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Workshop Inspection Report-Mill gearbox 立磨减速机返厂维修服务报告

Customer: Yunnan Kungang Jiahua Cement Building
Materials Co., LTD

Contact: Tan Xiangbo 153 6611 1132

Project: Complete System Maintenance

Date: 24. May. 2023

Engineer: Hu shuanglong

Order No.: WS23054S30503

Gearbox: Type: WPU200;; S/N: 16005037/10

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1. Site Conditions

On May 22, 2023 a faulty gearbox (Model - WPU200; Serial Number 16005037/10) was received. The external appearance and preliminary inspection of the gearbox are shown in Fig. 1.



Fig. 1

Without a coupling
There are four lifting lugs
welded to the output
flange.
Prior to the output
flange, there has been a
replacement of welded
maze components.
Internal fastening bolts
are not tightened.
The three-layer gearbox
casing has undergone
welding and replacement
of local components.

2. Gearbox Structure

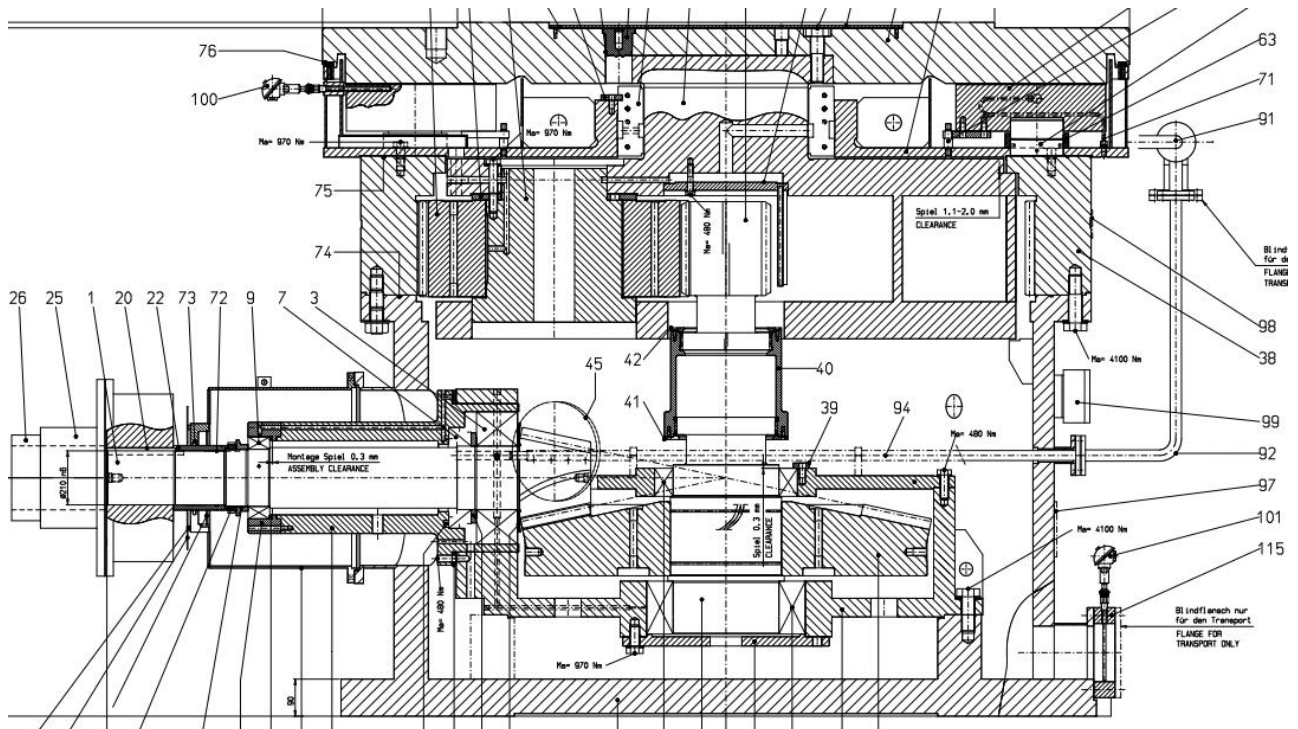


Fig. 2 : Gearbox Structure Diagram and Components

3. Gearbox Information

Model	WPU200	Serial Number	16005037/10
Power (KW)	3770	Lubricant Type	
Input Speed (RPM)	995	Viscosity	
Speed Ratio	39.8	Oil Change Time	
Manufacturing Date		Cooling Water Inlet Temperature (°C)	
Motor Manufacturer		Cooling Water Inlet Temperature (°C)	
Motor Production Date		Oil Station Outlet Pressure (Bar)	
Rated Power of Motor (KW)		Vibration (mm/s)	
Real-time Power of Motor (KW)		Cooling Water Inlet Temperature (°C)	
Operating Environment Temperature (°C)		Cooling Water Outlet Temperature (°C)	

