



Swept volume

As local authorities and their contractors come to terms with shrinking budgets, what can transport engineers do to help bring costs down? Brian Tinham investigates

Admit it; most of us are swayed by fashionable technologies – sometimes to the exclusion of apparently mundane, but practical, engineering improvements. So it is that, for example, electric bin lifts for RCVs (refuse collection vehicles), from the likes of Ecoprocess and Antares, have stolen some of the limelight in the waste sector, with their promise not only of fuel savings, but also faster operation – the latter meaning more work capacity from the fleet.

For transport managers concerned about shrinking budgets and the prospect of having to do more with less, such advances seem attractive. And fleet engineers may also welcome the replacement of another set of hydraulics with electrical and electronic controls, too. However, they're not the only game in town and, although other money-saving measures may not seem as glamorous, we need all the help we can get right now.

Just one unexceptional example concerns the siting of headlamps and light clusters on RCVs, either as integral to the bumper structure (looks smart) or mounted in the vehicle body (possibly dated). It's a trivial detail to some, but Denis Eagle is among those championing this cause. Why? Quite simply, says the specialist RCV maker, because bumpers get knocked and, if the lights are built in, you're into greater repair costs than if they are not.

Much the same goes for: the choice of bumper materials, their shape and attachment method; the positioning of warning beacons... The list goes on.

Andy Graves, technical sales engineer with Dennis Eagle, even mentions factors such as the chassis construction: "Ours are fabricated from 10mm C section steel, so they're heavier duty than those of some European manufacturers that no longer cater for landfill," he says. And he also cites aspects like Dennis' specification of Allison's integral retarder on the auto box, which minimises brake wear. "So you may pay a little more up-front but, in the long run, you get value for money," he offers.

Staying with the basics, he urges transport engineers to consider the value, for example, of front counter-weights built into short wheelbase RCVs, to offset heavy bin lifts and keep axle loadings legal, while also maximising load carrying. And he points to rugged cab and bin lift controls, for gloved hand operation, and air tanks mounted inside the chassis frames – which mean that council-mandated accessories can be fitted more easily.

But good engineering is not just the preserve of the specialists: arch rival Mercedes-Benz says there is value in the fact that its Eonic low entry RCVs share proven componentry, from the drivetrain up, with the whole Actros, Axor and Atego truck range – and are manufactured down the same production

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Whale Tankers believes demount bodies are an effective method of cutting costs

line. “That means they’re robust and reliable,” comments Sam Whittaker, director of truck sales and marketing. After that, the Econic shares the Allison transmission advantages with Dennis Eagle and others – and then you’re into point scoring, with items such as on-board weighing.

Beyond these, though, both Whittaker and Graves point to the wide range of sweeping, cleaning and collection vehicles available to improve efficiency and flexibility in everything from city centres to rural areas. “For us, it’s not just about the 18 tonne gvw RCVs,” comments Graves. “We also offer smaller satellite vehicles, such as the Rocarfor, which has a 6m³ open back tipping body and bin lift, as well as 9m³ capacity body units that fit on DAF or Renault 12–15 tonne chassis,” he says.

Surprising manoeuvrability

Equally, Whittaker talks of flexibility in its Econic chassis specifications, with 6x4s, 6x2s and 8x4s, mid-steers, rear-steers, etc. These, he says, are aimed at matching almost any requirement – even to the extent of mainstream trucks competing with narrow tracks. “We ran steering trials at the Railway Museum in York last year and people were surprised by just how manoeuvrable our rear-steer Econics are, even at 26 tonnes.” And he adds that people are likely to be just as surprised at the load distribution capability and manoeuvrability of its 32 tonne trade weight front-loaders, with their fourth axle set way back from the third steering axle.

Meanwhile, Graves suggests that uptake of side-loading RCVs is starting to grow again. “We won a contract in Horsham last year, using [German] HN Schoerling equipment on 24m³, 26 tonne gvw trucks. They have Volvo FM chassis, with the compaction module just behind the cab, and a side-

loader arm and demount body behind that. For operators, it means fewer trucks and more containers, which can save considerable capital cost.”

The other point is that the truck allows single-man operation, collecting 800 to 900 bins per container. In operation, the side-loading arm picks up kerbside bins, empties them into the rear tank and the compaction paddle sweeps the contents towards the rear. When it’s full, the truck drops the container behind the chassis and picks up another one. The full container then gets transported away by a hook loader and emptied via a swinging rear door. “It’s low tech, but it’s very effective,” comments Graves.

