CLAMPING

Dr. B. Chokkaliningam ME, Ph.D
Associate Professor
Department of Mechanical Engineering
Sri Ramkrishna Institute of Technology
Coimbatore-641010

PRINCIPLES OF CLAMPING

• Clamping need to be strong and rigid enough to hold the blank firmly during machining
• Clamping should be easy, quick and consistently adequate
• Clamping should be such that it is not affected by vibration, chatter or heavy pressure

PRINCIPLES OF CLAMPING

• Clamping and unclamping movement should be limited
• Clamping operation should be very simple and quick acting
• Avoid complicated clamping and locating arrangements
• Clamp should be designed to perform as many operations as possible in one setting

PRINCIPLES OF CLAMPING

• Clamping system should comprise of less number of parts for ease of design, operation and maintenance
• Wearing parts should be hard or hardened and also be easily replaceable
• Clamping force should act on heavy parts and against supporting and locating surfaces

PRINCIPLES OF CLAMPING

• Clamping force should be away from the machining thrust forces
• Clamping method should be fool proof and safe
• Clamping must be reliable but also inexpensive
• If possible make all clamps integral parts of the jig and avoid the use of loose parts

PRINCIPLES OF CLAMPING

• Clamp and clamping force must not damage or deform the workpiece
• Clamps should be positioned above the points supporting the component (to avoid distortion and bending)
PRINCIPLES OF CLAMPING

• A properly designed jig or fixture can use the cutting forces to hold the work

![Diagram of a properly designed jig or fixture](image)

• Clamping pressure should only be enough to hold the part against the locators.
• Part can bend

![Diagram showing clamping pressure](image)

• Bend of the part is avoided

![Diagram showing avoided part bend](image)

• Any force imparted by a cutting action should be directly opposed by a fixed location and not by a clamp
• Component should be located and clamped on a previously machined surface

![Diagram showing component location](image)

• Clamping process should be as simple as possible

![Diagram showing simple clamping process](image)
PRINCIPLES OF CLAMPING

- Distribution of clamping force to more than one point equally from one point of application

PRINCIPLES OF CLAMPING

- Clamps should keep the workpiece firmly in contact with locating pins on surface
- For soft and fragile workpieces, fibre pads are to be provided in the clamping face to avoid damage to the workpiece