Maintenance Manual

KMK 4080

Crane Identification Number:

04.01.1995

(05.01.1994)

2 085 878 / 531 en

2 Safety instructions

When maintenance work is carried out the following must always be observed:
– all applicable **regulations for the prevention of accidents** and
– all applicable **laws and regulations for the protection of the environment**.

The following **general safety precautions** should always be taken by the maintenance personnel:

- Familiarize yourself with how the truck crane is operated. Read the operating instructions through carefully and ask the crane operator to show you how the crane is operated.
- Only carry out maintenance work on the truck crane if you are authorized to do so.
- Take note of all signs on the truck crane relating to safety aspects and pointing out dangers.
- Follow all safety instructions given in this Maintenance Manual.
- Ensure that you know under which conditions the superstructure is allowed to be turned and the telescope sections of the boom are allowed to be extended when the boom is in the horizontal position.
- Never start maintenance work before the truck crane has been parked on level ground with a sufficient load bearing capacity and measures have been taken to ensure that it cannot roll.
- Keep all grips, steps, railings and ladders free of dirt, grease, snow and ice.
- If the parts to be maintained cannot be reached from the ground use the grips, ladders, platforms, etc., provided for this purpose. If work has to be carried out at any height, attach yourself to the crane.
- Never carry out maintenance work while the crane is running. Before you start work take measures to ensure that the truck crane cannot be started up accidentally by others. Remove the keys and attach warning signs to the crane.
- If an exception has to be made and the truck crane has to be started up to carry out certain work extreme care must be taken near moving parts (turntable, outriggers, cardan shafts, etc., rotary connection, engines, etc.) otherwise **injuries may be incurred**.
- Before starting work return hydraulic parts to their starting positions (e.g. boom) or block them (e.g. outriggers).

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5.2 Maintenance schedules

The descriptions of the routine maintenance work to be carried out at the intervals stipulated in maintenance schedules D, W and M 1 to M 12 are contained in
- **Section 7** for the **carrier** and
- **Section 8** for the **superstructure.**

In the schedules the **numbers in brackets** refer to the sections in which the respective maintenance work is described.
As a quick reference the different titles in
- Section 7 "Description of maintenance work for the carrier" and
- Section 8 "Description of maintenance work for the superstructure"

include the letters D, W or M1 to M12 referring to the applicable maintenance schedule.

Note: A description of the daily (**D**) and weekly (**W**) inspections (preventive maintenance) is also partly given in the operating instructions of your crane.

Apart from the **maintenance work for the carrier** and the **maintenance work for the superstructure** the schedules indicate:

- The approximate **oil fills** (the exact amount of oil to be filled depends on the oil level checked through the oil inspection ports, with the oil dipsticks or on the oil level gauges)**or** the **number of lubricating points**.
- The **oil/grease specifications** as shown in the lubricant table in Section 6.

Note: This maintenance manual **only contains some** of the maintenance work on the vehicle and crane engines. In this respect please refer to the instructions given in the Mercedes-Benz operating manuals and engine service booklets supplied with this maintenance manual.
The Mercedes-Benz operating manuals contain the descriptions of the maintenance work and the service booklets specify the maintenance intervals.

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5.2.6 Maintenance schedule M 12: maintenance to be carried out every twelve months / after 1000 operating hours / 20000 – 25000 km

