

Thapar Institute of Engineering & Technology – Patiala

Manufacturing Processes UTA026

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THAPAR INSTITUTE
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Manufacturing

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All of the above products are produced by a combination of various processes called

MANUFACTURING

Products & No. of Parts

3



Single material products



Multi material (parts) products



12,000 parts



>15,000 parts

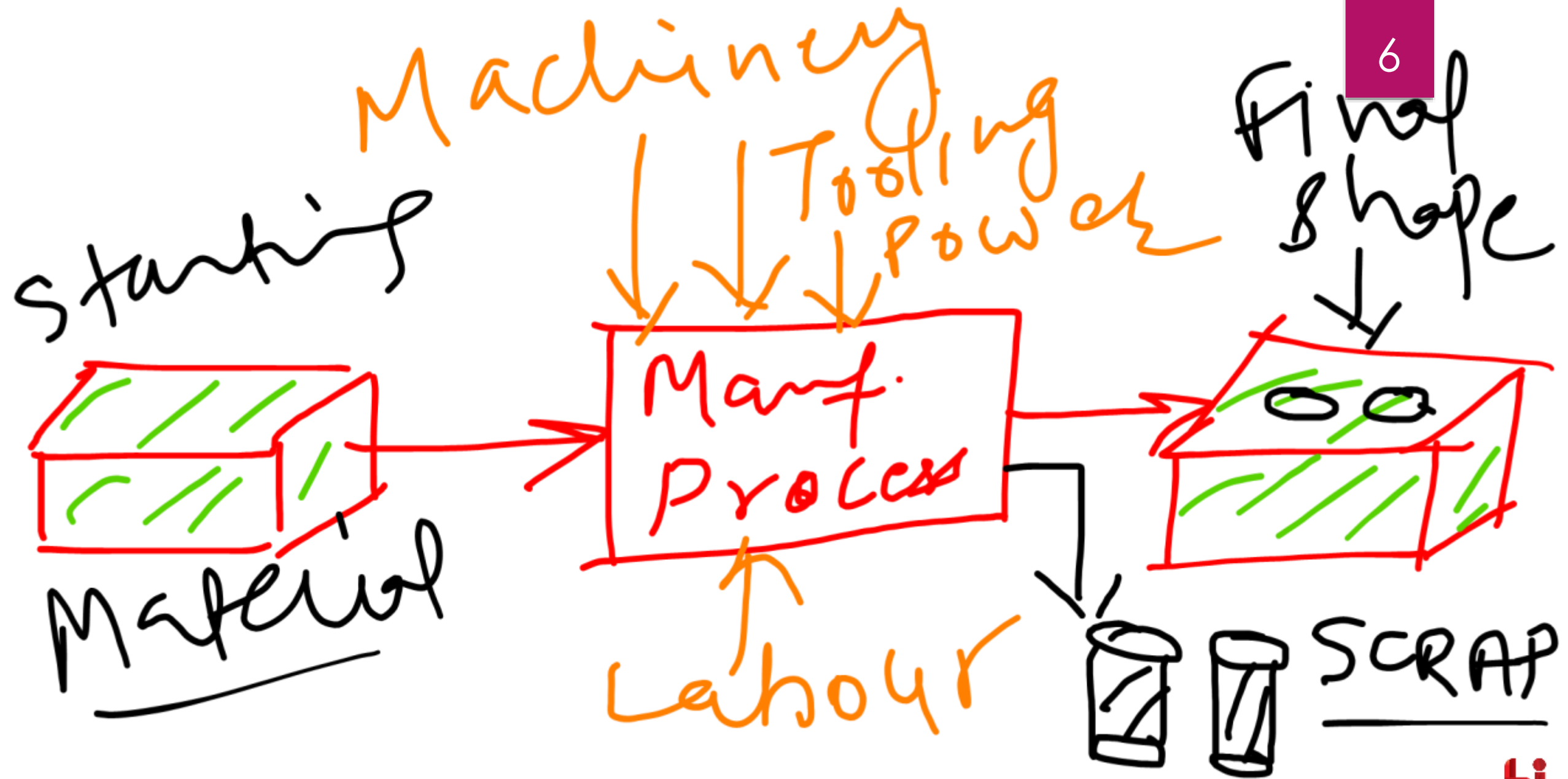


>6 million parts

What is Manufacturing?

