

Action code: **WHEN CONVENIENT**

Updated Crosshead Bearing Design

For K98 and K/L90 engines

SL2016-613/NIHE

March 2016

Concerns

Owners and operators of MAN B&W two-stroke marine diesel engines.

Type: K98, K90 and L90 ME/ME-C and MC/MC-C Mark 6 and 7.

Summary

Updated crosshead bearing design for K98 Mark 6 and 7, K90 Mark 6 and L90 Mark 6 engines.

Reference is made to: SL2012-552, CL52479-2012/LEO6, which is available on request, and the Operation Manual, chapter 708: Bearings.

Dear Sirs

The intention of this service letter is to inform about an updated crosshead bearing design for K98 Mark 6 and 7, K90 Mark 6 and L90 Mark 6 engines.

The design is updated in order to increase the safety margin against fatigue damage of the white metal lining of the bearings. The reason for the update is a number of incidents with fatigue cracks in the lining of crosshead bearings.

We refer to CL52479-2012/LEO6 for recommendations on how to detect and handle emerging fatigue issues in crosshead bearings.

We refer to SL2012-552 for general recommendations about inspections of the main, crank pin and crosshead bearings.

Yours faithfully



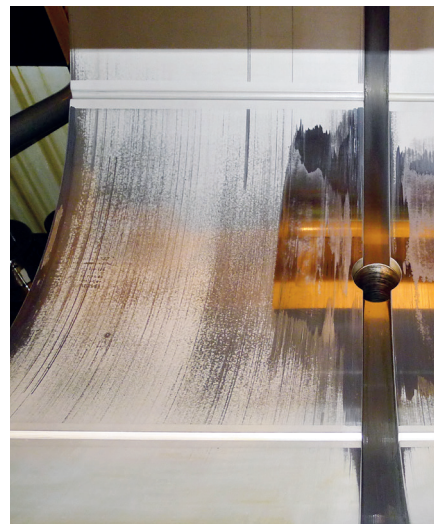
Per Rønnedal

Senior Manager, New Design



Stig B Jakobsen

Senior Manager, Operation



Head office (& postal address)

MAN Diesel & Turbo

Tegholmegade 41
2450 Copenhagen SV
Denmark
Phone: +45 33 85 11 00
Fax: +45 33 85 10 30
info-cph@mandieselturbo.com
www.mandieselturbo.com

PrimeServ

Tegholmegade 41
2450 Copenhagen SV
Denmark
Phone: +45 33 85 11 00
Fax: +45 33 85 10 49
PrimeServ-cph@mandieselturbo.com

Production

Tegholmegade 35
2450 Copenhagen SV
Denmark
Phone: +45 33 85 11 00
Fax: +45 33 85 10 17
manufacturing-dk@mandieselturbo.com

Forwarding & Receiving

Tegholmegade 35
2450 Copenhagen SV
Denmark
Phone: +45 33 85 11 00
Fax: +45 33 85 10 16
shipping-cph@mandieselturbo.com

MAN Diesel & Turbo

Branch of MAN Diesel & Turbo SE,
Germany
CVR No.: 31611792
Head office: Tegholmegade 41
2450 Copenhagen SV, Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Background and technical explanation

In MAN B&W K98 and K90 engines there have been a number of findings of minor fatigue induced defects of the crosshead bearing lining material. Most of these defects appear in engines equipped with a turbocharger cut out (TCCO) system for fuel saving during slow steaming operation. The defects are only seen in a percentage of the bearings. The majority of bearings in engines operating with a TCCO system will not have problems with fatigue cracks.

The crosshead bearing oil film thickness is reduced in engines with an active TCCO system. This is due to an altered balance between up- and downwards forces in the reciprocating system causing the crosshead bearing to always rest in the bottom of the lower shell. In an engine operating at higher speed with all turbochargers in operation, the forces of inertia move the pin to the upper shell once per revolution.

The origin of fatigue issues in the lining material is typically local geometrical deviations of the bearing and crosshead pin surfaces resulting in areas with decreased oil film thicknesses and increased oil film pressures. This challenges the fatigue strength of the white metal lining material.

In some cases out of specification components have contributed to the occurrence of fatigue. This includes lead overlay thicknesses smaller than specified as well as out of specification bore and pin geometries. In other cases no significant out of specification deviations have been identified.

We do not recommend inspection of crosshead bearings, unless justified by reasons described in SL2012-552. If a bearing is found with minor damages, it can be dressed up in accordance with CL52479-2012/LEO6.

Updated bearing design

An updated bearing design improving the bearing operating conditions at low load engine operation has been developed. The updated bearing design features two design changes:

- 1 A different shell thickness distribution in the lower shell
- 2 The axial oil grooves are changed from 40° spread to 70° spread

Both modifications are targeting an improved oil film thickness distribution when slow steaming with an active TCCO system.

The updated design has been tested for 12000 hours in units with previous fatigue cracks of the bearing lining material. Pictures from two units are shown in Figs. 1 and 2,

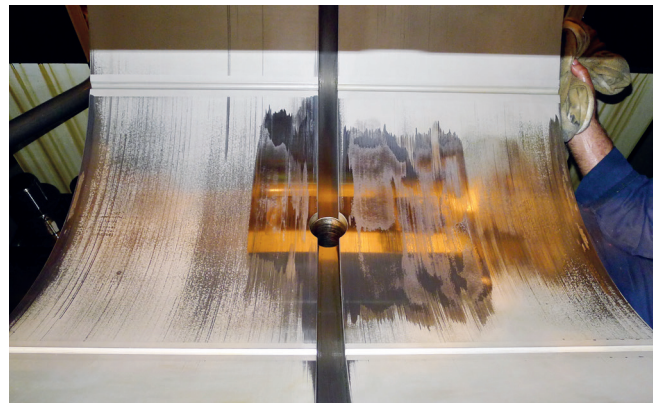


Figure 1: Bearing of modified design at 11620 hrs.



Figure 2: Bearing of modified design at 12012 hrs.

where it is seen that some redistribution of the lead overlay has occurred during the test period. This is a normal and acceptable sign of adaption between the surfaces. Otherwise, the bearings have nice appearances without any signs of fatigue cracks. As a consequence of the successful service tests, the updated design is the new standard for K98 and K/L90 engines. The bearing upper shell design has not been modified.

A sufficient number of running hours with the new design must be obtained to state that fatigue damages are totally avoided in the future.

Bearings with the new design are available from MAN Diesel & Turbo for K/L90 Mark 6 and K98 Mark 6 and 7 engines. The part numbers for ordering crosshead bearing lower shells are as listed in the table below. We recommend that only damaged bearings are exchanged to the new design. In most cases the original bearings will operate without problems for the standard expected lifetime.

Engine	Lower bearing shell part number
K/L90 MC6, MC-C6, ME-C6	5708773-3
K98 MC6, ME6, MC-C6, ME-C6	5679200-3
K98 MC7, ME7, MC-C7, ME-C7	5679204-0