Maintenance work - carrier: every 12 months / after 20000 – 25000 km	M 12 Oil / Lubricant Amount (l) /Quantity	M 12 Oil / Lubricant Designation
Carrier engine		
– Please see Mercedes-Benz operating manual and Mercedes-Benz service booklet.		
Automatic gearbox		
– Changing the oil and oil filter (7.2.2).	22.0	F1
Axle lines		
– Changing the oil of the (Kessler) axle central drives (7.4.2).		
1st axle line	13.0	E3
2nd axle line	16.5	E3
3rd axle line	16.5	E3
4th axle line	13.0	E3
– Changing the oil of the (ZF) axle central drives (7.4.2).		
1st axle line	8.0	E4
2nd axle line	9.5	E4
3rd axle line	9.2	E4
4th axle line	8.0	E4
– Changing the oil of the (Kessler) wheel drives (7.4.4).	2.3 each	E3
– Changing the oil of the (ZF) wheel drives (7.4.4).	2.2 each	E4
Compressed-air system		
– Changing the granule cartridge for the compressed-air drier (8.5.2).		
Hydraulic system		
– Have the pressure accumulator for the suspension system changed by a Krupp Service Centre or an authorized specialist workshop.[1)]		
– Changing the vent filter of the hydraulic oil reservoir.[1)] (7.10.4)		
– Changing the oil.[1)] (7.10.6) (depending on result of oil sample analysis, please see Section 7.10.5).	100.0	G2

[1)] after 1000 operating hours

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The used part S_2 of the theoretical service life is thus, in the 2nd inspection interval:

$$S_i = \frac{0.5}{0.125} \times 480 \text{ h} = 1920 \text{ h}$$

Remaining theoretical service life:

D_2 = 3040 h - 1920 h = 1120 h.

The above values are entered in the table (see example table p. 5 - 24).

3rd inspection (3rd year)

The crane was used for erection work and occasionally for unloading work in harbour operation: load spectrum: L 2, i.e. $Km_3 = 0.25$.

3000 h are read off from the superstructure operating hour counter, i.e. during this period: 3000 h - 2000 h = 1000 h (2000 h were used in the first two years of operation).

The winch was in operation for approx. 30% of this, i.e. T_3 = 300 h.

The used part S_3 of the theoretical service life is thus, in the 3rd inspection interval:

$$S_i = \frac{0.25}{0.125} \times 300 \text{ h} = 600 \text{ h}$$

Remaining theoretical service life:

D_3 = 1120 h - 600 h = 520 h.

The following entry is made in the table (see example table p. 5 - 24).

The remaining theoretical service life should be documented with the aid of the table which should be made for every winch.

This table should be filed in the crane logbook. For truck cranes for which no crane logbook or the like is required in order to comply with country-specific regulations, this table is located in the appendix to the maintenance instructions.

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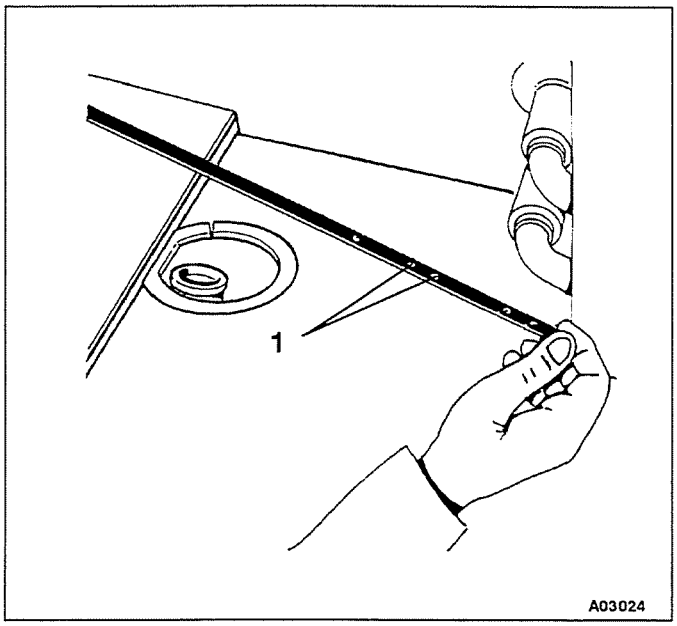


- First check the oil level when the gearbox is cold and correct the level if necessary.
- Let the engine run at idling speed until the oil reaches a temperature of 80 to 90 °C (shown on the temperature gauge in the front instrument panel).
- Check the oil level.
  It must be in the "hot range" (**1**).
- If necessary top up or drain oil by removing the hose from the dipstick pipe of the automatic gearbox.

