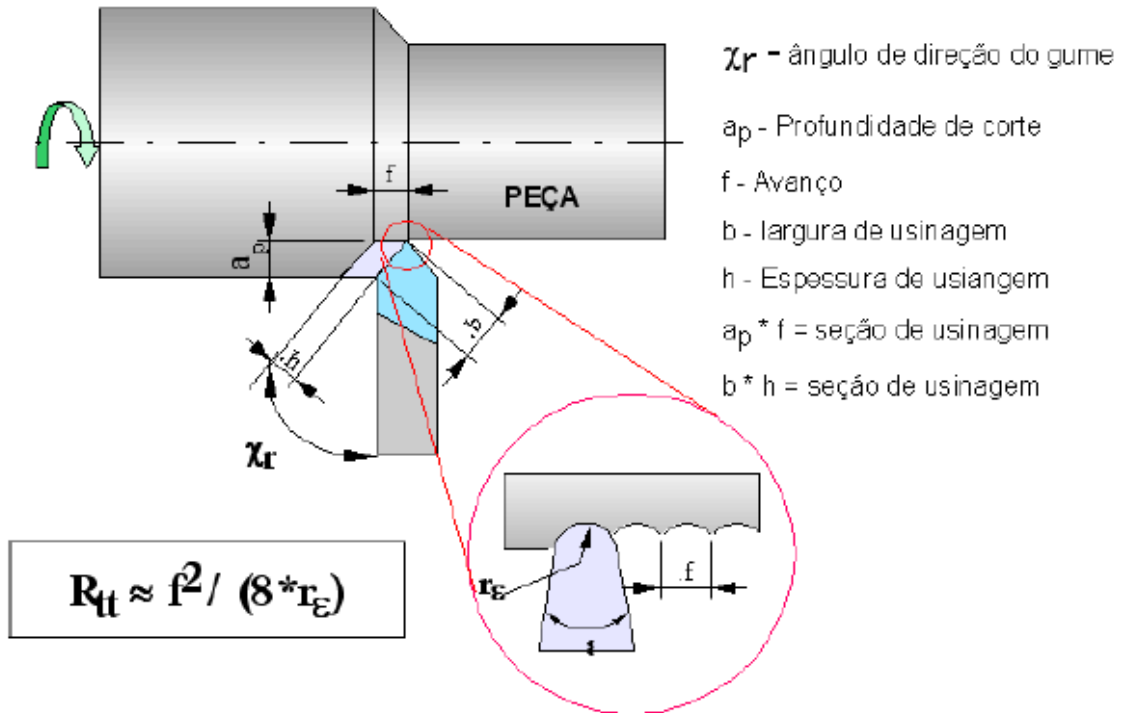


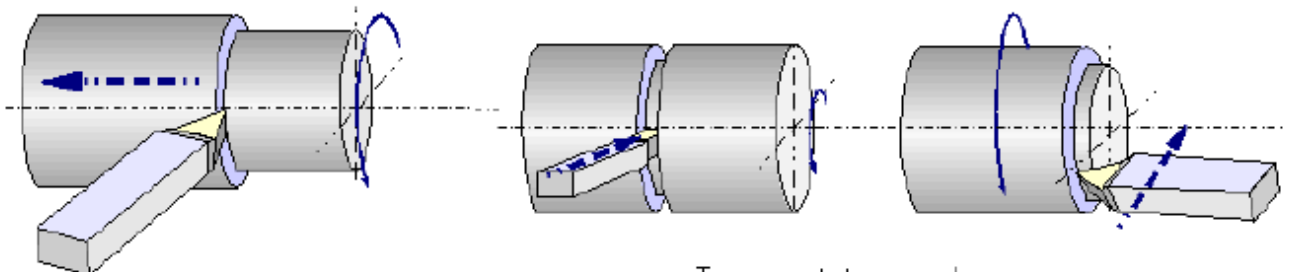
Processos de Fabricação - Torneamento

Introdução:

Definição: Processo de usinagem onde a peça executa o movimento de corte rotativo e a ferramenta o movimento de translação de avanço. Geralmente utilizado na fabricação de peças simétricas de revolução.

