

Complete and intelligent systems

The future of mobile hydraulics can be seen today. Modern mobile hydraulics of today and tomorrow consists of complete system solutions with integrated electronics, which make off-highway machinery more efficient and, at the same time, reduce life-cycle costs.

One of the unique requirements of mobile components is that they stand up to harsh conditions. Long-term temperature resistance of -40 to +85°C (-40 to +185°F) and shock resistance of up to 25 g—combined with enhanced electromagnetic compatibility—are required for onboard components to perform reliably.

The **Bosch Rexroth** RC control device family is one example of components specifically developed for use in mobile machinery. For complex applications, several control systems can be interconnected. The control devices communicate by means of CAN bus, which was developed by Bosch and now enjoys worldwide acceptance. The combination of digital closed-loop control electronics and tried-and-tested hydraulics has led to quantum leaps in efficiency and flexibility.

Another trend is the migration of essential control functions from hardware to software, and the development of complete software packages for swift implementation of advanced closed-loop control concepts. Manufacturers of mobile machinery are able to load many special functions into the control devices even without programming knowledge, thus enabling them to develop and market even small-scale series quickly and economically. Rexroth recently introduced an initial suite of software packages that will continue to make sophisticated control affordable in an increasing number of applications.

Exactly how complete system solutions interact, permitting solid progress for the user, is demonstrated by the example of higher travel speeds. Shorter travel times between application areas and higher turnaround increase productivity and reduce life-cycle costs for the

user. Although innovative components are required, it is the intelligent way in which all subassemblies within a system work together that allows for significantly faster machines. Track-laying vehicles, for example, can achieve considerably higher speeds by means of a connectable planetary primary stage in newly developed Rexroth HYDROTRAC hydrostatic travel drives. At the same time, they maintain the benefits of lower operating speeds. Dynamic service brakes can optionally be integrated into the drives of this product family, ensuring safe deceleration even at high speeds.

However, higher operating speeds, especially on uneven ground and with loads, place additional challenges on the dynamics of vehicle movement because the centrifugal mass of the load being conveyed has, up to now, formed a natural speed limit. Rexroth RSM stabilizing modules reduce undesired pitch oscillations to such an extent that mobile machinery can attain safer, higher speeds even off-highway. The movement of the lifting cylinders is cushioned by means of pressure accumulators so that they are no longer rigidly connected to the chassis of the wheel loader. Similar to shock absorbers in automobiles, this solution is easier on both vehicle and driver.

Furthermore, steering units must also be adjusted to cope with these new speeds. Above all, travel drives, service hydraulics, and auxiliary units have to be tuned to one another, and the software of the subsystems must communicate with each other. The engineering required for these adjustments is cost- and labor-intensive, and OEMs cannot and will not bear these costs alone.

Key here is the component supplier's ability to combine different technologies optimally. Also important is partnering with manufacturers.

The future of mobile hydraulics lies in the intelligent cross-linking of subsystems to form a high-quality, complete system, which Rexroth has done in the past and will do in the future. **OHE**



by **Manfred Grundke**,
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*Intelligence in hydraulic controls
increases productivity...*



...and makes equipment easier to use.