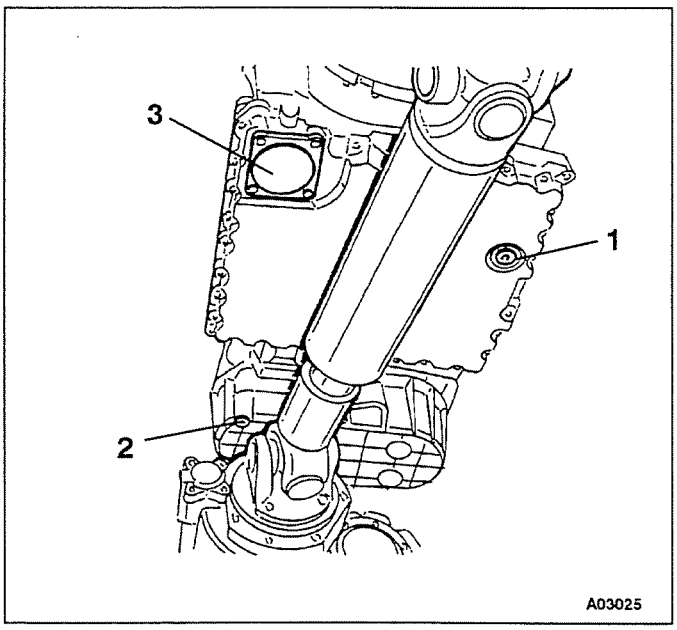
7.2.2 Changing the gearbox oil and oil filter

M 12

Oil is drained through the oil drain openings of the automatic gearbox (**1**) and oil cooler (**2**). The correct oil indicated in the lubricant table, Section 6, must be used.

Note: Before starting this work raise the truck crane with the outriggers or park it over an inspection pit.
Drain the oil when it is at operating temperature.

Danger: Do not drain the oil uncontrolled, otherwise **you may scald yourself**.



- Place suitable containers under each oil drain opening (for approx. 25 litres of oil).
- Unscrew the plug of the dipstick pipe.
- Unscrew the oil drain plugs (**1**) and (**2**) and drain the oil into the containers.
- Replace the seals of the oil drain plugs and screw the plugs back in.
- Unscrew the oil filter lid (**3**) and replace the oil filter.

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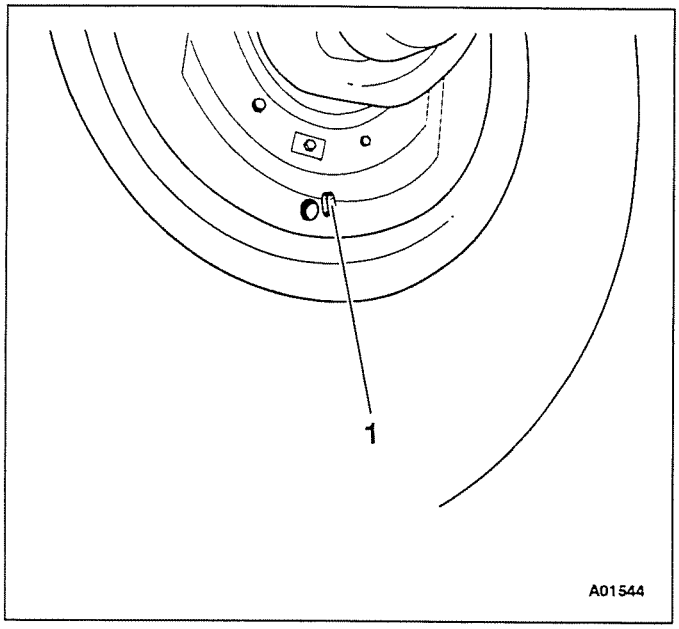
7.6 Checking the vehicle's brakes

7.6.1 Checking the linings on the brakes

M 3

There is an opening on the inside of each wheel (closed with a rubber plug) through which the thickness of the brake linings can be checked.



