



# DIGEST Corum Group





# CLS550P for thin seams

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Corum Group

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## DEAR **PARTNERS!**

Our company approved the "Corum-2030" development strategy. This means we continue the course of sustainable development adopted earlier, thereby guarantee the reliable partnership to our business for years to come

Today and in the future, our company is ready to offer your enterprises modern, innovative and high-tech solutions to increase the mining output, reducing overall time for reaching output goals and improving the security for processes adapted for customized for your individual tasks.

Our priority is to complete the "turn-key" projects, which allows our specialists from different subdivisions to provide every client with high-qualified support and to be engaged in every stage of the project implementation. Therefore, our company assumes responsibility for the results. Now we base our work on the same principle, and our main plan for the next 10 years - is to expand and improve this one.

MINE CONSTRUCTION. For the last three years, we have been witnessing 2-2.5 times increase of demand for Corum Minespecialbuild services per year. Seeing this, we have decided to increase our efforts to develop in the area of mine construction and offer the services of vertical and horizontal shafts construction and inclined tunnelling. We also see some prospects of restoring previously preserved entities. Corum Minespecialbuild already has the relevant experience in Vorkuta (p. 6).

Our mineshaft constructors are in favour not only in coal mining, but also in mining industry overall. They are currently implementing a large-scale project - the construction of a ventilation shaft for Zaporizhzhya Iron Ore Plant (pages 8-9). By 2024 they will have built a new ventilation shaft from scratch. This project will enable the enterprise to develop their business for decades to come.

INVESTMENTS. Corum expands its portfolio of services: we offer to our clients the range of casting products (page 10). We intend to increase the output of this workshop from 1400 to 5000 tons per year.

To master new products and produce equipment with increased service life we modernize selectively our plants - casting, forging capacities and power

TRANSFORMATION. The global tendency towards de-carbonisation makes our company to develop in related branches of the industry. Further long-term diversification of business will be consisted in widening of the product portfolio - we find the development of hydraulics and electrical equipment very promising. Such way we will be able to satisfy market demands in other areas, not related to mining industry. All these transformations will be assisting in developing Corum Group company during these times of change.





hydraulics manufacturing particularly. Our expectations concerning the demand of these workshops products confirmed by the KPMG company research.

The above will allow us to increase business efficiency, expand service life of manufactured products and master production of new equipment, according to the client needs.

**NEW MARKETS.** Our company can observe a huge long-term demand of its technologies and overall professionalism on the markets of Turkey and India, as the countries plan to augment volumes of mining mineral resources due to their significant growth of energy consumption. The company's experience in development of individual products adapted to the clients' needs and expanded product portfolio will facilitate this process.

Dear partners! Corum Group company has significant plans for the next 10 years. Our strategic goal – is to develop ourselves for you and alongside to you.



## THREE STAGES OF QUALITY CONTROL HOW DOES CORUM GROUP ENSURE **PRODUCTION QUALITY**

Every unit of Corum Group machinery is subjected to thorough quality control before to be delivered to the customer. The company's manufacturing enterprises are implementing a strict three-staged system of quality control. Exposure and removal of nonconformity at the earliest stages allows us, as the manufacturer, to optimize production terms and financial expenses and to provide our clients with a better offer at price-quality ratio as an outcome. Next, we will minutely provide a detailed explanation of the ways our company controls quality and reliability of produced equipment



Anastasiia GULINA Head of Quality Management Department of Corum Group

The system of quality control represented here allows us to produce reliable equipment and the long service life of our machinery proves it. Furthermore, we need to be sure that our products provide safe conditions for miners to work. The growth of Corum Group net promoter score (NPS) is truly confirming that our clients appreciate the quality and reliability of our equipment (see page 34 for detailed information).





All materials and parts delivered to Corum plants are subjected to strict control. It removes the possibility of using low-quality materials while manufacturing our products.



Regular audit of the suppliers secure stable quality of materials purchased. Corum cooperates with hundreds of suppliers all over the world, choosing leaders in their sphere of activity.

The inspectors and laboratories check the supplied product by several parameters: mechanical qualities, chemical composition and geometrical parameters. We use modern measuring equipment to fulfil this process.

It allows ensuring high

quality of materials for

further production.

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Removing of low-quality materials on this stage is an obligatory requirement to meet the contract terms of production and to reach the high reliability of our equipment.

Products that fails the quality control stage returns to the supplier. If that happens again, the supplier gets blacklisted, and the cooperation with such one is terminated.

This stage excludes almost 

100% of the "human factor" during production process by repeated control of all product parameters. Using measuring tools and testing equipment we reject low-quality parts during production and remove the possibility to use them in the final product.

Every workshop of the plant is involved in the production chain. The part is checked for compliance with technical requirements by worker, his supervisor and the inspector. The product passes to the next production stage after receiving three confirmations.

-Q2

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Quality control of Corum Group's

final products implies stand testing,

where the equipment is subjected

is tested. Successful testing of

calculations and guarantees its

passed all the tests is shipped to

reliability. Only the equipment

the client.

the equipment confirms designers'

to extreme loading and its durability

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Products rejected the quality control stage are utilized or transferred for removal of nonconformity or into recycling

regularly provides learning courses for

employees. Qualified experts allow

the company to master new product

lines, improve the list of services for

for more than 130 years.

clients and remain the industry leader

To improve product quality and workplace culture Corum company

## STAGE II Quality control during production process



Around 10 test stands provide various types of loading, which allows us to check the equipment efficiency in the conditions as close as possible to operating ones. During stand testing, we check about 50 parameters



Products failed the quality control stage are to be returned for revision, but such cases are quite exceptional. To avoid such inconsistency in the future the enterprise investigates the cause and performs obligatory troubleshootina.



## SINKING. RESTORATION OF VORKUTA **VENTILATION SHAFT HAS REACHED** A NEW STAGE



Construction specialists of Corum Minespecialbuild are to deepen the ventilation shaft No. 4 of Komsomolskaya mine (part of the largest coal mining company in Russia -Vorkutaugol) for almost 100 meters. After the restoration is complete, the shaft depth will reach around 1000 meters and will give a lease of life for the enterprise.

pecialists of Corum Minespecialbuild began to work on shaft sinking in April. Work performed by using blasting technique: boreholes (vertical and inclined) are drilled in the shaft foot to place explosives there. After the explosion miners load the blasted rock into buckets and lift to the surface. In the face created they install a casing and concrete a new area for mine-

shaft reinforcement. Such repeated cycles of sinking works allow us to deepen the shaft to the point of 1001.65 m. Before sinking, the miners of Corum Group

mine construction department had drained the 900 meters long shaft by pumping out about 50 thousand cube metres of water. This volume would be enough to fill 20 Olympic pools. Our specialists applied submerged pumps together with staged pumping to drain the water, as in the shaft chambers constructed before there were installed pumps one after another. Using them, water was successfully pumped up to the surface. These works allowed mine construction workers to prepare the shaft for sinking and reinforcing, which is going to be the final stage of Corum mine construction project in Vorkuta.

After the sinking and reinforcing works are done, the ventilation shaft No. 4 of Komsomolskaya mine will be equipped with hoisting machines Ts-3.5x2.4 - one of the largest drum-type machines produced by Corum. Miners will be able to descend into mine to almost 1 km and get back using the new equipment. This activity will become a part of realizing a complex project for the largest mining enterprise in Russia - Vorkutaugol. Miners of the Subarctic will receive the facility to operate in 2022



Dmitrii TORUBALKO Production Planning and Organization Manager Corum Minespecialbuild

k lt is almost twice cheaper and more profitable to restore preserved mine shafts rather building new facilities. Rich experience of our construction department, successfully implemented in Ukraine and abroad, prove our position. Mine restoration allows a client to resume coal field mining with significantly reduced time and costs.

