CORUM GROUP

WINTER-2018

DIGEST

CORPORATE EDITION FOR CLIENTS OF CORUM GROUP

CONTENT

Corporate Edition
for Corum Group Clients
Digest, Winter 2018

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Dear partners!

As usually, we sum up the results of our work at the end of the year and would like to share our achievements, because we have made them possible by close cooperation with you.

Our sales results are 30% higher than in the same period of 2017. Export supplies increased by 70%, and domestic – by 13%. As for sales pattern «service – new equipment», now equipment has higher priority. Demand for it rose from 48% last year to 60% this year. We competed and managed to satisfy the put-up demand.

Our enterprises are operating in double shifts with over 100% load to complete all orders on time. Casting complex capacity is boosted by half. We keep on hiring and training new employees. We also scheduled integration of several machine-building assets.

Volume of the contracts will exceed our annual business plan by 69%. It is possible due to the strategic agreements for new equipment supply signed with Polish companies Polska Grupa Górnicza and Jastrzębska Spółka Węglowa, subsidiary contracts with DTEK, and mine construction projects for Vorkutaugol and Pokrovskoe Mine Administration. Strategic alliance with Donetsksteel Group elevated cooperation between our companies to an entire new level.

Development of our new subdivision Corum Shakhtsspetsstroy was boosted by successful construction of the shafts for Vietnamese company Vinacomin and its reference.

The results are evidenced by performance indicators: the subdivision increased amount of the provided service by 2.2 times. Currently, Corum Shakhtsspetsstroy works on construction of ventilation shaft for Komsomolskaya Mine, which is part of Vorkutaugol JSC. It also constructs shaft tunnel with a total length of over 2,700 m for Pokrovskoe Mine Administration, which is part of Donetsksteel group (the largest Ukrainian producer of coal grade K).

This year, our teem became a member of our long-standing strategic partner DTEK Energo as an individual heavy engineering business unit having own brand Corum. This integration allowed us to gain such opportunities as new equipment development, its testing and market launch as well as creation of new products for other DTEK business units.

Moreover, a number of major external contracts and finished orders were added into our portfolio. The most important events of the year are contracts with Polska Grupa Górnicza, Jastrzębska Spółka Węglowa, EVRAZ, Severstal and others.

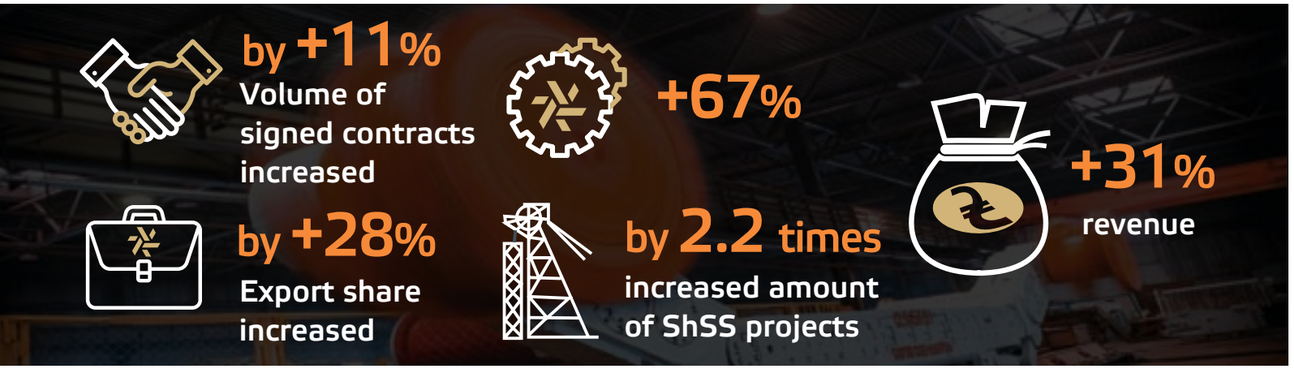
Summing up preliminary results of the year, we have optimistic expectations and build plans for 2019. Accomplishment of our identified goals will be based on further production management process automation and concentration of casting and forging capacities within the technical strategy of manufacturing unit development.

Next year, we are going to introduce a number of innovations to the market, including manufacturing and testing of new longwall shearers CLS550P and CLS400V. Our new product, a medium-heavy roadheader RH160 with a roof-bolter, will pass industrial tests. We also intend to start industrial manufacturing of electrical machinery and electric engines, implement new type of services in order to provide turnkey maintenance of longwall.

We are improving our equipment, our skills, professional competence, developing new product lines and services to assist you in accomplishment of your identified goals within the desirable time limits.

CEO Corum Group
Mikhail Potapov

Corum Group – 2018:



* Forecast data for 2018 in percentage correlation to the previous year

KEY CONTRACTS

UKRAINE

- CLS450 was upgraded by modernization of electrical-hydraulic equipment and abrasion protection, drum diameter was extended to 1.4 m. Its design capacity is up to 4,000 t of coal per day, if there are no restrictions for gas and dust.
- Seven KPD roadheaders were supplied to different mine administrations of DTEK Energo. 14 roadheaders have been delivered to the client during two years, which evidences significant trust in the equipment.
- Corum Group manufactured a roadcutter system KNF for DTEK Pavlogradugol. This is the third KNF developed in collaboration with the miners. As well as the previous KNF, this one will be operated at the mines of DTEK Pavlogradugol.

RUSSIA

- Longwall complex for Sadkinskoye Mine Administration is an integrated customized turnkey project. The miners of Sadkinskaya expect to produce 1.5 million tonnes of valuable anthracite per year using the complex.
- Implementation of the order for deflection sheaves for Ural Mining and Metallurgical Company (UMMC), Bogoslovskoye Mine Administration. Successful serial production of the sheaves at Corum Druzhkovka Machine-Building Plant.
- The third drill loader BPR will be manufactured for Sherlovskaya-Naklonnaya Mine (Donugol OJSC).
- Electric locomotive AM8D was delivered to Yubileynaya Mine (Topprom). This is the first time for the last five years when Corum electric locomotive was supplied to Kuzbass, which evidences that the company reenters the market.
- 140 mine cars VG-1.3 were delivered to Lukoil and operated at the oil mines.
- Under the Extreme North conditions and temperatures of up to -40 ºC, our company manages construction of the ventilation shafts for Komsomolskaya Mine, being a part of the largest mining company of Russia – Vorkutaugol JSC. According to the plan, the company shall «revive» the ventilation shaft No. 4 (900 m) of Komsomolskaya Mine and retrofit it in less than two years. The project is scheduled to be completed in May 2020.

POLAND

- Development of new design for the powered roof support ZRP15/35 (140 sections) for Polska Grupa Górnicza (PGG). This is prospective cooperation that makes it possible for the Ukrainian machine builders to enter Polish market. Corum longwall equipment will be delivered to Poland for the first time.
- Signing of the contract for supply of tunneling equipment for Polish mining companies Polska Grupa Górnicza (PGG) and Jastrzębska Spółka Węglową (JSW). They will be leased for three years.

KAZAKHSTAN

- Supply of the batch of 20 electrical substations and transformers TSP to Kazzinc Company within the framework of effective cooperation established in 2016. More than 60 substation have been shipped during this period.

major contracts, new developments and target markets

DEVELOPMENT OF PRODUCT PORTFOLIO

Roof support DT 08/18

The roof support of DT type was individually manufactured for Pokrovskoye Mine Administration (Donetsksteel); its customization included an increase in extension for up to 1.8 m, new coarse canopies designed to be used with hard-to collapse heavy roofs and multi-hose management system. All 200 sections of the roof support were put into operation.

Modified conveyor SP326

A unique conveyor designed for Osinnikovskaya Mine (Evraz Group). It is intended to solve the problem of sump cleaning, and its modified troughs ensure effective rock mass dehydration during transportation. Shipped to the customer.

Upgraded drives of conveyor SP251, including electrical engine with a built-in frequency converter

A drive with a frequency converter was used for the first time to improve performance and ensure correlation of the conveyor speed with an output per face. This is the first step toward automated transport chain. Since November 2018, the upgraded drives have been tested under operational conditions (for 90 days) at Dneprovskaya Mine (DTEK).

Medium-heavy roadheader RH160

The major distinctive feature of the machine is the combination of the roadheader and anchorage device allowing for the anchoring mechanization during development of tunnels and improvement of the shaft miner's labor security.

