PRONAR

AGRITECHNICA

THE WORLD'S NO.

PRONAR

We invite you to visit the **PRONAR** stand

PRONAR Hall **5** | Stand **B06**

AGRITECHNICA Hannover

10-16 NOVEMBER

2019

Pronar markets its products in 80 countries on 6 continents. Our offer includes agricultural, municipal and recycling machines as well as trailers, wheel rims, side boards, power hydraulics components, complete axles, axle systems and plastic products.

Successful sales of such a wide range of products on so many diverse markets would not be possible without excellent cooperation with regional dealers. The dealers intimately know their local customers, how they think and they can leverage various local cultural associations. That's why I highly value collaboration with our dealers. In order to help the dealers build the strongest position on their respective markets, we strive to provide them with a wide selection of modern and functional products that are excellent value for money. We are also open to any suggestions from the market that our dealers provide.

Our range of agricultural machines on offer is very diverse with over 120 models of trailers, including bale transport trailers featuring side wall hydraulic system, hook lift trailers, livestock transport trailers and high performance and high capacity transhipment trailers for transporting agricultural products. We also offer a complete range of machines for grassland management and animal feed processing that include fertilizer spreaders, mowers, rakes, tedders, wrappers, balers and feed mixers.

For many years, Pronar trailers and machines have enjoyed the unwavering trust of companies from all over the world in the business of public space and road maintenance in little villages, towns and large cities. In their day-to-day work, these companies use our sweepers, sand spreaders, snow ploughs, snow throwers, containers and multifunctional arms with many types of work heads available.

I realize how important environmental protection is for billions of people on all continents. International institutions, such as the United Nations or the European Union attach great importance to environmental protection. Pronar boasts many years of experience in the production of mobile recycling machines such as shredders, screens, conveyor belts and compost turning machines that help to protect nature. These machines make it possible to reclaim degraded post-industrial land, prepare horticultural substrates, shred, segregate and transport waste electrical equipment, furniture or construction waste and obtain material from segregation for energy generation. Recently, we have expanded our offer of recycling machines with stationary waste sorting lines that can process both mixed and segregated waste.

Our goal is to make sure that Pronar's functional and innovative products serve to protect nature and develop agriculture worldwide, which is why we will continue to develop mutually beneficial collaboration with trading partners around the world.

Sergiusz Martyniuk
Chairman of the Board, Pronar

1/2019

CONTENTS

GET TO KNOW US

Pronar Sp. z o.o.,
ul. Mickiewicza 101A, 17-210 Narew
tel. 85 681 63 29
pronar.pl
pronar-recycling.com

Editor in Chief: Zbigniew Sulewski
Graphic design: Jarosław Hackiewicz, Krzysztof Łuczak
redakcja@pronar.pl
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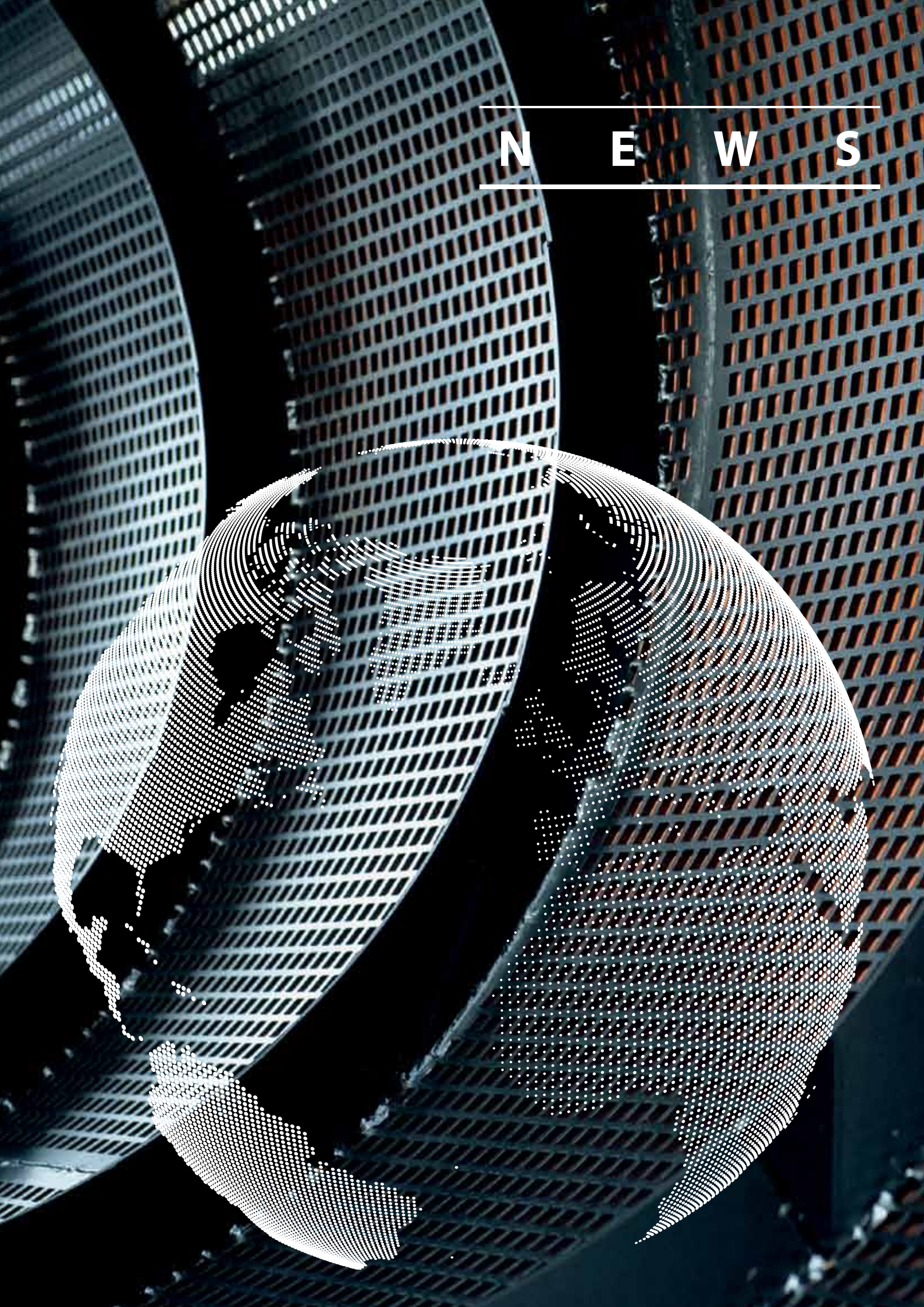
N E W S

JOINT CELEBRATION

As part of its 30th anniversary, on 14–16 June Pronar organised a special celebration in Narew (a town in north-eastern Poland, near Białowieża Forest, Pronar's headquarters). The event, arranged on a grand scale, was participated by several thousand guests, including representatives of state authorities and the local government, business partners from 40 countries, as well as company employees and friends.

This was the largest company event, compared to all other anniversary celebrations, which gave us the opportunity to present the achievements of the company that over its 30 years of activity turned into a global-scale enterprise selling its products to around 70 countries. The company has a stable position on many markets. In Poland, it is also a leader in the manufacture of agricultural, municipal and recycling machinery. It receives many awards every year.

The first day of the event was addressed to the students of technical secondary schools and colleges. It was driven by the following motto: “Let's take a new direction together, let’s discover the factory secrets”. Young people got to know our diverse production and the capability of new industrial facilities. They saw our biggest factory (which manufactures trailers, disc wheels, pneumatic and hydraulic systems, etc.), the Research & Development Centre, and the airfield. They could take a close look at our production processes. Then they took part in a meeting with Pronar's Human Resources staff. The students also learned about attractive personal development paths and the recruitment process used at one of the largest enterprises in the north-eastern Poland, which is also a leading employer in the region.

Additionally, they could take part in an educational tour around the exhibition grounds with an area of nearly two hectares, exhibiting over 300 machines in various equipment configurations, including tractors, many models of vehicles, forestry, hook-type and construction trailers (one-, two- and three-axle types), manure spreaders and reloading carriages,

↑ *Exhibition stands of the Axles and Drivelines Department and the Wheels Department*

machines composing our lines for green fodder harvesting and feed provision, as well as municipal and recycling machinery.

The diversity and production scale shown by Pronar were presented by the Pneumatics and Hydraulics (P&H) Department, Axles and Wheels - Department, Disc Wheels Department and Side Profiles Department.

The P&H Department showed our piston, plunger and telescopic actuators (single- and double-acting types). The guests were particularly attracted by the actuators commonly called large-size actuators, which are installed, for example, in PRONAR's hook-type trailers. The diameter of such an actuator (depending on the model) can be even several hundred millimetres, and its operating stroke is up to 4 m. P&H Department's wide range of capabilities is proven by our cylinders, whose control valve blocks are made directly in the actuator's components. The use of that technology is possible due to highly specialised machinery and equipment as well as the experience of department's engineers. Their products are made not only by

↑ *Exhibition stand of the Wheels Department*

machining, but more and more of them contain sophisticated electronic components, as exemplified by the hydraulic cylinder supplied with an electronic control and measurement system. With continuous extension, the range of pneumatic and hydraulic products is gradually suited to the demands of various markets, so Pronar's products can find more and more buyers worldwide.

The turning and fixed axles, boogie suspension, tracked chassis, spreading adapters used for spreaders, and cutting strips designed for mowers are some of the products made by the Axles and Wheels Department that attracted the visitors. The Side Profiles Department presented three types of products: 500, 600 and 800 mm profiles. The Disc Wheels Department (DWD) showed rims and tyred wheels (6" to 54") used for agricultural, construction, industrial and forestry machines. The department has also presented three versions of new 17"x25" rims (which vary in design and carrying capacity) intended for mining machines and equipment of various performance levels. The guests stopped for a while to look at our biggest, one-tonne tyred wheel supplied with the widest rim in the world, manufactured by Pronar (size: DW44Bx32) and the largest tyre (size: 1250/50R32). The wheel is used for agricultural harvesters. The DWD's presentation fully depicted the production capacity of Pronar, which is globally the third largest manufacturer of rims for slow-speed machines.

The departments that presented their production capabilities manufacture components which ensure a high quality of Pronar's machinery. A continuous growth of sales in many countries could not be possible without the involvement of sales experts supported by the engineers from the Research & Development Centre and the Implementation Department, who continuously introduce new products and upgrade the old ones. Pronar's machines stand out with top quality, prove themselves in the most challenging climatic conditions, and their design and equipment suits the demand of any market.

The second day of the celebration started with an official part, where speeches were given by our guests and by - Sergiusz Martyniuk, the President of Pronar's Owners' Council, who said: - I have called our guests a family, and we want to cooperate with our family in partnership, because if the family is well, it means we are in the right place. I thank all our partners, as our cooperation looks very well.

The attention of guests was drawn by the speech given by Jarosław Gowin, Deputy Prime Minister and the Minister of Science and Higher Education: - President Martyniuk has mentioned how Pronar was founded 30 years ago. This was also the time when free and democratic Poland came into existence. It was not an easy time.

↑ *President of the Pronar Owners' Council Sergiusz Martyniuk hands over statuettes to dealers in recognition of long-term cooperation*

It was 30 years of a very hard work, but now for many years Poland has been a leader among OECD (Organisation of Economic Cooperation and Development) member states in terms of the pace of economic growth. This success is mainly owed to millions of hard-working Poles, including many entrepreneurs, who were real leaders of the Polish economy. Among them, President Sergiusz Martyniuk and Pronar have a special position – said Deputy Prime Minister Gowin. - Right from the beginning, I have understood that this position is exceptional and unique, just like President Martyniuk and his partners are exceptional people. This modern and innovative company is your common work and the reason of pride for you and for all Poles – said Deputy Prime Minister Gowin to Pronar employees.

He has also emphasized that the national "Responsible Development Strategy" makes the Polish economy innovative. - But even if it is still just a plan on the national scale, Pronar have implemented it for 30 years – added Gowin.

Stanisław Derehajło, Vice-Marshal of Podlaskie Province, said: - I am proud that Podlaskie province has such a company as Pronar.

Józef Paszkowski, the Governor of Podlaskie Province, admired Pronar's achievements and market position: - I am happy that our province has such a thriving company, which for the last 30 years has been so daring in winning new markets not only in Poland but also abroad. Pronar is a special phenomenon not only on the national scale, as it is hard to find another company which was set up far from large scientific and industrial centres or big cities, but despite that is so successful. I think that it is a great example of that Polish entrepreneurship, which was triggered after 1989. I wish that Mr President and his team continue their success in the upcoming decades on an even broader scale.

The gratitude for many years of cooperation and the awards granted by Pronar were given by dealers' representatives from many countries, including EURO-Jabelmann from Germany, Rolmech from Poland, and Herwijnen Machinery from the Netherlands. Jimmy Van Herwijnen, the owner of the latter company, said: - Thank you for the award and trust given to Herwijnen Machinery from the start of our collaboration. Looking at all these years, I can see a positive trend of changes at Pronar as well as its fast development. Pronar offers a wide range of high-quality products, which have a stable position even on such a tough and challenging market as the Netherlands. I hope we will continue our cooperation, which will contribute to our common development and a growing scale of activity of our companies.

The employees who particularly contributed to Pronar's growth were given the "For the Great Service to Agriculture" order, awarded by the Minister of Agriculture and Rural Development, as well as Pronar's gold and silver medals. Many dealers were handed statuettes in appreciation of the cooperation.

A good atmosphere at the celebration was ensured by many music bands and dance groups, which presented Belarussian, Polish and Ukrainian folk culture; these included: Kurpie Zielone (a dance and music group from Podlasie, performing in colourful folk uniforms), Kalinka (a band signing Belarussian folk songs), Chutar (a folk music band signing in Belarussian), and Gaj (a Polish folk music band). Folk songs and dances coming from regions located far from Pronar's seat were presented by: Lowzar (a lively Chechen dance group) and Kwaśnica Bavarian Band (a music band from Silesia, performing Bavarian- and Tirol-style music). Contemporary dance arrangements were presented by Grupa Taneczna Szał, and all the guests were interested in the fire show performed by Fenix. The organisers also took care of opera lovers by arranging a concert of Michał Skiepko. The family atmosphere at the event was underlined by a performance given by Maciej Kondraciuk, a young pianist whose father works at Pronar.

On Saturday and Sunday, there were many attractions for children, such as a fine art workshop, face painting point or an exhibition of fire brigade, border guard and police vehicles. Those who wanted a

thrill of excitement were playing at a large inflatable playground. But most attention was drawn to the dance workshop (covering hip-hop, zumba and dancehall styles) conducted by Gabriela Mikołajczyk, an experienced dancer and Polish champion in hip-hop dance. Saturday night ended with fireworks, which amazingly illuminated the night sky over Narew.

The third day of the celebration was marked by a picnic organised for the residents of Narew and nearby towns, and for Pronar employees and their families. They enjoyed themselves and rested watching shows and eating snacks prepared by the company. Just like on the previous days, the guests were very much attracted by the machinery exhibition and the tour around the factory, the Research & Development Centre and the airfield. The opportunity was used by many people taking part in the anniversary. They got to know the production processes, saw the process lines, the state-of-the-art machinery and the Research & Development Centre, being one of the best equipped centres of its type in Poland.

Pronar is one of the most dynamically growing Polish companies. Its success was possible, among other factors, thanks to its own Research & Development Centre, the implementation of innovative technologies which allow producing more and more modern machines, a flexible approach to business, and a hard and effective work of all the staff. Given the ambitious development plans and a systematic growth of sales, Pronar may already look forward to celebrating next anniversaries.

ED

↑ *Kwaśnica Bavarian Band*

↑ *Dance team Kurpie Zielone*

During the 30th anniversary celebrated in June, Sergiusz Martyniuk, President of Pronar's Owners' Council, said: The success did not come without a reason. We had to work for it. Work very hard. Now there is no other company in Poland having such a huge manufacturing base and such a big research and development capabilities as ours. I am very happy that I can see so many friends of our company. I say 'thank you' to all of you for our common success and share with you my happiness of Pronar's achievements. I would like to invite you all for the celebration.

↑ *Exhibition stand of the Wheels Department*

↑ *The sky over the Narew has been illuminated by a wonderful fireworks display*

EXHIBITION AREA OF 2 HECTARES

WASTETECH IN MOSCOW

The high demand for Pronar recycling machines means that we are expected to present our portfolio of product at the most important industry events in the world. Therefore, on 4-6 June, visitors of the 2019 WasteTech trade fair in Moscow could acquaint themselves with the wide range of Pronar products.

From Pronar's very first days on the market, Russia has been one of the key export partners. It is in Russia where Pronar's recycling, agricultural and communal machines, machine components, such as wheel rims, axles, axle systems and as well as pneumatic and hydraulic components have found many clients over the years.

At the WasteTech Trade Fair in Moscow, Pronar presented a visualization of its latest product, a stationary waste treatment line, which is based on many years of experience in implementing mobile recycling machines. The product presentation was very impressive as it was set up on a 24 m² mock-up, which illustrated in detail the operating principle of the waste sorting system.

At 2019 WasteTech, Pronar also showcased one of its world tested and renowned designs - the MRW 2.85h shredder, which is also popular in Russia. The undoubted advantages of this machine include high performance, durability of components and ease of transport, thanks to the structure being mounted on a hook lift chassis. Visitors could have a close look at the version of the machine powered by a combustion engine. The attractively priced electric drive version, characterised by low operating costs, is also available on request.

A unique addition to the Pronar's portfolio are 13 models of mobile recycling machines manufactured using the 3D printing technology. Each of the machines is created using one of the largest 3D printers in Europe, operating at the PRONAR Research and Development Centre.

RB

AGRICULTURAL TRADE FAIR IN LOWER SAXONY

During 12 to 15 July in Tarmstedt (northern Germany), an exhibition took place devoted to agriculture and the supporting industries. About 750 exhibitors participated in the fair, and it was visited by a record number of almost 120,000 guests.

Machines and other products were presented on the 18-hectare exhibition area along with services relating to agriculture, gardening, landscape design, renewable energy and animal husbandry.

The Pronar's German dealer, who once again took part in the event, presented a multitude of Pronar trailer models — hook lifts (T185 and T286), bale trailers with a hydraulic wall lowering and lifting system (T022, T026M and T026M), the RC2100/2 low chassis trailer, the T680 double axle and the T654/2 single axle trailers, as well as the N161 manure spreader.

Many experts attended the seminars and discussion panels accompanying the fair. Issues such as biogas production and use, solar panels, wood heating and community wind farm systems were discussed.

The strong interest in Pronar machines is demonstrated by many sales agreements signed by the dealer during the event.

PR

BAUMA 2019 IN MUNICH

Pronar participated once again in Bauma - one of the world's largest trade shows for construction and mining equipment and machinery, held in Munich. The event was also attended by the largest manufacturers and dealers of municipal and recycling machinery.

The trade show in Munich is a special event, which brings together true leaders of machinery manufacturing and trade. Pronar was among them, which proves that the Narwia-based company is a reliable and substantial partner in the industry. During numerous meetings, organized together with the German dealers Koelsch and Christophel, the diversified Pronar's offer was presented to potential buyers from many continents. Many questions referred to the new products - MPT conveyors (MPT 15g, MPT 18/1g and MPT 24/1g), MRW 1.300 slow-rotation single shaft shredder and MRS 1.53 quick-rotation shredder. The visitors were particularly interested in MPB 20.55mobile drum screen, presented thanks to collaboration with the German dealers. Their questions concerned mainly the machine performance and the types of processed materials.