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## **INCREASING SECURITY OF TUNNELLING WORKS** CORUM MINESPECIALBUILD MECHANISES INSTALLATION **OF METAL SUPPORTS**

To provide the increased security of tunnelling works on Pokrovskoe mine administration, support installation process will be mechanized. As an experiment, this spring Corum Minespecialbuild specialists implemented this innovation on the client's facility.

onstruction specialists of Corum Minespecialbuild completed more than 10 km of tunnelling works for Pokrovskoe mine administration - the result of 2.5 years of the strategic partnership between two companies.

Currently the metal-arched support is installed manually. To complete this task workers create special temporary shelves. The tunnelling man climb these 1.5 meters

scaffolds and install the metal frames of the support. Such method demands a lot of labour and time, while being risky as well. All these conditions decrease the efficiency of tunnelling works. To optimise this intensive process, Corum Minespecialbuild specialists proposed to mechanize the installation of framed support. For that purpose, the specialists modernized the tunnelling machine used on Pokrovskoe mine administration. Engineers of Corum Druzhkovka Machine-Building Plant produced special setting device for supports installation with operating shelves and mounted it on the roadheader.

According to preliminary estimates, these activities will make miners' work much easier, by relieving them from the necessary to lift the heavy metal support frames. Furthermore, this innovation must improve the security of this process. If the experiment is successful, it will be applied universally during tunnelling works in other faces of Pokrovskoe mine administration

## CORUM



Head of the Corum Minespecialbuild Department More than 300 labourers of Corum Minespecialbuild help specialists of Pokrovskoe mine administration to reach the largest coal deposits in Europe. In 2020 three crews of Corum Minespecialbuild processed nine tunnels, performed five linkages (including one performed by counter-tunnelling with theodolite traverses more than 5 km long). Total length of tunnels constructed during the past year amounts to almost 4852 m. This way Corum Group mine construction department prepared two longwalls for operation, which allowed Pokrovskoe mine administration to keep stable rates of coal minina

Viktor YAROSHENKO





## **"THE LUNGS** OF THF MINF" CORUM MINESPECIALBUILD HAS STARTED THE CONSTRUCTION **OF VENTILATION SHAFT IN UKRAINE**

project and maximum efficiency of solving the client's problems.

Oleksii ZHYTNIK

Director of Corum Minespecialbuild

Our company has a significant and successful experience

especially valuable for us to add such

involved in its implementation, which

will allow us to control every stage

and achieve the integrity of the

in the implementation of complex

mining projects. Moreover, it is

a large-scale and unique project

of the construction and equipping

the South ventilation shaft No. 2

to our portfolio. Several departments and plants of ours are

Last summer Corum Minespecialbuild signed the contract for construction of Southern ventilation shaft No. 2 for Zaporizhzhya Iron Ore Plant with execution period set for the end of 2024. Sinkers have already performed some preparation works and began the implementation of a largescale and ambitious project in Zaporizhzhya region (Ukraine).

he 1.2808 hectares area of Zaporizhzhya Iron Ore Plant (ZIOP) is a place of active preparations for construction of the Southern ventilation shaft No. 2 and attendant complex of facilities: headframe with a mine surface building main ventilation assembly with a building and a ventilation conduit, hoisting machine

with a building, fire reservoirs with a pumping station.

This place being just a green field one year ago, now has units of construction machinery, the foundation pit for drilling freeze wells, piling fields for buildings' foundations and the first stages of constructing the wellhead on its territory. These are just some preparations in a way to implement this ambitious project for SVS No.2 construction.

Soon a large-scale and hi-tech construction will begin on this site. There were no such construction projects in Ukrainian mineshaft building for about 10 years ago.

### GROUND FREEZING IS A COMPLEX SHAFT CONSTRUCTION TECHNOLOGY

Because of the complicated geological and mining conditions, the construction of a new ventilation shaft on Zaporizhzhya Iron Ore Plant requires efficient technologies to fulfil this project.

Artificial ground freezing is the most approved method, which allows constructors to build Southern ventilation shaft No. 2 on watered grounds. To use this technology Corum Minespecialbuild will have to reduce the ground temperature around the shaft almost to -40°C to create subarctic conditions.

Four cooling machines supplied by the leading European manufacturer will be maintaining the sub-zero temperature while constructors will be creating 355-meters deep vertical mine shaft.

"Using the artificial ground freezing technology there will be created an additional temporary support around the shaft (or so called the ice-rock wall): the ground freezes up to 2.5-5 meters horizontally and to 320 meters in deep" says Nikolai Stepanenko, Corum Minespecialbuild manager for technological support of the production. - Groundwater freezes, so that simultaneously increase solidity of the grounds crossed, protect the shaft and the miners from rock

inrushes. In other words, this technique will allow us to create secure conditions for the project to be done.

The ground freezing will be completed the following way: on the 15-metres radius from the centre of the future Southern ventilation shaft No. 2 there will be drilled forty-three wells with pinpoint accuracy up to the depth of 320 metres to place the hermetic freezing columns. When our constructors complete the ventilation shaft structure, the unfreezing mode will be turned on and the well boreholes will be dismantled.

Nobody used the artificial freezing technology in Ukraine for more than 10 years because of its complexity.

### COMPREHENSIVE APPROACH TOWARDS MINE-CONSTRUCTION PROJECT AT ZIOP

Construction of Southern ventilation shaft No. 2 at ZIOP is a unique and ambitious project for Ukrainian mine building and machine building industry.

Corum Minespecialbuild specialists will perform the main part of this project – the sinking of the ventilation shaft and providing all necessary equipment.

Engineers of Corum Group enterprises will develop and produce the facilities required for these buildings as well. For example, the Corum Svet Shakhtera plant will produce the tubing for Southern ventilation shaft No. 2. The casted sections of

the cast iron ring will make the shaft frame hermetic, so it will certainly serve to Zaporizhzhya Iron Ore Plant for several decades. This will be the first external supply of Corum Svet Shakhtera casting in Ukraine. Until now, Corum Group had been manufacturing casting structures exceptionally for its own needs and to the European market.

Our Corum Druzhkovsky Machine-Building Plant will individually design and manufacture 3-meter drum hoisting machine Ts3x1.9. The completing of mechanical and electrical part of Ts3x1.9 is: bearings supplied by European manufacturer and disc hydraulic brakes. There will be used variable frequency-controlled drive to operate the electric motor, microprocessor equipment in the hoisting assembly and signalling system. Such set of facilities will provide a speed of vessel movement along the shaft up to 8 m/s with a maximum static load of the rope up to 14 tons.

During the construction of SVS No. 2 the machine will service the bucket hoisting, and after the construction will be completed it will be re-equipped to work with non-tilting cage. Firstly, it will operate on the depth of 340 m and then at 640 m (this depth will be reached later in accordance with field mining plan). Nevertheless, today the Corum designers are laying the groundwork for the Ts-3x1.9 to operate at the depth of more than 600 m with all safety standards and security rules.



- 2 > Equipping the shaft in the preliminary sinking and ground freezing, equipping the shaft for sinking at the same time: mounting of the headframe, winches and other required tunnelling equipment.
- 3 > Shaft sinking. The constructing and installing the main ventilation mine fan at the same time.
- 4 > Shaft reinforcing. Installing reinforcements.

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The supply of the Ts-3x1.9 machine will be conducted in the extended set of electric equipment: it includes everything necessary to ensure the power supply not only for the machine, but also for the machinery room. The installation of the Ts-3x1.9 machine at the Zaporizhzhya Iron Ore Plant is scheduled for the second quarter of 2022.

Corum Repair service department will perform full installation and commissioning. Thus, two service departments of the company and two production enterprises will be involved in construction of SVS No. 2 for ZIOP. This will allow us to control every stage and achieve the integrity of the project and maximum efficiency in solving the client's problems.

