

# Shifting STAR

It'll be around the middle of this year before Eaton officially launches on the Australian market its ultra-smart UltraShift-Plus automated transmission. In the meantime, real world testing continues to deliver all the right results. In this exclusive follow-up report, **STEVE BROOKS** looks at the transmission's performance in heavy-duty truck and dog work.

I'm normally not given to bold assertions of what will or won't occur in years to come. There are simply too many variables, too many possibilities, and too much risk. But having said that, and with both hands clasped firmly around crystal balls, I'll jump in the deep end and predict that the day is approaching when the vast majority of truck gearboxes will be either automatic or automated.

Quite simply, self-shifters are increasingly emerging as the way of the future and the more I see of modern transmission technology and experience its evolving abilities in real world work environments, the more convinced I become that self-shifters will eventually, and significantly, outnumber their manual counterparts. Just when this may happen is anyone's guess but sometime within the next five to 10 years is, to my mind, a distinct possibility as technology continues to search for and gradually find ways to deliver efficient, practical and smarter alternatives to established practice.

In the lighter classes, for example, market leader Isuzu now offers automated models while several other brands are relying on much improved torque converter automatics to meet operator demand for systems that ease the workload on drivers battling the increasingly congested madness of metropolitan traffic. Meanwhile, higher up the weight scale, evolving automated technology attached to an otherwise typical constant-mesh multi-speed transmission is in some estimations, including this one, continuing to provoke far greater acceptance of self-shifters in everything from mid-range models to the heavyweights of roadtrain work. Why? Simply because it makes the job easier and reduces fatigue in both man and metal.

Sure, given the current domination of manual models, it's a big call to predict the ultimate ascendancy of automated and automatic

transmissions, and many will no doubt disagree with the prediction. There are those who will continue to prefer the simplicity of a manual transmission over its automated counterpart, holding firmly to a personal preference for the ability to swap gears exactly when and where they choose. And there is, of course, also the driver satisfaction factor. Many drivers have a great deal of personal pride in their skill with the stick and I'm neither ignorant nor immune to the same sense of satisfaction. Critically, there's also the considerable cost premium attached to an automatic or automated shifter.

Having said all this though, the fundamental reason for having such belief in the future of automatic and automated boxes is simply that they have become so very, very good, with the modern crop demonstrating abilities way beyond their immediate predecessors. Quite literally, it's chalk and cheese, and perhaps nowhere is the evolutionary march more vividly exposed than in the Eaton camp where the supremely smooth and intuitive UltraShift-Plus 18-speeder is shaping up to make its AutoShift sibling appear rudimentary, even archaic, in comparison.

Apart from a suite of smarter software and enhanced hardware features, not least a highly capable electronically actuated clutch, the obvious difference between UltraShift-Plus and AutoShift is that the new system dispenses with the clutch pedal altogether. Additionally, there's a beefed up inertia (clutch) brake, an integral grade sensor to refine shift points and determine an appropriate start gear in hilly terrain, an anti-rollback hill-start option for trucks equipped with ABS anti-lock brakes, and an 'Auto Neutral' function which automatically engages neutral if the transmission is left in gear when the park brakes are applied.

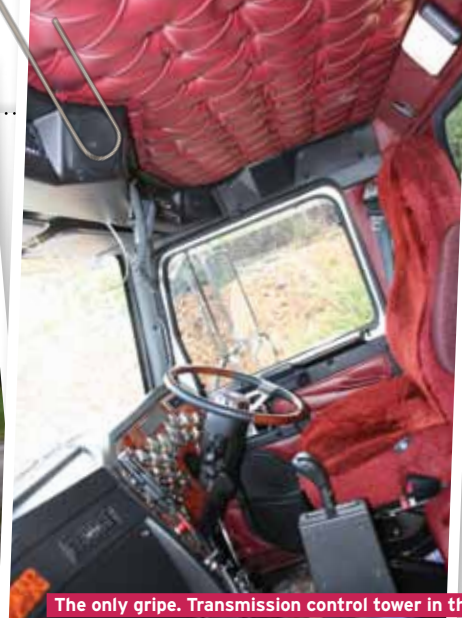
There's even new nomenclature. For example, the 18-speed version featuring in this report is







Whether trundling along greasy back roads or slick highways, the efficiency and finesse of Eaton's automated shifter are totally impressive. It makes the current AutoShift system archaic in comparison.