The trade show was also attended by Mr. Sergiusz Martyniuk, President of the Board of the Pronar Owners. His presence created an excellent opportunity for the exchange of information between the representatives of dealers, users of Pronar machines and potential buyers. During many meetings, President Martyniuk presented the vision of company development. The company's stand was visited also by journalists, who paid special attention to Pronar in their trade show reports, highlighting production diversity, presented machines and the growing presence of the company on many world markets. High interest in Pronar machines during Bauma trade show, indicates good perception of the brand.

Collaboration with Christophel and Koelsch at the stage of preparing the stand proves, that in addition to further development work and designing new machines, the company should focus on creating a dealers' network based only on the proven and reliable partners with a strong market position. This will guarantee both, better accessibility of Pronar products, and the high level of after-sale services.

The next Bauma trade show will take place in 2022.

MP

↑ *Visitors have paid a lot of attention to Mobile Trommel Screen MPB 20.55*

NEW PRODUCTS FROM PRONAR AT 2019 SIMA IN PARIS!

On Sunday (24/02/2019), the next edition of 2019 SIMA, Paris International Agribusiness show was launched, which will last until 28/02/2019.

This year PRONAR surprised everyone with its new products.

A new variety of wheels from 6 " up to 10" used in machines such as rakes, mowers and many others had their world premiere at SIMA.

In our flagship category of 22.5" floatation wheels, PRONAR presented the new wheel rims with a higher speed index, i.e. up to 70 km/h. The complete "boogie" TYPE suspension with UTAC homologation dedicated to the French market enjoyed keen interest of the visitors.

For the first time, sets of complete wheels with tyres from certified manufacturers such as TVS EUROGRIP and Carlstar / Carlisle were also presented.

Our Wheels Department has produced wheels for over 20 years. We are the 3rd largest manufacturer of low speed wheels in the world and supply our products to more than 90 countries on all continents.

RM

MASKINEXPO 2019 TRADE SHOW

MaskinExpo Trade Show, which took place on May 28-30 in Märsta, is one of the largest trade shows in Sweden presenting machinery and services for municipalities. The event gathered visitors from all Scandinavian countries, who took it as an excellent opportunity to learn about new solutions in agricultural, recycling and construction machinery. The exhibition space of 300 thousand square meters was used by over 220 exhibitors.

The PRONAR brand is widely recognized in Scandinavian countries, so the presence at MaskinExpo Trade Show was a priority for the company. During the event, Pronar presented three models of snowploughs (PUV3300, PUV3300M and PUV3600HD), hook trailers (T185, T286), as well trailers for stones and debris (T701HP and the prototype of T679/4M).

Respect for the natural environment is very important for Scandinavians, therefore high interest in the recycling machinery offered by Pronar was no surprise. Representatives of the company answered numerous questions regarding MPT18/1g belt conveyor and PRONAR MRW 1.300 mobile slow-rotation shredder.

Due to innovative solutions applied in its machines, Pronar provides products, which perfectly meet the demands of Scandinavian market. The most popular on the market are machines designed for year-round operation, such as trailers for stones and debris offered by Pronar.

ŁG

PRONAR IN ISRAELI MARKET

Pronar sold a first recycling machine to Israel in the first half of 2019. MPB 20.55 on wheel chassis with newest model of engine (Tier IV compliant) was the first model delivered to customer.

Each of the recycling machines exported by Pronar is equipped with elements ensuring not only the most effective waste processing, but also mechanisms that guarantee high work efficiency in a given climate zone. Due to the fact that the MPB 20.55 mobile trommel screen is supposed to work in difficult conditions (high temperatures and high dustiness) it was equipped with Cleanfix systems and a high-performance cooling system. Pronar specialists conducted trainings for operators and service technicians and helped to make the first start of the machine.

The delivery of the trommel screen to Israel is a great success of Pronar, due to the extremely high quality requirements for machines imported into this country. Pronar MPB 20.55 is used in modern waste sorting plan in the production of compost.

MD

PRONAR IS A PARTNER OF HARDOX® IN MY BODY

HIGH QUALITY GUARANTEED

In July last year Pronar joined the partners of the Hardox® in My Body (HIMB) programme by the company SSAB. Pronar is a leader in the production and sale of agricultural equipment, trailers, modern recycling and municipal machines in Poland. The company operates 7 factories and employs over 2,200 employees. In addition to machines, Pronar also manufactures pneumatic and hydraulic components, side walls, axles, transmissions, axle systems, as well as wheel rims for low-speed machines (third in the world in terms of production numbers).

In July last year Pronar joined the partners of the Hardox® in My Body (HIMB) programme by the company SSAB. Pronar is a leader in the production and sale of agricultural equipment, trailers, modern recycling and municipal machines in Poland. The company operates 7 factories and employs over 2,200 employees. In addition to machines, Pronar also manufactures pneumatic and hydraulic components, side walls, axles, transmissions, axle systems, as well as wheel rims for low-speed machines (third in the world in terms of production numbers). The HIMB programme certification confirms the high quality of Pronar products made Hardox® wear resistant steel made by SSAB (a global metallurgical company manufacturing high strength steel).

Pronar has been cooperating with SSAB for over a dozen years, utilising the special steel varieties from Swedish smelters. Hardox wear plates are used for load boxes in PRONAR trailers. The use of Hardox steel in the floor and side walls of the T679 and T701 series trailers provides increased strength and durability, and thanks to the reduced weight, increased load capacity. The HIMB symbol marked on these trailers confirms that the original Hardox wear plates produced by SSAB are integrated in the product. It is a guarantee of high quality products for our customers.

Pronar's participation in the HIMB programme means design and marketing support, the opportunity to implement joint development projects, and priority access to technical assistance and training tailored to the needs of our employees. For Pronar's own Research and Development Centre, this creates a wide range of opportunities for joint work on new innovative designs that utilise high-strength wear resistant steel.

MP


MPT 18
PROVAR

RECYCLING AND MUNICIPAL MACHINES

RECYCLING EQUIPMENT RANGE

MOBILE STOCKPILERS


MPT 18g


MPT 24g


MPT 15g


MPT 18/1g


MPT 24/1g

MOBILE SLOW-SPEED SHREDDERS


MRW 1.300


MRW 2.85


MRW 2.85g


MRW 2.85h


MRW 2.1010

MOBILE HIGH-SPEED SHREDDER


MRS 1.53

WINDROW TURNER


MBA 4512g

MOBILE TROMMEL SCREENS


MPB 14.44


MPB 18.47


MPB 18.47g


MPB 20.55


MPB 20.55g


MPB 20.55gh


MPB 20.72


MPB 20.72g

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PRONAR

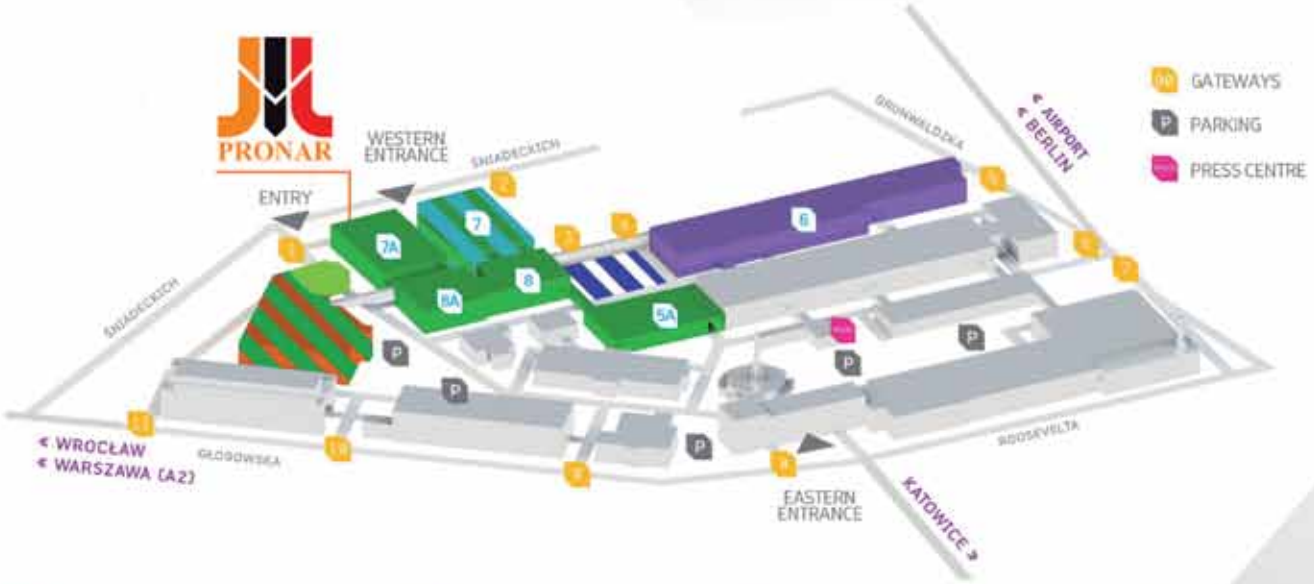
INTERNATIONAL TRADE FAIR FOR ENVIRONMENTAL PROTECTION

WE INVITE YOU TO VISIT PRONAR STAND
HALL: 7A
STAND: 1

9-11 OCTOBER 2019

POZNAN

POL ECO SYSTEM



CONFERENCE ROOMS

EXTERNAL EXHIBITION

POL-ECO SYSTEM

EKOFLOTA

THE MPB 18.47G MOBILE TROMMEL SCREENS IN CHINA

THE PODLACHIA TWINS

At the turn of May and June in Nankin, the former capital of China, experts from Narew trained the sales staff of a Chinese dealer and employees of a client who recently purchased a number of PRONAR MPB 18.47g tracked chassis mobile trommel screens. The training included presentation of Pronar recycling machines, a discussion of machine design, operation and servicing, all through a hands-on approach.

The training was divided into two parts. During the first part of training, all recycling machines produced by Pronar were discussed — trommel screens, shredders, belt conveyors and compost windrow turners. Pronar's trainers have outlined the extensive in base equipment and additional equipment, which significantly improves the machine functionality and boosts productivity. An important part of the training was showcasing the Pronar machines in operation when processing various materials in different climatic zones during changing weather conditions.

During the training session on servicing techniques and methods, the specialists from Pronar emphasized the safe operation of machines, the recommended servicing intervals and engaged the trainees in a detailed discussion on various risks of damage to machines resulting from improper use.

The hands-on part of the training involved the design and operation of PRONAR MPB 18.47g trommel screens ordered by the client. After the training, the client was well prepared to put the new machines to good use for the first time. Tracked trommel screens are equipped with a remote control in base. The remote control device not only allows to control the moving machine, but also to change its settings. This improves the ease of use and increases operator safety.

The Pronar mobile trommel screens, dubbed "the Podlachia twins" by the Chinese owner, did a great job. Thanks to the precision of screening, the material leaving the complete sorting line consisting of two trommel screens was very thoroughly screened. The quality and performance of PRONAR trommel screens clearly exceeded the client's expectations. Using our machines from Narew, the Chinese client is planning to launch the production of wood chips and decorative mulch. Thanks to Pronar trommel screens, raw components can be easily extracted from the processed material. It is the opinion of the owner that Pronar recycling machines are of very high quality. The client decided to purchase the Pronar brand machines, because in contrast to other companies, including the renowned German manufacturers, we deliver them quickly and at very attractive prices.

Anna Augustyniak

The Author is Export Sales Specialist at Pronar

↑ *Przesiewacz 18.47g w Chinach*

PRONAR MRS 1.53 MOBILE HIGH-SPEED SHREDDER

EFFECTIVE AND FUNCTIONAL

The MRS 1.53 high-speed shredder is the latest addition to the range of Pronar machines, which can be used to build a mobile recycling line. Its technical specification makes it ideal for shredding branches and wood waste intended for the production of biomass or enhancing compost.

The MRS 1.53 high-speed mobile shredder is a new machine designed, constructed and manufactured by Pronar specialists. It is equipped with an inline-six-cylinder, 12.78 litres, 530 HP economical and efficient Volvo Penta Diesel engine. An important feature of this engine is its maximum torque of 2650 Nm available speeds as low as 1950 RPM. The engine meets EU Stage IV and US EPA Tier 4 Final emission standards. It is a simple and proven unit manufactured with Volvo Group technology. Its unquestionable advantage is that there is no need to replace the Diesel Particulate Filter (DPF) and Diesel Oxidation Catalyst (DOC), since these components have been replaced by a Selective Catalytic Reduction (SCR) and an Exhaust Gas Recirculation (EGR) valve that ensures low emission of harmful nitrogen oxides (NOx).

The engine of the PRONAR MRS 1.53 shredder is easy to repair and spare parts are readily available. Its construction allows for all fluids to be exchanged quickly, which significantly saves time and reduces work interruptions. The Engine Management System (EMS) 2.3 software provides the engine with optimal operating parameters and supports instant diagnostics of any errors. The engine drives a 1,100 mm shaft rotating at speeds of up to 1,000 RPM and hydraulic cylinders allowing to configure the machine for work.

Mounted on the shaft are 36 interchangeable flail blades, which can be tilted (in the place of attachment) in case foreign objects such as metal or stones are encountered in the shredded material. This prevents blades from being damaged or even destroyed. The rotating shaft of the PRONAR MRS 1.53 high-speed shred-

der moves vertically in a wide range from 40 to 90 cm. The torque converter is another component that is designed to protect the machine against damage caused by foreign objects and contamination in the material. The torque converter eliminates the hazards caused by sudden overloading of the machine.

The PRONAR MRS 1.53 high-speed mobile shredder can be equipped with a number of accessories that significantly enhance its functionality. One of them is a screen mounted behind the shaft, allowing to adjust the subscreen fraction of the material at the output end of the machine. Pronar of-

↑ *A set consisting of a tractor and a Pronar front-loader + gripper bucket e.g. CHC18 or CHC20 can be used to top up the material in MRS 1.53 shredding chamber.*

fers a very wide range of sizes and shapes of screen perforation. Other accessories include a neodymium magnetic separator for separating ferromagnetic contaminants, a self crawler system, an extra compressor and fire extinguishers.

The MRS 1.53 high-speed mobile shredder ensures high efficiency and functionality of the Pronar recycling line, which can be built with the MPB series trommel screens and the MPT series mobile belt conveyors. The machine is used especially in the production of biomass, operating in line with the Pronar MRW slow-speed shredders and MPB series trommel screens.

Mateusz Daniluk
The Author is Export Sales Specialist at Pronar

ENGINE

Volvo Penta (EU Stage 4, 13 L, 389,81 kW (530 KM)@1900 rpm)

FRACTION SIZE

It can be adjusted by exchanging sieves placed under the shaft. Innovative technology of their production using water cutting and special high-strength steel significantly increases durability.

ABS AND TRACTION CONTROL SYSTEM

The European road approval allows for transport at speeds up to 100 km/h.

SHREDDING SHAFT

Equipped with 36 knives, it rotates at 1000 rpm. It crumbles green waste, wood and pallets.

COMPRESSOR

The air compressor mounted on the machine allows you to clean it after work (additional equipment).

CLEANFIX

Facilitates work in difficult conditions. Automatically cleans the hydraulic oil cooler

THE USE OF RECYCLING MACHINES IN PRODUCTION OF COMPOST

FAST AND EFFICIENT

Cut-off tree branches, mown grass, leaves and plant debris, as well as sewage sludge and some expert knowledge. This is a recipe for compost. This recipe cannot be implemented on a larger scale without high-performance, specialized machines.

Municipal waste, including lawns clippings and plant residues from gardens, parks and cemeteries, as well as marketplaces, are ideal for compost production. This waste is usually of different sizes, and must be shredded before being formed into a compact heap. Thanks to this process, an excellent structural material for the heap is obtained. Fragments of shredded tree branches up to 10 centimetres long optimize the composting process.

The PRONAR MRW 2.85 low-speed mobile shredder is ideal for pre-processing the source material. The machine can be manufactured with various types of chassis (hook, wheel or crawler). The MRW 2.85 is a 24-ton machine driven by a 400 HP diesel engine. Its shredding system consists of two cutting and shredding shafts - each with a length of 1,700 mm. The shredding force and speed are adjustable, so that the machine performance can be easily adapted to the type of the shredded material. In a composting facility, the MRW 2.85 shredder can also chop bales of straw that are often used as a structural material for sewage sludge.

After forming the heap, it should be constantly aerated. The PRONAR MBA 4512g compost windrow turner is ideal for achieving this thanks to a 1.2 m diameter shaft which operates at speeds of up to 220 RPM. The machine is powered by a 218-horsepower diesel engine. The windrow turner creates a windrow 4.5 m width and 2.2 m height, which creates optimal conditions for the composting process. If the load is too high, the machine reverses the shaft. If the overload level requires it, the operator can lift the shaft along with the gate.

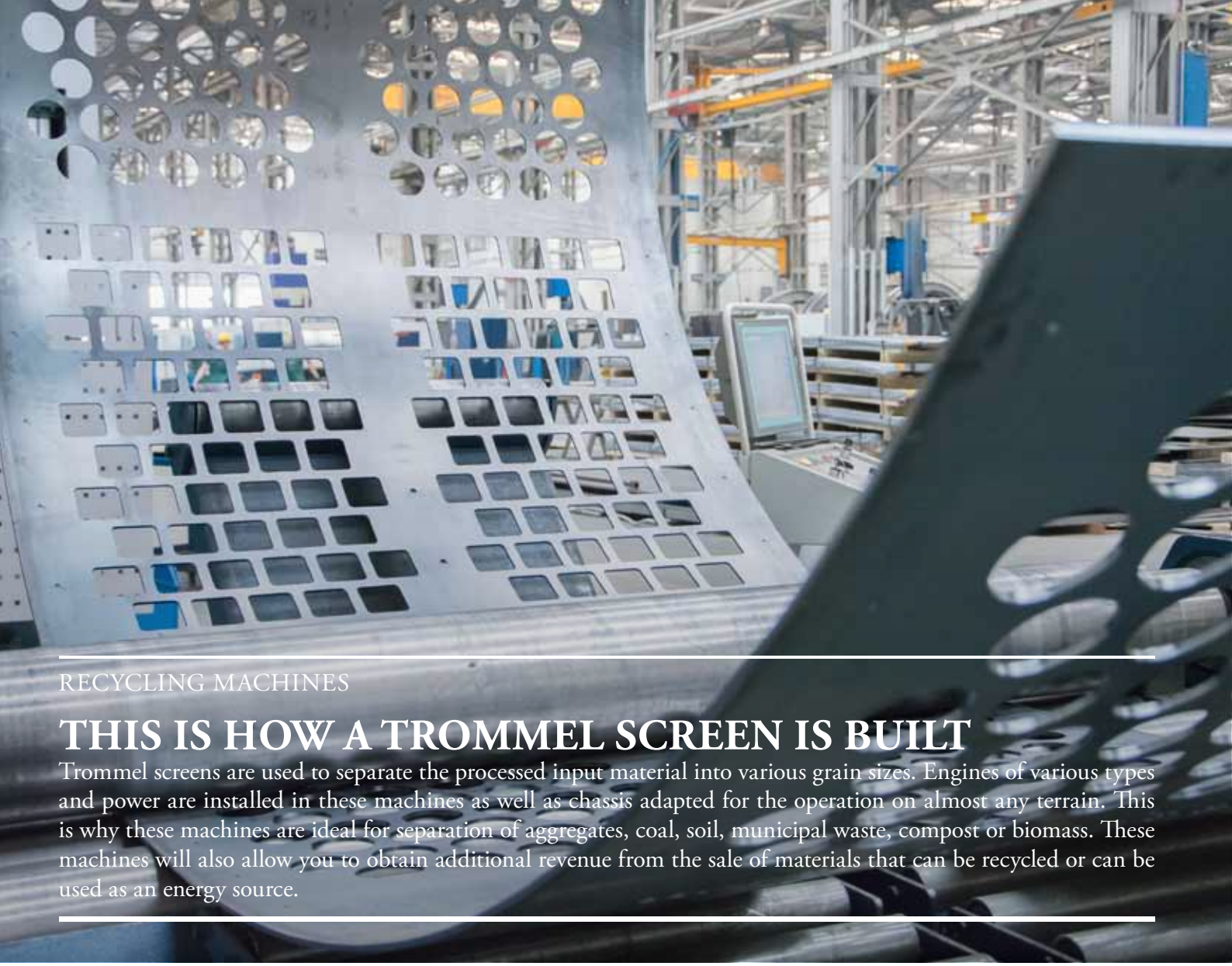
The operator is comfortable on the job, and the high seating in the air-conditioned cabin provides ex-

cellent visibility. The rear mounted camera, which transmits the video of blind spots, is another element that improves safety. The machine is controlled by a joystick and a touch panel. In base the PRONAR MBA 4512g compost windrow turner is equipped with a scraper and sprinkler system.

