

## TECHNOLOGY

# Maveric ejectors

**Ejector-bodied articulated dump trucks may not be a recent introduction but have been slow to gain favour among UK and Irish contractors. However, as Eoghan Daly reports, this does not detract from their abilities and one Galway company is highly commendable of the concept.**

First introduced at ConExpo 2002, Caterpillar's 740 ejector-bodied articulated dump trucks (ADT) offer many advantages over their traditional tipping-body counterparts, particularly in the areas of safety and productivity. In recognition of these benefits one Irish company has added two units to its fleet and, following their first year at work, they are highly impressed.

As one of Ireland's most innovative civil engineering companies, Maveric Contractors'

decision to embrace the ejector-body concept is not surprising. This innovative streak has seen the development of one of the most advanced plant fleets in the country, including exploiting the technological abilities of GPS-enabled machines to the fullest extent.

In addition to making full use of modern machine technology, a strong focus has been maintained on safety, for which Maveric has been awarded several notable accolades. Building on this

safety-orientated focus, the characteristics of ejector-bodied dump trucks were thought to have much to offer.

Already operating standard ADTs in the form of 25-tonne Cat 725s, Maveric did not require much convincing about the merits of Cat haulers. But when it came to acquiring larger 40-tonne dump trucks, the ejector-bodied design appealed as it provided a number of worthwhile benefits and the additional cost over a conventional 40-tonner seemed to be easily offset by what they had to offer.

Maveric looked carefully at the whole design and couldn't identify any factors that would limit their application range. If anything, they seemed to be far more versatile than a traditional machine. In a way nothing about the machine is new since it combines the fundamentals of the ADT with ejector blade technology, which has been used in scrapers for over 50 years.

*An ejector body 740 has a slightly greater body capacity of 23.1 cubic metres over the 21.9 cubic metre rating of a standard 40-tonner.*



With considerable evaluation into the ejector concept completed, two 740 units joined the fleet during 2008 and went straight to work on some of Ireland's larger projects. An ideal match for a Cat 345C LME, Maveric's largest excavator, the combination results in impressive output in bulk earthworks applications. The sheer capacity of a 345 excavator matched to two 740 trucks is the

main contributor to high output levels, but the operating characteristics of the ejector-bodied trucks also makes a valuable contribution to the equation.

The ejector-bodied trucks had a faster cycle time than any other equivalent ADT on site, with time gained on the unload part of the cycle. Although the ejector plate pushes out the load in

roughly the same time as it takes for a standard body to raise, once unloaded, the ejector trucks immediately depart the stockpile area.

Once moving, the operator can retract the ejector plate, ready to receive another load, while operators of conventional ADTs were still at the stockpile waiting for the tipping body to come down. It may not be much, in terms of the actual time served per cycle, but multiplied out over an entire working shift and the ejector-bodied ADTs had a clear advantage over their conventional counterparts.

Without a tipping body there are obvious advantages when working under power lines, bridges or other obstructions. But even on routine jobs there are many hazards attached to discharging standard ADTs and, even with the most responsible operators, the potential still exists for an accident, particularly on uneven or soft ground. An ejector-bodied ADT overcomes most of these risks.

Another practical advantage of the ejector body's permanent low centre of gravity is its ability to discharge on a slope, for instance when placing topsoil on motorway embankments.

However, ejector-bodied trucks really come into their own when unloading on the move, spreading the material over the discharge area. This results in a much easier, and therefore cheaper levelling task for the accompanying dozer. When combined with a GPS-equipped dozer to place capping material on a road building contract, the combination results in extremely fast and accurate work.

A spokesman for Maveric said, "In some

applications, it makes more sense to discharge the haul on the fly, which greatly reduces the work load of the dozer working with the 740s. Pushing a load from a 40-tonne ADT in a single pile can be challenging and takes time to level properly without putting too much strain on the machine.

"By spreading the load, this becomes much easier and in cases can result in a dozer in the D6R class being sufficient to cope with a number of 740s on a short haul. When placing material like Clause 804, discharging the haul on the move can achieve a very pleasing result with minimal levelling requirements by the grader or dozer."

Crucial to the whole concept is the design of the body that ensures a clean and unobstructed discharge. The ejector body has a flat floor, without the dovetail at the rear of a standard ADT body. Successful material retention during transit is achieved by a lowering tailgate, which also prevents material from building up beneath the rear of the machine.

The profile of the ejector plate is the same as the body, eliminating carry back, an issue with wet clay materials that can often stick to a conventional body and build up to a considerable deposit over repeated hauls.

The ejector plate itself is a fairly simple design, with the minimum of moving parts. A conventional ADT uses two hydraulic rams to achieve the body tipping action, the ejector plate is pushed into the body by a single, large ram. Unlike the side cylinders on a standard body, the ejector ram is shielded from accidental damage from the loader or side spillage during haulage or body raising. Instead, it is in an



isolated position protected from hazards to which a standard unit is exposed.