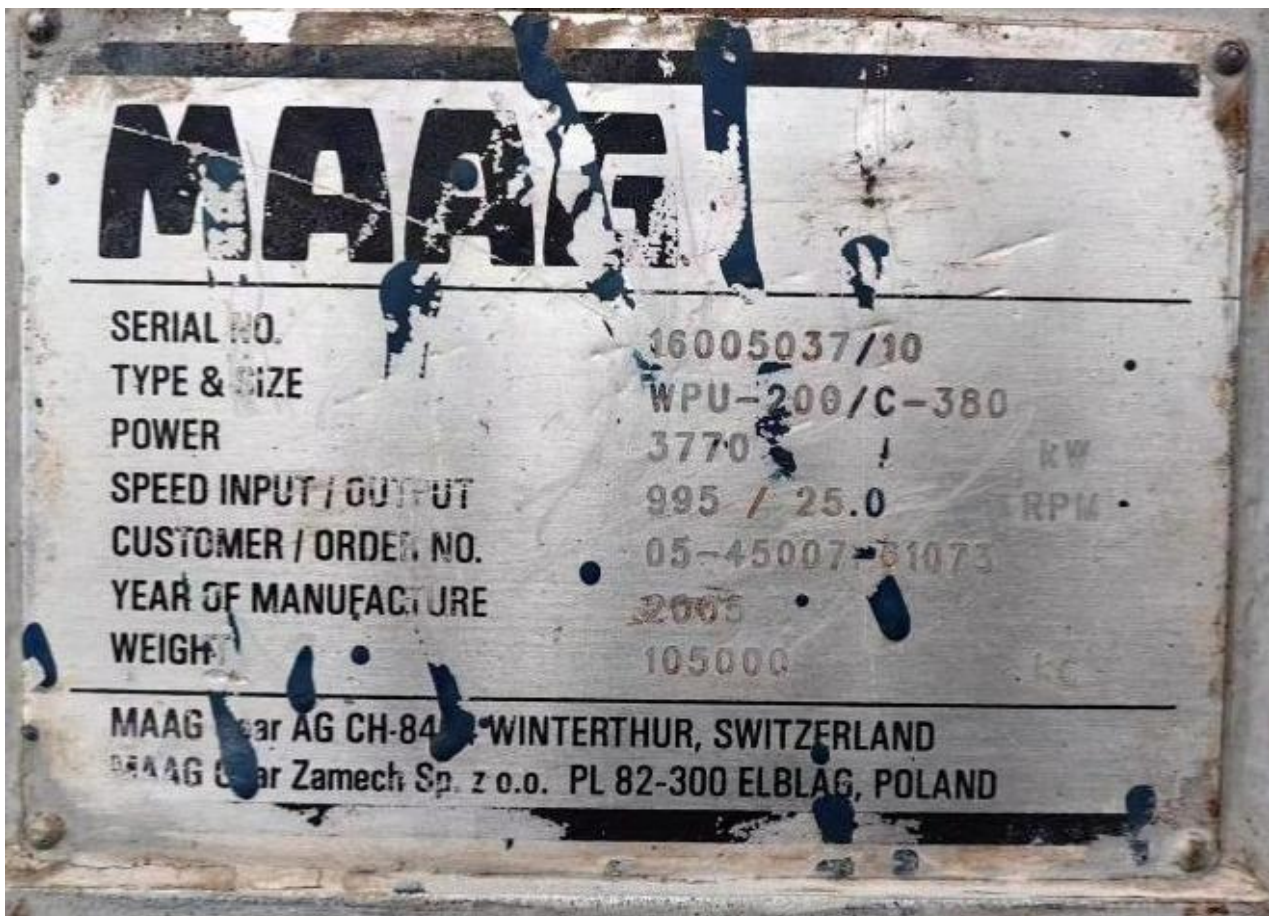


Fig. 3 Nameplate

4. Visual Inspection

Gears/Shafts:

- Input Shaft: Multiple areas with surface damage.
- Sun Gear (Gear 31): Surface peeling observed on the gear teeth.
- Input Shaft Gear (Gear 30): Surface indentation.
- Sun Gear (Gear 43): Peeling and pitting.
- Planetary Gears (Gears 54): Non-destructive testing (PT) revealed cracks in gears 2 and 3.

Bearings:

- Output Flange (Bearing 80): Surface scratches.
- Thrust Bearing (Bearing 64): Surface scratches.
- Planetary Gear Inner Hole: Radial scratches.
- Planetary Gear (Gear 54) - Wheel 1: Wear on the end face, showing signs of previous use.
- Pin Shaft (Pin 55): Radial scratches on the surface.

Accessories and Others:

- Output Flange: Damage to the labyrinth groove.
- Gearbox Casing (Part 60): Multiple fractures in the rib plates, damage to the labyrinth groove.
- Deformation of pins.

4.1. Gears/Shafts

1. Input Shaft



Fault Type:

Multiple areas with surface damage on the gear teeth.

There are signs of grinding.

Continued use after manual grinding.

	
<p>31 Bevel Gear</p> 	<p>Fault Type: One area of peeling on the gear teeth.</p> <p>There are signs of grinding on the gear teeth.</p> <p>Continued use after manual grinding of the peeling point.</p>
<p>30 Vertical Shaft</p> 	<p>Fault Type:</p> <ul style="list-style-type: none"> • Pitting • Deep impressions on the gear teeth <p>Replacement required</p> <ul style="list-style-type: none"> • Replacement of the entire set (three-piece set)

40 Gear Sleeve



Fault Type:

Normal wear.
 Continued use is possible.

If the sun gear or input shaft is replaced, this part should be replaced as a set.

