PROJECT ON

ANALYSIS OF SHAPER MECHANISM

Group-3

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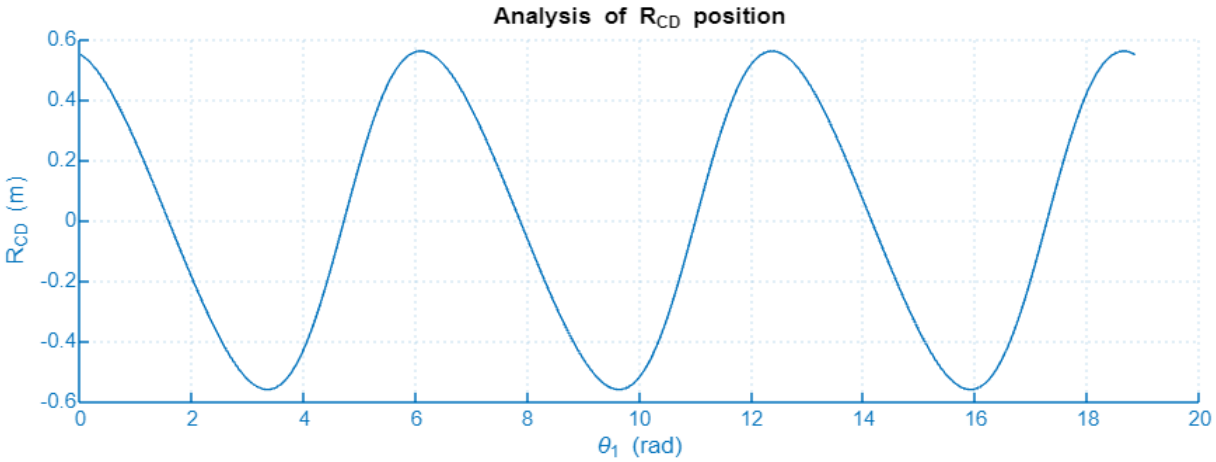
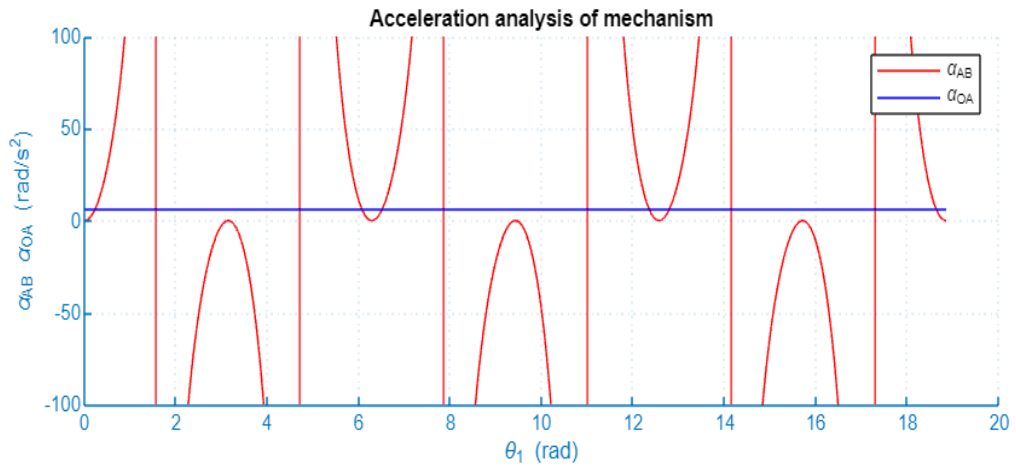
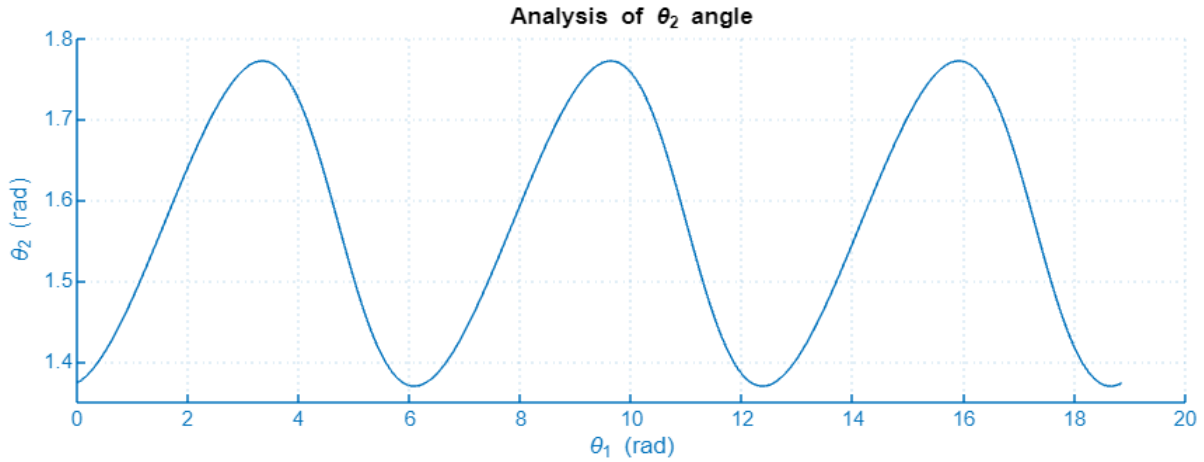
Introduction

