A TONIC FOR DUMPER DRIVERS

Nick Drew reports on what is probably the safest forward-tipping site dumper currently in the UK

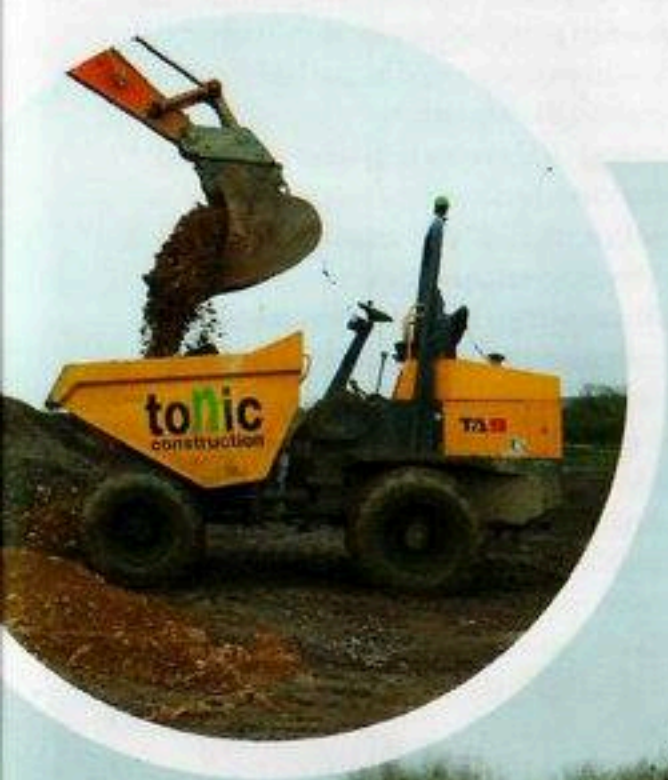
The configuration of forward-tipping site dumpers has remained unchanged for decades. While there have been many improvements in driveline systems over the years, with the exception of providing a roll bar, the working environment for the operator has stayed the same. Perched high up out in the open and exposed to the weather and all the potential dangers that exist on a busy jobsite, such machines are usually allocated to the least experienced operator.

In the wrong hands, if it is not treated with the respect that any machine deserves, the forward-tipping site dumper can be a dangerous piece of kit. Not only for the operator, but also for groundworkers. Tragically, last year there were six deaths in the UK associated with site dumpers, and three of those fatalities resulted from the operators being crushed by the overturned machine. In addition, there were and, unfortunately continue to be numerous serious injuries involving site dumpers.

FUTURE STANDARDS

Appalled by these tragic events, a group of industry professionals have been working behind the scenes to come up with a safer solution to both the design of forward-tipping dumpers and their use on site. This group includes large contractors, plant hire companies, manufacturers and the Health and Safety Executive.

It does not take a rocket scientist to work out one item on their list of things to discuss: cabbed site dumpers. This is an option that most manufacturers offer, but is rarely ordered by UK customers. →



Below and left: To improve site safety and productivity site rules and site dumpers have to change to allow the operator to stay in the cab during loading.

"FREQUENTLY CLIMBING UP AND DOWN MUDDY STEPS SIGNIFICANTLY INCREASES THE RISK OF A FALL FROM HEIGHT"

The additional cab guarding is to withstand the impact of an excavator's bucket during loading.

➔ In traditional cabless site dumpers there is a risk of the operator being hit by the bucket of the loading excavator. The official procedure on UK sites is therefore for the operator of the site dumper to apply the handbrake, switch off the machine, remove the key, dismount and move away from the danger area before the dumper is loaded. Then reverse the procedure before hauling the material to the tip area.

In my opinion this procedure is an over-reaction to one risk that puts the dumper operator in greater danger from a series of other risks. Frequently climbing up and down muddy steps significantly increases the risk of a fall from height. As an aside, this procedure also prevents the less able-bodied being assigned this task. No matter how bright their PPE is, an operator on the ground is not always visible to an excavator operator, or to the driver of another site dumper entering the loading area.

