

Rail fire safety
Why cable protection
systems matter?



White paper

www.cubis-systems.com

Rail networks are expanding and upgrading. That means increasing electrification, and rail corridors becoming more congested with power, signalling, telecoms, and data systems.

Traditionally, achieving that level of rail fire safety performance has meant either:

- a) specifying difficult-to-handle concrete troughs
- b) accepting compromises with lighter composite alternatives that may not deliver the same flame-retardant standards

PROtrough changes that equation. It offers the flame-retardant performance the industry expects, in a lightweight, non-cementitious format that's actually practical to install.

As infrastructure density increases, fire risk - whilst rare - is becoming a more important consideration in design and specification. This is particularly true in higher-risk environments such as tunnels, underground assets, and heavily vegetated routes.

For designers and asset owners, this raises an important question:

If modern rail infrastructure demands high flame-retardant performance across rolling stock, cable systems, and station environments... why should troughing systems be any different?

Table of Contents

Introduction	3
Understanding risk	4
Brake related fire hazards	5
Confined rail environments	6
Vegetation and lineside ignition	7
Rodents	8
Why flame retardance matters	10
Introducing PROtrough	13
PROtrough range	14-15
How PROtrough works	16-17
Project spotlight	18
A complete rail offering	20-21

Last updated: 10/06/2026



Let's look at each risk in turn:

1. Brake-related fire hazards

One of the most widely recognised potential risks comes from braking systems.

In certain (rare) fault scenarios, brake shoes or hot friction materials can detach from rolling stock. When these components land within the rail corridor, they then have the potential to:

- Ignite surrounding combustible materials
- Expose nearby infrastructure to extremely high temperatures

This risk becomes particularly relevant around cable routes and troughing systems. If a troughing product were to soften, deform, or contribute fuel during a fire event, the consequences could escalate rapidly. Risk is only intensified where critical signalling or power infrastructure is involved.

Modern rail infrastructure increasingly focuses on reducing these risks through improved rolling stock maintenance, composite brake materials, and operational controls.

However, infrastructure design also has a key role to play in mitigating potential outcomes.

Understanding potential fire risk in rail environments

Rail fire incidents are uncommon. However, when they do occur, infrastructure itself can influence how quickly a fire might spread - or how difficult it becomes to control.

Across the UK rail network, several scenarios continue to warrant careful consideration during the design phase:

- Brake-related fire hazards
- Tunnels and confined environments
- Vegetation and lineside ignition
- Rodent damage and cable exposure





3. Vegetation and lineside ignition

International rail safety guidance - including publications from the Australian rail sector regulator ONRSR - highlights vegetation and combustible material as a potential contributing factor in lineside fires.

Dry vegetation, debris within ballast, and unmanaged fire load along the corridor can all increase the likelihood and severity of fire incidents should an ignition source be present.

Potential ignition sources include:

- Hot brake components
- Exhaust sparks
- Rail grinding activities
- Welding and maintenance works
- Electrical faults

While vegetation management and maintenance procedures remain essential controls, infrastructure materials themselves can either reduce or worsen fire propagation should an incident occur.

The principle is simple: the less combustible material introduced into the corridor, the lower the overall fire load.

2. Tunnels and confined rail environments

Tunnel environments present another important rail fire safety consideration.

Unlike open-air routes, tunnels create confined spaces where heat, smoke, and toxic gases could accumulate quickly in the event of a fire. Access for emergency response is significantly more difficult, while evacuation and visibility become major concerns.

In these environments, the behaviour of construction materials under fire conditions matters enormously.

Materials that could generate excessive smoke, contribute to flame spread, or fail structurally under heat all increase risk. (True for passengers, rail workers, and emergency services alike.)

This is why fire performance standards are already heavily scrutinised across rolling stock interiors, station materials, cable systems, and tunnel assets.

Yet historically, troughing systems have not always received the same level of attention.





4. Rodent damage and cable exposure

Another potential rail fire safety risk comes from rodent activity.

Rodents can be a persistent issue across rail infrastructure, particularly around cable routes. Gnawing damage to cable insulation can expose live conductors. In turn, this increases the potential for electrical faults, short circuits, arcing, and ignition events.

Protecting cable infrastructure is therefore not only about physical security and asset longevity, but also a part of broader fire prevention strategy.

For this reason, designers are increasingly considering how cable protection systems perform both:

- a) structurally
- b) under extreme environmental and fire conditions.