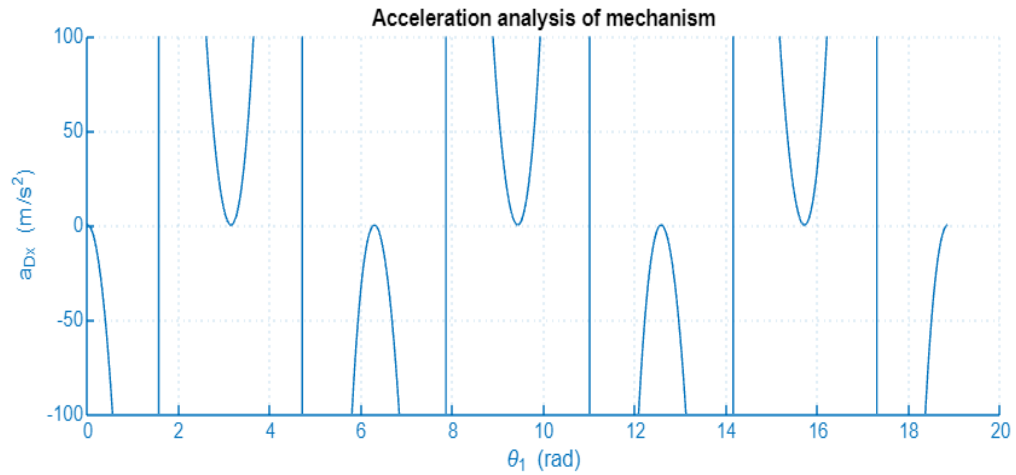
- A **Shaper mechanism** is a robust machine used to remove material from work pieces to achieve flat and smooth surfaces with high precision.

- Mechanism: Quick Return Mechanism


Analysis of R_{CD} position
R_{CD} (m)
θ_1 (rad)


Acceleration analysis of mechanism
α_{AB}
α_{OA}
α_{AB} α_{OA} (rad/s^2)
θ_1 (rad)


Analysis of θ_2 angle
θ_2 (rad)
θ_1 (rad)


Acceleration analysis of mechanism
a_{Dx} (m/s^2)
θ_1 (rad)

Objectives

- To perform a Explicit Dynamics analysis of Shaper Mechanism
- Compare the result of Total deformation, Equivalent stress ,Force
- Conducting the parametric study for other cutting tool velocity.
- Analyzing the result and developing the interference with different velocity

Methodology

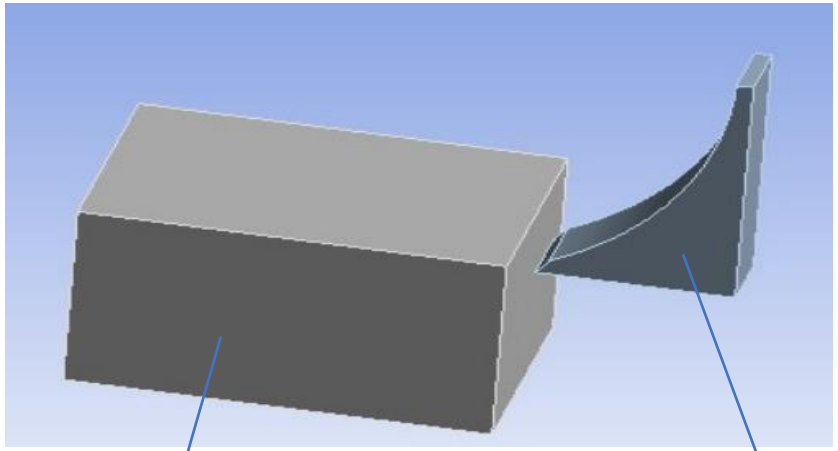
- **Geometry**-3D object with work pieces and Tool
- **Meshing**
- **Boundary Condition** : Fixed Support and Velocity for the tool
- **Connection Details:** The body intersection is set to be frictional