After completing the composting process, the heap needs to be screened so that the compost can be used as a fertilizer. That is why Pronar's offer also includes trommel screens in various chassis and screen configurations. The PRONAR MPB series trommel screens are fully mobile machines, which means they can be positioned in different places in the composting facility - wherever the compost heap is located. To power the machines, the reliable Caterpillar or Deutz diesel engines are used.

For larger recycling installations, we recommend to use higher-performance trommel screens such as the PRONAR MPB 20.55. It achieves a capacity of more than 100 m³/h with the compost screening efficiency in excess of 95%. The interchangeable drums or a star screen can be both used for the screening operations. For better separation of lighter materials such as paper or foil, it is recommended to install an air separator on the feeder above the screen.

Paweł Zubrycki
The Author is Pronar's Municipal Equipment Sales Specialist



RECYCLING MACHINES

THIS IS HOW A TROMMEL SCREEN IS BUILT

Trommel screens are used to separate the processed input material into various grain sizes. Engines of various types and power are installed in these machines as well as chassis adapted for the operation on almost any terrain. This is why these machines are ideal for separation of aggregates, coal, soil, municipal waste, compost or biomass. These machines will also allow you to obtain additional revenue from the sale of materials that can be recycled or can be used as an energy source.

The production of Pronar's screening machines is diversified. The steel drum screen is the most crucial component in this type of machine. The laser firing technique allows to obtain many types of perforation. The shape and size of the perforation of the holes can be matched to each application. Drum perforation can be from 6 to 100 mm. Even finer perforation can be obtained using a special mesh around the drum skeleton. The complex shapes of other machine parts can also be laser fired.

The perforated sheets are bent in a four-roll sheet rolling mill, where the sheets are precisely rolled into a cylindrical shape, thereby creating the trommel screen shell. The quality of bending is continuously monitored using a template. The drum elements are precisely welded at the work station designed and commissioned by Pronar engineers. High accuracy of this process is possible thanks to the system of clamps positioning the structural elements.

The drum produced in this way is then transported, sent to the paint shop. Iron phosphate coating is applied in the spray chamber, which improves corrosion resistance. Then the drum is electrostatically painted. The difference in electric potential of the screen and the paint particles used in this process allows for a uniform coverage of the entire surface. The paints are blended in computer-controlled mixers that allow the user to obtain perfectly consistent colour and composition of the paint blend. Paint mixers also allow the colour to be changed very quickly, which facilitates completing custom orders. Painted drum screens are ready for installation.

Other trommel screen components are made at the same time. All the profiles required for assembly are bent using press brakes. Different types of stamps and dies are used to obtain the required radius and bend angles. A laser machining tool is also used in this process, which greatly improves many processes and can replace several machines, including drills, milling machines and saws. An integral part of the laser tool, the turntable allows you to trim steel on each side of the workpiece, which creates multitude of structural and technological possibilities. Processed parts are subjected to blasting in blast chambers. During blasting, the surface is cleaned before the following stages of production can take place.

Individual frame elements are placed in welding tools. These allow to precisely position the welded elements to ensure

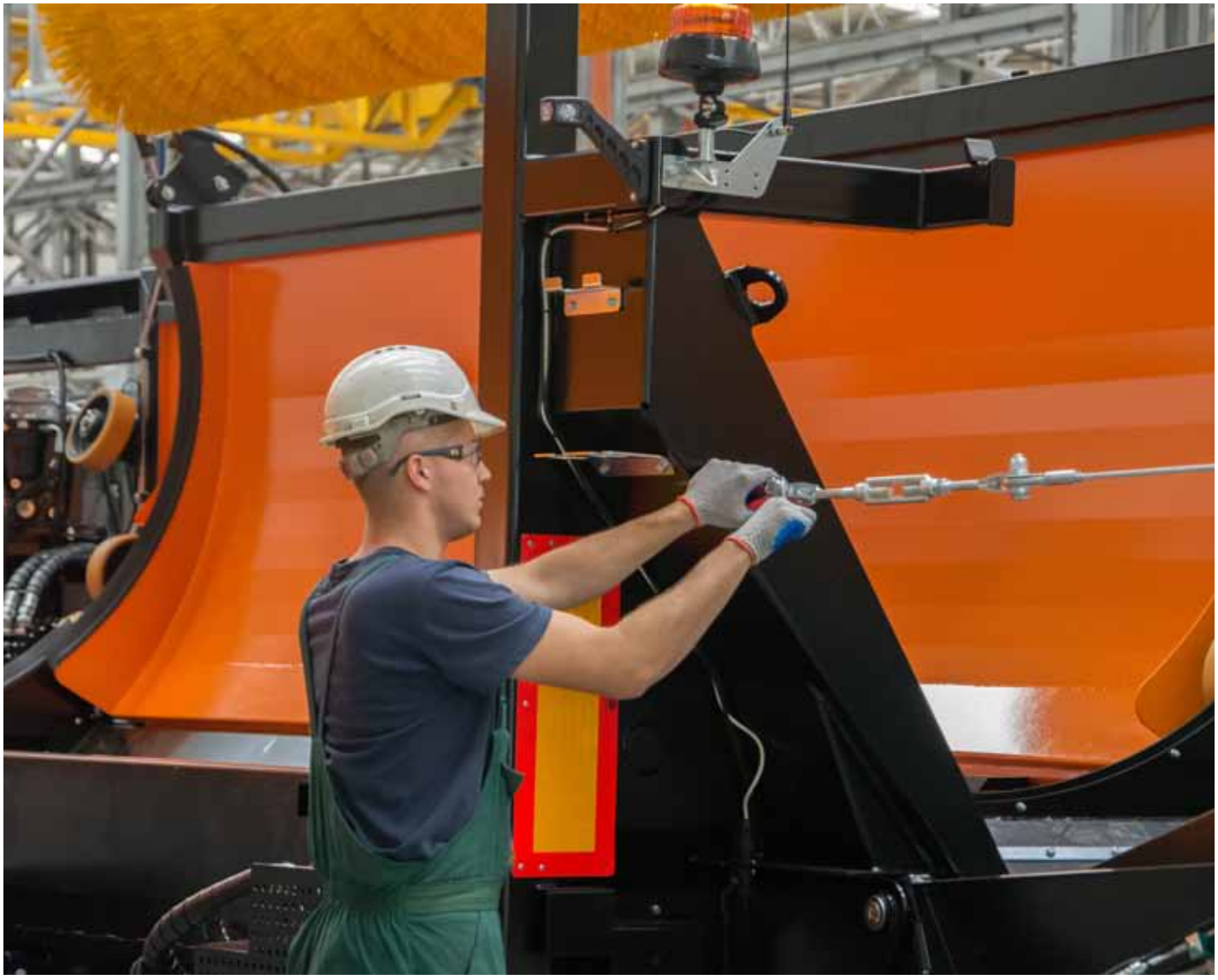
that dimensions reflect the design documentation and consistency across all products. Semi-automatic metal inert gas (MIG) welding machines are used in the welding process. The mixture of argon and carbon dioxide used during welding prevents spatter on joined surfaces. Other steel parts of the screen are welded in a similar way, which, once welded, are cleaned and prepared for painting. Some of the parts are transferred to powder paint shop for automatic transport, washing and degreasing. In order to increase the corrosion resistance, iron phosphate treatment is also performed before painting.

Once the paint is applied, the parts are heated in ovens where the paint is cured to obtain its final structure. This process is referred to as polymerization. Each production stage is subject to quality control. This is also applied to paint coat thickness.

Painted elements are transferred to the assembly line, which begins with the assembly of the selected trommel screen drive system. Depending on the conditions in which the machine will be operated, wheeled or crawler chassis is mounted.

In Pronar trommel screens combustion engine drives the pumps feeding the hydraulic motors with oil, which in turn activate individual components of the machine. The machine can also be powered by electric motors. Machines with an electric drive are perfect for indoor areas. Engine or electric motor is mounted on a frame, which allows fast installation and facilitates subsequent maintenance.

Hydraulic lines are installed along with valves and manifolds, which constitute the control infrastructure, ensuring efficient distribution of oil into all the components. The trommel screen mounted on a wheeled chassis is equipped with a pneumatic braking system. Regardless of the type of the chassis, electrical system that supports control and lighting is installed in all machines. A central lubrication system plays a key role in the smooth running of the machine. The central lubrication system allows for maintenance-free operation of rotating elements that are exposed to heavy loads and harsh operating conditions.



↑ *Assembly line for mobile trommel screens.*

↑ *Quality checks are performed on each stage of the production*

The polypropylene brush installed on the screen protects the drum screen perforation from clogging. Depending on the needs, it is lowered to the screen using hydraulic cylinders. Guards are mounted on the machine frame. Conveyor belts to transport the screened material are installed at the same time. All the components are mounted on the frame. The hopper that collects the screened material is installed first. The assembly includes a conveyor that feeds the material to the drum. Next, longitudinal, side and transverse conveyors are mounted that transport the screened fractions and the screen itself that is the vital part of the machine. The installation of the rear conveyor, which will transport the unscreened material from inside the drum, completes the machine assembly process.

The technologically advanced construction of Pronar trommel screen is checked at every production stage. Every component is subjected to high loads during machine operation, which is why it is extremely important to ensure the tightness of all systems. For this reason, the corresponding elements are carefully checked by competent employees. All connections that pass the quality checks are properly marked. Before being shipped to the client, trommel screen is thoroughly checked against a detailed checklist.

Mateusz Pietruszka
The author is Pronar's public relations and marketing specialist

↑ *One of the most important element of trommel screen is a steel drum.*

NEW

THE PRONAR HPBK-67HA HYDRAULIC CHANNEL BALER

The HPBK-67HA hydraulic channel baler is another addition to Pronar's range of machines for municipal waste recycling lines. It performs excellently in plants dealing with recovery, sorting, recycling and management of municipal waste. Through compaction of waste the machine significantly facilitates the storage and transport of the recovered raw material.

The PRONAR HPBK-67HA channel baler is a specialized machine that reduces volume of municipal waste by up to 90%. It creates bales from waste that are easy to store and can be stacked for transportation. Bales are fully recyclable and valuable compressed material for reuse. They are characterized by consistent weight and dimensions.

The bale is tied 4 times horizontally to prevent spilling of the compressed material and also to make sure that protruding wires do not damage trailer platform during transport or warehouse floor during storage. Tying makes stacking on the trailer much easier.

The main element of the HPBK-67HA baler is the hydraulic power supply. It allows the baler to achieve a maximum compression force of 670 kN, capable of compressing a large number of PET bottles into cubes weighing around 500 kg. The hydraulic power supply, equipped with oil heaters, ensures that the machine has a constant operating speed even at low temperature.

The machine operator selects the desired control program specially adapted to the type of compacted material. This results in a bale with the most optimal compaction ratio for a specific type of waste. The operating mode of the machine can be changed from automatic to manual at any time.

The loading of the hopper takes place via a conveyor belt. The material is fed directly from the loader to the hopper and a conveyor belt or into the channel (for channel conveyors). The PET bottles pass through the perforator, which perforates and crushes the bottles. Consequently, the bottles are not only crushed, but most importantly they are also drained of liquids and air. Thanks to this process, the formed bale is denser and heavier. From the perforator, the material falls into the compression chamber, where it remains until the sensors detect the threshold fill level. Then the material is pre-compacted, which reduces the number of cycles of the press slider.

The press slider compresses the material in the compression chamber, and then it is withdrawn and the cycle repeats when the chamber is filled up again. When the pre-programmed bale length is achieved, the machine starts an automatic 4-fold tying system. The resultant tied bale with a width of 1,100 mm, a height of 750 mm and a programmed length of 600 to 1,200 mm is pushed out of the chamber by the next forming bale. The finished compressed bale is transported to its place of collection.

The baler is equipped with a 10.4-inch touch screen control panel. Resistive control panel screen, which can be operated with gloves, is made of high quality materials resistant to dirt and scratches. It displays the progress information on the individual stages of the process. This allows you to monitor the operating setting, and modify them.

The panel functions can be password protected. It also records information on the number of machine cycles and materials that have been baled. This is a very useful function, especially when counting bales of material and determining the performance indicators such

as time and machine performance, which helps to decide on inspection dates.

Visualization on the panel screen changes dynamically depending on the installed equipment. If the machine is ordered without additional accessories such as the perforator, these accessories will be removed from the visualization. The interface can be viewed in different languages.

The baler features the compression chamber door with a safety lock as well as easily detachable mesh covers with a protective sensor. Buzzer and warning lights additionally improve safety by clearly indicating hazards for people in the vicinity or when normal machine operation is at risk.

The PRONAR HPBK-67HA channel baler for baling municipal waste is virtually maintenance-free as it only requires periodic lubrication and the tying wire to be added.

Mariusz Kłosowski
The Author is the Designer, Implementation Department at Pronar

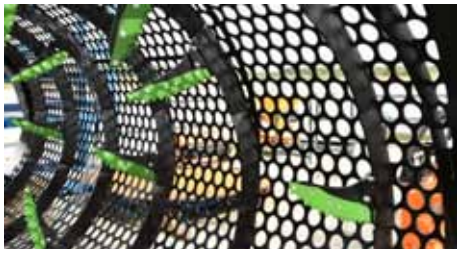
PRONAR HPBK-67HA hydraulic channel baler technical specification	
Maximum compression force (kN)	670
Tying (automatic)	4-fold
Bale weight (depending on the material) [kg]	up to 550
Engine Power [kW]	37
Bale dimensions (height/width/length) [mm]	750/1100/600-1200

↑ *The PRONAR HPBK-67HA hydraulic channel baler*

DRUMS FOR MOBILE TROMMEL SCREEN MACHINES

MACHINE PERFORMANCE DEPENDS ON MATCHING THE SUITABLE SCREEN TO APPLICATION

Trommel screens installed in Pronar's screening machines are interchangeable. The need to use different screens results from the type of screened material and the need to obtain a certain grain size of screened output material. Pronar also manufactures screens for machines of other manufacturers.

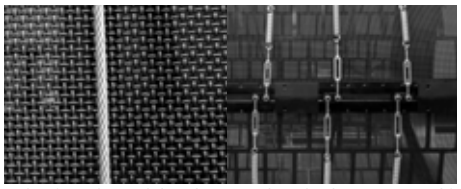


Blades to tear up bags can be mounted in all trommel screens

Threshold bars mounted in the trommel screen help to clean the material more effectively

Trommel screens installed in Pronar's screening machines are interchangeable. The need to use different screens results from the type of screened material and the need to obtain a certain grain size of screened output material. Pronar also manufactures screens for machines of other manufacturers.

Trommel screen can operate at maximum efficiency only when it is properly matched to the material being processed. Pronar offers the customised screens not only for machines of its own production, but also for screening machines of other companies.



Thanks to the mesh band surrounding the drum, it is possible to make a screen with a perforation of less than 10 mm

Pronar's technologically advanced production lines allow for a range of products. That's why the screens for mobile machines are available in a wide range of sizes and specifications. The buyer can choose the mesh pattern and the most popular are round, square or rectangular mesh with sizes from as little as 10 mm to as much as 100 mm. Such a wide selection was achieved thanks to the use of a precision laser cutter in the production process. If the screen perforation is too coarse and the material requires smaller mesh sizes, this is achieved by using a mesh band around the drum.

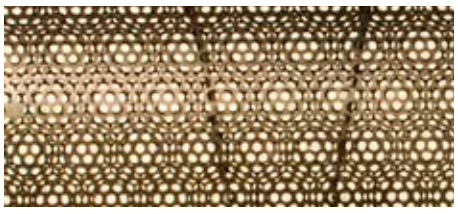
The mesh shape and size are not the only specs the customer can decide on. The trommel screen can also be fitted with blades that tear the waste bags or special thresholds bars that help to clean up the screened material more effectively. The functionality of Pronar screening machines can be further increased by replacing the standard mounted trommel screen with star screen for screening wet material, such as municipal waste, industrial waste, compost, chopped roots, wood, bark, contaminated aggregates or raw materials used in road or horticultural industries).

The spreading shaft evenly spreads and breaks down the clogged material falling on the spinning stars of the screen. Stepless adjustment of the star rotation speed allows to achieve high screening efficiency and extract the desired material grain size.

Mateusz Pietruszka

The author is Pronar's public relations and marketing specialist

Available types of perforation - the "K" square perforation



Available types of perforation — the "O" round perforation

STAR SCREEN FOR THE PRONAR MPB 20.55 SCREENING MACHINE

EFFECTIVELY SEPARATES THE MATERIAL INTO DIFFERENT GRAIN SIZES

Star screen can be used interchangeably with the trommel screen. Application of a star screen for screening of moist material improves the performance. The rotational speed of the stars transporting the material is infinitely adjustable, which allows to precisely determine the separated grain size.

The shaft spreading the material on the star screen

Materials that can be screened using a star screen:

- municipal and industrial waste, compost;
- shredded roots, wood, bark;
- contaminated substrates and aggr gates: sand, gravel, clay , stones, soil, peat, coal;
- bulk materials for ground, road o gardening works.

