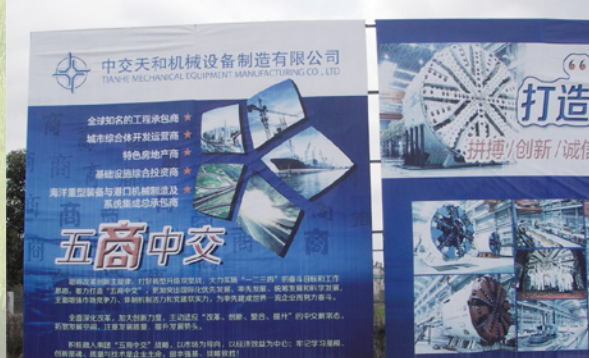
POCLAIN MAG

#7 November 2016

SUCCESS STORY: INDUSTRIAL APPLICATIONS IN CHINA



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NEVER GET STUCK

PIONEERING AWD SOLUTION

POCLAIN Hydraulics

ADDIDRIVE TECHNOLOGY

EDITORIAL

After 20 years of strong growth in the 1990s and 2000s the hydraulics market has been shrinking these last 5 years, due to the negative impact of multiple factors in our industry such as the European double dip in 2012, the collapse of the construction equipment industry in China, the drop in mining activities or the massive downturn in agriculture equipment, felt particularly hard in the USA. Faced with this uncertain environment, Poclain has taken several initiatives to maintain growth.

We have launched new products at an impressive pace: 30 liter motor, a new range of high performance MHP motors, MZ motors for mini excavators swing drives. We have broadened our systems offering with new pumps (PM30, PM50 closed loop medium duty; PW heavy duty pumps), new electronic controllers (our new CT range) and more valves.

We continue to enter new markets, working in more countries, constantly adding new customers ; sometimes we even create these markets together with our customers (think of the hydraulic assist drive function for trucks or cars - see p16 to p19). This never-ending quest for innovation alone would not be enough to grow our business. It must be complemented with operational excellence in quality, logistics, product reliability, and proximity to our customers.

As an example, our modular MS range of radial piston motors can now be manufactured in five different plants in the USA, France, Czech Republic, India and China.

We have also reorganized Poclain Hydraulics at the operative level around four product lines, each line having full control over R&D, Manufacturing, logistics and at the marketing level with several Business Platforms, each one in charge of a specific market (see one example p14).

Based on the belief that only agility, adaptation and an entrepreneurial spirit can allow companies to thrive, we can look with confidence into the future.♦

Denis GREDER
POCLAIN SALES DIRECTOR

POCLAIN AWARDED BY CATERPILLAR IN INDIA

Established in 2008, Poclain Hydraulics PVT LTD is part of POCLAIN Group and is based in Pondicherry, India. Poclain Hydraulics PVT provides hydraulic motors to various customers worldwide. 90% of the motors are exported and 10% are intended for the domestic market.
Poclain Hydraulics PVT started by supplying the MSE02 motors to Caterpillar BCP Sanford plant in the USA in April 2012 . In 2014, Caterpillar BCP transferred part of their skid steer production to Chennai (India). Poclain Hydraulics Pvt started supplying the motors directly to Caterpillar India in August 2014.
To date, the Poclain Hydraulics PVT team has met the OEM's requirements: 0 ppm and 100% on-time delivery.

The transfer of some of the motor shipments from Caterpillar Sanford to Caterpillar India took place a year after the implementation of Poclain's Quality Excellence Plan deployed all across the group plants and entities worldwide as from September 2013.
The Quality Excellence Plan covers all the areas of Poclain's activity (Design, Production, Sourcing and Sales) through a methodology of actions for continuous improvement deployed by the company management and cascaded top down across all the teams, with the objective to guarantee customer satisfaction.

A «Run @rate» audit by Caterpillar BCP team in 2012 also contributed to significant improvement within six months.

After a new visit of the Caterpillar BCP team in 2014, Caterpillar India recommended that Poclain Hydraulic PVT participate in the CAT SQEP certification process. Thanks to the support of Caterpillar India and the hard work of Poclain Hydraulics teams towards continuous improvement all across the supply chain, from the shop floor to the management level, Poclain Hydraulics PVT succeeded in meeting the challenging requirements of this certification and obtained the Caterpillar Supplier Quality Excellence Process – Platinum Certification Award for 2016.

Poclain Hydraulics PVT and the whole Poclain group are greatly honored by this valuable recognition.♦

From left to right : Representatives of Poclain Hydraulics and Caterpillar teams

MULTIHOG AND POCLAIN HYDRAULICS

A SYNERGIC RELATIONSHIP

Multihog is a dynamic manufacturer of multi-purpose tractors headquartered in Dundalk, on the east coast of Ireland. Multihog was founded in 2008 by Jim McAdam, who spotted an opportunity in the market for multi-purpose machines, which undertake a range of diverse tasks by simply changing the front or rear attachments.
The Multihog is capable of an endless range of tasks, from snow clearance in an airport to patch planing for road repair and everything in between. In this way, one base machine with attachments can replace several dedicated machines, offering greater flexibility to the owner/ operator and less seasonality of use.

In the short time since 2008, Multihog has developed three machine ranges, varying in engine power between 55 and 120 HP. The MH, MX and most recently CX ranges have several machine variations to meet the needs of a diverse collection of applications, but at the heart of the machine they are all based on the same concept: a diesel engine coupled with a high performance hydrostatic transmission. The key to the machine's versatility is the Poclain hydrostatic transmission, complete with MS wheel motors -these include dynamic service brakes as well as park brakes (drum brakes on size MSE05; calliper brakes on size MSE02) and a closed loop heavy duty pump of 100cc whilst the circuit also includes valves for hot oil exchange, brake control, flow dividers for traction control, as well as the high performance CT200 electronic controller. The latter allows the driver to have infinitely variable travel speed control, which is independent of engine speed in mode one, perfect for working with attachments.
With the flick of a switch the operator has the convenient ability to change to automotive style driving, including auto gear changes for road trips between jobs.

