

RAILCAR REPAIR PLANT COMMISSION ACT, 2002

16D25 lathes: vibration, heat and current cut without teardown

Almaty Railcar Repair Plant · commission: AVZ chief mechanic A. M. Mukashev (chairman), AVZ mechanic A. B. Bakenov, "W. F. G. Corporation" mechanic I. V. Anikiyenko · approved by plant director S. T. Yerezhepov

Almaty, Kazakhstan · treatment 17.06.2002 · control measurements 22 and 26.07.2002 · act approved 29.07.2002

PRODUCT

XADO revitalizants
treatment of friction pairs
without disassembling the units
· contract No. 14 of 20.05.2002

TEST SUBJECTS

16D25 screw-cutting lathes
three units: No. 0524 · No. 3563
· unnumbered, in service since
1989

DOCUMENT TYPE

Plant commission act
with signatures and seal

MACHINE	IN SERVICE SINCE	RUN TIME AFTER TREATMENT	CONTROL MEASUREMENT
16D25 No. 0524	1989	396 h	26.07.2002
16D25 No. 3563	1989	396 h	22.07.2002
16D25 unnumbered	1989	372 h	26.07.2002

All three lathes were treated on 17.06.2002 without disassembling the units: the "before" and "after" measurements were taken on one and the same assembly.

Key results

↓ **3.0-3.7 %**

current draw at 380 V, 3.3-5.0 →
3.2-4.85 A

↓ **50-86 %**

vibration velocity on the carriage
apron, 1.6-5.7 → 0.8-1.8 mm/s

↓ **6.5-11 %**

hydraulic oil temperature, 42-46 →
38-43 °C

Electric drive — current draw

MACHINE	BEFORE TREATMENT	AFTER TREATMENT	CHANGE
16D25 No. 0524	3.3 A	3.2 A	-0.1 A
16D25 No. 3563	4.0 A	3.85 A	-0.15 A
16D25 unnumbered	5.0 A	4.85 A	-0.15 A

Current was measured at a mains voltage of 380 V; the reduction was recorded on all three lathes after 372-396 h of operation.

Carriage apron — vibration velocity at control points, mm/s

POINT AND COMPONENT	16D25 No. 0524	16D25 UNNUMBERED
Point 1 — vertical	5.7 → 0.8	2.3 → 0.8
Point 2 — horizontal	4.1 → 0.8	1.6 → 0.8
Point 3 — axial	1.7 → 1.6	2.8 → 1.4
Point 4 — vertical	4.2 → 1.6	2.9 → 1.3
Point 5 — horizontal	3.0 → 1.5	3.0 → 1.4
Point 6 — axial	4.6 → 1.8	4.1 → 0.8

Six control points on the apron along the vertical, horizontal and axial components; the reduction was recorded on all three lathes.

Hydraulic system and machine noise

MACHINE	HYDRAULIC OIL TEMPERATURE	NOISE LEVEL
16D25 No. 0524	46 → 43 °C	quieter by 2 dB
16D25 No. 3563	42 → 38 °C	quieter by 2-4 dB
16D25 unnumbered	45 → 40 °C	quieter by 1-3 dB

Noise was measured at three control points on each lathe, the change in level is given; oil temperature was taken at operating mode.

Findings of the plant commission

The commission of the Almaty Railcar Repair Plant recorded that the reduction in vibration, noise level and power consumption "allowed the machine to run 'more evenly', chatter was reduced, the carriage moves more easily, which indicates a decrease in the resistance forces in the friction pairs, i.e. the deposition of a metal-ceramic coating on their surfaces". The conclusion of the act: "the use of this technology in the friction pairs of the machine-tool fleet makes sense, primarily on equipment with wear of less than **70 %**, which will give the most tangible effect and will keep the machine-tool fleet in stable condition for one year (the warranty period). Moreover, it does indeed appear possible to repair and restore worn friction pairs without disassembling the unit". The commission recommended repeating the treatment every **1000 operating hours**.



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The results apply to 16D25 screw-cutting lathes of the Almaty Railcar Repair Plant, in service since 1989 and treated without disassembling the units; on other equipment and under different operating conditions the figures may differ. The original act with signatures and seal is published in full and available for download. The treatment was carried out by "W. F. G. Corporation" under contract with the plant; the act was approved by the plant director.