

INVESTMENT AS A PATH TO SUCCESS

PP. 14-19



IN THE TOP THREE

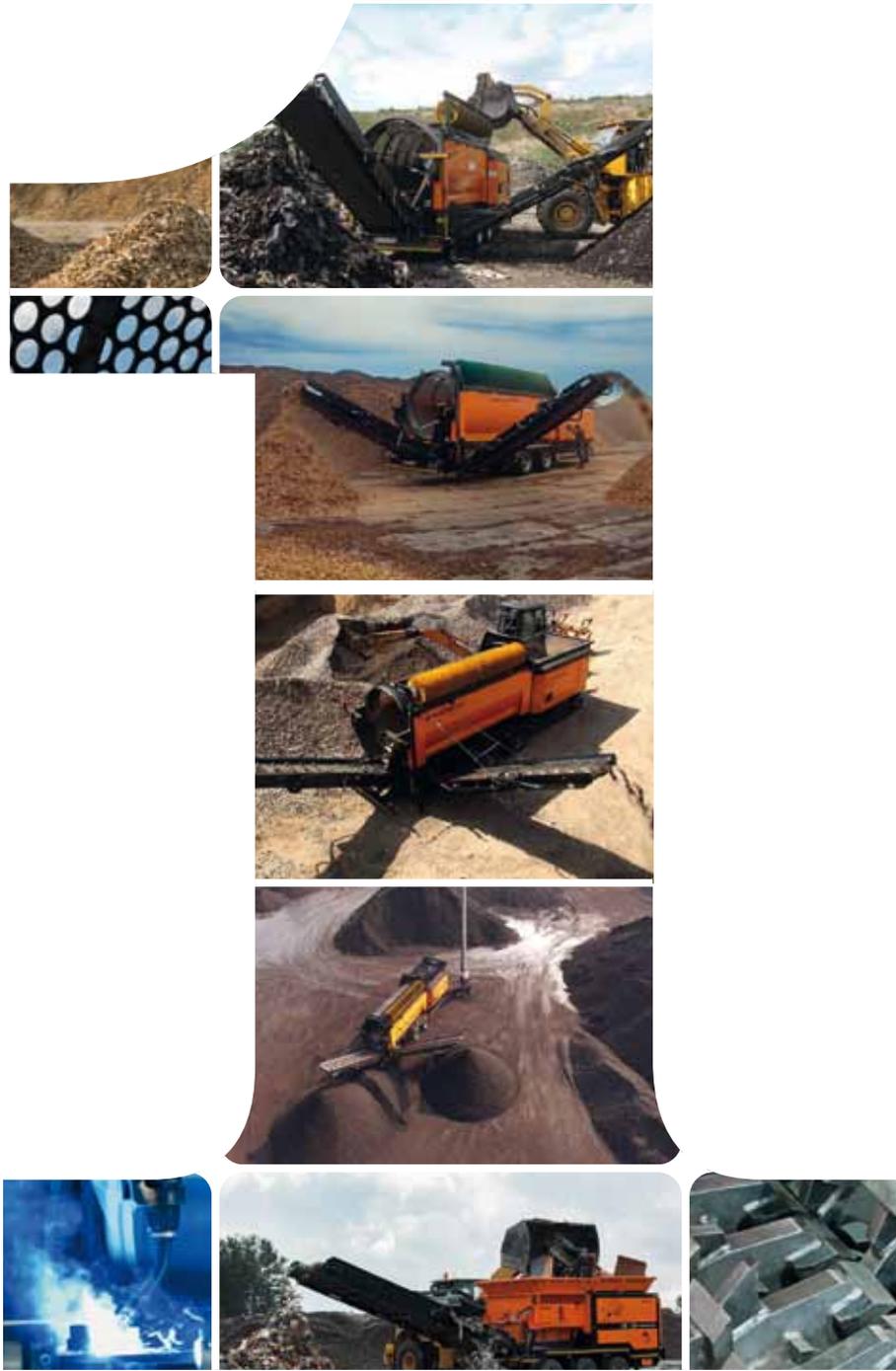
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PRONAR'S POSITION CONFIRMED

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TRAILERS

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AHEAD OF OUR COMPETITORS!

www.pronar-recycling.com

Accession to European Union required Polish companies to adapt to all European production standards, including technical parameters and product safety requirements. This means that customer buying a machine from any member state of the European Union is guaranteed that it will meet all the legally required standards, regardless of where the production took place.

As companies entered the market, the customers were provided with a wider choice of products. It also contributed to healthy competition, stimulating increase of effectiveness of the so-called 'old European Union' states. However, co-existence on a common market is not always competition. Cooperation also takes place, allowing, for example, buying less expensive intermediate products or subassemblies, what in turn allows lowering the price of the final product.

We are well aware that to succeed on the common market of the European Union, we have to constantly improve quality and functionality of our products, and offer them for the most competitive price possible. To achieve that goal, Pronar employs a group of 160 designers and engineers that continually work on introducing cutting edge technology into our products.

By the end of the year 2016, Pronar will finish expanding 3 of its plants and increase the surface areas of its production halls by 55 thousand square meters. The total cubic volume of new halls will be 750 000 m³. The total floor of seven Pronar plants will reach 210 000 m². This will make our company one the largest manufacturers of agricultural and municipal machinery in Europe.



Sergiusz Martyniuk
Chairman of the Board, Pronar

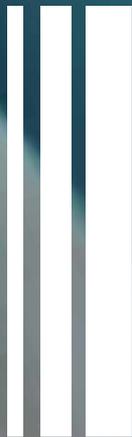


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NEWS



IFAT fair 2016

PRONAR AS THE AMBASSADOR OF POLISH ENGINEERING SOLUTIONS

IFAT Fair in Munich is the world's largest event concerning waste disposal, recycling, municipal services and machinery, as well as engineering solutions in these areas. Over 3000 exhibitors from 59 countries and around 135 thousand visitors participated in the last edition of this event that took place from 30th May to 3rd June 2016. Pronar exhibited its machinery on an area of 450 m².

In Munich, the Polish company presented new models of recycling and municipal machinery. Pronar mobile slow-speed shredders were presented for the first time. Both models: PRONAR MRW 2.85 mounted on a wheeled chassis and PRONAR MRW 2.1010 mounted on a caterpillar chassis, are the company's answer to dynamic development of the recycling services sector.

PRONAR MPB 20.55g - the newest model of the mobile trommel screener on a caterpillar chassis - adapted to work in hardly accessible areas, on boggy or unstable ground. Many experts from the sector

waited for this model to come out.

Among the municipal machines designed for road maintenance Pronar presented machines like the PRONAR SPT70 spreader (available with capacity 7, 8 or 9 m³) of the roughening material hopper, WWT-600 multifunctional hydraulic arm with 6-meter long working arm (used, a/o, for roadside maintenance), and modern OWF 2.6 snow blower. The offer included also working heads PRONAR GO800 and PRONAR GM500 designed to be adapted with our hydraulic arms.

Pronar representatives held many talks with visitors of the fair and business partners from around the

world, including a large number of representatives of municipal services providers and waste management companies. Many of them were impressed with innovativeness, reliability and high quality of Pronar's machinery. Attractive prices of our products did not go unnoticed as well.

We have every reason to believe that Pronar, being one of the European leaders in establishing the development direction of the recycling and municipality machinery industries, consequently strengthens its position on global markets. Many of those who got acquainted with our newest products shared this be-





lief, and we received a number of orders for our products. We were also very pleased with positive comments

from representatives of other Polish companies, who stressed that Pronar was the ambassador of Polish engine-

ering solutions in municipal services and recycling industries at the fair.

(bt)

POL-ECO-SYSTEM

PRONAR THE BEST ON POL-ECO-SYSTEM TRADE FAIR

Pronar once again won the The Poznan International Fair Gold Medal and Acanthus Aureus on Pol-Eco-System 2016. These awards were granted for the best product and best exhibition on the Pol-Eco-System trade fair in Poznań (Poland). For four days, visitors could browse the offers of Polish and foreign companies.

Leading companies dealing with municipal services and environmental protection machinery manufacturers from Poland and many other countries presented their offers on Pol-Eco-System 2016 trade fair. The goal of Pol-Eco-System is to gather as many companies from those industries as it is possible to allow exchanging international experience, inspire progress in environmental protection and facilitate finding new business partners.

To present products of Pronar, largest Polish manufacturer of municipal and recycling machinery, 3 000 m² of exhibition space was required. For the first time in history of the fair, a single company rented an entire hall. Modern machines manufactured with use of innovative technologies were presented on a grand scale. Those that raise overall recycling rate by facilitating waste sorting aroused exceptional interest. Most visitors were impressed by

our shredding and sorting machines, and congratulated us not only on our products, but also on the manner of their presentation. "Spectacular", "impressive", "breathtaking" are just examples of comments we heard from visitors to our hall.

Pronar presented 6 models of trommel screeners: 4 mounted on a wheeled chassis: MPB 14.44, electrically driven MPB 18.47e, MPB 20.55, MPB 20.72; and 2 on a caterpillar chassis:



MPB 18.47g and MPB 20.55g. 3 models of slow-speed shredders were presented as well, namely the MRW 2.85 model, MRW 2.85g on a caterpillar chassis, and finally – a brand new MRW 2.1010, for which Pronar was awarded with a gold medal of the fair. Our company presented also other machinery, designed for road maintenance in summer and winter, as well as modern recycling equipment:

- municipal tractors,
- hook lift and transport trailers,
- sand & salt spreaders and road sweepers,
- snowploughs and snow blowers,
- multifunctional hydraulic arms with compatible equipment.

Sławomir Matyśkiewicz
The author is municipal equipment sales specialist at Pronar





Pronar Research and Development Center

RESEARCH DEVELOPS INTO MEASURABLE BENEFITS

Discovering innovative solutions and technology is one of conditions a company needs to meet to properly develop. However, R&D should not be a goal in itself, as the most important skill is utilizing research results for the benefit of the business activity conducted and achieving tangible advantage. It is the ability to adopt the R&D activities and results to meet market requirements what makes a company competitive, and their products and services unique.





On the competitive market, means to achieve an advantage are innovations, ability to utilize human resources, knowledge and research results effectively. Establishment of Pronar Research and Development Center was a natural consequence of strategy and mission our company has been implementing for years. Profits are not the only focus here, but also means to keep the talented research staff and erase the barriers between the economic and R&D spheres.



” R&D Center offers tests:

- of hydraulic cylinders;
- of motors, pumps and distributors of actuator-based hydraulic systems;
- of durability of hydraulic lines (DIN/ISO 6802, DIN/ISO 6803, ISO 8032);
- of loaders and hydraulically powered machinery;
- of three-point hitch lifting capacity;
- of external hydraulics capacity;
- of Roll Over Protective Structures (ROPS) in accordance to ISO 5700:1996, Directive 2009/75/EC, CODE 4, CODE 6, CODE 7;
- of hitches and protection devices (UN/ECE Regulation No. 58, UN/ECE Regulation No. 73);
- axle fatigue strength;
- of products' mechanical and dynamic strength;
- of axle braking efficiency (inertia machine) UN/ECE Regulation No 13;
- of impact of weld deformation strains on the occurrence of axial throw and circular oscillation in wheels and similar equipment;
- of sheets plastic working parameters optimisation for new products (stamping technology);
- of temperature distribution (thermography);
- wheel rim rolling simulation;
- disc wheel fail-safe technology development tests (safe destructive tests);
- diagnostics of prototypes (hydraulic and brake systems);
- X-ray tests of welds and material damage in a chamber
- of chemical composition of steel using spark spectrometry
- ultrasonic tests for material damage;
- of vehicles and machinery in a thermal chamber (extreme temperatures from -40°C to +80°C);
- of Falling Object Protective Structures (FOPS) in accordance to CODE 10;
- of vehicle stability (a/o UN/ECE Regulation No. 111);
- of fuel systems;
- of plastic parameters (ISO 1133, EN ISO 1183-1:2013-06 A);
- of electromagnetic compatibility (ECM tests) of vehicles and machinery (UN/ECE Regulation No. 10);
- of electrical values;
- of machine noise (ISO 3744);
- of paint coatings (ASTMD2794-93, ENISO 2409:2013-06, ENISO 2808:2008, EN ISO 2812-1,2:2008, EN ISO 2813:2014-11, EN ISO 4628-1,2,3,4,5:2005, EN ISO 4628-8:2013-05, EN ISO 6860:2006, EN ISO 15184:2013-04);
- in a salt chamber (ISO 9227);
- in a moisture chamber (ISO 6270-2);
- in a UV chamber (ISO 16474-2, ISO 4892-2).

Pronar Research and Development Center offers innovative and comprehensive tests measuring parameters of agricultural, forestry and

construction machinery, motor vehicles and their subassemblies. The tests are carried out with use of cutting-edge equipment, devices and computer so-





RESEARCH AND DEVELOPMENT CENTER PRONAR



BRIDGE BETWEEN BUSINESS
AND SCIENCE



OVERCOMING
A BARRIERS



UNIQUE RESEARCH
EQUIPMENT



EFFECTIVE USE
OF RESEARCH RESULTS



INNOVATIVE
SOLUTIONS



COMPLEMENTARY
RESEARCH

pronar.pl/en/research-and-development-center

ftware that contribute to the improve-
ment in innovativeness and shortening
of the time needed to commence pro-
duct manufacturing. The broad offer
of Pronar Research and Development
Center is directed to those who find tra-
ditional, standard methods of produc-
tion and measurement insufficient to
achieve their goals.

Our Research and Develop-
ment Center has a 3D scanner allowing

for quick verification of prototypes' di-
mensions for quality of workmanship
and the powerful, cutting edge Portus
900 MC 3D printer allowing creation of
three-dimensional objects basing on
a model and verifying their functional
properties. The R&D Center uses calcula-
tion workstations allowing FEM mo-
delling (Finite Element Method) to es-
tablish distribution of stress and deforma-
tion of designed constructions.

Among the Center's services
is high precision 3D laser cutting of va-
rious pipes (round, square, rectangular)
and steel profiles (T 2T, H, C, I and L). Our
laser can also cut threading while cut-
ting. The Research and Development
Center implemented friction welding
technology and conducts endurance
tests of these welds.

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Company's own air service

PRONAR REACHES FOR THE SKY

On 15th July 2016, PRONAR airfield has been opened, with almost 1000 meter-long runway. The airfield was constructed mainly to allow company representatives to easily reach our business partners. Pronar conquers the markets all around the world, thus requires an extended dealership network and ability to provide maximal mobility for its representatives. Time is money, and also the only thing we need to implement ambitious strategy of our management.

