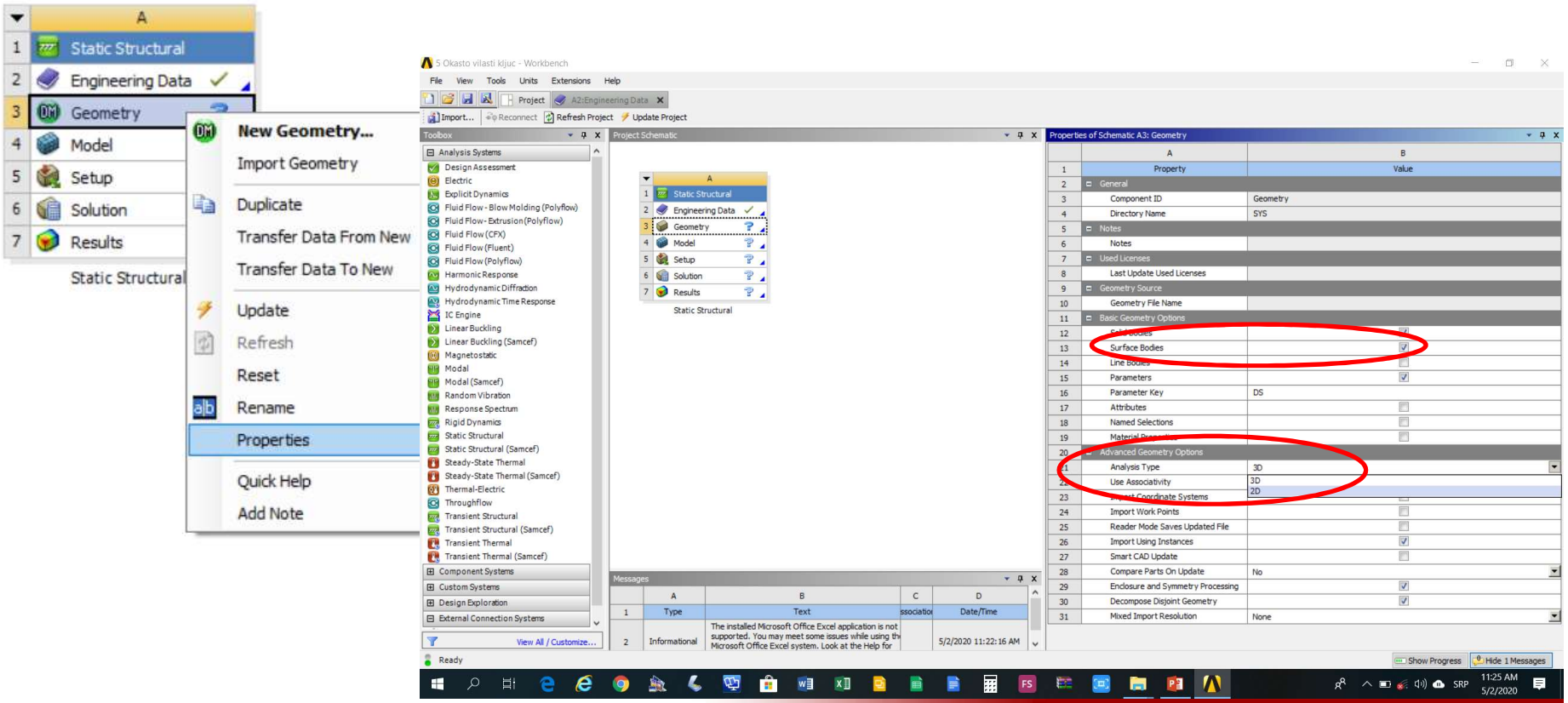
Izabrati opciju *Project* za povratak na shemu projekta





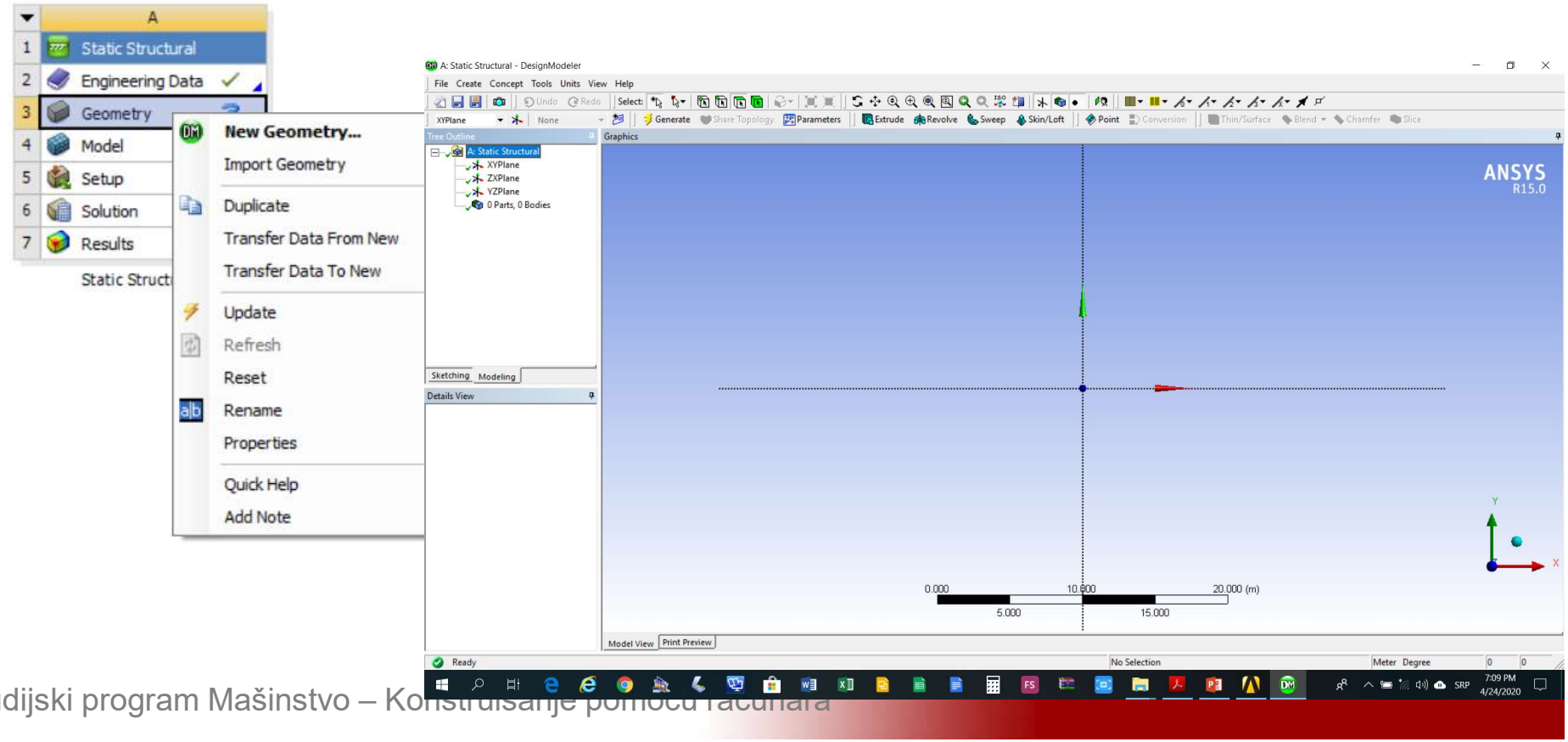
Modeliranje rešetkaste konstrukcije

Izvršiti podešavanja modula Design Modeler (*Geometry->Properties->Analysis Type = 2D*)