Crushing conveyor SP326

Special project for the shale mine Ojamaa (Viru Keemia Grupp). Elongated base enables simultaneous loading in four different places instead of standard two; the resource is 2 million tonnes of rock mass. Has been successfully tested in 2018.

Belt conveyors KL1200

Mastering in production of belt conveyors of standard industrial application and broadening of application of the belt conveyors. Five belt conveyors KL200 were shipped.

Transformer substations KTPV-DV-1000/6-1.2/0.69

Development of the substations KTPV-DV-1000/6-1.2/0.69 of new generation equipped with new protection units with advanced functions. For the first time, they were delivered to Yubileynaya mine (DTEK).

«Turnkey longwall»: integrated solution for miners of the Sadkinskaya Mine

In September 2018, Corum Group supplied a longwall complex to the Sadkinskoye Mine Administration, and it was used to develop longwall face No. 45. Its design is based on many unique engineering solutions purposed to ensure high equipment capacity.

The longwall complex for Sadkinskaya Mine Administration consists of 203 sections of special roof support 3KD90T, upgraded shearer KDK500, armored face conveyor and loader SPTs230. It ensures high production capacity (up to 12,000 t per day). The Sadkinskaya's miners plan to produce over 1.5 million t of anthracite from longwall No. 45 for a year using this equipment.

The longwall complex was presented in late August at the Corum Svet Shakhtyora Plant and captured a strong interest of both existing Corum customers and potential partners. Over 50 representatives of mining companies from Ukraine, neighboring countries, and Europe visited the presentation. For demonstration purposes, the equipment was installed on the floor of the Corum Svet Shakhtyora Plant, which imitates the so-called mini-longwall. This is not a trivial exercise to present such a huge complex in action without installing it to the face, but our engineers fulfilled the task admirably.

Representatives of the largest mining company of Europe – Polska Grupa Górnicza also came to the Corum Svet Shakhtyora Plant to assess the longwall complex. Corum is finalizing manufacturing of the longwall complex of 140 roof support sections ordered by this company. This is a milestone event because Ukrainian roof supports will enter Polish market for the first time.

The longwall was officially launched with new complex Corum at Sadkinskoye Mine Administration in October and demonstrated the scheduled production capacity of 5,000 t per day. Herewith, prospective capacity of the longwall complex is up to 12,000 t per day. Service engineers of Corum provide the equipment maintenance and monitoring for two months to ensure smooth complex operation.

«Buying the longwall complex is a clear solution for the miners for its cost-savings and performance, as it is a kind of turnkey longwall,» says Corum CEO Mikhail Potapov. «For us, as leaders in development of effective solutions, this is a unique experience proving our high level of professionalism when it comes to implementation of the integrated projects.»

Composition of the longwall complex

Armored face conveyors SPTs230-21.2 and SPTs230-63

Armored face conveyors SPTs230-21.2 and SPTs230-63 are operated in the high-loaded longwall faces where average daily production capacity is of 5,000 t of the mined rock, and the resource output may be increased up to 7 million t of the reloaded rock. Tried and tested engineering solutions applied for the conveyors SPTs230 operated at Sadkinskoye Mine Administration since 2011 were considered in design and production of the face conveyor SPTs230-21.02 and loader SPTs230-63. The face conveyors are equipped with a new pan line on the basis of the cast wall H=270 mm that is lower than the walls of the previous model SPTs230, which allowed using the longwall set with a shearer KDK500 and roof support 3KD90T under the conditions of the lowest extracting seam thickness of 1.4 m.

Longwall shearer KDK500

KDK500 is one of the most popular models of Corum longwall shearer among the miners, including miners of Sadkinskaya Mine Administration where the shearer has been successfully operated since 2012. When Corum engineers designed new KDK500, they managed to increase its power-to-weight ratio and introduced a system of diagnosis and monitoring of the main unit condition, information about whereof is shown on the display. The shearer may operate within the seam, the height of which ranges from 1.4 m to 3.2 m.

Powered roof support 3KD90T

Powered roof support 3KD90T, which is a part of the longwall complex, also has a specific design. The sections are characterized by increased load-bearing capacity designed for the unstable and heavy roof with fractured structure. Corum developed a unique engineering concept – a pressure arm operated by hydraulic prop, thus ensuring effective roof support near the face and high pressing force of up to 1,400 kN.

FEEDBACK

Yuriy ZUYEV, Director of Sadkinskoye Mine Administration

«Our mine administration has been using such Corum products as armored face conveyer, roof supports, shearers for a long period, and we are pleased with their operation and maintenance service. Therefore, we came to our reliable and tested partner, Corum group, when we needed to buy a longwall complex for our new longwall. Now, we have an awesome full cycle machine, as for which we have high expectations».

Sergey VORONIN, CEO of DTEK Pavlogradugol

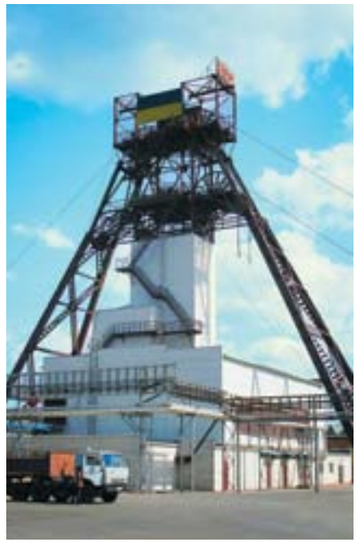
«This machine vividly demonstrates that Ukrainian machine-building industry is alive. Moreover, this is an equipment of the highest grade, and it may be a worthy adversary for its analogs in the world market».

Petr BOYARSKY, Technical Vice President of Polska Grupa Górnicza

«This year, we signed a contract with Corum on supply of the roof supports with a total value of EUR 10 million. And now, we came to see everything with our own eyes».

Corum Shakhtspetsstroy develops the way to new longwalls

Development of our new subdivision Corum Shakhtsspetsstroy was boosted by successful construction of the shafts for Vietnamese company Vinacomin and its reference. The results are evidenced by performance indicators: the subdivision increased amount of the provided service by 2.2 times. Currently, Corum Shakhtsspetsstroy works on construction of ventilation shaft for Komsomolskaya Mine, which is part of Vorkutaugol JSC, which is the largest mining company in Russia. It also constructs mine tunnels with a total length of over 2,700 m for Pokrovskoe Mine Administration, which is part of Donetsksteel group (the largest Ukrainian producer of coal grade K).



OPTIMIZATION OF VENTILATION FOR POKROVSKOYE MINE ADMINISTRATION

Construction of the mine tunnels, which open new longwalls, was started at Pokrovskoye Mine Administration (Donetsksteel) in February 2018. Currently, Corum Shahtspetsstroy is implementing two mine tunnels – namely, air roadway of the ninth southern longwall and approach No. 3 to the fifth northern belt entry needed to start operation of new longwalls and produce coal in block No.10.

In March 2018, the first face was equipped with tunneling equipment, and construction of the air roadway of the ninth southern longwall of block No.10 was started in April. A distance of 1,155 m was passed in eight months. Total tunnels length is 2.5 km.

In the second half of October 2018, Corum Shahtspetsstroy expanded its cooperation with Pokrovskoye Mine Administration related to the underground tunnels construction. It installed tunneling equipment required to arrange approach to the fifth northern belt road and then the downcast passage of block No. 10; tunneling works started in the second face in November 2018.

The downcast passage of block No. 10 allows to optimize the ventilation system of Pokrovskoye Mine Administration to develop northern wing of block No.10.

Pokrovskoye Mine Administration is the largest Ukrainian producer of coal grade K used in coke industry. When the enterprise has access to new longwalls, it may ramp up production to ensure stable supply of raw materials for metallurgical industry. The objects will be commissioned in 2019.

Dmitriy VOROZHTSOV, Director of Corum Rus

«Our goal is to ensure operation of ventilation shaft of Komsomolskaya Mine to enable development of the mine field resources by our client. This is not the first contract between Corum and Vorkutaugol signed in the past few years. The miners commended our mining equipment and trusted another project to us. The project will be fully administered by the trading company Corum Rus to ensure 24/7 communication with a client».

BEYOND THE ARCTIC CIRCLE

Corum Shakhtsspetsstroy constructs ventilation shaft No. 4 at Komsomolskaya Mine (Vorkutaugol). Our experts will perform a large volume of works to pump water out of the submerged part, sink, and reinforce the shaft.

