

Supplementary information regarding checking and replacing big-end bearings on medium-speed engines

Cus 190 • 02/02

The following directions are, by all means, to be observed in connection with checking and replacing big-end bearings on the basis of the work cards 030.01 - 030.06.

Operational wear on the crank pin

Because of unfavourable operating conditions, wear may occur on the crank pin of crankshafts of medium-speed engines. One type of wear is the so-called ridge wear (please also refer to the publications of bearing manufacturers, technical literature, etc. (1), (2), (3)).

Depending on the sense of rotation, an unevenness, the so-called ridge, forms in the range between 15° and 60° after crank pin BDC. Reasons for this are, e.g., an increased contamination of the lubricating oil or an increased lubricating oil temperature. This ridge is harmless during normal engine operation. The actual material wear out in connection with this type of wear is within the range of a few 1/1000 mm.

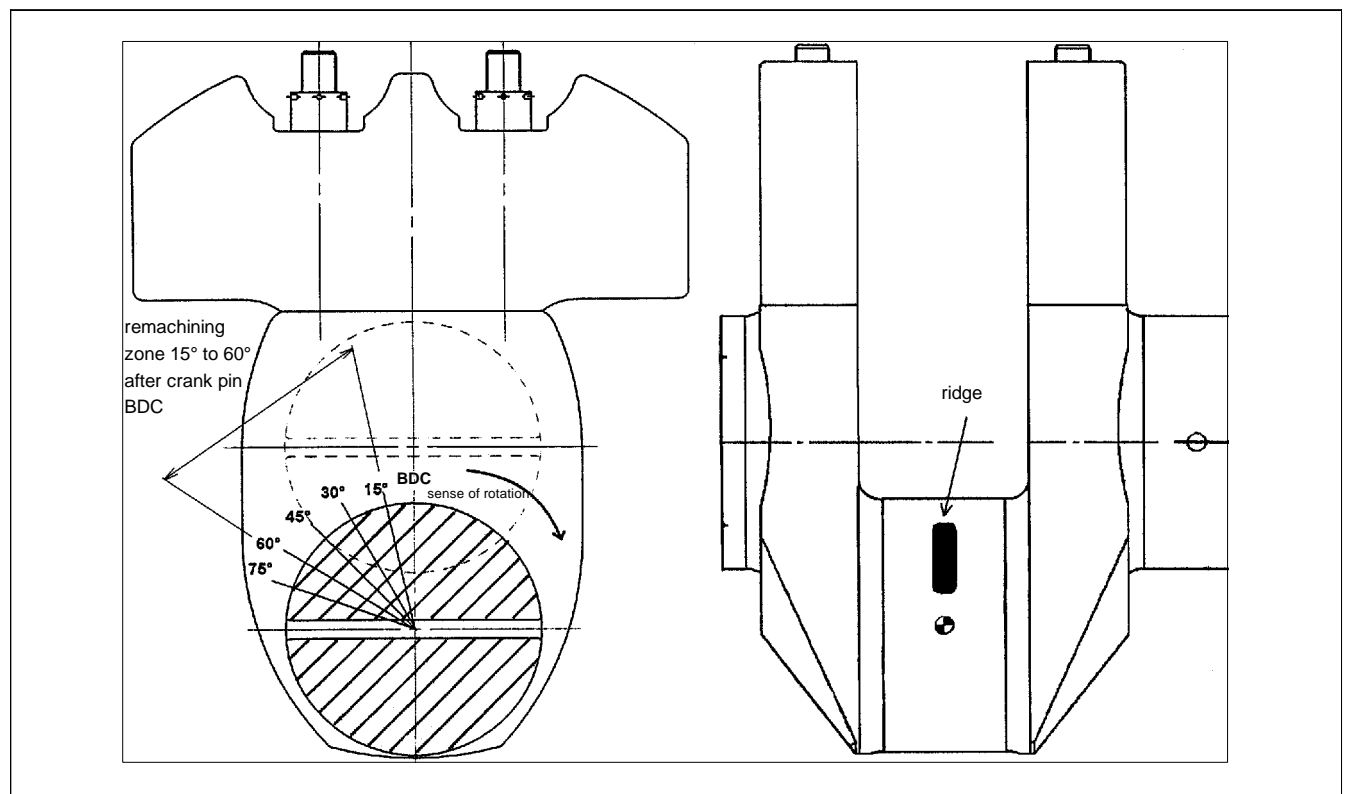


Figure 1. Zone of the crank pin, in which the described wear may occur

In special cases, however, such as, e.g., after installation of a new big-end bearing shell, this wear may lead to damage, as the existing unevenness on the crank pin may considerably hinder running-in of the bearing shells.