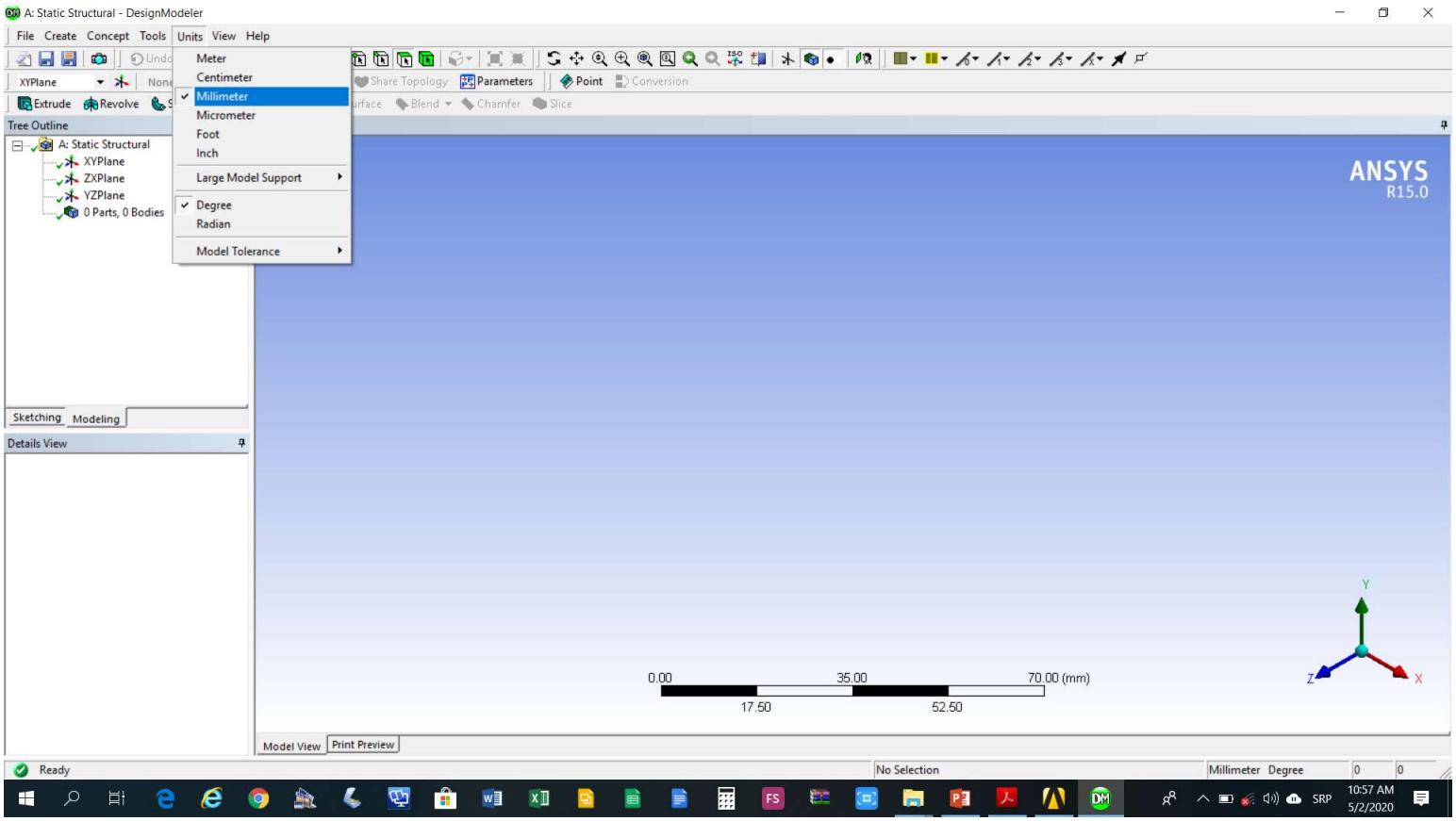
Modeliranje 2D problema

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



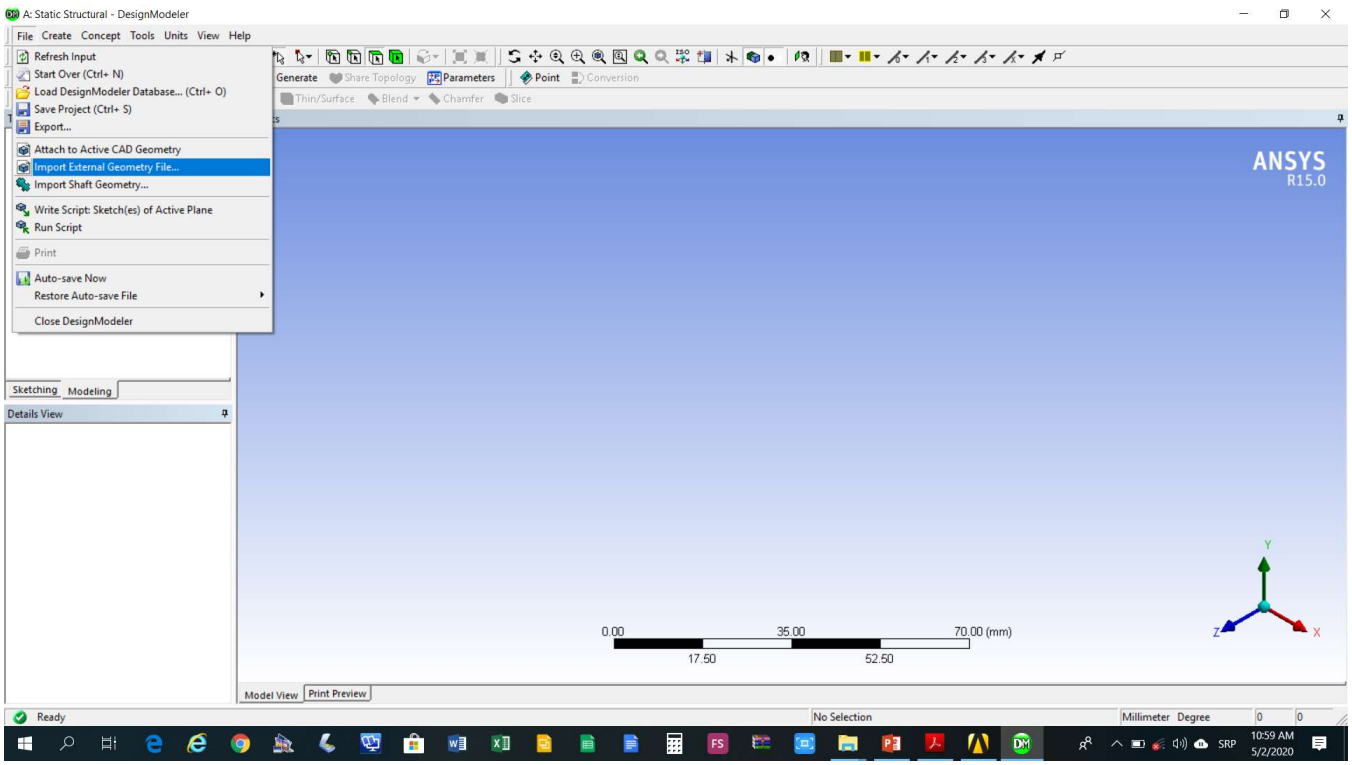
Modeliranje 2D problema

Podesiti dužinske jedinice (Units->*Milimeter*)



