

TEST DRIVE

# Rough and TERRAIN

The Merlo DBM 3500 EV self loading concrete mixer takes concrete to places it has never been. *Dominic Uys* put it through its paces.

**C**onstruction projects in or near major infrastructure may present many challenges, but logistics is usually not one of these. Transporting equipment and materials to a job site is, in most cases, rather straightforward. Working with concrete on site has also been significantly simplified in the form of ready-mix. That being said, what about jobs in areas that are slightly more remote – the locations where one's handiwork can only be appreciated by the occasional 4x4 enthusiast. The average truck mixer does not handle rough terrain particularly well. And, if you think that you are going to get concrete delivered from the nearest town 400 km away, think again.

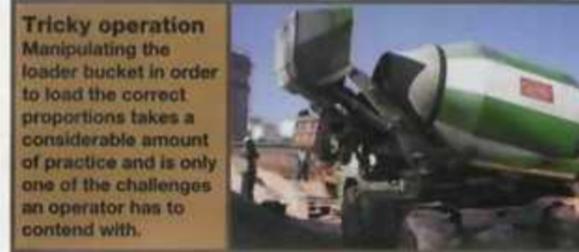
Self-propelled concrete mixing systems offer a state-of-the-art solution to the problem. In recent years, self-loading rough terrain concrete mixers have gradually started making their appearance on more and more building and civils projects in the country.

Fiori, Carmix and D'Avino have all identified significant potential in the South African market. A favourite of civils company, Franki, Fiori has recently found an agent in the country. Carmix will also start selling its 2.5 model this year through Carmix SA.

SA French on the other hand, is the agent for Merlo's range of rough terrain mixers. SA French CEO, Quentin van Breda, tells *Plant* why his company sells Merlo. "Merlo keeps the design and fabrication of all the components of its machines in-house, as opposed to other companies that reverse engineer existing designs and make use of parts suppliers. This means that while Merlo develops its technology at a slightly slower pace and at higher expense, the company is able to offer the best kind of support. They can tell exactly what might be going wrong with the machine and why it has certain limitations, because Merlo knows each component intimately," Van Breda imparts.



Photographs by Dominic Uys

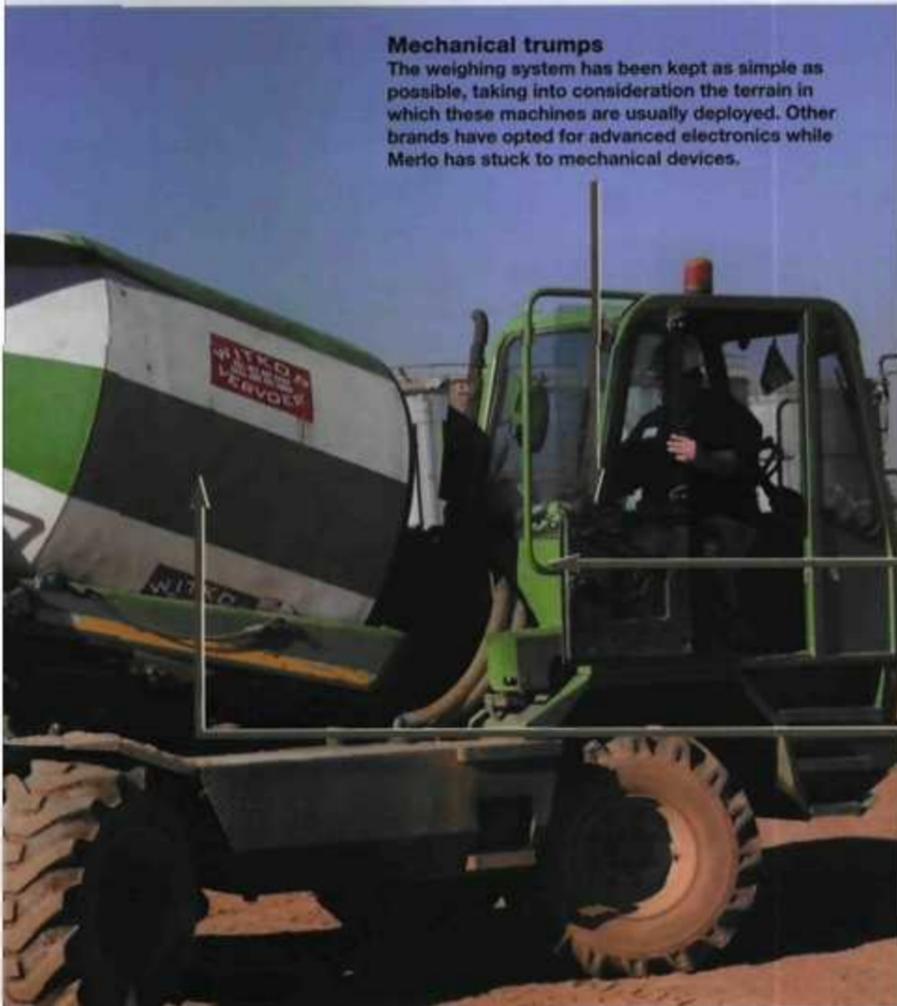


**Tricky operation**  
Manipulating the loader bucket in order to load the correct proportions takes a considerable amount of practice and is only one of the challenges an operator has to contend with.