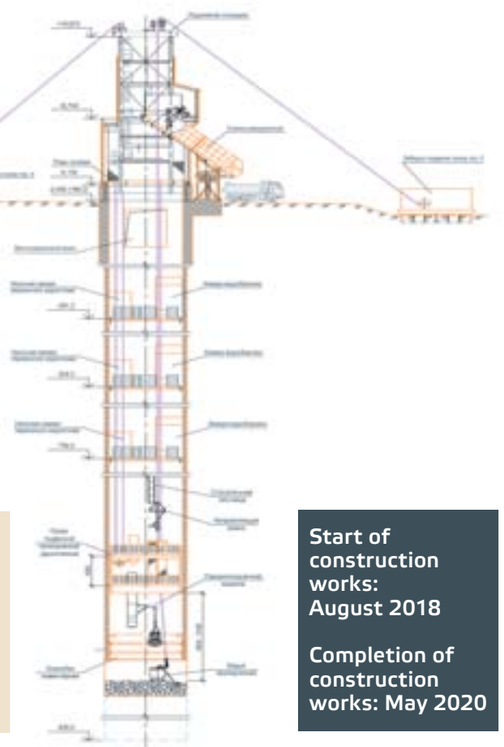
It is expected that sinking works and shaft reinforcement will be completed in 2020.

The object entrusted to Corum Shahtspetsstroy is ventilation shaft No. 4 of Komsomolskaya Mine (910 m) flooded by 885 m. Our mine constructors will have to restore the shaft. For this purpose, they need to complete construction works and completely retrofit the shaft in less than two years.

The project will be implemented in three main phases. During the first phase, the mine constructors shall pump water out of the submerged part and equip the shaft with shaft-sinking facilities. The second phase includes the shaft deepening by 90.1 m. The third phase is the assembly of the rope armor as a part of the permanent equipment. Komsomolskaya Mine will get a second wind when ventilation shaft No. 4 is constructed.

Corum Group mainly applies its own equipment that has been successfully tested during construction of the shaft of Nui Beo Mine (Vietnam). Sinking and construction under the Arctic conditions at a temperature of up to -40 ºC will be another «extreme» experience of Corum Group.

Technological cut along the SHAFT



Shaft inner diameter – **8.0 m**
excavated dimeter – **8.7 m**
Shaft depth with sump – **1 km**
Shaft inner cross-section – **50.3 m²**

Start of construction works: August 2018

Completion of construction works: May 2020

Strategic alliance with Donetsksteel: focus on import substitution

In October 2018, Corum Group established a three-year strategic partnership with one of the largest hard-coking coal producers Donetsksteel Group. One of the main purposes of the long-term partnership is the substitution of expensive foreign equipment with the machines manufactured by our company.

We started implementation of shearers and work with new nomenclature of spare parts in 2018. The active phase is planned for 2019. At the same time, we planned a lot of import substitution measures at the mines of Donetsksteel.

Igor VASSERMAN, Roof Support Sales and Development Manager of Corum Group

«Principal design features of new section are a hard canopy and catamaran separate basement having lifting mechanism of specific design. This enables development of thin seams of 1.1 m under complex mining and geological conditions. A unique design of the lifting mechanism of the basement front part and kinematic diagram optimization make it possible to cope with any defects of the seam floor and work with hard roofs. Reliable operation of the power hydraulic mechanism is provided by the stainless coating of the work areas (duplex chromium for external and single-layer chromium for internal areas) and highly resourceful polyurethane seal Hallite».

Pokrovskoye Mine Administration has already positive experience. In early 2018, the Mine Administration purchased 200 sections of new roof support DT 08/18 as a part of long-term partnership with our company.

It should be noted that new design of the roof support DT 08/18 has been developed together with the specialists of Pokrovskoye Mine Administration, as they provided a detailed list of technical requirements to the roof support design. Corum engineers developed the required technical solutions to ensure efficient operation of the roof support. This cooperation allowed us to develop a technical proposal of the roof support DT 08/18 that was better than the one of our European competitors.

Corum specialists mounted the roof support at the 14th longwall of Pokrovskoye Mine Administration in July, and the longwall work started in August. Herewith, Corum service support provides maintenance of the equipment to ensure its maximum efficient operation. Strategic cooperation between Corum and Donetsksteel allowed ensuring coal production from the thin seam of 1.2–1.4 m and keeping really high average daily production of 4,200 t per day; maximum daily production was 5,200 t.

Moreover, import substitution program also includes: substitution of the line pans of Czech conveyors CZK228/800 and CZK260/852 by the analogs manufactured at Corum Svet Shakhtyora Plant. Herewith, a pilot batch (20 items) of the conveyor CZK228/800 has already been successfully tested, and two pan lines have been delivered. Targets of similar implementation of line pans for the conveyors CZK260/852 for 2019 have been agreed upon.

Joint working group for implementation of the shearer CLS450 was created, additional works were performed to meet the requirements of Pokrovskoye Mine Administration, Czech shearers of MB series will be substituted by Corum shearer. Scheduled supply period is 2020.

Strategic alliance between Corum and Donetsksteel allowed improving coal production efficiency upon implementation of Corum high-tech equipment and our maintenance.

DONETSKSTEEL
Group of Companies

555 METERS OF PAN LINE

200 ROOF SUPPORTS DT 08/18

1 TUNNELING PROJECT

DTEK: five years of partnership

In 2013, Corum Group and DTEK Energo established a strategic alliance. This partnership produced tangible results. Thus, 28 of 32 longwalls of DTEK Energo mines are equipped with the machines manufactured by Corum Group. 100% of mining equipment installed in the longwalls of the Geroyev Kosmosa Mine is made by our company.

«Today, we meet the demands of DTEK Energo in mining equipment for almost 100%,» says Mikhail Potapov, acting CEO of Corum Group, about partnership with the key client. «The agreements concluded in 2013 ensured that the equipment was delivered to our partners in a reasonable short time. Overhaul of equipment takes less time, and warranty period is extended. All these factors result in mine performance improvement.

Corum Group experts have profound engineering base and, thus, may offer to the miners various innovations adapted to the coal production conditions at the mines owned by DTEK Energo. For example, we designed a shearer CLS450 upon the request of the miners, which was successfully used in development of thin and middle seams. Currently, our designers and miners work together to launch production of new roadheader RH160.

Last year, DTEK Energo managed to achieve the following record results with Corum equipment:

20 million tonnes is produced at the mines of DTEK Pavlogradugol, and about 3 million tonnes, at the mines of DTEK Dopropolyeugol.

DTEK Energo is going to develop own machine-building business unit on the Corum base. This is a way to increase production capacity and broaden the product range. Consequently, this is how both companies may achieve strategic business goals till 2022.

Number of new equipment	
 Longwall Shearers	52
 Powered Roof Supports	802 sections
 Armored Face Conveyors	78
Over 4,700 items have been repaired	

* Data for the period of 2013–2018

FEEDBACK

Sergey BIATOV, Head of Department of Energy Mechanical Support, DTEK Energo

«We have been cooperating with Corum Group for a long time, and we are real partners who share in the common cause. The company designs and manufactures unique machines enabling us to produce the «black gold» coal, at the Pavlogradugol Mine Administration and Dobropolyeugol Mine Administration. This partnership resulted in record indicators in 2017: we produced almost 20 million tonnes at Pavlogradugol Mine Administration, and 3 million tonnes at Dobropolyeugol Mine Administration. Today, Corum is one of the leaders of coal industry both in Ukraine and in the world. We believe in this».

Prospects for Corum Group development in 2019

Close production cycle is a basic competitive advantage of Corum: from subproducts (cutting, forging, casting) passing mechanical and thermal treatment to assembly and test, and own engineering. This is how the company ensures the production process with minimum expenses and offers qualitative products at a reasonable price.

The close production cycle allows us to minimize our reliance on the external suppliers, and thus, we assume full responsibility for the quality of our products and keep the production cost low. Moreover, all these factors boost development of individual approach to every client and make it possible to offer unique solutions and customized products.

Corum Group understands its competitive advantages and efforts to stay a leader of the market by optimizing production costs and improving total efficiency of their enterprises. Anyway, this is just a small part of what the company is going to do to meet the client demands in 2019. Please, find more information on the principal productivity enhancement drivers in our materials.