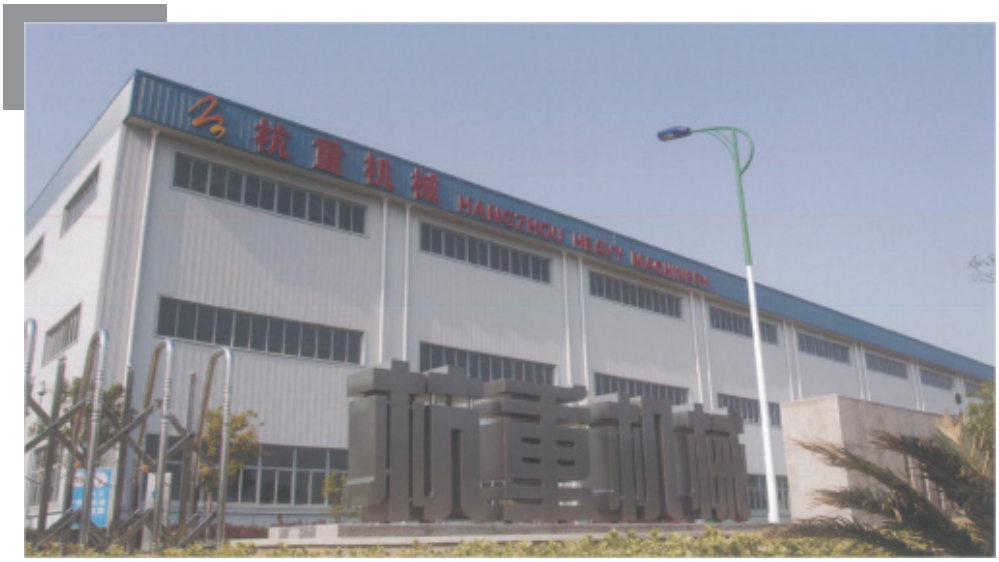
Poclain and Multihog have collaborated closely to develop the control system and software for the machines, which has evolved over time to include customised functionalities to enhance the usability of the machine for the driver, reduce fatigue and increase safety. The combination of high performance, efficient and reliable components coupled with intelligent transmission design and customised control help give Multihog the edge in a competitive marketplace.♦


Multihog
Multihog

SUCCESS STORY FOR INDUSTRIAL APPLICATIONS IN CHINA

While Poclain Hydraulics is clearly identified as a leader when it comes to hydrostatic transmissions for mobile applications, our customers also recognize Poclain Hydraulics' ability to deliver high performing and reliable hydraulic solutions for stationary applications such as shredders, tunnel boring machines and bulk material handling equipment.
In addition to developing its presence on the stationary hydraulic market, in the past few years Poclain Hydraulics has extended its presence in China. This growth has been reinforced by the Poclain Hydraulics, facility located in Shanghai since 2011.
The following two success stories illustrate the success of Poclain's strategy in the region.

Hangzhou Heavy Machinery and Shanghai Jellix Hydraulics Co. Ltd (Shredder)



Today the Chinese government is conscious of the environmental challenge and is strongly committed to preparing the country for a more sustainable growth.
An example of this environmental concern is the incentive to develop a recycling solution for all types of waste, offering strong opportunities for shredder manufacturers.
Anticipating this trend, the company Hangzhou Heavy Machinery, already a leader in consolidation equipment for ground foundation, decided to penetrate the recycling market and in 2013 developed their first shredder.

Committed to becoming a leading company in the shredding field, their strategy was to propose the highest operating performance and reliability while offering strong service levels to their customers. Hangzhou is also very conscious of the severity of the shredding application and the need to avoid any down time.
After having investigated the market needs, Hangzhou Heavy Machinery first had to consider the accuracy of waste recycling in China: since waste is not always sorted, the shredding system needs to be as versatile and robust as possible, in order to operate with a large variety of

incoming material (metal, plastic, paper, rubber, etc.).
This is why, when choosing which technology to use for the cutting drive, the design team selected low-speed, high-torque hydraulics motors, which provide high torque capacity while being less sensitive to sudden direction changes and load peaks, when compared with electric or high speed hydraulic motor and gearbox.
As expressed by M. Gaoqing Han, Vice General Manager in charge of Engineering, the key decision driver for the choice of their hydraulic supplier was to select a company that offered the highest guarantee of success thanks to their experience and recognized track record on this very demanding application.

Hangzhou Heavy Machinery was looking for companies offering adequate technology but also with strong references in the shredding market.With over 20 years experience in supplying hydraulic motors for shredders and references among the world's leading manufacturers, the choice of Poclain Hydraulics became obvious!

Following a close collaboration with the local Poclain Hydraulics sales and application team to define the right solution, the design team selected the MS125, which provides a displacement up to 15l with a maximum rated pressure up to 320bar. The Poclain Hydraulics MS125 is one of the most popular hydraulic motors for shredders.

Once the motor was selected, the request from Hangzhou Heavy Machinery was to work with a single supplier for the complete hydraulic system.
This is why Poclain Hydraulics proposed the exchange and crossover relief valve, which protects the motor from excessive pressure and heat and maintains a reasonable oil temperature in the close loop circuit.

To complete the offering, Poclain Hydraulics proposed a partnership with Shanghai Jellix Hydraulics Co. Ltd to supply the rest of the system, including the hydraulic power unit.
Once the design was completed, it was time for Hangzhou Heavy Machinery to release their shredder, called HZPS001, on the Chinese market. Hangzhou has had lots of success so far, and they continue to

record high sales, with an expected growth of 10% for 2016, thanks to their robust design and performance.

