

# TRATOS WARNS OF HARD-SHOULDER ECONOMY FOR UK PLC



*UK plc & Britain's motorway traffic short-changed with false-economy cable:  
Cable Manufacturer Tratos calls for new purchasing practices for Highways England.*



Prepared by Tratos UK Ltd

## Executive Summary

Cables - the last component to be considered for design and build projects where the significant costs are typically in civil and structural engineering elements of the work.

Their role is on the rise as technology-dependant SMART motorway schemes proliferate.

Cables enable electronic display signs, speed enforcement, surveillance cameras and vehicle sensors – the neural network that manage traffic flow.

Tratos says cables, purpose-designed to help keep our motorways moving are losing out to cheaper off the shelf products. Lower spec cable that is not designed for (and will fail in) the highways' harsh operating environments is a real threat to UK PLC, clogging arterial routes and triggering economy-damaging domino delays.

Highways England, which has an imperative to cut costs, is paying more, not less, for a built-to-fail network - but it is not to blame.

As it pushes forward with smart motorways, the organisation's network of contractors manage on a supply and fit basis. Some are being cross-sold cheaper cable when their preference is not in stock with the reassurance that the replacement 'does the same thing'. That too is correct, it does, but not for long in a particularly harsh environment it wasn't designed to cope with.

*To re-enable the cable powering traffic flow, Tratos proposes:*

- Highways England should maintain and monitor its Type Approval mechanism to reduce its exposure to operational failure of its technology schemes.
- Highways England should stop the installation of non-approved cables on its highways and motorways by prime contractors and, where breaches in its Type Approval mechanism are found, it should be the specific contractor that 'makes good'.
- The planned Traffic Management Technology framework by Crown Commercial Services on behalf of Highways England and others should stipulate the Type Approval mechanism and bar procurement outside accredited framework suppliers.
- Highways England should negotiate with its approved suppliers to maintain a call-off stock level - which is currently practiced in the railway and electrical distribution network industries - to better manage its cable inventory and improve delivery timescales.

This paper highlights the importance of **Type Approval** in the procurement of energy and communication cables for use on the highways and motorways of England.

## Introduction: False economy

The drive to reduce costs of infrastructure projects is under close scrutiny, and any and all opportunities to manage budgets effectively should be taken. However, short-termism with cheap cable purchase is putting the country's economic highways at risk.

While cost reduction in cables is to be expected and sought after, Highways England should also be looking at how to enforce longer-term outcomes for its purchasing strategy enabling more informed decisions (down the supply chain) based on performance within very particular applications.

The current strategy within Highways England is to procure approved, CE marked cables with the intended aim of securing shorter delivery times and reduced costs.

The CE mark is the manufacturer's declaration that distributors' in-stock cable meets the minimum safety requirements of all the Directives (laws) applicable to it.

This presents two conflicts for Highways England.

Its specific installation needs aren't answered by the CE mark. ***CE marking does not guarantee that the cable is suitable for installation within the highways and motorways and a distributor will only stock cables that are widely used - i.e. not manufactured for a specific application such as for highways and motorways. Faced with a potential delay in supply, the temptation is to buy 'the next best thing'.***

Tratos warns that this strategy will inevitably lead Highways England to procure cable that is not necessarily intended for use within a highways and motorways environment.

And, there is evidence that this is already impacting schemes in England with some cabling projects completed within the last five years or so experiencing network failure and, consequently, disruption and expenditure on replacements.

The consequences for these fails were not as high impact as the inadequate cables were used for lighting only.

The contractor (in this case) was liable but the replacement works still caused delays to the public and, consequently, losses for UK plc.

Total cost over its lifetime is how the economy of cabling should be judged.

Tratos, which works directly with customers rather than through distributors, believes that Highways England should consider a relationship or number of relationships directly with manufacturers to ensure a call-down stock for its contractors.

The consequences of cable failure are usually high, particularly as the motorway and major road network infrastructure becomes more technology dependant.

### **Intelligent 'lifetime' cost analysis will save time and money for UK's economic highways**

Total costs should include installation, maintenance and replacement and of course losses to UK plc from traffic congestion. Replacement or repair because of premature failure must be factored in; longevity of performance in situ is where the value lies.

Other impact costs include the increased risks to installation workers and those driving through the traffic management whilst the replacement or repair is being carried out.

A cheaper cable with a performance certificate of conformity, CE marking and warranties may seem adequate and appropriate for use on the highways and motorways but these assurances only apply to the cable design and manufacture and not its use. The manufacturing process for these generics will not have taken into account the environmental extremes these cables need to withstand. That is only available with cable that has been specifically ordered.

## **Background**

Cables are often the last component to be considered for design and build projects where the significant costs are typically in civil and structural engineering elements of the work.

This is inconsistent with their importance in delivering workable project objectives for the duration of the design life.