- Remove the rubber plug (**1**) and check the brake linings, if necessary using a torch.

If the thickness of the brake linings has worn down to the wear mark (stepped edge or groove) **or** the linings have worn down to a thickness of 3 mm:

- Have the brake linings replaced by the Service Centre or an authorized specialist workshop.

Caution: Always replace all brake linings on an axle line.

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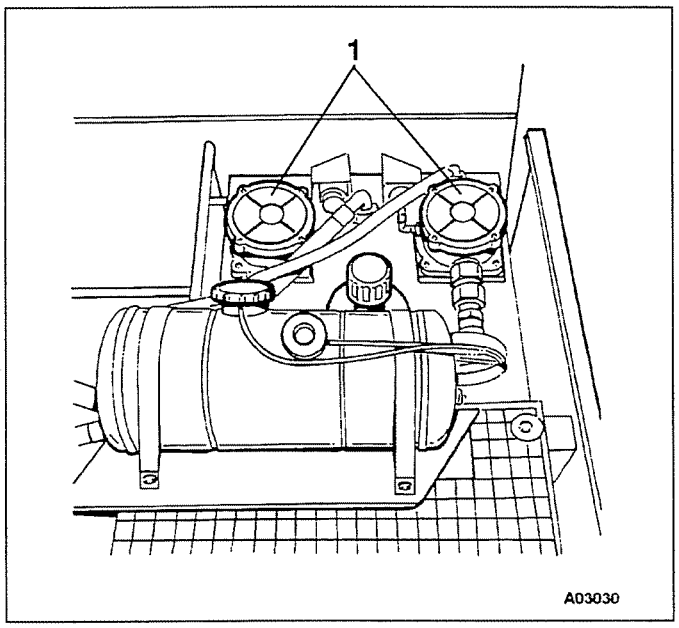
7.10.3 Changing the hydraulic oil filter, cleaning the magnetic bar

M 3



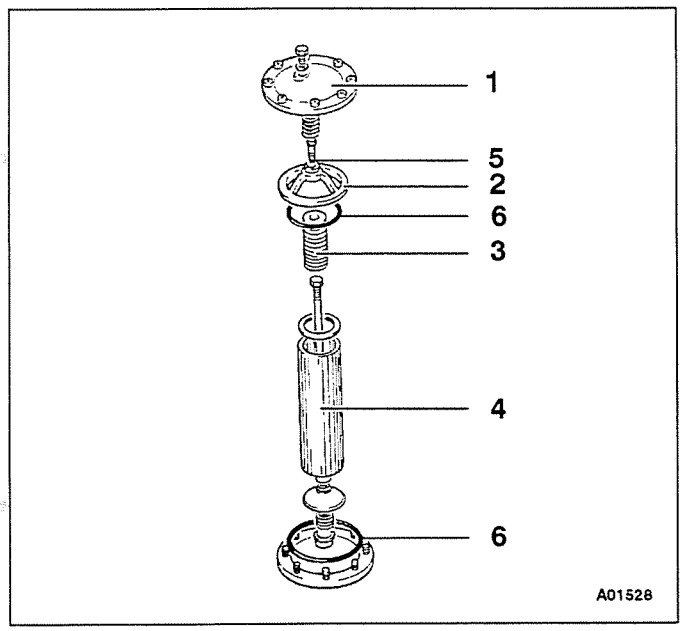
The hydraulic oil tank has two hydraulic oil filters (return filters). The hydraulic oil filters must be changed:

- if the warning light "hydraulic oil return filter" lights up on the front instrument panel in the driver's cab,
- each time the hydraulic oil is changed.