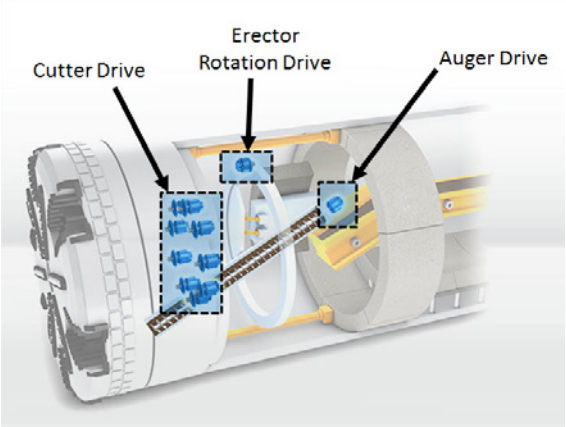
This development was a first step in the new company strategy for Hangzhou Heavy Machinery. The company has decided to dedicate more resources to develop this new market and address the rising demand for shredding solutions.
Hangzhou can definitely count on the support of Poclain Hydraulics, which proposes a wide range of hydraulic solutions, including new motors with displacements up to 30l and a power capacity of 500kW, to equip demanding shredding applications.♦

TIANHE MECHANICAL EQUIPMENT MANUFACTURING CO. LTD

Even if the Chinese economy is showing signs of slowing down, the country continues its development, driven by the transfer of more and more people to large cities.
This situation drives infrastructure investments, including public transportation.

This is why the demand for subway construction remains strong, pulled by large and mid-size cities that want to offer an efficient public transportation system to their inhabitants, bringing more activity by improving the traffic conditions.
For example, the city of Beijing is planning to build 12 new subway lines within the next five years, to reach a distance of almost 1.000 km.

TIANHE, a state-owned company, is one of the leaders in China for manufacturing of tunnel boring machines. The company has produced 105 machines since 2002, when the company started to manufacture its first machines for the Japanese market.
Today, TIANHE produces more than 20 tunnel boring machines per year in its factory, located in Changshu (North-West of Shanghaï), with the target to raise capacity after completion of a new building, in order to satisfy the significant domestic demand.
Looking at the tunnel boring machine itself, there are three main functions which can be operated by hydraulic motors: the cutting drive (rotation of the shield), the auger drive (the screw that is conveying the extracted soil) and the erector rotation drive (positioning of the tunnel segments).

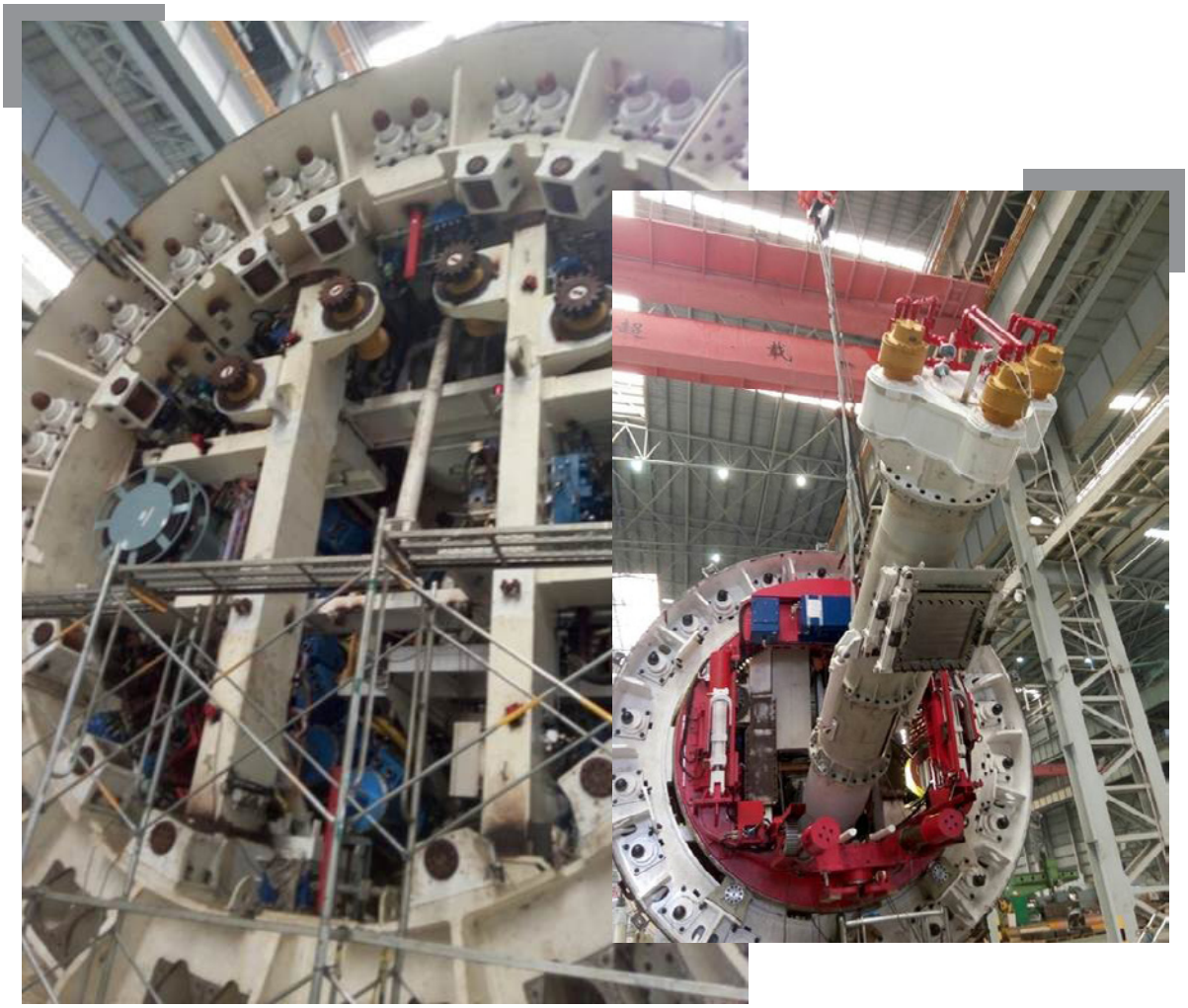


Main functions of Tunnel Boring Machines using Hydraulic Motors

According to M. Zhang Tianju, Deputy Director for R&D, the decision to select Poclain Hydraulics motors for the auger drive and the erector rotation was justified by Poclain Hydraulics' strong experience in this market as well as several references, especially in Japan, for more than 20 years.