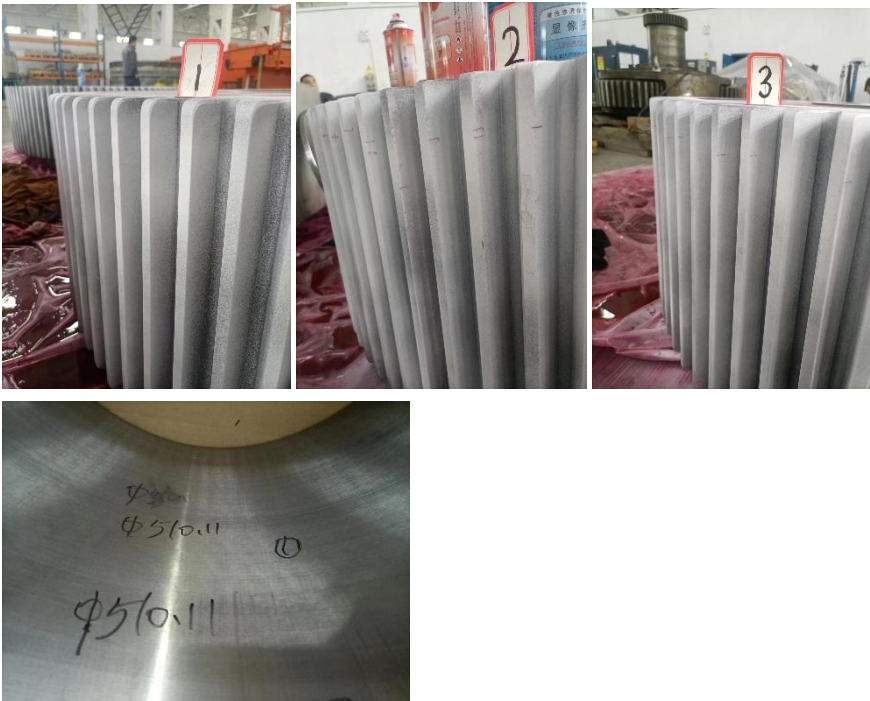
43. Sun Gear



Fault Type:

- Pitting
- Peeling
- Replacement required
- Replacement of the entire set (three-piece set)

54 planetary gear



Fault Types:

1. Fine cracks detected in approximately 2/3 of the teeth on planetary gears 2 and 3 during non-destructive testing (PT).
2. Wear on the inner hole of planetary gear 1, but within acceptable tolerances.
3. Continued use of planetary gear 1.
4. Wear on the



end face of gear 1, which had previously experienced surface loss during disassembly.

5. Peeling observed on planetary gear 2.

4.2. Bearings

<p>9- Input shaft 1</p> 	<p>Fault Type:</p> <p>Foreign object ingress.</p> <p>Radial scratches observed.</p> <p>Replacement required</p>
<p>7-Input shaft 2</p> 	<p>Fault Type:</p> <ol style="list-style-type: none"> 1. Foreign object ingress. 2. Radial scratches observed. 3. The cage has impact marks and comes into contact with the roller surface, causing scratches on the roller surface. 4. Replacement is required.

<p>3- Input shaft 3</p> 	<p>Fault Type:</p> <ol style="list-style-type: none">1. Foreign object ingress.2. Radial scratches observed.3. Replacement is required.
<p>32- bevel gear bearing 1</p> 	<p>Fault Type:</p> <ol style="list-style-type: none">1. Foreign object ingress.2. Radial scratches observed.3. Replacement is required.
<p>33- bevel gear bearing 2</p> 	<p>Fault Type:</p> <ol style="list-style-type: none">1. Foreign object ingress.2. Radial scratches observed.3. Replacement is required.

55- Pin



Fault Type:

1. Extensive wear on the surface of the shaft (2#3#Pin) made of Babbitt alloy, with significant abrasion in the oil groove. However, the diameter dimensions are within the tolerance range. Poor establishment of the oil film, affecting lubrication.
2. Continued use after repair.
3. Scratched oil line.
4. Manual grinding to remove scratches.

Question:

- Whether it's possible to install by rotating 90° in direction.

56-Radial bearing



Fault Type:

1. Radial bearing has scratches.
2. Continued use after manual grinding.

64- Thrust Bearing



Fault Type:

1. Radial wear on the thrust bearing, with 3-4 areas experiencing maximum wear width of approximately 8mm, and a noticeable depth.
2. Continued use after repair.
3. The surface has been lathe-turned, cast with Babbitt alloy, coarse-turned on a lathe, and ground to



meet
dimensional
requirements.

4.3. Accessories

60-Casing



Fault Type:


1. Multiple fractures in the rib plates of the gearbox casing, reinforced with welded steel plates at 4 locations, and new cracks have appeared.
2. Deformation and damage to the labyrinth groove of the gearbox casing, with overheating adhesion occurring at the labyrinth joint with the output flange.
3. Replacement is required.