The only gripe. Transmission control tower in the Burdett Star impedes cross-cab access and is rudimentary compared to other installations. Why not adapt column-mounted SmartShift wand from corporate colleague Freightliner?



Winning grin. Eaton engineering manager Graeme Weston. UltraShift-Plus trial program is delivering quiet confidence and best of all, remarkably few issues. "I don't think I could be much happier with the way things have gone."

labelled an FO-20E3-18-MXP; meaning it's a Fuller Overdrive with 2050 lb ft torque capacity using an Electronic clutch, while 3 signifies the 3rd generation design level and 18, of course, defines the number of forward speeds. Finally, MXP signifies it's a multi-purpose, extreme performance transmission.

Right now Eaton is saying that UltraShift-Plus will be available from the middle of this year and for some time to come will be offered alongside AutoShift. However, Eaton also quietly concedes that despite AutoShift's considerable sales success on the Australian market – driven entirely by the fact that it is the only automated transmission available behind a US engine – the automated box has had its fair share of issues in some installations. Overall though, it's the lack of consistent performance behind the different US engine brands which has been the major bugbear for AutoShift, causing sales to stagnate and in more recent times, even diminish.

Consequently, timing for the introduction of UltraShift-Plus probably couldn't be better and make no mistake, it is a quantum leap forward. Massive in fact, because UltraShift-Plus not only equals the operational smarts and smoothness of Europe's finest self-shifters, but is based on the indisputable acceptance and versatility of the most popular heavy-duty truck transmission in the country, Eaton's quintessential 18-speed Roadranger. Importantly, UltraShift-Plus also retains a standard 15.5 inch twin-plate clutch and the gear ratios of its manual counterpart which, says Eaton engineering manager Graeme Weston, means it loses nothing in gradeability or low-speed manoeuvring. Input torque capacities range from 1450 to 2250 lb ft.

Ultimately, 10 and 11-speed versions for

vocational roles and a 13-speed model for general haulage work will be also available but it will, of course, be the utilitarian 18-speed that dominates.

### TESTING TIMES

In its unhidden intention to ensure a smooth introduction and not repeat the mistakes which ultimately marred much of AutoShift's local existence, Eaton has been testing UltraShift-Plus in a number of applications for the past year or so. In September last year, for example, we filed an exclusive report on the new automated shifter's progress in the linehaul B-double fleet of Collins Adelaide. To recap, company principal John Collins is a convert to automated transmissions and over the past few years has specified AutoShift in all new linehaul trucks. With this in mind, Eaton saw Collins' B-double shuttle runs between Adelaide and Sydney as an ideal test bed for UltraShift-Plus, coupled to a Cummins ISX engine tucked under the snout of a new Kenworth T608.

Gratefully, John Collins was content to let me behind the wheel and with the combination grossing 67 tonnes, it didn't take long to accept Graeme Weston's claim that the two-pedal UltraShift-Plus is a major improvement over the three-pedal AutoShift. "In technical terms, the jump from AutoShift to

UltraShift-Plus is a big one. A really big one," Weston said at the time. It was, however, the opinion of Collins driver Lance Hunt that best typified the extent of the evolution.

"I'm not that impressed with AutoShift," he remarked. "It always seems to have a mind of its own, giving you a gear when you don't want one and using more gears than it really needed to, especially accelerating from traffic lights. And even in easy hills you'd spend more time in manual than auto to get the best out of the engine. To me, that seemed to defeat the purpose (of an automated transmission).

"This thing (UltraShift-Plus) is miles better." Indeed it is!