Construction order for SVS No. 2 obtained by Corum Minespecialbuild became a part of further cooperation between the parties after successful realizing of the construction project for the Main ventilation installation of Northern ventilation shaft in 2016 as well as after adjustment of tunnelling equipment and reinforcing the drainage ventilation shaft in 2019.

The launch of the SVS No. 2 complex in 2024 will allow ZIOP to perform mining of Pereverzevskoe iron ore field (estimate of deposits - more than 350 mln. tonnes) and maintain the general output for the mine at the level of 4500 thousand tonnes of iron ore per year. This will ensure the stable operation of the plant for several decades to come.



## CASTING. CORUM EXPANDS **ITS PORTFOLIO OF SERVICES**

Casting production is going to be available now as a separate service. Before it used to be a part of internal production chain of the company. New technologies will allow Corum Group to supply to the market up to 5000 tonnes of casting per year.

oday Corum Group casting is in demand on European market. In 2020, we supplied about 150 tonnes of casting to Poland. In the long run, the demand for casting will be growing not only abroad but in the domestic market as well. These are – the tubing for metro construction, pad brakes for railways, casted armour and casted sidewalls for heavy face conveyors. With a strict look to the future, the company is modernising this part of production now.

The renovation will affect about 70% of all casting production. The old equipment will be dismantled and the new will be installed on two out of three casting workshop areas of the Corum Svet Shakhtera plant. There will be launched for operation the new heating furnace, formation line based on the coldhardening mixtures, double-crucible induction melting complex.

The company's investments into modernizing the casting production will amount to more than 5 million dollars.

The last time the casting production on Kharkov Corum Group plant was renewed back in 2011, when there was re-equipped one out of three areas for 500 kg steel casting manufacturing.

In 2018, the casting production was concentrated on the Corum Svet Shakhtera plant, which allowed us to double the casting volumes. New technologies will assist us in reaching new goals and modernization will allow Corum Group to supply its clients in CIS and Europe with high-quality casting products.



Stepan SANAGURSKYI Head of Corum Group Technical Development Department

The cast producing on our plant is like hand-made. It allows to manufacture exclusive production, but in limited quantities. Our goal is to preserve individual approach to every order while increasing the producing volumes from 1400 to 5000 tonnes per year. This would be beneficial for both our clients and us. Such approach is fully corresponding to our win-win business culture.





**"TURN-KEY" SOLUTION FOR** SADKINSKOE MINE ADMINISTRATION SECOND LONGWALL COMPLEX HAS BEEN LAUNCHED

The face No. 49 of Sadkinskoe mine administration was equipped with a new longwall complex. This face was commissioned at the beginning of 2021. Using the modern equipment, the next 12 months miners intend to extract more than two million tonnes of rock mass

ongwall complex for face No. 49 became the second complex produced for Sadkinskoe mine administration. The first complex was shipped to the customer at the end of 2018.

The composition of the second longwall complex is equal to the first one: KDK500 shearer, armoured face conveyor SPTs230-21.2, stage loader SPTs230-63.1 with connection device and 190 sections of the modernized 3KD90TS 12/24 powered roof support.

The connection shield-conveyor-shearer from the same manufacturer allows the equipment to work efficiently in a seam with a thickness of 1.4 to 2 meters, which provides safe, reliable and productive coal output in difficult mining and geological conditions.

The unique design of Corum R&D specialists constituted the base of longwall complex development - the engineers equipped KDK500 with modern diagnostic system for main assembly units and the "black box" for recording indications of all sensors and operating modes. These are excellent solutions to control and analyse the load of shearer and reducing the equipment breakdown rate during mining shifts.

The conveyor is equipped with a long-life line pan combined with a cast sidewalls and drive units. The total installed capacity equals to almost 1 MW. The screen displays the information required to control the oil and cooling liquid temperature in key units of AFC.

The second complex is helping now the miners of Sadkinskoye mine administration to output rock mass from the face No. 49, while the previous one is operating in the face No. 47. Together this machinery helps the coal mining enterprise to reach their goals and to increase output.



### The video

longwall complex №2 is available via OR code



Aleksandr KOVALCHUK Director of Corum Svet Shakhtera Plant

The complex supply and service assisting equipment by same Corum supplier will provide the Sadkinskoe mine administration with beating coal output rates and high-quality equipment maintenance



Yuri ZUEV Director of Sadkinskoye Mine Administration

We've received the positive results of the cooperation with Corum company while developing the longwall No. 45 and No. 47. Now we are planning to obtain the same outcome while mining the new longwall No. 49 launched in January of 2021. We expect to produce the first million tons of coal by the 1st of June.



## CLS550P THE NEW SHEARER TO MINE "CLEANER" COAL

Corum Group company designed and produced the new-generation longwall shearer CLS550P to mine "cleaner" coal in thin seams. Innovative technologies applied in the new equipment will reduce content of rocks (ash-content) of the "black diamonds" by 4–5%.

ne new shearer is supposed to operate in thin coal seams 0.85 to 1.5 m thickness. CLS550P is a bridge-type shearer with a body designed as a boxshaped frame to place the feeding modules, hydraulic inserts and electric module with frequency converter. The installed on-board frequency converter to operate with chainless feeding system is a distinctive feature of this shearer. Such assembly system allows reducing coal cutting with enclosing rocks, so that means reducing the ash content in the coal produced.

"The CLS550P was equipped with a modern control system," - says Dmitry Pankov, the product-engineering manager

The video about innovative shearer CLS550P

at the Corum Group Engineering and Technical Centre. - It provides control over the load of main units and shearer speed autoregulation".

The control system regulates the shearer operate functions: automating the control, recording the operating parameters, communication between the shearer and  $\approx$ 

Coal mining on the new longwall 427 started in March and is going to be completed by the end of 2021.

other equipment in the face, data transmission to the roadway and/or to the surface, which minimizes the equipment downtime.

The machinery passes industrial tests on Pavlogradskaya mine (DTEK). The CLS550P is unified with the already operating in DTEK mines UKD200-500 and CLS450 shearers, at which there had also been applied the well-tried options in mechanic and electric units.



Competently

Anatoliy KOROLCHUK Corum Group Longwall Equipment Manager

The CLS550P shearer is able to mine up to 10 tonnes per minute with the coal cutting resistance up to 550 kN/m while operating in a very thin seam from 0.85 m. The shearer is fully automated and warrants the safety of miners.



Custom

Aleksandr BEKESHKO Director of Pavlogradskoye Mine Administration

CLS550P is a break-" through in mining equipment. We have high expectations to this shearer and we are glad to watch the development of our machinebuilding partner: Corum Group implement innovations into their products, so the result is the quality of Corum machinery and its efficiency equal or even higher than the European analogues.









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## TOP-3 INNOVATIVE SHEARERS PRODUCED BY CORUM GROUP BEST SOLUTIONS FOR DIFFERENT MINING AND GEOLOGICAL CONDITIONS

he product line of shearers is one of the most demanded ones of Corum Group. The shearers proved their efficiency in different mining and geological conditions of the mines in Ukraine and Russia. The company is constantly working on their improving. Now shearers KDK500, CLS550P and CLS450 totally meet the requirements of modern mines. More information on advantages of every machine is presented in this material.



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It is passing tests at

DTEK Pavlogradskaya

mine in Ukraine

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Operates at the following

mines in Ukraine

Almaznaya

Dobropolskaya Bielozyorskaya

Set a record at Sadkinskove

mine administration in 2019.