80-Output flange






Fault Type:

1. Scratches on the mirror surface of the output flange.
2. Damage to the labyrinth groove of the output flange.

	<p>Repairs Needed:</p> <p>Grinding of the mirror surface. Replacement of the labyrinth groove. Lathe-turning for the mirror surface, grinding to meet the drawing requirements for smoothness. Production of the replacement labyrinth part.</p>
<p>22- Oil seal sleeve</p> 	<p>Fault Type:</p> <p>Wear at the sealing position of the oil seal sleeve.</p> <p>Replacement is required.</p>

<p>73- Root</p> 	<p>Fault Type:</p> <p>Failure of the felt seal.</p> <p>Replacement is required.</p>
<p>72- O-ring.</p> 	<p>Fault Type:</p> <p>Aging of the O-ring.</p> <p>Replacement is required.</p>
<p>74- O-ring.</p> 	<p>Fault Type:</p> <p>Aging of the O-ring.</p> <p>Replacement is required.</p>
<p>Pin</p> 	<p>Fault Type:</p> <p>Deformation or bending of the pin.</p> <p>Replacement is required.</p>

<p>12-Input shaft adjustment shim</p> 	<p>Fault Type:</p> <p>Adjustment shim used during input shaft adjustment.</p> <p>Replacement is required</p>
<p>39-Bevel gear adjustment shim</p> 	<p>Fault Type: Adjustment shim used during bevel gear adjustment.</p> <p>Replacement is required.</p>
<p>35-Bevel gear cover plate</p> 	<p>Fault Type: Custom machining of a cover plate is required to meet the adjustment requirements for the axial clearance of the adjusting bevel gear bearing.</p>

5. Summary

After prolonged use of the reducer, foreign objects entering may cause scratches on the thrust tile surface, scratches on the sun gear pin, scratches on the radial tile, and scratches on various levels of bearings. It is speculated that excessive vibration has caused the third-layer casing to crack. The water content in the lubricating oil exceeds the standard as observed, and there is surface rust on the parts.

6. Maintenance Materials List

No.	Item	Location Number	Qty	Repair Form	Remark
1	Input shaft	1	1	Continue use.	
2	Umbrella gear	31	1	Continue use.	
3	Vertical shaft	30	1	Replace.	
4	Sun gear	43	1	Replace.	
5	Tooth sleeve		1	Replace.	
6	Planetary gear	54	2	Replace.	
7	Planetary gear	54	1	Continue use.	During disassembly, end face wear has been rectified and assembled.
8	Bearing	9	1	Replace.	
9	Bearing	7	1	Replace.	
10	Bearing	3	1	Replace.	
11	Bearing	32	1	Replace.	
12	Bearing	33	1	Replace.	
13	Pin	55	3	Repair.	
14	Radial tile	56	1	Continue use.	
15	Thrust tile	64	12	Repair.	Technical solution proposed
16	Casing	60	1	Replace.	
17	Output flange	80	1	Repair.	Technical solution proposed
18	Oil seal sleeve	22	1	Replace.	Technical drawings provided.
19	Disc root	73	1 米	Replace.	
20	O-ring	72	0.5 米	Replace.	
21	O-ring	74	22 米	Replace.	
22	Pin		3	Replace.	Technical drawings provided.
23	Input shaft	12	4	Replace.	Technical drawings

	adjustment pad				provided.
24	Umbrella gear adjustment pad	39	4	Repair.	Technical drawings provided.
25	Umbrella gear cover plate	35	1	Replace.	Process according to adjusted data.
26	Output flange		2	修复	Technical solution proposed

7. Recommendations:

1. Regularly inspect the contact and tooth flank clearance of the umbrella teeth.
2. Periodically check the lubricating oil and replace it on time according to the reducer's operation manual.
3. Implement vibration condition monitoring every six months.
4. Avoid operating under overload and frequent impact loads."

————— END —————

Engineer: Hu shuanglong

Date: 24. May. 2023