LEAN PRODUCTION

Product competitive price depends also on the reduction of production costs. Our company has been implementing lean production tools for many years. This year, we additionally implemented system Novator at our plants in Kharkov and Druzhkovka, as it had been successfully used at DTEK enterprises for many years. Novator system is targeted to make the plant employees improve their skills and form the idea of lean production. This way, we will reduce equipment production costs and improve its quality.

Novator system will be integrated in several phases. The first phase, implementation, started in the fall 2018. Next year, we are planning to develop the idea of lean production at the level of workshop managers. In 2019, expected economic benefit of the system implementation will be UAH 10 million for each plant.

Novator will result in reduction of production losses, but it may never eradicate the human element completely. Therefore, Corum Group intends to take a number of measures purposed to automate production processes and thus improve flexibility and transparency of manufacturing control.

AUTOMATION OF PRODUCTION

A new phase of production automation was observed in 2018: we determined the contractor and drafted a technical task for implementation of Preactor System (developed by Siemens). Automation will allow for reasonable planning of the enterprise capacity use, managing the bottlenecks, and thus increasing capacity of the entire production system.

Yevgeniy ANFALOV, Head of Corum Group Production Department

«Today, an order schedule depends on many factors, including expertise of specialists engaged in production planning. That's why we are going to reduce dependence of the production process on this factor and commit this part of work to a system that will ensure proper execution of the processes, from the start of equipment manufacturing up to its shipment».

Preactor will be implemented in 2019. Corum Group is going to use the system to increase the enterprise capacity by 10% of the annual plan, reduce number of delayed orders, and manage its current assets in a more intelligent way.

CONCENTRATION OF DUPLICATE PRODUCTIONS

Maximum utilization of available capacities is also of great importance when dealing with the efficiency enhancement. Historically, both plants in Kharkiv and Druzhkivka were engaged in foundry and forging, but last year we decided to focus on blank production. Corum Svet Shakhtyora will be engaged in foundry. Corum Druzhkovka Machine-Building Plant will be focused on forging. This is how we are going to concentrate load on one of the available complexes and thus ensure peak efficiency and prevent underloading of the enterprises.

In 2018, we managed to increase our casting volumes by 1,000 t per year (almost twice) when concentrated the related production at Corum Svet Shakhtyora. We are also planning to increase the production volumes by another 3,300 t per year. We will attract new technological solutions proposed by our specialists and additional investments to achieve the target.

The cast panels ordered by our European clients are another evidence of the high quality of our products. This fact enables us not to hesitate to say that European mining equipment partially consists of the equipment made in Ukraine at the Corum Plant in Kharkov. Currently, a batch of casting of 47 t, which will be sent to Europe, is launched into production at Corum Svet Shakhtyora Plant.

Stepan SANAGURSKIY, Head of Technical Development Department

«We have ambitious casting production expansion plans. In future, we are going to employ additive technologies, which are widely used today for production of almost everything, including mining equipment. 3D printers are broadly used all over the world. We believe that this is a promising vector for casting production development. Implementation of the additive technologies is, first of all, in interest of our customers, as they will contribute to reduction of the production period from several days to several hours. This will also influence the prices of the supplied products. Anyway, we are only planning to do this way».

PRODUCTION HEALTH ASSESSMENT

Corum Group intends to increase finished product sales twice till 2022. The company updates the strategy of its production enterprises development involving global experience to achieve the goal. One of the leading consulting companies, KPMG, will assist us in determination of the best possible path to our goal.

Aleksandr DYATLOV, Chief Production Officer Corum Group

«We are planning to survey production processes of our company in the near future. We will examine their current condition as a part of value creation chain, develop new target model for every process and determine principal natural and financial efficiency indicators, assess the resources needed for the transformation purposes. Our objective is to compare our current performance standards with the best world practices, understand key differences, develop the best ways to eliminate them, and ensure production of qualitative and competitive equipment at the lowest possible cost».

DEVELOPMENT AND LAUNCH OF NEW PRODUCTS

Our approach is peculiar because we always develop customized equipment. Thus, for example, our company constantly works on simultaneous development of several products for DTEK and our strategic partner Donetsksteel. Herewith, there are the following basic requirements for new products: long resource and increased performance while maintaining minimum dimensions to ensure efficient processing of the thin seams.

The following projects are included into the list of priority tasks for upgrade and development of new machines:

- new middle-heavy roadheader RH160. The major distinctive feature of the equipment is the combination of the roadheader and anchorage device allowing for the anchoring mechanization during development tunnels and improvement of the miners labor security;
- new gantry-type longwall shearer CLS550P with chainless haulage system to be operated in the thin seams. The task to be solved is an increase in performance and resource almost twice as compared to the operated analogs;
- new longwall shearer CLS400V is a unique shearer with drum-type cutting tools and vertical rotation axis without the cutting chain. We intend to increase the shearer resource twice as compared to the previous version KA200;
- new standard mining transformer substation will allow offering equipment that will meet the highest expectations to the companies having no limitations by hazardous mineral production conditions at the lowest possible price;
- an upgrade of the electric locomotive AM8D with speed control will let us create a new up-to-date machine with the most innovative solutions purposed to create comfortable conditions for miners and having improved technical specifications, which is based on the model that has been successfully operated for many years;
- an upgrade of the conveyor SP251 using electric motor with an integrated frequency converter will ensure smooth and soft start of the conveyor and enable speed adjustment for the conveyor traction chain. Herewith, wear and tear of the mechanical section will be significantly reduced, and the conveyor performance will be increased (by up to 30% as compared to the serial production).

Automation, visualization, and digitalization issues were a focus in the development of new equipment. The greater part of our equipment is produced customized. A variety of factors determines the selection of individual adjusted design of the machines in every single case. Modern mining equipment is an individual product, which features depend on the client preferences. We offer equipment, where individually adjusted minimum technical solutions are used.

EXTENSION OF PRODUCT PORTFOLIO

Our company has been continuously developing, exploring new ways and possibilities to launch new products. Integration with DTEK Energo allowed us to enter new product niches. Today,

Valeriy KRUPITSKIY, Head of the product Line Development Department of Corum Group

«Preliminary results of the year reveal that Corum has managed to increase volume of products manufacture by more than one quarter as compared to the same period of the last year. Continuous performance of our plants is 109%. This is necessary to fulfill all orders in time. The same trend is expected to be observed in the next year».

the most promising directions for us are production of arch supports and mastering the manufacturing of explosion-proof motors.

Corum Group considers possible integration of additional business assets to implement its plans. Integration shall result in extension of manufacturing capacity and increase in production output by at least UAH 1.5 billion a year.

SERVICE DEVELOPMENT

We are in a continuous process of improving our standards as for the quality of equipment warranty service; special attention is paid to the response to our customers requests related to the equipment operation and time to fulfill our obligations as provided by the contract.

In 2019, we are going to implement better maintenance monitoring tools to increase the quality of our service. We will expand our 24/7 respond system to handle 100% of the requests coming from our customers in the territory of Ukraine. Moreover, we will launch service centers on the foreign markets.

We have set for ourselves that development of competence in complete longwall services is prospective for us: longwall

complex (shearer, powered roof support, armored face conveyor, VSPK, pump station) will be used while developing 1–3 production faces. It is supposed that

100% of spare parts and materials will be delivered to a client from the Corum stock during the service period.

The clients who buy mining equipment manifest their interest for several reasons: 1) the equipment supplier undertakes complete outsourcing maintenance process and, consequently, solution of every warranty and not warranty issues arising in the process of mining equipment operation, thus enabling the client to focus on coal production; 2) expected increase in production due to reduction of plan period and unscheduled equipment downtime; 3) assumed increase in service life of the maintained equipment and reduction in time required to move the equipment from one longwall to another.

The company intends to introduce CLS450 to the external market

The first model of shearer CLS450 allowed the miners of Dobropolskaya Mine (DTEK) to increase daily coal production capacity for up to 65% and reduce time required for the longwall equipment maintenance almost twice. Corum Group started serial manufacturing of new generation shearers and delivered CLS450 No. 2 to the Belozerskoye Mine Administration (DTEK).

Anatoliy KOROLCHUK, Corum Group Longwall Equipment manager

«There are the following fundamental differences between CLS450 No. 2 and CLS450 No. 1: upgraded electric hydraulic equipment, additional abrasion protection, and cutting drive diameter increased to 1.4 m. CLS450 No. 2 will be operated at the seams of 1.45–1.55 m, while the first model operates at the seams of 1.25 m. A designed capacity of the shearer is up to 4,000 t a day, in case if there are no methane and dust restrictions».