Also operates at the

following mines in Ukraine:

Bielozyorskaya

Novodonetskaya

Novogrodovskaya



## STRONG RELATIONS WITH EUROPE **NEW RECORD ON CORUM** MACHINERY WAS SET IN POLAND

The record-setting 1.1 million tonnes of coal was produced from the longwall 922 at Piast-Ziemowit mine in Poland. The miners received such results at 2020 yearend the year after equipping the face with Corum Group sections of powered roof support ZRP 15/35. Such partnership achieved the high rates of output to the Polish enterprise and at the same time allowed us to strengthen positions in the European market.

oal mining from the longwall 922 in Piast-Ziemowit mine will continue until July of 2021. After that, Corum Group roof supports will continue operating in the next longwall 923, where the face mining will be performed until the end of 2022.

ZRP 15/35 roof supports are used to operate in seams with thickness of 1.6 to 3.5 m. The high mining resistance - over

6000 kN - allows to withstand the load of heavy mine roofs in Poland.

"To improve safety of mining equipment operation Corum engineers have installed innovative technologies on the powered roof supports - says Corum Group project manager Mikhail Lysenko. – Hydraulic system with a fluid pressure monitoring function will set a signal to service personnel in a case of a failure. Electronic tags in the support elements keep an operate log. This way the electronic catalogue, where all information considering the operating information is created.

Corum powered roof supports have enabled the run of longwall complex at the Piast-Ziemowit mine and provided the shearer and the transportation chain the maximal efficiency and security of the operation.

Piast-Ziemowit, Sośnica and Wesola mines are a part of the biggest Polish coal mining company Polska Grupa Gornicza (PGG). Since 2018 Corum has already supplied the Polish market with over 400 roof support sections and over 500 casting structures. Corum Group is a reliable partner of PGG enterprises.

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### DOCUMENTS ON COMPLIANCE WITH THE EU REQUIREMENTS

The certificates ISO 9001 - on conformity of quality management and ISO 3834-2: 2008 - on conformity of welding production quality with the requirements of the European Union – they confirm that our company works according to international standards.



Jaroslaw ZNALEZNIAK head of the official Corum dealer in Poland

Sections of powered roof support ZRP 15/35 are manufactured in compliance with international quality standards and EU requirements. To create this equipment we have used high-quality metal, parts produced by leading foreign manufacturers and innovative technologies. Corum has formed a production synergy with our PGG client. We are ready for new cooperative projects.



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Adam ROZMUS Chief technology officer of the Piast-Ziemowit mine

We have equipped the longwall No. 922 with powered roof supports produced by Corum company. It is a high-quality equipment - we realized that after visiting the manufacturing plant in Ukraine. Our miners will be working under the protection of these supports for years to come without overhaul





## POWERED SUPPORT DTM 14/35. CORUM SUPPLIES EQUIPMENT FOR ONE OF THE TOP-5 LONGWALLS

400-meter longwall on Sibirskaya mine is being prepared for commissioning in autumn 2021. It is one of the top-5 longwalls worldwide by its length and planned output volumes. Its equipping with Corum roof support complex is a tribute to expertise of the company with over 130 years of machine-building experience. It is also a challenge for Corum production facilities, which are to produce the roof support DTM 14/35.

orking range of powered roof Support DTM14/35 is from 1.8 to 3.5 meters, installation step is 1.75 m. Section weight amounts to 28 tonnes and specific resistance exceeds 1100 tonnes. Over 8000 tonnes of high strength steel were required to create the

set of roof supports. Corum Group will manufacture 235 sections of powered roof support DTM 14/35 to equip the longwall 1106 of Sibirskaya mine.

support DTM14/35 was produced in September of 2020. In accordance with the contract terms, it successfully passed the factory test, static and cyclic tests on the stand STD-2000. Such testing guarantees reliable functioning of the equipment underground.

Support sections are shipped to the client in batches. The delivery is scheduled to be complete in July-August 2021. The Support DTM14/35 will be operating on Sibirskaya Mine as a part of longwall complex combined with the German equipment: the shearer Eickhoff and the armored face conveyor jointly produced by Corum and CAT. This equipment will allow Sibirskaya mine to achieve scheduled coal output of 6 million tonnes per year with possible increase to 12 million tonnes.

Within this project Corum Group not only supplies its equipment but also performs and coordinates connection of the whole longwall complex in Kuzbass.

The prototype section of powered roof



Inor WASSERMAN Corum Group Roof Supports Sales and Development Manager

For us this order is a confir-mation of our company's expertise in the development and production of powered roof supports for various difficult mining and geological conditions and implementation of complex projects taking into account all the specific requirements of every client.





# Competent



Vitalii SENICHKIN Corum Group Longwall Equipment Manager

For the first time we have used the receiving tanks as a part of the conveyor – the sectional steelwork to accumulate and drain water from the transferred rock mass to special flanges (holes for connection the pumping tubes). The new conveyor guarantees the smooth and fail-safe mine operation.

## NEW CONVEYOR SP326 PRODUCED BY CORUM FOR ROCK MASS DEWATERING



Corum Group have produced the 130-meters long conveyor SP326 for Osinnikovskaya mine. This new equipment will help the enterprise to reduce operational expenses and increase the efficiency of cleaning water reservoir.

he new-type scraper conveyor SP326-91.17 will help Osinnikovskaya mine to minimize manual labour in cleaning the water header using individual engineering options, developed by Corum Group R&D specialists. They equipped cleaning machinery with more complicated filtration system: special sieves will prevent the rock mass from settling into the sediment while drying it off and transferring at a low speed along the tunnel. This technology will allow dewaterConveyor SP326-91.17 has two loading areas. The main flooded rock mass will be transferred to the conveyor near the loading zone of the end-cap area. Water is separated from the coal by special sieves of the pans. After that, the reservoir is filled only with cleaned water via the special waterway from storage containers. While loading on the second area the rock mass firstly moves towards overturning from the upper to lower branch. That is how the primary loss of water happens. Then it keeps moving by the lower branch towards the main drive to the point of overturning the belt conveyor. The rock mass arrives here already dewatered.

ing 200 cubes of flooded mass per hour.

This approach will help a coal-mining plant to reduce operational expenses on cleaning the water and providing additional coal output as well. Before it just used to settle down in the header.

Conveyor SP326-91.17 will be working on the 500-meters horizon. This new conveyor will become the second Corum Group conveyor among the technical equipment of the Osinnikovskaya mine. In July 2019, our company supplied to this coal mining enterprise the same scraper conveyor SP326-90.11, which dewaters and transfers the flooded rock mass from the sump (the lower part of mining shaft) directly to the mine car. Corum machinery proved its efficiency from the first months of operation: unloading of rock mass at the Osinnikovskaya mine (EVRAZ) was performed by 2.5 times quicker while miners were relieved from manual work.

Two operational Corum Group conveyors provide the unification of the main units – another advantage in developing the long-term partnership between the client and the manufacturer. Individual approach helps us to effectively solve the client's problems and achieve high performance rates

### SPECIFICATIONS OF CONVEYOR SP326-91.17

Length	130 m
Total installed power	1x55 kW
Supply Voltage	660/1140 V
Performance	up to 60 tonnes
	per hour
Chain speed	0.2 m/s

## PAN LINE SPTS230 WILL BE WORKING IN SYNERGY WITH EUROPEAN MACHINERY

Corum Group company will produce over 200 sections of pan line SPTs230-41.2 for European armored face conveyor. The new longwall equipment will be used to equip 400-meter longwall, which is scheduled to be launched on Sibirskaya Mine in autumn 2021.

he face, which Corum Group longwall equipment will be produced for enters the global top-5 list by its deposits and size. Sibirskaya Mine management has chosen the best mining machinery produced by global manufacturers to equip it. For instance, Corum Group pan line will be working in alignment with Corum Group roof support sections and German conveyor and shearer.

For the conveyor to be operating well, the R&D engineers of our company have optimised the SPTs230-41.2 structure according to parameters of the European equipment. We used the wear-resistant Hardox steel to produce its bottom parts. This technology developed in accordance with specific needs of Sibirskaya mine will simplify the assembling and conjunction of equipment into a single complex and will guarantee its efficient operation in the future.