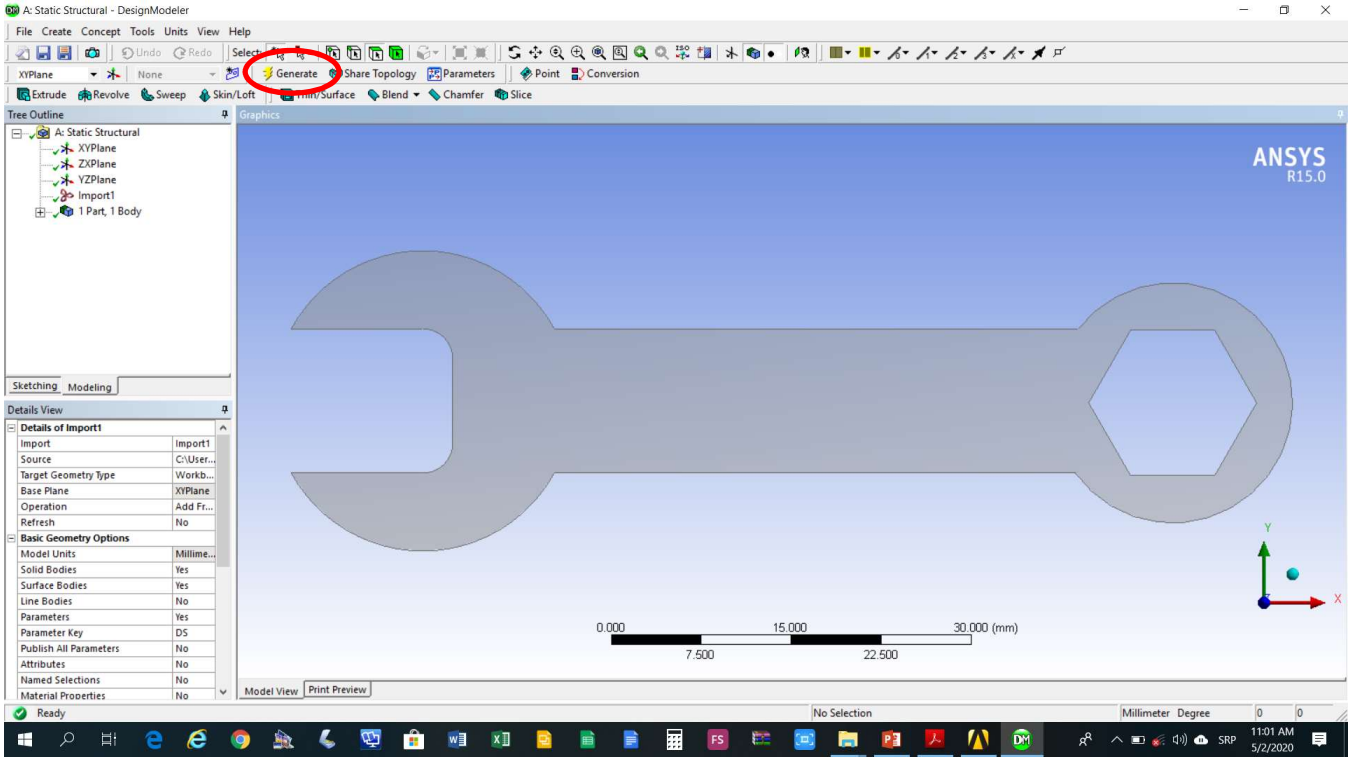
Modeliranje 2D problema

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



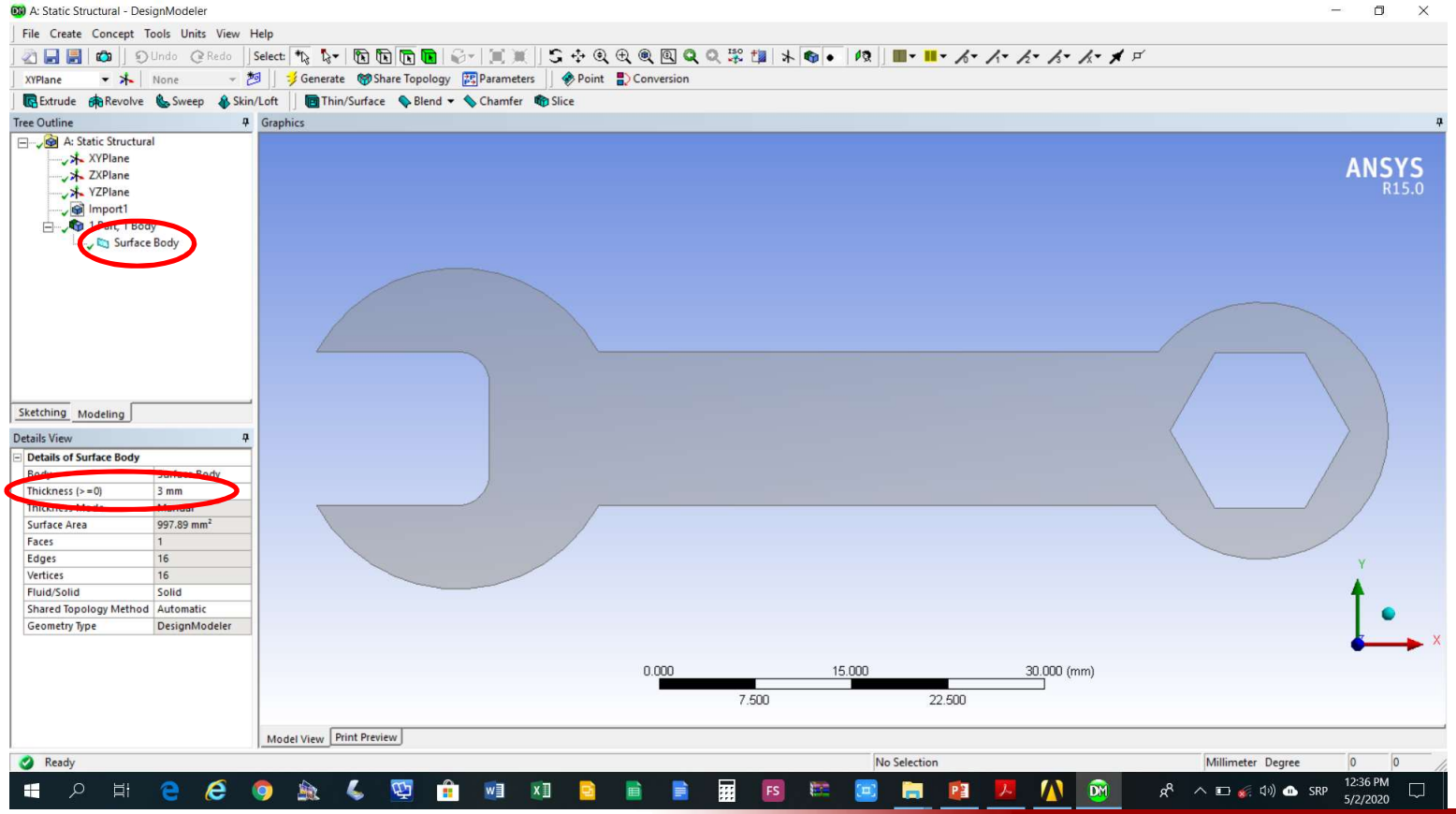
Modeliranje 2D problema

Učitavanje eksterno generisane geometrije okončati komandom *Generate*



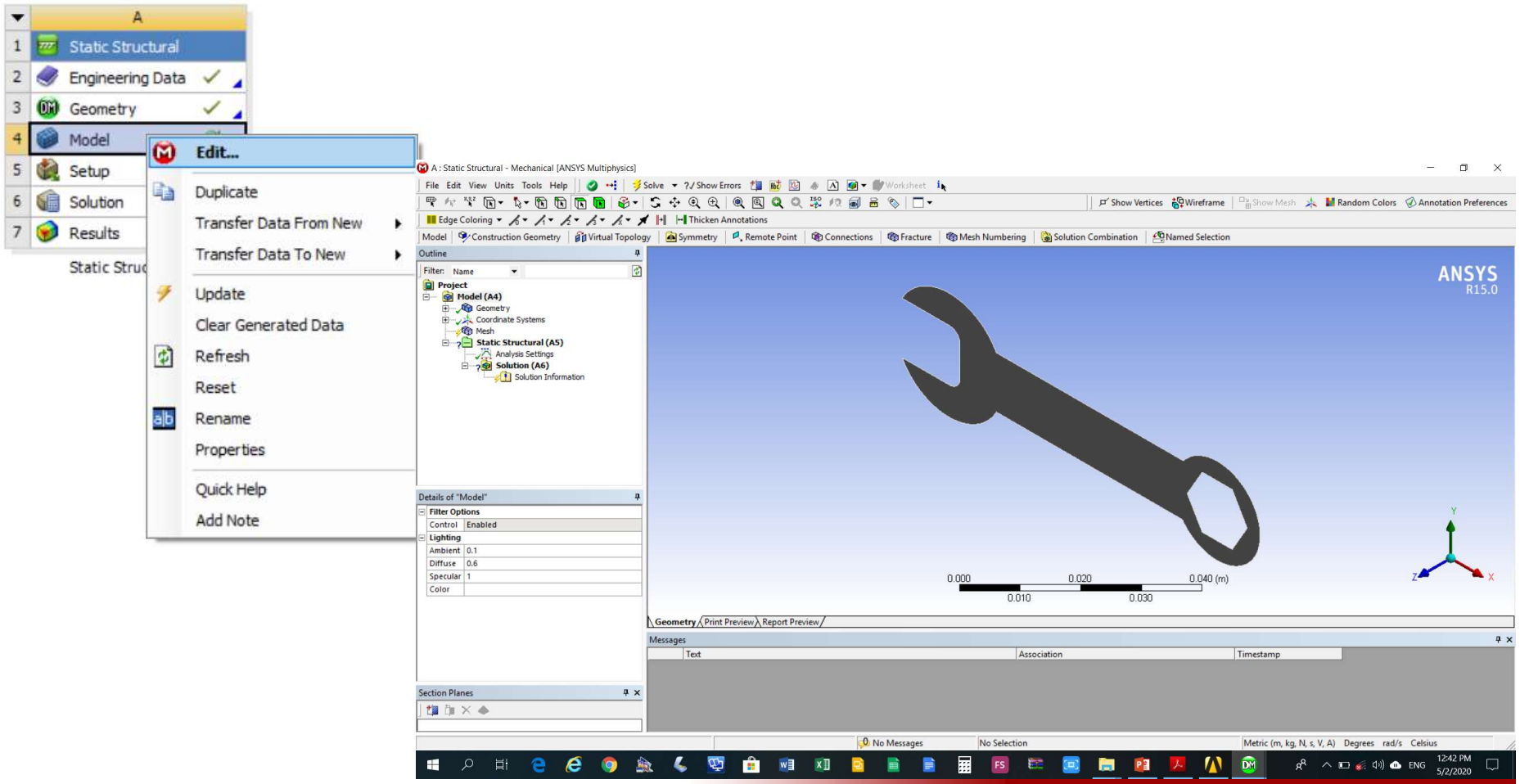
Modeliranje 2D problema

Podešavanje debljine učitanoj površini u polje *Details of Surface Body->Thickness* unijeti 3 mm



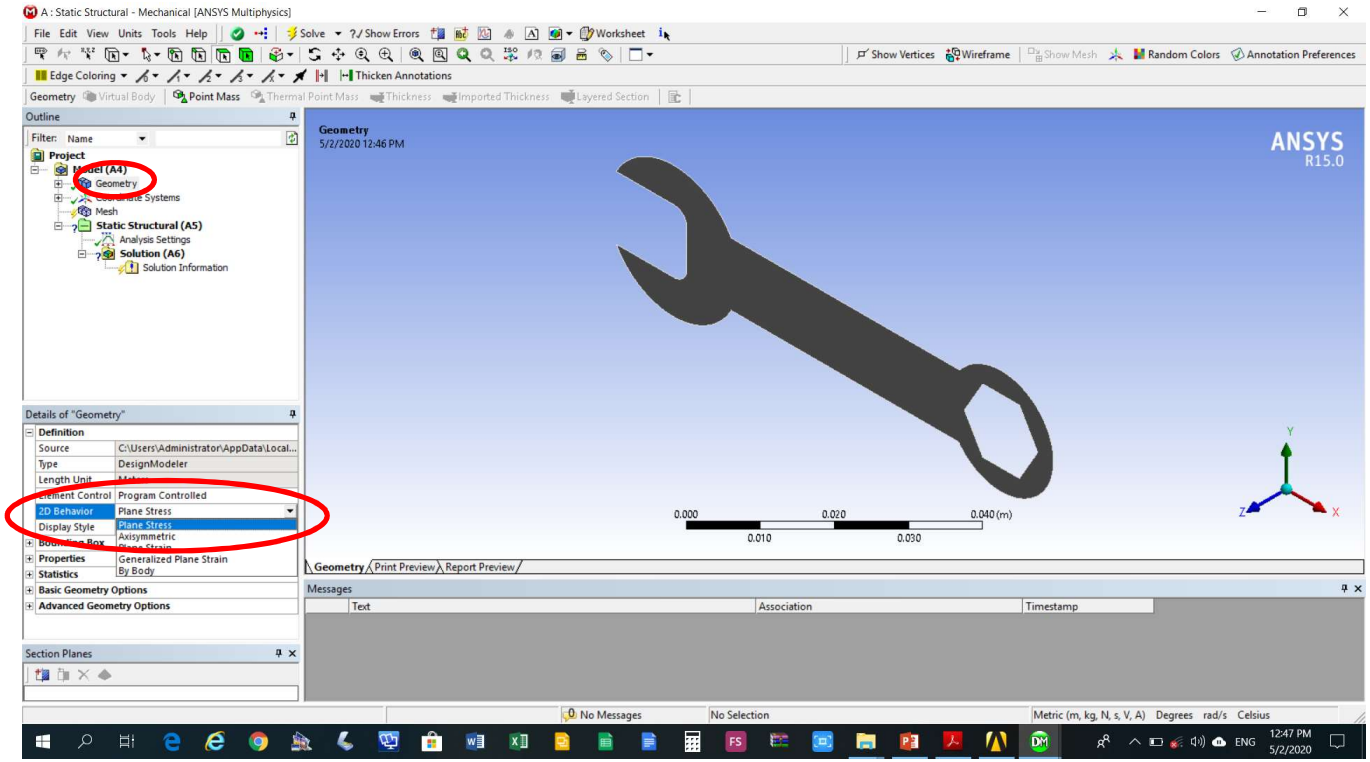
Modeliranje 2D problema

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



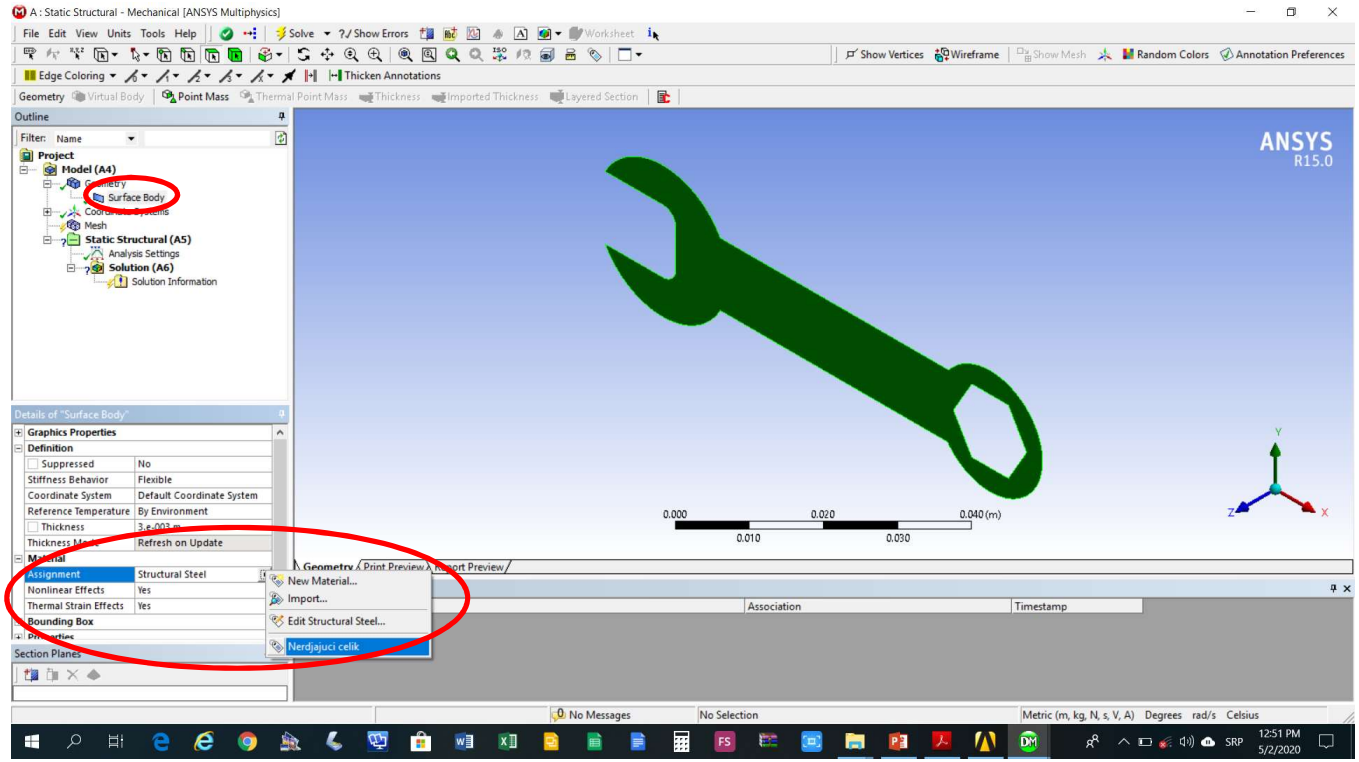
Modeliranje 2D problema

Izabrati analizu ravanskog stanja napona sa liste *Details of Geometry->2D Beahviour* izabrati *Plain Stress*



