

# Report

**Nom et Prenom**

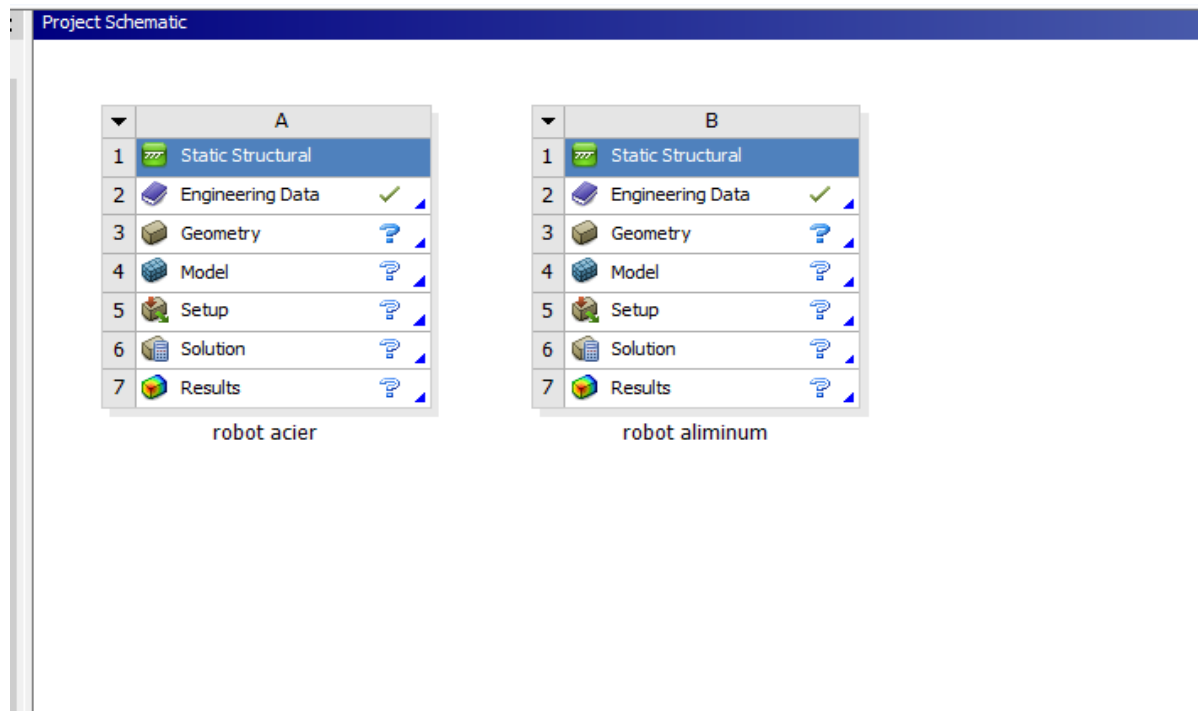
**Iheb Kadri**

In the project, two simulation blocks were created using Ansys static structural analysis, designated as "Steel Robot" and "Aluminum Robot." Each block incorporated the provided industrial robot model, with the robot's height determined to be 1.342 m.

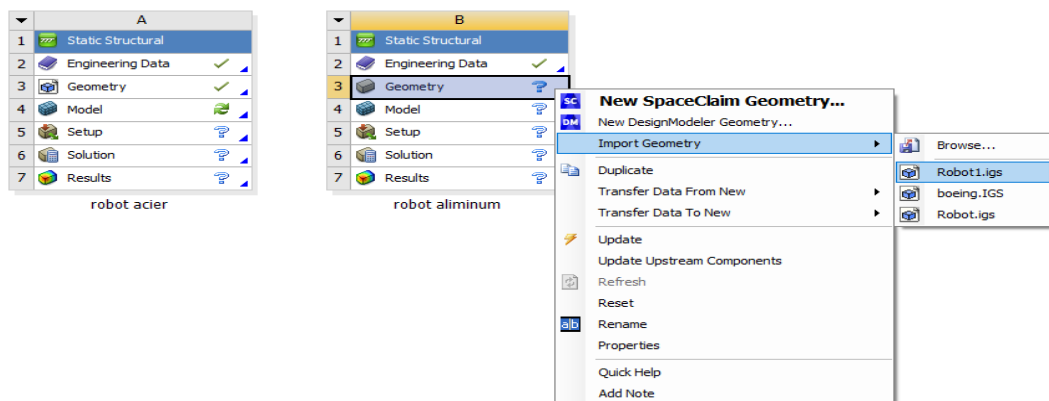
To analyze the material properties, aluminum alloy was added to the Aluminum Robot block, while the presence of structural steel was confirmed for the Steel Robot block. Following this, the masses of the two robots were compared: the Steel Robot had a mass of 657.34 kg, whereas the Aluminum Robot weighed 231.95 kg.