Based on the machine size (mostly between 6 and 9 meters) and required torque, the design teams selected the MS35 (up to 4,200cc displacement, pressure up to 450bar) and the MS50 (up to 6,000cc and 450bar) motors for these two functions.

As shown in the photos, in order to provide sufficient torque, each function can be driven by several motors at the same time:



An additional reason for the choice of the MS motor was its modularity with the possibility to adapt a parking brake to hold the motor shaft in position, which is required for the erector rotation.

Last but not least, M. Zhang Tianju emphasized the extreme reliability offered by Poclain Hydraulics' components, because these motors can run flawlessly for more than ten years, giving them the opportunity to re-use them when building a new tunnel boring machine and helping accelerate the return on investment for end users.

With more than several hundred motors supplied each year for tunnel boring machines across the world, Poclain Hydraulics is a leader in this industry.♦

THE "AG." PLATFORM
A NEW APPROACH TO FULFILL OUR CUSTOMERS' NEEDS

Hired by Poclain in 1988, **Jean Heren is Platform Business Manager for the Ag industry**, which encompasses, for the time being, spraying equipment, grape and fruit (olives, coffee…) harvesters as well as straddle tractors. His nomination coincides with the company's new organization into platforms in September 2015, a strategy that positions the customer's machine at the heart of Poclain's offering.

What is the platform business manager's role at Poclain?

My role is to coordinate the teams' tasks to better serve the markets I oversee. My position is cross-functional as I take part in project management, R&D, manufacturing, logistics, purchasing and sales.

My position addresses the changes in our customers' machinery. They are becoming more sophisticated, while the farmers' everyday constraints are increasing. In order to help our customers improve their competitiveness and machine performance, I bring our teams to work more closely with the OEM's engineering teams. We can draw on our broad product offering to design holistic solutions that combine the drive and the auxiliary functions of the application. If you take sprayers for example, we can now power the spraying function in addition to the wheels, by selecting products from our valve and medium duty motor and pump catalog.

The new organization goes hand in hand with platform-specific reporting, in order to set the objectives and measure the outcome. We work alongside the sales team to put together offerings that integrate validated solutions.

What are the three major assignments of a platform business manager?

Each platform business manager leads a team, composed at least of a systems architect, a project manager and a marketing expert. The team's number one assignment is to consolidate Poclain's position on the market; the second is to feed the Innovations Team by proposing future solutions, looking far ahead into the future. The third assignment is to optimise profitability. As our company culture is deeply rooted in quality and engineering, we ensure that we find the right compromise between innovation and price. This leads us in some cases to simplify our products to reduce costs, while staying in line with the market's quality and performance requirements.

It sounds like a platform team functions like a business unit…

It's true that there are similarities. The platform teams lead their projects autonomously, whether they cover systems or products. The cross-functional organization makes it flexible, adaptable and reactive. One of our customers' major preoccupations is time-to-market. We conduct our projects just like our

MHP Motor

PW Pump

SD-CT Controller + EcoDrive™ Software

customers, who are business owners, coordinating the key functions in the company. We must ensure the internal processes work in sync to respond rapidly and precisely to the external stakeholders. Focusing on the customer is one of the keys to our organization's success.

In the automotive industry, thinking innovation in terms of platforms leads manufacturers to establish partnerships. Does the same apply to Poclain?

As we tend to think more in terms of functionality rather than components, we do indeed work with partners, such as engine and user interface manufacturers, for instance to streamline data exchange and information flow to the operator.

How do the customers benefit from the Platform organization?

As we report directly to the steering committee, the information collected in the field is communicated rapidly and the decision loop is shorter. The quality and logistics discrepancies are resolved fast. The second advantage is that we are more dedicated to our markets. Each platform team dedicates 100% of its resources to serving a limited amount of customers and distributors. We nurture close relationships with our external counterparts, which gives us a finer judgment over what is important and what is becoming a trend in the mid and long term. We are thus able to come up with innovative solutions that meet their requirements, as well as the regulations, pricing and timeframe. Our expertise will help them stand out from the competition with more efficient and reliable transmission systems that bring real benefits in terms of productivity and operator comfort.♦

ADDIDRIVE

2 CARS IN ONE... FOR EVERYONE

www.addidrive.com

POCLAIN MAKES AWD
TRANSMISSIONS AFFORDABLE WITH ADDIDRIVE

The Addidrive hydraulic transmission received the Gold Trophy for Innovation in the OEM category at the Equip'Auto 2015 Paris trade show.
Eric Vives, Director of Poclain Powertrain, explains why Addidrive is a true revolution in automotive mobility.

How does Addidrive work?

Addidrive is a hydraulic transmission system that is comprised of a pump and one or two motors. In the case of personal cars and light commercial vehicles, it is mounted in parallel with a standard mechanical transmission system to power the rear axle of a front-wheel drive vehicle. The transmission is connected with hosing and pipes, with no front/rear mechanical shaft.
The hydraulic technology features a lightweight and compact dimensions and can be easily fitted with minimum impact on the chassis for excellent traction performance.

In what way does Addidrive represent a technological breakthrough for manufacturers?

Addidrive will radically change the approach to platforms as well as all-wheel drive (AWD) vehicle options. Until now, manufacturers have had to use dedicated or compatible platforms in order to offer an AWD vehicle, rendering this option unsuitable for sheer 4x2 versions. Addidrive makes the all-wheel drive function accessible to sheer 4x2 plateforms, and can therefore be offered for a wider range of vehicles. Furthermore, the simplicity of the Addidrive integration halves the cost of an AWD option, enabling manufacturers to target new markets.

How can the automotive industry be convinced to invest in hydraulic technology rather than focusing on electronic and electric innovation?

It is true that most innovations in the automotive industry are related to driver assistance through linked systems, making vehicles increasingly autonomous, as well as developing electricity as an energy source. Our Addidrive hydraulic transmission system offers manufacturers a new vision of mobility, which merges seamlessly with their own developments.
Our hydraulic components provide real-time compensation of any slip differential with the front axle, with no need for a controller.