In addition to this vulnerability, an operator on the ground has an increased risk of a trip accident. Frequently getting on and off a dumper throughout a shift also brings other dangers, the biggest of which is to discourage the use of seat belts.

To put the scale of this risk in the house building sector alone, if all operators are strictly following the demount procedures, this could equate to tens of thousands of opportunities for a fall or trip every day in the UK.

I have long thought that the solution to this problem should be that all large site dumpers in this day and age should be fitted with a full safety cab, where the operator can remain during all phases of the loading cycle. The demolition industry is rapidly moving to this safe form of working, with the use of quick-hitches that automatically disconnect and connect the oil supply to the attachment. One benefit of this is that it keeps the operator in the cab without the need to venture into a danger zone a couple of times to change from a hammer to a grab.

Looking at the bigger picture, there is widespread concern that the current rules regarding visibility from the operator's seat of a wide range of construction equipment is not fit for purpose. This is a particular concern on fully loaded large site dumpers.

"THE SKIP ITSELF HAS BEEN REDESIGNED TO GIVE IT A LOWER FRONT LIP AND MORE SLOPING SIDES"

TONIC CONSTRUCTION

One of the main driving forces behind the desire to have safer site dumpers is the Wiltshire-based groundworks contractor Tonic Construction, which suffered a fatality on one of its sites involving a forward-tipping dumper. As a result, MD Tony Iles is determined to do something to make these machines safer and to bring this venerable piece of construction plant into the 21st century. Where many would try and hush such matters up, Tony's initiative should be congratulated.

Working closely with manufacturer Wacker Neuson and Simon Tomblin of Rocket Rentals Plant Hire, Tonic Construction commissioned a prototype safe site dumper, which they have designated as the BMT (Bulk Material Transporter).

The starting point is the fully road compliant nine-tonne class, hydrostatically-driven DW90 model, powered by a 55kW Stage 3B Perkins engine. These Austrian-built dumpers have been available with fully heated/air-conditioned cabs as an option for some time. However, this was only used as a base for the development of the BMT, which benefits from a host of additional safety features.

One aspect of this dumper that appealed to Tonic was its hydrostatic transmission. If there is no pressure on the accelerator pedal the machine remains stationary with no freewheeling effect. There will also be the ability to implement a computerised speed restriction on the dumpers, which can only be a good thing. I know from my years of experience on sites that sometimes testosterone levels get the better of some lads and they start racing around.

WALK-AROUND

We caught up with Tonic's BMT on a busy housing development site in Devizes, Wiltshire. From a distance, apart from the cab structure, the highly visible access steps are among the noticeable elements. This follows the best practice being deployed on top-end excavators, particularly in the quarry industry. Saying that, I would have liked to see a little more attention paid to make the handrails more visible, but this is a prototype and one purpose of it working on site is to identify real world issues.

The most extreme part of the additional safety improvements to this dumper is a fully CE-marked cage around the cab. This includes a heavy-duty screen guard, reminiscent of those fitted to forestry and demolition excavators. In addition, there is a spill guard fitted to the rear of the skip, one purpose of which is to protect the cab from any falling material.

However, this guarding system has been principally designed and rigorously tested to protect the cab – and therefore the operator – from any impact from an excavator's bucket. In turn, this allows risk assessments to conclude that the safest place for the operator to be is in the cab during all parts of the loading cycle.

The skip itself has been redesigned to give it a lower front lip and more sloping sides. This reduces the chances of it being overloaded and improves forward visibility. In addition, both front- and rear-facing cameras are fitted, and their output channelled to an 8in full colour screen in the cab. This effectively eliminates any blind spots around the dumper.

It has long been recognised that incorrect tyre pressures are a major contributing factor to accidents involving telehandlers. Best practice is to check these every morning as part of the operator's daily routine. In practice, I cannot recall seeing anyone check the tyre pressures of a site dumper on site.

