REPORT ON TREATMENT RESULTS · 425 HOURS OF OPERATION

Booster press gearbox: tooth thickness increased, vibration and current fell

UKROLIIA LLC, booster press No. 2 · commission: chief engineer S. B. Kosvintsev, chief power engineer V. N. Likhach, XADO LLC representatives I. A. Nikolaev and I. N. Sharaikin

Dykanka, Poltava region, Ukraine · treatment and measurements 27.07–07.11.2007 · report approved 07.11.2007

PRODUCT

XADO revitalizants

full gearbox treatment cycle under XADO technology

TEST OBJECT

Two-stage gear reducer

booster press No. 2 · stage I and II gear drives, shafts I–III with bearing supports, electric drive

DOCUMENT TYPE

Company report with signatures and stamp

OBJECT	CONDITION BEFORE TREATMENT	WHAT WAS MEASURED
Stage I and II gear drives	Stage II wheel wear over 100%, incorrect meshing of the pair	Tooth thickness over the constant chord, ShZN-18 gear tooth caliper
Gearbox housing, 15 control points	Vibration velocity 6.45-14.2 mm/s, vibration displacement up to 314 µm	Vibration acceleration, vibration velocity, vibration displacement
Drive electric motor	Drive pulley with severe radial and face runout	Current, voltage and power consumption

Measurements before treatment and after 425 hours of operation under the same comparison mode: no load at 1000 rpm of the input shaft.

Key results

↑ 0.2-0.5 mm

tooth thickness of stage I and II gear drives, 4.0-6.9 → 4.3-7.2 mm

↓ 10 %

electric motor power consumption at no load

↓ 57-68 %

gearbox housing vibration velocity, 6.45-14.2 → 2.14-5.44 mm/s

Tooth thickness over the constant chord — before treatment and after 425 hours

GEAR PAIR	BEFORE TREATMENT	AFTER 425 h	GAIN
Stage II pinion, 3 teeth	6.6-6.7 mm	7.0-7.1 mm	+0.3-0.5 mm
Stage II wheel, 5 teeth	6.7-7.3 mm	7.1-7.3 mm	up to +0.4 mm
Stage I pinion, 3 teeth	4.0 mm	4.3-4.35 mm	+0.3-0.35 mm
Stage I wheel, 5 teeth	4.0-4.2 mm	4.3-4.4 mm	+0.2-0.3 mm

Measurement over the constant chord, ShZN-18: stage II m = 5.5 mm, stage I m = 4.0 mm. The metal-ceramic layer builds up along the contact patch — where the load is carried.

Drive power consumption at no load

PARAMETER	BEFORE TREATMENT	AFTER 425 h	CHANGE
Power consumption, phase A	8.0 kW	7.15 kW	−10.6%
Power consumption, phase B	7.8 kW	7.07 kW	−9.4%
Power consumption, phase C	8.0 kW	7.22 kW	−9.8%
Supply voltage	365 V	366 V	mode comparable

Measurements at 1000 rpm of the input shaft. According to the conclusion of the report, the current drawn at no load decreased by 14%.

Gearbox housing vibration, 15 control points

QUANTITY	BEFORE TREATMENT	AFTER 425 h	TYPICAL REDUCTION
Vibration acceleration, m/s²	12.5-85.6	1.88-5.28	77-87%
Vibration velocity, mm/s	6.45-14.2	2.14-5.44	57-68%
Vibration displacement, µm	147.2-314.0	25.7-167.3	5-75%

SENDIG 911 vibrometer, 15 points on the housing; for vibration velocity a reduction was recorded at every point. For the drive pulley with severe runout the source of vibration is external.

Findings of the commission

The commission of UKROLIIA LLC and XADO LLC recorded: before the treatment began, wear of the second-stage gear wheel of the reducer exceeded 100%. After completion of the full treatment cycle under XADO technology, a metal-ceramic layer is clearly visible on the tooth contact patches of the pinions and gear wheels on the working side, while fine scratches and scoring are visible but cannot be felt by hand: "the tooth thickness of the first- and second-stage gear drives increased by **0.2-0.5 mm**, the tooth contact patch area increased by **30-45%**". The current drawn in no-load mode decreased by **14%**, the power consumed by the electric motor — by **10%** on average, the vibration level at the control points of the housing — by **2.4×** on average. Conclusion of the commission: "The considerable overall improvement of the operating parameters of the reducer, despite the critical wear of individual parts, indicates the high efficiency of the use of XADO revitalizant compounds".

XADO

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The results refer to the two-stage gear reducer of the booster press at UKROLIIA LLC after 425 hours of operation following treatment; on other equipment and under different operating conditions the figures may differ. The original report with signatures and stamp is published in full and available for download.