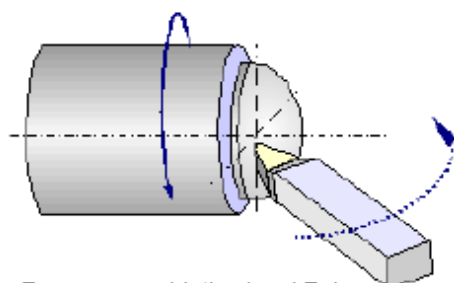


Principais movimentos de torneamento:

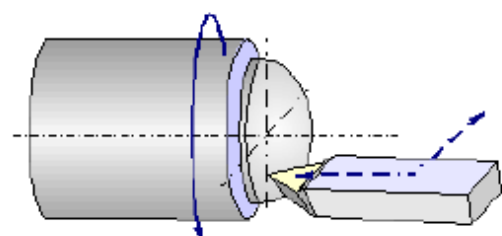


Torneamento Longitudinal

Torneamento transversal

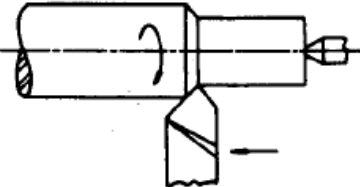

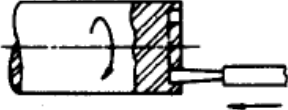
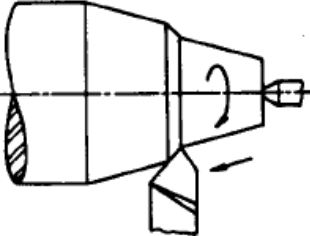
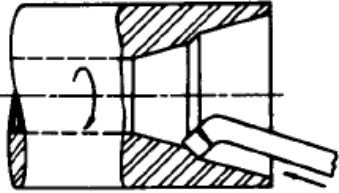
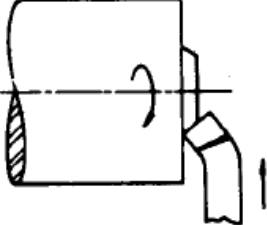
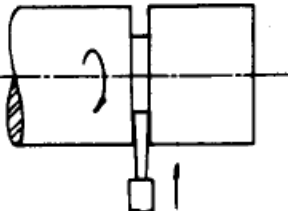
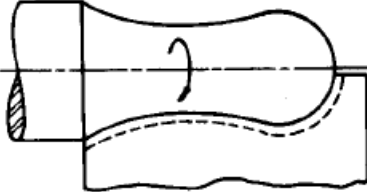
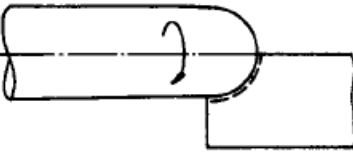
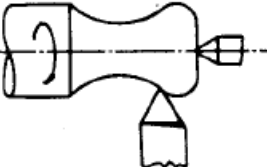