CLS450 NO. 2 IS BETTER THAN THE PREVIOUS MODEL

The shearer CLS450 substituted old mining equipment RKU-10, RKU-13, and 2GSh68B that has been used at the mines of Dopropolyeugol (DTEK). New Corum equipment shall become a perfect alternative for both Ukrainian and foreign shearers: MB410E of Czech company T Machinery and KGS25 of Polish Company Famur.

Our shearer CLS450 No. 1 has been successfully tested at the Dobropolskaya Mine. 70,000 t of coal is produced there for a month that is more than provided by the month schedule. Our equipment operates at the same level as European analogs, and its price is lower. Corum designers have developed a system of the shearer control and electric equipment where the parts of European manufacturers are used; herewith, modern technologies and high quality of the steel grades applied allowed increasing CLS450 resource and making it equal to its foreign analogs.

The following remarks of the miners to the first model were considered when producing CLS450 No. 2: new high-capacity pump, installed additional external spraying system and supplementary abrasion protection. The shearer was even better than the previous model. Today, the company is actively working to introduce serial CLS450 to the markets of Russia, Kazakhstan, and Poland.

CLS450 NO. 1 EXTRACTS MORE THAN 1 MLN T OF COAL

Corum Group upgraded CLS450 No. 1 for the ninth northern longwall of Dobropolskaya Mine, which is part of Dobropolyeugol (DTEK). As was provided by the technical task, our designers improved supporting-movement system and put the shearer lower to enable its operation in the seams of 1.18–1.25 m. Using the upgraded equipment, the miners managed to extract more pure coal. CLS450 No. 1 produced over 1 million t of coal in 15 months.

CLS450 No. 1 is equipped with the latest automated control system and characterized by high capacity (up to 14.8 t per minute), it is safe and enables to reduce maintenance time by 40%; herewith, its performance is increased by 65%.

Roof supports DM-6.1/15 were put into serial production

Two sections of the powered roof support DM 6.1/15 have been successfully tested under the complex mining and geological conditions of Dobropolskoye Mine Administration, and the upgraded roof support version is going to be put into mass production soon.

During three months, two sections of powered roof support DM-6.1/15 have been tested and operated together with the previous DM series in the ninth northern longwall of the seam m5 of horizon 450 m in the Dobropolskaya Mine (Dobropolskoye Mine Administration, DTEK Dobropolyeugol). 260,000 t of coal was produced by the end of the tests.

Strength analysis was carried out, and one section was checked at the test stand STD2000 for compliance with the requirements of both GOST R 52152-2003 and European standard EN1804-2001 at the Corum Druzhkovka Machine-Building Plant before the roof support was put into pilot operation.

Roof support DM-6.1/15 is used to keep light roof in the face area of the longwall when flat seams of 0.8-1.5 m with a dip angle of 35º along the strike are handled, up to 10º to the dip and to the rise, and in the mines, hazardous gas and dust, including over categorical ones, according to GOST 28597-90.

Roof supports DM-6.1/15 have been developed and manufactured to meet the demands of Ukrainian clients with due regard to geological features of our country.

Design features of the roof support:

- may be operated under the conditions of unstable roof and soft floor of the seam;
- convenient maintenance access to the main parts;
- efficient compatibility with any set of longwall equipment.

Integration of the control systems of the leading global manufacturers contributed to improvement of operation and control reliability.

Mikhail LYSENKO, Chief Specialist of Longwall Equipment, Corum Group

«Our roof supports have proven themselves to be very efficient while operating at the soft floor because of reduced ground pressure within the front part of the basement. Roof support structure has been designed to be operated under the conditions of thin seams with complex mining geology. Not a single defect has been determined during three months of operation. The roof supports have been successfully tested at every phase under the real face conditions, and all coal production parameters have been met».

KDK500 was upgraded by 90%

Shearer was overhauled in 2.5 months – that period is twice less than the time provided for such operations.

While operating under the complex mining and geological conditions of Novodonetskaya Mine, the longwall shearer KDK500 produced almost 1 mln t of coal. When the longwall face was finished, shearer was dismantled and came up to the surface. Corum Svet Shakhtyora managed to repair the machine in addition to the scheduled orders.

Machine builders completely restored the main frame of the shearer, examined cutting tools and replaced sealing and joint rings (so-called general rubber goods (GRG)), overhauled the shearer feed mechanisms, and replaced the GRG, bearings, and many spindle and gear details at the request of the customer, Belozerskoye Mine Administration. Electric unit was repaired, hydraulic panel was replaced. Hydraulic equipment and spraying systems were completely replaced. The shearer is equipped with new drums of 1,400 mm in diameter made by scientific-production association Donbassugol. In other words, the machine was upgraded by almost 90%.

Today, the longwall shearer KDK500 is operated at the Novodonetskaya Mine in the fifth northern longwall of Belozerskoye Mine Administration (DTEK Dobropolyeugol). There is 1.5 million t of coal stock at the face.

Sergey MEGELBEY, Head of Department of Mining Equipment Overhaul Development of Corum Svet Shakhtyora Plant

«KDK500 is a powerful and highly resourceful shearer with 33 t weight. Consequently, this shearer has larger and heavier parts than those to be handled by our machines. Imagine that weight of one frame is 8.5 t, and its length is 5 m... And capacity of the hoisting-and-transport and drilling equipment of the plant is restricted. That's why we faced some difficulties while preparing for the technical process. But our name is Svet Shakhtyora (The Light of A Miner), and we shall do our best to make hard work of the miners easier. And we did it!»

FEEDBACK

Vitaliy BAKHMATYUK, Deputy Production Director of Belozerskoye Mine Administration, DTEK Dobropolyeugol

«I knew that the plant would complete the task, although they had never repaired such shearers. You have proper repair facilities, vast experience and great specialists».

Import substitution program for Pokrovskoye Mine Administration in effect

During the last year, the machine builders of Corum Svet Shakhtyora have been working hard to upgrade Czech conveyor by reinforcement of its line section with our pans. And now, the miners don't have to order the pans abroad as there are Ukrainian qualitative analogs.

A set of 20 pan lines of the conveyor line section was the first step on the way to the future cooperation, and its test models were produced in Kharkov in September 2017. This was a successful experiment and Kharkov pans turned out to be suitable for the Czech shearers.

Such design features as special German profile of 225 mm, high-tensile wear-proof steel Hardox in the main and lower bottom, alignment notches and spigots for locking clamps and connectors, secure clamping of the pans with a load of at least 2,000 kN per one connector ensured increased reliability resource of the equipment.

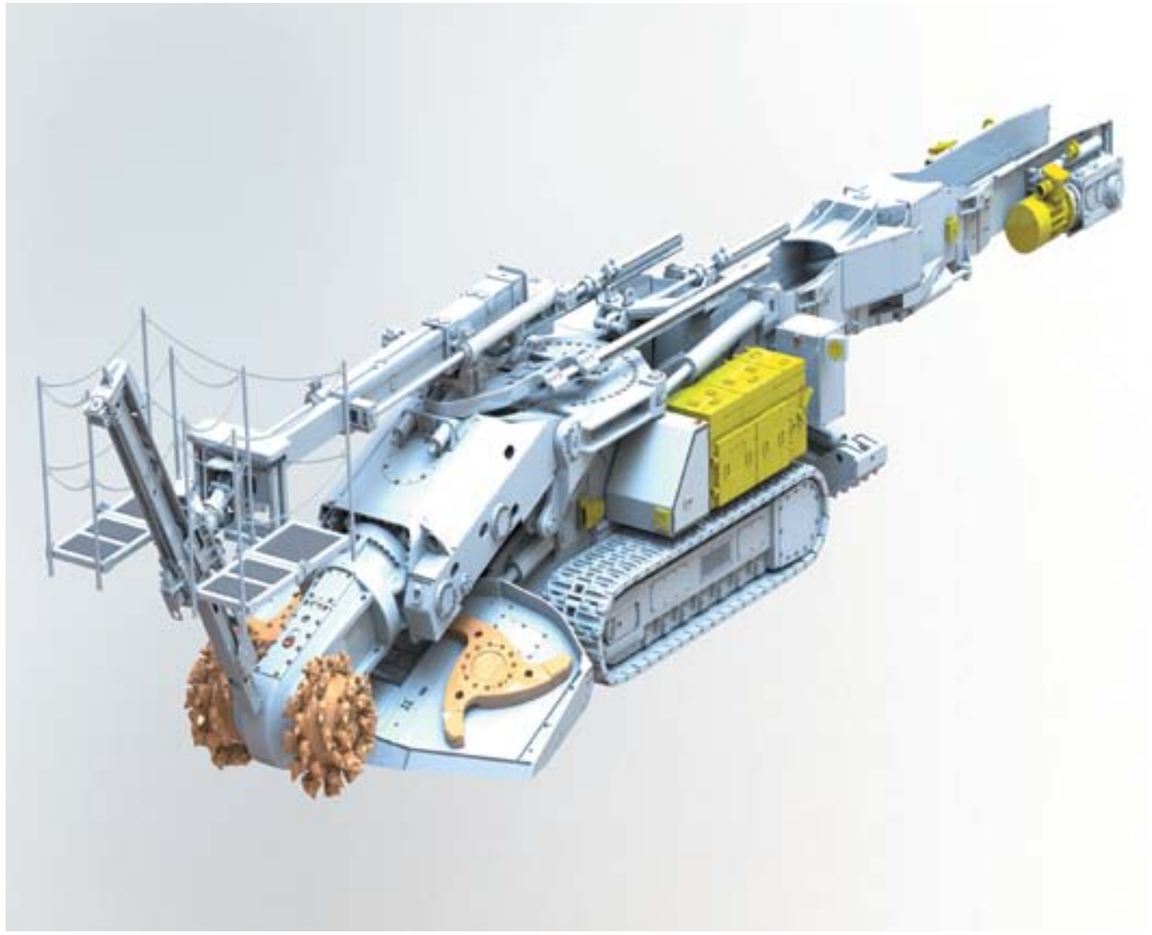
Miners of Pokrovskoye Mine Administration liked our pans so much that they ordered a batch of 180 sections to be delivered to the client in December 2017.

