

Drive & Control profile

Rexroth Hydraulics:

Giving the A380 Airbus a Piggy-back



Whether in the hangar or at take-off position: The TPX 500 S towbarless aircraft tractor shoulders the mightiest aircraft in the world, the A380 Airbus.

The A380 Airbus marks a new chapter in civil aviation. The largest commercial aircraft in the world, with space for 555 passengers on-board, is also setting new records on the ground. The French company TL Europe undertook the challenge to develop the TPX 500 S towbarless aircraft tractor for this new dimension of aircraft, while staying true to their company philosophy: Innovative, simple, reliable.

TLD, a world-wide leading specialist in technical solutions for ground

handling operations, has introduced the TPX 500 S, a towbarless aircraft tractor which considerably simplifies the coupling of the plane to the towing tractor, greatly improving safety and efficiency at the same time. The vehicle with a U-shaped tail drives backwards towards the nose landing gear of the enormous Airbus, then encloses the front landing gear. Hatches lock onto the front landing gear framework. The push blade then drives forwards and fixes the wheels to the hatches. This is

Challenge

Develop hydraulics power system for innovative new towbarless aircraft towing tractor

Bosch Rexroth Solution

- A4VG axial piston double pumps
- A6VM axial piston variable displacement motors
- DA traction drive control system

Benefits

- Tractor locks onto and lifts front wheel assembly and entire plane to tow it
- Hydraulic power system able to lift weight of world's largest passenger aircraft
- New towbarless system safer, more efficient, less-accident prone than older aircraft towing systems
- Proven pumps and drive motors offer extremely reliable performance
- DA traction drive control system sensitive yet robust and easy to assemble

where the show of power begins: The towing tractor then lifts the nose landing gear—and as such, the aircraft—to transport it. Even though the Airbus engineers were able to limit the weight of this giant aircraft, designed to carry up to 555 passengers, to 600 tons when fully loaded, by using new types of materials, its weight still lies 50 per cent above that of current long-haul aircraft.

Faster and more secure

The fully automated latching and release of the towbarless technology significantly increases safety and efficiency. Unlike when using towing bars, only one operator is required for the TPX 500 S, who as the driver has a direct line of vision to the aircraft landing gear. The time-consuming handling process, which was prone to accidents and used heavy towbars and coupling devices is now completely redundant, along with the video

camera which had previously been necessary for the driver when this technology was employed. With the ‘shouldering’ technique, TLD has simplified and sped up the whole process considerably. Additionally, the locking mechanism of the TPX 500 S, which is without play, protects the nose landing gear and can take over all transport tasks.

The towing tractor then pushes the giant Airbus backwards into the take-off position (the so-called pushback) or pulls the aircraft to areas of the airport that are further away. This innovative solution guarantees considerably smoother acceleration and braking maneuvers, which protects the landing gear the landing gear as well as the passengers.

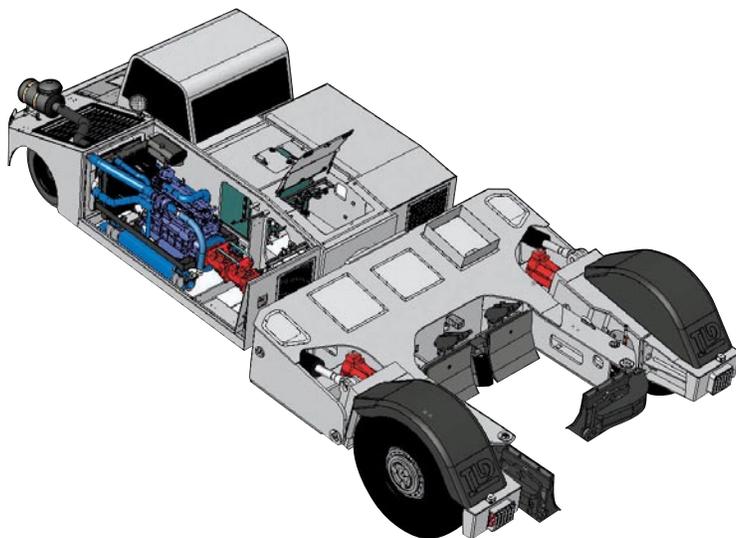
These requirements place the highest of demands on the automation system. In order to make the towbarless aircraft tractor powerful enough for the

A380, TLD worked in close co-operation with Rexroth on the development and design of the hydraulic power unit.

The hydraulic system reliably supplies the required power for the 600-ton giant by means of two A4VG axial piston double pumps and two A6VM axial piston variable displacement motors with a power rating of 583 kW. The traction drive control design is based on the hydro-mechanic DA traction drive control system which is sensitive but extremely robust and easy to assemble. “The advantages of Rexroth components lay in the fact that the products were already available in series production. This means we are guaranteed established and reliable equipment with international and uncomplicated customer service,” explains Hervé Criquillion, CEO of TLD Europe, highlighting the advantages of using standard components.

Double the service life

Even with this project, TLD and Rexroth set their sights on as simple a solution as possible by reducing the number of lifting cylinders. In this way the TPX 500 S fulfils the constantly increasing demands of end users with regard to improved reliability and longer service life. The volume of air traffic is growing rapidly the world over and the airport service industry is also in the grip of this change. “Our equipment is now used for 3,500 hours instead of 1,500 hours per year,” reports Hervé Criquillion, speaking from experience. “At the same time,



Simply powerful: The U-shaped tail of the towing tractor encloses the aircraft's nose wheel. The powerful hydraulics locks the aircraft's front wheels, then simply lifts the new Airbus, weighing up to 600 tons.



Both A4VG pumps incorporating the proven DA control system supply the power for the TPX 500 S.

the product life expectancy has doubled from ten to twenty years.“

World-wide service guaranteed

During development, TLD made use of Rexroth’s branch competence in mobile applications. “We are not hydraulics specialists,” the CEO of TLD Europe admits openly. “In that respect we rely on our partner company who can offer world-wide technical knowhow and service to our 250 customers in 100 countries.”

In collaboration with the French Rexroth specialists, TLD mastered the development in under twelve months from project start to delivery. TLD builds around 150 towing tractors per year, all of which are equipped with Rexroth components and systems. In the future, the TPX 500 aircraft tractor will also be supplied for other versions of the A380, for example for the “Ultimate Freighter”, planned for 2008.

Rexroth
Bosch Group