Yet the Collins Kenworth is certainly not the only test bed for UltraShift-Plus and it was always our intention to follow the Collins exercise with a report on the transmission in a totally different application. The standout target was a Western Star truck and four-axle dog combination operating in the fleet of well-known Victorian landscape and quarry products supplier, P & A Burdett.

According to Graeme Weston – the highly dedicated individual whose commitment and expertise are steering the testing, development and ultimate suitability of UltraShift-Plus under Australian conditions – there are now six trial units working in applications as diverse as B-double container haulage in and around Melbourne, local and regional distribution, B-double linehaul (Collins) and the Burdett truck and dog. Weston admits he's also keen to see the transmission perform in logging and roadtrain roles prior to its official release.

The majority of installations are in Kenworths but along with the Burdett Star there's also a Freightliner Columbia running the UltraShift-Plus box on Victorian local and intrastate operations. It's our belief the Freightliner is punched by a DD13 engine, Detroit Diesel's new 13 litre lump currently

being evaluated in readiness for a launch late this year alongside its 15 litre DD15 sibling. For his part, Graeme Weston simply declined to comment.

Asked if Mack was showing interest in UltraShift-Plus, Weston was again hesitant, saying only that if Mack does decide to introduce the 18-speed version it would probably be offered only behind the Cummins engine option in heavy-duty Super-Liner and Titan chassis. And the reason for that, of course, is that Mack's preferred choice of automated transmission behind its own 13 litre MP8 and upcoming 16 litre MP10 engines will be eventually a suitably 'kennelised' version of Volvo's super-slick I-shift 12-speed box. M-shift, perhaps!

More recently, we've heard that Mack is in fact testing UltraShift-Plus in a Metro-Liner prime mover behind an 8.9 litre Cummins ISL engine, indicating it's either a 13-speed or one of the vocational versions. We also hear the engine runs Euro 5 emissions levels, so like the new Detroit engines, it probably won't be launched until the eve of new emissions standards due in January 2011.

As for the likelihood of UltraShift-Plus ultimately appearing in the International models locally assembled by Iveco, Weston's only comment was, "We've had talks, but that's all." Then again, with rumours abounding that the existing relationship between Iveco and International is under threat from a new consortium of Caterpillar and International interests, it's easy to understand if Eaton's latest shifter isn't quite at the top of the Iveco priority pole. For the moment, that's another story for another day.

Anyway, back on the Burdett truck, it was the first UltraShift-Plus installation to go to work and for an openly satisfied Graeme Weston, the transmission's performance typifies a test program which is delivering quiet confidence and best of all, remarkably few frustrations. "Overall, there have been only minor issues," he asserted. "It has been mostly a case of tweaking the shift calibration programs to suit the different applications rather than any inherent issues with the fundamentals, particularly the electronics. Really, I don't think I could be much happier with the way things have gone."

Vitaly, he insists Eaton engineers in the US are totally committed to the exercise, particularly in tailoring shift programs specifically to Australian applications. And their commitment, Weston suggests, is easily understood given the Australian market's strong uptake of automated transmissions



**Veteran. As far as Burdett driver Charlie Leggett's concerned, UltraShift-Plus is as good as they come. "It's perfect exactly the way it is," he says following amendments to shift calibrations.**

A driver for the best part of 40 years, more than half with Burdetts as both owner-driver and company driver, Charlie Leggett is a taciturn 62 year old whose economy with words is balanced with an inherent ability to get straight to the point. "It's perfect exactly the way it is. Don't touch it." He wasn't kidding.

## BURDETT BUSINESS

P & A Burdett is a mother and son team, Pearl and Andrew, who through sharp management, an equally sharp eye for opportunity, and fortunate foundation at Langwarrin alongside the burgeoning growth corridors of Melbourne's south-eastern rim, have built the business from modest beginnings in 1973. Today it's an operation with two quarries, a bustling retail outlet, 79 staff, 33 trucks, an extensive fleet of earthmoving equipment, and annual turnover notching around \$30 million.