Torneamento bi-direcional Polar



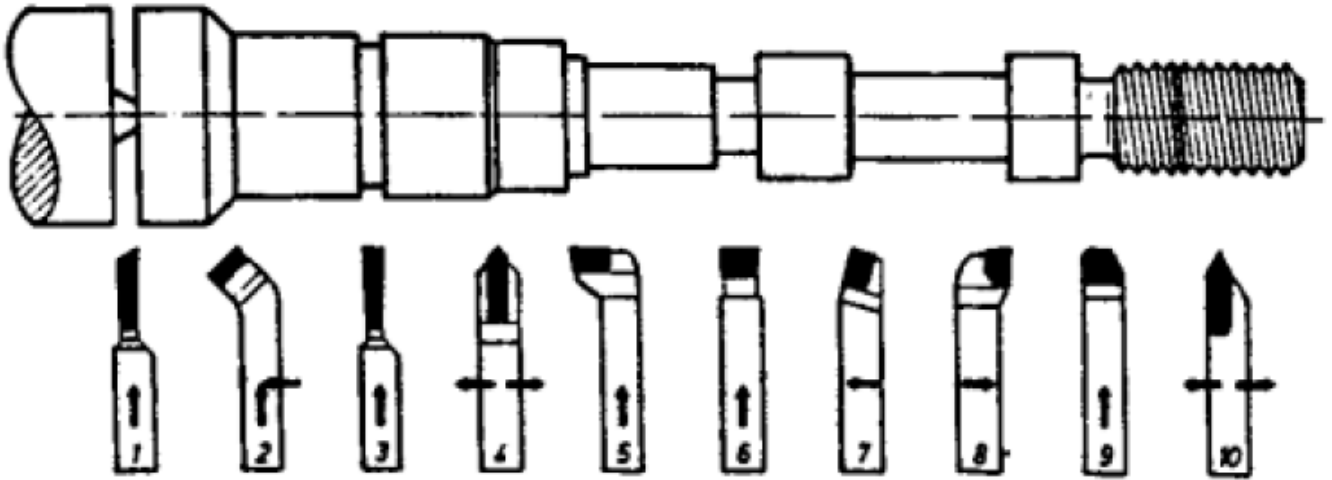
Torneamento bi-direcional Cartesiano

Principais operações de torneamento:

<p>- Torneamento cilíndrico externo</p>  <p>A schematic diagram showing a lathe tool cutting the outer surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length. A chip is shown being removed from the surface.</p>	<p>- Torneamento cilíndrico interno</p>  <p>A schematic diagram showing a lathe tool cutting the inner surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length. A chip is shown being removed from the inner surface.</p>
<p>- Sangramento axial</p>  <p>A schematic diagram showing a lathe tool cutting a chamfered end on a cylindrical workpiece. The workpiece is rotating, and the tool is moving axially towards the end.</p>	<p>- Torneamento cônico externo</p>  <p>A schematic diagram showing a lathe tool cutting a conical shape on the outer surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length.</p>
<p>- Torneamento cônico interno</p>  <p>A schematic diagram showing a lathe tool cutting a conical shape on the inner surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length.</p>	<p>- Torneamento de faceamento</p>  <p>A schematic diagram showing a lathe tool cutting a flat end face on a cylindrical workpiece. The workpiece is rotating, and the tool is moving axially towards the end.</p>
<p>- Sangramento radial</p>  <p>A schematic diagram showing a lathe tool cutting a chamfered end on a cylindrical workpiece. The workpiece is rotating, and the tool is moving radially towards the end.</p>	<p>- Torneamento de forma radial</p>  <p>A schematic diagram showing a lathe tool cutting a curved, radial profile on the outer surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length.</p>
<p>- Torneamento de forma axial</p>  <p>A schematic diagram showing a lathe tool cutting a curved, axial profile on the outer surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length.</p>	<p>- Torneamento de perfil</p>  <p>A schematic diagram showing a lathe tool cutting a complex, non-cylindrical profile on the outer surface of a cylindrical workpiece. The workpiece is rotating, and the tool is moving along its length.</p>

Processos de Fabricação - Torneamento

Principais operações de torneamento:



1. Cortar

2. Cilindrar à direita

3. Sangrar

4. Alisar

5. Facear à direita

6. Sangrar com grande dimensão

7. Desbastar à direita

8. Cilindrar e tolear à esquerda

9. Formar

10. Roscar

1. Cortar (*bedame*)

2. Torneiar/facear à direita

3. Sangrar

5. Facear à direita

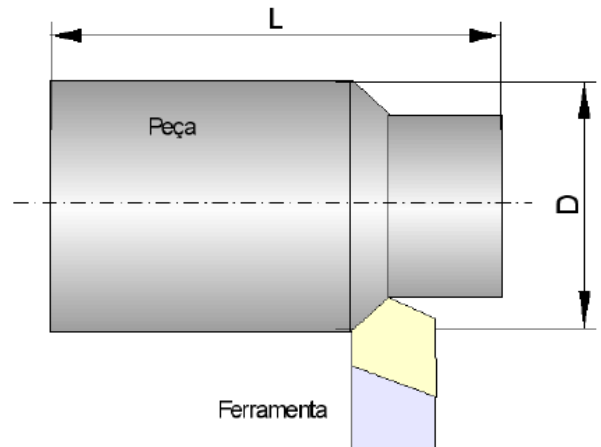
6. Sangrar (*largo*)

7. Torneiar/facear à esquerda

10. Roscar

Torneamento cilíndrico externo:

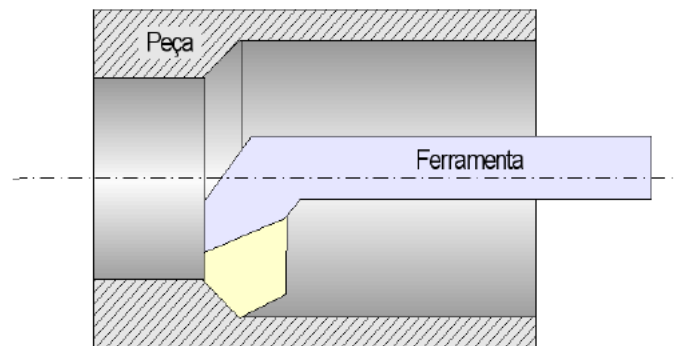
- $L/D \leq 1.5$ fixação em balanço
- $L/D > 1.5$ fixação com contra-ponto



Torneamento cilíndrico interno:

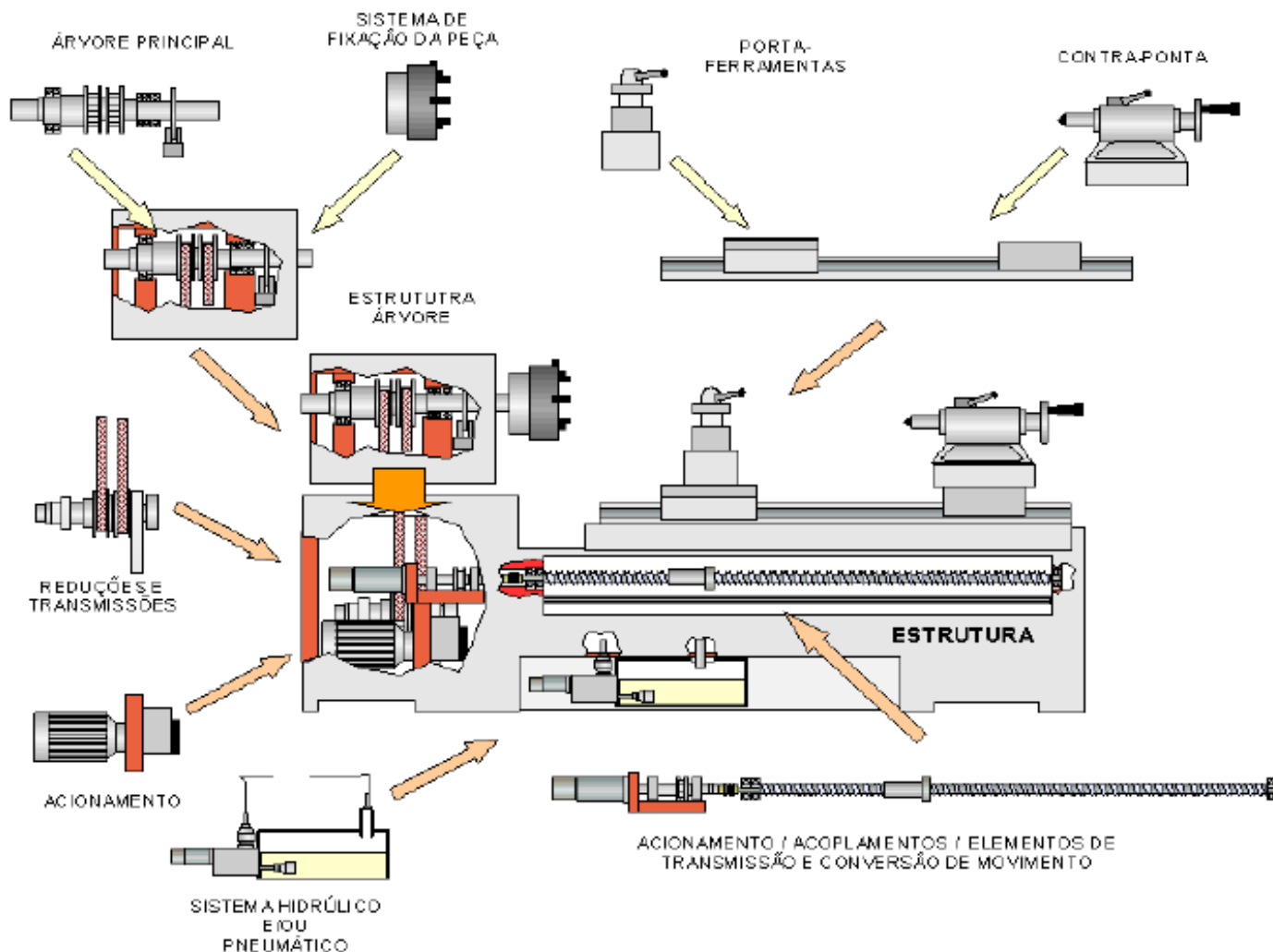
Problemas:

- Refrigeração
- saída do cavaco
- vibração (ferramenta delgada)



Processos de Fabricação - Torneamento

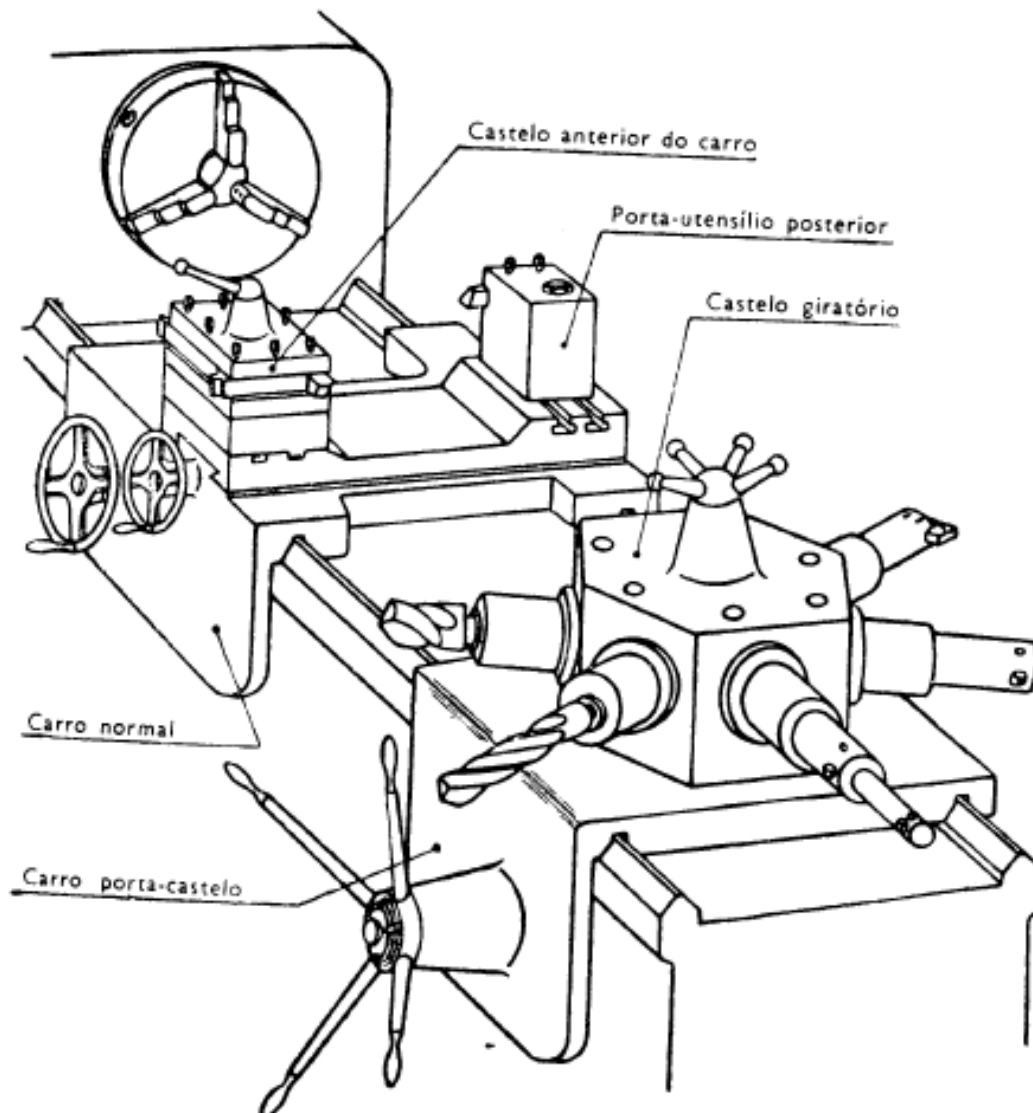
Partes de um torno universal:



- uso em oficinas e ferramentarias
- flexibilidade
- grande dependência do operador
- baixas velocidades e avanços
- fabricação pequenos lotes
- baixo grau de automação

Processos de Fabricação - Torneamento

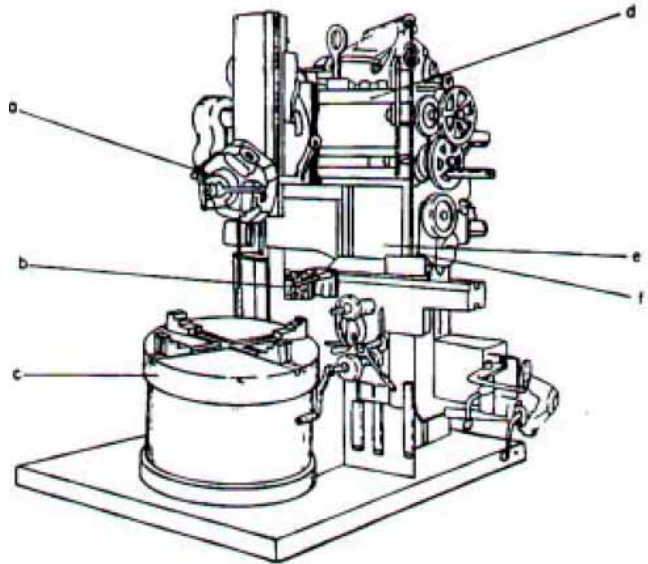
Partes de um torno revolver:



- grau de automação médio - principalmente mecânica
- fabricação pequenos e médios lotes
- uso em produção
- grande dependência do operador
- baixas velocidades e avanços

Processos de Fabricação - Torneamento

Partes de um torno vertical:



- alto grau de automação eletrônica (mecânica ou eletrônica)
- fabricação pequenos e médios lotes
- uso em produção
- baixas e médias velocidades e avanços
- peças de grande dimensões

Partes de um torno CNC:



- alto grau de automação eletrônica
- fabricação pequenos e médios lotes
- uso em produção
- baixa dependência do operador
- altas velocidades e avanços