- **Manufacturing** is derived from the Latin: *manus*=hand, *factus*=made
- **Manufacturing** in its broadest sense, is the process of converting raw materials into products.
- **Manufacturing** is the use of machines, tools and labour to produce goods for use on a larger scale.





Selecting a Manufacturing Process

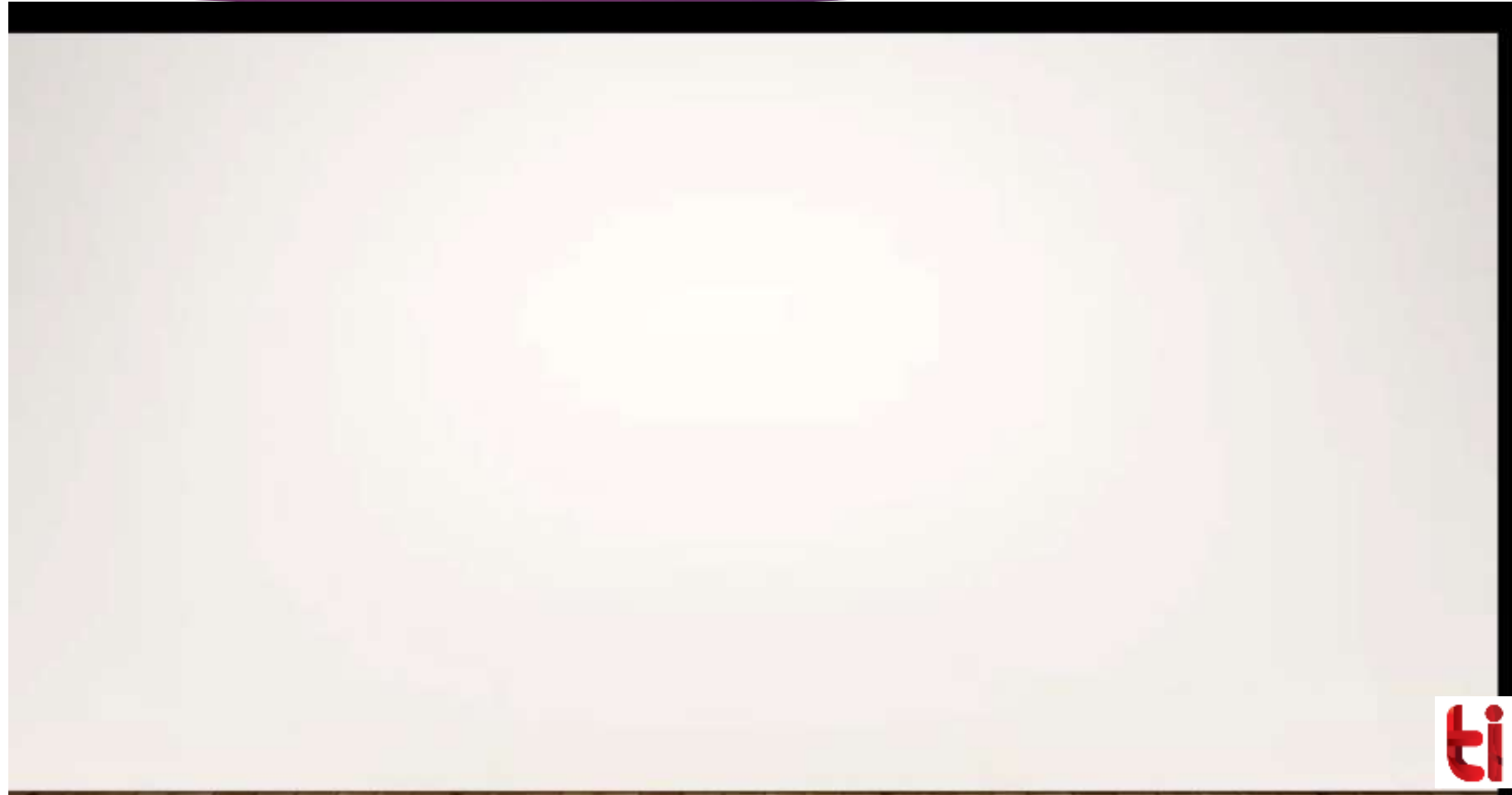
- ▶ Type and nature of the starting material
- ▶ Expected quality and properties required
- ▶ Technical viability of the process
- ▶ Volume of production
- ▶ Economy