May 2015 was the beginning of a new era in Pronar. First, a short range helicopter and a helipad were bought. It soon proved to be a bull's-eye. This led to a decision to pur-

chase airplanes able to reach airfields in Europe and other continents. Next step was to construct infrastructure allowing for optimal use of new equipment. That is, to build an airfield.

Local community also benefits from the Pronar Airfield. Thanks to agreements made, it will also be used by Border Guard, Police, Air Rescue Service and firefighting planes of forest services, that is, these services that directly care for safety and health of local citizens.

Until now, Podlasie region (north-eastern Poland) lacked a place where planes heading to this region or abroad could land and refuel. Because of this, Pronar airfield became a strategic place on aeronautical charts and tourist maps of this region of Poland.

By joining the airfield network in Poland, Pronar contributes







to the development of aviation in the region, provides comprehensive services and backup landing site for air operations of national aviation and air rescue services, and contribute to promotion and development of Podlasie.

At the moment, Pronar owns two helicopters and two airplanes: Beechcraft KingAir C-90 and Diamond DA-42 Twin Star. To use them effectively, a helipad and an almost kilometre-long airstrip was constructed. The air vessels are capable to operate un-

der Visual Flight Rules conditions both during the day and at night.

The construction investment encompassed construction of: a hangar, a tarmac helipad, a hard-surfaced runway, a taxiway, an airfield weather station, a radio mast with lighting, a CCTV system, and a airfield lighting system specially designed to facilitate night takeoffs and landings.

To keep up the momentum, Pronar – already the leader of the local fuel market – expanded the scope of its license for the sale of liquid fuels with JET A-1 fuel, satisfying the demand for this merchandise in north-eastern Poland. Pronar has a specialised cistern that can hold up to 12 000 litres of fuel, equipped with a cutting-edge filtering system. This equipment allows refuelling to be carried out in any indicated location.

Helena Landowska

The author is a marketing specialists at Pronar

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On 2nd August 2016, members of the Volunteer Fire and Rescue Service had the chance to use the Pronar airfield for the first time. A training drill have been carried out, focused on cooperation with M-18 Dromader firefighting plane, owned by the Regional State Forest Directorate in Białystok (the capital of the Podlaskie Voivodeship – north-eastern Poland). Thanks to its location, Pronar airport became an inseparable part of the intervention plan drawn up to fight possible forest fires in the area of Białowieża Forest, a UNESCO



World Heritage site. These trainings will become regular from now on to refine the cooperation of various entities involved in protecting the region. The Regional State Forest Directorate in Białystok manages over 620 000 hectares of land, of which 580 000 hectares are forests.

Investments

NEW FACTORIES ARE BEING CONSTRUCTED

Investments are Pronar's domain. Thanks to them, the company achieved a strong position in many countries in which our agricultural and municipal machines are sold. Pronar was established in the year 1988. Since then, it continuously develops, taking up one ambitious challenge after another.

Pronar introduces new products, opens production plants, launches the Research and Development Centre, invests in modern technologies, raises employment. It enters new markets as well, last ones were a/o Uruguay, Argentina and USA. Our company builds helipads and airfields to make communication with the world easier and faster. All of these make it one of the fastest and most dynamically growing Polish companies.

Pronar paves its own way to the economical top with embracement of new technologies and products, flexible approach to business and hard, effective work. It currently employs over 2 thousand people. It owns seven modern production plants, innovative Research and Development Centre, a helipad and an airfield. Being number one in production of agricultural, municipal, recycling and forestry machinery,

it also manufactures steel trailer sides, axles, wheels and steering systems, disc wheels, components of pneumatic and hydraulic systems, as well as many other parts of machines and devices.

In the year 2016, the company started-up a new production plant in Hajnówka (north-eastern Poland), where, on the area exceeding 90 000 m² (including 18 000 m² of production floor), it manufactures axles, gears, steering systems and drivelines. Simultaneously, works are in progress to expand production plants in Narewka and Siemiatyczne (both also located in north-eastern Poland).

Narewka plant will raise more than twofold in size – from current 14 600 m² to 26 900 m². This will allow optimising the production process and increasing overall capacity. The plant in Siemiatyczne is being enlarged by 21 000 m². When the construction

” Total production floor of seven Pronar production plants will soon reach 210 000 m², an equivalent of 30 full-size football pitches.

works will be finished, its production floor will be almost 50 000 m². Siemiatyczne plant will manufacture main components of recycling machinery (up to 60 tons), and smaller appliances.

Construction of the new plant and development of two already existing ones is a result of the company's development strategy. This way we create new, attractive jobs and activate workforce in the region by means of allowing young people obtaining new qualifications.

Helena Landowska
The author is a marketing specialist at Pronar





NAREW – PLANT NO. 1

Total surface area of the plant

28 200 m²

Surface area of the production floor
17 000 m²

Cubic volume of plant's production space
136 000 m³

Type of activity

Production of plastic products

NAREW – PLANT NO. 2

Total surface area of the plant

170 809 m²

Surface area of the production floor
79 662 m²

Cubic volume of plant's production space
995 760 m³

Type of activity

production of trailers, disc wheels,
hydraulic and pneumatic systems,
assembly of tractors
Research and Development Centre



NAREW – PLANT NO. 3

Total surface area of the plant

25 263 m²

Surface area of the production floor
10 191 m²

Cubic volume of plant's production space
122 160 m³

Type of activity

Production of trailer sides
Wholesale of steel





STRABLA

Total surface area of the plant

12 500 m²

Surface area of the production floor
8 500 m²

Cubic volume of plant's production space
120 309 m³

Type of activity

Production of green forage machinery

NAREWKA

Total surface area of the plant

128 737 m²

Surface area of the production floor
26 943 m²

Cubic volume of plant's production space
303 044 m³

Type of activity

Production of large-sized trailers
and disc wheels



SIEMIATYCZE

Total surface area of the plant

118 369 m²

Surface area of the production floor
48 000 m²

Cubic volume of plant's production space
530 000 m³

Type of activity

Production of municipal
and recycling machinery



HAJNÓWKA

Total surface area of the plant

90 000 m²

Surface area of the production floor
18 100 m²

Cubic volume of plant's production space
218 000 m³

Type of activity

Production of axles, gears,
steering systems and drivelines



What's behind this success?

A BOLD STRATEGY PROVES TO BE EFFECTIVE

A good export plan takes a long time to prepare, requires knowledge of strong and weak sides of the company, experience gathered throughout the years, efficient reconnaissance of the global market. There is no perfect, universal recipe that will work for any manufacturer. Even a great export plan may require quick modifications as company's environment is subject to constant changes. One must learn to react swiftly to any signal coming from the market.

Pronar sells its merchandise all around the world, from European countries to those in remote parts of the globe like Uruguay, Argentina, New Zealand, and many others. It is easier to sell on markets that are close geographically and similar in terms of culture or language. This is the most natural and least expensive direction of expansion. When exporting outside Europe, it is important to understand cultural differences and to be ready to adopt to different ways of conducting business. The challenge lies in legal issues, necessity of obtaining various types of approvals and the need to establish

a representative office in a given country. It is possible to get some support from Polish government institutions from time to time, however, even though there are certain positive changes in our government's attitude towards domestic companies, exporters from other countries are still usually much more strongly supported by theirs. In short, to success in exporting, numerous barriers and obstacles must be identified and dealt with.

Why did Pronar succeed? The company is not afraid of undertaking bold strategic decisions preceded with identification of ten-

dencies and requirements of individual markets. It closely observes newest trends in economy. It invests huge amounts in newest technologies.

Pronar's mode of operation makes its efforts on foreign markets bring such good results. The company attaches great importance to its image and ensures that not only its products, but the PRONAR brand as a whole is getting more and more recognition around the world. Participation in large, international trade fairs clearly helps to achieve that goal. Many prestigious international companies establish cooperation





with Pronar. Just recently, the company concluded contracts with Mercedes and Michelin.

Thanks to impressive production capacity (less than 10 percent of components needed for production is manufactured by other companies) Pronar is very flexible, able to quickly react to changes occurring on individual markets and adapt its products to their needs. Following certification and registration procedures of individual countries does not cause much trouble as well.

Can Pronar adapt itself to trade policies in individual countries? Of course. Can it modify manufacturing process to fulfil specific needs of local markets? Yes, it can. No one can doubt that after the last edi-

tion of Pol-Eco-System, the largest fair of municipal and environmental protection machinery in Poland (pp. 8-9). Pronar is number one in Poland, far ahead of any competition. Now we plan to conquer other markets. Last year, Pronar's share in total sales of various types of trailers reached 50 percent in many countries. Our recycling machines also continuously gain in popularity in a number of national markets.

Pronar is also a manufacturer of disc wheels. Our products enjoy a good reputation on many markets. They are manufactured with unique cold treatment technology. Apart from Pronar, only three companies in the world use it. Pronar received a prestigious certificate of compliance from SGS

(the worldwide leader in control, verification, testing and certification), for high quality of wheel assembly. The certificate was awarded in result of an audit carried out at the commission of Michelin, and confirmed that Pronar's procedures meet the highest quality requirements and allow it to compete with the best companies in the industry.

Pronar machines no longer work only in European countries or states of the former Soviet Union. They are being purchased in Africa, Asia, Australia and both Americas. Maybe one day PRONAR brand will be as recognisable as world's top brands?

Helena Landowska
The author is a marketing specialist at Pronar

Pronar trailers on the German market

IN THE TOP THREE

Germany has one of the largest and most demanding agriculture equipment market in Europe. Pronar has been selling its products there for over 12 years. It is our great success that among 5 manufacturers whose trailers are most often registered in Germany, there is only one foreign, Pronar. Halfway through the year 2016, we reached 3rd place, just after German companies.

Presence on the German market requires continuous engagement, adapting to its expectations, improving products and meeting various approval requirements. For us, that is just the start. To deliver highest quality merchandise, Pronar established Research and Development Centre (CBR) to research and test all kinds of subassemblies and machines (article "Research translates into measurable benefits, pp. 10-13).

Pronar's most popular products are agricultural trailers, registered in Germany by the Federal Motor Transport Authority (Kraftfahrt-Bundesamt - KBA). For the last two years PRONAR trailers have been occupying top positions in most important rankings of manufacturers who have their trailers registered in Germany. On top of that, about a year ago we reached top five most often registe-

red trailers in Germany. In June we have moved up to third place, just behind German companies. Among that among 5 manufacturers whose trailers are most often registered in Germany, Pronar is the only non-German one.

Such great results are possible mainly thanks to constant expand of dealership network and professional, partner-like contacts with dealers and customers, based on cooperation and mutual understanding. Construction of new production plants resulting in increased production capacity is also a factor here.

It is worth noting that our company strives to be as independent of outside contractors as it is possible. Currently, 90% of parts and subassemblies installed in Pronar machinery is manufactured in our plants. This allows to fully control the

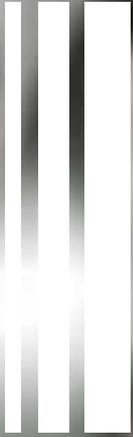
quality of these components and – in result – reliability of our products. Of course, the more parts with PRONAR logo sits in our machines, the more of them needs to be manufactured and the higher our production capacity must be. Fortunately, we are ready for that.

Production of long series of individual components makes the price for a single piece drop, thus Pronar merchandise can be offered with competitive prices. The fact that increased production capacity increases also our importance as one of the biggest employers in north-eastern Poland is also immensely important to us.

Przemysław Rogala

The author is a foreign trade specialist at Pronar





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TRACTORS



PRONAR 5440 tractor

MEASUREABLE BENEFITS

PRONAR 5440 is the newest model from the P5 series, meeting the requirements of Stage IV of the European toxicity class and US Tier IV Final toxicity rating. It will be the successor of PRONAR 5340 model. In this article, I will present the subassemblies responsible for fume quality of PRONAR 5440 and summarise its running costs.

Similarly to 5340 model, PRONAR 5440 tractor uses Deutz TCD3,6 L4 series engine with maximum power of 106 HP. This type of engines have been used in tractors and agricultural machinery for years. They are well known and prized for their smooth performance, reliability, durability and low fuel consump-

tion. In terms of subassemblies, engine mounted in PRONAR 5440 is not much different from the one used in the previous model. It is still a turbo-charged engine with an intercooler, common rail fuel injection, externally cooled exhaust gas recirculation (EGR) and Diesel Oxidation Catalytic Converter (DOC).

The fundamental modification of the engine consist in adding another catalytic converter. Its function is to reduce harmful nitric oxides into atmospheric nitrogen (N₂) and water. This process is called Selective Catalytic Reduction (SCR). It requires usage of diesel exhaust fluid (AdBlue) stored in a separate tank





and injected into the exhaust system. The catalytic converter was placed in front of the driver's compartment, hidden behind right frame of the window to not obstruct driver's field of view. As in previous model, diesel Oxidation Catalyst (DOC) without DPF (Diesel Particulate Filter) will still be used.

Despite seemingly complex construction, this is still one of the simplest Stage IV toxicity class engines with such horsepower. This means measureable benefits for the customer, related to usage of DOC catalyst:

- It was designed in a manner ensuring low running costs, mainly due to the catalytic converter being entirely maintenance-free and having lifetime equal to the lifetime of the entire engine, unlike the short-lived catalytic converters equipped with Diesel Particulate Filters.
- It has an open structure, does not require active regenera-

tion with an engine running, like PDF filter do when the engine works under low load.

- The catalytic converter does not have any moving parts or electronics controlling the airflow. Low number of deli-

cate parts means greater reliability.

Another benefit comes from the fact that the engine construction being adapted to the next toxicity stage (Stage V), which





is going to come into force in the European Union in the year 2020. The change will concern only the fume treatment system. This means that the spare parts will be available in the market for a long period of time and will be compatible with both PRONAR 5340 and PRONAR 5440.

What awaits buyers of the PRONAR 5440 tractor in terms of additional maintenance and costs? Apart from the need to refill the AdBlue liquid in the addi-

tional tank, nothing. The capacity of the tank is so large (about 20 dm³), that refilling is required on average once every two times the fuel tank is refilled. Both the tank and its tubes are equipped with heating systems, what allows to quickly unfreeze the fluid in negative temperatures (it freezes at -11°C) AdBlue tank was built in the structure of the newly designed fuel tank in a way that both fillers are located next to each other.