The BMT is fitted with larger and wider tyres for improved stability, and the wheel nuts are fitted with lorry-style fluorescent indicators to show that they have not loosened off. In addition, tyre pressure sensors are fitted to the valves as a visual indicator of air pressure status.

IN THE CAB

This prototype has been fitted with a KAB 514C high-back excavator-style seat, which incorporates a four-point inertia seat belt system. The construction industry standard is a simple lap belt, which was a worthwhile safety improvement for a 1950s era Land Rover, but can hardly be described as best practice in a modern, large site dumper with similar off-road performance. Again, the quarry industry is moving towards three-point seat belts, and some are looking at four-point restraints.

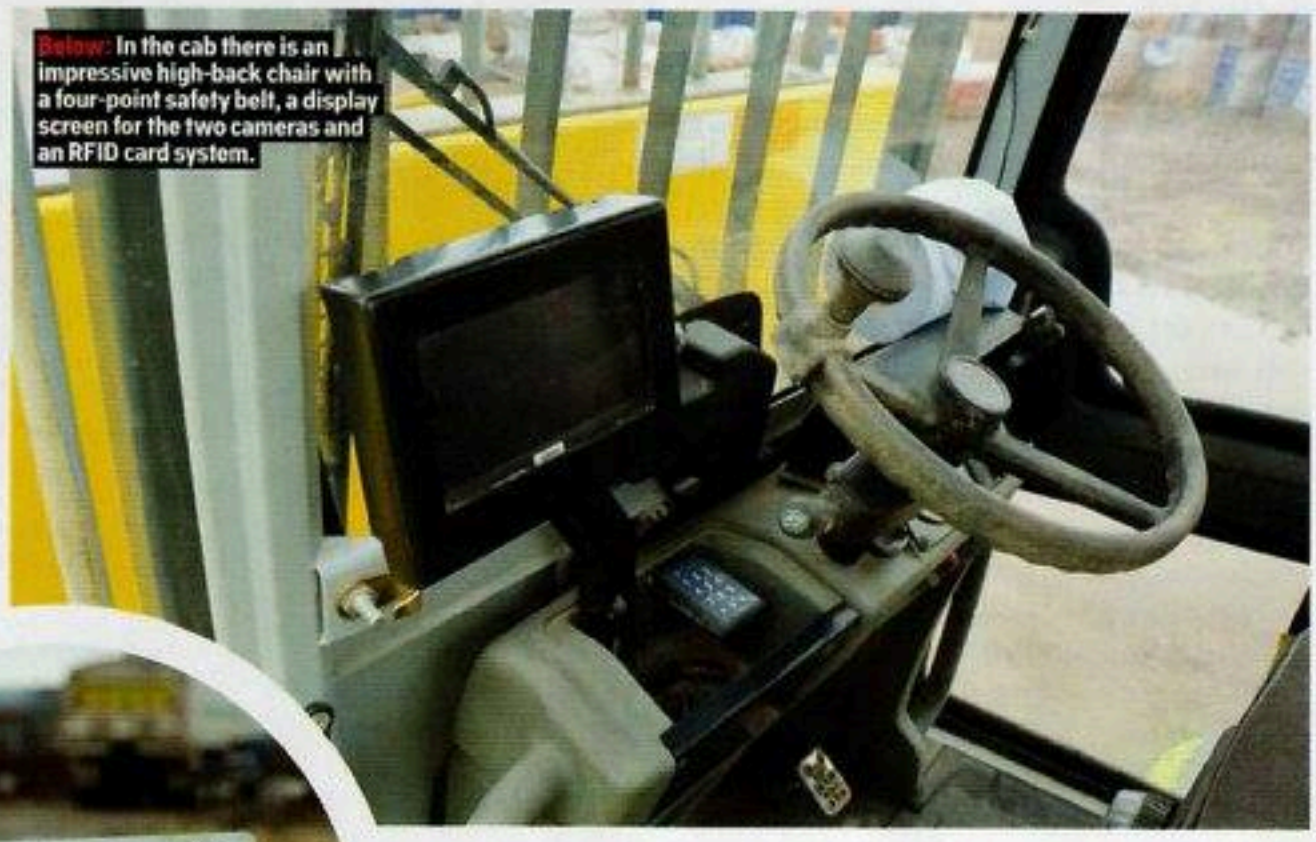
A series of sensors means that the operator must be sat in the seat, have their foot on the brake pedal and the seat belt buckle engaged before this dumper will start. A green roof-mounted beacon confirms that this is in order.