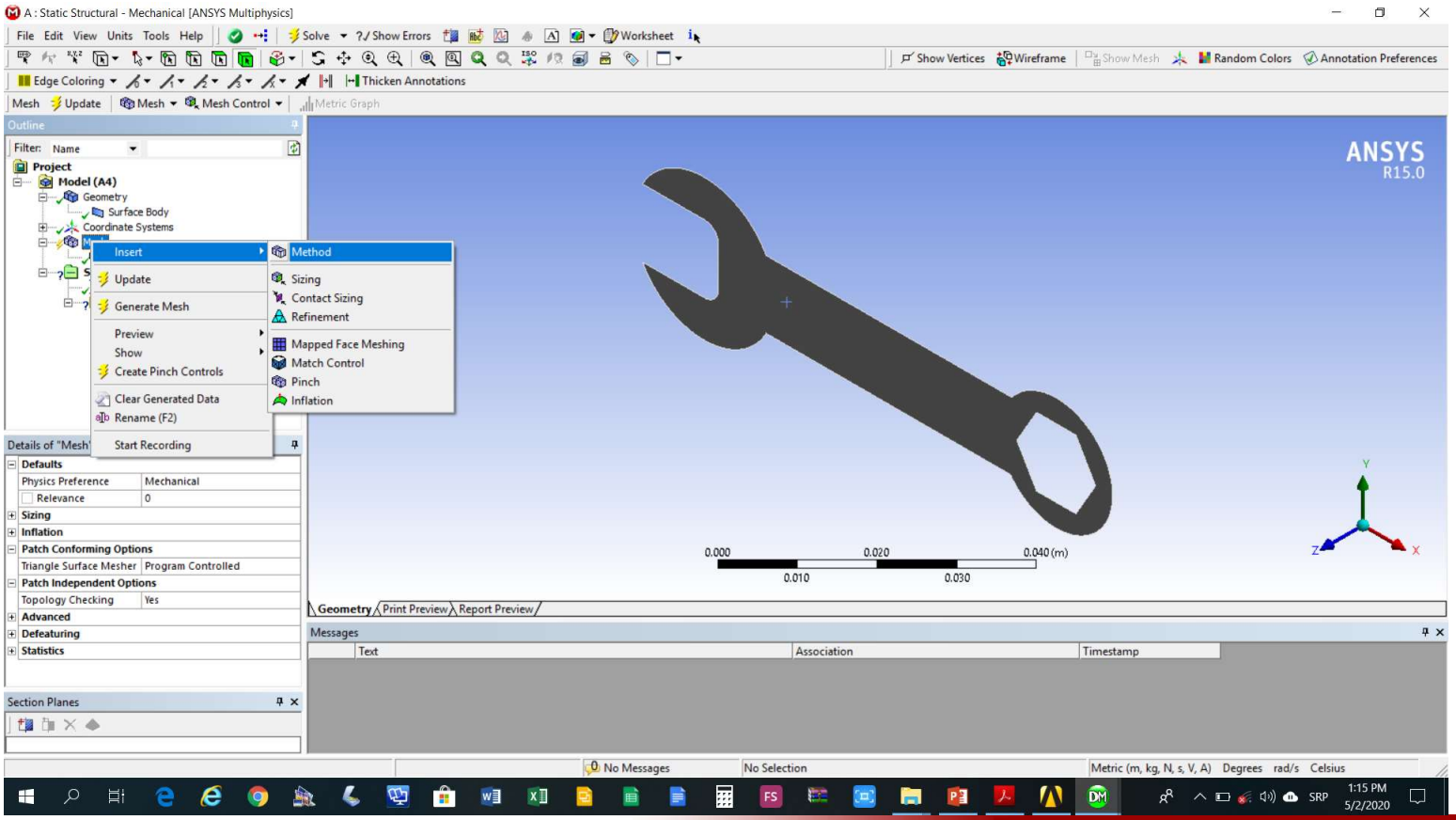
Modeliranje 2D problema

Dodjeliti odgovarajući materijal sa liste *Details of Surface Body->Material->Assignment* izabrati *Nerđajući čelik*



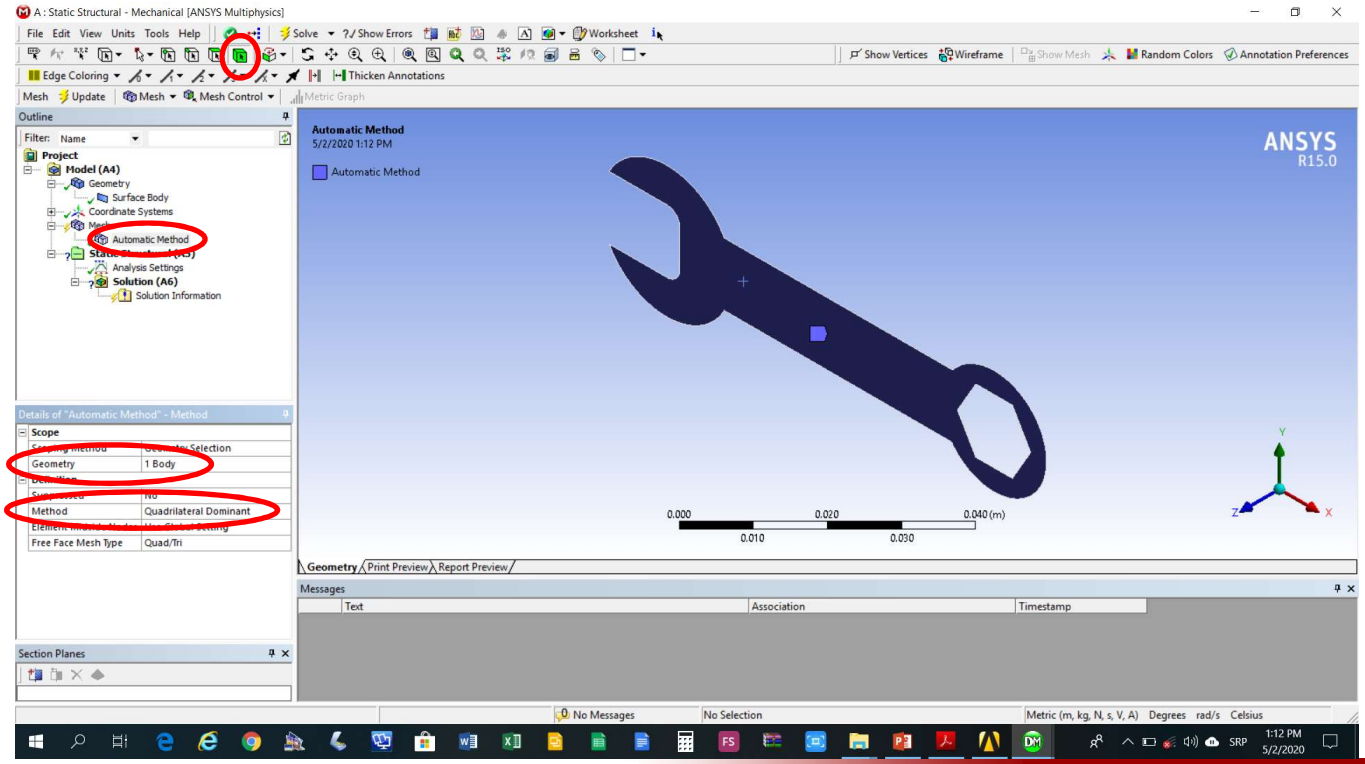
Modeliranje 2D problema

Izbor tipa konačnih elemenata (*Mesh->Insert->Method*)