Mateusz Pietruszka

The author is Pronar's public relations and marketing specialist

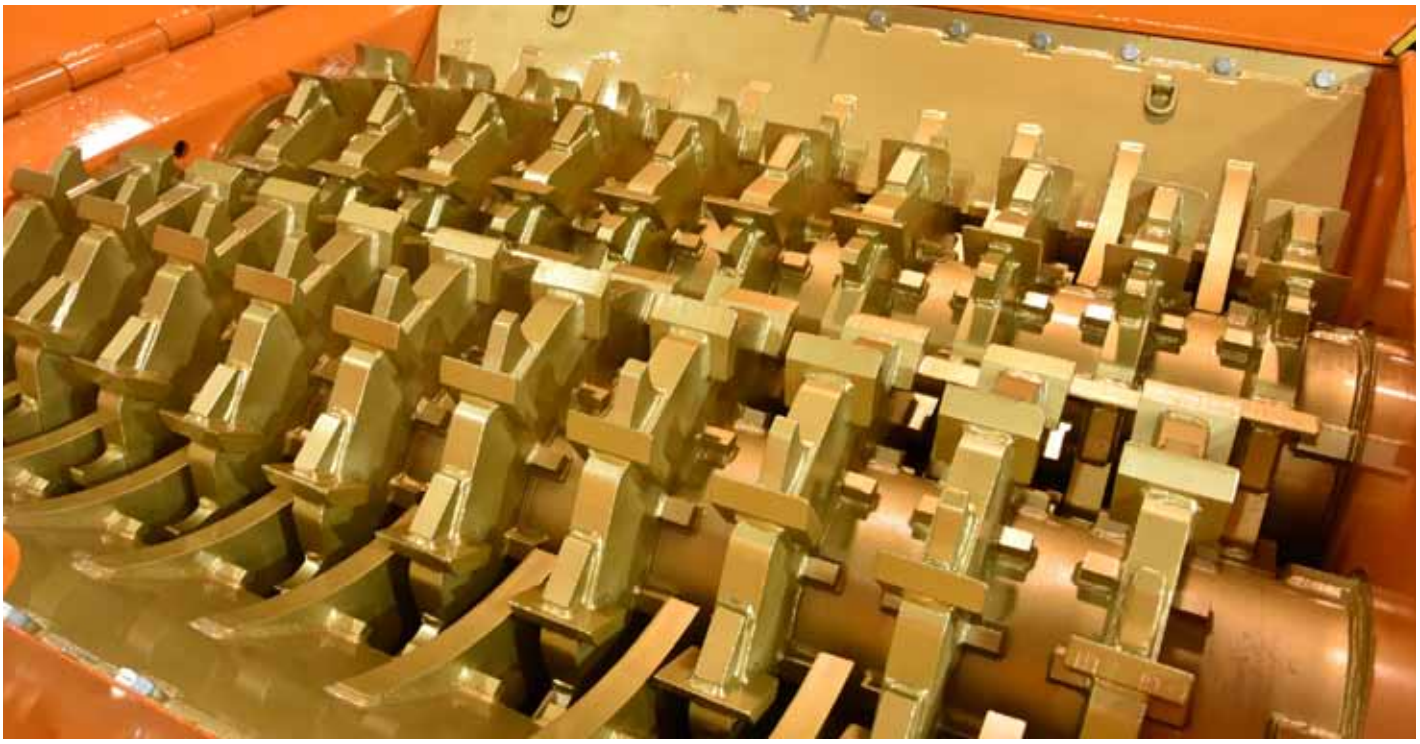
Models	Screening area
MPB 20.55	1,2 x 4,9 (5,72 m^2)

↑ *Star screen mounted in the machine*

SHREDDING SHAFTS IN SLOW AND HIGH SPEED SHREDDERS

FOR PROCESSING VARIOUS MATERIALS

Shredding shaft used in our Pronar MRW and MRS series recycling machines, as well as custom-made shafts, are solutions strictly tailored to the needs of our clients.



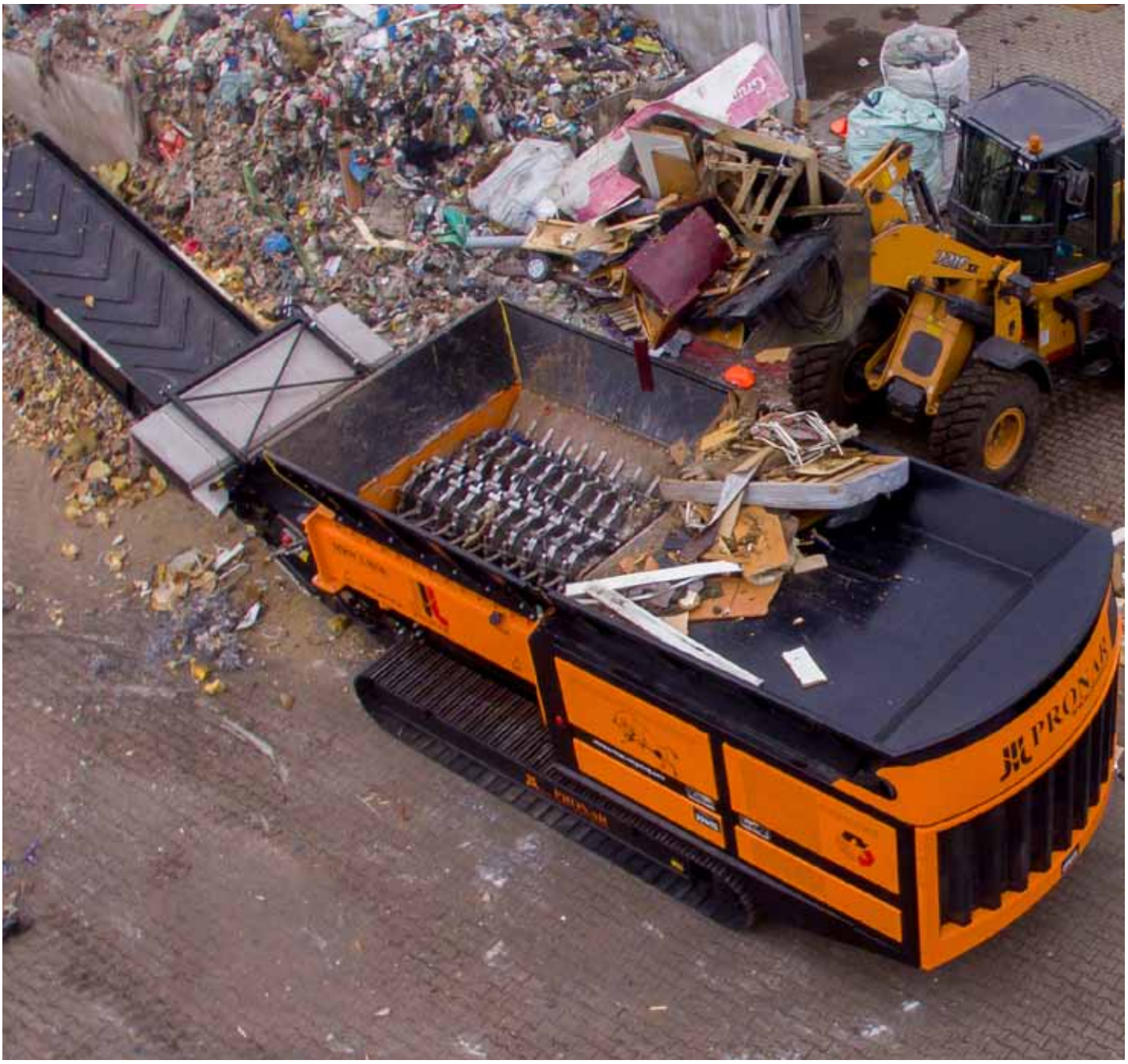
You can use our wide range of shafts to crush and shred all the most common materials, including municipal waste, construction waste, pallets, light debris, branches, bulky materials such as furniture or light scrap metals. You can opt for a universal shaft or a specialised shaft with blades and hooks designed for a specific type of material.

The most advanced technologies, including water cutting, are used in the production process of our shafts. This ensures high hardness of the shredding unit of the shaft across its entire cross-section. We utilise smart welding robots to achieve flawless welds and high repeatability of electrode movements. High-strength and wear-resistant steel ensures long shaft life without the need to regenerate or replace it.

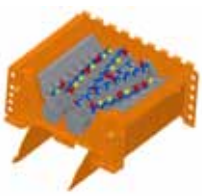
Mateusz Pietruszka

The author is Pronar's public relations and marketing specialist

Shaft	Purpose
5-blade	- wood and wood waste (including branches, rootstock, roots and pallets); - municipal and industrial waste; - household waste; - bulky waste, e.g. furniture; - tyres; - aluminium; - paper, waste paper; - thin-walled scrap and sheet metal up to 2 mm thick; - train track underlay.
6-blade	- wood and wood waste (including branches, rootstock, roots and pallets); - municipal and industrial waste; - household waste; - bulky waste, e.g. furniture; - tyres; - aluminium; - paper, waste paper; - thin-walled scrap and sheet metal up to 2 mm thick; - train track underlay.
8-blade	- wood and wood waste (including branches, rootstock, roots and pallets); - bulky waste, e.g. furniture; - green waste.
10-blade	- wood and wood waste (including branches, rootstock, roots and pallets); - municipal and industrial waste; - household waste; - bulky waste, e.g. furniture; - tyres; - aluminium; - paper, waste paper; - thin-walled scrap and sheet metal up to 2 mm thick, car bodies; - train track underlay.
36-blade (for high speed shredders)	- wood and wood waste (including branches, rootstock, roots and pallets); - green waste.
42-blade (for low-speed single-shaft shredders)	- wood and wood waste (including branches, rootstock, roots and pallets); - municipal and industrial waste; - household waste; - bulky waste, e.g. furniture; - tyres; - paper, waste paper; - train track underlay.



↑ *Shredding shaft used in Pronar MRW*



Ring - 5 blades

Ring - 6 blades

Ring - 8 blades

Ring - 10 blades

36 blades (high speed shaft)

42 shredding blades

STATIONARY WASTE PROCESSING LINES

HELP MEET EU REQUIREMENTS

The circular economy involves minimizing the consumption of raw materials, the amount of waste generated as well as emission of pollutants and energy leakages by creating a closed loop in production processes. In order for mentioned goals to be implemented more effectively, Pronar offers stationary waste processing lines.

The circular economy is possible through the extension of the recycling processes and the use of processed waste. It benefits both - the environment and the economy. The implementation of this waste management method is based on waste recycling lines.

European Union regulations oblige the waste processing line manufactures to meet the requirements of the circular economy, as well as to achieve high rates of material recovery. Pronar offers comprehensive solutions that are helpful in achieving these guidelines. Every institution responsible for municipal waste management is obliged to follow these guidelines. The characteristics of stationary waste processing solutions offered by Pronar:

- economically effective - advantageous relation between cost and environmental efficiency;
- multifunctional - they can be used in the recycling of both mixed municipal waste and segregated waste;
- reliable and modern - state-of-the-art components and subassemblies as well as custom technological solutions and Best Available Techniques (BAT), high level of automation, segregation versatility adapted to the client's needs;
- modular - you have an option to add, reconstruct, modernize, retrofit, replace and modify the components so that the line performance meets expectations and ensures the implementation of waste segregation and recovery processes, and if you need to reduce or increase the capacity (depending on the needs and volume of waste);
- effective - increase the quantity and quality of separated and sorted waste and raw materials, reduce the amount of ballast, ensure effective separation of waste into individual grain sizes (including calorific, bio, sub-screen, sup-screen, coarse, fine).

Pronar stationary recycling lines can be used to process mixed municipal waste as well as segregated waste. You

can simultaneously separate two waste streams. The lines are circular economy ready and allow you to focus on the most effective possible material recovery. Our waste processing lines are designed to segregate mixed municipal waste (straight from a waste truck) and segregated waste (paper, glass, PET bottles, folio cartons, foils).

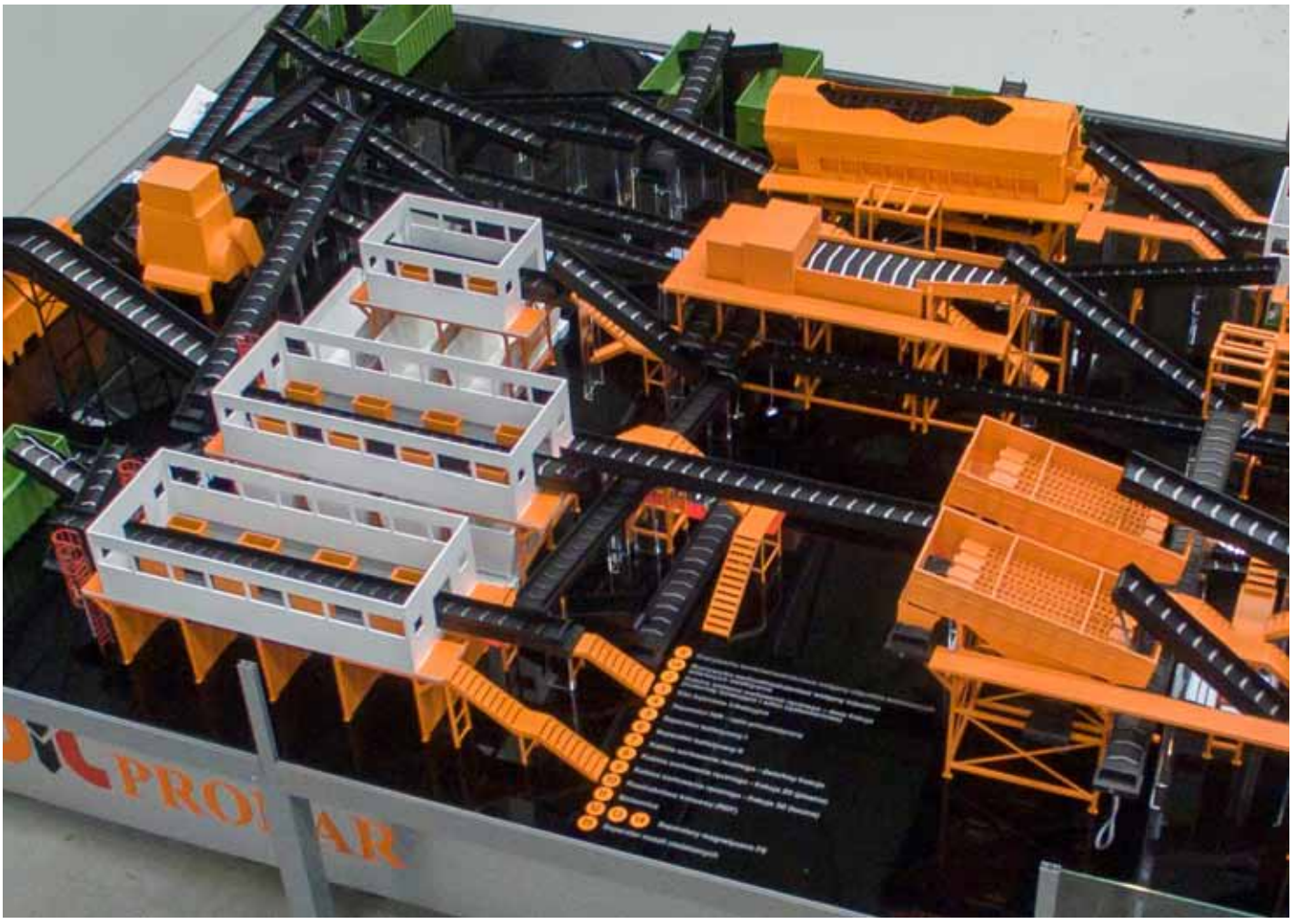
Pronar waste processing lines will help you process waste and meet EU guidelines regarding packaging segregation. The future physical and chemical harmonization of product packaging (e.g. PET bottles, packaging of household chemicals) will significantly contribute to increasing recycling efficiency. Currently, beverage producers across Europe use several types of bottles (PET, PP and others), which require separate segregation processes. Therefore, it requires to install at least two separators for the segregation of this type of waste. After harmonisation of standards for the chemical composition of packaging, Pronar waste processing line equipped with opto (pneumatic) separators will ensure correct segregation. It is also possible to install two sorting lines, which allow simultaneous sorting of mixed municipal and segregated waste.

The line layout is designed to simultaneously sort mixed municipal waste (the highest volume) and segregated waste (pre-sorted at home or waste management companies). To help optimally use the capabilities of both processing lines, they are connected by means of reversible conveyors.

Stationary waste processing lines combine modern and technologically advanced components that automate and speed up the recycling process through the competent use of manual sorting, which guarantees the best quality end product. Pronar stationary waste processing lines will guarantee the expected proportion between the environmental efficiency and the waste management process cost.

Pronar waste processing plants achieve annual capacity ranging from 15,000 to 80,000 tonnes and recover about 80 percent of waste, while the remaining 20 percent is transported to landfills after prior mechanical processing. Automated control systems in individual units and machines making up the waste processing plant ensure that technical specification is fully utilised.

Sławomir Matyśkiewicz
The Author is Pronar's Municipal Equipment Sales Manager



↑ *Model of stationary waste processing line*

NEW MOBILE CONVEYOR BELTS

OUR CONVEYOR BELTS WILL HELP YOU REDUCE COSTS

Pronar expands its range of mobile conveyor belt. In addition to the MPT 18g and MPT 24g Heavy-Duty series machines already in production, we have introduced the new units MPT 15g, MPT 18/1g and MPT 24/1g. With the range expanded by the new machines you will be able to better match available machines to your needs and the existing machinery, including, the conveyor length, engine power, weight, and machine performance.

Mobile conveyor belts help transport loose materials, such as sand, gravel, soil, aggregate, coal or compost. A conveyor belt will help you reduce the heap formation time by up to 75% compared to using a traditional loader.

The main feature that differentiates Pronar's new conveyors is their length. MPT 15g - 16.3 m, MPT 18 / 1g - 19 m, and MPT 24 / 1g - 23.5 m. The conveyor length impacts the maximum heap height of 7.4 m, 8.7 m and 10.6 m. The new conveyors are designed for customers who do not need the high-performing Heavy Duty machines with a capacity of 600 t/h of material transferred. Therefore, the three new models achieve maximum capacity of 400 t/h.

These conveyors use a smaller, more fuel-efficient 2.2 litre, 36.4 kW (50 HP) CAT engine, meeting Stage IIIA and Tier IV Final standards. Subsequent structural changes allowed for the low weight of the new conveyors. MPT 15g weighs 9,385 kg, MPT 18/1g - 9,720 kg, and MPT 24/1g - 11,265 kg. The machines are made with high-strength steel, which significantly improved the rigidity of individual conveyor segments.

Transporting new models is as easy as with Heavy Duty machines. Overall conveyor dimensions allow it to be transported on public roads in most countries without having to obtain special permits. Each of

the machines is also easily placed in 40’ High Cube containers enabling easy freight by sea. After reaching the destination, without the need to use additional carriers, the conveyor can drive out of the container or off the semi-trailer (at "low" speed), and later it can be placed at the operating site ("high" range).

These new machines being introduced on the market are very well quipped. The available options include radio control, different types of belts to match the specific nature of the transported material, side sealing, feeder support, scrapers (drum scraper and inner scraper), as well as chute hopper wall extensions. In the case of the MPT 15g model, you can also order tracks with a width of 40 cm (base equipment - 30 cm).

All conveyors manufactured by Pronar are equipped with subassemblies of reputable manufacturers, and operation principle is based on advanced and proven solutions. High tech

research and testing workstations are used in the design and production implementation process. The extensive knowledge of our specialists in the Implementation Department and Research and Development Centre is put to good use. Each conveyor leaving the factory undergoes meticulous quality control procedures, which ensure that the customer receives a safe and fully operational machine.

The new conveyors complement the wide range of PRONAR recycling machines. The available range of PRONAR machines includes mobile trommel screens (different trommel screen sizes, powered by an electric motor or Diesel engines), mobile shredders (low speed - single and dual shaft, as well as high speed) and mobile compost windrow turner.

Mateusz Pietruszka

The author is Pronar’s public relations and marketing specialist

THE MBA 4512G COMPOST WINDROW TURNER TESTS

AN IMPORTANT STAGE OF THE IMPLEMENTATION PROCESS

Introducing a new machine to the market is a complicated and tedious process. Testing the prototype is one of the key stages. This helps eliminate any problems and improve the machine before it reaches the customer. Pronar attaches great importance to this and it is why the new MBA 4512g compost windrow turner undergoes testing at the potential buyer's composting plant.