The miners ordered another batch of 180 pans in May 2018. And we are going to deliver another two sets to our customer in Q2 2019.

May batch has been still successfully operated in the sixth northern longwall of unit 10 of Pokrovskoye Mine Administration. 127 line sections and 43 inspection sections were equipped with Hodotrack racks and couplings. This batch is made with stamp locks contributing to the significant improvement of reliability and extension of the product life.

Vitaliy SENICHKIN, Corum Group Longwall Equipment Manager

«In the past, Ukrainian miners ordered pans from foreign manufacturers. There is a stereotype that European products are known by their higher quality and better resource. Corum Svet Shakhtyora and R&D proved their competence for many times when it came to design and manufacturing of pans similar to the foreign ones, they always warranted high resource and quality at a lower price. Quick service support and fast product delivery owing to the proximity of the plant to the customers are another advantages».



RH160 – new roadheader

The major distinctive feature of the project is the combination of the roadheader and anchorage device allowing for the anchoring mechanization during tunneling and improvement of the miners labor security.

As far as we have such a product in our product line, we may meet the market demands. Our line will be extended, then we will offer our customers both light (27 t) and heavy (72 t) roadheaders.

The idea of RH160 was born by our engineers in 2013. Design of the roadheader RH160 was based on our own experience and foreign technical solutions, and this way we managed to implement solutions totally new to us.

Such obligatory requirement to the roadheader as a roof-bolter was said during negotiations on the possible tests of pilot samples under the mine conditions. This was a complex task as it was hard to put the roadheader with a roof-bolter into the face with cross-section of 15–17 sq. m. Several companies had already managed to solve the problem, but a minimal face section was 22 sq. m. Our designers agreed on the principal requirements with the customer and developed a roof-bolter to be installed on the machine. Herewith, the roof-bolter mechanism shall be controlled with a wireless or wired remote panel.

That was a complex task, but we managed to cope with it. Now, we are absolutely sure that we will show functional abilities of roadheader during production tests.

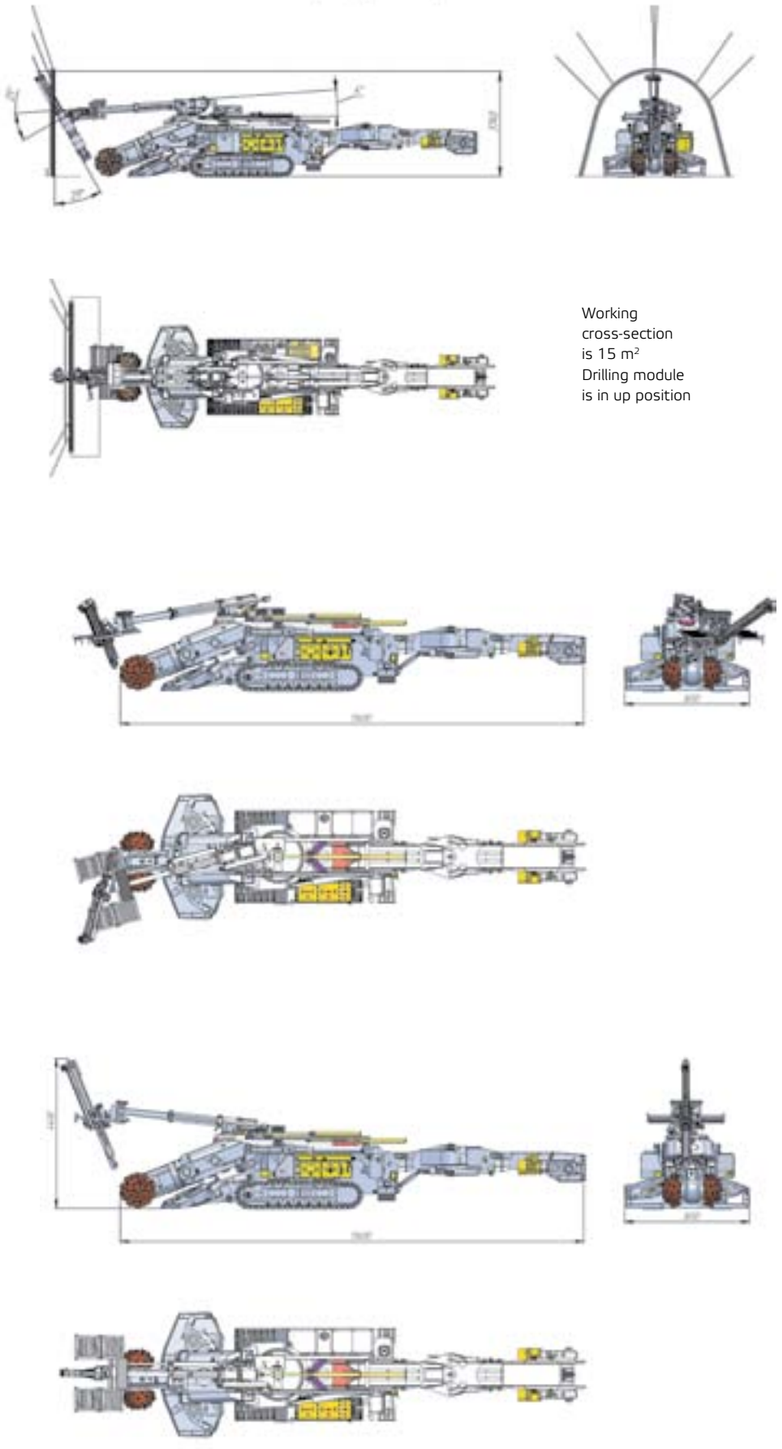
If there is a roof-bolter installed on the machine, the anchorage process may become mechanized, thus contributing to the reduction of tunneling workers efforts and improvement of their labor safety.

Aleksandr UDOVICHENKO, Tunneling Equipment Manager of Product Line Development Department, Corum Group

«There is a demand of roadheaders with high power-to-weight ratio able to operate in the faces with a cross-section of 15 sq. m. Moreover, anchorage technology is widely used in the preparatory tunnels and it makes us think about installation of the roof-bolters on the Corum roadheaders. RH160 will be the first machine of such a kind».

Basic specifications of the roadheader RH160:

Capacity of the electric driving motor of the cutting tool is **160 kW**
Roadheader weight is **55 t**
Maximum hardness of the destructible rocks is **110 MPa**
The diameter of cutting tools is **1,050 mm**
Hydraulic pressure of the shearer is **250 MPa**
Rotary support in the rotating frame of the shearer
Direct drive of the feeder loading stars
Planetary motor reducer at the drive of gear stars



Working cross-section is 15 m²
Drilling module is in up position

Skip and counterweight: turnkey supply for the Geroyev Kosmosa Mine Administration

Corum Druzhkovka Machine-Building Plant manufactured skip SNM11-185 and counterweight PS21-112 for our loyal customer DTEK.