The next step involved simulating the impact of a static load equivalent to 30 kg positioned under the beak of both robots. This required applying a fixed support and calculating the force as  $F = m \cdot g = 30 \cdot 9.8 = 294 \text{ N}$ .

Subsequent analyses focused on the maximum deformations and stresses experienced by each robot under this load. With the yield strength of steel established at 520 MPa and that of aluminum at 420 MPa, the study concluded by assessing the resistance of both robots to the applied stresses, highlighting the implications for design choices in industrial applications.

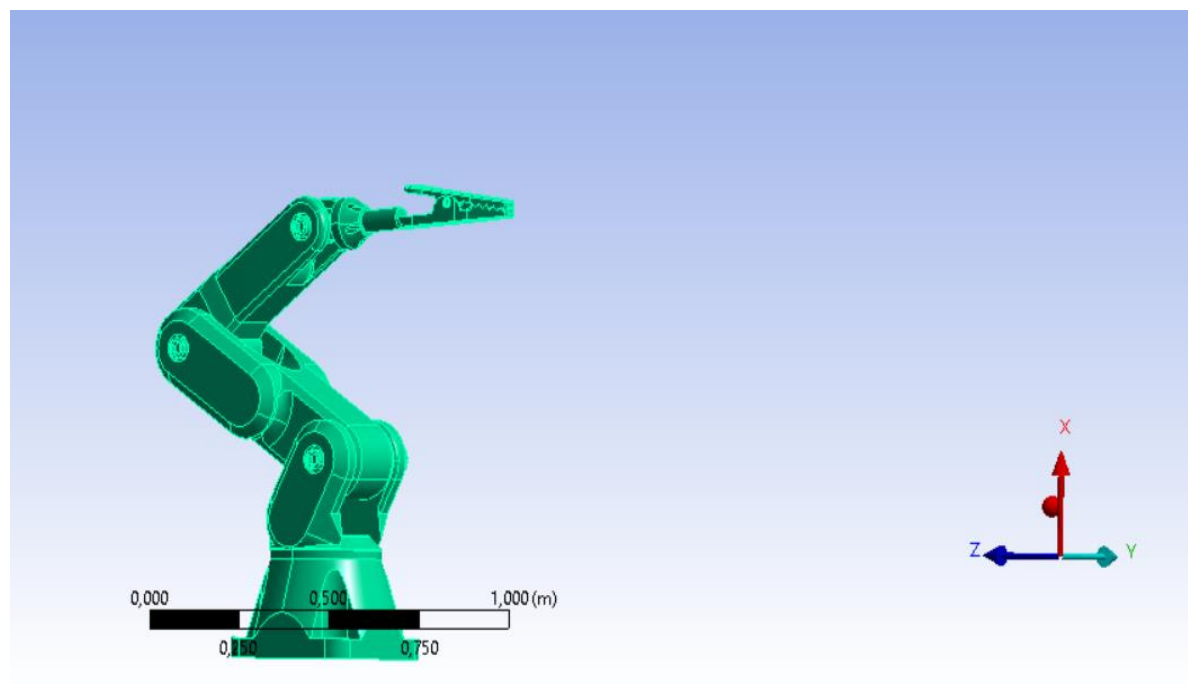


1. In each of the blocks importing the industrial robot provided



2. Calculating the Height :

Details of "Robot1-FreeParts"		▼ ↑ □ ×
Coordinate System	Default Coordinate System	^
Reference Temperature	By Environment	
Treatment	None	
<b>Material</b>		
Assignment	Structural Steel	
Nonlinear Effects	Yes	
Thermal Strain Effects	Yes	
<b>Bounding Box</b>		
Length X	1,342 m	
Length Y	0,41 m	
Length Z	1,1446 m	
<b>Properties</b>		
<b>Statistics</b>		

