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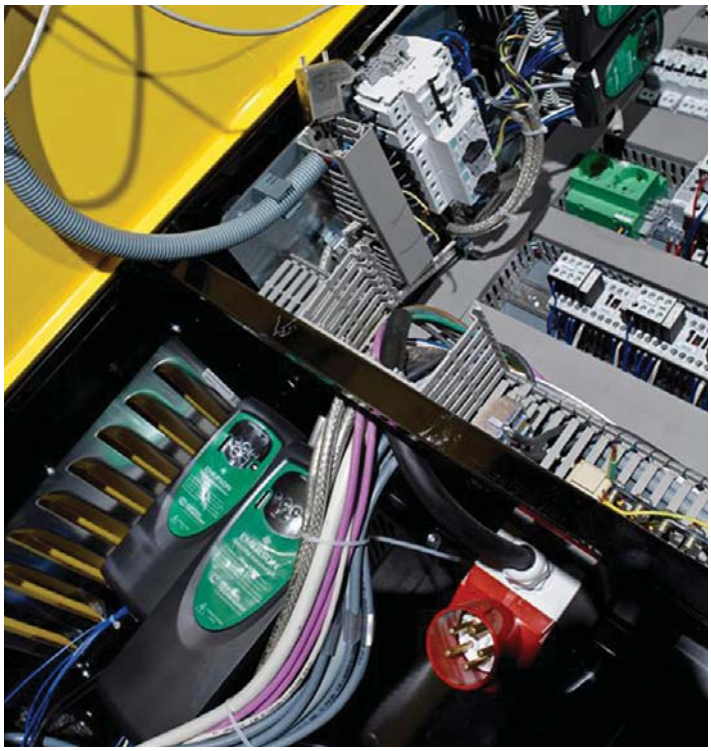
Driving Down Costs of Block Paving



A unique robot-based system for the laying of street paving slabs has been developed by Dutch company Robostreet, cutting operating costs, time and eliminating the huge problem of on-the-job injuries, particularly back-strain.

Streetwise 1200 is the first of a range of machines from Robostreet and already 22 have been sold to the local authority in Rotterdam. At the heart of each vehicle are either four or five Commander SK AC drives from Control Techniques, including the new ultra-compact 5.5kW size D model that controls the hydraulic pump.

"We recognised that there was a significant market need for such a vehicle," explains Mr A. van Wijngaarden, Technical Director of Robostreet. "Here in Holland, the heavy work involved in street paving is a major contributor to some 5,9% of employees being off sick through back injuries – a national cost of around €120.000.000. And most countries of the world have a similar problem. Local health and safety legislation is now limiting the amount that can be laid manually and the race is on to build street paving machines that are accurate, safe, fast and cost-effective."

A group of multi-disciplinary entrepreneurs accepted the challenge and, together with system integrator, Axoll, initiated a study of how bricks are laid and the development work began. Control Techniques' Rotterdam drive centre was approached to provide drives to control a hydraulic pump as well as a compressor and drives for the servo adjustment of a camera system and a rotating laser system.

KEY BENEFITS

- CUTS OPERATING COSTS
- ELIMINATES JOB RELATED INJURIES
- COMPACT SIZE
- VERSATILE OPERATING MODES

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CONTROL TECHNIQUES

An on-board diesel generator produces 400V AC, but this can drop by as much as 200V on heavy load and, on testing other types of drive this caused a trip-out. However, with the Control Techniques Commander SK, there was sufficient DC residue to allow the drive to ride through the dip without tripping. A further factor in its choice was its size. The space available on the panel is extremely limited and the new 5.5 kW Commander SK size D, which is some 30% smaller than its predecessor, fitted in with no problems.

During development, the versatility of the Commander SK proved valuable, with different operating modes being tested under operating conditions to find the most successful.

A 3 kW Commander SK provides compressor control and two small 0.25kW Commander SK drives provide rotation control for two rotating positioning lasers. A further small SK is used to provide precise height positioning of the camera in the vision-control system.

The finished Streetwise 1200 machine is equipped with a GPS compass navigation system that is accurate to a few millimetres and is driven by triple point positioning that takes the smallest deviation in the track into account.

All of the preparation work is done in advance – screeding, edging etc and the operator inputs the required data into the on-board computer. This includes the size and type of paving elements to be laid, the bond or laying pattern that is required, the width of the pavement or road area and other necessary data.

The operator then places a minimum of two marking poles and through this the machines is calibrated to create a hypothetical straight line.

Pallets of blocks are loaded into the back of the robot, where there is storage for up to 240 blocks, depending on size, and the machine is driven by remote hand-held wireless control to its starting point. The machine is capable of laying blocks in a herringbone pattern or other bonds as required.

The operator switches the machine to automatic and the vehicle takes over, the robot on the machine mimicking the movement of the pavior, picking up bricks, using a vision-control system, one or two at a time from its store in the back of the vehicle and placing them precisely one at a time in the required pattern. It has tracked transmission, with the facility to put down hydraulically controlled rams to provide a 'lift-and-turn' action on recently paved areas.

When the store is nearly exhausted, the system will call for a new load. Robostreet is following the launch of Streetwise 1200 with Brickclean 201, a machine that lifts, sorts and cleans blocks, neatly stacking them for re-use.