Among farmers, new exhaust emission standards raise concerns about increase in running costs. However, according to the engine manufacturer, its specific fuel consumption is lower in comparison to Stage IIIB-compatible engines. Thanks to this, total costs of fuel and AdBlue liquid should not exceed previous fuel costs.

Marek Iwaniuk
The author is the manager of the Tractor Section
in the Implementation Department at Pronar



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**GREEN FORAGE
MACHINERY**

PRONAR



Greenery maintenance machines in Argentina

FAVOURABLE OPINIONS, RAISING SALES

Argentina is one of the richest countries in South America. Due to its sheer size and location in the southern part of the continent, it is characterised by varying climatic conditions. In the north, this country has fertile soil and tropical climate. In the south, it has excellent pastures for cattle, horses and sheep. Thanks to these features, all possible branches of agriculture can be found in Argentina. Products of Argentinean agriculture are among the best in the world.

Knowing the varying climatic conditions, Pronar could not omit Argentina in its plans to expand. Thanks to great ideas, marketing and public relations activities of both Pronam Marketing Department and our Argentinean trade partner, our machinery was recognised and appreciated also on this market. Domi-

nating branches of Agriculture in Argentina are grain cultivation and cattle farming, thus representatives of companies cooperating with Pronar focused mainly on greenery machinery at first.

In the summer, Pronar fertilizer spreaders, mowers and round balers started coming into the Port of

Buenos Aires. These machines were all already well-known to European farmers, tried and appreciated by customers, having favourable reviews in Poland and abroad.

Reputation of Pronar and its agricultural machinery on the European markets combined with positive reviews of the machines shipped

to Argentina allowed our Argentinean trade partner to sell them all long before they physically reached Buenos Aires.

Simple and durable construction of FD1-M05L and FD2-M10 spreaders and their universality guaranteeing equally superb performance when loaded with artificial fertilizers used in South America were the key features allowing us to quickly gain customers in Argentina. Another machines introduced to that market were PDK220 and PDT260C mowers. These durable machines already tried out in Europe, proved to be equally effective overseas – a clear evidence of the excellent work engineers from Narew are doing, capable of designing machinery working well even on such a remote continent.

Gathering of green forage, hay or straw cannot be carried out without a baler. Because of this, our Argentinean dealer decided to introduce the Z500K model to the mar-

ket – a modern fixed chamber chain baler that presses the gathered material tightly and forms perfectly cylindrical bales. In this case it is worth to mention the universality of the machine, ability to work in various conditions. The Z500K model is well known among European farmers who appreciate its quality and performance. These opinions are now shared in Argentina.

Due to interest in Pronar machinery, our company decided to participate in agricultural fairs in Argentina. The success Pronar achieved in Uruguay will most probably be repeated on the neighbouring Argentinean market. Our brand steadily gains recognition. Renown built on previously penetrated markets makes our machines sought after worldwide, and the sales grows constantly.

Adam Czerka

The author is a foreign trade specialist at Pronar



PRONAR Z500K



PRONAR PDK220



PRONAR PDT260C



PRONAR FD2-M10



PRONAR FD1-M05



Rotary rakes

EFFICIENT AND PRECISE

The purpose of the rake is to clear the hay or cut grass as precisely as possible and form a windrow with a relatively repeatable diameter of the cross and longitude section. This is essential for the next phase of forage collection and the efficiency of collection machines aimed at preparing good quality feed. One such machine is Pronar's newly introduced ZKP460T rake.

Using the full potential of forage machinery (such as balers and wrappers) is connected with selecting rakes that are characterised by an appropriate number of working assemblies and are suitable for forming windrows with specific dimensions. The size of the forage windrow depends on the number of working passages of the rake, distance between individual raking assemblies, and proper set-up of the forming shields. The requirements for high quality windrow formation are best fulfilled by rotary

rakes. Pronar offers rotary rakes with one or two rotors:

Single rotor rakes:

- PRONAR ZKP300 features eight arms with a working width of 3 m. Each arm has three double raking fingers. The rake is attached on a rigid suspension with a transport system based on two pneumatic wheels. Its intended for use with tractors starting from 15 kW (20 HP). Its mass is 285 kg.
- PRONAR ZKP350 has nine arms with a working width of 3.5 m. The rake is attached on a rigid suspension with a transport system based on two pneumatic wheels. Its intended for use with tractors starting from 19 kW (25 HP). Its mass is 315 kg.
- PRONAR ZKP420 features eleven arms with a working width of 4.2 m. Each arm has four double raking fingers. The rake has an active suspension with a moving head





(improving manoeuvrability and ground traction), and two shock absorbers, which improve use comfort. It also has four pneumatic wheels set in tandem. Its intended for use with tractors starting from 22 kW (30 HP). Its mass is 500 kg.

- PRONAR ZKP460T (new model). In contrast to the machines described above, this rake is attached to the tractor with an articulated drawbar and is mainly intended for small farms, ensuring high efficiency with low powered tractors. Featuring a hydraulic height regulation system for the carousel, precise raking is guaranteed by its twelve arms. The rake has 4 wheels which ensures stability of the rotor and improves work efficiency.

Pronar's offer also includes a two-carousel rake:

- PRONAR ZKP800 is composed of two rakes with a working width of 3.1 m mounted on a single frame. The rotors spin in opposite directions which allows the raked material to form a single central windrow. Each carousel is coupled with the lifting arms with a cross articulated system, and is seated on a tandem suspension. Such design enables excellent ground traction also in bumpy terrain. The working width of the machine is adjusted with synchronised hydraulic cylinders, which also extend and fold the lifting arms, ensuring smooth regulation of the width between 7 and 8 m. By changing the working

width the operator is able to adjust the width of the windrow ranging from 0.9 to 1.9 m. Pronar's designers prepared the working system of the PRONAR ZKP800 rake using state-of-the-art dry transmission. Each carousel has 11 working arms, each ending in four double raking fingers. The solutions used in the working system ensure clean and precise (with no leftovers in inclinations) raking, and the windrow is laid extremely accurately.

Pronar's rakes improve the mechanisation of animal feed production, and enhance work efficiency in farms by shortening the collection time of forage.

Andrzej Czerniakiewicz
The author is a foreign trade specialist
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PRONAR Z500K round baler

QUALITY PRESSING

PRONAR Z500K is a fixed chamber press baler designed to gather hay, straw and green vegetation (to produce silage) scattered on the ground after cutting or formed in swathes.

Z500K is made of high quality materials making it durable and stable. Simple, yet effective design makes it easy to operate and maintain. It is highly functional and reliable. High pressing speed and effective wrapping of bales on both their edges significantly decrease work time, having a positive impact on overall output, especially significant on large farms. Farmers taking part in field presentations of PRONAR Z500K commented on how the bales were tightly pressed and had perfectly cylindrical shape, what is important when making high quality fodder (silage). They also apprecia-

ted how effectively Z500K deals with very dry straw.

Wide tires installed in this model facilitates moving on boggy ground. Z500K allows installation of additional equipment to increase its functionality, facilitate operation and maintenance. These are, among others: a mechanism allowing wrapping with a net, visual and sound signalling equipment, central lubrication system, tarpaulin, and an automated chain lubricating system.

Pronar is a manufacturer of an entire set of machines dealing with every stage of farming work related to green forage. It is good to remember

that a lot depends on what machine was used, from time needed to gather the forage to how well the forage itself is made (eg. how tightly it is pressed and wrapped). The latter have influence on nutrition value of the forage and – in result – on efficiency of the animal farming as a whole.

Pronar machinery (disc mowers, tedders, wrappers, rakes) allows proper preparation of forage and positively impacts the efficiency of an entire farm.

Robert Woldański
The author is a regional trade representative at Pronar





PRONAR PWP460 Rotary tedder

NEW MODEL NOW AVAILABLE

The PRONAR PWP460 is the latest addition to Pronar's rotary tedder offer. It is excellent for large farms focused on milk or beef production, in which time and quality of feed is essential.

The PRONAR PWP460 spreads and turns material evenly without damaging it, also removing soil or peat. Thanks to this the end result is impurity-free feed. Its solid design makes the tedder highly efficient, while the use of quality workmanship ensures long years of use.

The PWP460 tracks terrain excellently, making it possible to work on slopes and elevated areas. It can also work with low-power tractors (from 30 HP), making it an excellent addition to every farm, no matter the size or location of the pasture. Simple and uncomplicated construction allows the user to quickly set the proper working parameters.

PRONAR PWP460 tedder features:

- A short, three point hitch distributes loads evenly and improves the safety during driving.
- Rotors powered by tractor PTO are capable of working with tractors of a minimum power of 30 HP, and maximum shaft speed of 540 rpm.
- Hydraulic lifting and lowering system makes using the device to be comfortable and easy.
- 4 working carousels with 6 arms each - quality workmanship ensures long years of use.
- Maintenance free gear - grease filled and does not need

replacement.

- Mechanical settings for boarder spreading - each rotor can be adjusted to work at a selected angle and spread the mowed material evenly.
- Large wheels - reduce the load on the ground which improves its durability, and the mowed material is not pressed into the sod.
- Suspension with shock absorbers - ensures comfortable driving and excellent ground traction.

Katarzyna Żukowska-Matuk
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Disc mowers

PRECISION OF WORK

Being Poland's largest manufacturer of agricultural and municipal machinery, Pronar's offer includes various types of disc mowers (both front- and rear-mounted) with a working width ranging from 2.1 to 3.4 m. The mowers feature design solutions which increase the efficiency of mowing and improve work and maintenance.



Swath guides and collision protection

Depending on the model, the mowers are furnished with single or double swath guides which enable adjustment of the swath width. The machine also features hydraulic collision protection. In the case of colliding with an obstacle during mowing, the hydraulic protection will lift and tilt the mower back. When the obstacle is passed, the mower is lowered to the ground.

Cutting bars

The mower drive features high quality cutting bars, de-

signed and thoroughly tested by Pronar's Implementation Department, guaranteeing satisfaction for the most demanding farmers. Pronar's cutting bars are characterised by several important details which separate them from the competition. The drive transmission inside the bar features cogs with polished teeth. With taller gears (20 mm), the number of teeth and the module are adjusted to maximise the point of contact. Such design allows the transmission of extensive loads and quiet work of the cutting bars.

Drive disc

A crucial element of Pronar's cutting bars, it is built on a steel structure with two screw covers. Removal of the covers gives easy access to the drive transmission system. This is important because it is possible to lubricate the articulated shaft and clean the disc chamber of grass clippings without disassembling the cutting bar from the frame.

Swath conditioner

Pronar mowers also feature swath conditioners which - depending on the needs - can be engaged or di-

sengaged from the mower. It is intended to condition and form the swath during operation, which makes the grass dry faster by damaging its waxy surface. The fingers are spread on the conditioner shaft and rattle the forage while the metal guides form the swath, whose width ranges from 1.6 to 2.25 m.

The conditioner is powered directly from the cutting bar drive transmission via a set of V-belts and a spring tensioner, eliminating the need for an additional angle drive. The spring tensioner ensures smooth power transmission - even under high loads - and reduces the frequency of belt tension controls. The conditioner shaft operates at approximately 900 rpm. Accurate dynamic balancing eliminates vibration and results in very stable work of the complete mower unit. Depending on preference, the conditioner can be easily detached from the mower. Just loosen the tensioner, remove the v-belts and remove the six screws that fasten the conditioner to the mower frame.

The fingers, with double shock absorption, are spread around the shaft in a spiral and are made from wear-resistant steel. The intensity of swath conditioning can be adjusted with a lever located on the conditioner's cover. The PRONAR PDT260C and PRONAR PDT300C mower's standard equipment feature the conditioner. In standard versions of the PDT260 and PDT300 mowers, the conditioner is available as an easily attached optional equipment.

Comfortable hitching

A tractor designed to work with front mowers should feature a three-point linkage system and a front power take-off shaft with a (front) hydraulic section. The front mower is furnished with a triangular hitching system and is attached to the three-point linkage system of the tractor. A 60 HP or 75 HP (for mowers with a condition-

er) tractor is sufficient to power the mower. The PDF300 front mower (or the PDF300C version, featuring a conditioner), can be used together with a PDT300 rear mower (or the PDT300C version, with a conditioner). The working width of this mower combination is 5.7 m.

Central suspension

Pronar mowers feature a central suspension system that guarantees excellent ground tracking (correct cutting bar position against the mowed surface), clean aesthetic cut, and optimal mowing height. Another advantage of this solution is the possibility of adjusting the ground pressure of the mower. This is possible thanks to a three-level regulation system of stay springs - 70, 80, and 90 kg (depending on the mowed terrain, from soft soils and peats, to rough and dry ground). Also, a wide range of inclination (-16° - 11°) makes it easier to use the mower in uneven and steep areas.

Pronar's front-mounted mowers are characterised by a high ground tracking capacity of 510 mm (from the operating position: 270 mm up, and 240 mm down). Ground tracking sets

the cutting bar at +7 and -6° in relation to the mowed surface, ensuring a clean and aesthetic cut and proper mowing height.

For owners of large forage areas Pronar offers disc mowers creating extremely efficient working combinations. The front-mounted PDF390 mower is intended for working with self-propelled machines featuring a front power take-off shaft (900 rpm). With a rear-mounted PRONAR PDD830 disc mower (or a swath conditioner model - PRONAR PDD830C), it's possible to create a mower combination for large fields (a working width of up to 8.3 m) which can substitute expensive self-propelled mowers.

Pronar's offer includes rear-mounted disc mowers: PDK220, PDT260, PDT260C (with a swath conditioner), PDT300, PDT300C (with a swath conditioner), PDT340, PDD830, PDD830C (with a swath conditioner) and front-mounted mowers: PDF300, PDF300C (with a swath conditioner), PDT340 and PDF390.

Slawomira Sawicka
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at Pronar



Mixer feeders

CAPACITY ADAPTED TO THE NEEDS

Mixer feeders are machines that are an essential equipment of any modern livestock farm. They allow preparing precisely mixed fodder composed of many ingredients and feeding it to the animals. Pronar manufactures a number of mixer feeders that utilise innovative solutions based on ideas of our designers and consultations with farmers using these machines.



One of features PRONAR mixer feeders have is segmental construction. It allows the farmer to adapt capacity of the machine (even up to 12m³) to the size of his herd by

mounting or removing additional extensions.

