

Subject Name & Code:

MANUFACTURING PROCESSES-BE04000191

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ASSIGNMENT-7: Broaching and Sawing (CO-2,3,4)

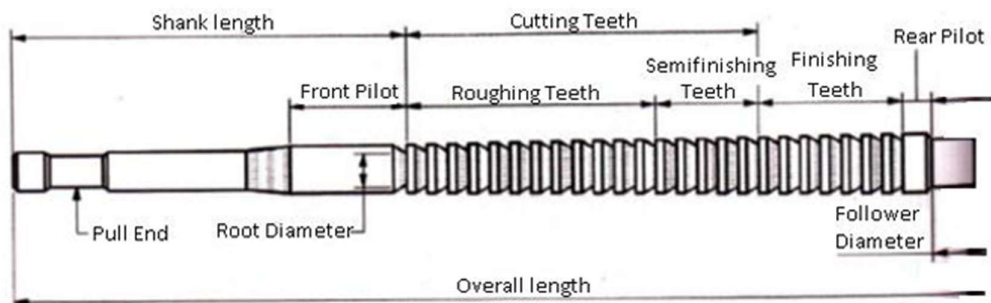
Q1. Give neat sketches of internal pull type broach and indicate the various terms relative to its teeth.

Internal Pull Type Broach Nomenclature:

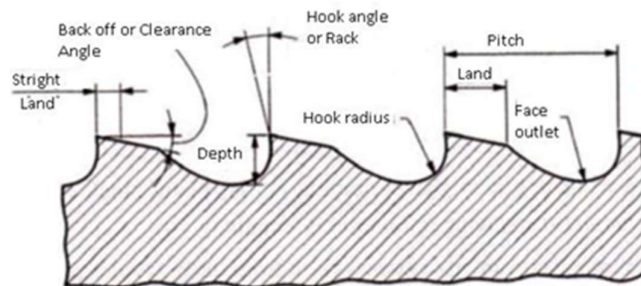
| Term | Description |
|-----------------------------|--------------------------------------------------------------------|
| Pull End | End gripped by broaching machine puller |
| Front Pilot | Guides broach into pre-drilled hole; ensures alignment |
| Roughing Teeth | Remove bulk of material; progressively increasing height |
| Semi-Finishing Teeth | Remove less material; improve surface and accuracy |
| Finishing Teeth | Final sizing; produce accurate dimension and finish |
| Rear Pilot | Supports broach as it exits workpiece |
| Follower End | Rear gripping end for retraction |
| Pitch | Distance between corresponding points on adjacent teeth |
| Chip Breaker/Gullet | Notch in cutting edge to break chips; space for chip accommodation |
| Land | Flat behind cutting edge; provides strength |
| Rake Angle | Angle of tooth face (typically 5°-15°) |

| Term | Description |
|-------------------------------|------------------------------------------------------------------|
| Clearance/Relief Angle | Angle behind land (1° - 3°) |
| Rise Per Tooth (RPT) | Increase in tooth height between successive teeth (0.02-0.15 mm) |

Diagram:



(a) Broach teeth detail



(b) Broach term

Fig.7.8 – Broach geometry

Q2. Describe working of circular sawing machine with neat sketch.

Circular Sawing Machine:

Definition: Power saw using a rotating circular blade with teeth to cut metal bars, sections, and tubes.

Types:

1. **Cold Circular Saw:** Low speed, high torque; uses HSS or carbide-tipped blade; cuts without heating workpiece.
2. **Friction Saw:** High speed; uses friction heat to soften and remove material.

Working Principle (Cold Circular Saw):

- **Blade:** Circular disc with teeth around periphery; tooth geometry similar to milling cutter teeth.
- **Cutting Motion:** Blade rotates at slow speed (10-100 RPM) while workpiece is clamped stationary.
- **Feed Motion:** Blade is fed into workpiece (vertically or horizontally).
- **Coolant:** Copious coolant supplied to cutting zone to prevent overheating.

Components:

- **Base:** Supports machine.
- **Column:** Houses drive motor and gearing.
- **Blade Guard:** Safety cover.
- **Vise:** Clamps workpiece.
- **Blade Feed Mechanism:** Manual or hydraulic feed.
- **Coolant System:** Pump and nozzle.

Working Steps:

1. Workpiece clamped in vise.
2. Blade motor started; blade rotates at set speed.
3. Coolant flow started.
4. Blade fed into workpiece at controlled rate.
5. Cut completed; blade retracts; workpiece unclamped.

Advantages:

- Fast cutting rate.
- Good surface finish and squareness.
- Less burr compared to band saw.
- Suitable for production cutting.

Limitations:

- Limited to straight cuts.
- Higher blade cost.

Diagram:

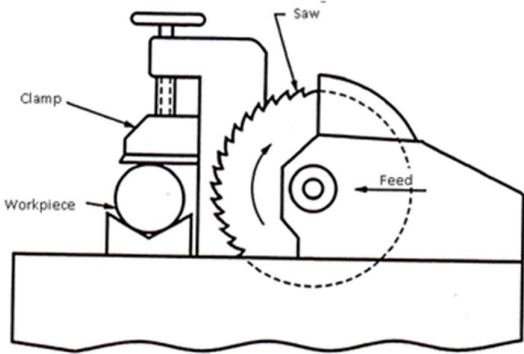


Fig.7.5 – Circular Saw