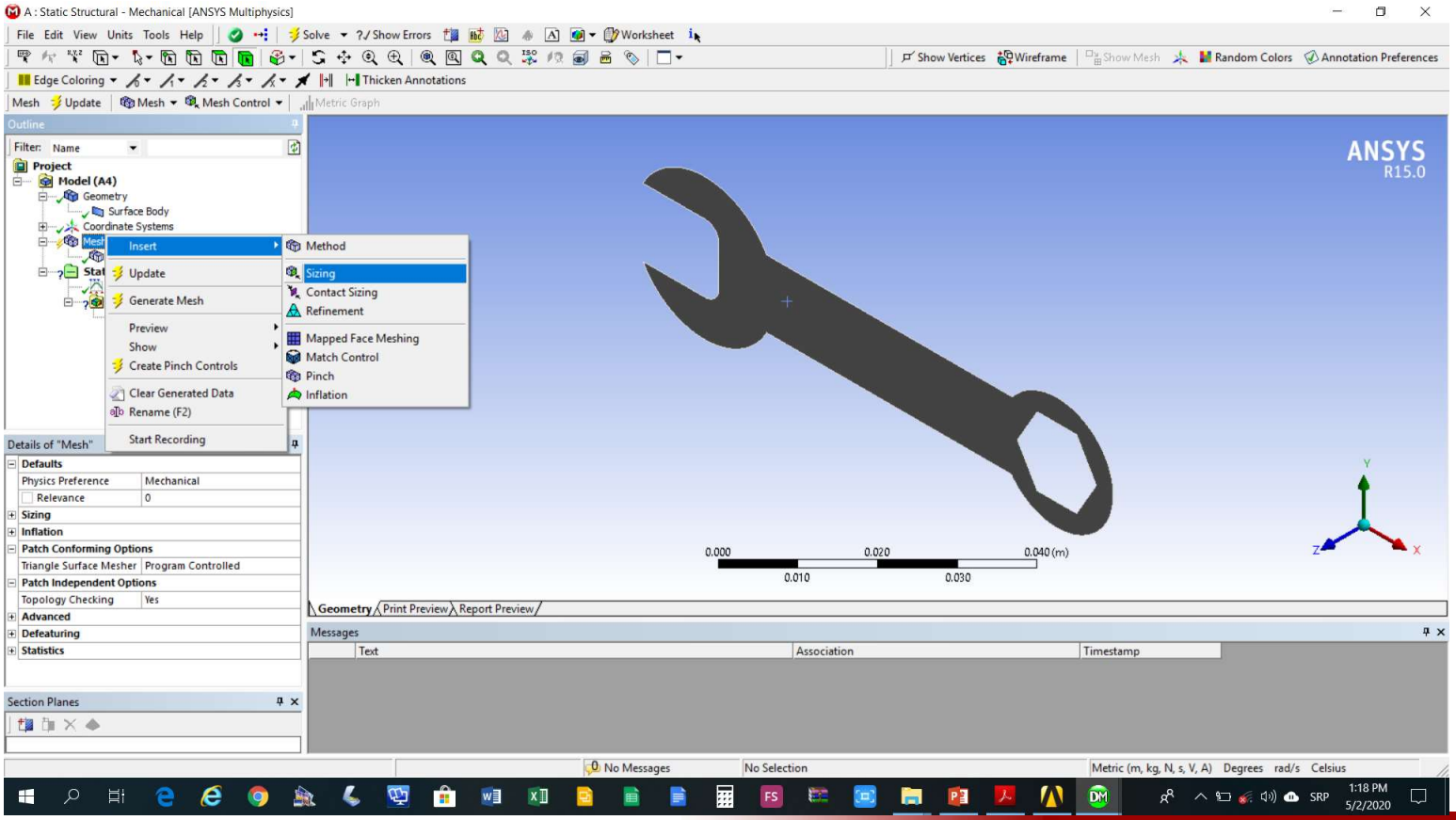
Modeliranje 2D problema

Izabrati *Surface Body* na koje treba primjeniti metodu za generisanje mreže (*Details of Automatic Method->Geometry->Apply*)



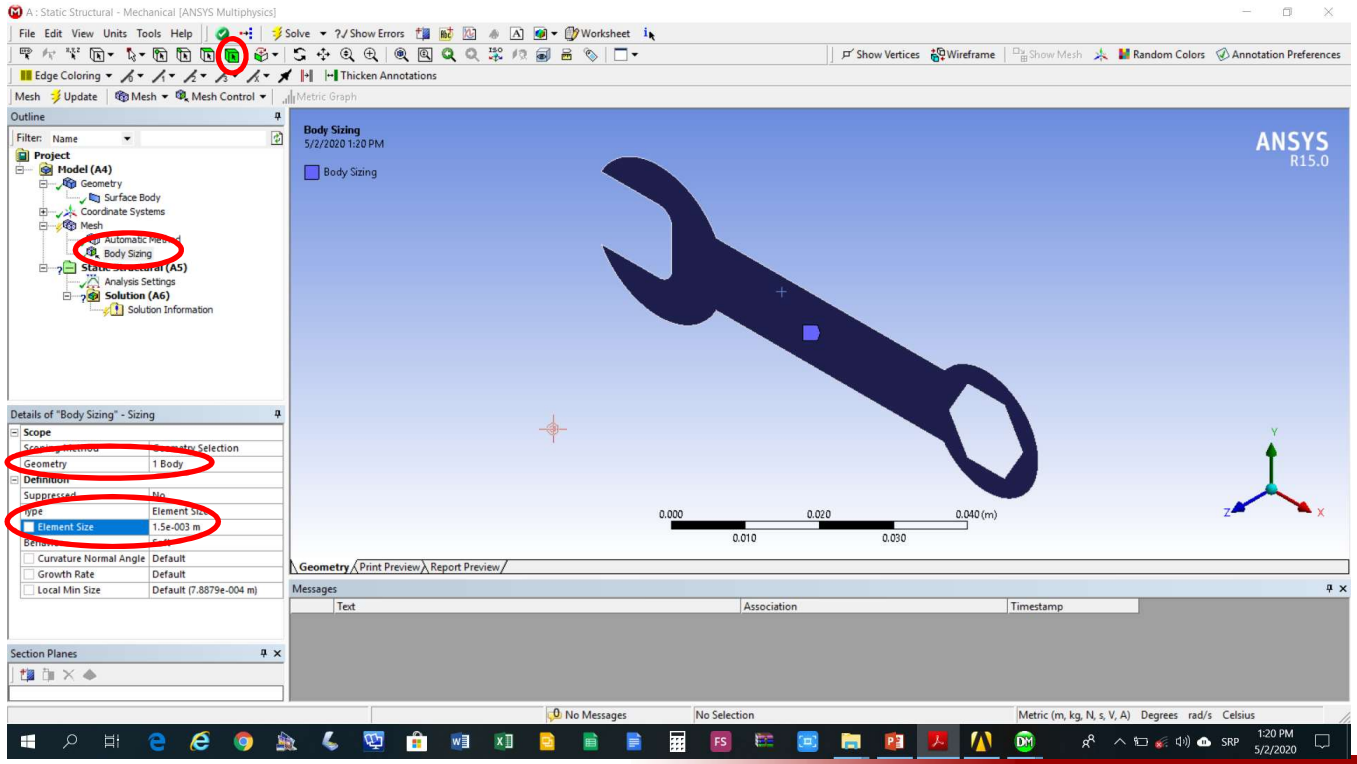
Modeliranje 2D problema

Podešavanje veličine konačnih elemenata (*Mesh->Insert->Sizing*)



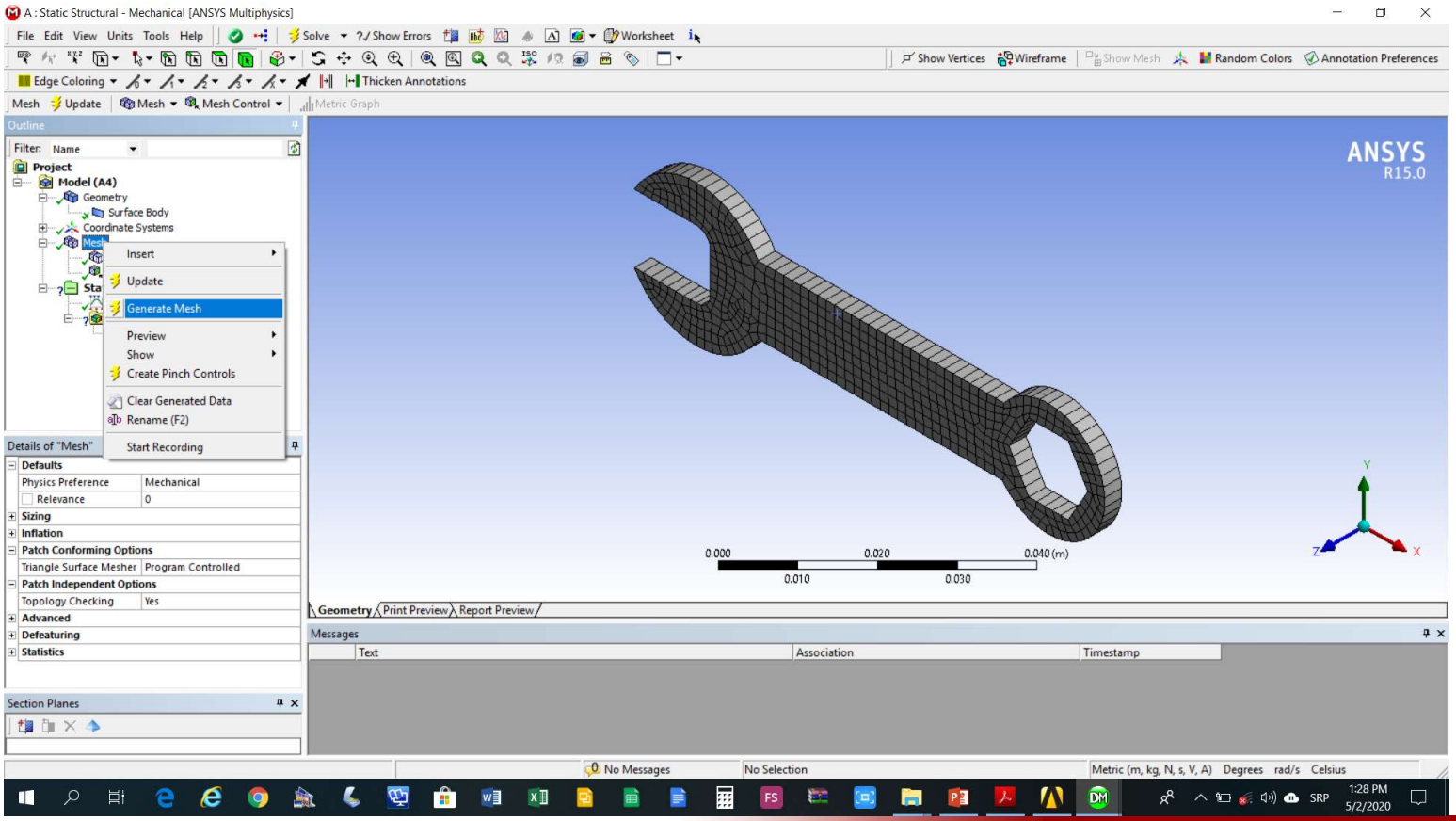
Modeliranje 2D problema

Podešavanje veličine konačnih elemenata, u polje *Details of Body Sizing->Element Size* unijeti 1.5e-3