Addidrive
2 designs and 2 torque levels for maximum compatibility with 4x2 vehicles

Central motor design
(1 pump + 1 motor in central position of rear axle)
Wheel motor design
(1 pump + 2 motors fitted into the rear wheels)

Standard torque version:
For small cars and light vehicles
Increased torque version:
For heavier cars and light utility vehicles

www.addidrive.com

They also enable driver assistance features to be optimized.
Hydraulic technology is an ideal addition to electric vehicles, as it extends battery life by covering all driving situations which require more torque.

What advantages does Addidrive give the user?

Addidrive combines the comfort of a small 4x2 sedan with the mobility performance of an all-wheel drive, at a reasonable price and with a minimal impact on fuel consumption (additional consumption of 4g/km of CO_2 in 4x2 mode, compared with 7 to 10 grams for mechanical AWDs).This is an exciting prospect for drivers with low budgets who regularly face difficult driving conditions. It is also an affordable option for drivers who wish to keep a standard vehicle, while having the option of being able to overcome difficult situations when required (snowy passes, muddy roads, etc.)

What feedback have drivers given?

The tests conducted by our independent automotive experts on our Peugeot 208-based prototype have been very positive. The grades that we have been given show that we are very close to our goal of achieving mechanical AWD performance, for half the cost.

What is the sales outlook for Addidrive?

It is very promising. Addidrive offers a great opportunity in the BRIC countries, particularly in Brazil, where 50% of vehicle sales are entry level models and where the AWD range is still in its infancy.
The outlook in more developed markets is also positive, as a more affordable option can be offered.
A potential opening could be the European LCV sector (Light Commercial Vehicles), where Addidrive can increase mobility while allowing heavy load capacity, as the system does not take up any room under the carriage.

When can we expect the first mass-produced vehicles fitted with Addidrive?

After a two-year study phase, we have now begun the development phase with the first manufacturer, and plan to start production at the end of 2018. Addidrive components will be produced in a Poclain dedicated automotive factory in India, which is currently under construction.♦

SIMEX

BAUMA TRADE FAIR IN MUNICH CELEBRATES A DOUBLE ANNIVERSARY

During the last BAUMA trade fair event held in Munich in April 2016, the Poclain Group, represented by Laurent Bataille, (Chairman and Chief Executive Officer), and Guillaume Bataille, (Chief Operating Officer) celebrated the 25-year anniversary of SIMEX, as well as 25 years of partnership and loyalty between the two companies.
Mr. Mirco Risi, owner of SIMEX, was keen to bring together all of the company's main customers, distributors and suppliers at the booth, numbering several hundred people.
The Italian company SIMEX is now the world leader in the production of self-levelling planers, wheel saws and cutter heads.

Mr Risi thanked its partners for supporting his company throughout its 25 years of expansion. Poclain Hydraulics and Promatec, Poclain Hydraulics Italian distributor (represented by Sales Director Mr Filippo Marelli) were both recognised for their roles in this great manufacturing success story.

A plaque engraved with the names of both companies was formally presented by Mr. Risi to Laurent Bataille to commemorate this long and productive partnership. Mr. Bataille took the opportunity to reaffirm Poclain Hydraulics' commitment to responding as effectively as possible to the future needs of SIMEX, and to continue to be a partner with an increasingly innovative offering.

This remarkable celebration ended with Mr Risi inviting his guests to attend an opera performance by the talented singers of the Modena Pavarotti Music Academy.♦

2-wheel drive «All Road» vehicles

+ Limited-slip differential
+ Specific under body protection
+ Increased ground clearance
+ «All Road» tires

MTC SYSTEM

POCLAIN Véhicules

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POCLAIN VEHICULES ON THE RIGHT TRACK

Build, design, manufacture. Poclain Véhicules' skill range answers the needs of the automotive industry for many types of conversion. It can contribute to a project at any stage: research, design, product launch, mass production, mounting and assembly.
Poclain Véhicules offers a solution for 'Enhanced Mobility', an innovative alternative to four-wheel-drive vehicles based on standard two-wheel-drive (utility vehicle or passenger car) vehicles.

Today the MTC SYSTEM (Mechanical Traction Control) represents a significant share of Poclain Véhicules' activity, with over 1500 vehicle conversions per year.
Since 2000, over 35 000 vehicles have been equipped with 'Enhanced mobility'.
Our references include police vehicles, EDF-GDF (the French Electricity and Gas provider), the Eaux et Forêts (forest maintenance), firefighters and Doctors without Borders.

The SNCF, the French national railway company, has been a partner of Poclain for ten years. Their utility vehicle fleet is equipped with the MTC SYSTEM, which represents 300 units per year produced at the Etupes facility, located in the Bourgogne-Franche-Comté region of eastern France.

Carlos SIMOES (SNCF Maintenance Manager): «Here at SNCF Réseau we have a fleet of 13,000 light commercial vehicles to cover the whole of France. These vehicles are used by our rail maintenance teams, which are responsible for maintenance work on rails, overhead cables, on-call duty and also rail renewal, replacement projects and railroad equipment.
The French rail network is an immense network built up over time, and is in constant evolution. We perform regular development and modernization work in order to keep our passengers moving, and to transport and secure goods. SNCF Réseau operates 30,000 km of railway lines across the French territory.

Maintenance, infrastructure monitoring, coordination, supply and worksite operations are carried out 24/7. Given the challenges and the size of the network that we have to maintain, the quality of the vehicles that we use on a daily basis is key to our strategy. Our vehicles have to be both reliable and perfectly suited to their environment.

We use utility vehicles equipped by Poclain Véhicules on our sites. They are designed to overcome often difficult challenges, where a standard all-wheel drive vehicle is not necessarily required.
Poclain Véhicules has offered us an alternative by fitting some of our vehicles with the MTC SYSTEM, enabling them to travel alongside our railways, often on paths or rough terrain roads, and in all weather conditions (rain, mud and snow)».

What have the converted vehicles brought to your role as Buyer/Fleet Manager?

At SNCF Réseau, this option for our leased vehicles has formed part of our vehicle policy for a number of years.

Ordering a vehicle equipped with the MTC SYSTEM couldn't be simpler: We simply tick this option in our TC Auto tool when we place the order. The cost is added to the rental costs.

