

General processing

High pressure brings benefits to cleaning

A new system transformed the speed and efficiency with which one local European authority can clean the undersides of its vehicle fleet. Not only did the new system cut the amount of man-hours, but recycling has overcome the costly problem of waste disposal.

A new automatic system has transformed the speed and efficiency with which UK local authority Dorset County Council (DCC) cleans the undersides of its vehicles. Direct benefits noted when the system was installed at Dorset Works Organisation Charminster depot in October 2007 are ongoing. Man-hours are being saved; a potential health and safety risk has been removed. The use of high-pressure cold water in place of steam cleaning is saving energy and, because the water is recycled, has overcome the problem of waste disposal and its attendant costs.

The new cleaning system, incorporating a seal-less Hydra-Cell pump working at 50 bar pressure, was designed and commissioned by FDI UK Ltd, who also designed and supplied the water recycling plant.

According to Terry O'Donovan, vehicle maintenance manager at the depot, FDI won the contract through its track record as a supplier of bespoke vehicle cleaning systems. Specifications for the Charminster project were demanding. The Council wanted a reliable, economical system for cleaning the underneath of a fleet of vehicles which differed in type and chassis height – using an unheated chemical solution of 'grey' (recycled) water. Such requirements called for a flexible flow/pressure performance beyond the scope of the relatively low-pressure fluid systems installed elsewhere.

FDI met this challenge by basing its cleaning system on a Wanner Hydra-Cell G35 pump. Its unconventional design, in which there are no dynamic seals, eliminates problems

of seal wear that had destroyed high-pressure piston plunger type pumps when these were used briefly on earlier installations. They could not satisfactorily handle the abrasive grit particles in recycled water and were quickly replaced with centrifugal pumps working at lower pressure – around 20 bar.

The Hydra-Cell unit however not only tolerates abrasive solids as big as 1.5 mm, it can also deliver flows (virtually pulse-free) of more than 120 l/min at pressures up to 70 bar. Moreover it incorporates Wanner's Kel-Cell innovation, protecting diaphragms in the event of inlet filter blockage. The pump can run dry with no risk of damage.

How often should the underneath of a local authority vehicle be cleaned? Ideally, says O'Donovan, it should be cleaned on every official inspection. Many key elements, tanks, pipework, valves, controls and drive mechanisms etc, are mounted beneath the body, and inevitably become fouled with oily dirt and grit. Accessing them for inspection, servicing or repair is more efficient and quicker if they are clean.

His team at Charminster, an integral part of the Direct Works activities of the DCC, is responsible for a mixed fleet of 450 vehicles, ranging from the coaches and minibuses of the Adult Services department to the gritters and tippers used in Highways operations, as well as a variety of vehicles serving Countryside, Education, Libraries and Grounds Maintenance departments.

Vehicle inspections are scheduled every few weeks, at intervals that depend on the



Figure 1. The underside of a tipper truck undergoes high-pressure automatic cleaning.



Figure 2. Tipper truck underside components after cleaning.

vehicle type – for example, 13 weeks for a tipper and eight weeks for one of the large coaches operated by Adult Services.

Until the new system was installed, underbodies were steam-cleaned; an operation carried out by a man with a hand lance. Employed full time on this task, the cleaner was working between four and five hours a day in a pit, constantly wet, and wearing a protective full face mask in compliance with H&S regulations. It was not a popular job. Nor was it quick. It took on average 3½-4 hours to clean the underside of a coach (now cleaned, with automatic consistency, in 30-40 minutes). Slow throughput meant, in practice, that many DCC vehicles had to wait until their annual MOT testing to receive a full underneath cleanup.

Vehicles are still cleaned over a pit at Charminster – but the new setup is unrecognisably different. Virtually everything is automatic – from the moment the driver parks and pushes a button on the pit-side programme selector to start a cleaning operation appropriate to the vehicle's type and length.

The spray head incorporates three rotating turrets, each with three jets. Hydraulic motors power its travel under the vehicle and also the rotation of the spray turrets. No energy is lost from the cleaning water system, whose pressure is calculated to achieve high impact without exceeding the acceptable waterproof level of vehicle components. Armoured and nylon-enclosed, the 'energy train' serving the spray head has double protection against mechanical damage and water ingress, and the whole pumping and cleaning installation is integrated with FDI's water reclamation plant.

"Results are fully justifying our investment," says Terry O'Donovan, "We are seeing direct benefits – manpower and energy savings and improved working practices – and we're more productive, giving us the capacity to



Figure 3. The system is based on an energy-efficient Hydra-Cell seal-less pump that can handle grit particles and deliver recycled water at pressures up to 70 bar.

integrate a planned under-chassis cleaning programme with scheduled inspection and repair dates. This translates into knock-on efficiency improvements in inspection, maintenance and repair of our whole vehicle fleet. It also means we can provide a

similarly upgraded cleaning service on a contract basis to our neighbours Dorset Fire and Rescue for all their locally based fire engines."

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