# inhospitable CONFRONTED

## Mechanical trumps

The weighing system has been kept as simple as possible, taking into consideration the terrain in which these machines are usually deployed. Other brands have opted for advanced electronics while Merlo has stuck to mechanical devices.



## At the heart

The four-cylinder Perkins turbo diesel engine and permanent four wheel drive gives the DBM 3500 sufficient power to handle rough terrain. It produces 64 kW at 2 400 rpm.



## To the drum

Water is stored in a 960 l tank on the underside of the machine which can be delivered to either the drum or washing lance through a 250 l/minute water pump.



## On a tickey

The operator can turn around in tight spots utilising all wheel steer or manoeuvre sideways using crab steer.

## Efficient contractors



### Aggregates, cement and water

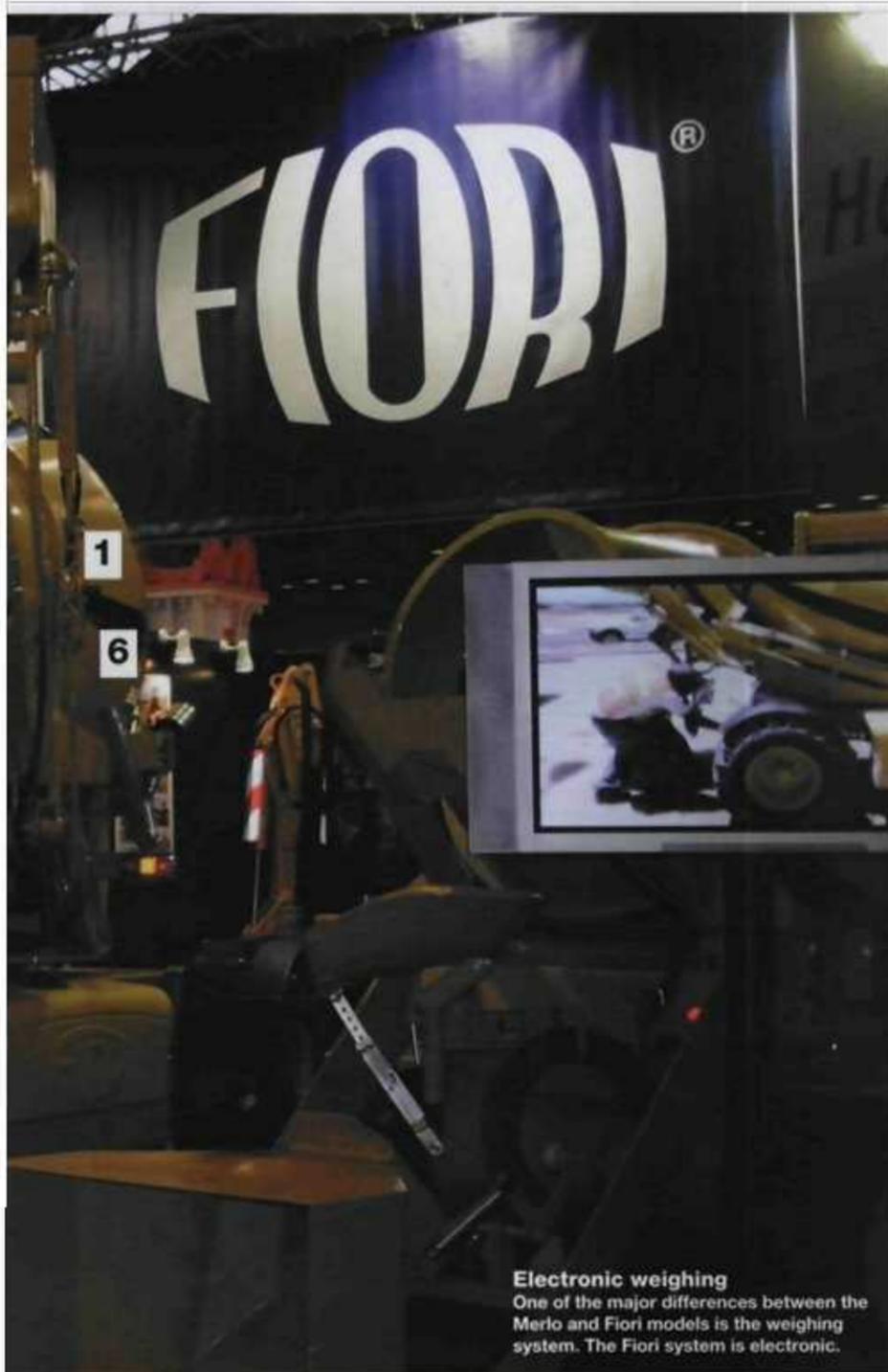
The Merlo DBM 3500 is designed to load the aggregates, cement and water for the required grade of concrete without any help from outside.