The testing of the MBA 4512g compost windrow turner is supervised by experienced specialists of the Implementation Department and the PRONAR Research and Development Centre. Their task is to create the best machine designed to meet the challenges posed by users and capable of performing reliably in all operating conditions. First, the prototype undergoes internal tests. During the testing, data on the machine's operation is meticulously collected - not only data from electronic systems, but also valuable operator comments. As a result, it is possible to optimize not only the operation of installed components, but also to refine ergonomics and operational safety. Each piece of information is thoroughly analysed and, if impact on the prototype's operation is considered significant, construction modifications are introduced. After a series of internal tests, the machine is commissioned in a

company or farm that closely cooperates with Pronar. There the machine operates for hundreds of hours under the watchful eyes of experienced employees. The opinion of users who work with the machine daily is extremely valuable and allows us to match it even better to the market needs. Any adjustments to the machine settings that may be required in the course of field testing are made by a team of designers, who also oversee the tests at this stage. Both internal and field testing phases produce a wealth of information that allows Pronar engineers to

design a fully refined machine that is ready for sale. This information is also very useful in the development of subsequent models and facilitates the introduction of improvements and additional accessories when the machine is already on the market. Successful testing phases ensure that future machine users will enjoy long machine life and confidence during operation.

Mateusz Pietruszka

The author is Pronar's public relations and marketing specialist

↑ *Each stage of implementing new solutions is properly supervised*

THE TESTS OF EACH PROTOTYPE ARE SUPERVISED BY EXPERIENCED CONSTRUCTORS

ELECTRICALLY POWERED TROMMEL SCREENS

ENVIRONMENTALLY FRIENDLY AND COST EFFECTIVE

Pronar manufactures mobile trommel screens on a wheeled chassis, which are optionally available powered by an electric motor. Environmentally friendly, electric drive brings many tangible benefits, but the operation of an electrically powered machine entails a number of requirements.

The biggest benefit from the use of an electric motor in PRONAR trommel screens is the great reduction in operating costs. The reduction is not only contributed by much lower electricity costs (compared to diesel), but also there is no need to replace filters, engine oil and coolants. Thanks to this, periodic maintenance of electrically powered screens costs half as much as maintenance of machines powered by an internal combustion engine.

Another benefit of using an electric motor in a screening machine is to reduce the operating noise level. This allows the operators to work longer hours and minimizes potentially adverse health effects.

Difficult to quantify, but increasingly important, is the image. Electrically powered machines are much greener than traditional Diesel machines (no emissions, quiet operation), which is an important premise in establishing cooperation with some contractors.

However, the use of electric power in recycling machines has some limitations. The most important limitation is reduced mobility, because a power connection is required. Every electrically powered Pronar screening machine comes with a dedicated 15-meter power cord. Electrically powered trommel screens require a high degree of cleanliness. This means you need to clean the housing of the electric motor and neighbouring components on a daily basis. This is necessary to prevent damage that may result from dirt and dust.

The above properties of electrically powered trommel screens make them most suitable for use in closed rooms, such as halls or other industrial facilities.

Krzysztof Januć
The Author is Export Sales Specialist at Pronar

OVERHEAD MAGNETIC SEPARATORS

INDISPENSABLE IN RECYCLING

The magnetic separators are mounted transversely above the conveyor belts in Pronar mobile shredders, trommel screens and belt conveyors. They are designed to separate ferromagnetic items from the processed material.

Magnetic separation systems were first utilised at car scrap yards in the United States, after the World War II. Early magnetic separation systems were mainly based on the use of electromagnets. Permanent magnets came into use as they became more widely available following a marked reduction in production cost of ceramic materials. In addition, the use of permanent magnets is not dependent on external power sources and there are no issues with overheating, which occurred in the early versions of electromagnets, which were usually expensive and bulky.

In modern permanent magnet separators, primarily ferrite or neodymium magnets are used, depending on the operating conditions. Ferrite magnets are brittle and have a lower magnetic field strength. Their advantage is the ability to operate at high temperature.

The maximum operating temperature of neodymium magnets is lower, as it ranges from 80°C to 200°C depending on the material, but they are currently the strongest magnets available (about 10 times stronger than ferrite magnets). The neodymium magnet is created by powder metallurgy, i.e. by pressing powdered neodymium, iron and

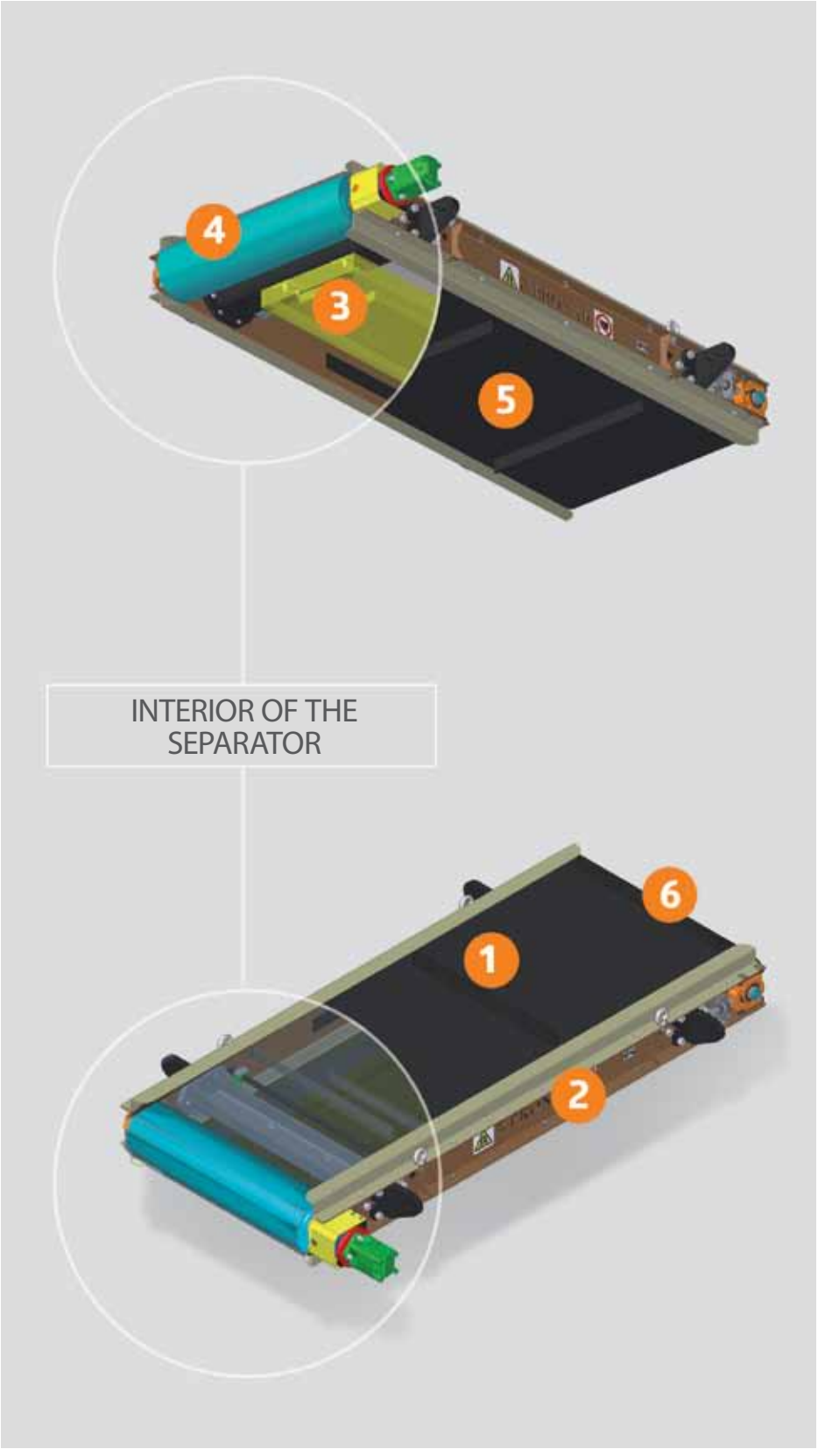
boron components in a magnetic field at an elevated temperature.

The main component in separators installed in Pronar recycling machines is a compact, low weight permanent neodymium magnet mounted centrally on the separator frame connectors. Driving and guide rollers are placed at the ends of the frames. The hydraulic motor sets the drive roller in motion. The material is transported via a conveyor belt. The separator is installed in the machine through dedicated mounting hole or it can be hung on transport lugs. Most separator components are made of stainless steel as it is not ferromagnetic.

The material to be separated moves directly under the separator on the belt conveyor of the Pronar recycling machine. As soon as the ferromagnetic waste moves into the magnetic field, it is attracted by the magnetic plate and onto the separator conveyor belt. The motion of the belt causes the separated steel waste to move out range of the magnetic field. At the point where the magnetic field strength is insufficient to hold the separated waste, it drops away beyond the machine belt conveyor operating area.

Recycling machines equipped with ferrous metal separators are perfectly suited for use in mining, paper industry, construction, recycling, aggregate mining, all kinds of demolition work, as well as tire crushing and woodchip management.

Mirosław Tomaszuk
The Author is the Designer, Implementation Department at Pronar



1. Conveyor belt
2. Separator frame
3. Magnetic plate
4. Drive roller
5. Material transport and rejection
6. Guide roller

PRONAR MUNICIPAL MACHINERY ADAPTED FOR LEFT-HAND TRAFFIC

WE ARE EXPLORING NEW MARKETS

We are gradually adding new municipal machines to our range. Recent additions include machines and tools for roadside maintenance and our range has been extended to include versions designed for left-hand traffic. The new offer also includes the PRONAR WWT620D multifunction arm mounted at the back of the tractor and the PRONAR BBK202M and PRONAR BKD202P flail mowers. These machines will allow Pronar to enter new markets of countries with left-hand traffic.

The Pronar WWT series multi-function arms perform excellently in roadside maintenance, pruning branches of trees and cleaning drainage ditches. The new WWT620D multi-function arm is designed for mounting on three-point hitch on tractor with a weight of over 5,000 kg. In contrast to the WWT600, the multi-function arm with the working head is located on the left side of the tractor, which makes it possible to perform maintenance works on the road shoulder in left-hand traffic.

The WWT620D has been equipped with an independent hydraulic system, consisting of two pumps with a total power of 39.5 kW, connected through a multiplier gear box with the power take-off shaft of the tractor. The first 6.5 kW pump powers the arm and working head motion control circuit. The second 33 kW pump powers the working head and allows for the shaft rotation to be reversed. The large 180 litre oil tank located on the opposite side of the arms acts as the counterweight, stabilizing the implement carrier. The hydraulic selective control valve with a system of mechanical cords connected with levers located in the operator's cabin controls the arms. Among the many advantages of the WWT620D rear multifunctional arm, special attention should be paid to its light and rigid construction resulting from the use of high-strength steel, as well as the overall compact dimensions of the implement. The combination of compact design and compatibility with virtually any tractor without the need for complex mounting systems makes the WWT620D very useful in companies providing services related to the maintenance of roads and motorways.

The BBK202M rear-side flail mower is a twin BBK200M

model. The difference is that the BBK202M mower is suspended on the pantograph on the left side of the tractor. It can be used for mowing ditches, escarpments and embankments. Its linkage system allows you to work outside the tractor's contour. Thanks to the extensive rotation range, from 65° downwards and up to 96° upwards, the mower can also be used for mowing slopes, escarpment and for pruning hedges in a vertical position.

The BKD series mowers are the support machines that can be used in a combination with multi-function arms or rear-side flail mower mounted on the tractor. Such a combination increases the working width of the entire set and thus the efficiency of the work performed. The new BKD202P flail mower is adapted to operate on the left side of the tractor. Easily replaceable slides and an internal casing made of wear resistant steel are standard equipment. The cutting height adjustment to 20, 40 or 60 mm takes place by changing the position of the tracking shaft integrated with the automatic cleaning system, perfectly tracking uneven terrain. The large diameter of the cutting shaft (Ø159 mm), when compared to mowers equipped with shafts of smaller diameter, makes it possible to obtain a higher linear speed of the cutting blades at the same rotation speed of the PTO shaft. The system of easily replaceable counter-blades made of wear-resistant steel increases the efficiency of mulching.

The advantage of all Pronar flail mowers is their ability to simultaneously mow and mulch the material. With the use of flail blades the grass is mulched and clippings are uniformly spread over the mown surface. This natural fertiliser supports the mineralization of the soil.

Michał Kalenik

THE PRONAR ZMC 2.0 AND ZMC 3.0 SWEEPERS

EFFICIENT AND THOROUGH SWEEPING

The Pronar ZMC 2.0 and ZMC 3.0 large and high-performance sweepers enjoy unwavering interest. The users express their satisfaction with the operations of our machines, as they are perfect for sweeping both in municipal and business environment where a large area needs sweeping.

For most buyers, one of the greatest advantages of these machines is the easy coupling with any tractor, which should be equipped with a PTO shaft, a hook or a fork type lower transport hitch. Both sweepers are compatible with most tractors currently available on the market. After the sweeping is finished, the machine is disconnected from the tractor, which can then be used for other work. Compared to self-propelled sweepers, a big advantage of ZMC 2.0 and ZMC 3.0 is their great value for money. Another advantage of these machines is the fact that the oil from their hydraulic system is not mixed with that of the tractor. The operators appreciate the great comfort of PRONAR sweepers - the efficient sprinkler system (tank capacity of ZMC 2.0 is 440 l, and up to 1,550 l in ZMC 3.0) ensures minimalisation of dust when working with even the driest and lightest material. Dirt is sucked in by the vacuum produced by a huge fan driven by the tractor's PTO and trans-

ported into a 2 m³ tank of the ZMC 2.0 On the other hand, the brush system in the ZMC 3.0 sweeper, sweeps the dirt away and pushes it onto the inner conveyor belt, which takes it to a 3 m³ tank. The large capacity of the tanks of both machines enables extended operation without worrying about the tank filling up quickly. During the emptying (e.g. to the trailer) the bottom edge of the tank is at a height of 1.6 m (ZMC 2.0) and 2.2 m (ZMC 3.0).

Both, the ZMC 2.0 and ZMC 3.0 sweepers, feature a very simple control panel installed in the tractor cab. Using the panel you can conveniently control the machine's functions, such as alignment of the sweeper with the curb by means of a hydraulic drawbar, control of the sprinkler system, emptying the waste container or activate an additional side brush (available in ZMC 3.0).

You can match the right type of brush to the degree of dirt. You can adjust the brushes in both the sweeping systems, and thus change the effective working width. Sweeping performance can be enhanced with a side pipe for sucking in the leaves (ZMC 2.0) and a small telescopic brush with tilt function (ZMC 3.0), which is very effective in sweeping gutters and curbs. Both of these solutions are additional equipment.

The range of machines produced by Pronar also includes other sweepers such as the Agata ZM series with working width from 1.25 to 2 m, the modernized Agata ZM-2300M sweeper (working width up to 3.17 m), the ZM-P16 (1.6 m) sweeper-sand spreader and the ZM-S25 (2,5 m) sweeper.

Joanna Jessa
The Author is Export Sales Specialist at Pronar

GREEN FORAGE MACHINERY

36 MONTHS WARRANTY

THE FULL RANGE OF GREEN FORAGE MACHINES

A WIDE SELECTION

Disc mowers, single and dual rotor rakes, self-loading bale wrappers, rotary tedders, balers and fertilizer spreaders are one of greatest interest for grassland owners who use them to manage their land. This is due to the fact that these machines most effectively optimise the tasks on the farm and reduce the amount of manual labour.

The fertilizer spreaders are the machines necessary to give a boost to grassland in the spring. Pronar manufactures the following spreaders: FD1-M03L, FD1-M05L and FD2-M10. These are single and double disc machines, characterized by simple operation and high durability. The advantages of the first two models include very attractive prices and lightweight design, facilitating operation in combination with small power tractors. Due to the special shape of the disc, the fertilizer spreading width reaches as far as 14 m, and the spread rate is adjusted with a lever in the tractor cab.

However, the FD2-M10 spreader was designed for farms in need of more efficient machines. It is equipped with a two-chamber, double-disc hopper with a capacity of 1,000 kg and spreading width of 10-24 m. The fertilizer spread rate is controlled from the tractor cab using hydraulic actuators located under each of the chute openings, which as graduated for easy operation.

Haymaking must precede the collection of green fodder, including grass. This is why Pronar offers a wide range of machines to make it easy to select a machine that is best suited to the area of the given farm and the tractors used in it. The Pronar PDK220, PDT260, PDT300 and PDT340 rear mounted disc mowers are built on the basis of the PRONAR high-strength cutting bar in an enclosure with a reinforcing profile. The optimal capacity of oil pan ensures efficient cooling of the cutting bar. The cutting bars feature the quick blade replacement system and protective skids that prevent wear.

In comparison to gang reel mowers, PRONAR disc mowers are characterized by 40 percent less tractor power demand. And thanks to a large range of inclination, disc mowers can be used on steep slopes and uneven terrain. The innovative shape of the discs and a solid, yet lightweight design ensure that the tractor has less resistance during operation. Pronar's offer also includes the PDT260C and PDT300C mowers equipped with an impeller conditioner, which speeds up drying by destroying waxy layers in the blades of the grass. This, in turn, eliminates the need for frequent use of the rotary tedder, and thus reduces fuel and labour cost.

In addition to the rear mounted mowers, Pronar also offers front mounted mowers: PDF300, PDF300C PDF301, PDF301C and PDF390. These mowers are produced with the highest quality materials and with the use of innovative technologies. Strong, flexible and compact design of these machines, in combination with great ground contour following ability make these mowers ideal for all conditions.

Pronar offers a very efficient PDD830 and PDD830C rear mounted mowers and PDF300 front mounted mower for farms with large grassland areas. The PDD830 and PDD830C consists of two cutting units (each with a working width of 3 m) attached to a single frame. The hydraulic protection system protects the machine against damage in the event of an obstacle being hit. When the PDF300 front mounted mower is added, the overall working width of the whole set increases to as much as 8.30 m. If the grass is to be dried, it needs to be turned, and Pronar's tedders an ideal solution: PWP460, PWP530, PWP770 and PWP900. These are solid and easy to use machines, which can be used with any tractor, equipped with a Category I and II linkage.

DISC MOWERS

ROTARY TEDDERS

ROTARY RAKES

ROUND BALERS

BALE WRAPPERS

The number of carousels spreading the swath depends on the width of a given model and ranges from 6 to 8 units. The tines are flexible, and work just as well for both clockwise and anti-clockwise rotation. The transmissions in the Pronar tedders are maintenance-free, hermetically sealed and grease lubricated (transmission gear immersed in oil).

Mowed, turned and dried grass is suitable for harvesting. In order to do this the dry grass must be raked. Pronar rakes with a working width of 3 to 8 metres are perfectly suitable for this: ZKP300, ZKP350, ZKP420, ZKP460T (with folding mechanism) and ZKP800 (double rotor). They are very efficient and easy to operate machines, which can be coupled with the majority of tractors on the market. Just like tedders, rotary rakes are based on hermetically sealed, maintenance-free transmissions with gears in an oil bath. As the working width of a given model increases, the number of raking arms increases from 8 to 12, and three or four double raking tines are mounted on each.

Pronar rotary windrower rakes have great ground contour following and cleanly rake the material. The ZKP800 twin carousel rotary windrow rake is an exceptionally efficient and functional machine. It features a tractor powered width adjustment system in the range from 7 to 8 m. Powered by the tractor's hydraulic system, the machine can also be folded for easy transport.

Round balers an important group of machines that assist in the harvesting of grasses. Pronar's range includes the following balers: Z500K, Z500R and Z500G. These are modern and efficient fixed-chamber balers that ensure high density of harvested straw, hay and green fodder. The PRONAR Z500G baler proves the most use-

ful when harvesting grasses and reeds from wetlands and swamps. The crawler chassis implemented in this baler ensures trouble-free driving on such difficult terrain. The Z500R model is equipped with a rotor to pre-shred the green forage and a 2,035 mm pick-up which is wider than that of the Z500K.

