Brake caliper
The MAPAL complete solution
Brake caliper

Brakes are parts that are produced in large numbers within the automobile industry. Simultaneously they are a vital safety component, on which high demands regarding surface finish and precision are imposed. The tooling concept must be reliable and cost efficient.

1. Task

The new possibilities available for tool production bring with them new possibilities for the machining of brake calipers. Therefore, in close liaison with the customer, the possibility of tool- and process optimisation is investigated. Hereby the entire spectrum of setting fixtures, CNC-Programmes and coolant is taken into consideration.

Results of the analysis:
- To many single tools, resulting in frequent tool changes
- Tool life too low / cost per part too high
- Realistic life of cutting edges not correctly utilised
- Problems regarding circularity, cylindrical form and surface finish
- Potential for optimisation

2. Engineering

After an assessment of the actual situation has been made, a new more cost-effective concept will be conceived through the optimisation plan. To achieve this, the entire machining process will be redesigned. Processes, tool concepts and CNC-Programmes will be optimised.

Important optimisation points:
- Conversion of time consuming processes to newer more efficient procedures
- Definition of a fitting tool concept
- Designing all individual tools with optimised geometry, inserts quantity and cutting material
- Establishing the correct clamping pressure through research tests to avoid work piece deformation from the clamping fixture
- Optimisation of CNC-Programmes in relation to the sequence of operations and travel path

3. MAPAL solution

The result of this comprehensive analysis and the subsequent re-planed machining process, is a significant increase in productivity, as well as improved process reliability.

Advantages and benefits:
- A 40% saving in time through interpolation turning as opposed to circular milling
- Additional reduction of non-productive time through the increased usage of MAPAL combination tools
- Optimised CNC-Programme with coordinated operation sequences and travel path
- Coolant adjustment in relation to the cast material to be machined
- Tool life observation in the CNC-control for 100% utilisation of cutting materials
- Assurance of quality and sustainability through personnel training

The tools for the perfect MAPAL solution:

- Disc milling cutter
- Gang milling cutter
- Boring tool
- Tangential roughing tool
- Interpolation turning

Disc clearance / Pad wall
Mounting bracket
Reference face
Boot
Grooving
The MAPAL EFFECT:

- Time saved: $-15\%$
- Cost reduction: $-20\%$

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HPR
Piston bore finishing

Tangential fine boring tool
Piston bore finishing

Actuating tool
Piston bore finishing / Turning grooves

Actuating tool with contact stop
Diamond turning / Grooving
TIMESAVEDTHROUGHINTERPOLATION

THE MAPAL EFFECT:

→ Shorter machining time
→ Process development and support by MAPAL specialists
→ Fewer tool changes through combination tools

Process analysis, tool development and tool layout

→ Cutting material optimisation with respect to substrates and coatings
→ Identification and optimisation of time consuming operations
→ Increase in quality through optimising work piece clamping

Optimised machining

→ Reduction of the machining time
→ Lower CPP-values
→ Process optimisation

40% time saved through interpolation turning

→ Reduction of non-productive time through combination tools
→ Adjustment of the coolant
→ Use of tangential milling cutters for increased tool life and feed

Task

Engineering

Tool solution

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Complete programme
Know how
+ Perfect service