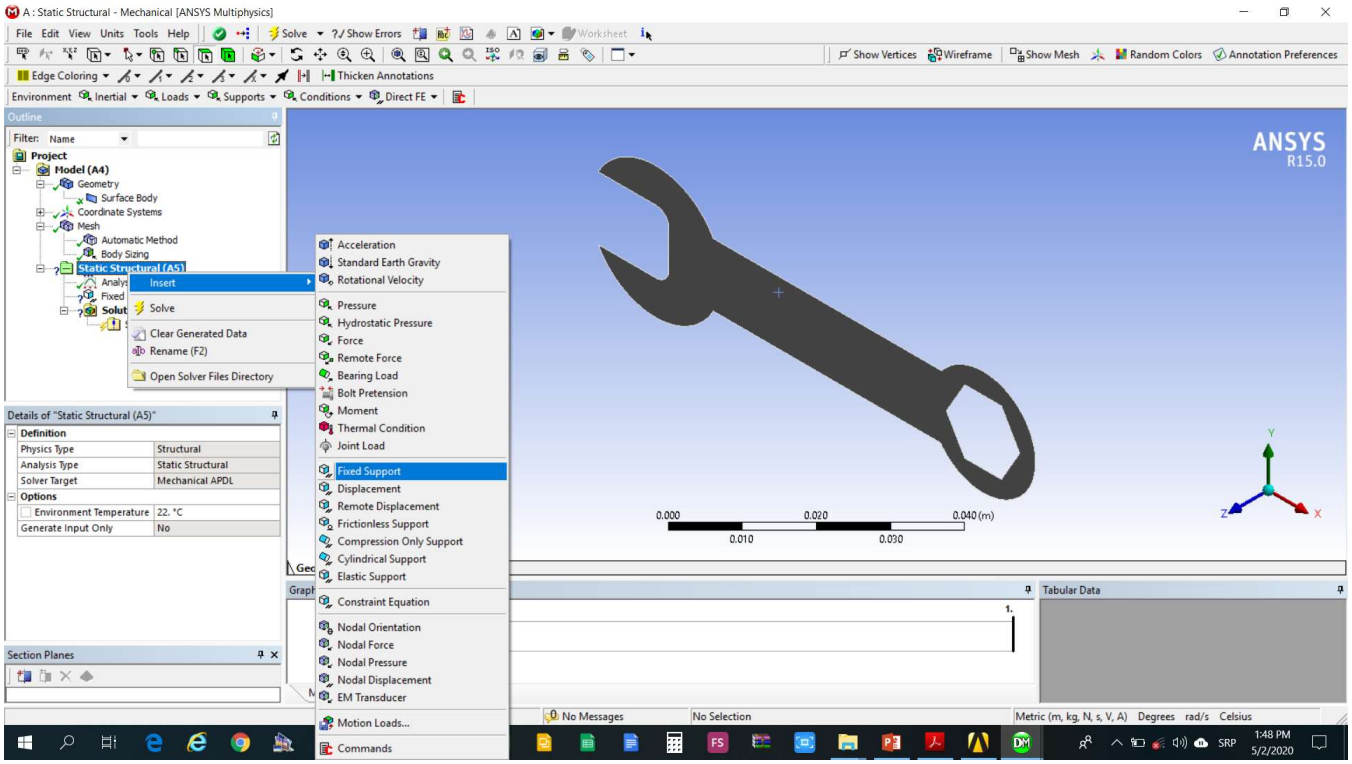
Modeliranje 2D problema

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



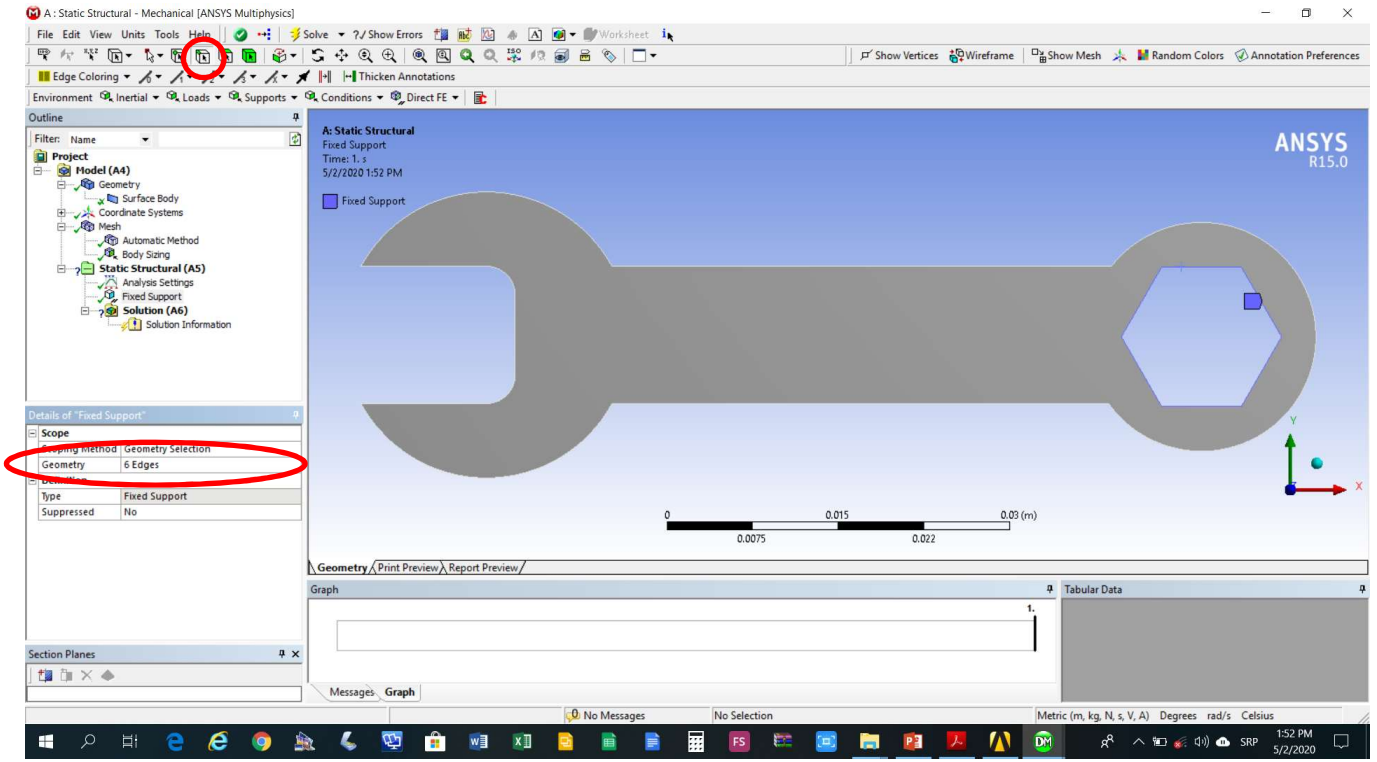
Modeliranje 2D problema

Postavljanje nepokretnih oslonaca (*Static Structural->Insert>Fixed Supprot*)



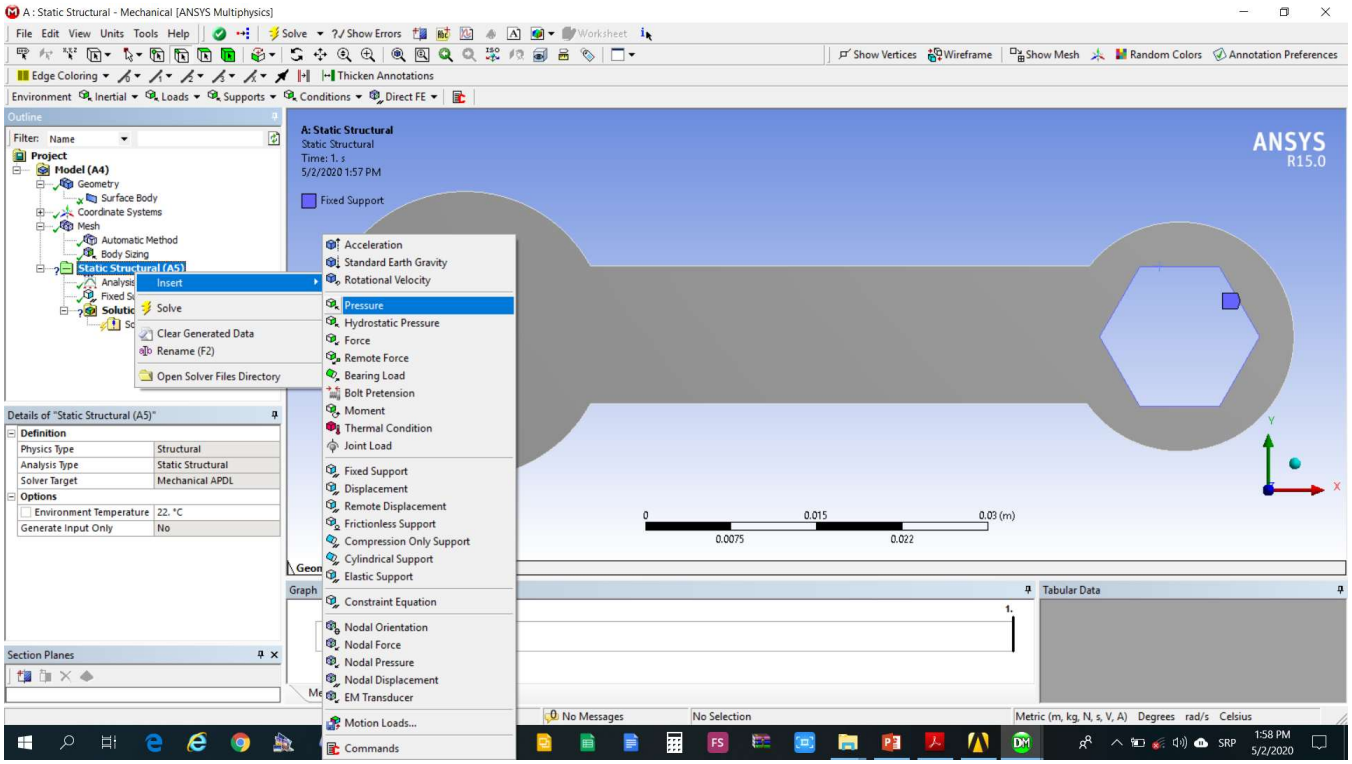
Modeliranje 2D problema

Postavljanje nepokretnih oslonaca (*Details of Fixed Support->Geometry>Apply*)



