



CMEIG Engineering Position Paper

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Electric devices on Asphalt Pavers

Since first introduced into the Australian road paving industry circa 2000, there has been widespread acceptance of the electrically heated screed in lieu of the former propane heating systems for asphalt pavers. This new approach is inherently more environmentally friendly and does away with the lifting of propane bottles which contains risks for muscular injuries.

Most paver manufacturers are now offering electric heating options with either a hydraulically powered onboard generator, or alternatively an engine belt driven generator. Primarily there are two distinct categories of generators in use today, namely:

- 415 v ac heating systems found mostly from European manufactured pavers or
- 120 v ac / 240 v ac heating systems found on North American pavers.

With onboard electrical generators come new responsibilities for the electrical systems, additional maintenance inspections and testing not previously encountered on propane heated asphalt pavers.

Without exception, all electrically heated screeds imported into Australia & New Zealand are required to be fitted with a safety Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCB)¹ in accordance with Clause 1.7.4.3.1 to AS/NZ 3000. These devices trip both the active and neutral power circuits in the event of a short to ground (earth leakage) to prevent an electric shock to personnel.

The RCD device is required to be regularly tested in accordance with AS 3760 as a minimum²:

- Daily “trip” test via the TEST button to ensure safe & correct operation prior to use, and
- Regular “time” interval testing to ensure the device trips within the defined time limit.

Operators and machine owners should develop work practices and operations that remind them of this safety testing before placing the machines into service each day.

Another important factor often overlooked is the variations in the output frequency of the power supply circuits in some machines (ie: 240 v at 60 Hz) rather than the normal mains supply of 240 v at 50 Hz. Some 415 volt electrical systems have output frequencies varying from between 50 Hz to as high as 100 Hz and are not usually frequency controlled.

¹ A term used by some manufacturers.

² These test requirements are outlined in the Standard.

It should be noted that for the purpose of heating, the frequency is not critical, but rather can become an issue if any socket outlets have been installed for operating luminaries for night paving work. The higher frequency may pose a hazard if any light or other type of electrical equipment is not frequency tolerant, for example a ballast unit as used in fluorescent tubes. The ballasts usually are locally set for 50 Hz and have the potential to burn, short out or even explode if connected to a higher frequency.

A safe approach is to display a safety warning decal adjacent to the socket outlets warning of the higher frequency to avoid potential hazards.

Additional care should be exercised when ‘dieseling’ the paver prior to asphaltting operations or washing down the paver at the end of the operations, so as to not allow solvents to penetrate the electrical systems and wiring. Under no circumstances should the operator spray the electrical system, generator or wiring whilst the generator is in operation.

Widespread use of varying types of solvents and fluids in the cleanup operations make it difficult for manufacturers to predict the longer-term effects of these solvents on the electrical wiring, connectors and insulation. Greater vigilance should be adopted at regular servicing and maintenance times on these machines, with regularly testing by authorised electrical personnel to ensure the integrity of the connections, wiring and insulation.

The Standards require all electrical systems to be tested by an authorised electrical person prior to the unit being returned to service if any repairs involving the electrical systems have been involved eg: dismantling of the heating circuits, replacing elements or generator etc. Depending on the State of operation for the paver, the authorised person may or may not be required to be a licensed electrician. However, the Association would recommend that a licensed electrician be used on all regions of Australia.

If properly maintained and serviced these types of heating systems are expected to outperform the propane system and with less problems attributed to:

- varying gas quality,
- leaking gas bottles and hoses,
- less lifting & strain injuries for the workplace.



Figure 1 Paver high voltage electrical systems.

Bibliography

AS/NZS 3000 Wiring rules

AS/NZS 3870 In service safety inspection & testing of electrical equipment

AS/NZS 3820 Essential safety requirements for low voltage electrical equipment

AS/NZS 2790 Electricity generating sets transportable

Engineering Position Paper No.3 – Amended 18 September 2008

Construction & Mining Equipment Industry Group Inc

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