

Stress Analysis Report



Analyzed File:	QuadCopter Main Body.ckpt
Autodesk Inventor Version:	2022 (Build 260153000, 153)
Creation Date:	4/28/2023, 8:09 AM
Study Author:	Grace

Static Analysis:1

General objective and settings:

Design Objective	Single Point
Study Type	Static Analysis
Last Modification Date	4/28/2023, 6:25 AM
Model State	Master
Detect and Eliminate Rigid Body Modes	No

iProperties

Summary

Author	Grace
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Project

Part Number	QuadCopter Main Body
Designer	Grace
Cost	\$0.00
Date Created	4/27/2023

Status

Design Status	WorkInProgress
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Physical

Material	PC/ABS Plastic
Density	0.357273 g/cm ³
Mass	0.0489973 kg
Area	30992.3 mm ²
Volume	137142 mm ³

Center of Gravity	x=3.49722 mm y=-2.25965 mm z=0.00540883 mm
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Note: Physical values could be different from Physical values used by FEA reported below.

Mesh settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2
Grading Factor	1.5
Max. Turn Angle	60 deg
Create Curved Mesh Elements	Yes

Material(s)

Name	PC/ABS Plastic	
General	Mass Density	0.357273 g/cm ³
	Yield Strength	54.4 MPa
	Ultimate Tensile Strength	54.1 MPa
Stress	Young's Modulus	2.78 GPa
	Poisson's Ratio	0.4 ul
	Shear Modulus	0.992857 GPa
Part Name(s)	QuadCopter Main Body. ipt	

Operating conditions

Force:1

Load Type	Force
Magnitude	20.000 N
Vector X	0.000 N
Vector Y	-20.000 N
Vector Z	0.000 N

Selected Face(s)



Bearing Load:1

Load Type	Bearing Load
Magnitude	20.000 N

Vector X	0.000 N
Vector Y	20.000 N
Vector Z	0.000 N

Selected Face(s)



Bearing Load:2

Load Type	Bearing Load
Magnitude	20.000 N
Vector X	0.000 N
Vector Y	20.000 N
Vector Z	0.000 N

Selected Face(s)



Bearing Load:3

Load Type	Bearing Load
Magnitude	20.000 N
Vector X	0.000 N
Vector Y	20.000 N
Vector Z	0.000 N

Selected Face(s)



Bearing Load:4

Load Type	Bearing Load
Magnitude	20.000 N
Vector X	0.000 N
Vector Y	20.000 N
Vector Z	0.000 N

Selected Face(s)



Gravity

Load Type	Gravity
Magnitude	9810.000 mm/s ²
Vector X	0.000 mm/s ²
Vector Y	-9810.000 mm/s ²
Vector Z	0.000 mm/s ²

Selected Face(s)



Fixed Constraint:1

Constraint Type	Fixed Constraint
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Selected Face(s)



Results

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
Fixed Constraint:1	59.5193 N	0 N	0.503288 N m	-0.403144 N m
		-59.5193 N		-0.00839731 N m
		0 N		-0.301169 N m

Result Summary

Name	Minimum	Maximum
Volume	137142 mm ³	
Mass	0.0489972 kg	
Von Mises Stress	0.0111102 MPa	17.2353 MPa
1st Principal Stress	-5.53313 MPa	20.0562 MPa
3rd Principal Stress	-19.7925 MPa	7.16444 MPa
Displacement	0 mm	3.20985 mm
Safety Factor	3.15632 ul	15 ul

Figures

Von Mises Stress



1st Principal Stress



3rd Principal Stress



Displacement



Safety Factor

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