

# A turn for the better

CONTROL IS NOTHING WITHOUT SAFETY. BY OFFERING CONTINUOUSLY VARIABLE DISPLACEMENT ACROSS A WIDE SPEED RANGE, WHEEL MOTORS CAN HELP DESIGNERS IMPROVE BOTH ASPECTS WHENEVER THEIR MACHINES ARE AT WORK IN DIFFICULT CONDITIONS

▶ The most technologically advanced self-propelled machines are capable of reaching very high speeds even when they are working in the most arduous conditions. This creates a continuously increasing demand for high-quality products as part of a safe vehicle design layout.

How is SAI, a leading manufacturer of wheel drives, able to get around this and make safe transmissions? Several factors must be taken into consideration – including lowering the centre of gravity (CoG) to prevent overturning. The wide range of products that SAI offers the market enables its customers to select the best solution for powering the vehicle – and its wheel drive units enable its CoG to be lower, resulting in more stability, even when operating on very steep slopes. As well as reducing the risk of overturning, overall vehicle performance is thereby improved too.

Furthermore, as a result of the use of SAI wheel motors in place of a mechanical axle transmission, the redefinition of the vehicle layout and its dimensions provides more flexibility in terms of cabin design and engine position, increasing comfort and safety. One application example is that of orchard tractors: these compact vehicles benefit from a lower cabin, enabling access and operation under low-hanging trees.

## Better traction

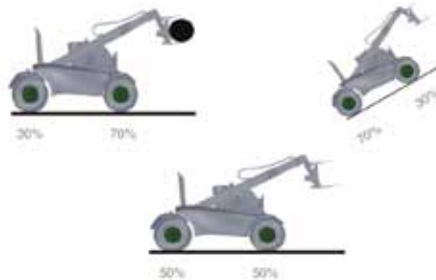
Traction distribution and the enabling of anti-spinning features is another benefit. Controlling the traction means simply transmitting the available torque to the ground in the most efficient way possible.

When vehicles do not operate safely as a result of wheel spin, the introduction of alternative circuitry, such as the inclusion of flow dividers or by connecting motors in series, is not the most efficient solution – nor does it give the fastest reaction times. The best solution is to balance each individual wheel torque output to the torque transmissible to the ground. SAI's variable-displacement technology means a motor can vary its displacement continuously under full power, to reach every single wheel torque limit, even down to 0cc/rev, to prevent the wheel spinning.

Safety is another major factor affecting traction distribution. The company's variable-displacement wheel drive units enable fine independent output torque distribution from every individual motor. By using a continuously variable wheel motor, the



ABOVE: Compact five-piston variable-displacement wheel drive unit with integrated gearbox and brake. Supplied with a complete electronic control package, the sturdy unit also features heavy-duty bearings and high-speed capacity



ABOVE: An example of distribution traction

machine makes the most efficient use of the power available for the specific soil conditions.

When manoeuvring on extremely steep areas, the operator must be protected to ensure safety; in such cases, by using variable-displacement motors, it is possible to increase the displacement on the more heavily loaded wheels, thereby guaranteeing safe traction, even on slopes and when heavily laden. Therefore it is possible to use the same power or the same flow setting on the vehicle, but to split it more to the front axle or more to the rear axle, as best required by the working conditions. All of the above result in much more efficient performance and a safer operating machine.

## Assisted braking torque

Every continuously variable displacement motor produced by SAI boasts extremely high mechanical efficiency and supplies high levels of braking torque from the moment the vehicle starts to decelerate, thereby guaranteeing rapid and controlled stopping. What is more, the operator can continuously – and with full control – reduce or increase the displacement as required, thereby boosting the braking torque on any individual wheel, depending on specific needs.

SAI motors used for auxiliary traction are able to work at high speeds by modulating the displacement. They can therefore be used for driving torque at low and medium speeds, and they can be set to 0cc/rev when being towed.

The motor can continuously vary its displacement while running, conveying variable power to the auxiliary wheels. The SAI speed capability makes it possible to work at the maximum speed limits allowable by law. **ivT**

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