Water is stored in a 960 l tank on the underside of the machine and is delivered to either the drum or washing lance

through a 250 l/minute water pump. The aggregates and cement are loaded with the loading shovel at the back of the mixer and their quantities are monitored by a hydraulic weighing system. The drum can rotate by 180° in either direction, increasing the machine's ability to pour in hard-to-reach and congested locations.

The feature that makes this machine

such a need-to-have on difficult sites is its hydrostatic four wheel power steering which allows the DBM to manoeuvre into almost any spot or position. The operator can turn around in tight spots utilising all wheel steer or manoeuvre sideways using crab steer. The four-cylinder Perkins turbo diesel engine and permanent four wheel drive gives the DBM 3500 sufficient



**Electronic weighing**

One of the major differences between the Merlo and Fiori models is the weighing system. The Fiori system is electronic.

power to handle rough terrain. It produces 84 kW at 2 400 rpm.

The weighing system on these machines is a matter of debate within the sector. Fiori, for example, is a big proponent of an electronic weighing system. Pan Mixers South Africa director, Walter Ebeling, tells *Plant* that the electronic system is extremely useful in that it provides the

operator with highly accurate measurements which can be recorded and printed out for quality control purposes. He believes that Fiori is a leader in this regard; it recently launched a system that not only weighs the proportions of aggregates but also measures the slump of the concrete.

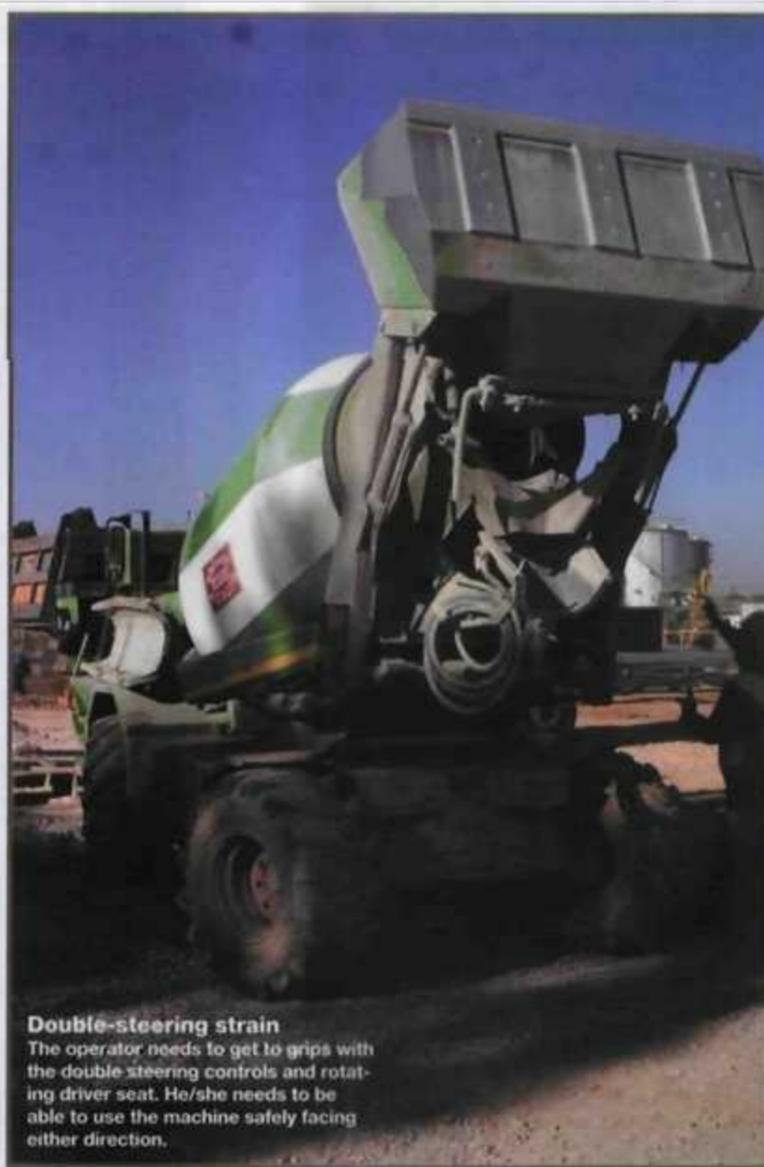
On the other side of the argument, Van Breda is of the opinion that the electronic