- Turn off the engine and release the pressure from the hydraulic system.
- Remove the screws of the lids (**1**) and take the hydraulic oil filters out of the hydraulic oil tank.

Caution:

If there are large amounts of metal chips adhering to the magnetic bars the hydraulic system must be checked for damage.
Have the hydraulic system checked for damage by the Service Centre or by your own repair personnel.



- Remove screw (**5**) and take off the top part of the filter (**2**).
- Unscrew the magnetic bars (**3**) and clean them.
- Change the hydraulic oil filter elements (**4**).
- Replace the O-rings (**6**) in the bottom and top parts of the filter.
- Reassemble the hydraulic oil filters and put them back into the hydraulic oil tank.

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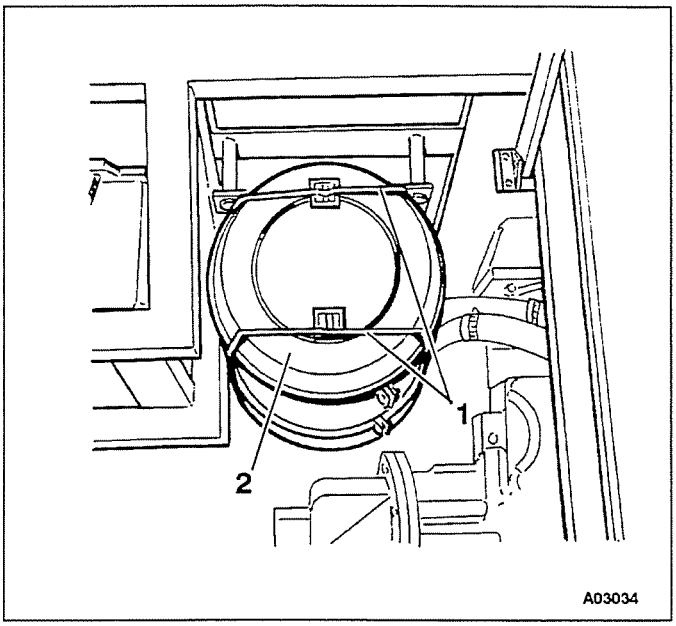
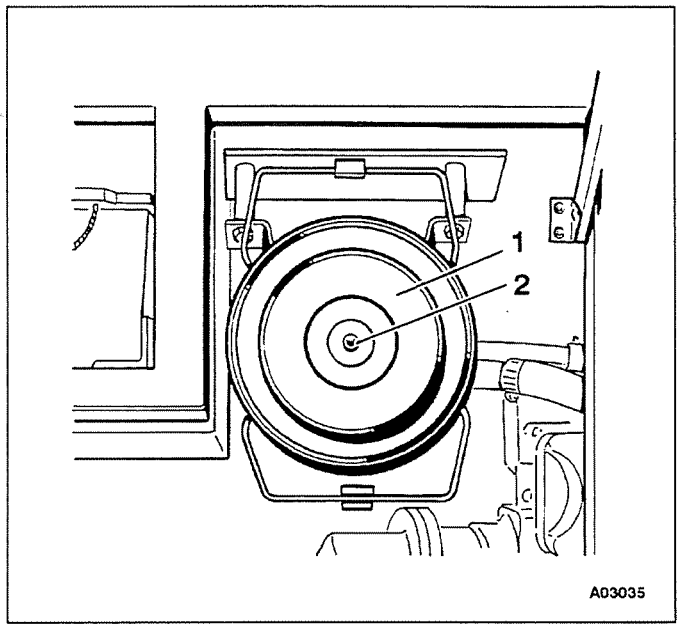
8.1.3 Checking the dry air filter

D



The dry air filter is behind the crane engine on the right-hand side of the superstructure and is accessible through the rear side plate.
The indicator lamp "Engine air filter" is on the front instrument panel in the crane operator's cab. If the indicator lamp lights up the air filter must be changed.

- Remove the catches (**1**) from the lid of the filter and remove the lid (**2**).



