

# CUBE SAT

ANSYS PROJECT

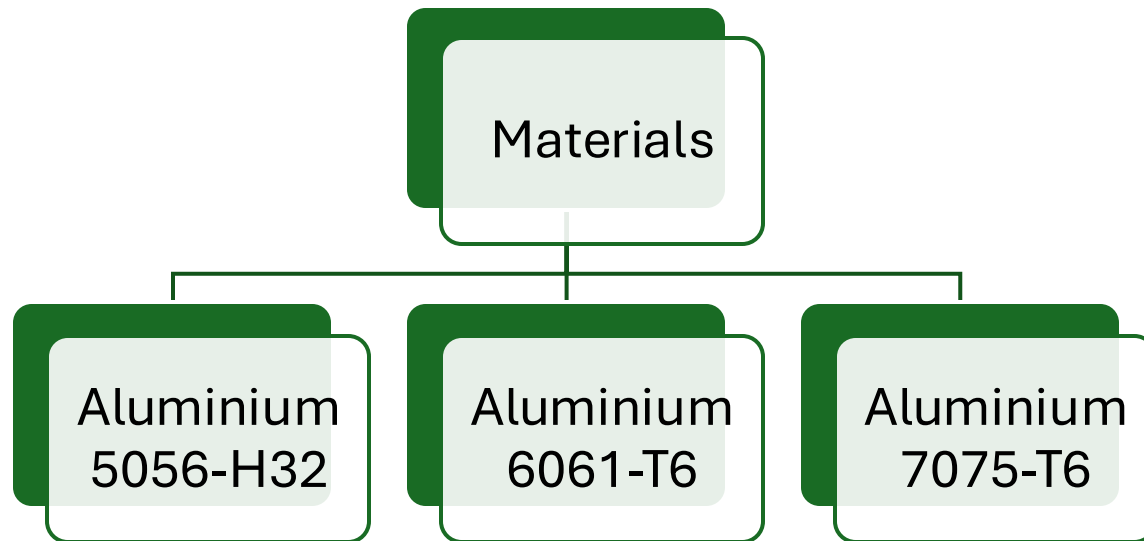
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# Statement of the Project

- Designing the one unit cube sat satellite for that our aim to perform first phase analysis on Cubesat satellite frame



# Objectives

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Basic Analysis

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Identify Material

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Try to Finalize one structure  
for that material frame

Analysis  
should  
Perform

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Static Structural

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Modal Analysis

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Pre-stressed Modal Analysis

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Buckling Analysis

## Material Properties

Material	Aluminium 5052-H32	Aluminium 6061-T6	Aluminium 7075-T6
Density	2680 kg/m**3	2700 kg/m**3	2810 kg/m**3
Ultimate Tensile strength	228 Mpa	310 Mpa	572 Mpa
Tensile Yield strength	193 Mpa	278 Mpa	503 Mpa
Modulus of Elasticity	70.3 Gpa	68.9 Gpa	71.9 Gpa
Poission ratio	0.33	0.33	0.33

# Boundary Condition



LOAD : 100N compressive  
load on all the faces



Constraint: Fixed  
constraint on the  
support faces

# Result Required

- Static structural analysis: Total Deformation  
Directional Deformation  
Equivalent stress  
Equivalent Strain

Modal Analysis and Pre-stressed Modal Analysis:

- > First 6 Mode Shapes
- > Corresponding Natural Frequencies

Buckling Analysis

- > Buckling Load Factor
- > Buckling Load shapes

# Software



ANSYS WORKBENCH



> Static structural



> Modal



> Eigen Value



# Final Result obtained(static structural)

Material	Aluminium 5052-H32	Aluminium 6061-T6	Aluminium 7075-T6
Total Deformation	0.25484	0.26002	0.24987
X Deformation(max)	+0.2005	+0.20457	0.19658
X Deformation(min)	-0.19579	-0.19977	-0.19197
Y Deformation(max)	0.25484	0.26002	0.24987
Y Deformation(Min)	-0.21974	-0.2242	-0.21545
Z Deformation(Max)	0.19311	0.19704	0.18934
Z Deformation(Min)	-0.19457	-0.19852	-0.19077
Equivalent stress(max)	82.513	82.513	82.513
(min)	0.02356	0.02356	0.02356
Equivalent Strain(max)	0.0011828	0.0012068	0.0011597
(min)	9.3371e-7	9.5268e-7	9.1547e-7

Units are in mm

Final  
Result(Modal  
, Pre-stressed  
Analysis)

Frequencies	Aluminium 5052-H32	Aluminium 6061-T6	Aluminium 7075-T6
Modal 1	1395	1375.8	1375.9
Modal 2	1519.7	1498.8	1498.9
Modal 3	1642.3	1619.8	1619.8
Modal 4	1675.9	1652.8	1652.9
Modal 5	1693.7	1670.4	1670.5
Modal 6	1871.5	1845.8	1845.9

Result(Buckling  
Load Factor)

Load factor	Aluminium 5056-H32	Aluminium 6061-T6	Aluminium 7075-T6
1	156.46	153.34	159.58
2	158.1	154.95	161.25

# Selected Material is AL 7075-T6



Al 7075-T6



High buckling load factor, especially for a CUBESAT satellite where structural stability is crucial.



High modal frequencies: Reduces the risk of resonance and structural damage



Low deformation: Maintains satellite shape and functionality under various loads.

**THANK YOU**