- 1. A concrete factory**  
The mixing system ensures correct production of concrete via the special shape of the drum, the correct loading system and the right rotation speed.
- 2. Double reverse**  
The Fiori units feature a patented double-reverse system, which combines driving reversibility with 360° loading. This also allows complete mix control directly from the cabin.
- 3. Easy drive**  
The "easy drive" system allows excellent driveability and stability at a speed of more than 30 km/hour due to the advanced oscillation system, larger tyres, 87,99 kW turbo engine, high-pressure hydrostatic transmission with dynamic automotive, electro-hydraulic gearbox and negative parking brake.
- 4. Operator is king**  
The cab has been designed ergonomically with easy-to-operate controls and rapid inversion guide turret.
- 5. Fast-loading system**  
The "fast loading" system has a compensated kinematic loading mechanism driven by five hydraulic cylinders servo-controlled by a joystick with an integrated forward movement. More than 16 m<sup>3</sup>/hour of concrete can be produced.
- 6. Mix control**  
The MixControl F6000 allows for water intake into the drum. The mixing and unloading functions are always available to the ground operator.

system is more of a burden than it is worth. "Admittedly, it is more accurate than the hydraulic system, but in rough terrain the electronic system is prone to cause problems. The rough conditions and constant knocks and bumps wreak havoc on sensitive equipment. An owner will probably need to spend about half of his time recalibrating his equipment," he comments.



Photographs by: Damien Oys



**Double-steering strain**  
The operator needs to get to grips with the double steering controls and rotating driver seat. He/she needs to be able to use the machine safely facing either direction.

### Training an operator

Van Breda comments that a self loading mixer is somewhat trickier to operate than the average mixer truck. "SA French offers training for the operators. It can take up to 10 weeks to get a driver up to speed though," he says.

According to Van Breda, the complexity of the machine makes its efficient operation no less difficult than piloting a small aircraft. The correct mixing of aggregates, cement and water is the first challenge for the operator. Manipulating the loader bucket to be able to load the correct proportions takes a considerable amount of practice, according to him.

The operator also needs to get to grips with the double steering controls and rotating driver seat, and needs to be able to use the machine safely facing either direction. Opinions on the amount of time needed for

training, however, vary. Ebeling tells *Plant* that Pan Mixers trains operators and it takes about two weeks to get a driver up to speed on the mechanics.

Either way, both companies seem to agree that it is not beyond the abilities of most operators to learn the ins and outs of the self loading mixer if they are given proper instruction.

### Some tender loving care

Rough terrain mixers are by all accounts quite resilient. A Merlo owner operating in South Africa tells *Plant* that none of his machines have needed any major repairs since he acquired them a number of years ago. Lead times on components are anything between two weeks to a month.

When working with concrete, however, Van Breda comments that the life of the equipment depends largely on the owner.