In addition to the instructions given in our work cards 030.01 - 030.06, we therefore urgently recommend to entrust our qualified, specialised personnel with the following procedure, which is to be carried out every time a big-end bearing is checked or replaced, using the corresponding tools.

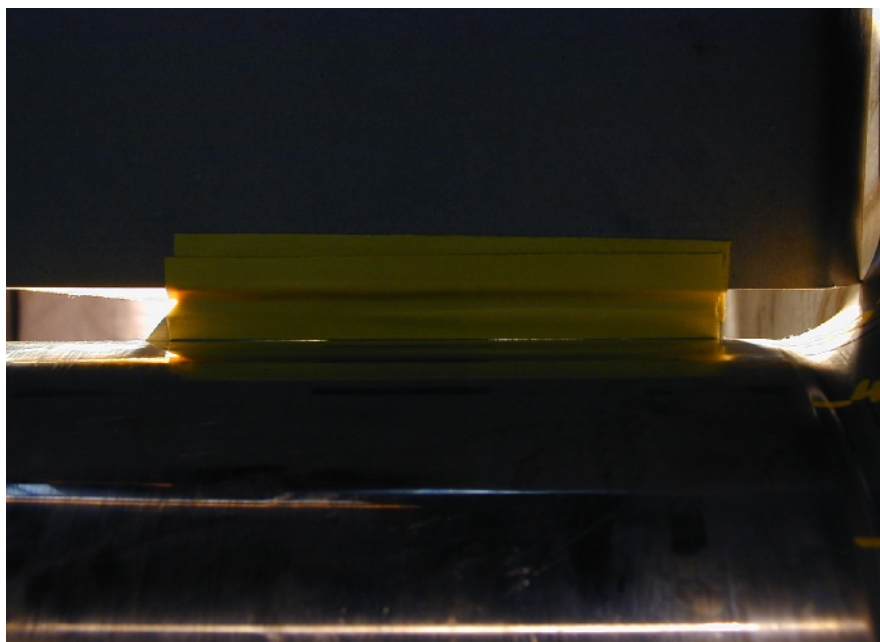


Figure 2. Photo not showing any ridge wear

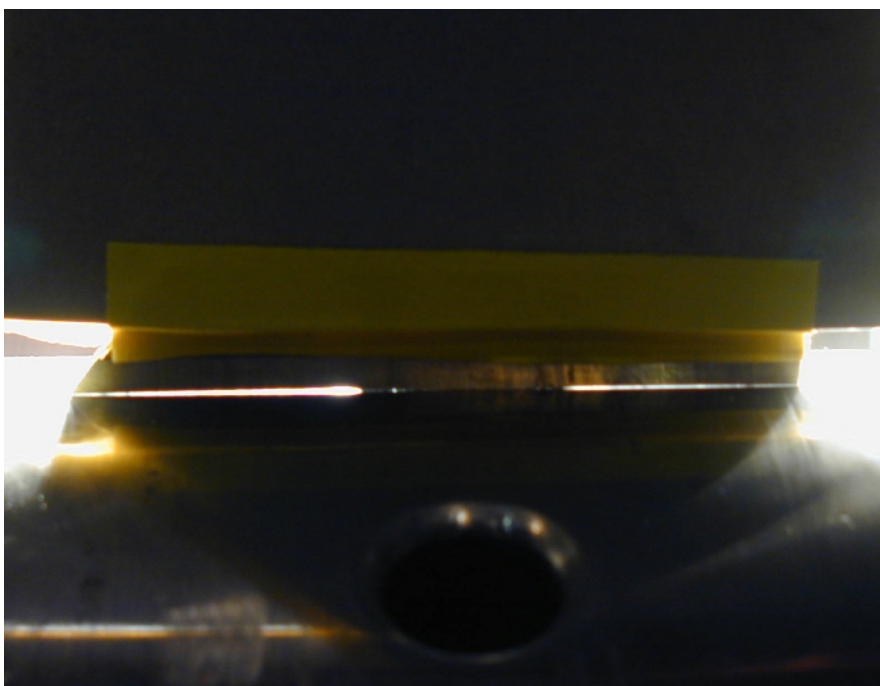


Figure 3. Photo with clearly visible ridge wear

Check to determine possible ridge wear

Using a straight edge with a length of approx. 150 mm and a strong source of light, examine the crank pin in the range between 15° and 60° after pin BDC for unevenness/ridge formation.