Types of Manufacturing Processes

- ▶ MACHINING PROCESSES
- ▶ CASTING PROCESSES
- ▶ FORMING OR DEFORMATION PROCESSES
- ▶ JOINING PROCESSES

Machining

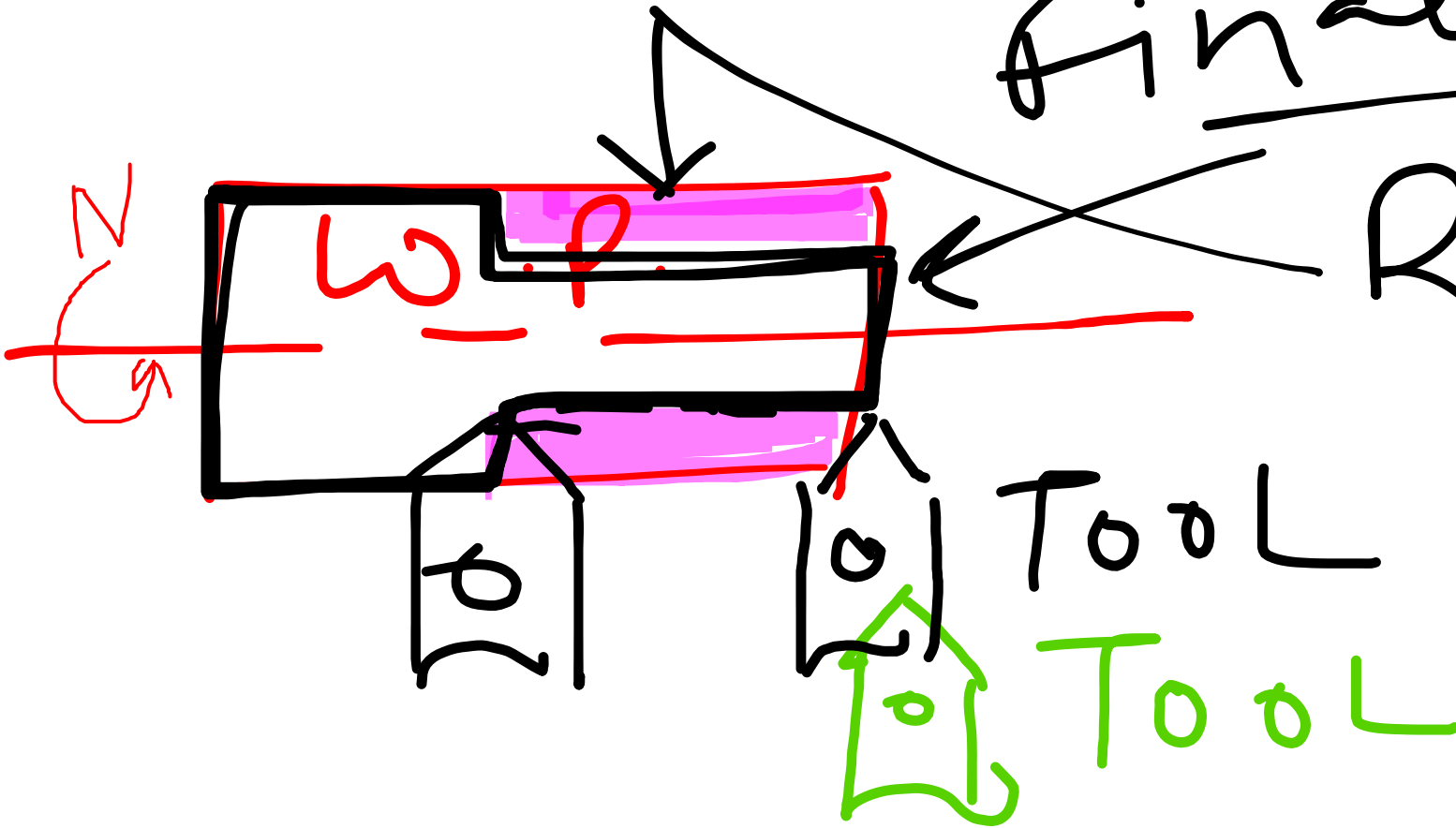
- Excess material removed from the starting piece so what remains is the desired geometry
- Examples: turning, drilling, and milling; also grinding and non-traditional processes



