

COLLECTION OF REPORTS ON XADO TECHNOLOGY · FOUR TRIALS, BULGARIA, 2002–2004

Gear drives and compressor: treated teeth gained thickness, control ones kept wearing

"ZhP Traktsia" locomotive depot, Plovdiv · BERL, Stara Zagora · BERL, Dimitrovgrad · "FINTEHMASH" AD · treatment performed by distributor "MAY" OOD, manager A. Iliev
Bulgaria · trials 2002–2004 · collection compiled 11 February 2004

PRODUCT

Treatment by XADO technology
performed on units in service,
without disassembly or removal
from operation

TEST OBJECT

Gear drives, reduction
gear, compressor
depot, two BERL plants,
"FINTEHMASH" AD

DOCUMENT TYPE

Combined collection of
reports
from four enterprises

ENTERPRISE	OBJECT	OBSERVATION PERIOD	WHAT WAS MEASURED
"ZhP Traktsia" locomotive depot, Plovdiv	Gear pair: large wheel — test, small wheel — control	22.06.2002 → 10.10.2002	Tooth deviation from nominal, five marked teeth on each wheel
BERL, Stara Zagora	Large gear wheel, test and control	not stated in the report	Tooth thickness at seven points, at heights of 30 and 60 mm
BERL, Dimitrovgrad	Traction motor reduction gear of locomotive 06-083.0, wheel sets No. 0891 and No. 0801	07.05.2003 → 11.02.2004, mileage 45 132 km	Thickness of marked teeth of the test and control reduction gears
"FINTEHMASH" AD	KV-25 compressor, central control area	13.05.2003 → 07.07.2003	Receiver filling time up to 6 atm

Four different enterprises under one cover: this is a collection of independent reports, not a series of trials on one machine.

Key results

↑ **0.1-0.3 mm**

tooth thickness gain of the traction motor reduction gear over 45 132 km of mileage

↓ **48 %**

receiver filling time up to 6 atm, 2 min 28 s → 1 min 17 s

“ZhP Traktsia” locomotive depot, Plovdiv: tooth deviation from nominal

TOOTH	TEST WHEEL, 22.06	TEST, 10.10	CONTROL, 22.06	CONTROL, 10.10
I	-0.62	-0.28	-0.68	-1.0
II	-0.61	-0.28	-0.7	-1.0
III	-0.61	-0.27	-0.69	-1.0
IV	-0.62	-0.26	-0.7	-1.0
V	-1.22	-0.64	-0.7	-1.0

The value is the deviation from nominal: the closer to zero, the more metal on the tooth. The unit of measurement is not stated in the report table; the figures are given as they are.

BERL, Stara Zagora: tooth thickness of the large gear wheel, seven points at two heights

MEASUREMENT POINT	TEST, BEFORE	TEST, AFTER	CONTROL, BEFORE	CONTROL, AFTER
Height 30 mm, point 1	16.60	16.70	16.20	14.20
Height 30 mm, point 2	16.25	16.10	16.20	14.20
Height 30 mm, point 3	16.25	16.18	16.20	14.50
Height 30 mm, point 4	16.32	16.45	16.20	14.40
Height 30 mm, point 5	16.38	16.52	16.10	14.50

MEASUREMENT POINT	TEST, BEFORE	TEST, AFTER	CONTROL, BEFORE	CONTROL, AFTER
Height 30 mm, point 6	16.30	16.28	16.12	15.00
Height 30 mm, point 7	16.55	16.68	16.10	14.50
Height 60 mm, point 1	16.45	16.30	16.20	14.60
Height 60 mm, point 2	16.40	16.40	16.24	14.20
Height 60 mm, point 3	16.45	16.44	16.20	14.30
Height 60 mm, point 4	16.18	16.58	16.20	14.60
Height 60 mm, point 5	16.50	16.70	16.20	14.50
Height 60 mm, point 6	16.50	16.48	16.24	14.50
Height 60 mm, point 7	16.52	16.80	16.26	14.50

On the test wheel seven points out of fourteen grew, six decreased and one stayed the same; on the control wheel all fourteen dropped. The unit is not stated in the report.

"FINTEHMASH" AD: KV-25 compressor, receiver filling

PARAMETER	BEFORE TREATMENT	AFTER 55 DAYS	CHANGE
Receiver filling time up to 6 atm	2 min 28 s	1 min 17 s	-48 %

Treatment on 13.05.2003, repeat measurement on 07.07.2003. Noise and vibration were assessed by the commission in words; the report contains no instrument measurement.

What the reports recorded

The collection has no conclusion of its own: the findings are stated separately for each trial. "ZhP Traktsia" locomotive depot, Plovdiv: "analysis of the data shows that the test gear wheel has a build-up of tooth thickness, while wear of the control gear wheel continues"; the same report notes the formation of a hard metal-ceramic protective layer on the test wheel. BERL, Dimitrovgrad: "increase in tooth thickness of the test reduction gear from **0.1 to 0.3 mm**" over **45 132 km** of mileage of locomotive 06-083.0; the small gear wheel of the test reduction gear was not measured, as it is inaccessible without removing the bogies, while on the control reduction gear the third traction motor was replaced during the observation period. "FINTEHMASH" AD: "the compressor reduces the time to build up the required **6 atm** by **48 %**, which leads to electricity savings"; noise and vibration, according to the report, decreased. In three trials out of four an untreated control unit ran alongside the treated one throughout the whole period.



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The results relate to four trials in Bulgaria in 2002–2004: gear drives of the "ZhP Traktsia" locomotive depot and of the BERL plants, and the KV-25 compressor of "FINTEHMASH" AD; on other equipment and under other operating conditions the figures may differ. In two of the trials the unit of measurement is not stated in the tables of the original. The fifth attachment to the collection — the report on the compressor of "Agria" AD — is published as a separate case and is not included here. The original reports are published in full and available for download.