The industry focus on fire-conscious infrastructure

Rail fire safety is a universal consideration in projects around the globe. Across modern rail infrastructure, for example, there is an emphasis on reducing combustible materials and improving resilience in higher-risk environments. This emphasis is already evident in:

- The use of concrete sleepers instead of timber
- Fire-resistant cable systems
- Improved maintenance and vegetation controls
- Reduced-smoke materials within stations and rolling stock.

Extending the same design philosophy to cable troughing systems

Traditionally, many troughing systems have relied on concrete or polymer-based solutions that either:

a) Create significant installation and handling challenges

or

b) Offer limited flame-retardant performance

For designers trying to balance fire performance, installation efficiency, maintenance practicality, and long-term durability, that creates a difficult compromise.

This is exactly the challenge Cubis Systems set out to address with our PROtrough range.

Why flame retardance matters in troughing

No infrastructure product can eliminate fire risk entirely.

However, infrastructure can absolutely be designed to minimise potential for:

- Flame spread
- Heat contribution
- Smoke generation
- Secondary fire escalation

In practical terms, then, a flame-retardant troughing system helps reduce the likelihood that cable management infrastructure itself could become part of the problem in the rare event of a fire.

Where high temperatures or ignition events might occur, specifying materials designed to resist flame propagation is simply a sensible engineering decision. This is particularly important in:

Tunnels

Underground stations

High-density cable routes

Heavily trafficked corridors

Locations with difficult emergency access





Introducing PROtrough

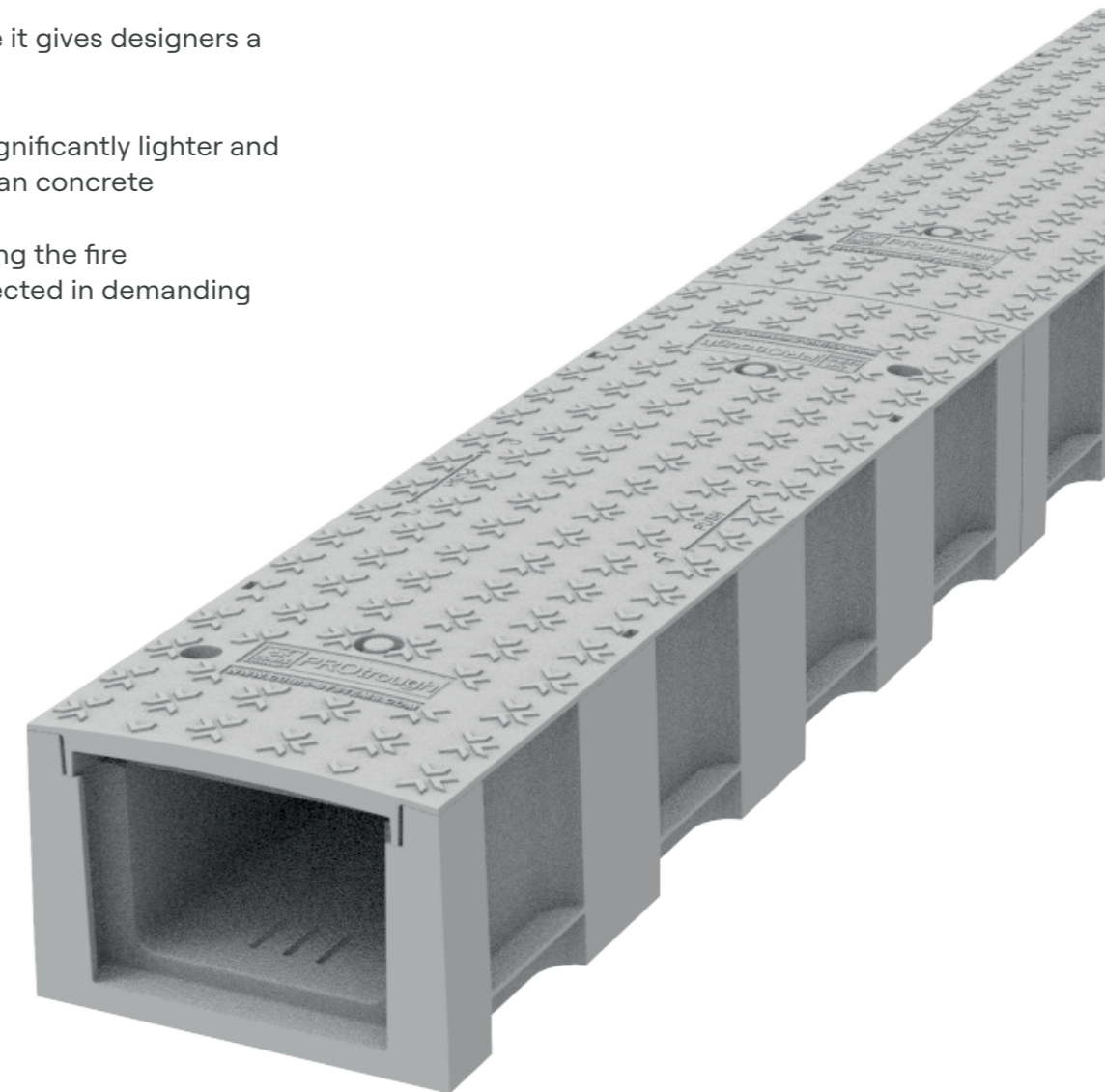
PROtrough is a modern approach to rail troughing. The solution has been developed specifically for modern rail infrastructure environments where traditional troughing systems may not meet every requirement.

