POWER

When Power Electrics needed to rethink its eight-wheelers to accommodate heavier loads, it turned to Imperial Commercials and Central Hydraulic Loaders to generate a solution. Brian Tinham reports

Power Electrics took delivery of its first new specification truck late in April, and a second is due for delivery as we go to press. More will probably follow.

CHALLENGE

It's not every day that engineers are called upon to think outside the box, and specify a custom truck for a new and challenging duty. Even less frequently does such a project involve pushing the boundaries, not only on weights and dimensions, but also manoeuvrability, payload, and crane and axle configurations. But that's what Alex Harris, transport manager at national generator specialist Power Electrics, came up against late last year.

Harris explains that, until a few months ago, the Bristol-based firm was running a fleet including 17 Hiab-equipped trucks for its heavy work, largely DAF six- and eight-wheeler rigids. Most were capable of handling the then flagship 500kVA FG Wilson diesel generator, which came in at 6.5 tonnes. Most had rear-mounted lorry loaders and were equipped for hauling tandem or tri-axle drawbar trailers with ancillaries and/or additional generators for customers – mostly utility companies, construction firms and organisers of sports events and festivals.

It was an ideal mix, he says, established over many years for its ability to get large, heavy equipment into tight, sometimes inaccessible locations – such as substations in housing estates or down country lanes.

"Then late last year, FG Wilson launched their Tier 3 engined [Euro 6 equivalent for static plant] machine. We knew they were bigger and heavier, but hadn't realised they would come in at 7.6 tonnes," he recalls. That wasn't an immediate problem: Power Electrics had some eight-wheelers with 38- to 48-tonne-metre cranes man enough to lift the beasts, and space on the truck beds to carry them. But, being double-drive, they weren't hugely manoeuvrable. "Also, the cranes were working near capacity and, with the new generators substantially longer, there wasn't a lot of clearance between the trucks' front-mounted stabilisers and the rear Hiab outriggers when placing them on site. So we needed to think again."

Harris describes the new requirement as a 32-tonne rigid with: a bigger crane; payload capacity and bed space for the same plus ancillaries, or combinations of smaller generators; and toolboxes for lifting gear, etc. The new truck also needed manoeuvrability close to its existing six-wheelers; it had be drawbar compatible; and it needed to facilitate transshipping of plant on-site. It was a big ask and he accepted that some compromises were inevitable.

"The new truck also needed manoeuvrability matching our existing six-wheelers"
Alex Harris

BETTER COMPROMISE

"For example, it was always going to be fairly easy to design a truck that worked when loaded, but ensuring the rear axle wasn't overloaded when running empty was another matter," he states. "Also, we knew that at Euro 6, there wasn't going to be much space behind the cab for our preferred high-level exhaust stack – but we still needed reasonable ground clearance at N3 as well as space under the body for the truck's supplementary stabilisers."

Power Electrics turned to DAF Trucks' dealership Imperial Commercials, in Bristol, and PM Cranes' distributor and bodybuilder Central Hydraulic Loaders, in Tamworth. And what resulted, according to Imperial's sales manager Gary Woodruff, was a model collaborative design project.

"We started by using our TOPEC [DAF's CAD software]," says Woodruff. "Comparing the latest chassis drawings with Power Electrics' Euro 5 eight-wheelers, even on the nearest new Euro 6 equivalents there was less space for the exhaust, and the cab size was a little different, too. Central Hydraulics then provided their recommended PM 53023 48 tonne-metre crane data, with weight and load space requirements, and it became clear that the truck bed length would have to be a little shorter, while payload would be about a tonne down."

From then on, it was about working with body lengths, wheelbases, crane position, exhaust layout, etc, to hit the criteria and keep the axle loads legal whether laden or unladen. For example, if Power Electrics stuck to its high-level exhaust, the front headboard would have to be pushed back. To achieve the

bed length, the crane would also need to shift rearwards – but that risked overloading the rear axles when the truck was unladen.

So the team then looked at a conventional exhaust. That solved the bed length and payload issues, but left inadequate space to accommodate the front stabilisers. One option was to raise the bed so the stabilisers could fit above the exhaust. However, that would necessitate heat shielding; there would be weight implications; and the bed would be too high for health and safety.

The solution: Central Hydraulics' Digby Scott suggested mounting tilted stabilisers, capable of squeezing in front of the headboard without sacrificing the bed length or the crane position. But that, in turn, required a compact, rigid subframe light enough to stay within the design parameters. Hence the choice of a box and cruciform structure fabricated from high-grade steel – a choice proved by DAF's and PM Cranes' CAD systems.

What about that all-important manoeuvrability? Harris says the project team eventually settled on a DAF CF 460 FAX with a 6.4m wheelbase and 6.9m body, and equipped with a rear-steer axle. "That meant losing the double drive, but we have one MAN single-drive truck and it has never got stuck. In recent years our customers' sites have increasingly become properly tracked, so double-drives are less critical. Frankly, it was a compromise we were prepared to take to get the turning circle we needed." And that was 5.88m inner radius – slightly better than Power Electrics' existing six-wheelers.

DEVIL IN THE DETAIL

Harris says that once the big picture had been nailed, there were just a few tweaks ahead of bodywork construction. "I went to Tamworth with our workshop foreman, partly to ensure that the truck would meet National Small Series type approval, and partly to check that the vehicle would be flexible enough for our operations," he explains.

"For example, we need large toolboxes for our lifting accessories, ratchet straps, etc. But while the drivers want them to be accessible, they're not impact rated so have to be protected by the side bars," he explains. That meant agreeing a mounting arrangement for them that wouldn't impact type approval. And it was a similar story with the rear crash bars, which had to be fabricated from cylindrical section steel – so were specified with gas struts for easy lifting. As for the drawbar, the team settled on a VBG air-operated unit to simplify coupling for the driver, and improve health and safety.

Remarkably, iDAF's and PM Cranes' CAD software disagreed by a mere 10kg payload. Imperial Commercials' theoretical figure (including chassis, fuel, driver, crane, body and the 7.6-tonne generator) was 20,684kg, while Central Hydraulic's estimate came in at 20,830kg. However, the latter had allowed for a revised tool box arrangement and a 130kg tow hitch.

The result: Power Electrics took delivery of its first new truck late in April, and a second is due for delivery as we go to press. More will probably follow.

For Harris, this truck configuration is now the benchmark. "With this bed length, carrying flexibility, crane capacity and manoeuvrability, we can now use the new 32-tonner for all heavy contracts, whether we're carrying the new large machine or multiple smaller generators. There are thousands of potential combinations of equipment, but I am confident this new truck design will be up to them all." TE