PRONAR VMP-10 mixer feeder has 10m³ of capacity (additional extensions allow raising it to 12 m³)

and is characterised with a rigid construction. Tank walls are highly resistant to abrasion. It is equipped with two asymmetrically located discharge windows (on left and right sides of the machine, perpendicularly to its axle), allowing the tank to be emptied in a smooth and even manner. Electronic weighting system installed is based on four measuring sensors located under the floor of the tank. Weight of forage and mixing time are presented on a large and easily legible digital display. Location of the display can be adjusted both vertically and horizontally. Time needed for the



forage to be thoroughly mixed does not exceed 15 minutes.

Tractor's power requirement depends on the adjustment of blades on the screw mixing the feed. In case of VMP-10, there are 9 blades that can work in 3 different positions, what allows adapting the mixer feeder to the power of the tractor used. Forage mixing speed can also be regulated, regardless of whether it is added from a bale or a heap. Mechanically switched 2-speed gear used in VMP-10 model allows adapting the mixer feeder to the power of the tractor. Lower setting makes mixing take slightly longer amount of time, but significantly lowers mixer's power requirement.

Design of the PRONAR VMP-5ST mixer feeder having 5m³ of capacity was developed as a result of comments we received from farmers during tests they have carried out. This model is equipped with one rear



discharge window and one or two side discharge windows (customer's discretion). 250-mm extensions (additional equipment) allow increasing tank capacity to 6m³. Rear discharge window is a great convenience for sheds having a narrow passage, as conventional mode of feeding (from both sides of the tank) may result in the feed getting into the drinkers. In larger and broader sheds, two di-

charge windows allow to conclude feeding in one pass.

PRONAR mixer feeders (VMP-5S, VMP-5T, VMP 5ST, VMP-6ST, VMP-10, VMP-10S) are universal machines raising the level of agricultural mechanisations and making raising livestock easier.

Jan Kuklinski

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PRONAR Z245 and Z245/1 Bale wrappers

ACCESSORIES CREATE MORE POSSIBILITIES

The last stage of preparing feed for livestock is essential for proper storage that will preserve its high nutritional value. With Pronar bale wrappers this step becomes one of the easiest ones. The machines are easy to use and are equipped with systems enabling electronic steering or manual control from the tractor's cab.



PRONAR Z245 is loaded from the side using a loading arm, while PRONAR Z245/1 is loaded from the front. Each machine counts the rotations of the turntable with a wrapping counter inside the tractor's cab. Depending on the width of the foil, it is recommended to use 24 (for 500 mm foil) or 16 (750 mm) rotations. The wrapped bale is grabbed by the adjustable unloading mechanism and set on the side of the wrapper with the flat side down or is rolled down behind the machine (depending on the model).

The supported bale diameter for the Z245/1 wrapper is 1500 mm. Because of the varied size and weight of the bales, the placer is adjustable. This guarantees that every silage bale is stored precisely, without damaging the foil. Depending on the wrapper model, the standard equipment includes: gear and chain, and wrap counter.

Both wrapper models are standard equipped in a L-01 wrapping co-

unter. Every full revolution of the wrapped bale is counted and displayed on the screen. After making a user set number of revolutions, the counter pulsates and gives a sound signal to end the process. The counter can be set to 16 or 24 wrappings, depending on foil width. Optionally, the wrappers can be furnished with a L-02 counter that displays additional work parameters: number of bales, time of work, average number of bales wrapped per hour, and the number of wrappings for every bale.

Instead of manually controlling the hydraulic manifold, both models can be equipped with an electronic controlled (as optional equipment), which is connected to a module in the wrapper. The module is connected to a system of sensors which relates data (with a 5m wire) to a control panel inside the tractor's cab. The small size and weight of the control panel makes it possible to place it in a most comfortable location for the operator.

The control panel possesses a range of functions that, for example, make it possible to archive information about the total number of wrapped bales or the number of bales wrapped in a specific area. The working parameters in a given area can be saved in 16 sections of the panel. Before the first use, the parameters of the wrapper have to be set: number of wrappings per bale, current time and date. The foil tear sensor can be activated or not. The mechanism of the panel makes it possible to change the parameters at any time. The operator of the tractor monitors foil use and the automated process of wrapping the bale and cutting the foil.

The control panel provides information about work efficiency: the number of bales wrapped on a given area per hour, wrapping time, and number of wrappings per area. Archiving these information makes it possible to control the use of foil in specific areas. No more time is wasted on writing down or trying to remember the number of silage bales collected on a field. Both wrapper models are characterised by durability and solid design. The approved mass of wrapped bales is 1100 kg. Such high weight is especially important when wrappers are used with bales prepared by rotor balers which significantly compress the material resulting in heavier bales.

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MUNICIPAL MACHINERY

A new line of mobile slow-speed shredders presented at IFAT 2016

PRONAR'S POSITION CONFIRMED

In May 2016 at IFAT in Munich - the world's leading trade fair for environmental technologies - Pronar's new recycling technology line was presented, including mobile slow-speed shredders.

Both of the presented shredders: the PRONAR MRW 2.85 on a wheel chassis and the PRONAR MRW 2.1010 with caterpillar tracks are the result of the work done by Pronar's designers and managers who saw the dynamic development of recycling services sector and decided to develop specialist machinery for the industry.

The smaller model, MRW 2.85 (398 HP) weighs 24 tons, while the larger model, MRW 2.1010 (760 HP), weighs 40 tons. The two shredders are powered with combustion engines, and the MRW 2.85 instal-

led on a wheel chassis has an European type approval to move on public roads. It also meets the Stage IV emission limits.

The newest product in Pronar's municipal machinery was met with huge interest by the organizers of IFAT, trade fair visitors, industry experts, as well as representatives of companies from municipal and recycling sectors. The attention drawn by Pronar's machinery confirms the position of the company from Narew in this segment.

Mobile slow-speed shredders, similarly to drum screeners,

are produced in Pronar's factory in Siemiatycze (North-Eastern Poland). Pronar's years of experience in producing machines made it possible for the company to develop its own designs, create prototypes for testing and market mobile screeners and shredders. High-quality steel used to make these machines, as well as the excellent components ensure that the buyers of these machines invest in solid constructions, which is essential for works like reducing the volume of the most difficult waste (shredders) or proper separation of particular



fractions (screeners). Pre-shredded material can be later separated into specific fractions (for example, in a drum screener) and can be used in the production of fuels, furniture, or compost.

Mobile slow-speed shredders are mainly used for pre-processing difficult materials, also containing metal objects, for segregation. Replicable shafts ranging from 1700 to 2440 mm in length and 685 to 850 mm in diameter are able to easily process any input materials, such as: construction waste, bulk waste, furniture, pallets, tree roots, or tires. A magnetic separator placed above the conveyor belt is useful if metal elements are to be recycled.

Replacement of screener drums is essential for their functionality, and the replacement of shredding shafts is just equally important. Thanks to the variety of shafts offered by Pronar, various input materials can be effectively broken down. This makes the machines move universal, increases their usability, and the users no longer need to invest in different types of machinery. A unique solution in this machine category, it is offered by only few manufacturers globally and in limited numbers.

By starting the production of slow-speed shredders, Pronar joined the small group of producers offering machinery that forms technology lines composed of mobile shredders and drum screeners. Initial break down of waste material ensures efficient and precise separation of particles for later segregation.

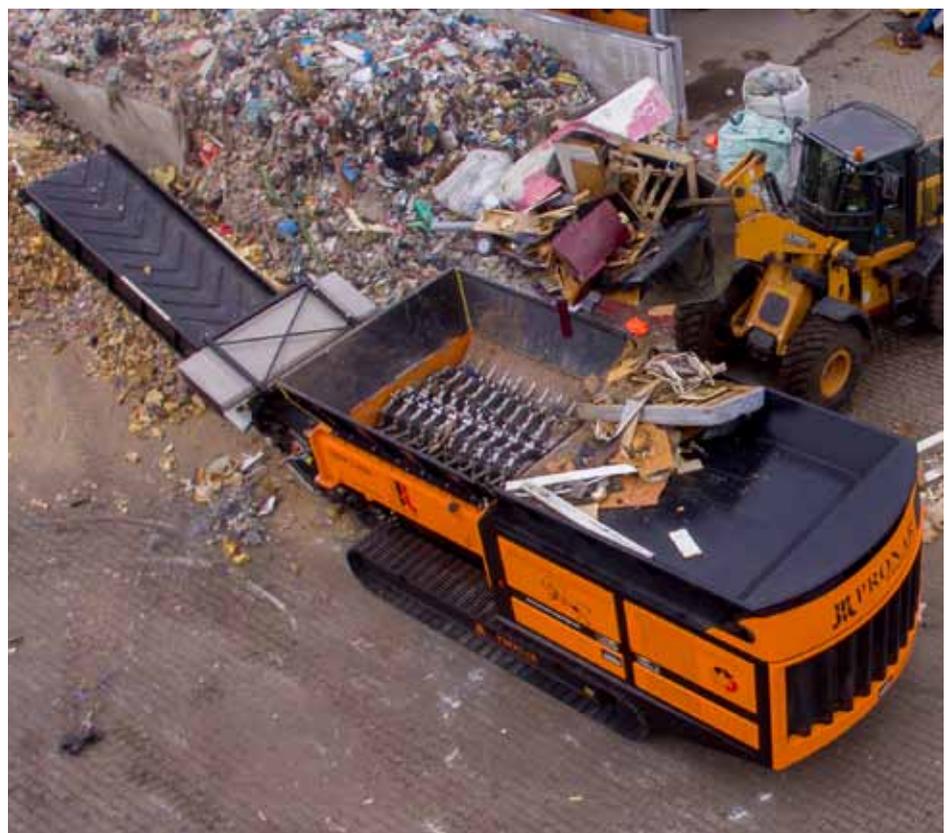
Pronar's shredders and screeners are mobile machines mounted on wheel or caterpillar track chassis. A wide selection of models



and the possibility to choose the appropriate drive and additional equipment increasing the usefulness of the machines place Pronar in the top of global manufacturers in this industry. This also improves the position of Pronar's dealers, as

international partners are able to offer their clients modern and innovative machinery.

Bartosz Tomczak
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at Pronar





Mobile shredders and screeners

DEMONSTRATIONS IN WESTERN EUROPE

Care for the natural environment and the need to raise the amount of municipal waste recovered for further use were an impulse to construct new mobile machinery: shredders and screeners.

New line of the recycling machinery – mobile slow-speed shredders: PRONAR MRW 2.85 and PRONAR MRW 2.1010 shred waste more thoroughly and allow municipi-

pal companies equipped with them to broaden their services.

To increase its brand awareness and maintain strong position on the European municipal ma-

chinery markets, Pronar organised presentations of its mobile shredders and screeners in western European countries, a/o in Belgium, France, Netherlands and Germany.

This year's largest Dutch trade fair of recycling and construction industries took place from 26th to 28th May 2016 in Almere. It attracted over 160 exhibitors and over 15 000 visitors. Our Dutch trade partner organised a presentation of Pronar mobile recycling machinery. Thanks to advertisements in trade magazines, newsletters and individual invitations, the presentation, as well as the stall of the Dutch company, were attended not only by visitors of the fair, but also potential customers and industry experts. Impartial expert opinions constituted a very impor-



tant indicator of the quality of Pronar machinery. The mobile trommel screener (MPB 20.55) and the mobile slow-speed shredder (MRW 2.85) were combined into a production line to treat varying materials. Effectiveness and smooth operation of these machines astonished even the most sceptic observers and experts.

Forexpo trade fair took place from 15th to 17th June 2016 in France. Various forestry machinery was presented at the fair. Forexpo is the largest trade fair of its kind in France.

Thanks to cooperation with Pronar's French dealer, MPB 20.55 screener, MRW 2.85 shredder and T644/1 forestry trailer were presented at work with lumber. Pronar screener was the only machine of its type exhibited on the fair, what made it especially interesting to visitors. MRW 2.85 Shredder, effectively shredding thick wooden logs into small pieces, also attracted a lot of attention. The fair lasted for 3 days and on each day the visitors had the chance to see Pronar machines at work.

In June and July 2016 presentations of Pronar shredders' operation were carried out in 20 Belgian and German entrepreneurships. Each enterprise was able to test PRONAR MRW 2.85 shredder's work with different materials: green waste, municipal waste, bulk waste and tree roots. Observers' expectations were fully satisfied both in terms of efficiency and level of fragmentation.

Due to a major success of the presentations, Pronar decided to plan new events promoting its shredders in Europe. Dates of these events can be found on the website www.pronar-recycling.com

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PRONAR Mobile Trommel Screeners

A GLOBAL SUCCESS

From the beginning of the year 2016, Pronar have been seeing a major increase in sales of mobile trommel screeners. The company attaches great importance to lowering exhaust emissions as much as it is possible, introducing technologies improving functionality and enabling customising every model to fit individual orders in. The goal here is to influence development trends of these type of machines.



Pronar's success with its MPB series screeners could be achieved thanks to systematic work our engineers and designers are carrying out to develop our products. Structure of the company, including modern Research and Development Centre, allows us to come up with and implement solutions improving functionality and universality of our screeners. This broadens the scope of their possible applications, make them more competitive and attractive to customers in many different countries.

The care Pronar's take to ensure the screeners are environmentally friendly had also an impact on their commercial success – all these machines received international certificates on par with the exhaust emissions in force in European Union (Stage 3B). Screeners mounted on a wheeled chassis are allowed to move on public roads of the European Union with up to 100 km/h of speed.

The fact that Pronar machines are used to segregate municipal waste, coal, lumber and construction

waste all around the world is an evidence for success of our engineering solutions. Our Mobile trommel screeners work in various, often difficult, climatic conditions, effectively sorting materials.

Pronar manufactures four models of screeners: MPB 14.44, MPB 18.47, MPB 20.55 and MPB 20.72. They are available with combustion engines or electric motors, on wheeled or caterpillar chassis. The diameter of the screening trommel in individual models ranges from 1,4 to 2 meters, while its length – 4,4 to 7,2

m. Effective surface area of the screener ranges from 16,2 to over 40 m².

Design and production technology of PRONAR screeners allow customising each model in accordance to the needs of the customer. It is possible thanks to a wide assortment of additional and optional equipment that increase the scope of possible applications and adapt screeners to particular needs. Assembly of only those components that meet the expectations of the customer eliminates the need to choose among few expensive options and has a positive impact on the final price of the screener. This allows adapting prices to the expectations of customers from different countries and – what is important – makes order lead time at Pronar significantly shorter than at other manufacturers.