Employees of Corum Druzhkovka Machine-Building Plant made PS21-112, which was the first counterweight manufactured by Corum for the Geroyev Kosmosa Mine Administration. The metal-intensive structure of 25 t will be installed on the multirope machine and counterweight of the skip SNM11-185-1.6 produced at the same plant in Druzhkovka upon the customer request.

Although this equipment is to be used for the rock recovery and purposed for the secondary tasks, miners of Geroyev Kosmosa Mine Administration are not going to neglect it.

If the rock hoisting equipment does not work for only ten days, the whole operation of the coal plant may be paralyzed. That's why our machine builders were particularly thorough when they designed new vessel models.

Literally, everything was considered in the plant: they applied special corrosion coating, upgraded metal structures and parts, completely adapted new equipment to the method of linkage of vessel and their suspensions that had been tried and tested by the miners, provided possible scheduled works for maintenance of the vessels with labor-saving tools installed on them.

TECHNICAL AND TACTICAL SPECIFICATIONS OF SNM11-185

Body capacity – 11 cub. m
Loading capacity – 18 t at once from a depth of 500 m

Yevgeniy PETROV, Chief Infrastructure Equipment Specialist of Corum Group

«The skips of SNM type is a serial nomenclature of our company, but we changed its design for our clients: we arranged a safety enclosure with umbrella, observation site, frame metallic structure, lining of stainless steel, flow guides, sector shutter, cross to connect hanger assemblies, and the rust-proofing agent all over SNM11-185 was improved and adapted to the actual operational conditions. All these amendments made the equipment more reliable, serviceable, and convenient for scheduled maintenance».

Skip duet at one double-drum hoist

Corum Druzhkovka Mashing-Building Plant manufactured two coal skips SO9.3-185 for Dobropolskaya Mine of Dobropolskoye Mine Administration. SO9.3 is a skip with deflection body. Because of such design, minerals are unloaded through the bottom hole by deflection of the body away from the vertical skip frame.

The skips have been individually designed by the engineering department of our company and adjusted to the operational conditions; all remarks of the mine mechanical engineering department were also taken into account. The manufactured equipment is different from previously used models. The customer will obtain reinforced rivet body with demountable elements of the peripheral body part, multifunctional reinforced site, and enclosure. Similar skips have never been used at the mine. The main difference of the model is an increased body lift capacity achieved without changing the skip length and width. The body is coated with a wear-resistant steel Hardox (6 mm and 8 mm) ensuring long operational life of our equipment. A reserve coating with a set of replaceable bushes for slide guides will be delivered to every customer in the first year of operation.

Dobropolskaya Mine ordered the skips to implement the project of modernization of skip hoisting of shaft No. 1 purposed to increase skip hoist capacity significantly. One of the performance improvement options is the use of the skips with increased body loading space without carrying out any significant mining operations in the skip loading case. Reconstruction process is quite difficult and takes a lot of time. That's why the customer asked us to design multifunctional skip, which has been created by means of design features. Now, this skip may work both in the shaft before reconstruction and in the reconstructed shaft.

Two skips will be operated together at one double-drum hoist.

TECHNICAL AND TACTICAL SPECIFICATIONS SO9.3-185-1.3

Body type – deflection
Skip body capacity – 9.3 cub. m
Lifting capacity: 10 t of coal per one hoisting operation

Deflection sheaves for a mining enterprise

Improved deflection sheave design ensures safe and faultless operation of the hoisting complex. Equipment downtime caused by the failure of the sheave parts will be minimized. This way the customer will be able to eliminate direct losses caused by the fact that the amount of produced ore is below the scheduled hoisting capacity.

Every sheave is operated as a part of the four-rope hoisting machine TsSh4x4rP. The machines are operated at the skip winder, hoisting magnetite ore to the surface. The ore is produced in the underground mine at a depth of 700 m.

Tatyana KALUGINA, Director of Corum Druzhkovka Machine-Building Plant

«Although the deflection sheaves are produced by Corum in series, we managed to provide some design improvements. We improved design of steel structures, installed rolling bearings SKF in the bearing units and disks, fitted the sheave with a set of slot inductive sensors. Our client will receive a sheave made of modern components».

Deflection sheaves are used to ensure the required angle of the traction sheave by head ropes and maintain the set distance between the axes of the suspended hoisting vessels. This supply provides customer sheaves, which design is in compliance with all actual reliability rates.

Modern parts, additional sets of liners in the package of spare parts will ensure nonstop operation, and the installed sensors for measuring disk rotation speed will make measuring of the actual speed more precise, which is important for multirope winding. Moreover, the new sensors significantly reduce time required for maintenance of electrical equipment.

A large variety of Corum cages

In the second half of the year, we signed contracts for production and supply of nine equipment with several mine administrations. The most popular items are non-dumping cages NOV.

In 2018, plants of Corum Group manufactured a lot of cages of different type and modification: serial non-dumping cages for single- and multirope winders, dumping cages, customized large and special cages purposed for the secondary hoisting tasks.

Traditional single-deck cage 1NOV400-9.0 and 1NOV360-6.0 were manufactured for Obukhovskaya Mine Administration and Novogrodovskoye No. 1⁄3, respectively. Dumping cages are very popular with the miners, and four cages UKOA3.3 and UKOA2.55 are in production for Novogrodovskoye Mine No. 1⁄3.

The peculiar feature of UKOA cage is dumping of the rotating platform of steel structure together with a car therein. This is how the car is dumped.

A double-deck cage 2KNM4.0-150 is used for multirope winding, and it was delivered in the second quarter as a part of suspension unit for head and balancing rope and used at Obukhovskoye Mine Administration.

Two individual cages 1NOV140 soon will be supplied to the miners of Belozerskaya Mine Administration. The dimensions of the cages are similar to the dimensions of typical elevator, and they are used for inspection purposes and emergency hoisting in the case of evacuation from the mine.

Sergey ASTAPENKOV, Principal Hoisting Equipment Design Engineer of Corum Group:

«Movement of the miners along vertical tunnels is a very demanding challenge. Cages mounted on the hoisting units are used to move miners up and down at the mines. Automatic locks are used when it is necessary to transport a rock or auxiliary materials in the cars at one or two decks. They are purposed to fix the mine cars and prevent their possible displacement within the steel structures of cages when they are moved in the shaft».

Currently, most cages are customized. Corum cages are in compliance with the requirements of technical task; the cages are special as they are customized at the design stage, characterized by high quality and guaranteed reliability.

KL1200: a chain of nine conveyors for Poltava Ore Mining and Processing Enterprise

Transportation of iron-ore concentrate from the filtration department to the plant where the milled iron ore concentrate is made; this concentrate is used for iron or cast iron production. A 1,200 mm wide belt conveyor is used for these purposes.

In August, our company signed a contract for supply of belt conveyors with a 1,200 m belt to be operated at Poltava Ore Mining and Processing Industrial Complex (the city of Gorishni Plavni). A part of the order, conveyors K-1 and K-2, will be manufactured and shipped by the end of the year. Other conveyors (K-6, K-7, K-8) will be delivered to the customer in February 2019.

The conveyor design is similar to the known mine conveyors, but their fundamental difference is a surface complex required under the certain operational conditions. Thus, for example, cargo gear is used to stretch a belt; this gear automatically supports the constant stretch of the conveyor belt without permanent control and adjustment as against mine rope.

Corum Group has been manufacturing mine belt conveyors since 1994. For almost 25 years, our company has sold 510 belt conveyors of different size: with a width of 800 mm, 1,000 mm, and 1,200 mm.

Boris DUMA, New Product Manager of Corum Group

«Belt conveyor market is characterized by extensive competition. There are about 10 manufacturers of such equipment only in Ukraine. But experience of our manufacturing plants plus our focus of customers make us serious players of the segment of the mine transport market».

Conveyors K-1, K-2, K-6, K-7, and K-8 are a part of the transport chain consisting of nine conveyors and designed for transportation of iron-ore concentrate outside and inside the facilities of Poltava Ore Mining and Processing Enterprise. The conveyors have been designed as customized one-of-a-kind items.