Main Parts of Shaper Machine

Methodology

[redacted]

[redacted]



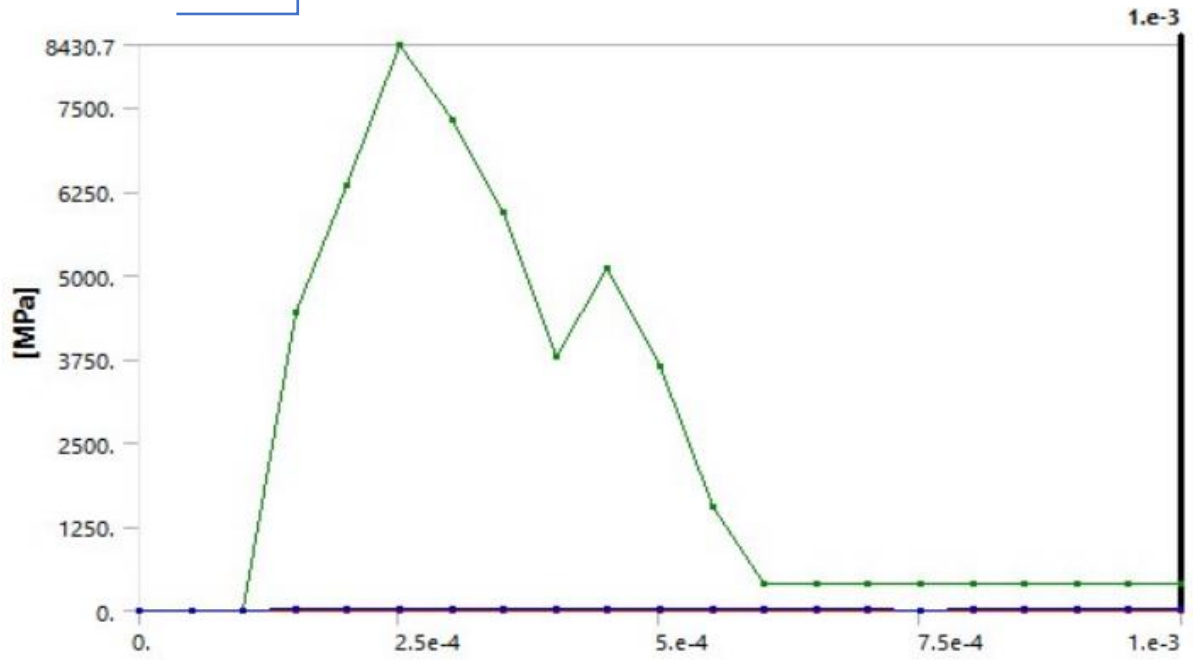
Work pieces(AL 6061)