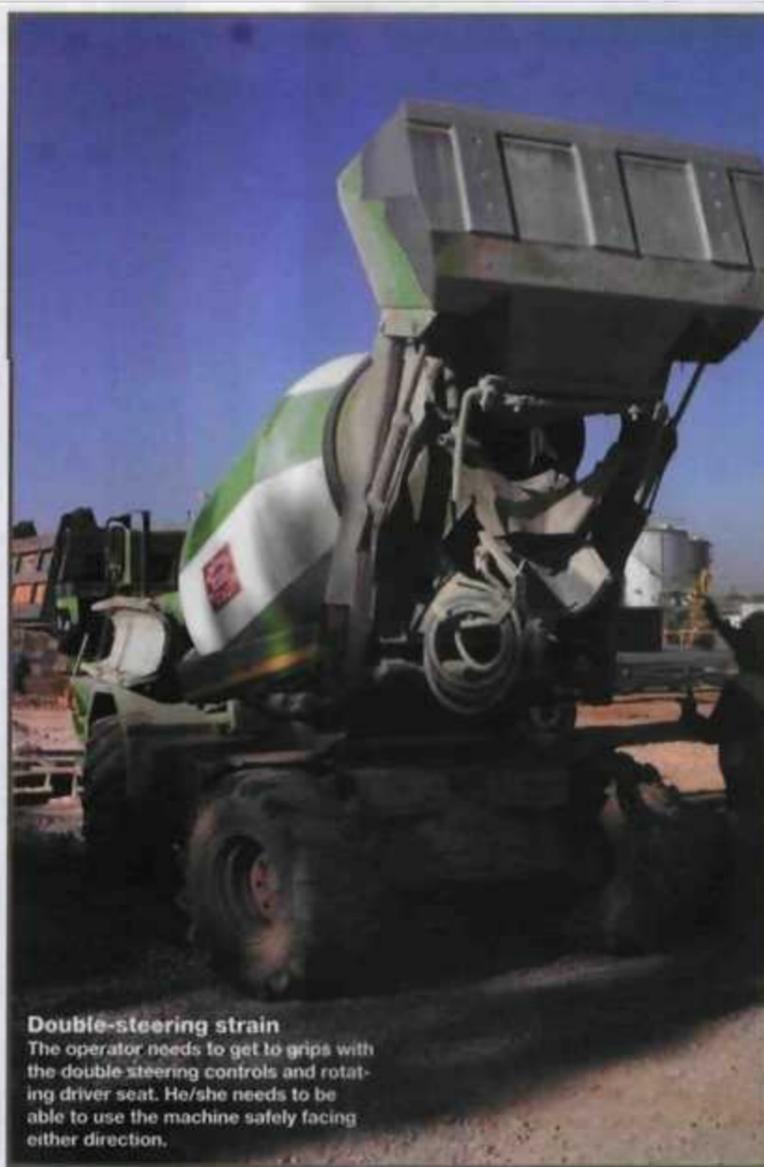
"Keeping the machine clean is paramount," he says.

Common knowledge, one would think, but Van Breda says that many operations neglect the daily maintenance of equipment handling concrete. One case that he mentions, involves a client who complained that his machine was not mixing concrete. "They would load the concrete mix and rotate the drum but the result would always be a mess. We found that the drum had hardened concrete inside that had completely covered up the mixing blades. The owner was basically trying to mix concrete inside a smooth barrel," he says.

Anyone who has ever tried will tell you that getting hardened concrete out of a mixer drum is just not worth the sweat and tears. The same goes for pumps and outlets, according to Van Breda.



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**More novel applications**  
Sanyati uses the units for an array of interesting applications, including railway rehabilitation work.

**Niche applications**

Self loading mixers have seen quite a few interesting applications over the years. Van Breda mentions a prominent civils company that used a number of these machines to erect fences along the Kuwaiti border.

“These machines have also been used in supplying concrete for cell phone towers on hilltops and mountains because of the ease at which they access these locations,” Van Breda adds.

YN Construction is also putting a Merlo DBM 3500 EV to good use. Though far

from what one might call a remote location, the upgrade of one of BP’s fuel storage depots in Witbank involves the kind of tight manoeuvring and flexibility that the machine can offer. “We would really be lost without the Merlo on site. This machine has to deal with a few steep



SA French

<b>Model: Merlo DBM 3500</b>	
<b>Dimensions:</b>	
Length	5 560 mm
Width	2 335 mm
Height	3 160 mm
Weight	7 300 kg
<b>Performances:</b>	
Concrete output capacity	3 500 t
Drum volume capacity	5 000 t
Loading shovel capacity	700 t
Water tank capacity	960 t
Water pump delivery	250 t/minute
Maximum drum delivery speed	18 rpm
<b>Maximum discharge height:</b>	
At drum outlet	2 285 mm
With drum outlet	2 100 mm
<b>Speed</b>	
Low range	11 km/hour
High range	40 km/hour

*Plant's comment:*  
**Demand for these machines is currently on the rise and, as is often the case, Merlo and its contemporaries in the country will probably start seeing some more competition soon.**

ramps and tight spots in between pipes and storage tanks. There is just no way of getting a regular mixer truck into the places that we need it on this site. If we find out that we need half a cube of concrete here or there, we can just mix some concrete up and pour," says Ross Norton, site manager for YN Construction.

So, have the likes of Merlo and Fiori made the ready-mix suppliers obsolete? Firstly, keep in mind that the DBM 3500, the largest in the Merlo range, only has a concrete output capacity of 3,5 m<sup>3</sup>. While there are brands that supply larger models, the larger machines tend to have difficulty turning in rough conditions, according to Van Breda.

At a top speed of 40 km/hour, the DBM 3500 is also anything but a long haul truck. "It is a specialised piece of equipment for specific applications," Van Breda maintains. ■