Pronar pays close attention to quality control. To consider the technological process complete and to ensure the product has desired functional properties, it is necessary to thoroughly inspect and test it.

Efficiency and durability of MPB screeners was endorsed by our clients numerous times, confirming that for them high quality and dependable technology are not just some data from a datasheet, but proper functional properties verified at work. In case of MPB series models, we managed to achieve that thanks to proper repair and maintenance services provided for our machinery. Pronar entrusts distribution of mobile trommel screeners to partners having established position on the market and proper service facilities.

Sales of Pronar screeners raise each month in many countries. Number of orders is on the rise and questions about the screeners are



being sent from many continents. Representatives of Pronar participate in fairs and are invited to conferences organised for most important manufacturers of the recycling machinery on the global market. At these events, visitors often find Pronar's stalls more interesting than those of our competition.

Comparative analysis of trommel screeners manufactured by Pronar and its global competi-

tors proves that at the moment there is no company in the world that offers more models of this type of screeners. There is also no manufacturer offering machinery with such advantageous quality/price ratio. Pronar currently prepares to launch production of new machines forming a complete recycling line.

Bartosz Tomczak
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at Pronar





PRONAR MPB 20.55g Screener

ON A CATERPILLAR CHASSIS

Pronar presented a new mobile trommel screener, MPB 20.55g model, based on the construction of the tried and trusted MPB 20.55.

PRONAR MPB 20.55g screener differs from the MPB 20.55 model in terms of its carriage system: wheels were replaced with caterpillar tracks. This allows the screener to move on rough terrain without any hauling vehicle. Usage of caterpil-

lar chassis also improves its overall capacity. After making a pile, it can move a few meters to make another one, so no loader is required to transport the output. The screener is able to access hardly accessible and waterlogged areas.

PRONAR MPB 20.55g screener can be transported only with a truck tractor with a flat-bed trailer. This is why its height was decreased in comparison to MPB 20.55. The mechanism of folding the conveyors moving oversize and undersize to

make them not be the highest parts of the machine during transport.

PRONAR MPB 20.55g screener retains all the high operating parameters of the MPB 20.55 model. It is propelled with a Deutz or Caterpillar engine (customer's discretion). A combination of high capacity with low running costs was made possible thanks to an optimally designed screening trommel having 5,5 meters of length and 2 meters of diameter. It allows reaching up to 150m³/h of capacity. Standard equipment remains unchanged as well, including, among others, a central lubrication system, hydraulically raised and lowered brush cleaning the trommel.

” Additional and optional equipment available for PRONAR MPB 20.55g screener

- screen hole sizes – at customer's discretion,
- screen thickness – at customer's discretion,
- additional separating grate over the charging hopper,
- magnetic separators located on the side and rear conveyors,
- air separator,
- CleanFix cleaning system for engine and oil radiators.

A remote control device, also among standard equipment, allows turning the screener on and off, as well as controlling many of its functions and mechanisms, like caterpillar tracks, engine revolutions, raising and lowering of the

hopper grate, raising and lowering side and rear conveyors. It also allows initialising emergency stop mechanism.

Paweł Zubrycki
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ZMC 3.0 Sweeper

A WORTHWHILE INVESTMENT

PRONAR ZMC 3.0 towed sweeper is a machine of superb performance able to effectively clean large squares and roads. ZMC 3.0 is one of many surface cleaning and sweeping machines manufactured by Pronar. While in no way less effective, this towed sweeper is significantly more affordable than expensive mobile sweepers.

ZMC 3.0 is equipped with two circular brushes mounted in front of the sweeper's axle and one roller brush located behind it. Sweeping surface of circular (side) brushes and the roller brush overlap to a degree, allowing thorough sweeping on the entire width of the machine. Dirt gathered by the side brushes is moved towards the back, where the rear brush, rotating in the direction opposite to the direction of the sweeper's movement, lifts it up onto a transmission belt trans-

porting them to the container. Each of the brushes, also the fourth one (additional side brush) is equipped with a water nozzle to prevent dust from raising while sweeping. Internal water pressure regulation system allows initial moisturising of the surface to facilitate removal of substances like peat or clay.

ZMC 3.0 is designed to clean road surfaces after the winter period and maintaining their cleanliness during the summer. Depending on the needs and type of surface swept,

the sweeper can be equipped with different exchangeable brushes. These with steel wires are the best at removing mud, these with mixed bristle (of metal and plastic) works best against light sand and trash, those with bristles made entirely of plastic are most effective on even surfaces of halls.

New, specially designed brushes with metal bristles can effectively clean, for example, grass pitches or lawns after concerts and festivals. They have been already tried out



by Pronar's British dealer. The grass-covered surface was cleaned it 95% and suffered no damage after the first pass with minimal pressure set. The surface was thoroughly cleaned and otherwise left intact. Another test positively verified effectiveness of new brushes in gathering up large amounts of wet leaves, a task traditional suction sweepers have trouble dealing with.

Suspension system of the side brushes allows regulating their angle in two planes, to adapt their position precisely in relation to the swept surface. When an obstacle is encountered, they are moved upwards to prevent the machine from getting damaged. The sweeper is driven by a hydraulic pump installed on the PTO of the tractor. The drive works silently even at maximum load. PRONAR ZMC 3.0 is characterised with a very good handling and high capacity at tight turns. Unlike competitive products, its standard equipment encompasses a hydraulic tilting system in form of a turning actuator mounted on the drawbar. This mechanism allows asymmetrical sweeping to the right or to the left.

Unlike the mobile sweepers, ZMC 3.0 does not have a suction turbine that creates clouds of airborne dust. Less dusting has a positive effect on health, especially for people in vicinity of a working sweeper. Thanks to this, usage of PRONAR ZMC 3.0 allows raising environmental protection standards.

Three hatches located on the sides of the sweeper allow easy access to all mechanical, hydraulic and sprinkling subassemblies. This makes carrying out necessary regulations and maintenance task easy. ZMC 3.0 is operated with a control panel installed in the driver's compartment.



Did you know...



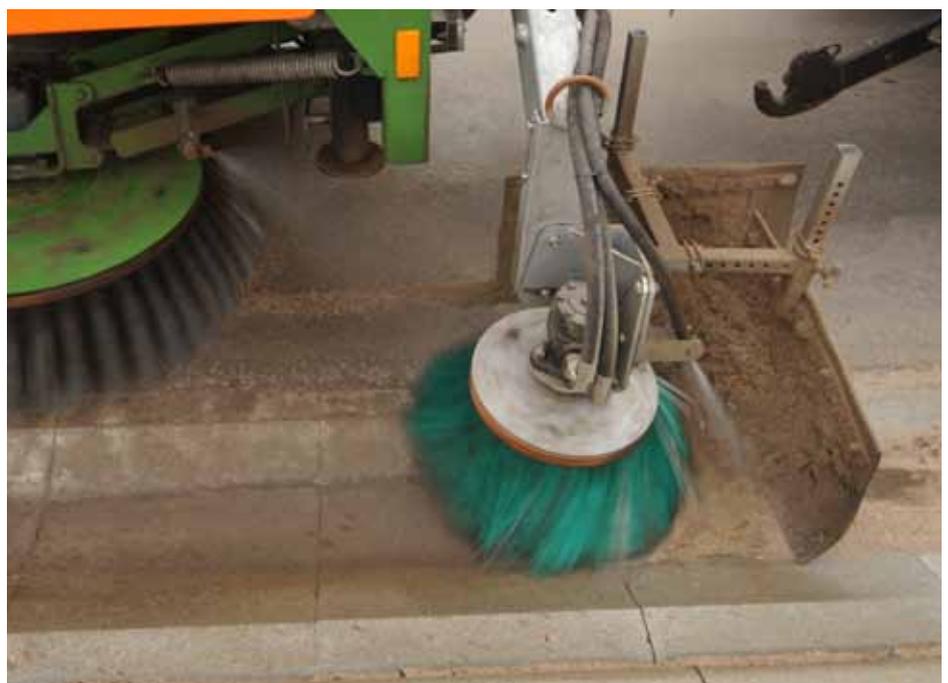
The very first sweeper was patented 4th of September, 1819 in USA.

The construction was made on the basis of elevator belt and it was aggregated to horse-drawn carriages.

It allows, among others, setting up revolutions of the side brushes or their pressure against the surface, turning on a jet-washer (additional equipment) or vibrations facilitating unloading trash gathered in the container. PRONAR ZMC 3.0 sweeper needs to be aggregated with a tractor having no less than 75hp.

Pronar manufactures also Agata series sweepers: ZM-1250, ZM1400, ZM1600, ZM2000, ZM2300, ZMC 2.0 mechanical towed sweeper, and ZM-S25 truck mounted sweeper.

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PRONAR PUT-S58 snow plough

MET THE NEEDS OF THE TESTERS

Year after year, cities turn into larger and larger agglomerations. This forces them to build new infrastructure, like express roads, ring roads and airports. To meet the challenge of maintaining ever-growing infrastructure, companies dealing with winter road maintenance require good equipment and machinery. For this reason, Pronar commenced production of PUT-S58 snow plough that can be mounted on trucks and special vehicles equipped with type A mounting plate following the DIN 76060 standard.

A feature of PRONAR PUT-S58 snow plough that deserve special attention is its adjustable operating width. Thanks to this, municipal service providers can use one and the same plough to remove snow from roads, highways and aircraft runways. This allows lowering operational costs of a company. Pronar made the PUT-S68 snow plough available for companies providing municipal services for testing, to learn users' opinions about this piece of equipment (about operating it, its quality and usefulness to a company etc.). The plough was tested by companies with many years of experience in the municipal services industry, so meeting their expectations required PUT-S58 to exceed most currently available competitive products in terms of functionality of installed equipment and mechanisms. All testers' opinions turn out to be favourable. They have stressed the following features of the PRONAR PUT-S58 snow plough:

- mouldboards are installed on a steel frame in a manner allowing the operator to easily regulate the operating angle, position, and transport;
- mouldboards (left and right) are driven by hydraulic actuators, move independently, their movement is smooth;
- each mouldboard can be



equipped with fixed ploughshares and slides;

- sectional construction of ploughshares allows their parts to be quickly assembled and disassembled;
- low level of friction significantly lowers fuel consumption.

In areas having stringent safety standards (e.g. airports), polyurethane ploughshares and support

ing wheels can be used instead of the standard equipment.

Pronar manufactures a large number of products for winter road maintenance and gritting. These are: tractor- and truck mounted snow ploughs, sweepers, tractor- and truck mounted spreaders.

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EPT-15 and EPT-21 electric spreaders

INEXPENSIVE AND EASILY OPERATED

The task of maintaining traffic flow at winter is not limited to removal of snow. Safe passage can only be ensured after the road surface is secured with sand, aggregate or chemical substances. For this reason, quality and functionality of spreaders used proves to be very important.

Pronar spreaders are adapted to grit the roadway with sand and other mineral and chemical substances. They can be used with both tractors and trucks. EPT series electric spreaders are popular and praised by customers: the EPT-15 model (with 1,5m³ capacity hopper) and the newest model, PRONAR EPT-21 (2,1m³).

One of the reasons behind popularity of these machines is the fact that they do not require additional combustion engine or hydraulic installation to work, what makes their usage both comfortable and affordable. They are designed to be mounted on light pick-up trucks capable of carrying up to 3,5 tonnes of payload, vehicles with a hooklift, or on towed trailers. They are powered from the electrical installation of the carrying vehicle. EPT-15 is equipped with a 12V electrical installation (24V as optional equipment), EPT-21 – with 24V drive.

Control panel in driver's compartment allows comfortable regulation of the speed of the in-feed belt, size of the gritting material, width and asymmetry of spreading. One of the buttons can also turn on the warning light. Regulation of spreading parameters has an 8 point scale: from minimal to maximal setting, what allows adapting the spreading to road condition and current speed. Due to highly corrosive work environment, compo-

ponents of the spreading system, including the chute, are made of stainless steel.

Both models are also equipped with sets of supports allowing the operator to easily attach the machine on the carrying vehicle on his own and without any additional tools. An advantage worth noting is the low weight of the spreaders. The hopper has an internal screen installed, preventing large lumps of gritting material from getting inside. The spreaders are also equipped with a slider allowing to adapt them to the type of gritting material used: salt, sand or aggregate. Spot lighting and warning lights increase safety of operation.

PRONAR EPT-15 and PRONAR EPT-21 are compact, what makes them especially effective in places where manoeuvrable machines and equipment are needed, like parking lots and narrow housing streets.

Pronar manufactures also attached (hanging) spreaders (PS-250 and PS-250M), and self-loading spreaders (HZS-10, HZW-150 and HZW-200). Company's offer includes also towed spreaders (T-130, T-131, T-132) and PT-40 series truck-mounted spreaders with three types of drive. The largest one, SPT-70 has 9m² of capacity.

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Changing weather sets up higher hardware requirements for providers of municipal services

PRONAR MACHINES PERFECT FOR EVERY WEATHER

Increasingly varying weather requires the companies providing municipal services to be ready for many specific situations. For this reason, it is necessary to have solid and functional machinery.

ZM-P16 sweeper manufactured by Pronar can certainly be called solid and functional. It can be used not only from spring to autumn (when it helps in maintaining roads, sidewalks and keeping parks clean), but also in winter (when it removes snow and covers the surfaces with grit or substances melting snow and ice). What's unique, this machine can be mounted both on the front and at the back of a tractor. There are also two types of drive to choose from.

Quickly melting snow and temperature that likes to stay around 0°C forces companies to use sweepers with brine tanks more often (Pronar's sweepers are equipped with

tank from 900 to 1800 litres of capacity), to melt the snow without leaving additional material that would need to be removed in spring. HPT, SPT and KPT models are capable of doing that. Each has a hopper (for sand or other materials) with 2,5 to 4 m³ of capacity, is equipped with a removable tarpaulin cover and a screen to remove lumps. Material is carried over to the spreading system by a conveyor belt with sidewalls. To ensure long life while operating in heavily corrosive environment, all spreading components are made of stainless steel. Components of the hydraulic installation were also selected in manner providing proper resistance to corrosion.

In countries where winter is short and growing seasons are long, companies providing community services need to prepare themselves early for cutting grass on roadsides, drainage ditches and in parks. Pronar provides machines to carry out all these tasks. 110cm-250cm wide BK-M and BBK-M mulchers are commonly used by companies maintaining urban vegetation and roadsides. They prove themselves when it comes to cut grass on large meadows and clearing fields covered with wild plants and weeds. A major advantage they have is the option to left the fragmented swath on site, to act as a natural mineral fertiliser.