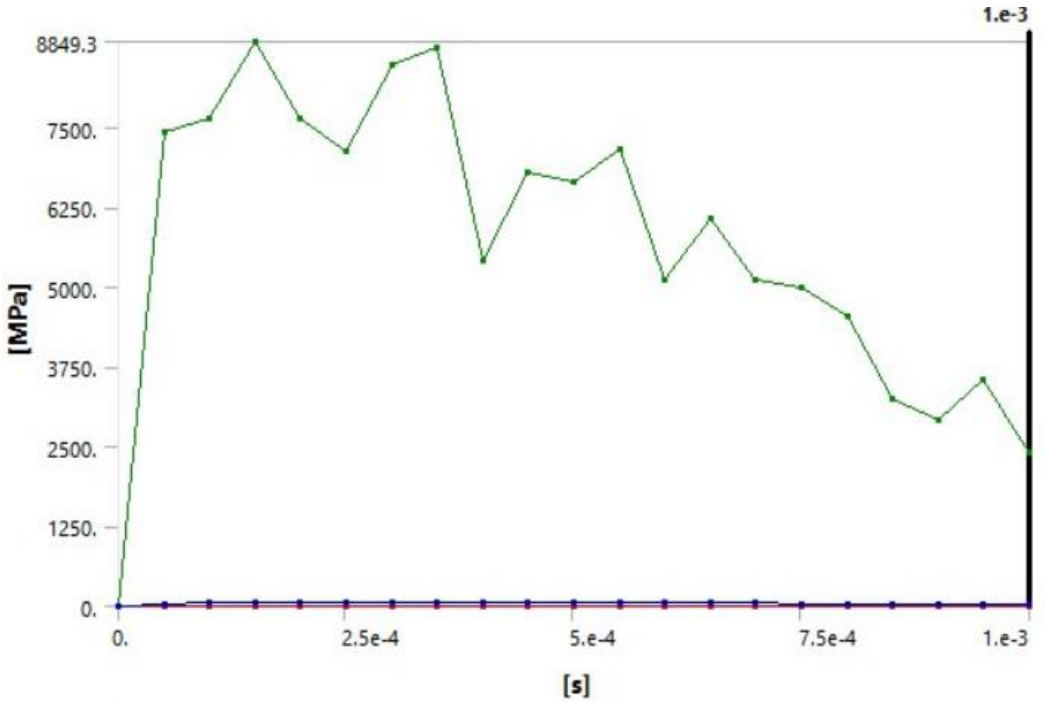
Tool(Titanium)