Corum Group already had the experience of completing similar task, when the client orders the equipment needed with quality equal to the best European mining machinery manufacturers, but considering to terms more beneficial. The advantages are instantly noticeable during the operation and service maintenance. Corum Group Ukrainian permanent clients reject European analogues in favour of domestic machinebuilding brand ever more.

This is the first import substitution case on Russian market. We are deeply convinced that our pan line SPTs230 will prove its efficiency in the nearest future. The delivery of the last batch of sections is scheduled for June 2021.

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# ompetentl



### Andrey LITVINENKO Business Development Manager, Corum Rus Trading Company

Our company has provided Sibirskaya mine with the best option to equip their new longwall, including the equipment produced by Corum Group and European manufacturers as well. This project will allow the mining enterprise to warranty provide the fail-proof run of the face and achieve scheduled output rates.



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## IMPORT SUBSTITUTION CORUM GROUP HAS COVERED THE DEMAND OF POKROVSKOE MINE ADMINISTRATION FOR ARMOUR FACE CONVEYERS AND STAGE LOADERS

The substitution of imported European mining equipment to domestic machinery on Pokrovskoe mine administration (Donetsksteel company, the largest manufacturers of high-quality K-grade coked coal in Ukraine) is going successfully. The mining enterprise achieved these results gradually alongside Corum Group machine builders. Let's sum up the results.

urrently Corum Group completely covers year demand of the Pokrovskoe mine administration in pan lines of armored face conveyors and stage loaders. In 2021 our machine-building company will supply the miners with two crushing units DSh264/800 and the main large parts for the Czech belt stage loader PZF-05. The industrial testing of scraper parts and drive servo elements is scheduled as well, which also provides optimization of client's operational expenses for equipping and maintenance the longwall faces.

The import substitution program was launched on Pokrovskoe mine administration in 2018. In order to substitute expensive imported equipment with domestic machinery the mining plant signed a longterm partnership with Corum Group. Due to implementation of the hi-tech Corum equipment with service maintenance, such synergy between the parties will allow increase the coal output efficiency on the Donetsksteel Company enterprises.

In 2018, Corum company launched the mastering of the new spare parts assort-

ment customized in accordance with the client needs. After successful testing the first 20 pieces of lightweight pan-sections SPTs230 (the analogue of CZK228/800) had been delivered to the client. During the following year there also has been completed the operation tests of heavyweight pan sections (the analogue of CZK260/852). When positive results were achieved, the manufacturer has delivered the complete typical-size pan lines and a crushing unit DSh264/800 for stage loader.

The client receives a wide range of advantages in ordering the mining equipment produced by domestic manufacturer. For example, a full transparency of the order completion – the access to the production facility and possibility to take part on every stage from the development of documentation up to manufacturing, acceptance tests and shipping the equipment produced.

In addition to the equipment received, the client can obtain a wide range of ser-



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Corum Group has produced the crushing unit DSh264/800 (the main photo) and the overhauled drum of crushing unit DU-1 for Pokrovskoe mine administration.

vices in assembling and commissioning machinery. Proximity of the production to the client also allows completing the orders in time and providing the service and the technical assistance.

With all these advantages, a quality of the equipment equals or even overthrows the European analogues. We are sure that miners of Pokrovskoe mine administration have already convinced in that.

Pokrovskoe mine administration also plan the next range of the import substitution. In addition, the schedule of changing the equipment to the domestic-produced ones is a prior for us as well

The main goals of the cooperation between Corum Group and Donetsksteel companies are the substitution of expensive imported equipment to the machinery provided by domestic manufacturer. The partnership between the companies allows reducing the operational expenses and increasing coal mining efficiency at the Pokrovskoe mine administration by implementing the hi-tech Corum equipment.

## CORUM





**Olea NESTERENKO** Director of Corum Trading company

The maintaining high efficiency of face and transport chains is one of the relevant tasks for any mining plant, so the management of Pokrovskoe mine administration has chosen our company. Within this partnership, we have undertaken the production development and delivery, while providing the necessary unification with existing machinery. As a reliable partner of Donetsksteel, Corum Group has confirmed the willingness of mastering and producing the range of armoured face conveyor units at workshops of Corum Svet Shakhtera with the simultaneous providing the necessary unification, quality and service life for the existing equipment park of the mine.





## CORUM GROUP HAS MODERNIZED THE SHEARER KA200



Corum Group has produced new KA200 shearer for Yubileynaya mine (Pershotravenskoye mine administration, DTEK Energo). The manufacturer used electric engine with modified shaft structure for the shearer, using involute splines, which increases the machinery service life by 40%.

quipment KA200 – is a mass-pro-- duced shearer with vertical drums. Corum Group produces this equipment with Chain feeding system of the shearer

Due to its ergonomic features, this mining equipment perfectly fits the thin formations of DTEK Energo mines. Stable demand for this equipment allows the manufacturer to modernize KA200 and to improve its structure and component parts.

Corum Group machine-builders modernized the electric engine of the new shearer KA200 based on R&D designers' recommendation. They changed the electric engine shaft structure, using involute splines, which allowed increasing the drive service life by 40% as well as reducing energy consumption.

This year on March, the new shearer was commissioned in the longwall 132 of Yubileynaya mine. Corum machinery for several months has already been helping the miners to produce coal: the daily output now is reaching 3000 tonnes with coal cutting resistance up to 500 kN/m.

The new shearer KA200 is the 45th one in the technological park of DTEK Energo mines and it will be helping the miners to produce coal and fulfil the scheduled output in time, as its predecessors used to do.



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The video about

shearer KA200

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Valery KRUPITSKY Chief Production Officer, Corum Group

KA200 is a mass-produced shearer that showed good results in extracting strong coal with weak adjacent rock of the thin seams. In the nearest future, we plan to develop such shearers by equipping them with drums without cutting chains and using chainless feeding system.



Aleksandr UDOVICHENKO Corum Group Tunnelling Equipment Manager

Corum Group developed a frontal cutting system with increased power to weight ratio, productivity and service life to solve cases that are more complicated. This will expand the system applicability in the terms of the rock strength up to 100 MPa. Consequently, it will be more efficient in solving tasks such as mining of installation chambers for longwall complexes and processing of low-tech coal deposits.



DTEK

### DTEK Energo

Frontal cutting system KNF – is a powerful and reliable machine. Usage of KNF allowed us significantly reduce the terms of face preparation. This also allowed us commissioning the longwalls per scheduled terms with minimum expenses for assembling and preparation works as well. Having the support of the Ukrainian Corum machine builders, we are increasing coal production and strengthening the energetic independence of our country.



# SYSTEM KNF

Corum Group machinebuilders produced the unique frontal cutting system KNF for miners of Ternovskaya mine (Pavlogradskoye mine administration, DTEK Energo) in February of 2021. This machine was commissioned in April.

seams

roof support, angular scraper conveyor and a stage loader, which allows miners to prepare the mounting tunnel for a new longwall to be launch operation as quickly and safely as possible.

The complex has automatized the process of cutting tunnels in difficult mining and

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## FRONTAL CUTTING SPEEDS UP THE FACE LAUNCH FOR COAL MINING BY 30%

his new complex is supposed to excavate the rectangular cross-section in up to 2 meters low-thickness

The machine includes the roadcutter,

geological conditions. The high capacity of up to 1.5 tons per minute allows increasing the mining speed up to 10 meters per day, as a result – speeding up by 30% the face launch for coal mining in thin seams.

Using the frontal cutting system allow solving two main problems - the construction of preparation chambers to install the longwall complexes and the mining of lowtech deposits of coal formations for various purposes. In both cases, the frontal cutting system has a wide range of advantages in comparison with roadheaders used by most of the enterprises.