Users of Pronar mulchers can adopt their machines to the material they are currently working on, selecting one of seven types of easily-exchangeable cutting blades. For companies dealing with municipal services, purchase of Pronar hydraulic arms from the WWT and WWP series and saw heads from the GK series allows extending the scope of services provided. Pronar manufactures 7 different multifunctional hydraulic arms with up to 6 meters of effective range. They can be mounted on the front or back of a tractor or on the front of many trucks (e.g. Unimogs). Operating width of the saw heads ranges from 80 to 140 cm. For owners of smaller tractors, Pronar offers GK80L and GK100L sawing heads. "L" in the name indicates the light version – de-





signed to be mounted on lighter tractors with lower capacity.

Cutting roadside vegetation involves dust raising over the roads, that are – in winter – additionally covered with sand partly mixed with operating fluids from vehicles and pieces of damaged blacktop. Still, every road must be cleaned to assure proper grip and aesthetics. Best machines to achieve that goal are the towed sweepers from the ZMC series: ZMC 2.0 or ZMC 3.0. Both of them have sprinkling systems preventing dust from raising installed

as standard equipment. They are designed to maintain municipal infrastructure of cities and roads of higher categories. ZMC 2.0 is equipped with a vacuum suction system to collect dirt. ZMC 3.0 collects dirt with a main brush and a conveyor belt transporting it to the 3m² container.

When it is time to remove snow from, or clean squares, small housing estates or towns and villages, ZM-P16 sweeper proves to be extremely useful. It can be used not only during the winter thanks to additional brushes desi-

gned for warmer seasons with thick bristle and a sprinkling system preventing dust and light dirt from becoming airborne.

Pronar offers a wide range of municipal products for maintaining road infrastructure and urban vegetation that can prove themselves in any conditions, no matter if they were caused by weather or changing market requirements.

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Truck mounted snow ploughs

PLOUGHS WITH SHAPE MEMORY

Shape memory? Is that even possible? It turns out that yes, it is. Pronar applied a special type of material that makes the mouldboard return to its original shape after being deformed. In result, the plough's life cycle extends substantially.

Pronar, an experienced manufacturer of winter road maintenance machinery, extends its offers of snow ploughs with PU-S-series models: PU-S25HL, PU-S27HL, PU-S30HL and PU-S34HL. Modern production technology and usage of a special material makes the mouldboard return to its original shape after any deformation. Additionally, application of rotomolded mouldboard resulted in the weight of the plough being significantly lower in comparison to ones with polyurethane mouldboards. Stable, high-quality construction mounted on a metal, ribbed frame makes the PU-S25HL, PU-S27HL, PU-S30HL and PU-S34HL ploughs extremely light. Their weight is, respectively: 450, 530, 550, and 590 kg, while their working width is: 2,15; 2,38; 2,63 and 2,97 m.

New plough models were also equipped with two interconnected turn actuators that allowed usage of a sweep valve. In result, when the plough

encounters an obstacle causing the hydraulic system to reach pre-defined safety pressure, this system make the mouldboard to turn and avoid and avoid being damaged (used in PU-S27HL, PU-S30HL and PU-S34HL models).

Another change seems small, but it significantly increases overall functionality of the plough. Pronar introduced a change in the method of controlling the vertical and horizontal working position of the plough. As before, there is a control panel installed in the driver's compartment, but, to make control even more intuitive, the new panel was equipped with a joystick. Among others, it allows selecting the "float" option (where the pressure to the ground comes solely from the weight of the plough) or the "press" option (a short increase in pressure to the ground).

Just like in previous models (PU-S25H, PU-S32H and PU-S35H), new ones also have a power pack in-

stalled (a box with its own 12V or 24V hydraulic drive) that allows mounting the plough on any truck equipped with type A or B DIN mounting plate.

Another solution already known from previous models is a set of springs and sectional construction of ploughshares. The springs protect the individual sections from obstacles on the way and press the ploughshares against the ground to increase efficiency of the machine.

User has two types of ploughshares available, made from perforated metal or rubber. First ones efficiently tear off the dangerous ice from the surface of the road. Rubber ploughshares in turn ensure that the surface from which the snow is removed will not be damaged.

Additional protection devices used in older plough models are bumpers preventing damage to kerbs and the machines themselves. In dependence of the surface on which the plough operates, slides or wheels may be used. Hydraulic systems utilised in new series of ploughs can be adapted to the customer's vehicle.

Addition of the new models to the PU-S series of snow ploughs is an evidence of dynamic development of municipal machines designed and manufactured by Pronar. It also provides the customer with wider choice and possibility to adapt the equipment to the owned vehicles.

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TRAILERS

www.pronar.pl

PRONAR NV161/2 Manure spreader

APPRECIATED BY THE SPANISH CUSTOMERS

At the beginning of the year 2016, Pronar started manufacturing new generation of manure spreaders, the NV series. Their innovative construction met with interest of Spanish customers.



A favourable reception of NV-series manure spreaders on the Polish market did not go unnoticed by Pronar's foreign partners. A visible effect of that is sale of said machines to Seville in southern Spain.

Interest of the Spanish market in Pronar machines is a success

of the company and an important stage in development of its distribution network. Spanish customers are generally loyal to their national brands and gaining their trust is not an easy task. Statistics show how unwilling are the Spanish customers to buy products of foreign compa-

nies: 98 percent of trailers – including manure spreaders – sold on the Spanish market were manufactured by Spanish companies.

A customer takes many factors into account when buying a new machine. PRONAR NV161/2 spreaders, despite their price raised by costs of transporting them from Poland to Spain, turned out to be interesting enough for the customers from Seville to be chosen as the go to machine with 8 tons of capacity, despite many competitive products from Spain and other countries.

Rich standard and additional equipment increases functionality of the machine and allows adopting it to be used in any climate, even on the sizzling hot fields of Spanish Andalusia. Hydraulic system controlling the guillotine slurry door and rear shields protects the cargo and controls the spread of the carried manure, peat or compost. V-shaped hopper prevents the material from getting stuck.

Adapting machinery manufactured by the Polish company to work in hard climatic conditions became possible thanks to the tests carried out in a special environmental chamber owned by the Pronar Research and Development Centre. Diagnostic and testing capabilities of the chamber allow simulating impact of various climatic conditions on newly manufactured machinery.



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José Troncoso Párrado from Utrera in Spain (Sevilia surroundings), the owner of Ganadería Troncoso González Slu farm.

- We did not expect from this trailer as many benefits as we received. Not only is the trailer's standard equipment useful for

emptying a manure. One of the most useful matters is the wooden bar that protects trailer's side profile, and such solution is offered on this market solely by Pronar. Another very important feature is the cover that protects PTO from manure spreader. NV161/2 is a great investment for intermediate size farms.



Pronar production plants are not the only ones that take advantage of the services provided by the Research and Development Centre. Many European companies have their research and tests carried out there.

Manure spreaders from Poland were also recognised by Spanish agricultural sector media. Internet portal profesionalagro.com described, broadly and in detail, innovativeness of the PRONAR NV161/2 manure spreader and expansion of the Polish brand on the Spanish-speaking markets of South America.

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Information about Pronar, its presence on the European and worldwide markets and production capacity was published on the Spanish portal profesionalagro.com
The article is available under the following address: www.goo.gl/kNjxqZ

M-series bale trailers

SECURED CARGO

Among numerous trailers manufactured in Pronar, bale trailers designed to transport bales of straw, hay and silage can be found. M-series bale trailers have light, stable construction and optimal floor thickness. Their walls are adapted for transport of two layers of bales, while low platform facilitates loading and unloading.

M-series encompasses T022M, T023M, T024M, T025M and T026M trailers. Their load capacity ranges from 7 (T022M) to 18 tons (T026M). Their design and large platform allows not only transporting bales of straw, hay or silage, but also pallets, Euro-pallets and large-sized cargo.

A characteristic feature of M-series trailers are side racks of the loading platform. They are profiled and have their edges rounded in a manner protecting the cargo from uncontrolled movement and the wrapped bales from damage. Another important element, two-pint ladder fixing system allows resigning from supporting cables that can complicate the loading process.

Highly resistant to deformation, 4 mm floorboards were used in the trailers from the M series, allowing

them to be used not only in agriculture, but, for example, to transport pallets. It is possible to regulate the length of the platform to adapt it to the size of the cargo. All M-series trailers have two coiling devices installed allowing the user to coil bands or ropes securing the cargo.

A solution significantly increasing resistance to corrosion is construction of the trailer platform with a single central weld. Another factor limiting corrosion is properly applied and high quality chemically bonding coating. Stable and strong suspension with parabolic leaf springs ensures longer life cycle of the trailer.

M-series trailers allow installation of additional components: side collision guards, capacious toolbox and rear collision guards integrated with rear lighting.

Pronar, as one of the leading European trailer manufacturers, constantly modernises its products. M-series trailers are no exception here, they were created in results of improvements made to older models. Modernisation of Pronar bale trailers is a result of ideas and hard work of our designers and efficient communication with customers from Poland and abroad. Their remarks allow adapting our machines to the needs of future clients. This way we are able to maintain constant improvements to functionality of our trailers, safety of transported cargo and allow our trailers to find applications not only in agriculture, but also in widely-defined transport industry.

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T700 and T700M monocoque trailers

PERFECT FOR LONG DISTANCES

In the last year, Pronar introduced the T700M trailer (a modernised version of the T700 trailer) onto the market. Monocoque trailers prove to be a good solution for medium and large farms, where various goods often have to be transported over large distances.

PRONAR T700 and PRONAR T700M trailers are efficient and have considerable carrying capacity (respectively 14,43 and 16,04 tonnes). Rich standard equipment, including hydraulic mechanism lifting, closing and locking the tailgate, improve work comfort and allow for more efficient and safe unloading of goods transported. Both models come equipped with durable tandem suspension with parabolic shock absorbers, axles having 150 mm of diameter and drum brakes. They are adopted to move with up to 60kph of speed. Internal surfaces of the container are smooth what effectively lowers the risk of damaging agricultural products while loading or unloading them. The trailers can be effectively used to transport root crops and grain, including corn.

The container is highly sealed by design, what allows transporting loose materials without any additional sealing. There is an additional discharge window on the tailgate allowing for unloading cargo steadily with a narrow stream. One of the advantages of these trailers is strong and compact construction, useful in harsh conditions of works in the field.

Large number of additional equipment allows the customer to easily adapt the product to his own needs. Functionality of the trailer can be improved with a rear hitch and hydraulic (straight or foldable) draw bar support. A number of alternative



tires is also available, as well as well as a steering axle and spring draw bar, that facilitate manoeuvring and improve driveability. These options are especially favoured by owners of large farms in which goods have to be transported over large distances.

Pronar, as an owner of a brand available in many countries,

constantly works on implementing innovative solutions into its trailers. Thanks to this, their functionality increases what makes them more fitting to fulfil customers' needs.

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PRONAR T286 trailer with pneumatic suspension

COOPERATES WITH MANY BODIES

PRONAR T286 hook lift trailer is utilised in many sectors of economy. It proves itself in farming, construction, municipal, forestry and pomicultural works. Its construction allows usage of one chassis that works in combination with many bodies constructed on the basis of a hook lift container.

T286 trailer can be used with many types of containers. Additionally, thanks to a pair of hydraulic connections in the back, it is possible to attach another trailer or power up hydraulic door in the carried container. T286 has also a central hydraulic system. It allows controlling certain functions, namely blocking the container, blocking the suspension, pulling out the rear bumper.

Hydraulic actuators allow raising and moving the hook frame and feed the pair of hydraulic outputs for the second trailer. A message showing on the control panel informs about currently enabled functions of the central hydraulic system. Additionally, a special controlling programme protects from turning unauthorised functions on by accident.

Replacement of traditional suspension with pneumatic one

is one of the additional equipment options of the T286 trailer. Specialists from the Pronar Implementation Department carried out tests to compare pneumatic suspension and mechanic suspension. They formed the following conclusions:

- Thanks to pneumatic bags replacing traditional shock absorbers, amortisation of the trailer is smoother and more continuous, what significantly improves user's comfort.
- Airbags are more resistant to temporary overloads than steel leaf springs. This way they lower the risk of the trailer being overloaded during operation as well as the risk of the leaf spring breaking.
- Changing settings of the levelling valve allows regulation of trailer's height. This allows it to fit perfectly to the

tow hitch of the towing vehicle.

- Pneumatic suspension does not have elements prone to wear and tear during work like swing arm rubber bushings, screws connecting the axle and swing arms, or sliding surfaces of swing arms and leaf springs. It extends the life cycle of the trailer.
- Pneumatic suspension improves trailer's adaptation to the terrain. It can be raised to facilitate moving on uneven ground.
- Unquestionable benefit of using pneumatic suspension is fixed travel clearance (not depending on the load). Even if the trailer is fully loaded, the suspension remains on the same level.

Choosing T286 trailer with pneumatic suspension installed instead of the standard mechanic suspension improves traction properties of the vehicle towing the trailer and ensure optimal reduction of vibrations and shocks, what improves the comfort of driving. Numerous advantages of the recommended pneumatic suspension were recognised by many customers who decided to pick this option while purchasing the T286 model.



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Pronar trailers in Austria and Switzerland

MECHANISMS INCREASING SAFETY

Pronar agricultural machinery sold to Austria and Switzerland have been an important part of the company's export for many years. Pronar designers carefully listen to suggestions of customers and dealers to improve manufactured machines in terms of functionality and comfort of operation.

Users' remarks were an inspiration to start manufacture of animal transportation trailers with 1500mm walls. This change in construction improves comfort and safety of large animals during transport, as their heads do not extend over trailer walls. Another improvement is the internal lighting that limits the risk of animals tripping while entering and leaving the trailer. This makes farmers' work more comfortable and the animals safer.

Austria and Switzerland are characterised with a diversified landscape (mountains, hills). Efficient and high quality brakes are especially important to people from these countries. For this reason, Pronar trailers are equipped with special mechanical and electrical valves ensuring proper safety during transport, loading and unloading of cargo. Work safety is increased also by optional equipment components: stronger axles (adapted for higher speeds) with larger drum brakes. These mechanisms additionally improve comfort of work with the trailer on hilly terrain.

Pronar, being major European manufacturers of various trailers, operates on many markets. Its products are highly popular. An example of that is PRONAR T028KM bale trailer with hydraulic system of raising and lowering the side boards. This trailer increases work automation.