"Yeah, there's never any shortage of things to do," a jovial Andrew Burdett says as we sit in his Ford F-250 waiting for a heavy rain shower to pass over the company's quarry near Leongatha in Victoria's Gippsland district. Charlie already has the truck loaded for the return run to the Langwarrin quarry about 90 minutes away and he appears a tad tentative about a few things; the rain's effect on the steep slope leading out of the quarry and maybe the fact that someone else will be driving his truck for most of the return run. He is by his own admission "a fussy old bugger" and it shows, not least in the sparkling appearance of the truck with its Hercules body and quad-dog.

For the moment though, we wait as Andrew details a diverse fleet of makes and models ranging from lightweight rigid tippers to 19 metre B-doubles, semi-tippers, and truck and dog combinations. Among the heavies of the fleet, International, Iveco, Kenworth, DAF, Volvo and Western Star all have a presence. Charlie's Star is a relatively recent addition powered by a 500 hp Detroit Series 60 EGR engine and starting work in May last year after the UltraShift-Plus box was retrofitted under Eaton's guidance by P & D Diesel in Ballarat. "I can't speak highly enough of the quality of the work P & D does for us," Graeme Weston added.

Anyway, as Andrew Burdett went on to explain, Western Star has been a reliable performer and the decision last year to order another unit through Melbourne's Patterson & Cheney dealership coincided



**Andrew Burdett. "I suppose I was as keen as anyone to see how it (UltraShift-Plus) would perform in our work." And so good has performance been that an identical sister truck has been ordered.**

over recent years. "On a pro rata basis, the acceptance of automated boxes in Australia has probably been greater than in the US," he suggested.

Weston was quick to admit, however, that three different shift calibrations have been tried in the Burdett Star in a bid to fine-tune the transmission's performance in the truck and dog role. "I think we've now got it just right," he quipped, agreeing that a heavy-duty truck and dog combination working largely in metropolitan environments, and spending almost as much time unloaded as loaded, probably has the greatest potential to define deficiencies in shift programs.

"In Burdett's case, the truck's grossing around 50 tonnes (now up to 56 tonnes with recently acquired Performance-based Standards - PBS - accreditation) and apart from backing into tight spots and pulling out of quarries, there's a lot of stopping and starting in traffic, so in many ways the need to get the calibrations right is even more critical than linehaul work," Weston explained. "It took a few goes but the driver seems really happy with the way it is now, and he's the sort of bloke who'd soon let you know if he wasn't."

with Eaton's search for a company willing to be involved in a trial of the new automated transmission. "I could see no reason not to be involved," Andrew conceded. "I suppose I was as keen as anyone to see how it would perform in our work."

However, unlike the Collins Kenworth, the Burdett Star is not fitted with the hill-hold option for trucks equipped with ABS brakes. "We didn't have the complete software for hill-hold when the transmission was installed," Graeme Weston explained.

Automated boxes are certainly not new to the Burdett fleet with DAF and Iveco models running their own self-shifters. But as Andrew commented, "This Western Star is the first time we've run an automated box in an American truck." Why, when AutoShift has been available for almost 10 years? "I couldn't see the sense in paying close to an extra ten grand for an automated box that still had a clutch pedal," he quickly answered. "To me, it always seemed to be at odds with having an automated gearbox at all. But Charlie tells me this thing's (UltraShift-Plus) doing everything right," he states, "so I've just ordered an identical sister truck." And that includes disc brakes on truck and trailer as Burdett aims to configure all new trucks for the higher gross weights attainable through PBS compliance.

It's to be hoped, however, that Burdett's next Western Star will have a better transmission control unit than the basic slab-sided tower standing next to the driver's seat in Charlie's truck. Apart from consuming limited space in an otherwise neatly appointed cab, it is a crude creation compared to the Cobra set-up in the Collins Kenworth and lightyears adrift from the fingertip Smartshift wand mounted on the steering column of Freightliner models fitted with an automated box. Western Star is, after all, part of the same Daimler family as Freightliner so there appears little reason why Smartshift couldn't be part of the same automated package.