The new frontal cutting system is the fifth one in DTEK technological park and the second one for Pavlogradskoye mine administration. Since 2014 the Corum frontal cutting complexes mined over 6000 linear meters on the DTEK enterprises and destroyed almost 53 000 m<sup>3</sup> of rock mass.

The system performed itself perfectly in face preparation - more than 25 roadways with cross-section of 10 m<sup>2</sup>. This is a truly unique equipment, unrivalled by its technical features.



# **RH160**

**TIME PROVED CORUM INNOVATION** FOR MINING **EQUIPMENT** MARKET

## **INNOVATIONS DRILL-LOADING MACHINE BPR-02** HAS BEEN EQUIPPED WITH MODERN **CONTROL SYSTEM**

R&D engineers of Corum Group equipped the drill-loader released in 2021 with modern control system. This innovation allows monitoring the function of all BPR systems from the surface in the real time. Such improving increases security of tunnelling in mines, especially those that are dangerous due to gas and dust presence.

orum Group R&D specialists developed new control system of BPR-02 equipment based on programmed industrial controller with advanced monitoring and diagnostics features.

The BPR control system enables to collect the data about the operating mechanisms in real time. The system allows transmitting to the surface and dispatcher monitor the information concerning the

state of drill and thermal protection of every drive. It captures network voltage of the machine station and energy consumption of electrical equipment, as well as oil level and temperature in the oil tank and other functions.

The new control system BPR machine has been certified in accordance with technical regulations of the Customs Union, which allows using it in underground tunnels of coal and potassium mines, including those dangerous due to gas and dust presence in face.

The data transmission is performed via Ethernet interface or Wi-Fi network - this option is customized with equipment of every mine.

BPR machines are used in particularly strong rocks requiring destruction by the blasting method, in conditions where the use of roadheaders is ineffective. Loading speed of 3 m³/min and drilling speed of 48 m/h provide miners the high output rates.

BPR machine manufactured by Corum Group operates on mines of Ukraine, Republic of Belarus and Russia.



Artem ROMASHOV chief engineer for design of tunnelling equipment of Corum Svet Shakhtera

We equipped BPR-02 with local control coloured panel, which displays state of drives and protections in real time. It has a simple interface, which ensures its comfortable and efficient exploitation. The factory testing of BPR-02 has successfully proved this.







- ☆ Up to 12 thousand of installed metallic anchors per year
- ☆ Strength of cut rocks up to 110 MPa

### **Golden prize** of URiM 2019

in the category "Development and producing new technological equipment for coal mining industry"



d corum.com To order the equipment please contact official Corum representatives in Russia, Ukraine, Kazakhstan and Poland.



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## TS-3X2,2AR – "TURN-KEY" **PROJECT FOR POKROVSKOE** MINE ADMINISTRATION DESIGN, MANUFACTURING AND INSTALLATION



The new ventilation shaft No.3 at Pokrovskoe mine administration (Donetsksteel company) was equipped with hoisting machine Ts-3x2,2AR, which lifts miners to the surface of the 11-th block. The new equipment is already helping the miners to hoist down and up the staff and cargo to the depth of almost 1 km during facility construction. This ensures a stable and safe functioning of the coking coal mine.



The video about hoisting machine Ts-3x2,2AR for Pokrovskove Mine Administration

he maximum static rope load of the machine with 3-meters diameter drum is about 14 tonnes. To sustain such assignment R&D engineers of Corum Group adapted the latest innovative applications in the field of hoisting equipment designing. Ts-3x2,2AR was equipped with a modern control system, radio communications, shaft alarm, the equipment for power supply and controlling the electric motor. These technology advents will provide the reliable work of the hoisting machine.

Corum Druzhkovsky Machine-Building Plant used the best options offered by domestic and global manufacturers from Japan, Italy, Belgium and Germany to complete the hoisting machine. Ts-3x2,2AR was equipped with geared drive, 800 kW electric motor, pad-radial braking system, pneumatic panel and air supply system.

The specialists of Corum Repair service have performed supervising of large hoisting equipment installation at client's site. They also performed the adjustment and commissioning of the machinery. In addition, the engineers briefed miners of Pokrovskoe mine administration on the new equipment operation, the methods and ways of maintenance, which allows increasing operational safety of Ts-3x2,2AR and extending its service life

Evgeny PETROV Corum Group Infrastructure Fouipment Manager

Several business units of Corum Group were involved in the

development of Ts-3x2,2AR hoisting

service department. Such entire list

to assembling and commissioning

the ongoing works on every stage

receives "on-key" equipment and

ouality assurance.

of the project. In the end, customer

the equipment – allows us to control

machine: engineering office. production facilities in Druzhkovka,

of services – from designing

### A MINESHAFT IN VORKUTA WILL BE EOUIPPED WITH 3.5-METER DIAMETER DRUM HOISTING MACHINE

Ts-3,5x2,4 hoisting machine is already being produced for Komsomolskaya mine (Vorkutaugol company). The specialists of Corum Minespecialbuild will use the new machine to equip the ventilation shaft No.4 after it is recovered. This is also going to be a "turn-key" project for Corum Group, when the client receives mine construction services and reliable mining equipment in a single package, so this activity will give Subarctic mine a new life (see page 6 for more information on mine construction project in Vorkuta)

## CORUM WILL PRODUCE AND SUPPLY TO KAZZINC **MOST-PROPORTIONED SHEAVE H336-2**

The headgear sheave H336-2 has six meters in diameter, the weight of 14.5 tonnes and a load withstanding up to 404 tons. This is the most proportioned sheave of Corum Group product portfolio. This year in June our company will produce such hoisting equipment for Kazzinc company. New H336-2 will be the second one in the client's technological park.

chine-Building Plant. The plant engineers designed H336-2 to satisfy special customer needs.

for Kazzinc are individual radial and frontal sheave rim wobbling. The H336-2 rim wobbling will be 2.5 times less to the number allowed for serial sheave structure.

engineering developed the special technology of equipment manufacturing that makes the assembly and its accuracy stricter.

The implementation of this project includes a delivery of an extended set of the sheave complements, including the SKF









Sergey KURBATOV head of the official Corum dealer in Kazakhstan

Kazzinc company, the leader in zinc, gold, ferrous and rare metals production, has chosen Corum as a supplier of the hoisting equipment. The client appreciated the manufacturer's "turn-key" offer. Corum will produce, ship, and organize commissioning works to install the hoisting sheave H336-2 at customer's facility. This way the client will receive not only the product, but a wide range of services from the manufacturer as well, so these activities will ensure the reliable functioning of the sheave after its commissioning.



nly a few plants in CIS are able to produce such hoisting sheave, including Corum Druzhkovsky Ma-

The structural specifics of the sheave

To receive the required wobbling Corum

clamping sleeve bearings, tools and training of Kazzinc personnel for equipment operation after its commissioning.

Kazzinc ordered two Corum Group sheaves at once: the first was delivered in October 2020, the second will arrive to Kazakhstan in June 2021.

The new equipment will support and direct the rope during lowering and lifting the mine bucket. H336-2 sheave will work on the skip hoisting that lifts produced ore. This will increase efficiency of the client company's overall output.

Currently Corum Group is producing a set of sheaves for other ore mining plants: one H336-2 sheave for Yakovlevsky Mining Plant (Russia) and two H336-2 sheaves for Krivoy Rog Iron Ore Plant (Ukraine)

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Tatiana KALUGINA Director of Corum Druzhkovsky Machine-Building Plant

The complex approach in solving the client problems allowed performing a main ventilation fan overhaul and supply fresh air for underground tunnels of Heroiv Cosmosa mine.