Talking of demounts, Mark Warmington, managing director of gully emptying and jetting trucks specialist Whale Tankers, advocates demount bodies as one old, but increasingly popular, way of improving vehicle utilisation and so cutting cost. “By specifying demounts, local authorities can turn a chassis cab into a gritter, a gully emptying tanker or a flatbed, with kit on the front, such as grass cutting or snowplough equipment. We’ve seen 30 to 40% growth in demounts in the last 18 months,” he says.

Warmington cites work that Whale has been doing with Econ [gritting vehicles manufacturer], so local authorities can do quick swap-outs of gully emptying tanker bodies for gritters in the winter. He also talks of similar arrangements with Multicar and Unimog, for grass cutting and forestry work, and emergency vehicles, respectively. “We’re building a demount gully cleaner demonstrator, with high jetting capability, alongside Unimog, for one of their 15-tonne 4x4 chassis now,” he says. “It makes sense for local authorities: they get an emergency response fleet that’s flexible and lowest possible cost, not only in terms of capital cost, but MOTs and maintenance.”

Making this approach work is about careful



specification, and keeping costs and complexity down by, for example, not duplicating equipment that can sensibly be installed on the chassis. Warmington suggests that all the hydraulics (pumps, tanks, piping and controls) need to be on the vehicle, with a quick release system bringing all connections to one location. He also points to the fact that, since tanker bodies (and others) are likely to outlast the chassis, they need to be future-proofed, by designing and engineering to standards.

Stirling Council's Environmental Services department is one that has taken this approach, with DAF. Aside from a new Volvo FE240, permanently configured with a suction tank for gully emptying, the authority has two DAF LF 55s, one of which switches between three demountable bodies for tipping, gritting and jet-patching. The chassis are also fitted with snowplough attachment brackets.

"We believe we have the first truck in the UK with a demountable Velocity jet-patcher for filling in potholes. Combined with the other two bodies, we can achieve very high vehicle utilisation and have eliminated the need to purchase another dedicated truck," says John Jeffress, Stirling's fleet coordinator.

The DAF spends most of its day in jet-patching mode, but then, after a 15 to 20 minute changeover, transforms into a gritter, ready for de-icing at night "The Allison transmission is central to making this multi-body approach work, with its PTO allowing us to power the hydraulics for jet-patching and gritting," comments Jeffress. "Hydraulic power is selected for each function via a chassis-mounted remote control diverter valve. This saves us money on additional sandwich PTOs and their maintenance."

Meanwhile, Whale's Warmington concedes that there are bound to be compromises with demounts, but says that the alternative of fixed, but multi-



Econic RCVs shares components with other Mercedes-Benz trucks in a bid to keep costs down and reliability up

functional, tankers is also catching on. "Instead of gully emptying and some jetting, we're seeing vehicles specified with, maybe, storage for road closure equipment, beefed up jetting and vacuum pumps and upgraded control systems. As extremes of weather happen more frequently, this is a very practical and affordable way of getting the right kit."

Whole vehicle type approval

That said, he accepts that such vehicle projects aren't without implications, in terms of Whole Vehicle Type Approval, which will bite by 2012, but says that Whale is working towards 17 type approved tanker functions. For him, easing the pain is a matter of encouraging local authorities and others to select certified packages. "We've invested a lot of time with the likes of the VCA [vehicle certification agency], SMMT and the chassis manufacturers, so that our trucks won't be delayed over compliance issues."

All well and good, but what about alternative fuels, hybrids and other driveline re-engineering that might make a difference to lifetime operating costs and efficiencies? Most pundits point to the limit with dual-fuel engines on RCVs – where stop-start work means that gas substitution just isn't enough to justify the expense of dual-fuel conversion.

However, Graves suggests that gas-diesel should not be dismissed – pointing to co-operation between Dennis Eagle and Hardstaff, with the latter's OIGI (oil ignition gas injection) dual-fuel system being trialed on a 26 tonne RCV by Veolia, with Westminster City Council, over the last year. That was on a Volvo Euro 5 D7e six-cylinder 7.14 litre engine, developing 290bhp, and similar vehicles are currently on trial in Enfield and Leeds, as well as in Sweden.