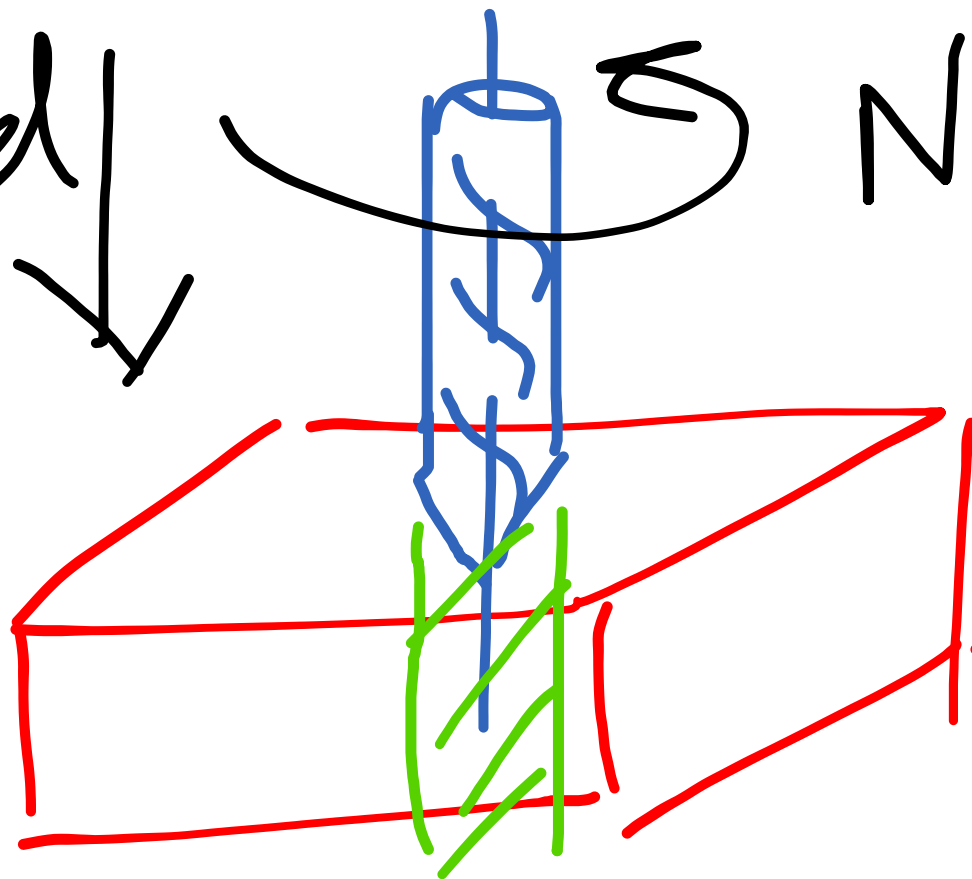
Machining \rightarrow

Final Shape

Removed Material



feed ↓



Material Removal

“SUBTRA-
CTIVE”

Drill

Casting

12

- Starting material is heated sufficiently to transform it into a liquid or highly plastic state
 - Examples: metal casting, plastic moulding