Despite its positioning, the ejector's hydraulic cylinder remains fully accessible for inspection or repair when required. This is principally achieved by the skeletal structure of the front of the body, which allows unobstructed access to the discharge mechanism.

The ejector body, being more of a U-shaped profile with a wider floor than a conventional V-shaped tipping body design, provides a lower centre of gravity. This allows for faster laden travel speeds in certain circumstances without adversely affecting safety. Even though the ejector body design allows

**Above: The open front end of the body allows access to the ejector mechanism with its single four-stage double-acting hydraulic cylinder.**

lighter construction in some areas due to the removal of stress from traditional points, the ejector components and upper rails on which it travels result in the overall weight being marginally greater than a standard 740. However, the capacity of the ejector body is quoted at 23.1 cubic metres, marking a noticeable increase over the 21.9 cubic metres of a standard 740.

A new concept for Irish users, the pair of 740 ejectors run by Maveric Contractors has gone a long way to dispel any fears and they have been operating continuously over their first year without incident. The machines have also struck a cord with their operators, both of whom are experienced on a number of different ADTs.

Working with Maveric Contractors since the addition of the new ejector body 740s, Mike Lawless and Martin Walsh are highly impressed by what the machines have to offer. Even though the ejector body design is the only area that sets them apart from a standard Cat 740, the underlying machines themselves are also singled out for particular merit.

## Impressed

Mike Lawless said, "The 740 is a real driver's truck and is very comfortable to drive with a well thought through layout. Compared to a Volvo, the Cat is noticeably better from the driver's point of view and having driven this 740 from new, I'm very impressed with it."

Similarly, his fellow operator Martin Walsh, who has experience of a number of types of earthmoving plant and cranes, rates the 740 very highly. He said, "Compared to others, the transmission is very nice to handle. The ejector 740s also feel more stable on site when loaded and have the added safety feature of the ejector body."

Martin also praised the power of the Cat 740, which comes in the form of a C15 Acert engine offering an output of 350kW. However, it is the



**Main Picture and Below: As soon as the load has been discharged, the 740 heads back while retracting its ejector plate, reducing cycle times over conventional tipping designs.**





**Main Picture:** The Cat 740 ejector ADT making a controlled descent through a structure site on the M7 motorway project in Ireland.

**Above (4 Pictures):** During its first 3200 hours, this Cat 740 ejector-bodied ADT has proven to be a hit both with the operators and management.

**Below Right:** Mike Lawless and Martin Walsh seem happy enough as the full-time operators of Ireland's first ejector bodied ADTs.

utilisation of this power that contributes most to the 740's abilities. The seven-speed, electronically controlled transmission incorporates Individual Clutch Modulation (ICM) and Controlled Throttle Shifting (CTS) systems. The systems are said to significantly reduce power train stress and clutch wear by controlling engine speed, torque converter lock-up and transmission clutch engagements.

In addition to these elements, the 740 boasts an effective suspension, which in combination with the traction control system makes for excellent operator comfort and off-road performance in the most adverse conditions.

Over the past year the use of ejector-bodied dump trucks by Maveric Contractors has gone a long way to prove the concept to Irish users. However, the pair of 740s is also highly significant as they herald the introduction of another significant milestone among Irish ADT users, as the duo is equipped with a highly sophisticated machine tracking and monitoring system. Already utilising such systems on all their existing machines, Maveric has been able to maximise output with the help of the system and the data is also expected to have many long-term benefits when it comes to the mechanical well-being of the fleet.

Even though Caterpillar offers an in-house system known as Product Link, Maveric Contractors require a more broadly based system and they have

opted for Trimble's Construction Manager. Utilising a combination of elements, this comprehensive package far exceeds the capabilities of a standard tracking and monitoring system.

Providing an extremely comprehensive range of information on a continuous basis, Trimble's system on the 740s records a wide range of performance related data. Among the most useful facts provided is the ability to monitor cycle times, number of loads hauled, distance travelled, travel speed and hours of operation. This data is retrieved by a number of extra sensors fitted to the machine and linked to the central tracking device designated Cross Check Global Locator. Information is relayed from the ADTs via a wireless network.

Having long-term experience with the Trimble system and the software at head office to which it is linked, a spokesman for Maveric said, "The Trimble system makes the job of invoicing and payroll so much easier. On the other side of it, it allows us to monitor the productivity of our machines continuously and identify if approaches to work are achieving the maximum return. With Trimble Construction Manager we can detect unauthorised movement and receive alerts on servicing requirements. At this stage, we could not imagine running a fleet of machines without this vital tool as it more than justifies its use in the everyday running of our operation."