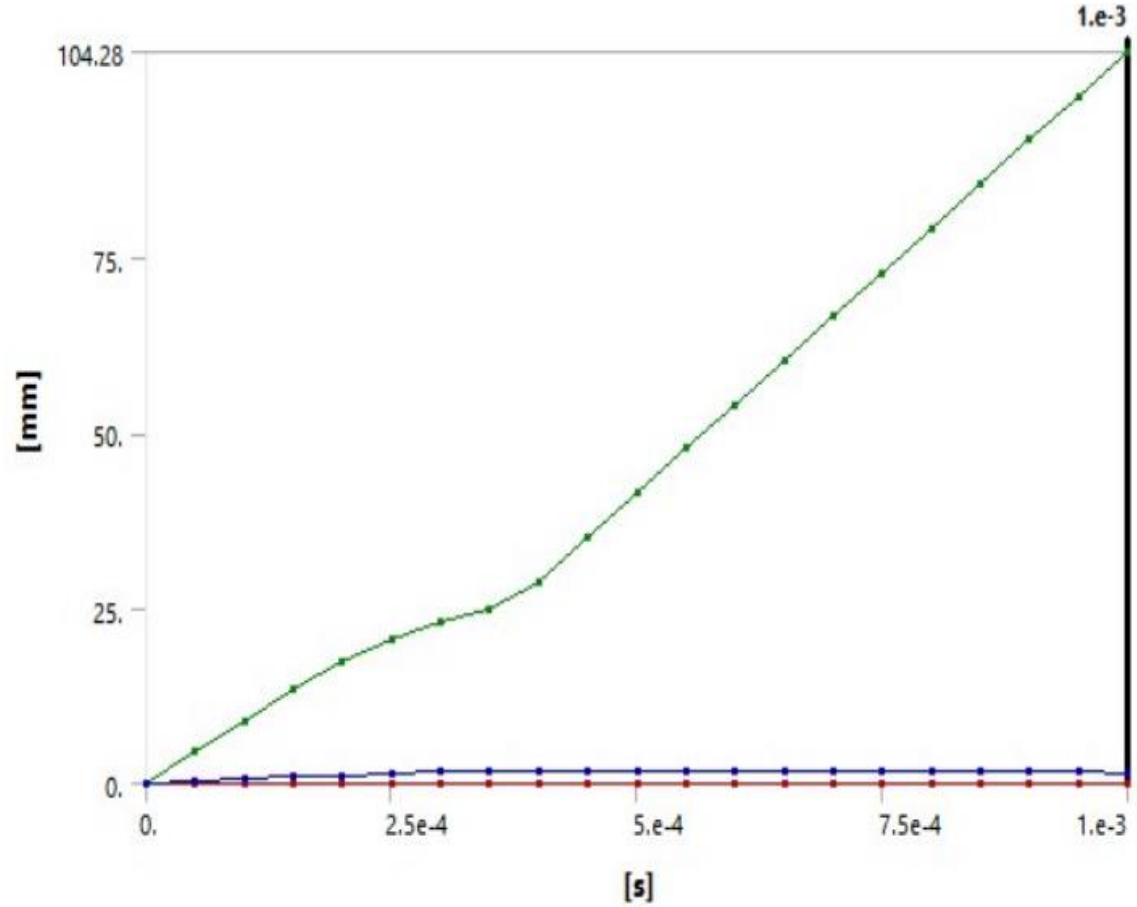
RESULTS

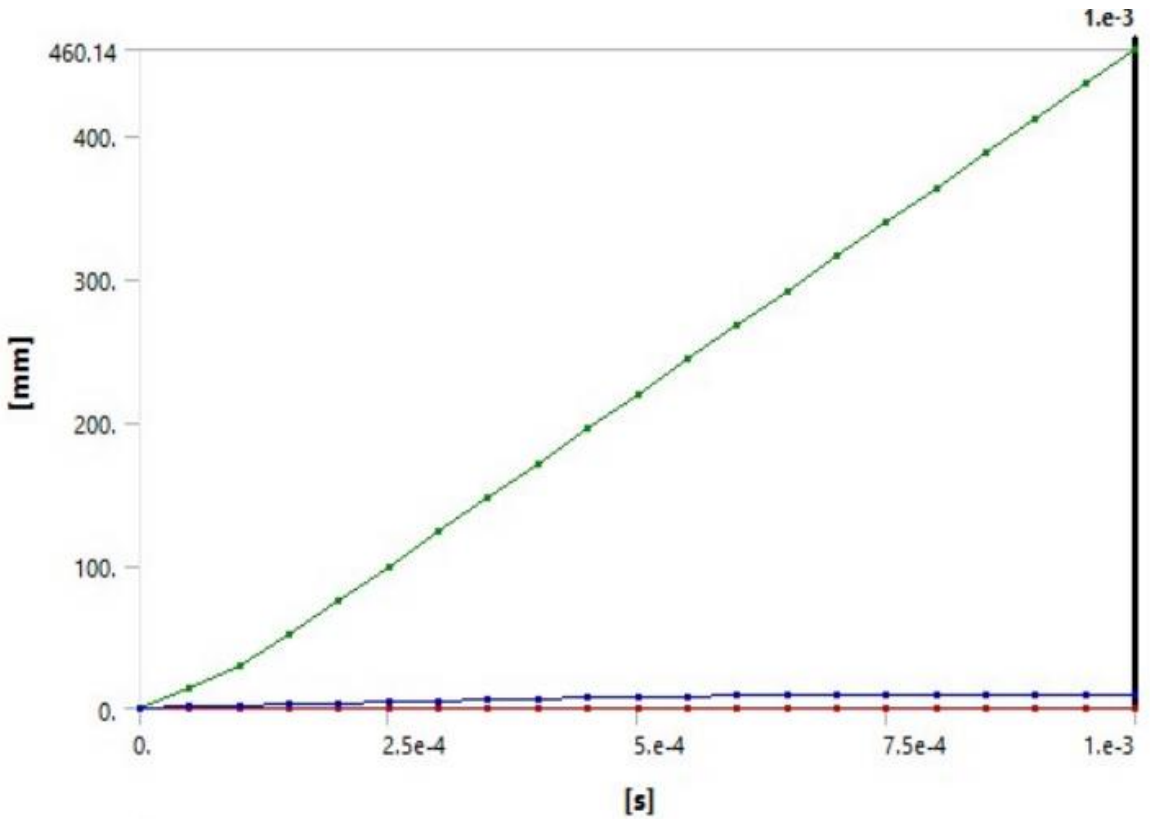
➢ **Results:**

Velocity	Max. Total Deformation	Force
2.9e+005 mm/s	460.14 mm	748.33 KN
90000 mm/s	104.28 mm	847.80KN






1.e-3
104.28
75.
50.
25.
0.
[mm]
0.
2.5e-4
5.e-4
7.5e-4
1.e-3
[s]


1.e-3
460.14
400.
300.
200.
100.
0.
[mm]
0.
2.5e-4
5.e-4
7.5e-4
1.e-3
[s]

Conclusion

- Higher the velocity of the cutting tool, lower will be stress developed.
- Hence ,lower effort required for higher cutting speed.
- Productivity will increase.

THANK YOU