Meanwhile, Charlie Leggett has at one time or another steered most brands of truck and before the arrival of the Western Star had spent the previous two years in an Iveco PowerStar punched by a Cursor 13 engine stirring through a EuroTronic 16-speed automated transmission. So how does the new Eaton shifter rate against one of Europe's most accomplished automated boxes? Thoughtful for a few moments, Charlie answered, "I was in the PowerStar from new and the box was good but not as clever as this one, if that makes sense. You'd use it as a manual a lot more than you need to with this one.

"With this thing you just put it in auto and it'll do almost everything you want. Sometimes I'll go to 5th gear to start off when running empty but even then it'll decide if it's the right gear or not. I've really come to trust it, particularly over the last three or four months since the new shift program went in and the way the clutch works, it's as good as using your foot to control it, especially when you're crawling into a tight spot. The only time I go into manual is when the ground's boggy, like climbing out of here."

**"YET AS THE EARLIER COLLINS EXERCISE ALSO SHOWED, THE GREATER 'SMARTS' OF THE ULTRASHIFT-PLUS SOFTWARE PACKAGE PROVIDE A SIGNIFICANTLY MORE LEVEL PLAYING FIELD AMONG ENGINE BRANDS, WITH THE CUMMINS ISX DEMONSTRATING A SIMILARLY HIGH LEVEL OF COMPATIBILITY WITH EATON'S LATEST AND GREATEST SHIFTER."**

Rain on loose dirt gave the steep pinch out of the quarry all the consistency of melted margarine and with diff locks engaged, the shifter locked in 2nd gear, and long experience dictating deft throttle control, Charlie had the 50 tonne outfit on firmer ground at the third attempt and soon pulled over to move into the passenger seat.

"Let me know if I'm doing anything you don't like," I said in a bid to placate any concerns on the other side of the cab.

"Don't worry, I will!" he grinned.

Fortunately, we were both quickly at ease and it became a pleasure to simply steer a truck punched by a responsive engine feeding its lumpy grit through a supremely smooth and highly intuitive automated transmission that, truly, left nothing to be desired. Muscling over hills,

dawdling through towns, accelerating from lights, ambling along open highways; the transmission's ability to quickly pick exactly the right gear at exactly the right moment, combined with a level of refined smoothness that would be humanly impossible to match on each and every shift, were nothing short of remarkable. And perhaps most telling of all, not once was there an instance or an urge to move to manual mode.

Yet as the earlier Collins exercise also showed, the greater 'smarts' of the UltraShift-Plus software package provide a significantly more level playing field among engine brands, with the Cummins ISX demonstrating a similarly high level of compatibility with Eaton's latest and greatest shifter.

Likewise, the willingness of the transmission to make broad skip shifts through low range – far broader than most drivers would probably attempt and far sweeter than most could consistently achieve – was as evident and impressive in the Burdett application as it had been in the Collins trial. A typical progression saw the transmission start in 3rd gear then swap to 6th, then 9th before hauling into 12th gear in high range and generally taking full shifts to top slot. Or on slightly sharper terrain, from 3rd to 5th to 8th, then into high range in 11th gear followed by occasional split shifts on the way to top gear. And all performed with seamless efficiency, making full use of the engine's inherent tenacity, particularly in the lower, high torque end of the rev range.

But herein, said Graeme Weston, is where some salient lessons have been learned. In an obvious bid to make full use of torque output, downshifts under full load in both the Collins and Burdett trucks were originally programmed to occur at 1200 rpm but as Collins driver Lance Hunt had earlier emphasised, "The only thing I'd like to see different is downshifts a bit earlier ... I reckon it'd be better around 1300, particularly in hills and that's really the only time I go to manual." Charlie Leggett agreed, saying that since the revised shift calibration pushed the downshift point up to 1300 rpm, the overall performance of the transmission had become even more impressive.

So, are there any instances where you think a manual box has an edge for truck and dog work? Charlie's answer was immediate and definite. "No, none at all. Some blokes reckon they'd never have an auto box but once you've tried a good one, and I don't think you'd find one better than this, you'd never go back. I wouldn't. Never!" **IID**