## NEW MINE FAN VRTSD-4,5 SM HEROIV COSMOSA MINE RECEIVED A SECOND BREATH

The new rotor for main fan VRTsD-4,5 SM was produced and installed in short terms by Corum Group company for Heroiv Cosmosa mine (DTEK Pavlogradugol), which provided the continuous supply of fresh air to the underground mine tunnels and allowed the plant non-stop producing coal.

fter the 10 years of operating, the rotor shaft of the main ventilation fan VRTsD-4,5SM on Heroiv Cosmosa mine has been cracked. Mine admi-

nistration specialists detected this during preventive revision. It was decided to produce a new rotor based on Corum Group production capacities to avoid breakage and stopping of the main fan.

The Corum Group Engineering and technology centre designed and Corum Druzhkovsky Machine-Building Plant produced this rotor, taking into account the needs of the client.

On every stage of production, our specialists applied the best methods and parts made by global manufacturers.

Corum Repair specialists supervised the assembling and adjustment while installation the equipment on the site. The specialists were assembling the mine fan within 24 hours and to reach that purpose there used significant human and technological resources. As a result, in just several months the mine received a modern and reliable fan unit with high efficiency, reduced energy consumption and increased service life of more than 30 years.

Power of VRTsD-4,5 SM is 4 megawatts. The mine fan has an operating capacity for about 340 m<sup>3</sup> of air per second and creates pressure of 430 mm w.c. This is enough for stable and reliable ventilation of the existing tunnels.

The repaired mine fan was commissioned in November 2020. Now it works with rotation frequency of 400 rps (with maximum possible frequency of 500 rps), having reserves for future ventilation of new seams and distant tunnels.

One single ventilation unit VRTsD-4,5 SM ventilates about 100 km of mine tunnels of Heroiv Cosmosa mine per day. The stable main fan functioning provides the efficiency and safety of the work for more than 2600 miners, who also provide the constant coal mining to increase the energy independence of our country.



## VLG-18-750 **EXTRA-COMFORT MINE CARS**

Corum Group produced a set of modernized passenger mine cars VLG-18-750 for Yakovlevsky Mining Plant. This supply of mining transport differs the serial product by increased reliability and comfort, which guarantees safe transportation of people in mine tunnels.



he mine car VLG-18-750 is designed to transport people in horizontal tunnels in coal, shale and ore mines. Typical design of Corum Group VLG-18-750 mine cars has a wide range of advantages: stability on the rails due to increasing the width of undercarriage and better grip. The mine cars are also have no significant pushes. This quality was achieved due to installing damping elements on the push-on coupling devices and hangers.

In addition, another advantage of the mine car is its ability to fit into the turns - turn radius of 10 meters instead of 15. All this ensures the high demand for this transport.

Nine VLG-18-750 mine cars for Yakovlevskiy Mining Plant were modernised according to client needs and safety requirements for personnel transportation in the mine. The mine cars were equipped with extra rigid doors and elements of the wagon structure. The seats are soft and comfortable. Due to additional insulation, the level of noise and vibration inside was reduced. We also increased the reliability of bearings of wheel pairs by reinforcing them. This will create comfortable and safe conditions for people transportation in underground tunnels of mine at the speed of 20 km per hour and increase the service life of mine transport.

VLG-18-750 was equipped with closing doors instead of the opened chain frames, which protects the passengers from the wind and cold while moving on the surface, as well as in cases when temperature underground goes below null.

ing the operational safety of VLG-18-750 mine cars has already been guarantying the high demand for Corum Group transport for the last 15 years.

The regular modernization and increas-



Anton ZAITSEV Corum Group Infrastructure Equipment Manager

The two-tier mounting of the wagon warrants the comfort of mine car passengers. The first tier is a set of rubber dampers absorbing the energy of high frequency vibration with small disturbance range. The second tier is a set of springs absorbing the energy of small frequency vibrations with large disturbance range when wheels go through bumps and joints of the railway. Rubber dampeners support the seats and create additional damping while moving. The seats and the backs are equipped with soft upholstery with filling. Mine cars are protected from water below, which is important for passenger transportation in flooded tunnels.

## POWER TRAIN KTPV-EP-1250 CORUM WILL PRODUCE INNOVATIVE MACHINERY TO INCREASE MINING EFFICIENCY



Corum Group introduces to the market a set of new-generation KTPV-EP type power trains with rated power from 400 to 1600 kVA. This machinery will allow mines increasing efficiency of the underground works. The first prototype of KTPV-EP-1250 will enter to the market in 2021.

ne power trains of KTPV-EP series are unique equipment developed by Corum Group engineers taking into account the European experience of similar products manufacturing. This machinery is able to supply power to 10 units of technological equipment with voltage of 1140 or 660 V. KTPV-EP power train controls the technological equipment (for example, two-speed conveyor), observes operating parameters of powered equipment, gathers and keeps the information.

A distinctive feature of Corum power train is expanded functionality for protection. The access to the information kept is regulated - the control system has several access levels: high, medium, low and without code. On the high level, there are system security parameters, on the medium level - the main technological parameters of equipment, on the low level - statistical data and the one needed to choose the most suitable running mode for powered equipment. Level without code just allows looking through basic information.

The program records every adjustment of the parameters by date and time without the possibility to change log. Power train observes operating modes of the main technological equipment. The system records the operating time for every unit for the entire period of operation. The data is transmitted to the surface via a network. KTPV-EP is equipped with mass storage device in case when the train cannot be connected to network.

All advanced technologies are fulfilled in this power train: modern system of visualisation, control and management. Component parts of the leading European companies are used as well.

Release of Power train KTVP-EP-1250 prototype is scheduled for 2021. Industrial testing of new electrical equipment will take place in one of the coal mines of DTEK Energo. After the successful completion, Corum Group plans to launch mass production of power trains.

### TECHNICAL SPECIFICATIONS OF KTPV-EP-1250

Nominal rating capaci Nominal rated voltag the highest (B the lowest (HF Power transform short-circuit loss, kV ED-100%, at 115 ° Idle curre

A new prototype of Corum Group electrical equipment will be produced for Pokrovskove mine administration.

NFW SFPARATING

SUBSTATIONS KTPV-T-630/6

WILL INCREASE SAFETY OF MINING COMPANIES

eparating substations KTPV-630/6-6 are intended to power supplying of three-phase alternating current collectors with a frequency of 50 Hz. This allows dividing mine network into parts without galvanic connection. The new machinery will also provide protection from loss of current and maximum current protection of the secondary high voltage line.

Separation transformer KTPV-T-630 is a modernization of separating substation TSVR-630 type, exclusively produced by Corum Group for many years.

The manufacturer equipped this hightech unit with high-voltage separating load switch device, three-phase separator with short-circuit breakers, vacuum contactor and protection control unit, which in total will significantly increase the convenience, reliability and safety of mining equipment.

The KTPV-T-630 substation can be included into information controlling system as a low-level substation. Data exchange with

substation performed via the data exchange protocol Modbus RTU. The KTPV-T-630 substation is equipped with smart functions of monitoring, remote controlling and event logging.

The prototype of separation transformer KTPV-T-630 has already been launched for production. After the successful testing at Pokrovskoe mine administration Corum Group plans to expand the product line and produce 1000, 1250 and 1600 kW substations.

### TECHNICAL SPECIFICATIONS OF KTPV-T-630/6

Rated power, kVA	630
Frequency, Hz	50
Primary voltage (BH), kW	6
Secondary voltage (BHI), kW	6,2
The coiling connection	U/U-0
scheme	
Voltage of short circuit, %	3,9
Losses of short circuit, kW	5,8
Idle current, %	1,3
Losses of idle current, kW	2,2



Dmitry SHAPOVALOV Senior Key

Account Manager, Corum Trading

The miners and us are expecting that new KTPV-T-630 substations will significantly increase the reliability of mine energy supply system, and reduce the emergency situations if the safety rules are observed. obviously



CORUM



y	1250 kVA
e:	
H)	6.0 or 10.0 kV
H)	1.20/0.69 kV
er V,	
С	7.7 kW
nt	0.95 %



Sergey PODOLYAN Corum Group Electric Equipment Manager

The power train is designed to supply power to the face equipment, lighting and automation circuits. Usage of KTPV-EP power train significantly simplifies the system of energy supply to the longwall, reduces the length of distribution area and reduces labour intensity for equipment transporting and maintenance (scheduled works performance) during the operation. The power train may supply up to 10 current receivers and has 4 connections for rated current up to 450 A, 4 connections for rated current up to 200 A and 2 reverse connections for rated current up to 200 A. Rated currents and the quantity of connections may be changed according to the customer requirements. We are ready to propose the best chose for every facility and client tasks.





