ЗАТВЕРДЖУЮ
Директор шахтоуправління
підземного видобутку руди
ПАТ «АрселорМіттал Кривий Ріг»
(посада)
_____ **Антон ЧИРВА**
(підпис)
«27» жовтня 2022 р.
(дата)

Act
about the test results
technologies of seamless engineering of friction surfaces

We, the commission, consist of:
From the Mining Department of Underground Ore Mining
PJSC ArcelorMital Kryvyi Rih:

Ігор ТИЩЕНКО

Acting chief engineer From
"MODIFIK" LLC:

Захар МАЦУК

Director of "MODIFIK" LLC **made**
this act about the following:

In accordance with the decision of the Technical Council of the Mines Administration of Underground Ore Mining PJSC "ArcelorMital Kryvyi Rih" and letter No. 92-01/485 dated 08.06.2022, demonstration tests of the non-disassembly engineering of friction surfaces of "MODIFIK""(LLC Mineral Special Project is the supplier) LLC and its products were carried out, namely:

1. Prokhodnytsia precinct. Pneumatic motors.

From 19.07.2022 to 10.10.2022, in the mode of real operation, was conducted processing of two "repair" pneumatic motors PMP 10 and one new pneumatic motor PMP 20, machine MPP-3 (Inv. No. 42056886) using the composition of fillers of solid lubricants NT 1-5 TU U 20.5-42277844-001:2019 (Change 1), and basic pneumatic engine lubricants (I-40), by ensuring the continuous operation of engines on a pre-prepared lubricating mixture during one work shift or the time of actual consumption of the aforementioned mixture by units, depending on what comes first.

During the tests, the specialists of the site recorded the engine hours of the treated engines until they failed for technical reasons related to friction, or until the end of the test, whichever came first..

2. Internal mine transport station, VSHT-26. Bearings.

From 01.08.2022 to 20.10.2022, in the mode of real operation, comparative tests of the technology of non-disassembly friction surface engineering of "MODIFIK" LLC"(LLC Mineral Special Project is the supplier) were carried out on the rolling bearing assemblies (7522; 7520) of the wheels of mine trolleys VG-4,5.

During the tests, the commission marked two trains, seven cars in each, the bearings (56 units) of the wheels of which were subsequently operated on the lubricant composition NT 10-20 TU U 20.5-42277844-001:2019 (Change 1) and basic bearing grease ("Solidol Zh"). The treatment of the wheel bearings of the selected trolleys was carried out by twice pressing the lubricating composition into all the bearings of the selected trolleys and ensuring their operation until the next replacement of the bearings or until the date of termination of the tests.

Along with this, the commission marked two other trains, 7 wagons in each, the bearings (56 units) of the wheels of which were operated on a standard lubricant under identical to the processed conditions of transport work.

During the tests, specialists of the station recorded the replacement of wheel bearings of selected trains for technical reasons related to friction, and a comparative analysis of the technical condition of treated and untreated bearings was carried out.

RESULTS OF RESOURCE TESTS:

1. Prokhodnytsia precinct. Pneumatic motors.

As for "repair" engines. It is known that the relative resource of a "repair" and "new" engine (under identical operating conditions) is expressed as 2:1. Analyzing the production conditions of horizon No. 1135, the commission established the limit of rejection for "repair" engines of the PMP type, which work with the use of industrial lubricant I-40, based on signs of a drop in the main operational indicators, at the level of 225 engine hours.

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solid lubricants NT 1-5 TU U 20.5-42277844-001:2019 (Amendment 1) and base lubricant for air engines (I-40) at the level of 59%.

As for the "new" engines of PMP 10, 20. Analyzing the production conditions of horizon No. 1135, the commission set the limit of rejection for "new" engines of the PMP type that work with the use of industrial lubricant I-40, based on signs of a critical drop in the main operational indicators, at the level of 450 engine hours

According to the result of accounting for the time of operation of the aggregates, during the tests, the "new" engines PMP 10, 20 of the MPP-3 machine (Inv. No. 42056886) worked for 562.5 engine hours, which indicates the presence of an effect of compensating the resource of the aggregates, which was achieved due to the one-time use of the composition fillers of solid lubricants NT 1-5 TU U 20.5-42277844-001:2019 (Amendment 1) and base lubricant of pneumatic engines (I-40) at the level of 20%.3

Internal mine transport station, VSHT-26. Bearings.

As for rolling bearings (7522; 7520) of the wheels of mine trolleys. The tests were carried out in the mode of real operation of the horizon 1135 track.

Based on the analysis of the statistical data on the replacement of bearings for reasons related to friction:− оброблених підшипників замінено – 16,0 од.

− untreated bearings were replaced - 22.0 units, which indicates the presence of an effect of compensating the resource of nodes with a high degree of wear, which was achieved due to the one-time use of the filler composition of the solid lubricant HT 10-20 TU У 2 20.5-42277844-001:2019 (Change 1) and base lubricant "Solidol Zh" at the level of 27.27%.

CONCLUSION OF THE COMMISSION:

Taking into account the positive results of resource tests, the commission believes that the application of the technology of non-disassembly friction surface engineering of "MODIFIK" LLC"(LLC Mineral Special Project is the supplier) and its products (lubricant compositions and lubricants created with the addition of fillers of solid lubricants TU U 20.5-42277844-001:2019 (Amendment 1)) on all during the stages of operation of highly loaded units, the friction of mine equipment is expedient.

Signatures of commission members:

Ігор ТИЩЕНКО

Захар МАЦУК