At the final stage of animal feed processing, Z245 or Z245/1 self-loading bale wrappers are indispensable, which efficiently wrap the bales with foil. The Z245 is equipped with a side arm allowing you to load the bales without stopping. The bale wrapper features a wrap counter and a hydraulic selective control valve, which allows the operator to control the machine from tractor cab (a bale wrapper with an electric control system is also available to order). Unlike the Z245, the Z245/1 baler allows you to operate the front bale grab. It enjoys a particularly good reputation among farmers who do not have much freedom to manoeuvre the tractor with the coupled machine, such as when the plots are narrow or short.

Pronar machines can build an extensive and complete line for growing and processing green fodder plants, starting from fertilization, through mowing to fodder management. We continue to introduce new machine models to the market, and upgrade the machines already in production to make them more efficient and functional for our customers. Thanks to solid construction, high quality and simple operation as well as attractive prices, Pronar's machines are recognized by farmers in many countries.

Patryk Bańkowski
The author is Pronar's commercial representative

GREEN FODDER MACHINES

THIS IS HOW A DISC MOWER IS MADE

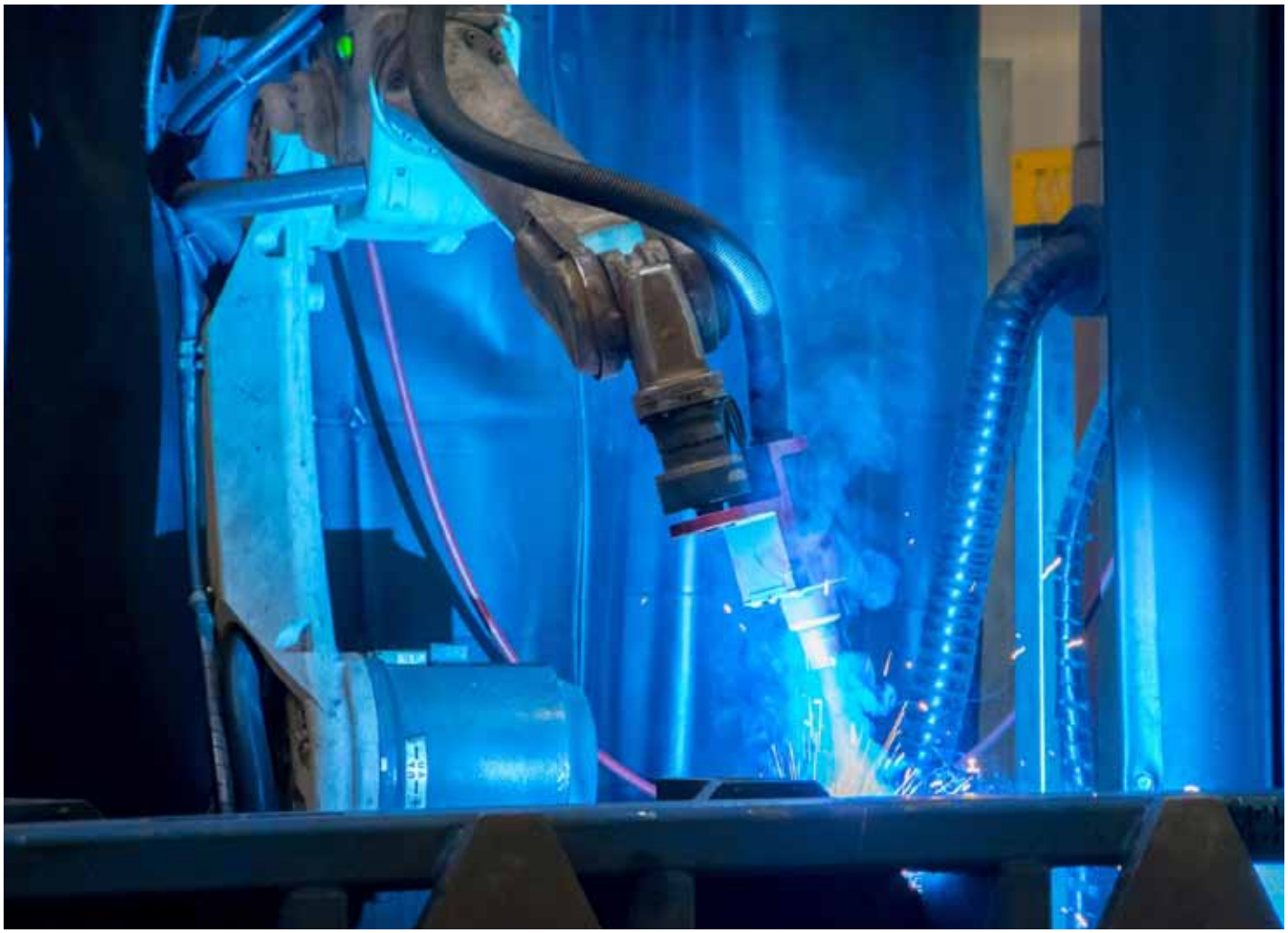
Centrally mounted at the front, side and rear of the tractor, disc mowers are used for mowing grass and other green plants. Combined in a working set, disc mowers allow mowing a meadow belt up to a width of 8.30 m.

Pronar produces a variety of disc mower models. The concept of a disc mower begins in our design department. When the design is ready and prototype produced, operational tests are carried out, which, when successfully completed, determine if the machine will be implemented into production. Let's follow the development process of the most popular rear mounted disc mower.

All elements including those made by Pronar and those supplied by contractors are checked for quality and dimensional compliance. The X-ray station checks all components and castings for any hidden defects. Approved machine bodies are milled.

Precision instruments are used to verify the geometry and dimensions of individual components. The chemical composition of materials is checked against specification. One of the key elements of the mower is its transmission. It transfers the torque from the tractor to the cutting bar. The high quality of the transmission is a basic requirement to ensure trouble-free and quiet operation of the machine. This is guaranteed both by the materials used and the workmanship of all components. The gear ratio used in the gearbox enables significant rotational speed of cutting discs. The gear wheels are made wear-resistant steel to ensure resistance to overload which could occur during mower operation.

One of the key elements is the cutting bar where cutting discs are mounted. Gears are first assembled and then placed inside the cutting bar. The gears transmit torque to all working elements. Before closing the cutting bar with an enclosure, an adhesive ensuring tightness is ap-



plied to its edges. This is important, because the cutting bar is filled with a lubricating oil that protects the drive gears. Then both enclosures are screwed together and the edges are reinforced with protective skids. All screws are additionally secured with glue. At this stage of the assembly process, gear units and couplers to mount the cutting discs are installed. The final tightening of all connections is done with torque wrenches to guarantee the correct pressing force. The body of the cutting bar and all elements exposed to abrasion are made of wear-resistant steel with improved mechanical resistance.

The cutting bar assembled as described above is ready for painting. All mounting points for other components are protected with reusable covers. Before painting, the cutting bar is degreased. In order to increase the corrosion resistance, iron phosphate treatment is also performed before painting. A paint coat is applied to the cutting bar prepared in this way.

Quality control is the next production stage. After removing the protective covers, the tightness of the cutting bar is checked. It involves filling the unit with compressed air and checking if there is any drop in pressure. To conduct a stress test and measure the noise level, the cutting bar is filled with transmission oil. Power is provided to the connection on the right, which accelerates the mechanism to the working speed. The meter indicates if the noise generated does not exceed the permissible 96 dB. Then, on the left side of the cutting bar, a brake is attached that determines the working load. After testing, the cutting bar is fitted with the remaining accessories. Slides made of hardened wear-resistant steel (with admixture of boron) are mounted at the bottom. Discs are assembled and mounted. The cutting blades will be embedded in the discs.

An articulated coupler that connects the cutting bar to the gearbox ensures that the torque is transferred from the tractor to the machine. Cutting blades (exceptionally hard) are easy to use and can be mounted on both sides, which extends their life. At this stage the assembled the cutting bars are taken to the main assembly line.

At the same time, other mower components, including covers, are

made. CNC machines are use to bend the covers to guarantee that each item is exactly the same. Similarly, tubular frames are installed on which a protective tarpaulin is mounted. The bending machine used in this process bends the designed shapes very quickly and precisely. Depending on the needs, the bending settings can be changed very quickly.

An important stage in the manufacturing process of the disc mower is the production of the main frame and suspension. The complete fittings are joined using welding machines that ensure the required quality of welds. Due to the complex design of the mounting frame, this process is done by a robot that ensures 100% repeatability of the process.

The welded assemblies are subjected to shot blasting to clean them thoroughly. In a closed chamber, the components are blasted from all directions with high speed metal pellets to remove impurities from the surface and ensure the desired surface texture before painting, the next stage of production.

Most of the cutting bar components are powder painted, while some of them, such as body, are wet-painted. Once the paint is applied, the parts are heated in ovens where paint is cured (polymerisation) to obtain its final structure. Before handing over the painted elements for further assembly, thickness of the varnish coat is checked. The final shape of the mower is achieved by assembling the pre-painted components.

Prepared components are ready for final assembly. In the first stage the cutting bar is coupled with the gearbox and then the main frame with the accessories. Hydraulic cylinders are installed, which allow positioning of the mower during operation and ensure lifting to the vertical transport position. In the next stage of assembly, stay springs are installed. They relieve the pressure of the cutting unit on the ground, protecting the turf from damage and reduce the tractor power demand when mowing. The mower is equipped with hydraulic lines necessary for the operation of hydraulic systems.

The core suspension system, which couples the mower with the tractor, is assembled at a separate workstation. Bevel gear is installed, through which torque will be delivered to the cutting bar. In the next stage of the disc mower production, the assemblers equip it with frames, covers, swath forming discs and a suspension system with a gear and horizontal the cutting bar positioning cylinder. All articulated connections are pressure lubricated.

Depending on the customer order, disk mowers are produced with a different number of cutting discs. This translates into a cutting width that ranges from 220 to 390 cm. Many elements, including cutting bar or coupling system are protected by patents owned by Pronar. Each mower leaving the Pronar factory is

equipped with a protective cover, an articulated shaft for connecting the mower with the tractor and a set of spare cutting blades. The quality of the machine produced is confirmed by the quality controller stamp.

In comparison to other mower types, disc mowers of a given working width have up to 40 percent less tractor power demand and about 30 percent less weight. Disc mowers are also very efficient, because they can mow at a speed of 15-20 km/h. The disc cutting units can be tilted freely to mow roadsides and slopes. The swath created by the disc mower is wide and thin, so that it dries evenly and is easy to ted.

Mateusz Pietruszka

The author is Pronar's public relations and marketing specialist

Watch video about rear mounted disc mower:

LEARN MORE

IMPLEMENTING THE PROTOTYPE DESIGN

THE PRONAR PDF301C DISC MOWER

Pronar has just completed the implementation procedure for the new PDF301C prototype disc mower. It will be available for sale later this year.

Our offer includes many disc mower models and all customers will find a machine suitable for their needs and size of the farm. The new PDF301C disc mower is characterized by a modern design, a 3 metre working width, weight of about 1,200 kg and 75 HP (55 kW) tractor power demand.

To mount a front mower, the tractor must be equipped with a front 3-point hitch, PTO and one hydraulic connection at the front. All PRONAR front mowers are equipped with a category II hitch, mounted on the front 3-point hitch of the tractor. The new PDF301C mower is designed primarily for heavy duty on uneven terrain. Its key component is the proven and reliable PRONAR cutting bar that guarantees high quality mowing. A sturdy, flexible and compact machine design is based on modern materials and production technologies in combination with very flexible ground contour following, the PDF301C will perform excellently in all conditions, while maintaining great cut quality.

One of the key advantages of the PDF301C mower is its wide range of ground contour following of 700 mm (450 mm / 14° up, 250 mm / 10° down) and 24° horizontally. This ensures perfect ground contour following at a constant angle (regardless of field conditions) and clean and aesthetic cut. The cutting assembly and conditioner are suspended on the mower's frame and trail behind. This allows

the PDF301C to overcome any obstacles encountered by lifting it and simultaneously reversing the unit, which reduces the risk of damage. Two strong flotation springs regulate the pressure of the cutting and loosening unit on the ground. This allows the user to easily adjust the pressure to the prevailing field conditions.

PDF301C is equipped with a spring tine conditioner that accelerates the swath drying process, which allows you to increase the yield of the forage harvest. The degree of swath conditioning can be adjusted depending on the needs and type of mown grass. The conditioner drive is moved to the right side to balance the bevel gear providing torque to cutterbar, located on the left. This is why, the cutting unit and conditioner are always in balance, which ensures even pressure of the cutterbar on the ground. The range of swath width adjustment in PDF301C is from 1.25 to 2 m, by adjusting the two swath guides.

The machine can be coupled with the rear mowers (PDT300, PDT300C - working width of the set is 5.7 m) and lateral mowers sided (PDT830, PDT830C - 8.3 m). These sets prove especially effective in large areas, saving time and fuel. Thanks to folding side covers, the transport width does not exceed 3 meters. In base the PDF301C includes functional transport locks and a quick blade replacement system.

Przemysław Rogala
The Author is Export Sales Specialist at Pronar

36
MONTHS
WARRANTY

TRAILERS

AGRI TECHNICA®
THE WORLD'S NO.

PRONAR

We invite you to visit the **Pronar** Stand

HANNOVER
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SINGLE AXLE TRAILERS


T654/2


T671

TANDEM AXLE TRAILERS


T663/3


T683


PT512

DOUBLE AXLE TRAILERS


T672/2


PT612


T680

THREE AXLE TRAILERS


T780

LOW -LOADERS


RC2100-2

POWER PUSH TRAILERS


T902

CATTLE TRAILERS


T046/2

MONOCOQUE TRAILERS


T669/1


T679M


T700M


T700XL


T682

DUMP TRAILERS


T701


T679/4


T701HP

MIXER FEEDERS


VMP-10S


DVMP-14

HOOK LIFT TRAILERS & CONTAINERS


T185


T285/1


T286


T386

MANURE SPREADERS


N262/1


NV161/3

CHASER BIN


T743

FORAGE WAGON


T400R

BALE TRAILERS


T026M


T027M


T028KM

SLURRY TANKS


T314

LOG TRAILER


T644/1

MANURE SPREADERS

OUR MANURE SPREADERS MEET THE EUROPEAN UNION REQUIREMENTS

Pursuant to Directive R167 / 2013, as of 2018, EU machinery approval is required for the registration of agricultural machinery driving on public roads. The homologation regulations, which until the end of 2017 were different in individual EU countries, are now unified. However, a transitional period of 1-2 years is now in place in most countries, allowing the registration of machinery under the old rules.

Pronar, as a major manufacturer of agricultural trailers in Europe, continues to submit homologation tests of subsequent product groups. We have recently successfully tested single axle spreaders: NV161/1, NV161/2, NV161/3, NV161/4, NV161/5 and NV161/5 and the N262, N262/1 of tandem type.

Manure spreaders are among the basic machines on farms. Compared to machines produced by other companies, Pronar spreaders are distinguished by high versatility and excellent performance. Our spreaders can be used not only for spreading manure, but also for spreading peat, compost and other organic matter as well as sewage sludge and lime. Pronar produces a variety of spreader models. Our extensive offer allows the customers to match a spreader to farm area and to the existing machinery. The common feature of all Pronar spreaders is a reliable and compact design, which contributes to sig-

nificant popularity of our spreaders around the world. The chassis and drive system are important elements of each spreader. The trends in the development of agricultural machinery, which are also reflected Pronar's offering, show a move towards reducing the number of axles. Until recently medium capacity manure spreaders (10-14 t) were available almost exclusively with a tandem axle system. Today, some manufacturers, including Pronar, offer a range of single axle manure spreaders with large-diameter wheels. Such wheels, in conjunction with the appropriate tyre tread, do their job perfectly. First of all, the use of large single axle wheels reduces the power demand, which means lower fuel expenses. Other advantages of this solution include higher manoeuvrability of the machine and elimination of pushing the ground during turns.

Of course, the tandem axle system has other advantages and continues to find its advocates on the market. Thanks to a much smaller wheel diameter, the axle system fits under the load box and does not limit its width. Another advantage of this type of axle system is the high stability of the spreader while driving. This is due to the fact that the axles are amortized with parabolic springs which significantly improves the comfort of use and safety of transport. However, suspended drawbar with top or bottom hitch (Ø40, Ø50, K80) is used in the Pronar NV series single axle manure spreaders. A wide selection or PRONAR spreaders and the innovative technical solutions applied allow for optimal matching of the machine to the needs of each farm. When choosing a manure spreader, decide on its load capacity first. Then consider your applications and choose the type of load box and your spreader unit, which determines the performance and quality. One should also take note of power demand to match appropriate tractor to the spreader.

Szymon Kucharski

The Author is Export Sales Specialist at Pronar

36 MONTHS WARRANTY PRONAR

Details at Authorized Dealers, Pronar sales representatives and on pronar.pl

01 DO THE SERVICE

36 months warranty covers new machines from the group of trailers and green forage machinery on condition of doing paid warranty inspection at Authorized Dealers of Pronar, after 24 months from the date of purchase, but no longer than 25 months*

02 ENJOY WARRANTY PROTECTION **FOR 36 MONTHS**

Details at Authorized Dealers,
Pronar sales representatives
and on pronar.pl

serwis_agro@pronar.pl

PRONAR

36 months warranty covers new machines from the group of trailers and green forage machinery on condition of doing paid warranty inspection at Authorized Dealers of Pronar, after 24 months from the date of purchase, but no longer than 25 months.
Warranty inspection must be confirmed by an entry in the warranty card. The 36 month warranty applies to machines manufactured from 2019 and purchased from 01.09.2019
Warranty inspection must be carried out by Authorized Dealer who sold the equipment to the buyer.
36 months warranty does not cover:
Lacquer coatings (non-renewable 24 months warranty)
Green forage machiery: VMP5S, VMP 5ST, VMP10, VMP10S, DVMP12, DVMP14, DVMP16, DVMP18, Z500K
Trailers group: T900, T902, T400, T400R, T740, T743, TB-4, N161, N162/2, N262, N262/1, NV161/1, NV161/2, NV161/3, NV161/4, NV161/5"

THE PRONAR T740 AND PRONAR T743 TRANS-SHIPMENT TRAILERS

UP TO 400 TONNES PER HOUR

Trans-shipment trailers enable the transport of grain (including maize) from the combine harvester to the means of transport (usually lorries), which transport the crop to grain silos, collection centres or warehouses. Trans-shipment trailers are also used in the delivery of crops to grain seeders and supplying fertilizer spreaders.

The reduction of grain production costs and the growing number of large-scale farms encourage farmers to invest into increasingly more efficient machines. Therefore, the PRONAR T740 and PRONAR N743 trans-shipping trailers are very popular among the owners of such farms. The trans-shipping trailer collects grain from the combine harvester and then transfers it to the lorries that transport it to the place of storage. When you eliminate the need for the combine harvester to drive up to the trailer to unload the crop, combine unproductive time is significantly reduced. A consisting set of two combines and a trans-shipping trailer achieves the same efficiency as three combines alone. And the difference in the price of the combine and the trans-shipping vehicle is a significant win.

The trans-shipping trailer transports the crops between the lorry and the combine harvester operating on the field. An extremely important factor that determines the efficiency of the combine is efficient grain transport. In order to ensure consistency of the combine operation and to avoid excessive idle time, the number of trailers and trans-shipping trailers must match with the number of harvesting combines operating on the field. In the case of insufficient number of transport lorries, trailers will not be able to collect the grain from the combine in time, which will cause idle time. During harvesting, grain is most often transported by lorries which higher transport efficiency results from a higher speed.