- Unscrew the screw (**2**) and change the filter element (**1**).
- Check the seal in the filter lid and replace if necessary.
- Put the lid back on the filter.

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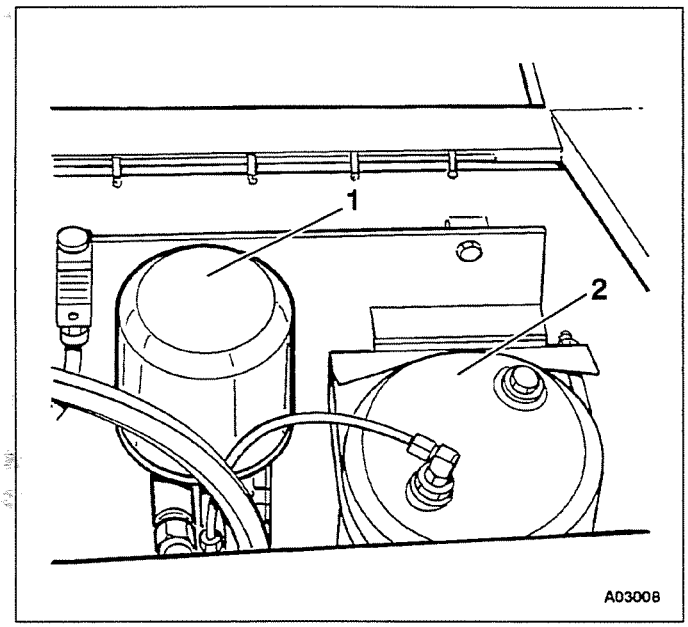
8.5 Compressed-air system of the superstructure

8.5.1 Draining moisture from the compressed-air system

W

Moisture is drained from the compressed-air system through the drain valves under the compressed-air reservoir and under the conditioning tank (**2**). If moisture is found during inspection the air drier must be checked.
The compressed-air reservoirs are on the left-hand and right-hand sides of the air drier on the turntable.



- Operate the drain valve.
- Replace the drain valve if compressed-air continues to escape after the valve has been operated several times.
- If large amounts of moisture are found during inspection, have the air drier checked by your repair staff and changed if necessary.

8.5.2 Changing the granule cartridge in the air drier

M 12

The granule cartridge of the air drier is between the two compressed-air reservoirs on the turntable. Please refer to the illustration above.

- Release the pressure from the compressed-air system.
- Release the pressure from the conditioning tank (**2**) through its drain valve.
- Unscrew the granule cartridge (**1**) with a filter strap (the cartridge is attached to the cover hood).
- Replace the granule cartridge and apply a little grease to the ring seal.

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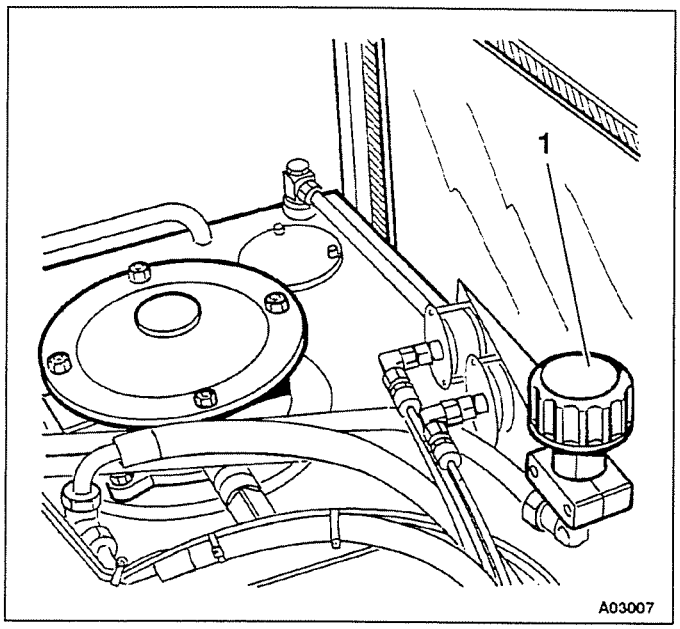
8.6.6 Changing the vent filter