## ADJUSTMENT OF STATIONARY EQUIPMENT NEW CORUM REPAIR SERVICE

Corum Group offer "Revision and adjustment of stationary equipment" – a new service to clients if they purchase stationary equipment – the main ventilation fans and hoisting machines. This service is available for company clients since 2021.

Corum Repair provides the new service, which relieves the clients from need to look for contractors for commissioning of large mining equipment. Furthermore, such service guarantees high quality of pre-commissioning as well as training of machine operating personnel. Service support covers the whole guarantee and post-guarantee term of machinery operation.

Corum Group strategic partner, Pokrovskoe mining administration, was the first to feel the advantages of new service in practice. In winter 2021 the Corum Repair service specialists helped the client to assemble, install and adjust the hoisting machine Ts-3x2,2AR (look at page 26 for more information about this equipment). Now the machine operates correctly at the ventilation shaft No. 3 and helps the client to lift and lower miners and cargo up to 14 tonnes to the depth of 1 km.

Now the service "Revision and adjustment of stationary equipment" is available for Corum Group clients in Ukraine. The company works to expand the borders – soon new service will be available for customers who order the stationery equipment in CIS and Europe.

The help of qualified Corum Repair service specialists will be available 24/7 on the hot-line phones. Depending on the task difficulty, the client can receive a phone consultation or order professional help with a specialist to arrive on the site. Such service and swift resolution of the issues will help to extend the equipment service life and reduce idle time, thus preserving high efficiency of mine operation.



on assembling and adjustment of Pokrovskoe mine administration equipment performed by Corum Repair workers



Alexander MIROSHNICHENKO

Creation of the "Revision and adjustment of stationary equipment" service is a significant and responsible step for Corum Repair department. This service covers not only Corum Group stationery equipment. Our specialists' qualification allows us to perform adjustment of both homemade and imported main fans and hoisting machines. We are ready to help the clients, perform the service support and guarantee its quality.





## HIGH-QUALITY SERVICE DURING COMMISSIONING OF LONGWALL EQUIPMENT GUARANTEES TROUBLE-FREE FACE OPERATION

Corum Group provided the full cycle of service support during supply of the new longwall complex for Sadkinskoye mine administration, which warranted the qualified equipment integration into the face and its trouble-free operation.

During supply of new longwall complex to the client Corum service specialists were involved on every stage starting from acceptance of mining equipment to supervising the installation and pre-commissioning in face, so it allowed avoiding personnel errors during longwall equipment commissioning and reducing the time for preparing the face for operation.

- The first time after launching of new longwall complex we have made the test run for new units and mechanisms, as well as personnel training for the equipment operation. At this stage service specialists to be especially attentive is extremely required – says Aleksei Onufrienko, Corum Repair service support manager. – It is important to organise the full technical assistance and minimise personnel errors in time, which allow us controlling the maintenance to be full and correct.

The access to the technical documentation of equipment manufacturers, direct communication with engineering and technical specialists – all these allow our service specialists to make decisions on operational issues and provide the feedback in time. It is very important to setup the optimal modes of equipment operation in the longwall. Hereinafter the client is provided with 24/7 technical assistance of Corum Group service while using the new longwall complex.

The top-management of the key client Sadkinskoye mine administration thinks that the engagement of manufacturer service at the beginning guarantees the quality and efficiency of the equipment in the longwall. In June 2021 the mining company is going to extract first million tonnes of rock from longwall No. 49. (read the material on page 11 to learn more about the new Corum Group longwall complex).

### CORUM REPAIR HOTLINE PHONE NUMBER

For clients in Russia: +7 (863) 303-61-44

For clients in Ukraine: + 38 (050) 993-05-55

Compete



### **Dmitry VOROZHTSOV** Director of Corum Rus trading company

We give every client in CIS countries and Europe a possibility to sign a service contract for high-quality maintenance of mining equipment produced by Corum or other manufacturers. It gives the client an access to qualified technical assistance with flexible personal schedule and systematic supply of spare parts. Such service increases efficiency of equipment operation and extends service life.



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## NPS LEVEL – 53% clients are recommending corum group as a reliable business partner

The net promoter score (NPS) index of our company reached 53% at the last yearend, which surpasses the rates of year 2019 by 11 points.

A bout 150 of 251 survey participants highly estimated the customer-oriented approach and winto-win partnership, the quick response to inquiries and the high qualification of Corum Group team.

To get the most objective appraisal, the clients gave feedback to the entire range of services provided by Corum Group: the warranty and commercial service for products, overhaul services, spare parts supply and all Corum Group product lines. Customers noted the high quality of products manufactured by the plants "Corum Svet Shakhtera" and "Corum Druzhkovsky Machine-Building Plant".

In 2020, the Corum Group has been searching and implementing new technologies for customer relations during the difficult pandemic situation. Modern technologies helped to reduce the distance between business partners: the manufacturer organized on-line acceptance of equipment. This allowed the clients seeing the equipment in operation using high-resolution cameras and operator work, researching the details and communicating remotely with Corum Group specialists. The clients highly appreciate this approach, especially those who located abroad. These small steps towards the client help the company to develop and maintain leading positions in the engineering industry.

Corum Group achieved almost 2x growth in NPS in 2017. Since then our Company's NPS has remained at 42% for DIGEST / 2021



Daniel DOMASHCHENKO Corum Group Marketing Department Manager

Such sufficient growth at 2020 yearend indicates our company knows how to work with client feedback. The customers' remarks help us to improve our results permanently in order to be "better than yesterday". Therefore, when we compare ourselves with our industry benchmarks, we can observe our company to be on the same level with top-list ones and leaders of machine-building sector. In order to keep positions we will continue growing and improving our business, products and services.

three years, a high rate for the engineering industry. In 2020, we achieved the next boost in NPS level. The Company's goal is to increase this index up to 60% by 2022, so Corum Group continues to develop relationships with customers and remain the reliable business partner for mines for many years to come.

We thank every customer who takes part in the annual NPS survey and spends his time to provide feedback. You help us to change and improve our equipment; you give ideas to create new products and improve current ones. In our turn, we do the best we can to make Corum equipment help you to set new output and profit records!

### WHAT IS NPS AND HOW IT IS MEASURED?

To calculate the customer loyalty index or NPS, we ask our customers to answer a question: Would you recommend our company to your colleagues and business partners on the scale from 0 to 10? Based on the scores, the customers' responses are divided into three groups: "Promoters" are those who gave 9-10 points, "Neutrals" – 7–8 points. Those who gave the score below six points are included in the "Detractors" group. The difference between the share of "Promoters" and the share of "Detractors" is our Company's net promoter score index.



## CORUM GROUP launched a mobile app for customers

Corum AR is already available for Android and iOS smartphones users

## Images will come to life in three steps:

**1. Download the Corum AR** app on your smartphone from Google Play or Apple Store.

**2. Point your smartphone** at the photo in this digest with a special icon. A Choose any flat surface.

3. A three-dimensional image

of the equipment will appear at the screen. You can view it from all sides, real sized and on a scale; main units can be controlled, as well as dissembled into components to look into the heart of Corum machines.

DM roof support, CLS450 shearer and RH160 roadheader will be available in the AR format.

### Download Corum AR app:













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