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Auxiliary uphill steering

ELECTRO-HYDRAULIC STEERING SYSTEMS FROM MOBIL ELEKTRONIK ARE PROVIDING THE TRACTION REQUIRED FOR AGRICULTURAL VEHICLES WORKING IN MOUNTAINOUS LOCATIONS

Small, but steep, slopes; obstacles such as trees and rocks; narrow roads through villages and towns – these are the conditions tractors face daily in mountainous regions.

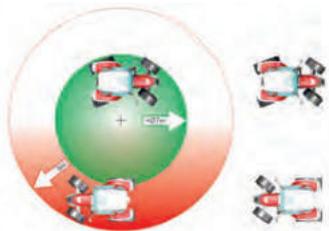
Tractor company Lindner specializes in exactly this. For 70 years the medium-sized family business from Kundl, Austria has developed tractors for mountain and meadowland farming, as well as the municipal sector. In the past few years its expenditure on research and development has increased from 2% to 4%.

One of a kind standard tractor

One of the recent models is the Lintrac 90, the first standard tractor with continuously variable transmission and steered rear axle.

“We expected that half of all Lintracs sold would be equipped with a steered rear axle. In practice we deliver 90% of all vehicles with this feature,” says David Lindner, marketing and export manager of Traktorenwerk Lindner. The rear axle can be steered up to 20°, giving this already compact vehicle excellent maneuverability.

The introduction of the first standard tractor with a steered rear axle is a prime example of product development by the ‘leading user’ approach. The aim of the method is to involve leading users in the development process, to produce ideas and concepts for new products. In this way, Lindner analyzed the requirements of customers as a first step. For small farms, it is important that multiple vehicle types are combined into one, namely a standard tractor, a hillside mower and a farm loader. Ahead of series production, selected users of Lindner’s key markets tested the vehicle thoroughly. The results



ABOVE: Maneuverability is at a high level thanks to the rear axle steering capabilities



contributed to further development. To prevent slipping at the rear of the tractor, the rear axle can be steered manually in the same direction as the front axle, via the on-board display of the auxiliary steering system. Using this diagonal drive, the vehicle can be stabilized on a slope.

Also a family business, Mobil Elektronik has more than 50,000 of its auxiliary steering systems in operation worldwide and is a key Lindner supplier.

With its EHLA (electronic hydraulic steering) systems, not just one axle can be steered, but as many as the vehicle needs. For instance, up to six axles can be steered individually on mobile cranes. Multiple computers can communicate with each other and give support in the event of an error.

An EHLA Plus system was used for the Lintrac, which has its hydraulic unit, steering cylinder and angle transducer forming a closed control loop.

The set point of the axle to be steered is calculated based on variables such as the geometry of the tractor, the steering angle of the front axle and so on. If there are any errors they are automatically adjusted. The steering angle of the front axle is recorded by an angle transducer and the vehicle speed is read redundantly by a CANbus or magnetic encoder. For the hydraulic supply, a motor-powered fixed displacement pump is used.

“It was important for us to get an individual system customized for us,” says Lindner. Accordingly, Mobil Elektronik has integrated Lindner’s own

hydraulic components into the system for the rear axle steering.

EHLA Plus meets the requirements of ECE-R79 Annex 6, so it can be approved for use on public roads – an important prerequisite for the Lintrac.

The rear axle steering is only active in field operation, which means it is hydraulically centered and locked by block valves when driving on roads. In the event of a safety-relevant system error during field operation, the axle is hydraulically locked in position by the EHLA Plus.

In field mode, several useful steering programs can be activated. One of these is the snow chain mode, which has been created specially for Lindner and limits the steering angle of the rear axle electronically to avoid collision with the snow-chain covered tires and other parts of the tractor. Another helpful feature is the mowing-mode that only activates rear steering if the front axle is steered at more than 20°. Other standard EHLA Plus steering programs include all-wheel-steering and soil protection.

“Once you have tried the rear axle steering, you will always want it,” says Lindner.

Due to the strong demand there are plans to extend the Lintrac product portfolio. This is good news for Mobil Elektronik, as agricultural machines are one of the company’s core markets. **ivt**

Wolfgang Stadie is head of sales and marketing at ME Mobil Elektronik GmbH



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