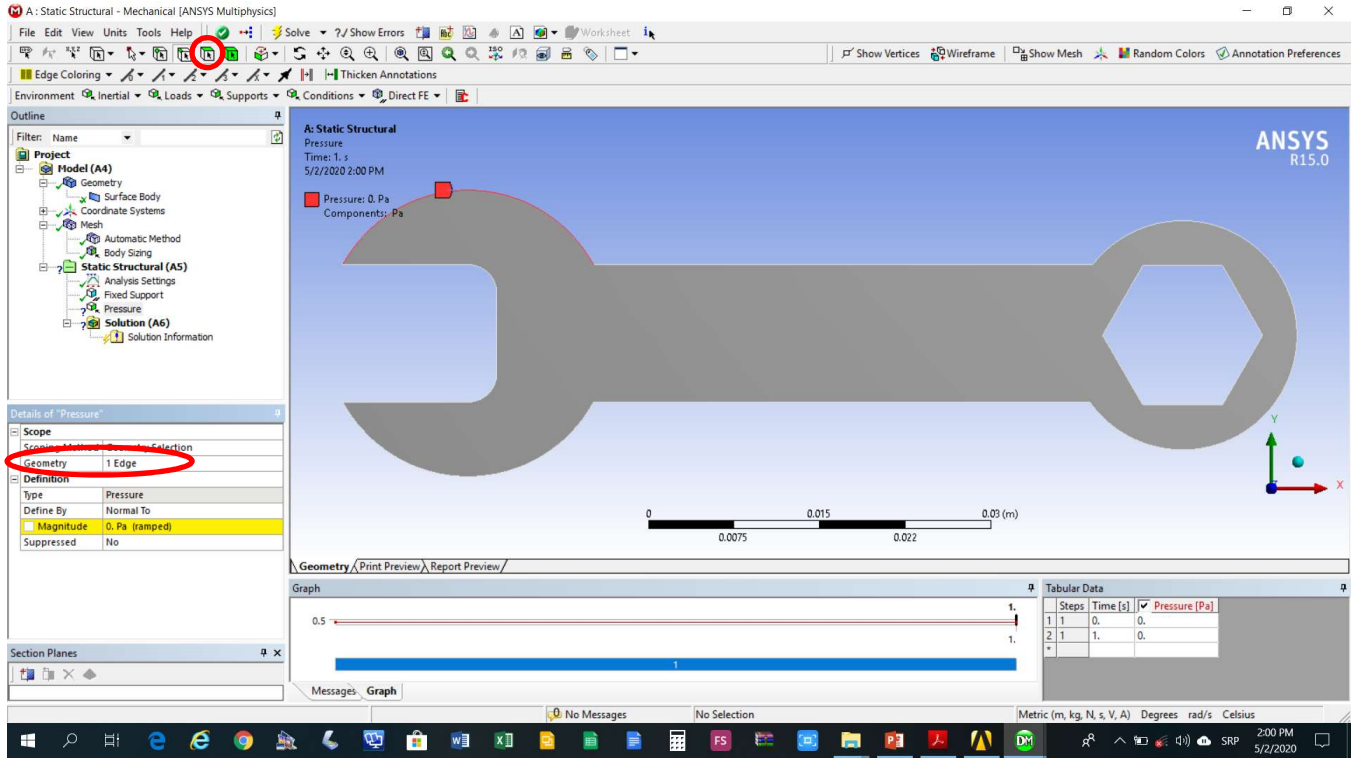
Modeliranje 2D problema

Zadavanje opterećenja (*Static Structural->Insert>Pressure*)



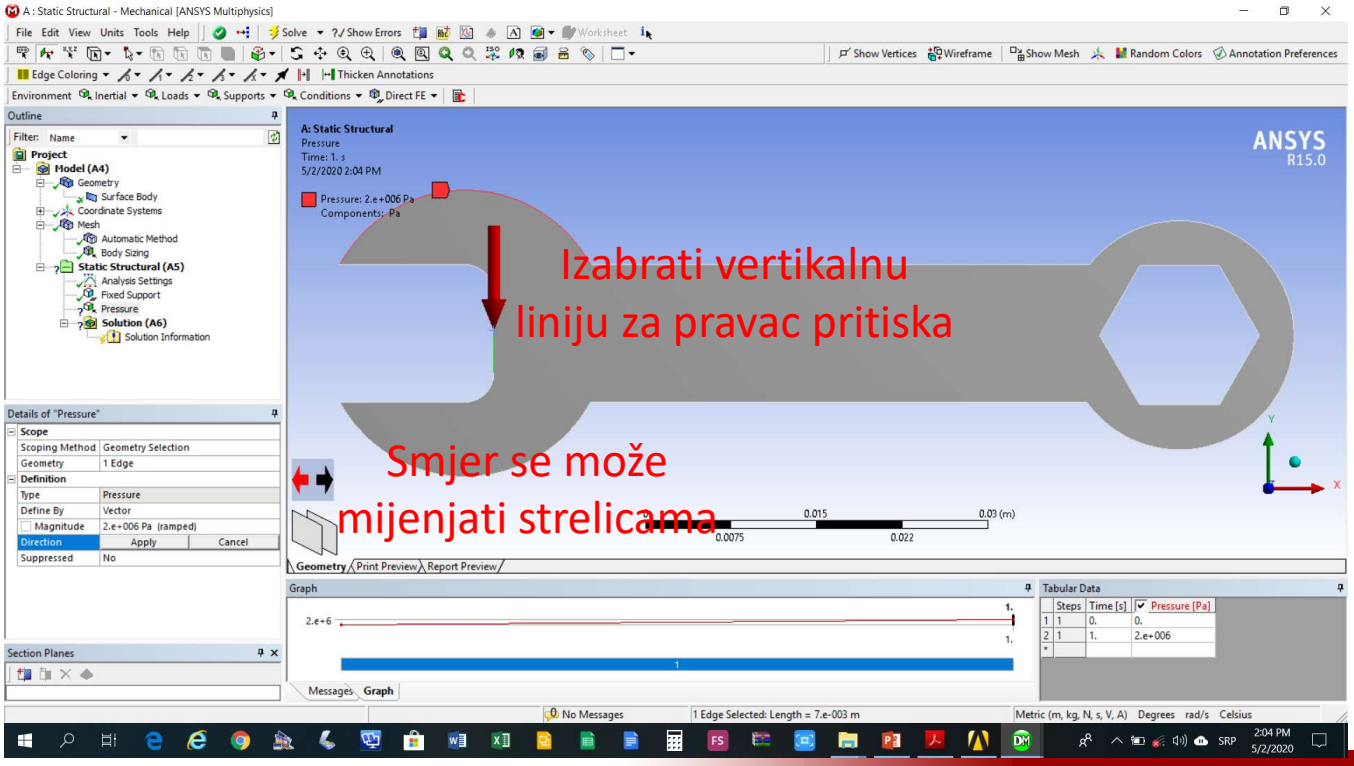
Modeliranje 2D problema

Izbor ivice po kojoj djeluje pritisak (*Details of Pressure->Geometry>Apply*)



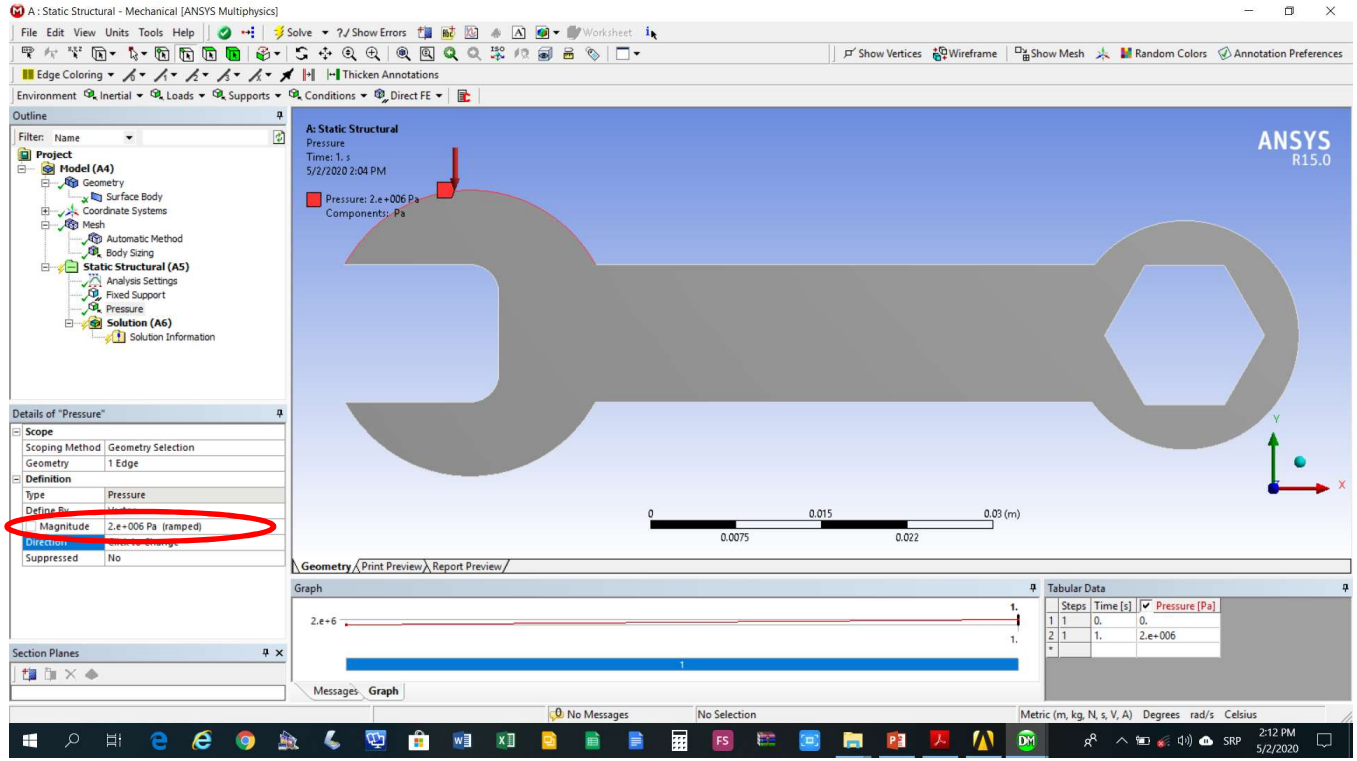
Modeliranje 2D problema

Zadavanje pravca pritiska (*Details of Pressure->Define by->Vector*) i (*Details of Pressure->Direction->Apply*)