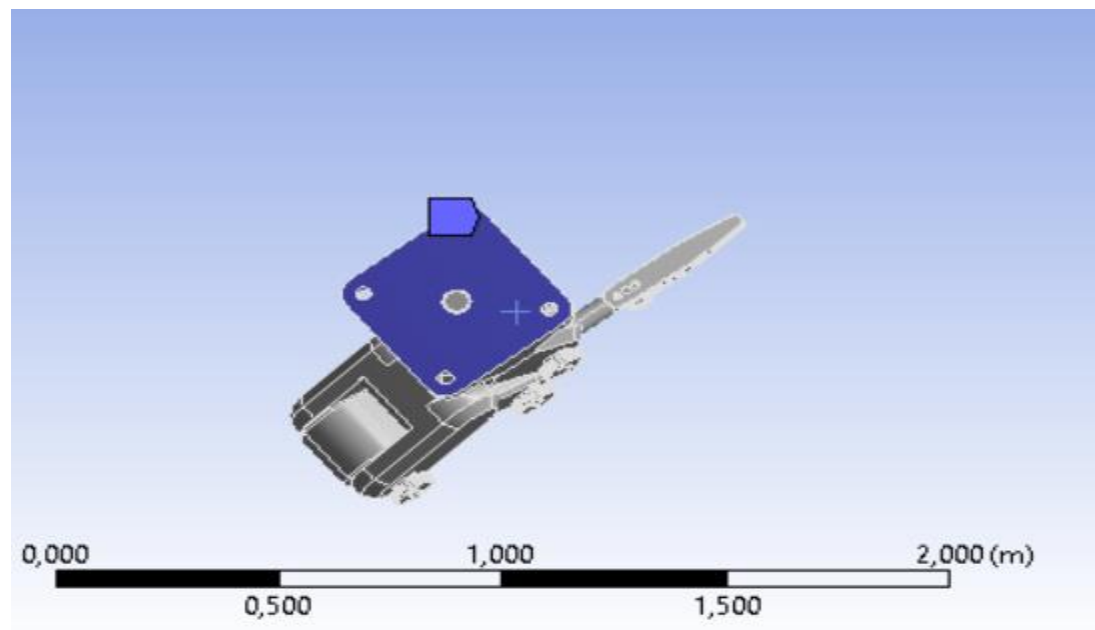
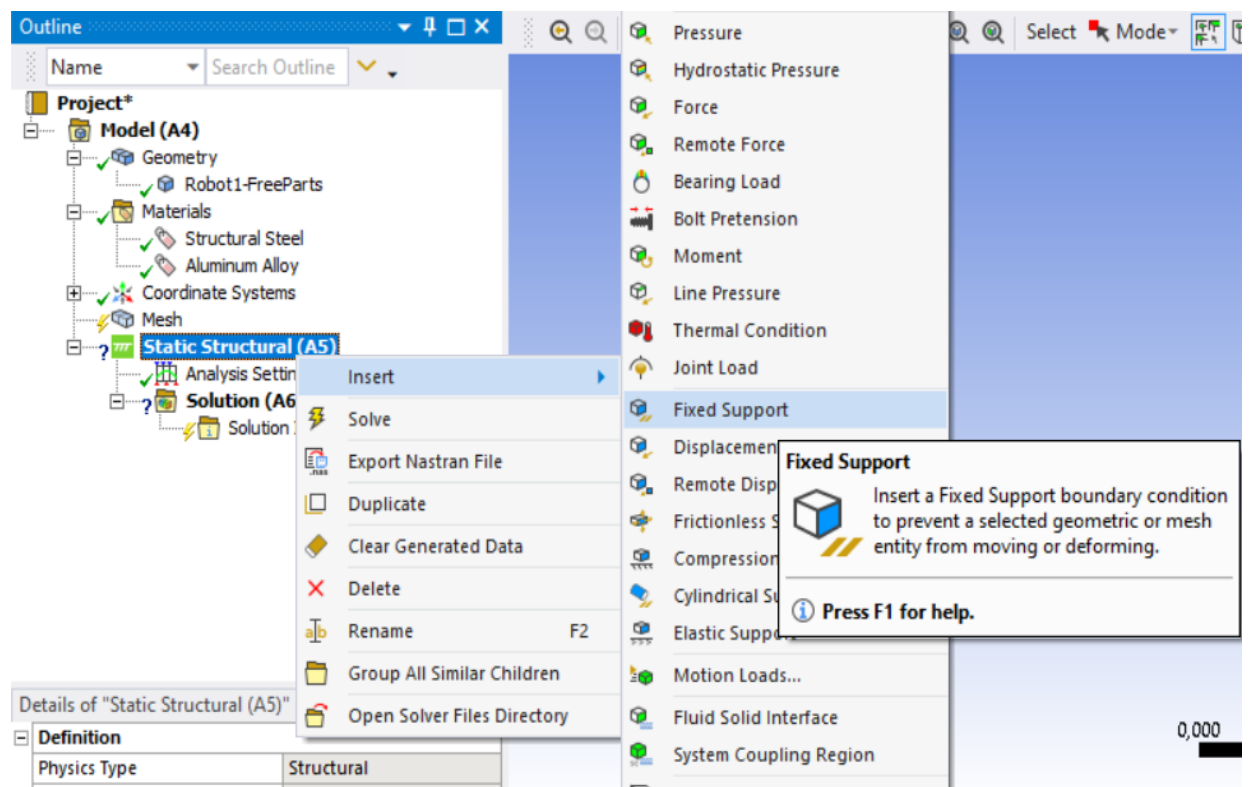