For many years, there has been a systematic reduction of employment in agriculture in favour of increased mechanization in most countries. In these circumstances, the demand for more and more efficient agricultural machines is growing. This also applies to trans-shipping trailers. The PRONAR T740 and PRONAR T743 are the most popular among trans-shipping trailers manufactured by Pronar. Depending on the material transported, the efficiency of unloading for both models ranges from 200 to 400 tons per hour. The electronic weighting system with LCD display (accessory) allows the operator to control the weight of the load. The sight-window in the tank and the ladder (along with a operator's platform) allow controlling of individual stages of the vehicle operation. In order to protect the transported material from adverse weather conditions, a tarpaulin (accessory) can be placed on the vehicle load box.

Siergiej Siemakowicz

The Author is Export Sales Specialist at Pronar

PRONAR T700M MONOCOQUE TRAILER

HIGHER EFFICIENCY OF TRANSPORT

Modern production technologies, increasing weight of transported agricultural products and extensive logistics chains make it necessary to continually improve the organization of transport.
That is why monocoque trailers have become a preferred means of transport in modern farms.

Pronar, an experienced trailer manufacturer, makes many monocoque trailer models with the smallest load capacity of 12 tons, and the largest reaching up to 24 tons T679, T679M, T669, T669 / 1, T700, T700M, T700XL (all on tandem suspension). The largest Pronar monocoque trailer is the T682 on tridem suspension.

However, the T700M is considered one of the most functional Pronar trailers. It is a modernized version of the PRONAR T700 monocoque trailer with the increased permissible gross weight of up to 23,000 kg and the load capacity up to 16,090 kg. Noteworthy is its very large capacity of 35 m³ (using wall 800 mm extensions). In combination with good work organization, this increased capacity of the PRONAR T700M can significantly increase transport efficiency. This is especially important during the harvest season, when every trailer counts when you transport the crop from the field to the farm. The combine harvesters are very expensive machines and their operating costs are relatively high. Any combine idling time caused by insufficient capacity of means of transport extends the harvesting time and thus increases cost.

The side wall structure of the T700M trailer has also been upgraded. This significantly lowered the centre of gravity of the load box, which increased the stability of the trailer and improved operational safety. The new design of the PRONAR T700M made the trailer very popular not only among owners of large farms and service providers, but also among medium-sized farms.

The loading height of the PRONAR T700M trailer, without side wall extensions is only 295 cm. Therefore, it can also be used with older machines (e.g. Grain combine harvester or root crops combine harvester), while still maintaining a significant capacity of 23 m³. All this makes the trailer a versatile and very useful farm equipment. Also noteworthy are the rubber seals mounted in the tailgate. They form a system that ensures proper tightness during transport of any type of cargo, such as liquids, bulk and loose materials.

The PRONAR T700M trailer is fitted with a very extensive standard equipment that includes drawbar suspended on a steel leaf spring with height adjustment for connecting to the upper or lower hitch of the tractor, wide 550/60-22.5 tyres, and axles adapted to tow speeds up to 60 km/h. On the other hand, additional equipment includes steering axle, tarpaulin, fenced platform, wheels of various sizes (even as big as 800/45-26,5).

The T700M technical specification and additional options to enhance functionality make this trailer ideal for agriculture and the transport industry.

Piotr Kozak
The author is Pronar's commercial representative

PRONAR T700M TRAILER

IT SPARKS INTEREST IN LUXEMBOURG

Sitting in the tractor cab I can see the wheels and sides of the trailer. This greatly improves the comfort of towing it. An important feature of the T700M is its large tipping angle, which facilitates unloading. You can add to this a very strong suspension and braking system with automatic load-dependent braking (ALB), which ensure that tyres do not wear quickly - this is how Emile Kieffer from Luxembourg describes the advantages of the PRONAR T700M trailer he owns.

What does your company do?
- My company's business is to rent trailers. Customers are increasingly aware of the fact that it is not always worth buying high performance trailers, which will only be used several times a season. Therefore, seeing market trends, I adjust the offer to meet the needs of my customers.

What convinced you to buy a PRONAR T700M trailer?
- Observing the trailer rental market, I found that in the summer my company should make available for rental a trailer with a capacity of about 35 m³. That's why in 2016 I bought the T700M trailer. What most convinced me is the good size of the load box and the desired capacity. When compared with products of other manufacturers, the Pronar trailer stands out with its solid and well-thought-out design, and its handling does not cause any problems. Thanks to this, it enjoys the growing interest of farmers. Of the five trailers I rent, my clients ask about PRONAR T700M most often.

Emile Kieffer from Luxembourg, owner of the PRONAR T700M trailer

What makes the PRONAR T700M trailer so popular?
- When I used this trailer for the first time, I was pleasantly surprised that I could see the trailer's wheels and side walls when sitting in the tractor cab. This greatly improves the comfort of towing the trailer, especially in the field through posts or ditches. Another advantage of the T700M is its large tipping angle, which facilitates unloading. What else matters to me? The suspension is very sturdy and the automatic load-dependent braking (ALB) means that the tyres do not wear quickly and can be used twice as long.

What is your opinion on other Pronar trailers?
- The first trailer I bought was not the PRONAR brand. Unfortunately, its design errors made it unsafe and it needed modifications. This, in turn, caused downtime and I could not provide services to clients. In my opinion, Pronar trailers are high quality and the price is right. Based on the opinions of my customers and their own experience, I have only good things to say about the PRONAR trailers. I would recommend the T700M to anyone who needs a strong trailer with a large load capacity.

Thank you for taking the time to talk with me.

Paulina Czurak
The Author is Export Sales Specialist at Pronar

NEW

THE PRONAR T400R SELF-LOADING WAGON WITH ROTOR

We have added the PRONAR T400R self-loading wagon with rotor to our range. It extends our offer of trailers designed for biomass transport, offering a better choice to modern farms with significant grassland areas and companies providing agricultural services.

The PRONAR T400R trailer is designed for operation with a tractor with a power of at least 182 hp, a 1,000 rpm power take-off shaft and equipped with a hydraulic system with an operating pressure of up to 200 bar and oil output up to 130 l/min. Its construction is based on a tandem hydraulic suspension with four steel half-springs with a 1810 mm wheelbase, a front rigid axle and a hydraulically stabilised, adjusted and actively controlled rear steering axle. The standard rear steering axle minimizes turf damage and tyre wear when driving on asphalt. The trailer is fitted with 700/50 R26.5 tyres.

The frame structure of the trailer chassis is made of durable, rectangular, closed profiles. The load box is made of longitudinal members made of high-quality steel and posts made of closed profiles, to which profiles with a special anti-corrosion coating

are fixed. The headboard and tailgate are opened using a hydraulic system. The conveyor chains are placed in metal guides embedded in wooden platform floor.

A very important element of the T400R trailer is its cam pick-up assembly with a working width of 2 m, which allows the trailer to operate at high efficiency. Thanks to the cams, the pick-up tines accelerate rapidly when in contact with the soil to collect material not only cleanly but also at high speed. The pick-up is equipped with 8 rows of pick-up tines. Adjustable wheels protect turf and ensure perfect ground contour following.

However, the key element of the T400R is a loading rotor with a diameter of 800 mm with eight helically arranged rows of arms made of wear-resistant steel. The pick-up cutting system consists of 45 blades made of hardened tool steel, whose theoretical cutting height is 34 mm. Each blade is overload protected against damage. Upon a collision with a stone or other obstacles, the blade tilts back. Thanks to this feature, it is only blunted, but not broken. After passing the obstacle the cutting blade returns to its original position. The ability to replace blades without using special tools is also important. The PRONAR T400R trailer is perfect for farms with large areas of grassland. It simplifies the organization of work as it eliminates the need for additional machines to transport green fodder, as well as reduces the need for manual work and reduces fuel expenses. The choice of Pronar trailer is also supported by very high cutting accuracy, comfort and safety of work and high productivity all the way from harvesting to unloading, which is very important in modern farms and companies providing services to agriculture.

Krzysztof Smoktunowicz
The Author is the Trailer Deprtment Manager, Implementation Department at Pronar

PRONAR HOOK LIFT TRAILERS IN BELGIUM, THE NETHERLANDS AND LUXEMBOURG

THE MOST POPULAR

The versatility of Pronar hook lift trailers results from their year-round use in many industries, including in agriculture, horticulture, construction and municipal environment. This is also true in Belgium, the Netherlands and Luxembourg, which boast a very modern agricultural economy.

These small countries, are not only among the leaders in the global economy, but they are also the leaders in importing the Pronar T185, T286 and T386 hook lift trailers. Our experience in the production of trailers and the long-term presence of our products on the Benelux markets help us understand the needs of local farmers, and since 2010 we have seen a stable increase in sales.

Thanks to continued upgrades of our hook trailers they are sell well to international clients, which makes Pronar a leading exporter to Belgium, the Netherlands and Luxembourg. The combined marketing effort of Pronar as the manufacturer and dynamically operating dealers, numerous meetings with customers and potential buyers and, most importantly, the high quality of our products result in a well-established and stable position on these markets. For example, Pronar hook trailers are the preferred choice in Belgium.

What makes PRONAR trailers so popular? First of all, it's the versatility and functionality. For example, the newest and largest Pronar hook lift trailer, the T386, allows the transport of containers 5,000 to 7,500 mm. This extensive range of dimensions makes it very versatile. The trailer comes with three axles of which the leading and trailing are steering axles to reduce tyre wear and turning radius.

Loading and unloading (or tipping, depending on the operating mode) takes place using two hydraulic cylinders in both T386 and T286. This design solution is successfully used in hook lift trailers adapted for use with road vehicles. Two cylinders lift the container at the same time to load / unload the container smoothly and without problems.

Both hook lift trailer models are also equipped with hydraulically adjustable and damped drawbars, which allow for smooth tractor hitch height adjustment and protect the drawbar and load-bearing frame from vibrations and shocks during operation. This improves safety and comfort of use. To further advance these features, the trailers have a retractable rear bumper that uses two hydraulic cylinders. Another feature improving the level of safety

and comfort of use is the reduced work cycle with the application of oil tank and the efficient oil pump supplied from the tractor's power take-off shaft. This solution also increases the power of the hydraulic cylinders.

The PRONAR T185 trailer, on the other hand, gained great popularity in fruit farming. Its construction was based on tandem suspension with longitudinal rocker arms. This solution provides relatively easy manoeuvring when reversing and put additional weight on the tractor wheels, which increases grip. You can also use wide tyres with the T185 to ensure high performance even in very difficult conditions, such as wet fields or forest paths. The trailer is perfect for handling agricultural, construction and municipal containers as well as transport platforms.

Pronar offers five hook lift trailer models: T185 (maximum total weight: 15 t), T285 (21 t), T285/1 (23 t), T286 (23 t) and T386 (34 t). The Pronar T386 is one of the most popular trailers in Belgium, the Netherland and Luxembourg — it is the largest and latest trailer in the range. The most popular options which improve the PRONAR T386 trailer functionality include: aluminium mudguards, two extra hydraulic system valves by the hook and LED warning lights. Compatible with hook lift trailers, Pronar offers agricultural and municipal containers (KO01), construction containers (KO02 and KO03) designed for transporting heavy materials as well as large volume high load municipal containers (KO04).

Paulina Czurak

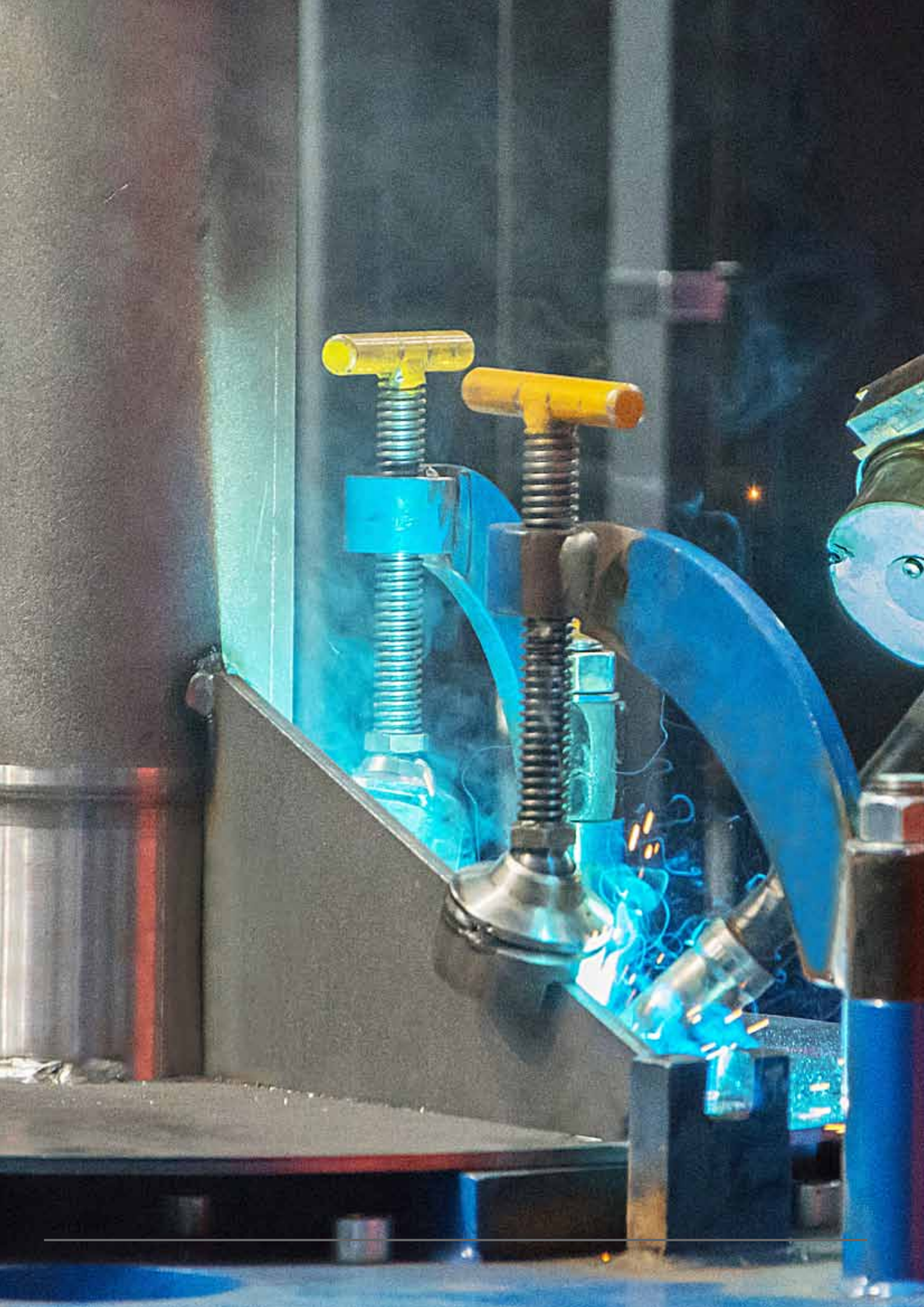
The Author is Export Sales Specialist at Pronar

END USER OPINION

Tom Haas from Luxembourg, owner of the PRONAR T185 hook trailer:

I bought the T185 hook trailer in February. Why did I choose the PRONAR trailer? I know a farmer who uses the T285 hook trailer and it performs to his satisfaction. I also saw the T185 trailer in action and I had only good things to say about it Also, I found the trailer worth buying due to its attractive price.

I have been using the trailer for around six months and I can confidently say that it is easy to operate and I do not have to waste a lot of time on it. It also performs well when used with various types of containers and platforms for transporting grass or sand. I was surprised by the fact that the trailer with such a simple mechanical suspension ensures very comfortable ride. I recommend the PRONAR T185 hook trailer to anyone who does not want to waste too much time as is the case when handling trailers from other brands.



TECHNOLOGIES

THE PNEUMATICS AND HYDRAULICS DEPARTMENT

MODERN MACHINERY

Technologically advanced machines, highly qualified employees and the use of cutting edge computer aided design software make Pronar a leading European manufacturer of pneumatics and power hydraulics. Pronar cylinders, tanks and hydraulic and pneumatic lines are used in areas such as industrial automation, construction, transport and agriculture.

The Pneumatics and Hydraulics Department has very modern machines at its disposal, mainly on numerically controlled machine tools. At the heart of the department there is a modern design and technology office employing highly qualified specialists, working on improving products already manufactured and introducing new products to production. The use of modern computer aided design and production software serves to reduce the time of production launch to a minimum, also to fast track projects commissioned by external companies.

Thanks to the experience of Pronar staff and applied technologies the Pneumatics and Hydraulics Department makes the most innovative pneumatic and power hydraulic components. At the same time, access to the latest technologies creates an excellent climate for the development of young engineers making the department a friendly place that provides great opportunities for professional development.

Employing over 200 people, the Pneumatics and Hydraulics Department is one of the largest organizational units in Pronar. With the continued technological progress and ever growing range of manufactured products we need to hire more employees - from machine tool operators through designers and technologists to the managerial staff. The Pneumatics and Hydraulics Department pays well above the average wage in Poland and deeply cares for its employees.

Pronar telescopic cylinders enjoy an excellent reputation both in Poland and on many international markets. The range of hydraulic cylinders is continually expanded. As one of the few producers in Europe, the Pneumatics and Hydraulics Department, also manufactures double-acting telescopic cylinders. In addition to series production we also accept custom orders for very complex built, innovative cylinders meeting the highest quality standards. Decades of experience allows us to provide modern and reliable products at competitive prices.

The highest quality and reliability of components manufactured at the Pneumatics and Hydraulics Department is confirmed by steadily growing sales. The growing

range of offered products includes not only power hydraulics. Pronar also expands its range of offered pneumatics, such as compressed air tanks. The compressed air tanks are manufactured in accordance with Directive 2009/105/EC and bear CE marking.

Customers looking to order pneumatic or hydraulic cylinders may provide their own design documentation, but optionally the documentation may be developed by engineers from our Pneumatics and Hydraulics Department. Each of the previously mentioned products can be made to custom order, according to individual design instructions.

In accordance with the requirements of ISO 9001:2015, Pronar monitors and measures product specification against the technical standards and design documentation. At the Pneumatics and Hydraulics Department, specification is inspected and examined at every stage of production, starting with delivery control through to the finished product. The quality assurance operations are carried out by representatives of the Quality Control Department as well as by the production staff of the Pneumatics and Hydraulics Department during the production process.

Every employee, who takes measurements and is involved in quality control, is trained to improve their qualifications. When using the random quality checks for the attribute characteristics of the irregularity acceptance, the criterion is 0. This means that if any non-compliance is found, the process is stopped and the entire batch of products is checked.

THE PNEUMATICS AND HYDRAULICS DEPARTMENT PRODUCTION RANGE:

- double-acting telescopic cylinders,
- a very wide range of high and low pressure flexible hydraulic and pneumatic lines with straight and angled couplers (metric and imperial);
- piston and plunger cylinders (with a custom stroke);
- telescopic hydraulic cylinders
- rigid hydraulic lines,
- compressed air tanks.

Monika Siebiesiuk

The Author is a Sales Specialist in the Pneumatics and Hydraulics Department at Pronar

ROBOTIZATION OF PRODUCTION PROCESSES HELPS US COMPETE WITH THE BEST

INCREASED PRODUCTIVITY AND CONSISTENCY OF PRODUCTION

Each of the factories is different, produces different items, using different technologies. However, each one faces same future - robots.

Real-world scenarios show that the robotization of production processes is not only an opportunity to increase the competitiveness, but above all, it is a necessity if we intend to keep up with the global powers. Avoiding issues with human resources, greater accuracy, ideal consistency and speed are the key advantages of robotization. High consistency of products and improved quality significantly reduce the production costs, including warranty.