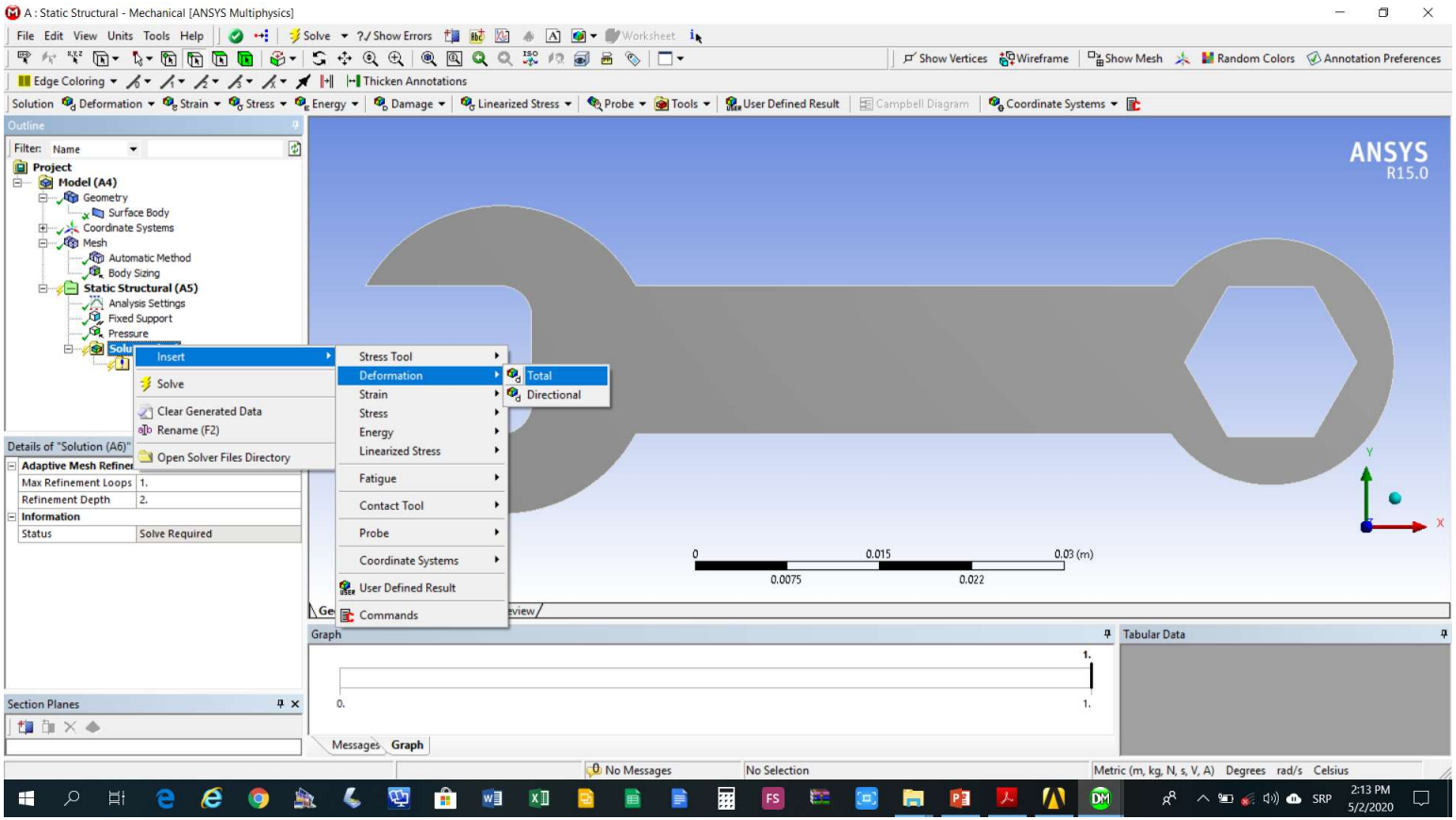
Modeliranje 2D problema

Zadavanje inteziteta pritiska, u polje *Details of Pressure->Magnitude* unijeti 2e6



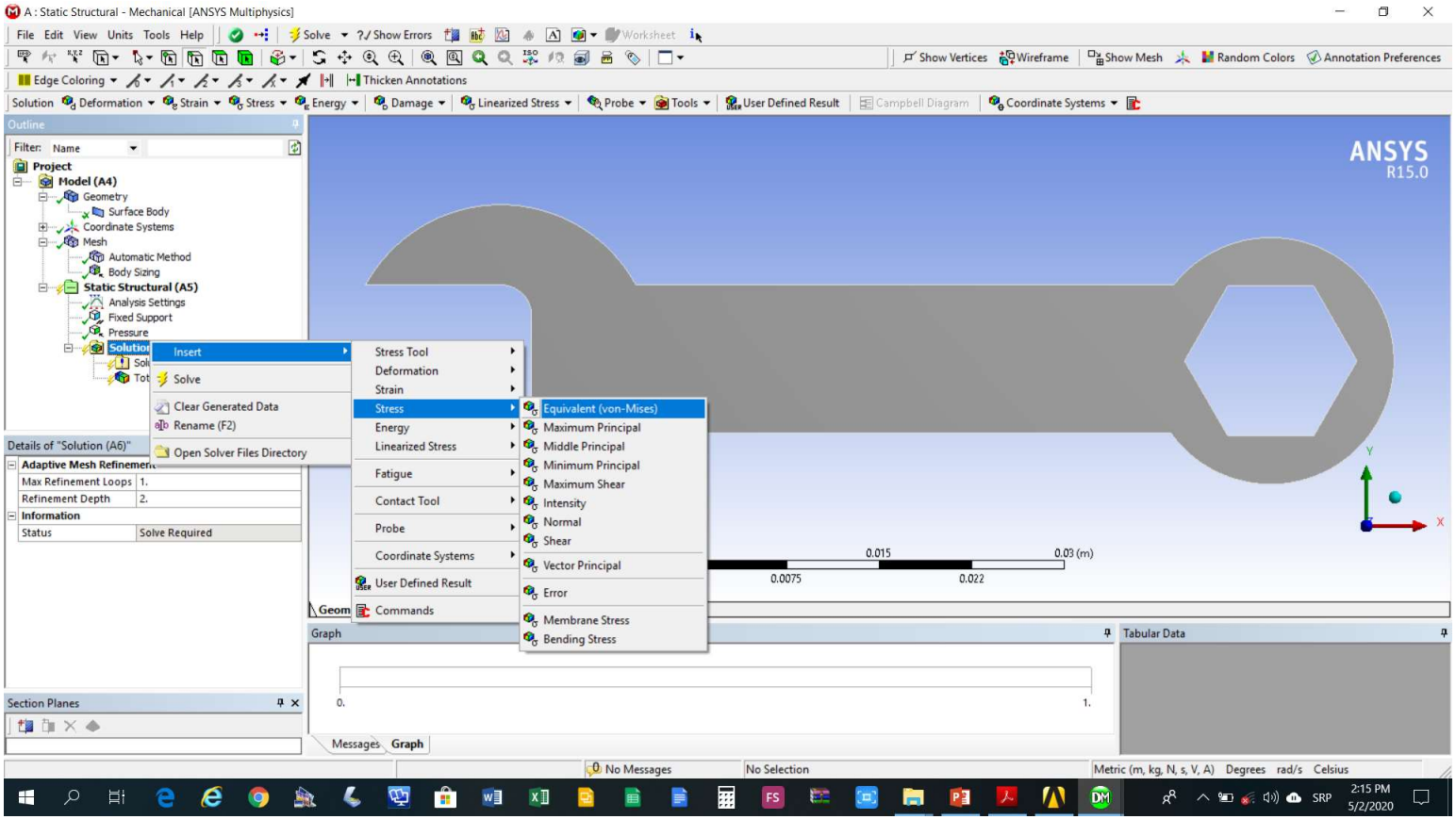
Modeliranje 2D problema

Izabrati analizu pomjeranja



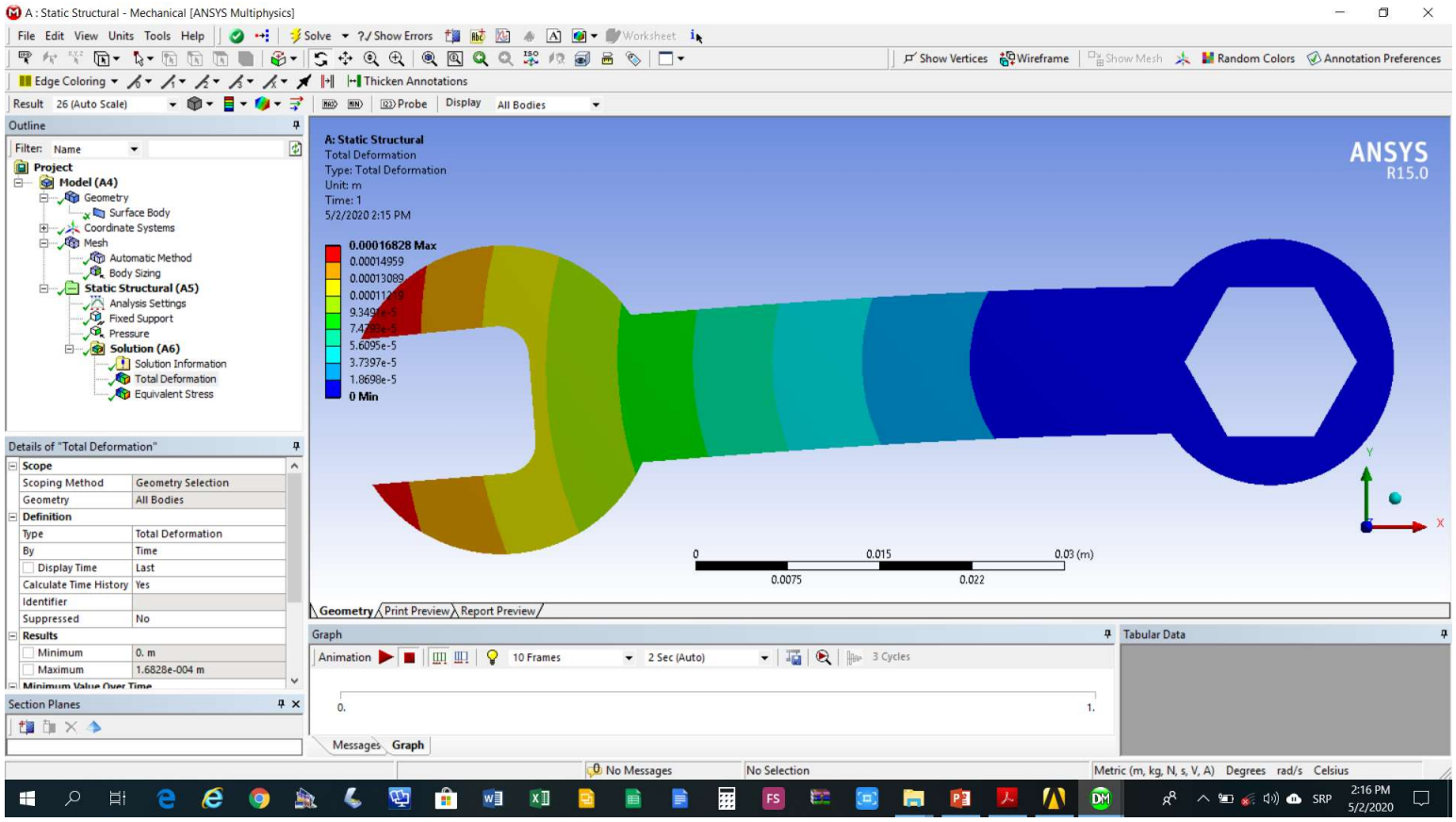
Modeliranje 2D problema

Izabrati analizu von Mises-ovih napona



Modeliranje 2D problema

Polje pomjeranja



Modeliranje 2D problema

Polje von Mises-ovih napona