Their critical role is plain to see in the technology dependant SMART motorway schemes being rolled out nationally by Highways England.

These schemes use technology (electronic display signs, speed enforcement, surveillance cameras, vehicle sensors) to actively manage the flow of traffic by either temporarily or permanently opening the hard shoulder to traffic.

At best, the failure of an energy cable could render the scheme useless (until the unplanned expenditure of cable repair or replacement is completed). At worst, failure during system operation with the hard shoulder running could increase the risk of a road traffic accident.

Highways England is responsible for setting and maintaining the standards and specifications for cables used on the highways and motorways of England.

These standards have been carefully updated to take account of material and manufacturing advances, the performance/cost requirements of Highways England and aligned with European and/or international standards.

Traditionally, to ensure conformity to these specifications Highways England employed a Type Approval mechanism in which all cable suppliers submitted production samples of their cables for either independent or technically witnessed testing of their electrical, mechanical and environmental properties. Once Type Approval is granted for a cable, Highways England would require regular inspections of batches prior to delivery to ensure continued compliance and therefore maintain quality.

## Energy Cable Composition

There are three basic components to an energy cable – the conductor, the insulator and the outer sheath. The conductor and its insulator covering provide the electrical characteristics required by the application and are clearly defined in predominantly aligned national, European and international standards. The choice of outer sheath material depends on the environmental conditions to which the installed cable is subjected and the required design lifetime of the project. Informed clients understand the extremes of environmental conditions to which their cable is subjected and select the material which best delivers value over the lifetime of the project.

For energy cables used on the highways and motorways of England the conductor raw material is copper. The monetary value of this copper within these cables is up to 80% of total cost of the cable. Copper prices from reputable suppliers are linked to copper exchange trading prices as listed on international metal trading exchanges such as the London Metal Exchange. So for a defined standard, the copper value for a cable in the UK, Europe and internationally is comparable.

For the outer sheath Highways England has since the 1970s specified Medium Density Polyethylene (MDPE) and is seen as best practice for its environment. It provides robust and proven performance for both above ground and underground installations with excellent mechanical strength and withstanding a wide range of environmental conditions. The process to manufacture this type of outer sheath is slightly more complex than more widely available Polyvinyl chloride (PVC) cable which is more suited for internal (building) installations. This complexity in manufacturing is equivalent to between 5-10% of the cable cost.

## Why maintain Type Approval?

The Type Approval and inspection mechanisms are considered best practice within the railway, underground, electrical distribution network, oil and gas, maritime to name but a few. Only those suppliers who can provide nationally accredited and audited quality controlled procedures for their manufacturing facilities can apply for Type Approval. An accredited quality control system will provide assurance that the materials, the manufacturing processes, the skilled labour and the internal testing procedures are in place and adhered to. So Type Approval is rigorous in its approach to ensuring consistent quality of product from a manufacturer.

By maintaining these mechanisms, Highways England can reduce the risk of installing inferior cables, ensure that the cables meet their electrical, mechanical and environmental requirements and, maintain performance consistency.

Given that a significant cost of a cable is its copper content, cheaper cables can only be produced by using inferior grade copper which at best will compromise its performance and increase the risk of failure. Although an electrical designer will allow some tolerances for variations within their calculations for a scheme, the use of inferior grade cable which increases the failure risk, will not be one of these variations.

As mentioned previously, Type Approval mechanisms are widely used here in the UK where safety and reliability are paramount and where system operation is critical to public safety such as in the railways and underground.

Highways England's dependence on technology to manage and control the highways and motorways of England has been rapidly increasing over the last decade and will continue to rise in the foreseeable future.

The roll out of SMART motorway and other such technology heavy schemes to actively manage the flow of traffic should underline the criticality of their operation to Highways England. Failure of a cable on such schemes during their operational periods will inevitably increase the risk to the driving public.

Such risks to the public are not entertained by the railway and underground sectors who insist on using the rigors of Type Approval testing to ensure public safety so why should Highways England be different?

## Recommendations

Highways England should maintain and monitor its Type Approval mechanism to reduce its exposure to operational failure of its technology schemes.

Highways England should stop the installation of non-approved cables on its highways and motorways by prime contractors and where breaches in its Type Approval mechanism are found then it should be the specific contractor that `makes good' the error.

The planned Traffic Management Technology framework by Crown Commercial Services on behalf of Highways England and others should stipulate the Type Approval mechanism and should forbid the procurement of goods and services outside of those listed on the framework.

Highways England should negotiate with its approved suppliers to maintain a call-off stock level which is currently practiced in the railway and electrical distribution network industries to better manage its cable inventory and improve delivery timescales.

## Tratos

Tratos is an innovation-led global cable manufacturer with manufacturing facilities in the UK and Italy. The company employs more than 400 people around the world producing electrical, electronic and fibre optic cable solutions.

Further information about Tratos is available at:

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