Passively safe roadside cabinets for electrical equipment

By David Milne

INTRODUCTION
Signs and lighting columns now being installed on trunk roads without barriers are now usually passively safe to EN 12767:2007 – "Passive safety of support structures for road equipment".

This passively safe street furniture is proving exceptionally safe with almost no recorded severe injuries in vehicle impacts. Passively safe signposts and lighting columns are proving a most economical alternative to traditional steel signposts and lighting columns with associated protective barriers and energy absorbing terminals. This direct financial saving explains why passive safety is proving so popular on our trunk roads. Regrettably rural non-trunk A roads with their serious accident rates are far behind in their use of passively safe street furniture.

Until now crash tested passively safe roadside cabinets have been unavailable. Cabinets on trunk roads have typically been either installed behind barriers, up embankments or otherwise safely clear of the carriageway. Now Ritherdon have developed a cabinet which is passively safe to EN 12767. Ritherdon make high quality, long lasting, weatherproof, painted stainless steel cabinets for highway use. Their cabinets are used for feeder pillars for lighting columns and to house electrical apparatus including traffic light controllers and motorway communication equipment. Cabinets are needed to provide a dry accessible environment for the increasing amounts of electrical equipment on our roads. Ritherdon's use of stainless steel construction for their cabinets allows thinner material to be used without fear of corrosion reducing weight and lessening impact forces thus making such construction well suited to the passively safe cabinet they have developed.

Crash Testing Ritherdon’s Passively Safe Cabinet at the Transport Road Laboratory in accordance with BS EN 12767 “Passive safety of support structures for road equipment. Requirements, classification and test methods”

Ritherdon crash tested their “RB800 Passive Cabinet” at TRL in December 2012 and January 2013. The cabinet was 800 wide 380mm deep and 1200 high and loaded with two weighted shelves each weighing 13.1 kg to represent the weight of electrical equipment.

THE RITHERDON CABINET AND TRL CRASH TEST VEHICLE
Two BS EN 12767 crash tests were conducted where cabinets were hit by 900 kg cars at 35 kph and 100 kph.

In both tests the cabinet sheared away near its base on impact. In the tests the cabinet was knocked ahead of the vehicle in the impact and ended up down the track close to the path of the vehicle. The shear arrangement for mounting the cabinet to give the passive safety performance has been developed and patented by Ritherdon.

The TRL testing gave the cabinet a passive safety classification to BS EN 12767 of 100 NE 3.

ELECTRICAL ISOLATION
Electrical cables pose a problem for passively safe equipment in an impact. The National Annex to BS EN 12767 demands any electrical supply is isolated in an impact to prevent apparatus becoming electrically live. Also cables must pull away and not tether the cabinet in any impact.

Ritherdon sought Poletech's expertise in electrical isolation systems gained from supplying cabling systems to passively safe lighting columns and illuminated signs. The test cabinet was provided with 4 multicore cables to represent a typical cables arrangement. The cables were provided with moulded PolePlug IP 68 rated weatherproof plugs. The plugs separate at or below ground level when the cabinet is knocked forward during the impact.

Impact will also trigger a shock sensor mounted in the cabinet which then isolates the power supply at a relay safely sited away from the cabinet.

The isolation arrangements worked perfectly in the test. New cabinets could have been readily installed on the existing undamaged foundation units utilizing the plugs on the feeder cables.
Ritherdon found the Poletech expertise in cabling and electrical isolation married in so well with their all weather electrical cabinet business that they have now taken over the firm.

The combination of Poletech cabling technology and the Riverdon shear failure mode at the underside of the cabinet has the following advantages:

a) The supply cables with their moulded plugs and the buried cabinet base will almost certainly be undamaged in a vehicle impact so a replacement cabinet to be quickly installed (minimizing traffic delays and traffic management during installation)

b) Cabinets can be fully factory fitted out prior to installation. Cabinets can be returned to the factory for equipment upgrading and maintenance. This facilitates a “plug and play” approach to electrical installations and their maintenance.

c) The cabling and cabinet below ground base can be installed early in the contract and plated over. Cabinets containing the electrical equipment can then be quickly installed after the civil works are completed.

CONCLUSIONS

The concept of a “passively safe road” with only passively safe street furniture is a great concept for a road scheme and Ritherdon’s new cabinets will help make it achievable. Passive safety advances have been nearly always product led and Ritherdon’s passively safe cabinets will continue this pattern.

When passively safe street furniture began to be widely used in the UK in 2003/2004 the products were Scandinavian. Now uk industry is developing our own passively safe products. Ritherdon aim to have a range passively safe cabinets that are smaller and lighter than the crash tested cabinet to create a family of passively safe products meeting the requirements of EN 12767.

If you are need to install electrical equipment in a cabinet or cabinets for a road scheme where they would be vulnerable to vehicle impact you may well find a passively safe cabinet provides the cheapest and safest solution.