In order to improve the visibility of the ridge, a protection against light, e.g., by means of a piece of card board, should be provided on the straight edge.

Machining the ridge wear

Tools

For refinishing, MAN B&W Diesel AG developed a slipring that can be both borrowed or bought.

The slipring offers the possibility to restrict well-aimed refinishing work to the affected zone of the crank pin instead of reworking the whole pin circumference.

We recommend to entrust our qualified specialists with this refinishing work.

Alternatively, refinishing can be carried out by the operator's trained, qualified personnel.

We are, of course, prepared to train the customer's personnel in using the tool required for this work.

In principle, however, this tool is to be used for planned work on big-end bearings and is therefore to be ordered in time.

Remachining

1. With an uneven light gap prevailing, close all lubricating oil bores. Subsequently, mount the slipring in centred position on the big-end bearing running surface of the pin (the lubricating oil bore represents the centre of the running surface), in order to render reworking the ridge possible (the actual wear can be seen in the light gap).
2. Use emery cloth with a grain size of 400 and clamp it to the spring-loaded grinder clamp. Now, carry out approx. 10 double strokes in the zone between 15° and 60° after crank pin BDC.
3. If necessary, renew the grinding material and carry out another 10 double strokes. Afterwards, fix 30 µm polishing cloth.
4. With the polishing cloth fixed, carry out another 20 double strokes in the specified area and, if necessary, renew the grinding material.
5. After completion of the refinishing work, dismount the slipring and check the result by means of a straight edge and a strong source of light.

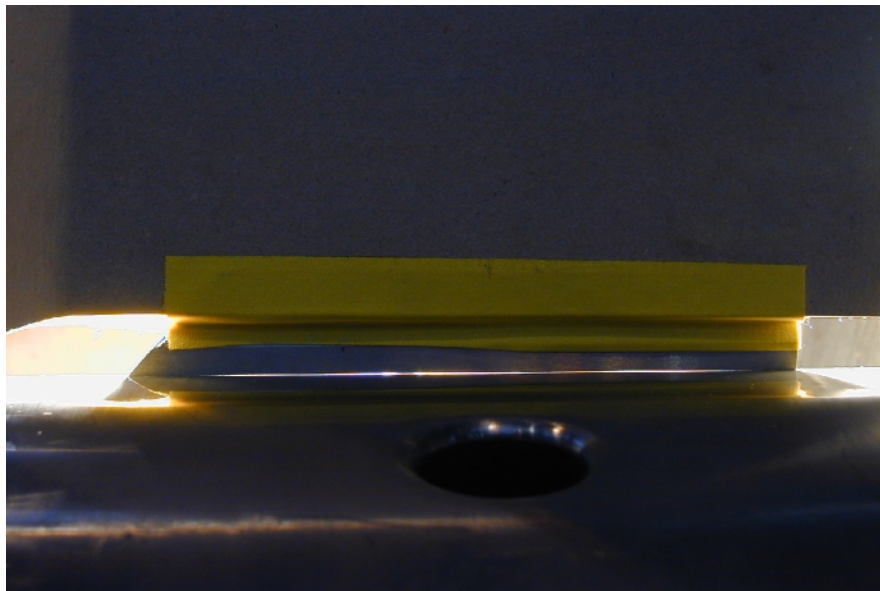


Figure 4. Successfully completed refinishing work on the crank pin

6. In case a continuous light gap does not yet prevail and/or unevenness can still be recognised, the grinding process has to be continued using 30 μm polishing cloth, until a satisfactory result has been obtained.
7. Subsequently, smoothen the complete pin circumference over the whole width using 15 μm polishing cloth.
8. Clean the pin and open the lubricating oil bores.

Should, during inspection, doubts arise as to whether or not refinishing work is required and to what extent, please contact our Technical Service in Augsburg or one of our Service Centres.

Literature:

- (1) Cimac Report 1995, Evaluation of Wear between Crankshaft and Bearing Materials in Diesel Engines
- (2) Miba Gleitlager AG, Engine Bearing Manual
- (3) Greutner/Zima 1994, Motorschäden (Engine Damage)

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