Another Pronar product that is a direct answer to needs of



our client is T286 hook lift trailer with pneumatic suspension system. This type of suspension provides smooth and constant amortisation of the machine. Airbags are more resistant to temporary overloads than steel leaf springs. This solution significantly lowers the risk of suspension getting damaged. Additionally, pneumatic suspension does not have elements prone to wear and tear during work like swing arm rub-

ber bushings, screws connecting the axle and swing arms, or sliding surfaces of swing arms and leaf springs.

Pronar takes care to ensure the highest quality of its products. It is also open to customers' opinions and suggestions, as cooperation with them contributed to successes the company achieved on many markets.

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PRONAR T400R forage wagon for transporting biomass

TESTS CONFIRM WELL-KNOWN FEATURES

The PRONAR T400R forage wagon is based on the T400 model. This is a trailer for heavy loads and large volumes (41 m³) used for collecting and transporting forage from harvesters. The trailer can be equipped with one of four braking systems: single line pneumatic, double line pneumatic, double line pneumatic with ALB, or hydraulic.

Before hitting mass production, the PRONAR T400R trailer was extensively tested during last forage harvest. Experts from Pronar's design and implementation department tested and evaluated the trailer to see if it is ready for production. The tests focused on:

- work of the trailer during transport, loading and unloading.
- tightness of the wagon;
- functionality of the platform

and flap;

- durability, suspension and axles;
- operation of the trailer - its modern steering system.

Several elements and mechanisms of the trailers which ensure its proper operation were verified, adjusted and verified:

1. Loading rotor and cutting system with 45 blades. Each blade is equipped with individual damage

protection. During tests, the blades which were hit with stones or other solids tilted backwards and were not damaged. Blade replacement was also tested, which proved to be effortless and did not require any special tools.

2. The 2 meter pick-up cam causes its tooth to significantly speed up on contact with the ground, which results in fast and precise collection of material. The pick-up cam comprises of 8 rows of fingers, ensu-

ring constant material flow. The traction wheel was adjusted to ensure perfect ground tracking. The machine was tested in uneven terrain, where forage was properly collected.

3. Durability of the hydraulic tandem suspension was tested on varied terrain.

4. Rear steering axle, which greatly reduces the damage to sod and improves tire wear during driving.

5. The design of the trailer's frame, based on durable, rectangular closed steel sections. This solution shows great performance on uneven, highly varied terrain, confirming the trailer's stability and durability.

6. Suspended drawbar which reduces the load put on the tractor and trailer. Smooth, hydraulic regulation of the drawbar's height makes it possible to quickly set its position from operation to transport mode. It is also very easy to adjust the height of the hitch, adapting it to the tractor.

7. The system of controlling and steering the trailer from the tractor's



cab was test once again, proving that it is easy, simple and safe to use.

8. During field tests, the rear hydraulic flap was tested. The protections applied to the trailer prevent the flap from closing uncontrollably.

The tested trailer is a specialist machine. Its use is cost-effective and may bring great savings to farms. The trailer makes it possible to collect

and transport biomass to storage areas or processing plants. Its solid and modern design surely draws attention. Reliability, low maintenance costs, ease of manoeuvring, and high transport volume - these are the key qualities of the PRONAR T400R.

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Comparison of 18 ton trailers

PRONAR T680 HAS THE LEAD

Pronar compared the most important construction elements of 18 ton (maximum authorised mass) twin-axle trailers made by several top German manufacturers and the Pronar 18 ton T680 trailer. At first glance, all trailers look similarly but upon a closer look there are some differences that determine the quality and durability of the machinery.



The lower frame is welded from closed steel sections made of high quality construction steel



Lower Frame

In Pronar's trailers the frame is welded from closed steel sections made of high quality construction steel, which guarantees that the trailers will maintain their properties for years, ensuring reliability and safety of transport. Also, in the corners of the chassis

have welded supports which improve the frame's resistance to deformation, improving their stability and safety during transport or load dumping.

Other producers often use regular I-sections which do not guarantee the same level of chassis durability as closed sections. Also, other

trailers do not have frame supports, trying to reduce production costs and - consequently - lowering the quality.

Suspension

The PRONAR T680 trailer's suspension is based on parabolic springs with three leaves, narrowing

towards the end. They are shaped so that the thickest part is located centrally, and the thinnest sections are located at the ends. Thanks to this design they do not require any lubrication. Even so, the T680 is furnished with lubricant fittings in order to improve comfort of driving. Comfort is also improved by leaf spring bumpers, which, among the compared trailers, are only used by Pronar. Because of these design solutions we can say with full certainty that the PRONAR T680 trailer suspension ensures highest comfort among all of the compared trailers.

The competition also uses parabolic springs, but in most cases they are limited to two leafs, and the bumpers are not available or available as paid options. There are also no lubricant fittings in the compared German trailers available as standard. One of the compared trailers also used the so-called leaf springs, an old type of suspension which in Pronar became a thing of the past a long time ago.

Rear beam

The equipment of the rear beam of PRONAR T680 is model example for other trailers with a maximum authorised mass of 18 t. It is very easy to break a tail light during work on a farm. That is why Pronar offers LED lighting as standard, which is protected by easily detached metal casings.

In this respect Pronar is also ahead of its competitors. Most often, standard equipment of the rear beam does not provide any lighting protection and many producers do not offer any forms of protection as additional equipment. The rear beam is galvanised which extends its lifespan and improves the visual properties of the trailer.



The chute is closed with two tension rods which make it easier to open and lock it.

Grain chute

What separates the T680 from other trailer is its grain chute. The chute is closed with two tension rods, which make it easier to open and lock it. The tension rods increase the tightness of the chute, and the screw which blocks them prevents spillage of grain during transport. This is the safest and surest way to close the chute among all of the compared trailers, which usually use a simple mechanism based on a lever and two blocking screws.



The suspension is based on parabolic springs with three leafs, narrowing towards the end. Thanks to this design they do not require any lubrication.

Marta Frąckowiak

The author is the deputy manager for export sales at Pronar



Rear beam with LED lighting

PRONAR RC2100 low bed trailer

INEXPENSIVE TRANSPORT OF LARGE-SIZE CARGO

Among numerous trailers manufactured in Pronar, universal low bed trailers adapted to transport large-size cargo can be found. A broad selection of additional equipment allows purchasing a technically advanced version, or a standard and affordable one. Despite these variables, every model is a product with a quality/price ratio that will satisfy even the most demanding customers.

Among Pronar low bed trailers, the most affordable one is the RC2100 model. Its basic version lacks many

unrequired, additional equipment. Thanks to this, the price is lowered by 25 percent, while the smaller weight allows transporting 200 kg heavier cargo. This 7-meter-long trailer allows broadening its platform and

ramps by 25cm on each side to make the load width reach 3040mm. This allows transport of machines and cargo of non-standard dimensions. 1,9-meter-long ramps facilitate loading of vehicles, extend the load surface and secure the cargo.

Allowable total weight of PRONAR RC2100 trailer is 19 tons. Proper amortisation is secured by mechanical suspension on parabolic leaf springs (the hook is also amortised). Permissible speed equals 40 or 60kph, depending on the mechanisms installed in the trailer.

Another components (additional equipment) that can improve functionality of the trailer are hydraulically controlled ramps and 45mm thick oak floor boards that increase durability and damage resistance of the trailer bed. The boards are connected by tongue-groove-joints what prevents them from disjoining and limits floor deformation caused by transport of heavy cargo.

Low bed trailers allow for transport of machines and heavy cargo, but also of bales of straw or hay. They have applications in agriculture, construction and transport industries. Next to the RC2100 model, Pronar offers a number of other low bed trailers, namely RC2100/1, RC2100/2, PC2300 and PB3100.

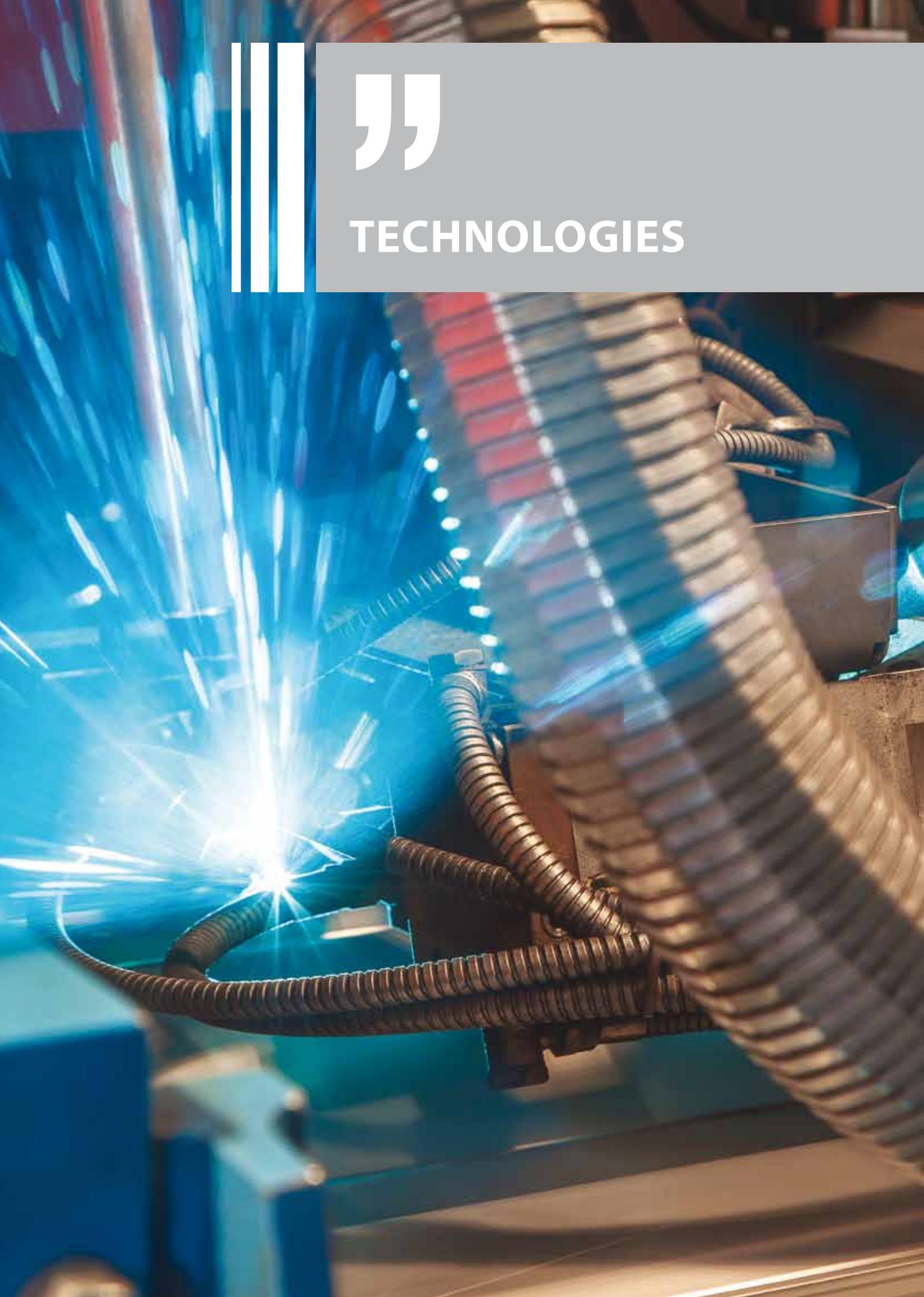
Jan Kuklinski

The author is a foreign trade specialist at Pronar





TECHNOLOGIES



Flotation tires

INDISPENSABLE ON SOFT GROUND

Flotation tires are well known in agricultural industry. Thanks to their large volume, they allow heavy machinery to move over soft ground with little pressure exercised on it. Avoiding putting pressure on the ground protects the soil from getting compressed and this way protects root systems of sown plants.

Flotation tires have a number of applications. Generally, they can be divided into off-road tires

and agricultural tires used on roads. In case of road tires, the most popular are the ones with steel

cord due to intensive use under heavy load. For machines with low maximum load, like mixer feeders or balers, tires with nylon carcasses are still often selected.

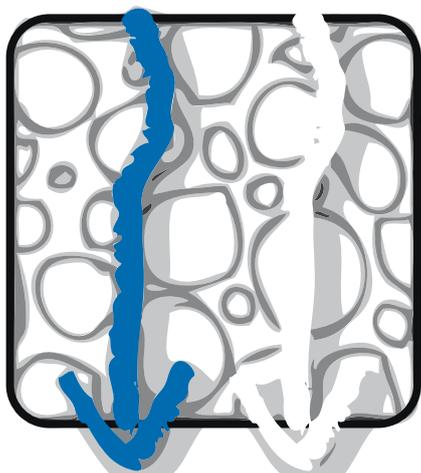
The steel cord tires usually have their carcasses reinforced with steel belts or steel nets. Thanks to this, in dependence of the number of nets, these tires feature:

- higher stability,
- higher maximum load,
- better protection against getting cut by sharp objects,
- better abrasion resistance.

Rapid technological development and increase in world's population forced faster gathering of crops and their transport to storehouses and processing plants. This in turn caused manufacturers of agricultural equipment to include highly specialised machines and equipment into their offer. These are designed to work efficiently and move quickly not only on roads with different surfaces, but also in the fields.