Converted vehicles provide all of the features that we need to meet the everyday requirements of the tasks undertaken by our teams.

The under body protection and the higher ground clearance provide better protection of all of the exposed parts on the lower part of the vehicle (crankcase, under body and exhaust).

The limited-slip differential and specific tyres (mud & snow) provide additional mobility for difficult terrain, making obstacles easier to cross.

We believe that MTC SYSTEM is an excellent alternative for vehicles used primarily on the road, but which may sometimes need to be driven off-road. The system does not affect fuel consumption, while providing good performance in more challenging driving conditions.♦

"MADE IN POCLAIN"

STANDARDISING THE PRODUCTION FACILITIES WITH PROJECT MANAGEMENT

85% of Poclain products are sold outside of France. This achievement stems in part from the production facilities that the group has set up in three continents that have benefited from reinforced project management since July of 2015. **Harry Callebaut, the Group's Industrial Project Manager**, explains the changes.

Can you define what constitutes a project at Poclain?

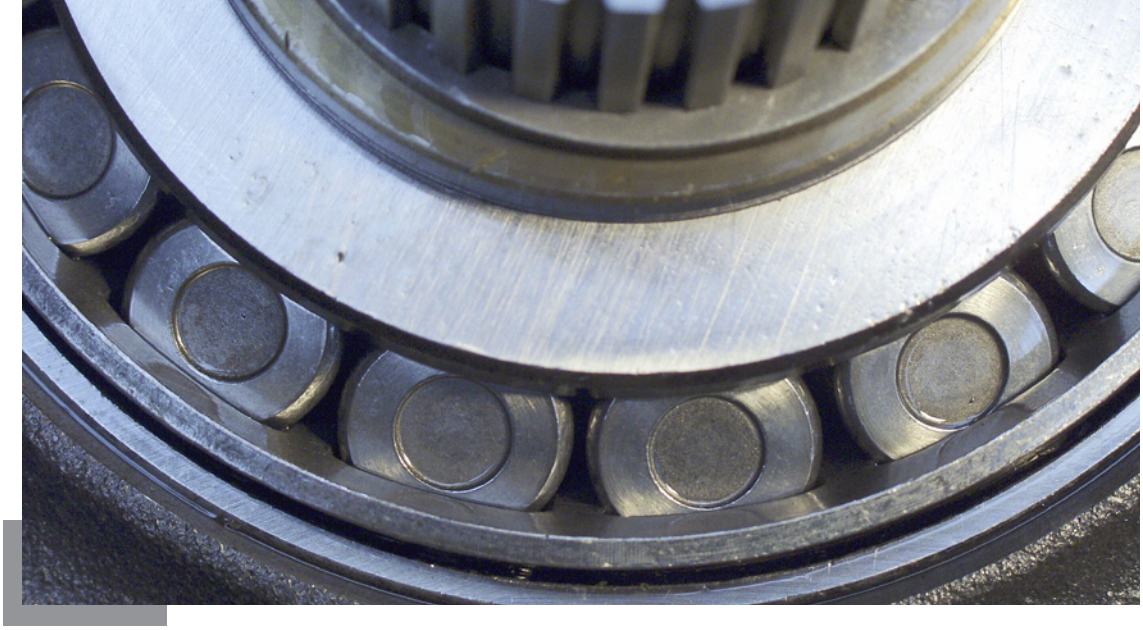
When we launched the new organization, we identified three project types: production transfers between production facilities, introducing new materials or processes, and acquiring new machinery.

What role do you play as group project manager?

I ensure that the project Process is respected, especially concerning the milestones. For instance, prior to the purchase of a new machine, I will verify that its specifications are clearly defined, that they cover the expected scope and levels, and that the machine actually fulfils the specifications. I also ensure that the information required for the project to run smoothly is accessible to the project stakeholders. I check that timelines and budgets are under control. I do not, however, delve into the product details.

What does the group aim for with a project-based organization?

The manufacturing plants were relatively independent before the projects were in place. We are now harmonising our fleet of machines and manufacturing approach. We validate the processes, which are carried out according to the rule book, and we ensure group-level standardization. To give you an example, as of the end of 2017, the same MS18 motor will be manufactured identically in three plants, thus covering all of Poclain's markets. The



customer can expect identical performance and quality levels, no matter where the motor comes from, and they know that delivery is secured, as one plant can take over from another. Other projects aim at increasing our control over the process, for instance, by integrating stages that used to be outsourced. Lastly, automation projects enable us to control costs while guaranteeing consistent quality.

Which projects stood out in 2015?

In order to be closer to the Asian market, we inaugurated the Shanghai plant in 2012. Today it manufactures valves, pumps and motors. In the Pondichery, India plant we installed a second assembly line to build size 18 motors, as well as a painting line.

As far as process projects are concerned, we ran several in the Yorkville plant in the USA. We reengineered manufacturing with a leaner workflow, by optimising three machining cells and the warehouse. We also invested in two milling centers to improve the quality of the cylinder blocks, increased our heat treatment capacity and improved the induction treatment process.

There is a lot of talk about the Smart Factory. How do you integrate these innovations into your projects?

We set up pilot Smart Factory projects to validate the processes before deploying on a larger scale. The Gaggio, Italy, plant, which manufactures high volumes of a same sub-assembly, is state-of-the-art. Its automated machining units enable it to run autonomously for a whole weekend. Picture carts transporting trays, each containing a hundred parts. Robots manipulate the trays and machine the parts. That level of automation requires modifying their design so that they can be handled using hydraulic clamping, instead of being held manually. Automation needs to be smart to work autonomously for 48 hours. The robots must measure the parts to verify their compliance and check the wear of the operating tool. If the latter is worn, its duplicate in the warehouse will automatically take its place. The Smart Factory bears promising perspectives for Poclain's products and processes. Applying the new technologies to our custom-made offering, one of our major competitive advantages, is an exciting challenge.♦

GRANDRY TECHNOLOGIES

CELEBRATES 1st ANNIVERSARY SINCE JOINING POCLAIN

In July 2015, POCLAIN announced the acquisition of the GRANDRY TECHNOLOGIES company, founded in 1848, based in France (Sablé-sur-Sarthe) and specialising in manufacturing complex, molded, spheroidal graphite, cast iron parts.
This upstream integration is the fruit of a strategic move aimed at increasing the added value for the customers and markets that both companies serve.
The cast iron industry is highly competitive and undergoing in-depth changes; its players face several challenges:

- Customers are going global.
- Competition is also global, in particular for medium to high volume series for basic parts.
- Most geographical zones have overcapacity
- Ageing resources and dwindling expertise.
- Consolidation of the cast iron foundries, mostly because of financial difficulties.