Highly reinforced cars VG4.5U-750-4.5(-01) for the Central Ore Mining and Processing Enterprise

Corum Druzhkovka Machine-Building Plant manufactured the cars VG4.5-750-4.5 taking into account specific requirements as to the elements of structure for the Central Ore Mining and Processing Enterprise – namely, Ordzhonikidze Mine (Kryvyi Rih).

Mine freight cars VG4.5U-750-4.5(-0.1) are designed to transport ore rock mass with a bulk density of 4.5 t/m³ (iron ore), and other cars VG4.5-750-4.5 are designed to transport the rock mass with a bulk density up to 3 t/m³.

Anton ZAYTSEV, Manager of Infrastructure Equipment, Product Line Development Department of Corum Group

«To prevent formation of fractures in the frame rails in the point where the rails get off the wheel pair mounts, the office of the Chief Designer of Corum Druzhkovka Machine-Building Plant added two fins between the body bottom and wheel pair mount case to transfer the load from the cargo in the body directly to the mounts and then to the wheel pair dampers rather than to the frame rails».

In summer 2018, Corum Druzhkovka Machine-Building Plant manufactured the ordered cars VG4.5-750-4.5 of model VG4.5U-750-4.5(-0.1)—that is, in accordance with the requirements to the structural elements applied at the Central Ore Mining and Processing Enterprise – namely, Ordzhonikidze Mine (Kryvyi Rih).

Before, the cars were supplied in 2014 (8 pcs.), and in 2018 we delivered 30 items and didn't upgrade the car design significantly.

The car VG4.5U-750-4.5(-0.1) is the most heavy-duty car manufactured by our company. Parameters of the car structural elements: body wall thickness is 14 mm, body bottom thickness is 20 mm, frame rails form the corner are 200 x 200 x 20 mm. Wheel pairs are manufactured with hard thread.

The customized structural toughness and strength of the car VG4.5U-750-4.5(-0.1) is ensured by the brace in the body corner and underlying angle spreading all over the bottom perimeter at the place of transition of vertical wall to the body bottom; internal binding angle on the perimeter of the upper body edge; 4 vertical rods from the angle at every side wall (two rods for other models) and fins under the body bottom.

Design documentation has been developed at Druzhkovka Plant and based on the customer (Central Ore Mining and Processing Enterprise) configuration data sheet and considers all requirements of the car features.

Main technical specifications of VG4.5U-750-4.5(-0.1):

Capacity (structure) – **4.5 m³**
Load capacity – **11.3 t**
Track – **750 mm**
Tread diameter of the wheel – **400 mm**
Joint – rotating coupling
Coupling axis height from the rail level – **365 m**
Rigid wheel base (distance between the wheel pair axis) – **1,250 mm**
Overall dimensions, not more than:
- Length over buffers – **3,950 mm**
- Width – **1,350 mm**
- Rail level height – **1,550 mm**

Weight – **4,200 kg**

KTPV-1000

Transformer substations made in Ukraine

Corum Group electrical equipment is resistant to the technological overloading during operation and may be used for 30 years without overhaul.

TWENTY ITEMS FOR KAZZINC

Since 2016, Corum Group has been supplying to Kazzinc about 20 substations every year. This year was no exception: in the fall 2018, our company shipped 14 transformer substations KTPV and two transformers TSP-160 to the Kazakhstan mining holding.

«Warranty operating life of our transformer substations and transformers is three years from the commissioning date,» says Sergey Podolyan, Electrical Equipment Manager of Corum Group. «But they actually operate for 30 years and more without overhaul. They are resistant to technical overloads. Our technical equipment is reliable, and this is the best quality for the price. That is why our customers like our transformer substations and transformers manufactured by Corum Group and regularly order them.»

In the second half of 2018, our company shipped two substations KTPV-400 and KTPV-630 for Mining Company Selidovugol (Donetsk Region) and three substations KTPV-630 for Pokrovskoye Mining Administration. Miners like our quality and technical specifications of our products.

Aleksandr KOVALCHUK, Director of Corum Svet Shakhtyora Plant

«Our company has vast experience in production of transformer substations: we have already manufactured 47,000 substations since 1961. This equipment is operated by all mining enterprises of CIS countries. Many transformers have been operated for several decades».

Sergey PODOLYAN, Manager of Electrical Equipment, Product Line Development Department of Corum Group

«Substations KTPV-400/6-0.69 UKhL5 are upgraded depending on the customer requirements and proposals. They may be equipped with electric power meters DMG-200, automatic switches Susul, earth leakage current protection devices AZUR-4PP. Our substation is equipped in such a way to enable our customer to operate electrical equipment with frequency converters and control its operation through the common automated control system of the mine».

Currently, we are manufacturing another five substations KTPV-1000 for Pokrovskoye Mine Administration.

AN EU COUNTRY BOUGHT A BATCH OF UKRAINIAN ELECTRIC EQUIPMENT

In November 2018, we signed a contract for supply of eight substations KTPV-400/6-0.69 UKhL5, which enabled us to develop good business relations between machine-building company Corum Group and Estonian company Viru Keemia Grupp (VKG). This will be the fifth batch of substations dispatched to the EU country since 2014. Our company has supplied 16 substations KTPV during this period.

New batch of KTPV-400/6-0.69 UKhL5 will be installed on the high sliding frames to be operated in the wet places. In February–March 2019, we are going to ship substations KTPV-400 to the shale mine Ojamaa being part of Viru Keemia Grupp AS.

FEEDBACK

OJAMAA MINE, VKG KAEVANDUSED OU, ESTONIA

We have ordered several Corum substations for our mine for the past several years. They manufacture electric equipment of the highest quality and use modern parts. The most important is that company takes all our requirements into account and manufactures customized transformer substations specially for our mine. This is the electric equipment of the highest quality that doesn't need any warranty maintenance.

Corum Repair: how to can extend the equipment life

Equipment life cycle consist of three main cycles: introduction, operation and overhaul. This edition is focused on the equipment operation and tells on how midlife repairs may extend the equipment life and postpone overhauls.

Aleksandr MIROSHNICHENKO, Director of Corum Repair

«Overhaul is a costly stage followed by the long shutdown. Thus, the extension of periods between repairs is a double benefit for the customer because direct expenses and losses are minimized. That is why planning and performance of the midlife repairs are of high priority for Corum Repair. Of course, if machine is maintained by our service on a regular basis, we will be able to check its repair history and quite accurately foresee a scope of the midlife repair».

QUALIFIED ASSEMBLING AND ADJUSTMENT

Amount of work performed by the contractor depends on the requirements and qualification of the customer maintenance department. Usually, it takes about 1–3 midlife repairs before overhaul. Quality of the work determines a period of operation until the next repair as well as required amount of overhaul. Corum Repair maintenance service specializes in the midlife repairs at the customer site as this work results in significant extension of the equipment life cycle and reduction of the customer expenditures.

The most important projects for Corum Repair implemented in the second half of 2018 were reconstructions of two KNF roadcutter systems that substituted previous models of KN78 roadcutter systems at Dneprovskaya and Yubileynaya Mines (DTEK).

«Today mine fleet consists of two KNF roadcutter systems, that is why the extension of their life cycle is on top priority,» says Dmitriy Imentsov, Chief Longwall Equipment Specialist of Corum Repair. «Dneprovskoye Mine Administration ordered spare parts from the trade company, and we joined only at the machine assembly stage. It took a month to assemble and adjust the machine. On October 25, 2018, the equipment was successfully commissioned and passed through the face entry of the longwall 1160 of Stashkova Mine.»

INTEGRATED REVIEW REDUCES RISKS

Preparation for the KNF repair at Pershotravenskoye Mine Administration started in the repair workshop of the mine long before operations start. They engaged Corum Repair at the fault diagnosis stage in the spring 2018. Maintenance service ordered the required spare parts and carefully controlled how they were manufactured and shipped. All operations were carried out within the terms determined by the technical task.

«We had to finish the repair by the end of 2018,» sums up Dmitriy Imentsov. Our plants managed to bring supply forward, and, consequently, all operations were completed in early December, and the complex was successfully commissioned at Stepnaya Mine.

Comprehensive repair approach enables us to agree on the terms of reference and mechanism for interaction between the contractor and customer in advance, consider all possible risks, and prepare for the repair as carefully as possible.

It takes about 30–40 days, a team of 2–3 Corum Repair specialists, and 1–3 customer representatives to perform assembly directly on the surface of the tunneling machine. It is also possible that one specialist of the maintenance service may carry out supervision and engineering control.

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