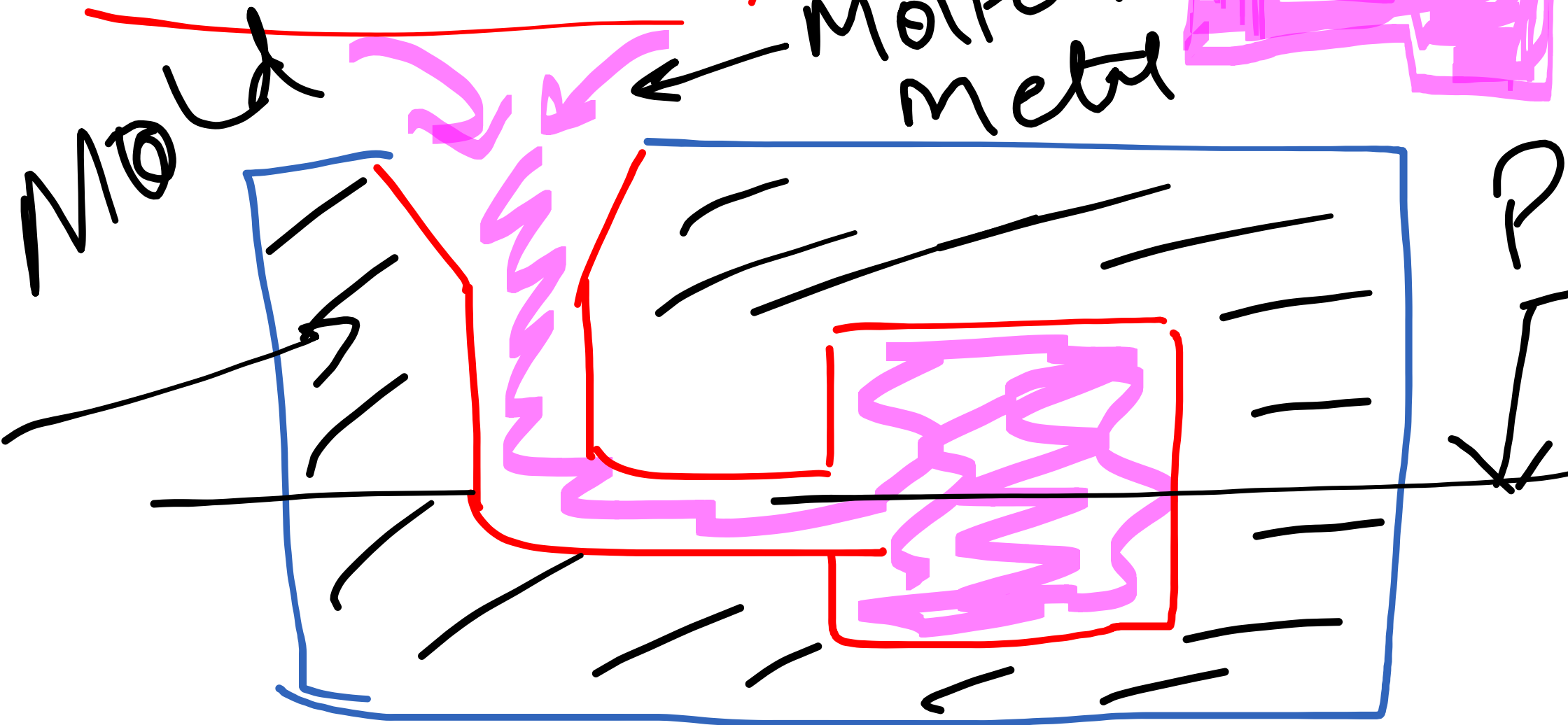
CASTING: —

CASTED

Molten metal

Mold

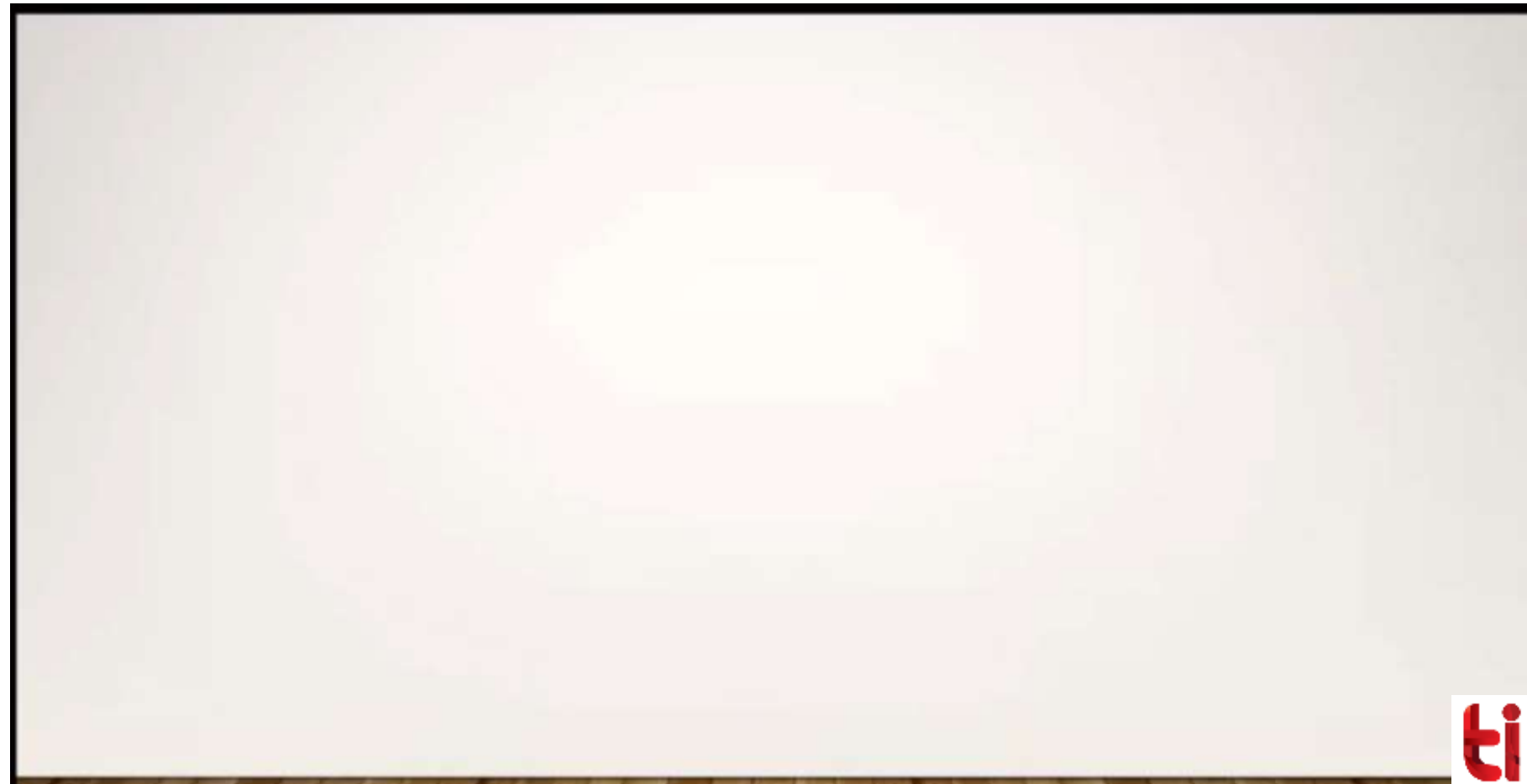
