

TECHNICAL REPORT OF 28.09.2006

Grinding machine 3A487: precision restored without teardown or repair

OJSC "Moskovskiy Podshipnik" · commission: Deputy Technical Director A. V. Pchelintsev, Head of the Engineering and Design Department S. A. Volchkov, representatives of LLC "XADO"

Russia · measurements 28.06.2006, after 110 h of machine operation following treatment · report approved 28.09.2006

PRODUCT

XADO revitalizant
compounds

treatment of the machine oil
system without disassembling
the units

TEST OBJECT

Grinding machine 3A487
N58

serial no. 55316/83, inventory
no. 112010011 · plain bearings of
the wheelhead and the
workhead

DOCUMENT TYPE

Technical report
of OJSC "Moskovskiy
Podshipnik"

approved by the Deputy
Technical Director of the plant

EQUIPMENT

Grinding machine 3A487
N58, serial no. 55316/83,
in service since 1974

CONDITION AT THE START OF THE TESTS

Finishing operations impossible: severe
surface waviness (chatter), unstable
dimensions, excessive ovality of parts
(0.03 mm). Repair and adjustment of the
machine failed to remove it

WHAT WAS MEASURED

Vibration at 8 control points of
the wheelhead and workhead
bearings; ovality of the ground
ring; drive current and voltage

The machine oil system was treated, without disassembling the units; repeat measurements were taken after 110 h of machine operation.

Key result

↓ **26-78 %**

vibration displacement in the plain bearings, 2.27-42.30 → 1.68-9.37 μm

Wheelhead — plain bearing vibration

MEASUREMENT POINT	VIBRATION DISPLACEMENT, μm	VIBRATION VELOCITY, mm/s	VIBRATION ACCELERATION, m/s^2
Pt. 1 — front bearing, vertical	9.50 → 5.12	0.437 → 0.316	0.487 → 0.305
Pt. 2 — front bearing, horizontal	42.30 → 9.37	1.210 → 0.437	0.697 → 0.420
Pt. 3 — rear bearing, vertical	7.14 → 3.47	0.396 → 0.333	0.643 → 0.464
Pt. 4 — rear bearing, horizontal	38.20 → 6.72	1.230 → 0.424	0.932 → 0.516

The report names points Pt. 2 and Pt. 4 as the most critical for machining accuracy: there vibration velocity fell by 64-66% and vibration displacement by 78-82%.

Workhead — plain bearing vibration

MEASUREMENT POINT	VIBRATION DISPLACEMENT, μm	VIBRATION VELOCITY, mm/s	VIBRATION ACCELERATION, m/s^2
Pt. 5 — front bearing, vertical	9.48 → 3.08	0.408 → 0.218	0.211 → 0.203
Pt. 6 — front bearing, horizontal	4.13 → 3.57	0.261 → 0.260	0.513 → 0.221
Pt. 7 — rear bearing, vertical	2.27 → 1.68	0.234 → 0.211	0.381 → 0.298
Pt. 8 — rear bearing, horizontal	4.19 → 3.88	0.233 → 0.233	0.537 → 0.232

SENDIG 911 vibration meter, 8 control points; vibration displacement decreased at all eight. The repeat measurements were taken with the same grinding wheel as the initial ones.

Conclusions of the plant commission

The commission of OJSC "Moskovskiy Podshipnik" recorded in the report:

1. The vibration level at all control points decreased substantially, and at points Pt. 2 and Pt. 4, the most critical ones for machining accuracy, vibration velocity fell by **64-66%** and vibration displacement by **78-82%**.
2. Waviness of the ground surface disappeared completely.
4. The machine became able to perform finishing operations without rejects.
5. Thus, XADO revitalizant compounds provided a perfect fit of the mating parts in the plain bearings of the wheelhead and the workhead, with optimal clearances formed, whereby the required accuracy of the machine was restored. Before the treatment the machine, built in 1974, had been withdrawn from finishing operations, and repair had failed to return it to service.



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The results apply to grinding machine 3A487 N58 with plain bearings in the spindle units and to the production conditions of OJSC "Moskovskiy Podshipnik"; on other equipment and under other operating modes the figures may differ. The original technical report is published in full and available for download.