July 2016:
An intensive investment plan was launched that spans several years:
Several changes have been implemented to the building to improve working conditions and reinforce the safety of the 135 employees. In addition, investments have been made in the machinery. In the finishing department, a new CNC grinding and automated sand blasting unit has been added to improve the quality of the hydraulic parts, which require a high degree of cleanliness in their internal channels.
A CNC grinding machine to process parts weighing more than 20 kgs has also been commissioned. These two investments contribute to reinforcing quality and consistency on operations that used to be carried out manually. They also improve working conditions. In the core shooting department, a new dedicated system to dry waterbased coatings has been installed. The ramp up and commissioning will take place during the second semester of 2016. This new equipment was needed to shift from alcohol based to waterbased technology.

This investment will enable GRANDRY TECHNOLOGIES to improve its environmental footprint by eliminating the primary cause of volatile organic compounds on the site and to access to the latest core coating technologies.

Lastly a new sand mixer integrating the latest technological innovations has been ordered and will be operational at the end of 2016.

Other investments deal with the modernization of the measuring tools in the Quality department, currently, with the set-up of a 3D measuring machine and next year the installation of a 3D scanning measuring system.

Also a new supply chain team has been created to consolidate planning and workflow management.
In order to reach excellence and reinforce the company's quality-driven culture, the GRANDRY teams have been trained to deploy the seven quality basics as well as the QRQC (Quick Response Quality Control).

Lastly, to respond to the existing customers' needs and the enquiries made by American manufacturers who cannot find on their home market foundries capable or interested in manufacturing small or medium amounts of complex parts, GRANDRY has opened a sales office in the United States. The Sales Manager for this geographical zone will be based at our Yorkville, Wisconsin plant.♦

LOGISTICS AT POCLAIN

Poclain customers already have confidence in the quality of our products. Therefore, the main challenge is to provide on-time worldwide delivery and tracking service. This straightforward requirement conceals a complex and ever-changing structure which is heavily reliant on new technologies. We ask **Pascal Bartek, Supply Chain Engineering & Organization Director,** to explain further.

Which means of transportation are used for Poclain products?

We primarily use road and sea transportation. We also have an air delivery option for urgent orders. The choice of road or sea is usually based on the itinerary. Deliveries within Europe primarily use road transport, while Japan relies on maritime transport.
In 2015 we delivered to 57 different countries, a challenge supported by our freight partners. All destinations are local to us, and this year the countries we have delivered to include Moldova and Kyrgyzstan!

Describe your Logistics Team at Poclain.

Logistics has a strategic role at Poclain, which is one reason why I belong to the upper management executive committee as supply chain engineering & organization director. I lead a team of logistics managers, with one for each production site. The logistics managers oversee different teams, which include :

- The customer logistic agents who liaise between customers and production sites.
- Procurement who liaise with suppliers.
- Planning who generate supplier orders, fixed-term production orders and manage sub-contracting where required.
- The warehouse manager who manages warehousing and stock.
- The shipping manager.
- There are four logistics engineers, each deployed on a production site, who work to enhance Poclain's logistics expertise. Their role is to optimize flows for the mid and long-term.

The logistics workforce totals 230, which reflects the challenges and complexity of our role.

Why is Poclain's logistics so complex?

Firstly, it is due to the bespoke service that we provide. To give you an example, under the hydraulic motors category we delivered over 3800 different part numbers in 2015. 50% of these items only represent 2% of the total volumes shipped each year, with quantities of five or less per reference. The same applies to sub-assemblies, with 40% of motors'valving covers having orders for less than 20 units per year. I often compare this to the automotive sector, where I used to work, where manufacturers deliver thousands of units under only three references. We optimize our management of this extensive product range by calculating requirements on a daily basis, and using an information system deployed at the group level. It provides real time information to our head office in Verberie (France) on what the Chinese plant, for instance, is producing. We can therefore offer a bespoke delivery of our products within timeframes which suit our customers.

An extensive range with worldwide coverage...

We have deployed our industrial infrastructure to use our logistics platforms as hubs that enable us to reach our customers

in the five continents. Our Shanghai factory enables us to be extremely proactive throughout the Asia-Pacific region (China, Japan, Korea, ASEAN, Australia and New Zealand), both in terms of distributing new products and after-sales service. With the assistance of local distributors and Certified Repair Centers, our finely meshed network guarantees a quick turnaround for customers, and our transport routes are reliable regardless of where our clients are based within the region.

The same is true in the Americas, where our Yorkville factory (Wisconsin) produces and ships out components within North America, Canada and Latin America. Our Pondicherry site in India has also gained momentum, and is now able to provide logistical support to a wide geographical area.

How have customer expectations changed in terms of logistics?

There is a big difference between small manufacturers and "key" or "global" accounts. Small manufacturers have small visibility of their needs, and often order at the last minute, which means that we need to be proactive when supplying parts. Key accounts plan more and are more demanding regarding the process, given the volumes. We have set up an Electronic Data Interchange (EDI) with suppliers and with some of our customers, which makes order processing easier. From the customers' viewpoint, he or she can place orders directly through our ERP system, rather than communicate with our CLA by e-mail or on the phone. Then, as soon as a Poclain product is shipped, we send him or her an advanced shipping notice and an electronic invoice, which feeds directly into their ERP system. When the products are delivered, the operator simply scans the barcode on the delivery note, which validates the information already sent electronically. Manual entry tasks are reduced both for Poclain and for the customer, therefore providing financial savings as well as improving reliability. Customers in the automotive sector also request standardized labels and packaging, which saves time when they receive our products.