This is a fairly standard option to some modern excavators and the like, but Tonic has taken this to whole new level, as the dumper will only start when the operator's credentials have been confirmed when an electronic →

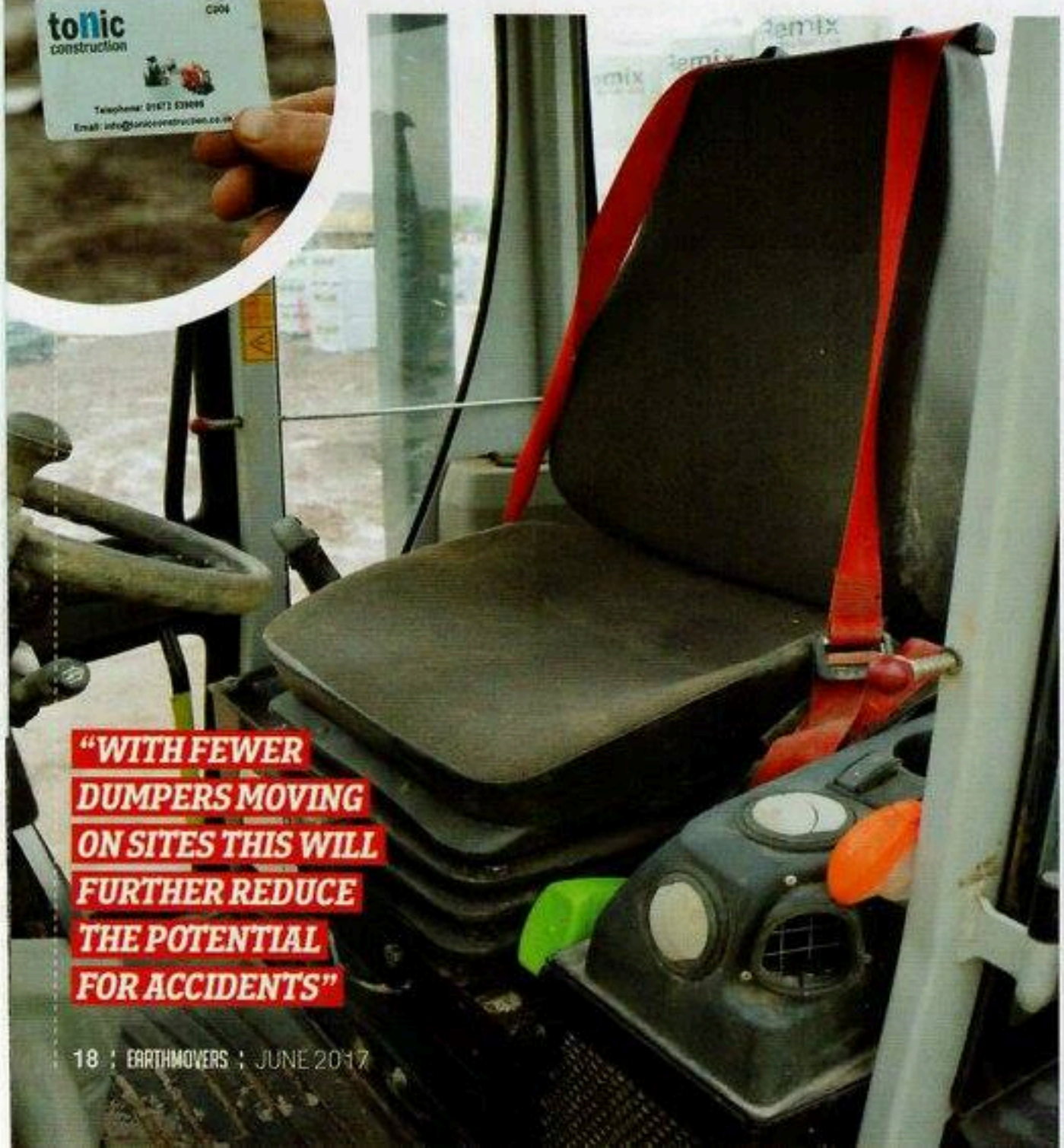
Above, below and below far left: A redesigned skip to provide a lower front lip plus larger tyres than standard all help to improve visibility and stability.