M 12

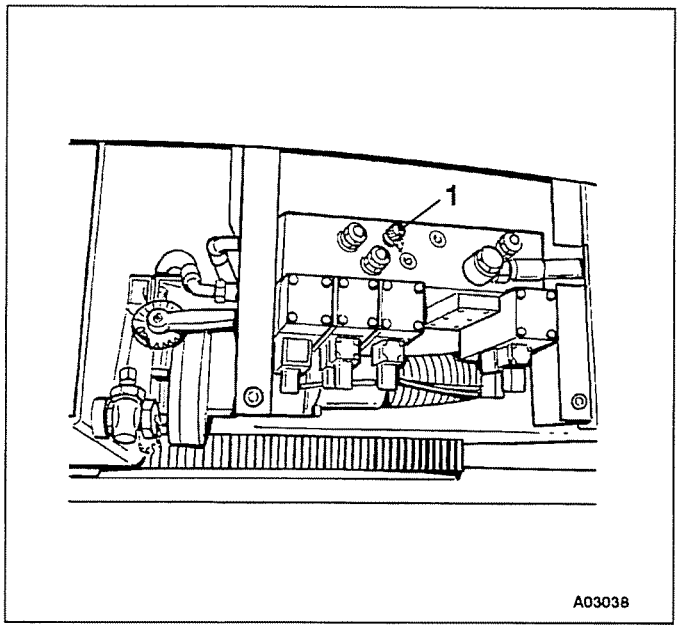


The two vent filters are on the hydraulic oil tank.

- Change the vent filters (**1**).

8.6.7 Taking oil samples

M 12



- Take the oil samples from the drain cocks of the hydraulic oil tank (please see Section 8.6.8) and from one of the metering nozzles (**1**) on the superstructure (at the rear of the turntable).
- Proceed as described in Section 7.10.5.

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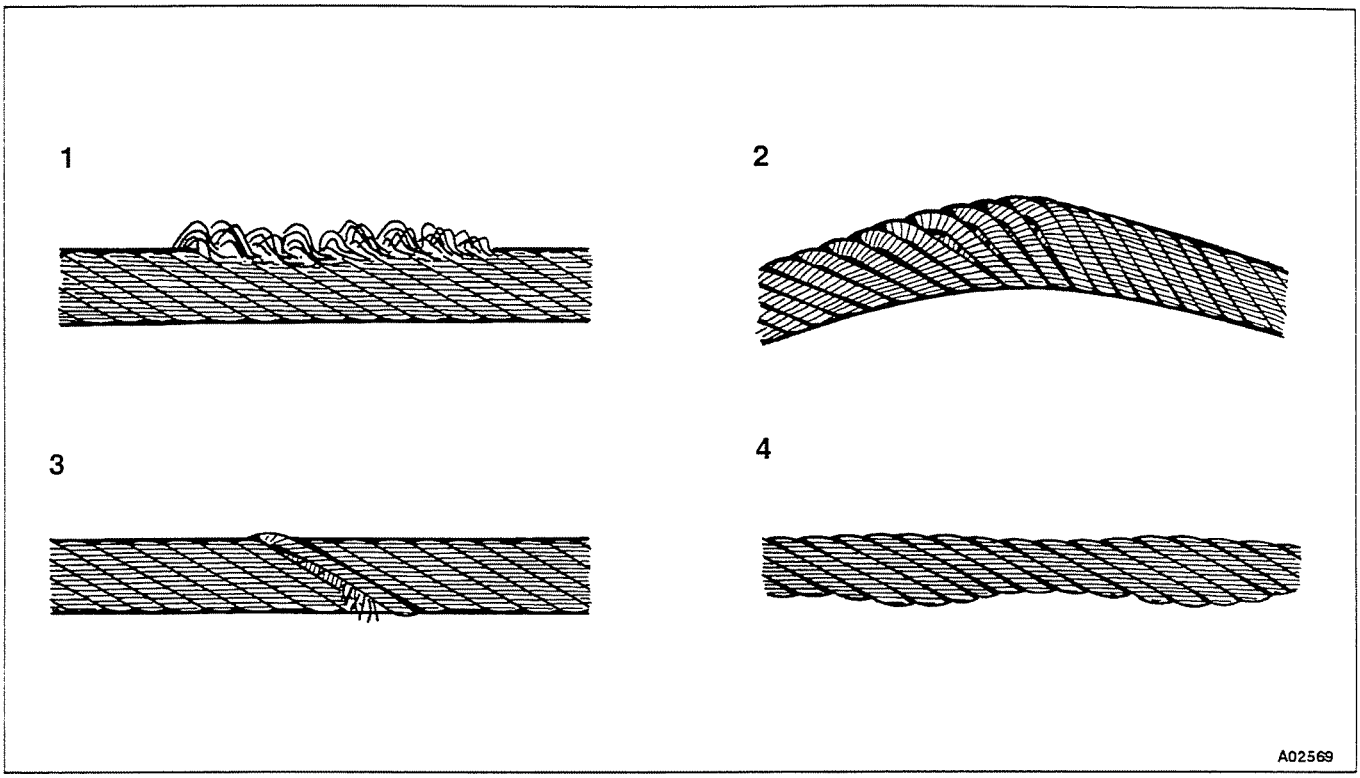

