

What's happening?

Best Practice on TLP KO2

Class 1 and 2 signalling power distribution system

Overview:

A new signalling power distribution system has been developed following a three year project lead by Network Rail's infrastructure project signalling innovations group. The system known, as a 'Class 2', has several reported benefits over a conventional Class 1 scheme. These include financial savings, reduction in the amount of copper used by 33%, a reduction in raw materials and embodied carbon emissions, increased ease of transport and better security performance to deter cable theft.

Class 1 Power cable

A Class 1 electrical system has an earth return so that any fault which occurs is sent directly to an earth point, protecting from potential electrical shock.

It is commonly used in existing signalling power distribution systems and has three cores. These three cores are: live one, live two and earth (also known as the circuit protective conductor). All cores are made of copper. The cable is armoured with a steel wire mesh which prevents any damage from rodents (see figure 1).

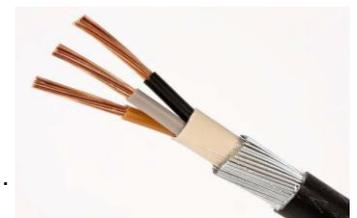


Fig.1 Traditional Class I cable

Class 2 Power cable

The Class 2 system consists of each individual location encased and double insulated. Any fault which occurs is kept within the casing, thereby removing the risk of exposure to electrical shock. The Class 2 system removes the earth core in the cable required by Class 1 and reduces the number of copper cores from three to two. Earth protection is provided through the use of Class 2 assemblies (transformers and power switch boxes). The system contains two copper cores, and built-in identifying tape and glass fibre material is used as rodent deterrent (instead of steel wire armoring). See Figure 2.



Fig. 2 Class II innovation

Application on Thameslink

Approximately 29 km of Class 2 cable has been used in place of conventional Class 1 cable on the TLP KO2 project. This has resulted in financial and environmental savings as shown in the table below.

Equipment	No	Cost		£ Cost	Total savings (£)
REB	32	Class I	Class II		
Transformers	32	£250.00	£450.00	£6,400.00	£165,975.00
Power switches	32	£800.00	£1,200.00	£12,800.00	Cu Savings (kg)
Power Cables	Length (m)	Class I	Class II	£ Savings	
Cable 16mm	870	£7.50	£5.00	£2,175.00	236.1

<i>Cable 70mm</i>	10800	£15.00	£10.00	£54,000.00	CO2 Savings (kg)
<i>Cable 120mm</i>	17200	£22.50	£15.00	£129,000.00	

Challenges for future application

The decision to use Class 2 power cable on TLP KO2 was dictated by the cost of Class 1 power cable required for the power distribution network against the cost of installing Class 2 power equipment in REBs. Although Class 2 power cables involved higher costs around internal equipment including transformers and power switches within the REB, economic benefits were nevertheless realised. Discussions with SRA project personnel indicated that there is good awareness of the Class 2 system.

Meeting the TLP sustainability objectives & targets

This initiative is aligned with TLP Sustainability Strategy *Objective 17*, ‘To increase the life of materials and reduce the consumption of virgin and unsustainable sources of materials.