→ RFID (Radio Frequency Identification) card has been swiped over the keypad. Such technology has been pioneered in the wider construction industry by the powered access sector and is beginning to be used by top end civil engineering and earthmoving contractors.

Again, Tonic has taken this to a whole new level, by combining the RFID card technology with an on-board telematics and fleet management system. The cards can be activated and deactivated remotely and an electronic ring fence can be established, so that items of plant can only be operated in designated areas.



Below: In the cab there is an impressive high-back chair with a four-point safety belt, a display screen for the two cameras and an RFID card system.



THE BUSINESS CASE

On a typical nine-tonne site dumper, these modifications will add approximately 20% to the cost of a standard non-cabbed model. Even taking into consideration the difference in capacity between this and the smallest two-axle rear tipping articulated dump truck – providing the requirement is not to work over really bad ground or on long hauls – the BMT is a surprisingly cost-effective alternative.

However, the business case really needs to be worked the other way: can this 20% premium over a non-cabbed nine-tonne dumper be recovered? The answer is yes, and more besides.

Tonic Construction's plan is to adopt the well-proven strategy of allocating a specific dumper to one operator and, equally importantly, manage the hauling operation to dramatically improve the utilisation of each machine. This is in contrast to the industry practice of having many dumpers on site, used by all and sundry, with an individual machine clocking up relatively few hours during the week.

Allan Flippance, Tonic Construction's health and safety manager, said, "We can see two major benefits from using the BMT with a single operator. Firstly, the maintenance and daily checks will be more controlled and likely to happen, offering potential savings on damaged equipment. For example, with traditional multiple users nobody is ever 100% sure if the dumper has had the correct daily checks. But when a single dedicated operator is assigned a piece of plant they do tend to look after it more, as there is no one else to blame for damage.

"Secondly, our dumpers have a monthly average working period of just 20 hours. We envisage that by using the single dedicated operator on the cabbed version we will increase machine utilisation, similar to that of a site forklift feeding several trades and in turn staying busy all day. With fewer dumpers moving on sites this will further reduce the potential for accidents."

Of course, no price can be put on the safety of a colleague, but purely as a business case the use of a cabbed machine, in which the operator stays put during loading, will generate significant productivity improvements over the course of a shift, and certainly enough to cover the additional cost of such a machine. Saving the cost of an additional site dumper on site and a lower long-term service and maintenance burden is the icing on the cake.

The greatest hurdle will be traditional attitudes of site management and, of course, dumper drivers. I for one was very impressed with Tonic Construction's forward thinking approach to site dumpers in the 21st century. For those that are still not convinced, those that really know about safety – as opposed to the tick box brigade – appreciate that improved standards are not a cost on the business, but an opportunity to be more profitable in the long term. EM

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EDITOR'S COMMENT

As a reminder, in this configuration it is illegal to use this dumper on a UK open public highway, due to its flashing green seat belt light.