Use of the right tire, but without properly selected rims, does not ensure safe usage of a machine. Right tire and a wheel rim selected to complement it create a wheel that is a component of a machine adapted for given working conditions (for example: on a waterlogged area or slippery surface). Pronar, being a leading manufacturer of wheel rims, produces an entire

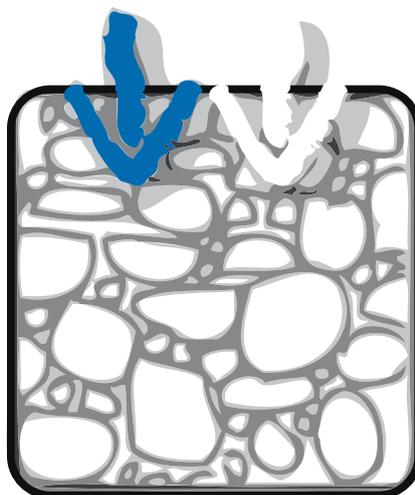
Soil with proper structure



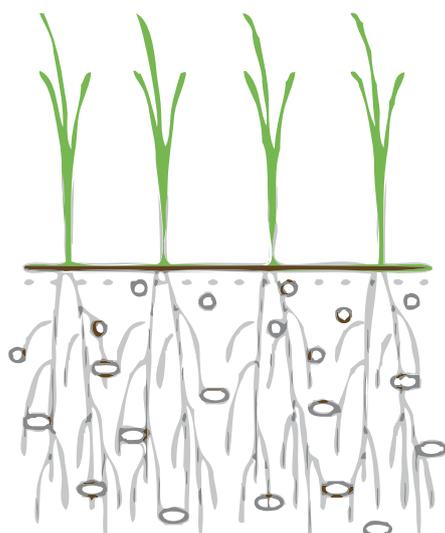
WATER

AIR

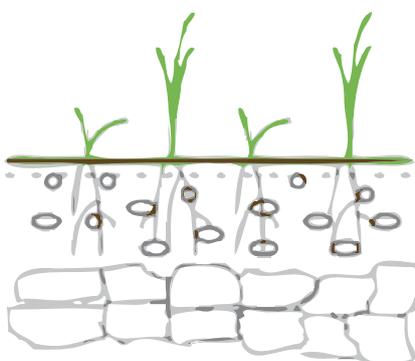
Pressed soil



LACK OF MOISTURE
LACK OF AIR



Soil with proper structure



Pressed soil



Flotation tires exercise lower pressure on the soil, what protects the root systems of sown plants

series of these products that prove themselves in difficult conditions.

Use of 5-10 mm thick outer lips and 8-18 mm discs allows transport of heavy goods, even up to 30 tons. Additionally, modern construction and high quality materials allow vehicles equipped with PRONAR rims to travel with up to 65kph of speed.

Pronar currently works to adapt the rims to travel with up to 80kph of speed. It is a complex process, as the rims cannot exceed acceptable standards of circular oscillation and axial throw. However, great involvement and high competences of Pronar engineering staff guarantee that these works will be

successfully concluded with time.

Pronar has considerable experience in constructing, manufacturing and using flotation wheels. For that reason, he sells not only the rims, but also wheels with tires. Cooperation with largest tire manufacturers in the world allows Pronar specialists to select the best wheels to meet the customers' requirements. Specialised endurance tests carried out for the needs of one of the leading tire manufacturer in the world proved that Pronar rims are more durable than those offered by other manufacturers. According to these tests, PRONAR flotation tires feature:

- rims with longer fatigue limit,

- higher effectiveness and efficiency,
- proper endurance due to use of low-alloy steel and appropriate belt thickness.

These features were confirmed with precise lab and field tests, and customers' opinions. Experienced staff and highly specialised technological lines allow Pronar to offer products to clients from different parts of the world. One of them is Artex, American company that uses Pronar flotation tires in its manure spreaders.

Mateusz Gudź
The author is a sales specialist at
Pronar Wheels Department



Flexible and stiff hydraulic lines

SHORT DELIVERY TIMES, ATTRACTIVE PRICES

Pronar's Pneumatics & Hydraulics department is a leading European producer of actuators, including piston, plunger, telescoping single- and double-action actuators, as well as flexible and stiff hydraulic lines, tips and connectors, and compressed air tanks.

The lines are used for connecting the working and steering elements comprising hydraulic systems in machines, devices, and vehicles used in construction, farming, forestry, etc. A quality connection of a hydraulic line and the tip ensures proper functioning and reliability. A hydraulic line is made from a hose with coated steel tips pressed on both ends. Pronar's Pneumatics & Hydraulics department produces tips with a wide range of applications, and are assembled in accordance with the client's needs.

Hydraulic lines are compatible with numerous liquids, such as mineral oils, water and oil emulsions, water glycol solutions, and pure wa-

ter. A wide range of working temperatures, ranging from -40°C to 100°C , and operating pressures in accordance with the PN-EN 857 standard ensure reliable work in changing weather conditions. The machinery used by Pronar's Pneumatics & Hydraulics department is made by leading European producers and ensure high quality of products.

Pronar also offers stiff hydraulic lines, which can be made from the following materials:

- black steel pipes (unpainted);
- galvanized steel pipes;
- stainless and acid-proof steel pipes;
- copper pipes;
- aluminium pipes;

Stiff hydraulic lines produced at Pronar are compatible to work with a nominal pressure of 16 MPa, and are tested at 32 MPa. These lines can be made to order. The Pneumatics & Hydraulics department can also make stiff hydraulic lines with square cross-sections.

High quality, attractive prices, timely deliveries, and modern production lines make it possible for Pronar's Pneumatics & Hydraulics to offer products that are renowned in Poland and many international markets.

Konrad Kłoskowski

The author is a deputy sales and marketing manager at Pronar's Pneumatics & Hydraulics

Steel sideboards

HIGH QUALITY, FAST DELIVERIES

Pronar's offer includes various components for agriculture machines as well as heavy and light transport, such as steel sideboards used in farm trailers and small and medium trucks.

The sections are made of S235 JR steel, which is supplied on a regular basis by leading European steel mills. By using continuous laser welding, both the upper and bottom sections are hermetically closed off along the whole length of the sideboard, preventing water penetration and, consequently, corrosion.

Pronar offers sideboards of 500, 600, and 800 mm. The first two have are made from corrugated steel sheets, and the 800 mm sideboard is made from trapezoidal steel. The ribs increase the maximum load on section walls. The sections produced by Pronar are 2.0 and 2.5 mm in thickness, and its standard length ranges from 1.5 to 6 m. Non-standard orders can be arranged with the buyer.

Pronar produces a number of sections: with a seal directed to the inside of the trailer (PSB, PSP), without seals (PBB, PBP,) and with the extension seal directed inwards (PNB, PNP). Attention to quality and a wide offer is our priority and is essential for meeting the market needs.

A survey conducted among international dealers who sell trailers that use sideboards produced by Pronar shows, that they are excellent not only for transporting bulk products, such as wood, forage or straw bales, but also for loose materials like grains, sand, silage, corn, manure or rape seeds. Our clients attest for the tightness of the sideboards with the floor or top extensions. This is possible thanks to a fully automated production line and detailed quality

control. The respondents also gave high marks to the durability, solidity and quality of the laser weld.

The 500 mm sections are most frequently used in trailers of up to 8 tons. Trailers bearing larger loads more often use 600 or 800 mm models. 800 mm sideboards are regularly used as top extensions for silage trailers.

Pronar provides sideboards to many Polish trailer manufacturers, as well as to companies from the EU, the Ukraine and Belarus. A top top of the line and automated production line makes it possible to deliver large orders in a short time.

Anna Toczyłowska
The author is a foreign trade specialist
at Pronar



Axle production department

HIGH TURNOVER, LOW MARK-UP

There are several crucial factors in order to conquer the markets with new products and establish your position. The most important aspect is a quality product, coupled with a competitive price. Apart from meeting these two requirements, to be fully successful it is also necessary to keep maintain short delivery times. Also, it is essential to have a comprehensive product offer. This is the case with Pronar's axles produced for agriculture - it has a wide range of braked and unbraked axles in any load or dimension requirement.

The Axle Production Department makes braked axles and stubaxles for a wide range of loads. Modern assembly lines and innovative technologies make it possible to produce axles for single- and twin-axle trailers and for tandem and tridem suspensions with loads ranging from 2 to 24 tons. Pronar's broad offer of unbraked axles and

stubaxles gives its clients the freedom to chose. Depending on their individual needs, the products can be manufactured on a carrying beam with varied dimensions, starting from 40x40 mm to 100x100 mm squares, or round beams from $\varnothing 40$ to $\varnothing 110$ mm.

Pronar also manufactures various wheel connectors, starting

from 5 studs to 10 studs in large axles for agriculture. A differentiated production line and a wide range manufactured elements ensures Pronar's valiant position in numerous markets and our products are the components of machines produced by other companies in Poland and abroad. Pronar's Axle production department also offers de-



signing complete suspensions and drivelines. Cooperating with other Pronar departments, the axles or complete suspension systems can be furnished with brake cylinders (pneumatic or hydraulic), full sets of wheels, or, for example, turntables. Promptness of orders, competitive prices and tailored design solutions in conjunction with high quality are the hallmarks of the Axle production department.

The price levels should always be analysed in relation to products with similar technological parameters. The lowest price is not always the most competitive one. From the buyer's perspective it is essential that the order is completed in a timely manner. The quality of servicing and post-sale support is also significant for a competitive offer.

Another important aspect that influences the production costs and, consequently, the final price of the product, is the scale of production. In order to keep the prices low, production has to be done on a large scale. Producing in long series and large quantities, Pronar is able to get better prices for the elements it purchases from its partners, which directly relates to the price of the final product.

Speaking of prices and short production times, it's worth to mention our machines and production equipment. The Axle production department is furnished with modern digital machinery which is extremely efficient and which significantly speeds up the production process. Essential for manufacture, the machinery makes it possible to control each and every created element. A perfect example of this is the production line of bearing bar pivots. Each

produced piece is automatically measured on the measurement table. If a single parameter exceeds the pre-programmed tolerance, it is automatically signalled to the machine, which then corrects the dimensions of next elements.

Each axle is delivered with detailed installation instructions (with important control points), which should be followed by the personnel assembling the piece. If the element is returned to Pronar due to a complaint, the staff of the axle production department is able to identify the origin of the defect, as well as to determine its root cause. All of this is essential because it forms grounds for preventing problems in the future, if any discrepancies occur.

The choices our clients make are significantly influenced by the recognizability and availability of Pronar Products. It is also important that non-standard or even custom made orders are always completed very quickly. This is the result of our years of experience and the policy that shapes the development of the company. A wide range of offered products makes it easier for clients to make the final decision. When selecting what to buy, people often decide to go with one brand in different groups of products, like tractors, trailers, loaders, mowers, axles or wheels from one producer, such as Pronar. For selecting several products at the same time Pronar offers significant discounts on orders and competitive prices for after-sale support services.

Andrzej Omelianiuk
Manager of the Axle Production
Department at Pronar





Pronar starts production of angle drives

FUNCTIONAL AND EFFICIENT

Angle drives are crucial components used in machine construction. They are frequently found in vehicles and farming machinery, such as spreaders, bale wrappers, rotary mowers, and shredders. As Poland's leading manufacturer of agriculture and municipal machinery, Pronar is striving to expand its use of own components in the machines it offers. With this in mind the company started the production of angle drives.

Angle drives are characterized by reliability and high efficiency also in the long term. Power transmission, speed reduction elements and other modules are installed in a single chassis, improving the maintenance and repair process of ma-

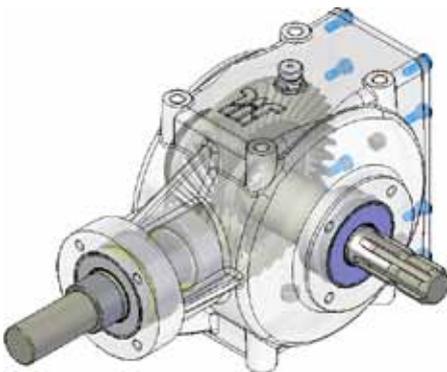
chinery. The characteristic features of Pronar's drives include small size, quiet and steady work, and high efficiency enabling them to transmit large loads.

Connecting different input and output shafts with different directions of rotation allow the drives transmit high speeds. Machinery often needs to reduce rotations. Angle drives with different component diameters are used exactly to this end. The larger the powered element in relation to the powering gear, the lower the speed of rotation. Reducer transmission is defined as the relation of angular speed of the powering drive to the angular speed of the

powered shaft. Individual angle drives differ in mechanical properties, available transmissions, power range, or the torque speed range.

Pronar is systematically investing in technological development, expanding its R&D park, and employing top specialists. All this allows it to offer design and implementation services to its national and international partners. Orders for complete drive systems are consulted with Pronar's designers. This ensures professional and competent services and promptness of orders.

Mateusz Jermak
The author is a sales specialist at Pronar's
Spare Parts Department





History

Establishment of the Company & creation of **PRONAR** brand.

1988

Export and import of agri-food products and mineral fertilizers.

1989

Beginning of trade MTZ with Belarus tractors.

1990

1991

Expansion of main plant for production of tractors, start of wholesale of fuels and motor oils.

Start of production of simple tractors based on imported components.

1992

1993

Dynamic development of trade of MTZ and self-developed tractors.

Creation of a dealer and service network in Poland.

1994

1995

Modernisation and adaptation of plant in Narew to new lines of production.

1997

Launch of autonomous Disc Wheel Department.

1998

Launch of Pneumatics & Hydraulic Department expansion of trade into import and wholesale of metallurgical materials.

1999

Expansion of Export markets.

2000

Active development of technical and engineering facilities, high employment growth, the start of serial production of PRONAR municipal machinery.

Launch of Plastic Production Department, introduction of **ISO 9001:2000**.

2001

2003

Start of production and sales of agricultural trailers.

Start of cooperation with Korean Daedong Ltd – distribution of Kioti brand of tractors in Poland.

2005

Start of production and sales of **high-tech tractors P5 and P7 series**, a complete line for hay, and straw, and machines for feeding. Upgrade of factory in Narew – assembly lines for trailers, disc wheels and tractors.

2006

2007

Implementation of the Integrated Information **System SAP**.

2008

Start of production of high-power **tractors P6 and P9**, launching of plant for hay and straw machinery in Strabla.

2009

Start of production and sales of machines and trailers for aggregation with trucks.

Launch of factory in Narewka intensive growth of production and sales of bulk trailers.

2010

Start of production and sales of steel profiles, strong employment growth and the expansion of sales on six continents. Start of construction of factory in Hajnowka.

2011

Start of production and sales of axles, machinery for sorting and processing of municipal waste and mowing bars constructed by Pronar engineers.

2012

Commencement of construction of Research and Development Center (RDC) in Narew and commissioning of new warehouse of Disc Wheels Dept.

2013

Expansion and modernization of factory in Siemiatycze, Service Department in Narew and the modernization of production and technological facilities of R&D Dept., Disc Wheel Dept. and Pneumatic & Hydraulics Dept.

2014

Building new factories in Narewka and Siemiatycze, Intesification of building and finishing works in new facotry situated in **Hajnowka** (axels production),

2015

Serial production of P5, new generation, tractors, Opening of **Research and Developmnet Center**.





Narew production facility nr 1



Narew production facility nr 2



Narew production facility nr 3



Narewka



Strabia



Siemiatycze



Hajnówka



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Technology for nature