The driving force behind technological progress is the desire to replace human labour. The trend of industry robotization is a growing one, which is why we invest in robots to meet the high demands of our clients. More and more companies around the world invest in robots so that production is even faster, more precise and, above all, much safer. Pronar also follows this route.

Welding is the most important manufacturing process in the metal industry, where robots are unavoidable. Thanks to the use of the latest robotics technology, Pronar has already significantly increased its production capacity, and our future strategy assumes the continuation of these trends. Robotization of welding stations reduces downtime, improves productivity and product quality.

The machines produced by Pronar operate in difficult conditions and are often used for intensive heavy-duty transport in agriculture, municipal or forest management. The high quality of workmanship guarantees reliability. The robotic welding process ensures that welds are always positioned as required. Therefore, high accuracy and consistency of joining welded components is always guaranteed ensuring identical specification and optimal performance in all operating conditions. High flexibility of the welding process makes it possible to join welded elements in places that are difficult to access or previously not accessible to people in general.

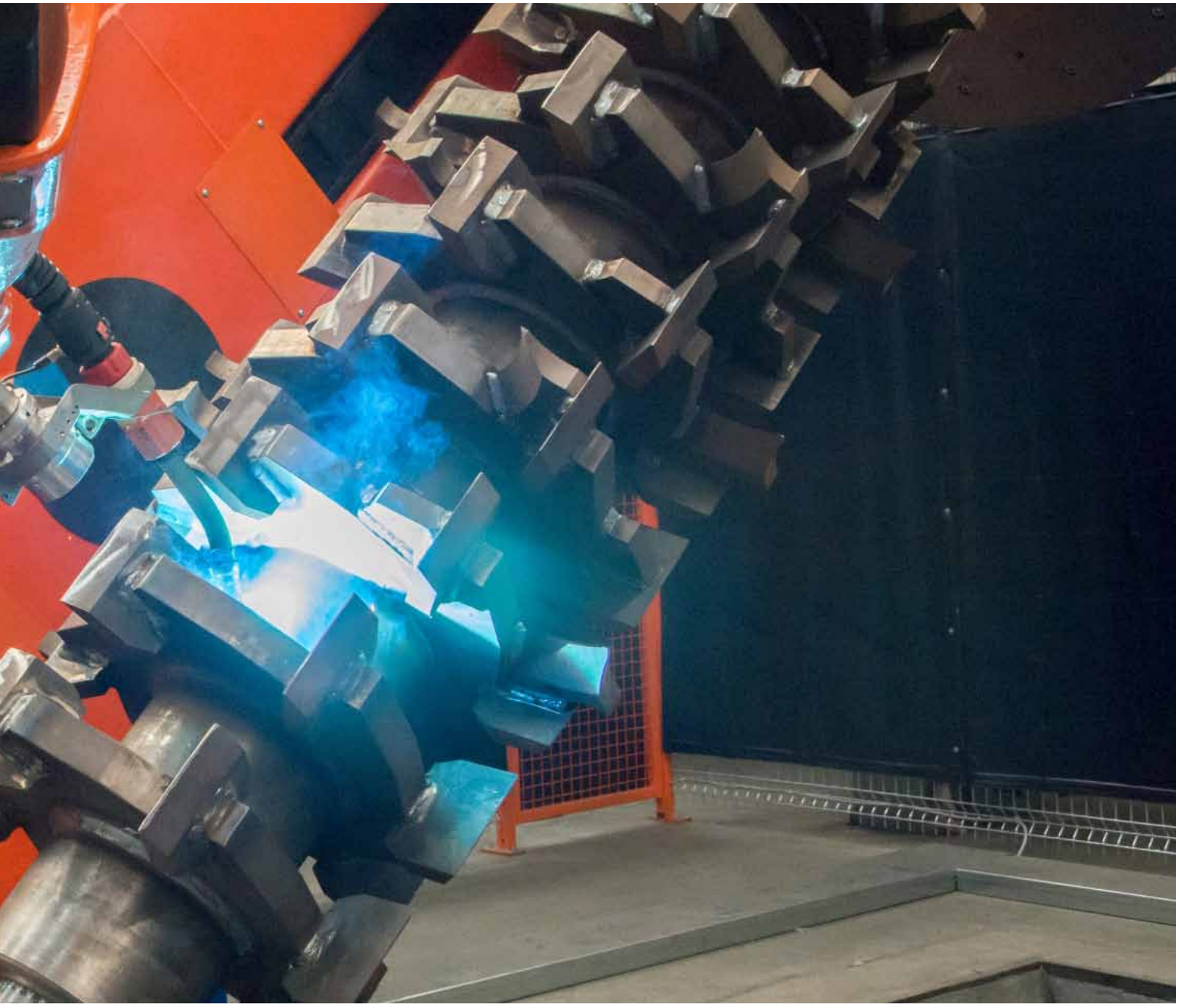
Robotization is the processes designed to replace human labour with machines controlled by advanced electronic systems. Robots needs no holidays, sick leave or require breaks during work — these are the most obvious benefits of using robots in production. The reliabili-

ty of production processes is already a reality at Pronar, and robots replace a human being in many activities while performing their tasks much faster and with more precision.

However, robotization does not cause reduction of employment. This will also be the case in the future. This is due to the constantly growing demand for our products. Robots relieve employees in monotonous processes consisting of repetitive steps and requiring increased physical effort. The highest precision and consistency of welding are not the only advantages of robotic manufacturing processes. One cannot forget about work safety, which is a priority during all production processes at Pronar. Thanks to the use of robots, the likelihood of accidents decreases practically to zero.

Robotization of production processes leads to obtaining products that meet the highest standards without compromise on efficiency. Thanks to investing in robotic production, Pronar is able to nearly completely eliminate any consistency issues. Many metal industries around the world struggle with this problem. The use of robots in Pronar factories twill replace human labour in positions where high physical effort is required and where hazards to health are a factor. The vision of large factories with manual labourers is becoming obsolete. The future belongs to automation and robotics, which are becoming more and more interrelated. The automation of processes is considered to be an investment at Pronar that will allow us to effectively compete with the best companies operating on a global scale.

Dariusz Nesteruk
The author is a production foreman at the Axle Department at Pronar



PRODUCTION OF TRANSMISSION UNITS

NOT ONLY FOR OUR OWN NEEDS

Pronar is the largest Polish manufacturer of agricultural and municipal machinery. Most components used in our machines are produced on site. These include transmissions produced at the Department of Axles, Drive and Transmission Systems, in one of the newly built Pronar factories.

The transmission unit is a key component of the kinematic chain of machines used in agriculture and other industries. It transfers the torque from the driving element to the driven element, often changing the ratio or direction of motion or rotation. Pronar uses transmission units in green forage harvesting machines, municipal machine and specialist trailers.

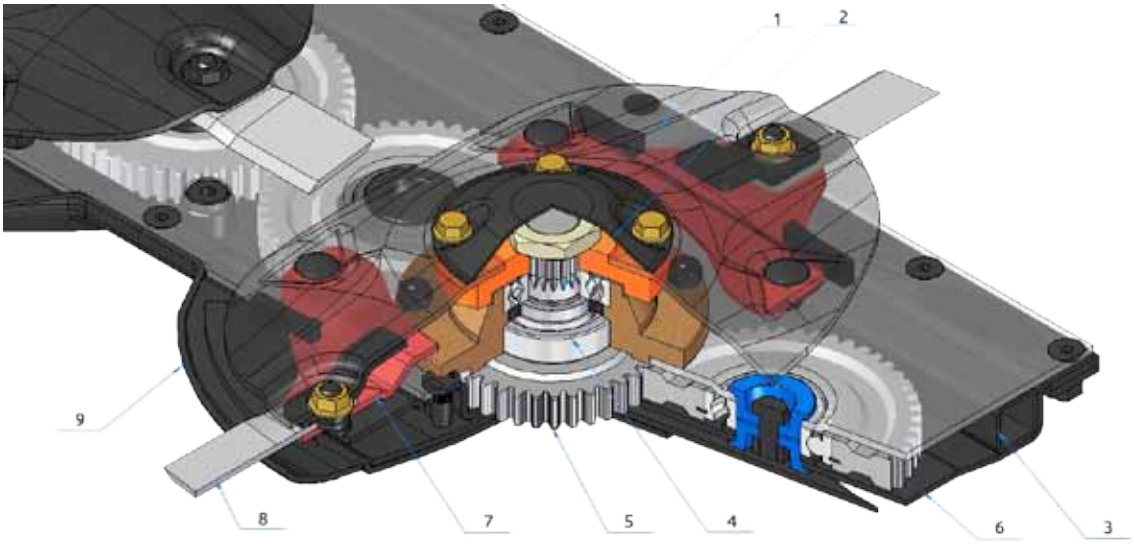
Transmission units manufactured at the factory in Hajnówka are characterised by high reliability and performance even when operating for long hours. Torque transmission, speed reduction and other drive modules are mounted in a common housing. This makes repairs and maintenance easy. The main advantages of Pronar transmissions are small dimensions, quiet and smooth operation, high performance and high power.

Pronar continually invests in technological development, expands the scientific and research facilities and employs top specialists. This is why we can offer design and implementation services to even the most demanding customers. Orders for complete drive units are consulted with Pronar designers. It ensures professional and competent service as well as delivery of final product on time.

Grzegorz Pugacewicz

The Author is the Axle and Transmissions Department Manager, Implementation Department at Pronar

Construction of the cutter bar produced by Pronar in disc mowers with the use of gearboxes also produced by Pronar



1 - discs of hardened boron steel with an innovative shape that provides less resistance to cutting and higher resistance to abrasion
2 - modular design ensures quick replacement of parts
3 - additional stiffening profile enclosed in the cutter bar body
4 - stable mounting by means of two ball bearings
5 - higher gears with ground teeth to reduce noise
6 - optimum capacity of oil sump ensures perfect cooling
7 - system of quick replacement of knives, hardened holders made of boron steel
8 - 120 mm long solid angled knives
9 - replaceable slides made of hardened boron steel

- cutting height adjustable in the range of 30 - 70 mm by changing the inclination angle of the cutter bar
- possible knives replacement in the central position at the front of cutter bar reduces the danger of losing the knife

WIDE OFFER OF PRONAR GEARBOXES

FRONT MOUNTED DISC MOWERS

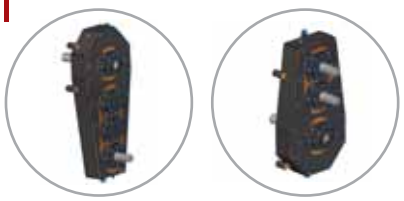
REAR MOUNTED DISC MOWERS

MULCHERS

ROTARY TEDDERS

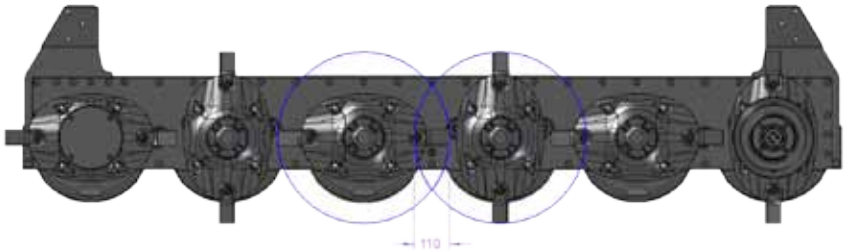
DOUBLE-ROTOR ROTARY RAKES

SNOW BLOWERS



FORAGE WAGON

MANURE SPREADERS



PRONAR CUTTER BARS

robust chute with a stiffening profile

A NEW INVESTMENT AT THE WHEELS DEPARTMENT

THE COMPLETE SUPPLIER

Thanks to many years of production experience and dynamic technological development, the Wheels Department at Pronar has become a reliable supplier with a global reach and an established commercial position. The new investment at Wheels Department this year, will allow the production of wheels of less than 12 inches in wheel diameter. In this way, we will be able to reach new groups of manufacturers who use wheels rims of this size in their products.

The Wheels Department offer includes more than 300 technical variants of welded and adjustable wheels. As a result, customers can create over 8,000 different configurations. The ability to produce custom wheel rims that meet the needs of clients all over the world has made the PRONAR brand known and its products desired by customers in many countries.

Pronar wheels have gained the recognition of global manufacturers of agricultural machines. The end users also express their favourable opinion of our high-quality wheels, which are designed to perform in even the most extreme working conditions. For many agricultural equipment manufacturers, the products of the Wheels Department have become the new standard of quality. The sales specialists of the Wheels Department are adept at gaining a better understanding of the current needs of our clients on many markets, and set the new direction for the development of the department.

Entering the new markets requires efforts on many levels. When working with potential buyers who have not previously encountered Pronar products, it is essential to present our modern technical solutions. This strategy takes focus off the price (it happens that some clients expect unreasonably low prices) and highlights the benefits of new technical solutions implemented in PRONAR products. Our wheels are top quality and more durable.

While designing unique construction solutions for new markets, our engineers ensure that our proprietary technological knowledge is protected. All trade meetings, including those on a different continent, require the Wheels Department employees to agree on technical documentation, and if necessary - also the delivery of sample products.

Until recently, Pronar produced large diameter wheel rims of up to 54 inches. This year, we will launch the production of a new variety of wheels below 12 inches. The whole project aims to manufacture wheel rims for rotary rakes, tedders, self-propelled mowers (garden mowers) or orchard trailers. Wheels of such small sizes do not make as big an impression as the largest products of the Wheels Department. However, there is a huge demand for wheels below 12 inches in diameter, which is why orders reach hundreds of thousands of units per year. The new investment will expand the product portfolio and allow Pronar to become the complete supplier.

Rafał Mazur

The author is the deputy manager for trade and marketing at the Wheels Department at Pronar

WHEELS & AXLES

SOUTH AFRICA - THE MOST PROMISING MARKET IN AFRICA

Thanks to the recent investments, the production of the Wheels Department has increased and the quality of manufactured products has been improved. Pronar factories in Narew and Narewka produce over one million wheels annually.

With such production output it is imperative that we always find new markets to sell our products to. Our foreign sales department looks for new markets all over the world. South Africa is one of the strategic markets for Pronar. It is the largest market for Pronar wheels on the African continent.

The country is classified as an emerging market with average GDP. In terms of area, South Africa is almost four times as big as Poland, and of this area nearly 75 percent is occupied by arable land and grassland. The development of agriculture is favoured not only by good climate but also by very fertile soils. The surplus food is exported. The country's mining industry is well-developed due to the presence of minerals. Thus, the demand for steel wheels for agricultural, construction and industrial machines grows from year to year.

The trade is facilitated by the 2000 Trade, Development and Cooperation Agreement concluded by South Africa and the European Union. It liberalized trade between the European Union and South Africa, and as a result the EU became one of the main trading partners of South Africa.

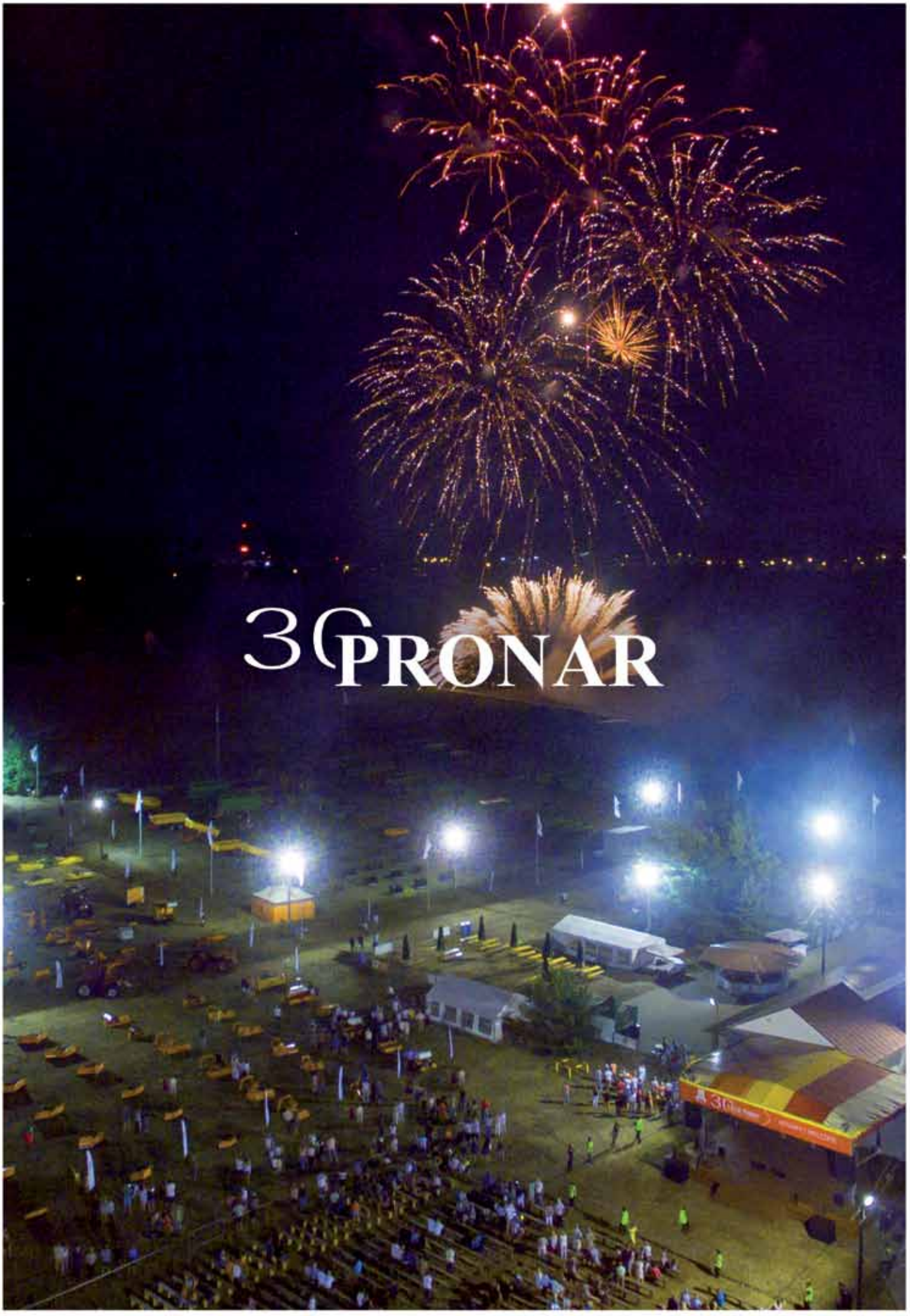
The export of Pronar's disc wheels to South Africa began in 2012. These are primarily complete wheels. The high quality, solid construction, durability and competitive prices of our products have been noticed by our business partners. They have appreciated these qualities for many years of cooperation. Pronar's disc wheels mainly sell to large manufacturers of agricultural and construction machines, which lay emphasis on very high quality. Our components are installed in their products.

The components for the production of wheels such as bare rims and discs are an important part of our exports. These components are used by smaller manufacturers to produce short series of wheels for individual consumers. Through the production of large batches, the above export model ensures full use of the machinery in our factories in Narew and Narewka.

Similarly to the American and Australian agriculture, the farms of significant areas predominate in South Africa. Therefore, the same range agricultural machines are used there. For Pronar, this enables combining production into all three markets. On the other hand, the Wheels Department faces the challenge of adapting the product offer to the requirements of these markets, which are very different from those of European markets. However, due to the availability of modern technical facilities including the Research and Development Centre, the Wheels Department introduces new products that contribute to further sales growth.

Rafał Mazur

The author is the deputy manager for trade and marketing at the Wheels Department at Pronar



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