Damage	Description	Cause	When to be discarded
Loop formation (1)	Wires in the outer layer protrude from the rope in a hairpin fashion on the side of the rope away from the sheave.	General wear due to aging of the rope or result of rope damage.	Discard hoist rope **immediately** if the rope formation is altered considerably by the loops.
Slackening of wires or strands (2)	Outer wires or strands have slackened and the inner strands are bearing the whole of the load.	Corrosion or abrasive wear.	Discard the hoist rope **immediately**.
		Other causes	The number of wire breaks determines whether the rope has to be discarded.
Node formation (3)	Nodes (rope bulges) occurring at repeated intervals; the core often protrudes from the rope. At the thinner sections of the rope the strands support one another and there are a greater number of wire breaks.	General wear due to aging of the rope or result of rope damage.	Determine number of wire breaks, discard hoist rope immediately if there is pronounced node formation.
Contraction (4)	Reduction in the diameter of the rope over short sections.	General wear due to aging of the rope.	Discard hoist rope **immediately** if there are marked contractions.

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10 Tightening torques

10.1 Tightening torques for fixing bolts

Standard metric thread Fine-pitch metric thread			Guideline		
Thread size (mm)	Spanner width (mm)		Tightening torques (max. permitted initial bolt tension) for oiled bolts (Nm) Bolt quality		
	Hexagon bolt	Cheese head bolt	8.8	10.9	12.9
M 8 M 8 x 1	13	6	23 24	32 34	36 41
M 10 M 10 x 1.25	17	8	44 47	62 66	75 79
M 12 M 12 x 1.5	19	10	78 81	110 113	130 135
M 14 M 14 x 1.5	22	12	120 135	170 189	210 225
M 16 M 16 x 1.5	24	14	165 203	190 284	320 342
M 18 M 18 x 1.5	27	14	260 293	365 414	435 495
M 20 M 20 x 1.5	30	17	370 414	520 576	620 693
M 22 M 22 x 1.5	32	17	500 549	700 774	840 945
M 24 M 24 x 1.5	36	19	640 702	900 990	1080 1170
M 30	46	22	1300	1800	2160
M 33	50	24		2700	
M 36	55	27		3300	

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