Parting Time



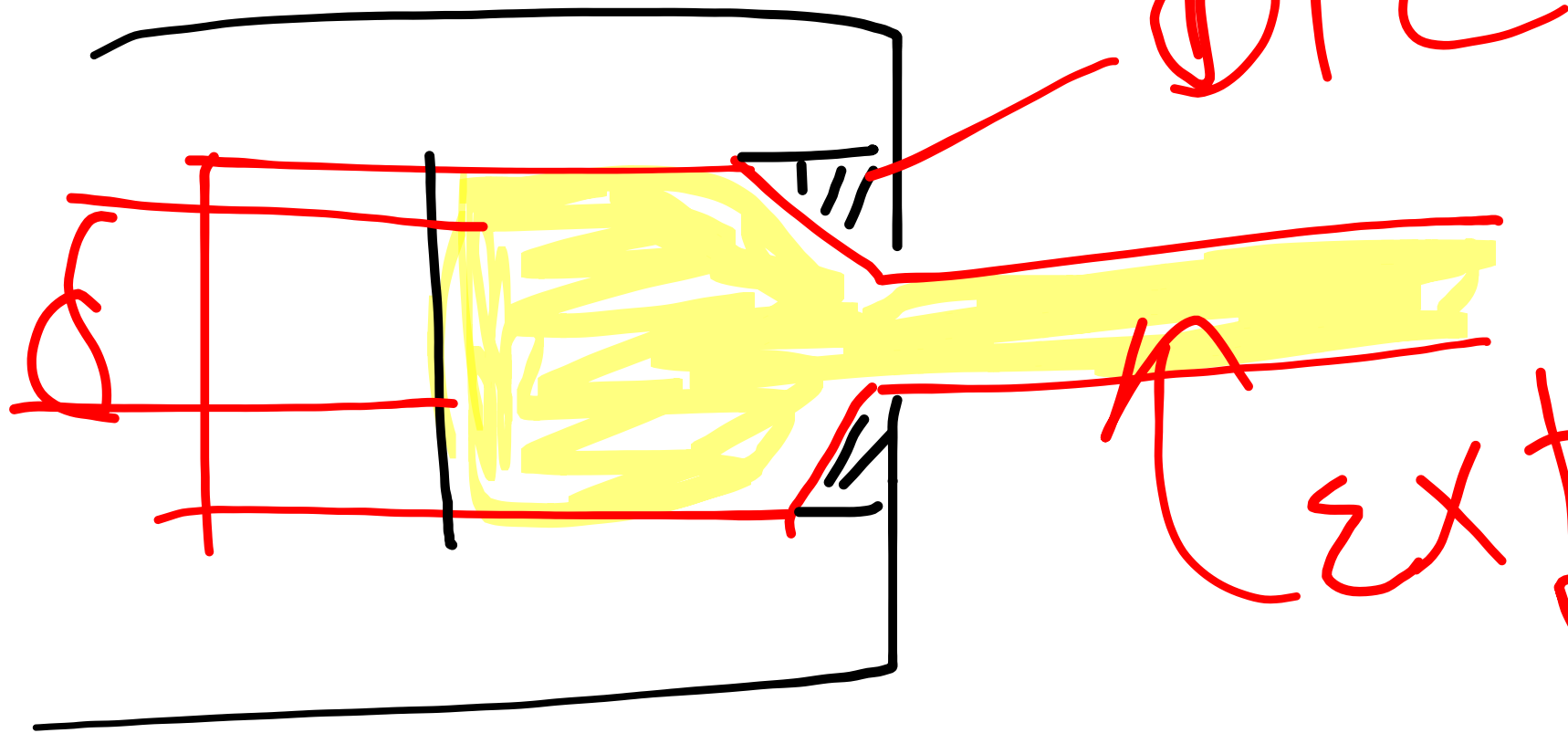
Forming

14

- Starting material is shaped by application of forces that exceed the yield strength of the material.
 - Examples: (a) Forging, (b) extrusion



