

STEERING GEAR SERVICE NEWS

DATE : 2019/3/27

No.: E8-17-003A

SUBJECT : Regular maintenance and inspection for the hardened steel plate

The steering gear transmits the thrust of the ram to the tiller through the ram pin, roller bearing and hardened steel plate. The hardened steel plate is constantly subjected to forces from the ram and rudder, as shown in Item No. 1003 in Figure 1, and is also in constant sliding contact with the roller bearings. Therefore, the hardened steel plate is subject to wear. If the clearance between the hardened steel plate and the roller bearing becomes large due to wear, there is a high possibility of abnormal noise, vibration, and shaking of the rudder during steering. In some cases, damage to the hardened steel plate may lead to damage to the entire steering gear. For this reason, we recommend checking the clearance between the hardened steel plate and the roller bearing every three months and at dockings, and replacing the hardened steel plate if necessary.

1. About the clearance between the hardened steel plate and the roller bearing

The permissible value of clearance: 0.5 mm

2. Inspection procedure

First, turn the tiller to starboard or port side so that the roller bearing are in touch with the hardened steel plate on one side. Then measure the clearance between the opposite hardened steel plate and the roller bearing. Please refer to Figure. 2 for the measurement points, and carry out the measurement for all points.(① to ⑧)

3. If the clearance is exceeded permissible value

We recommend to replace the hardened steel plate with new ones. Please note that all hardened steel plates should be replaced at the same time. Because it may cause damage to the steering gear. Until a new hardened steel plates arrive, the old hardened steel plate can be used on opposite side in temporally. However, when used on opposite side, the worn part of the hardened steel plate dose not come into contact with the tiller, so the contact area is reduced and there is a risk of damage to the roller bearing when they come into contact with the hardened steel plate.

We recommend to replace them as soon as possible, since the use of the opposite side is only a emergency use.

KAWASAKI HEAVY INDUSTRIES, LTD.
PRECISION MACHINERY BUSINESS DEVISION
CUSTOMER SERVICE DEPARTMENT

4. Replacement method of the hardened steel plate

Each hardened steel plate is secured with two or three bolts. Refer to Figure.1 and replace the hardened steel plate according to the following procedure.

Please carry out the replacement work at the time of regular docking or mooring.

When working on a mooring, use a chain block or similar device to secure the tiller so that it does not move.

- (1) Keep a gap between the hardened steel plate and the roller bearing by steering 2 to 3 degrees.
- (2) Remove the bolts that secure the hardened steel plate.
- (3) Replace the hardened steel plate.
- (4) Steer 2 to 3 degrees to the opposite side of 1).
- (5) Replace the hardened steel plate on the other side.

5. About maintenance methods

Apply grease (equivalent to lithium type No.2) to the surface of the hardened steel plate and the roller bearing periodically. The purpose of this is to reduce the frictional resistance of roller bearing and to prevent rust.

ITEM NO. 符 号	NAME OF PART	名 称
1001	TILLER	舵 柄
1003	HARDENED STEEL PLATE	焼入鋼板
1004	SOCKET BOLT	六角穴付ボルト
1005	SOCKET BOLT	六角穴付ボルト
1010	KEY	キ ー
1101	RAM	ラ ム
1120	RAM PIN	ラムピン
1121	ROLLER BEARING	ローラベアリング
1122	SPACER RING	スペーサーリング
1123	STOP RING	ストップリング
1124	SET SCREW	止めネジ
1125	GUIDE BRACKET	案内金具
1126	SLIDE PLATE	当て板
1127	HEXAGON HEAD BOLT	六角ボルト
1129	SPRING WASHER	バネ座金
1130	OILLESS BEARING	オイルレスベアリング

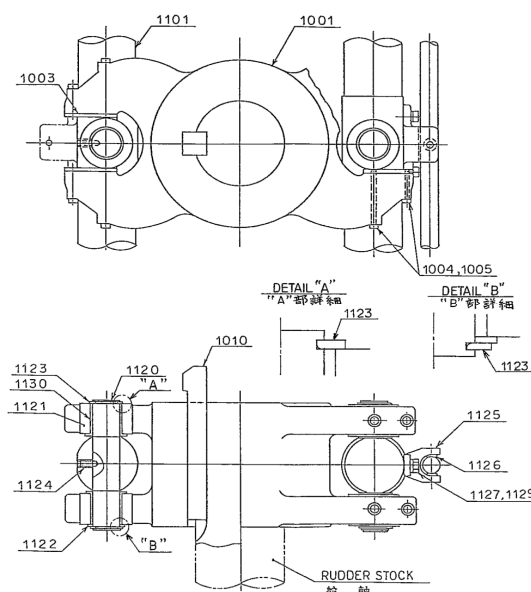


Figure. 1 Assembly of tiller and ram.

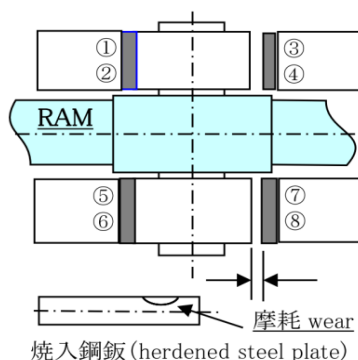


Figure. 2 The clearance between roller bearing and ram pin..