"We're seeing some interesting results, with increasing gas substitution, depending on the duty cycle," he says. And he adds that gas substitution rates are bound to improve as Hardstaff works on

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John Jeffress



its technology with Volvo in Sweden. Graves also points to the value of building up an infrastructure of anaerobic digesters and cleaning plant to make biomethane from rubbish – creating a virtuous fuel circle for RCV operators.

Meanwhile, Westminster is also trialling an Eonic RCV with the Hardstaff conversion – in this case compared against standard diesel Eonics on its fleet. Mercedes-Benz's Whittaker says it's too early to provide figures, suggesting merely that the diesel fuel cost reduction is "significant", certainly in terms of these vehicles' seven years replacement cycle.

However, Dennis Eagle chief engineer Barrie Lindsay also points to full spark-ignition gas engine trucks, using the Iveco Cursor 8 gas engine in its Elite chassis, built recently for a Ros Roca (parent company) operator in Barcelona. "These would be predominantly for the European market, where the infrastructure supports gas," he says. Lindsay indicates that key benefits include cheaper fuel and noise reduction, enabling evening refuse collection. But they come at a price – the gas engine premium.

Then again, in the UK, Leeds City Council is using biomethane. Leeds is working with Cenex, the UK's centre of excellence for low carbon vehicles, and says it chose an Eonic 2628LLG RCV, because of the council's experience with its fleet of Eonic 2629LL RCVs and the manufacturer's warranty. Its trial truck is powered by an M906LAG 6.88 litre turbo intercooled spark-ignition gas engine, certified to EEV (enhanced environmentally friendly vehicle) and matched to an Allison auto box. Although not much used in the UK, that engine, which delivers 279hp at 2,200rpm and 1,000Nm at 1,400rpm, with multipoint gas injection at 8.3bar, is in common use on buses and coaches around the world.

Gasrec supplied the biomethane from its Albury plant in Surrey, installing a temporary refuelling facility in the council's depot. Leeds operated the vehicle in regular service on two routes for six months,

comparing its fuel consumption, usability and reliability against a Euro 5 diesel Eonic and a Seddon Atkinson Euro 3 vehicle on the same routes.


Cenex quotes Leeds' enthusiastic environmental assessment officer Richard Crowther as stating that fuel economy was "superior" and averaged well-to-wheel CO₂ savings of up to 60%, "even allowing for the long distance transport of biomethane to the Leeds depot".

Electric bodies

But there are other fuel-saving options. Graves doesn't suggest that hybrid diesel-electric drives have any place in an operation as intensive as RCVs – the company's work a couple of years ago, with the University of Warwick and former group company Alexander Dennis, proved that's not viable yet. However, he does point to the value of an all-electric body, currently being trialled by Haringey, which is contracted via waste carrier Enterprise. "The packing and bin lift mechanisms are powered by hydraulics, but run by an electric motor, following development work at MIRA," explains Graves. And the results, he says, include clear fuel savings, but also noise reduction, compared to the standard PTO – although "not as much as we expected".

At the moment, Dennis' system relies on overnight single-phase charging, but Graves says the company is considering on-board charging. That might use regenerative braking, but more likely is an Antares' two-speed alternator, which steps up a gear for low battery levels or a straightforward onboard generator, driven by the PTO. "We're using Li-Ion batteries, which add 480–600kg, but, in the future, we could kill two birds with one stone by making the batteries the counterbalance," he says.

Another option being explored concerns some remapping of Allison's transmission and implementing its RELS (reduced engine load at stop) facility that partly disengages clutches to reduce power drag when vehicles are stationary. Then again, Graves points to the hydraulics and, for example, Terberg's variable flow eco pump, which, although not cheap, is attractive as fuel costs rise.

Finally, Whale's Warrington points to vehicle tracking systems as another route to cutting local authorities' bills. "Councils may have 90,000 gullies and that number is being added to all the time, as roads are adopted and extra gullies built to handle floods. How do you maintain those assets economically when, in many cases, you don't know accurately where they are or which are prone to blockages? What we're doing is linking GPRS through our tankers' PLC controls, so they can provide live data on vehicle location, but also the operation of the vacuum and jetting pumps, how deep the gully boom is down and time spent. That enables the authority to map its gullies and manage the asset far more efficiently." 

Whale tanker used for dirty water recycling