FORMING →



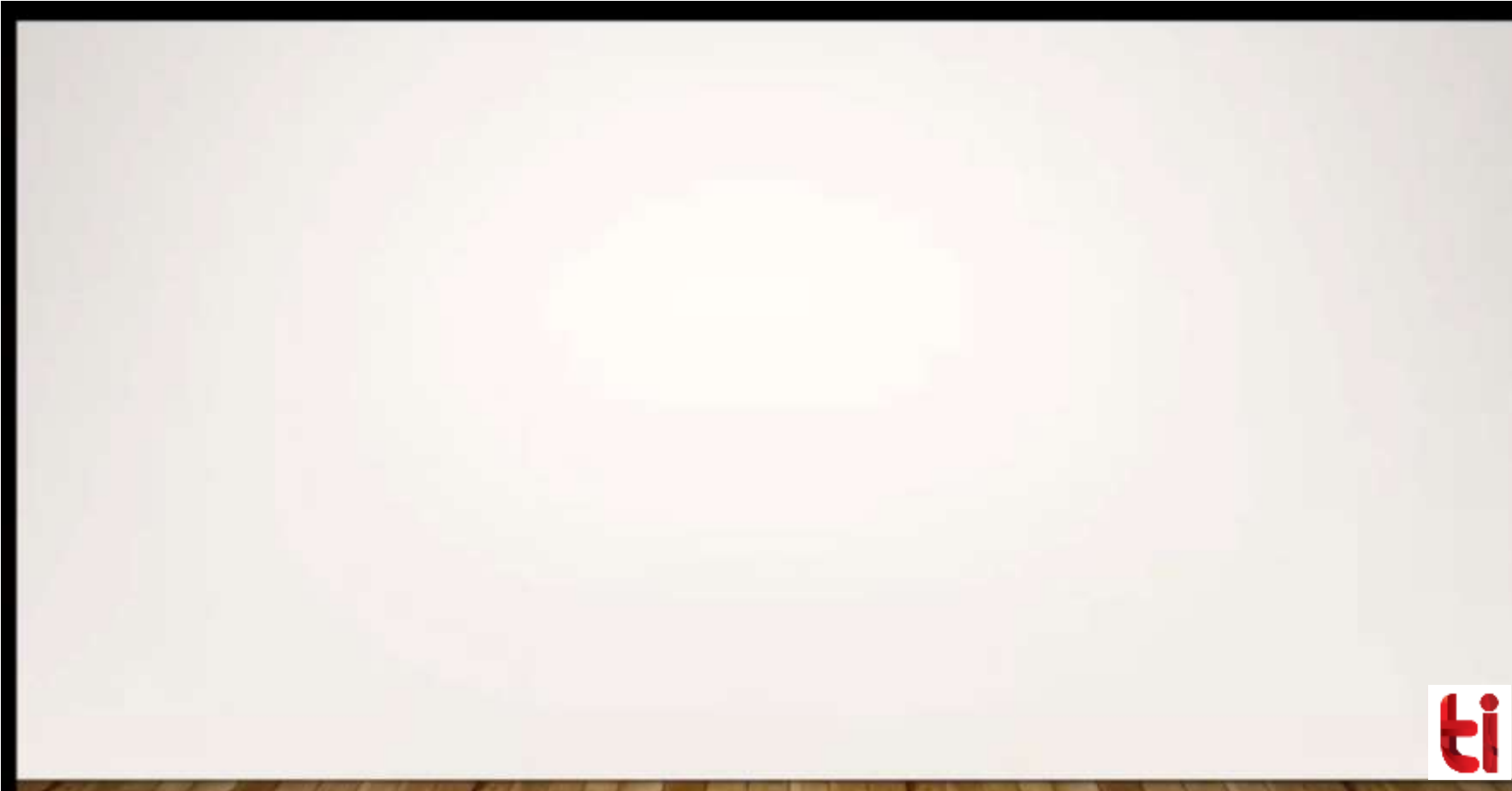
Vol
remain
const.

extruded
metal

Joining

16

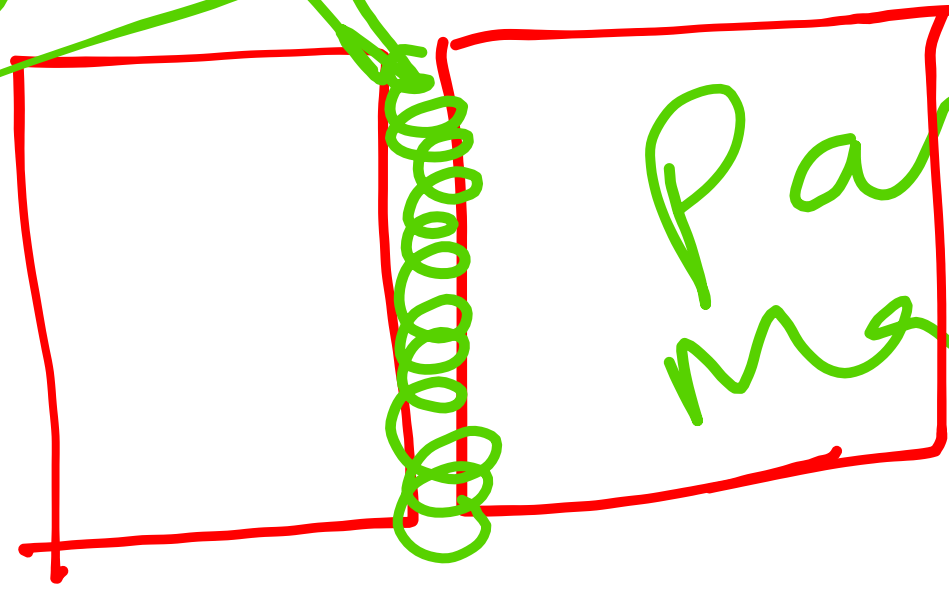
- These operations join two or more components to create a new entity
 - Examples: (a) welding, (b) brazing, soldering



JOINING

JOINT

Filler



Parent material

WELDING

Thanks!!