$H = 1,342 \text{ m}$

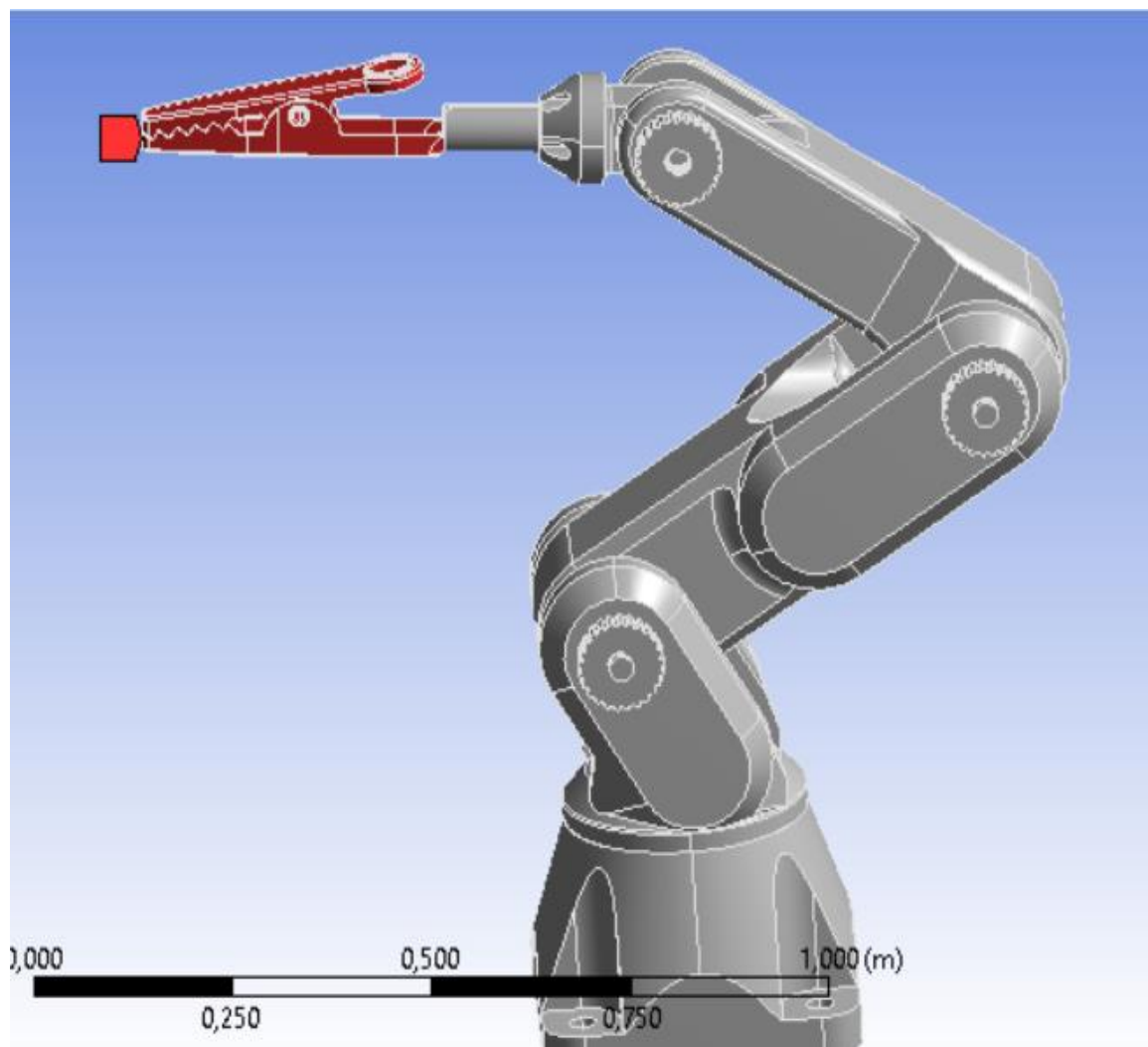
Verification of structural steel:



## Mass Calculation :



## Force Insertion :



Force

Solution (A6)

Solution 1

Total Def

Insert

Solve

Evaluate All Results

Clear Generated Data

Rename F2

Group All Similar Children

Open Solver Files Directory

Deformation

Strain

Stress

Energy

Linearized Stress

Stress Tool

Fatigue

Contact Tool

Bolt Tool

Probe

Coordinate Systems

Volume

User Defined Result

User Defined Criteria

Commands

Equivalent (von-Mises)

Maximum Principal

Middle Principal

Minimum Principal

Maximum Shear

Intensity

Normal

Shear

Vector Principal

Thermal

Equivalent Plastic

Equivalent Total

Accumulated Equivalent Plastic

Maximum I

Press F

Details of "Solution (A6)"

Adaptive Mesh Refinement

Max Refinement Loops 1,

Refinement Depth 2,

Information

Status Solve Required

☐ MAPDL Elapsed Time

MAPDL Memory Used

MAPDL Result File Size

Post Processing

Beam Section Results No

On Demand Stress/Strain No

Graph

