Connecting Rods

This is a typical example of high production bore finishing of automotive connecting rods. Both crank and pin bores are finished simultaneously with four diamond plated tools each. The rods are held securely on a locating plate, which is positioned on an X-Y (axis) floating fixture base. This allows the radial alignment of the two bores (bend and twist), along with perpendicularity to be locating surface to improve. The life of the diamond tools that are used on the forged steel crank bores average 100,000 parts; while the life of the diamond tools used on the bronze pin bores often exceed 1,000,000. This process has proven successful using either honing oil or specific types of water based coolant, even on the soft bronze bushing in the pin bore. Engis offers various packages for finishing connecting rods with production rates from 30 parts per hour all the way up to 720 parts per hour.

**INDUSTRY:** Automotive

**MATERIAL:**
- Crank Bore - Forged Steel
- Pin Bore - Bronze Bushing

**CHALLENGE:**
- Inconsistent bore geometry
- High down-time
- High perishable tool cost

**ENGIS ADVANTAGE:**
- Improved Quality: Cpk: >2
- Improved bore roundness to better than Sum for the crank bore and 3um for pin bore
- Improved "Bend and Twist"
- Production Rate: 300 parts per hour
- Total perishable tooling cost for finishing both bores is roughly $0.03.
- Quick change-over between part types
- Pin and crank bores finished together in the same machine

<table>
<thead>
<tr>
<th>CRANK BORE - FORGED STEEL</th>
<th>PIN BORE - FORGED STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BORE QUALITY</strong></td>
<td><strong>REQUIRED</strong></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.010 mm</td>
</tr>
<tr>
<td>ROUNDNESS</td>
<td>0.008 mm</td>
</tr>
<tr>
<td>SURFACE FINISH</td>
<td>1 to 3μm Ra</td>
</tr>
</tbody>
</table>

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