In Europe, attention has now turned to the Smart Factory (sensors, automation, big data, Internet of Things, cloud computing and more). This new generation of plants aims to continue to modernize production and to increase competitiveness in the face of the challenges posed by globalization. Logistics performance therefore clearly has a key role to play in creating economic opportunities for the company, and in creating potential areas for increased productivity by being able to share information quickly with all providers and customers.♦

BULMOR AIRGROUND TECHNOLOGIES
CUSTOM-MADE HYDRAULIC SYSTEM FOR RESTRICTED MOBILITY PASSENGERS

Quick and comfortable from the ground to the aircraft door: this is how passengers are conveyed by the SideBull Ambulift by BULMOR AIRGROUND TECHNOLOGIES. The ground traffic services at many airports around the world have relied on this unique transport system since 2008 for the transport of passengers with restricted mobility, which was also designed for the A380 upper deck variant. The SideBull cabin extends continuously from zero to over eight metres in the XXL version.

The SideBull has now been completely reworked and its operation significantly improved. Reducing the amount of hydraulic hosing from the carrier vehicle to the cabin was one of the many challenges during the revision.

Our distributor HAINZL INDUSTRIE SYSTEME GmbH, headquartered in Linz, Austria, worked with Poclain Hydraulics to design a brake-by-wire system to meet the customer requirement. All hydraulic lines for the brake circuit are built into the carrier vehicle.
An electric Poclain brake pedal is located in the cabin and transmits brake commands to a Poclain brake block in the carrier vehicle. The possibility of actuating the brakes as well as adjusting the brake pressure from the cabin via the vehicle electronics are key advantages of this new concept. In addition to the service brakes, negatively controlled parking brakes are built into the Poclain ground drive wheel hub motors.

The close collaboration and innovation of all three companies involved made a highly efficient and extremely flexible concept possible.♦

NEW CORPORATE BUILDING

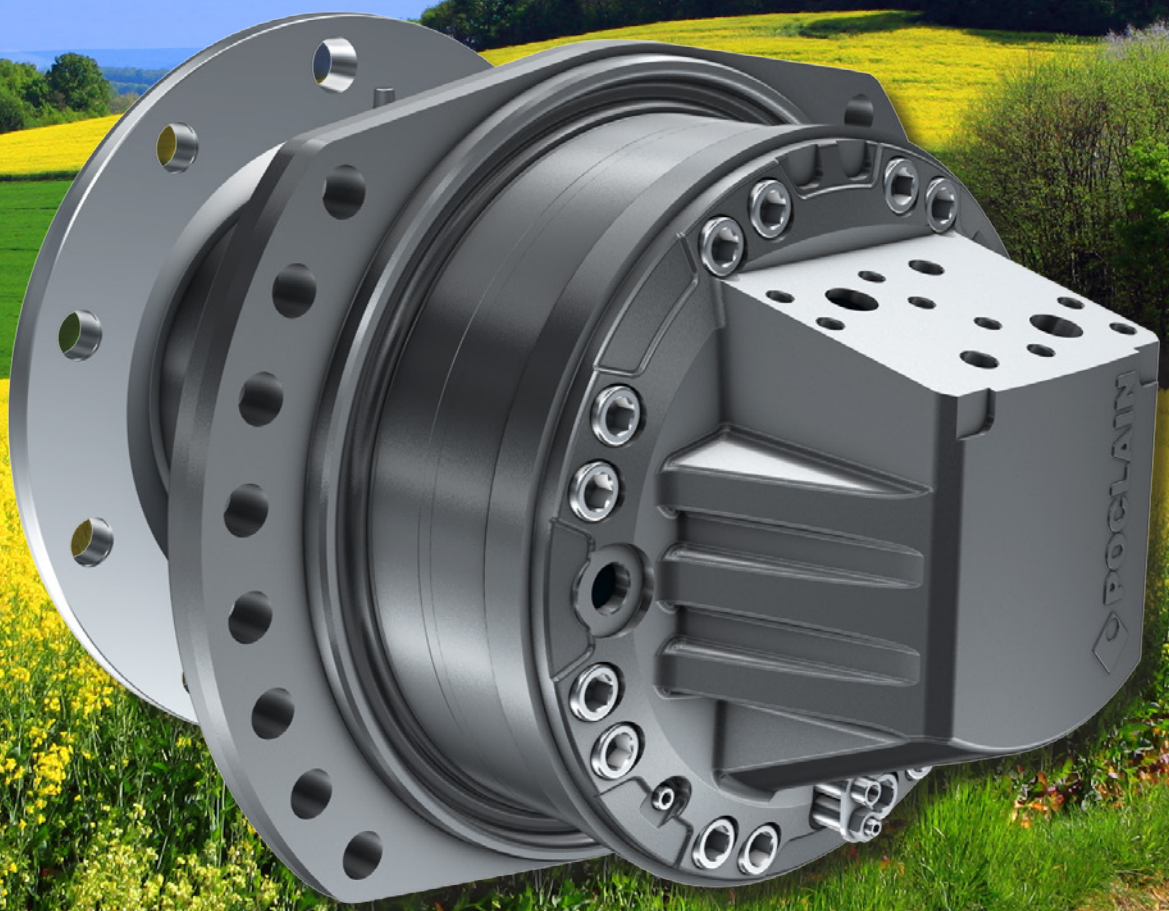
Poclain's head office in Verberie (Oise, France) has just been expanded, with the addition of a new corporate office building. After a year of construction work, approximately 200 employees moved into the new office space in April 2016.

The building, whose design spurs concentration and efficiency, houses all the support activities that are required to coordinate the international activities, the ultimate objective being to guide the group towards growing harmoniously and consistently across all the markets in the world. The building is also tangible proof that the group has been growing for several years, doubling its staff numbers in 15 years.

Additional investments are planned in the manufacturing plants to address the ever -increasing production volumes, the variety of subassemblies and product sophistication. ♦

MHP 20/27

THE HIGH PERFORMANCE MOTOR



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