The system combines lightweight modular construction with exceptionally high flame-retardant performance, without relying on traditional cementitious designs.

Most importantly, PROtrough is currently the UK's most flame-retardant non-cementitious troughing system.

That matters because it gives designers a practical alternative:

- A trough that is significantly lighter and easier to install than concrete
- While still delivering the fire performance expected in demanding rail environments



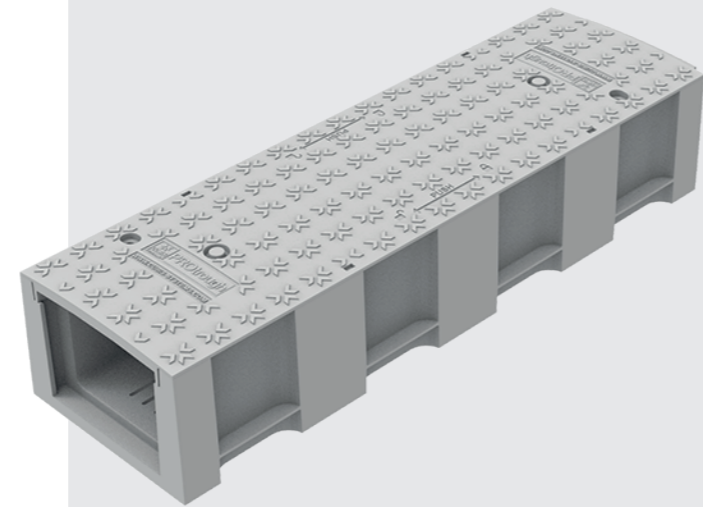
PROtrough

The industry's go-to flame-retardant, non-cementitious trough.

Our innovative cable trough system offers a modern, sustainable alternative to traditional concrete trough systems.

Fast fact comparison:

- Standard trough dimensions suited to most cable runs
- Clip-fit cover with secure, simple placement
- Cable management only



Key Benefits



Most flame-retardant non-cementitious trough in the UK. Tested to meet the highest fire safety standards.



No distortion or buckling with temperature changes. Engineered for stability in extreme conditions.



Heavy-duty range for slow-moving traffic. Designed for strength in high-impact areas.



Lightweight, modular, and high-strength. 5x lighter than concrete, with full structural integrity.



Greener and easier to get materials to site. Light, flat-packed, and putting fewer lorries on the road.



An integrated approach for smoother projects. Works seamlessly with the Cubis Systems range.



Delivers safer, faster, and more flexible projects. Easy manual handling plus quick modular assembly.



Measurable sustainability gains. 80.7% less carbon compared to using brick / concrete.

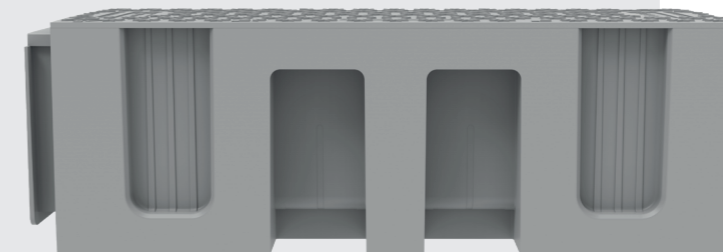
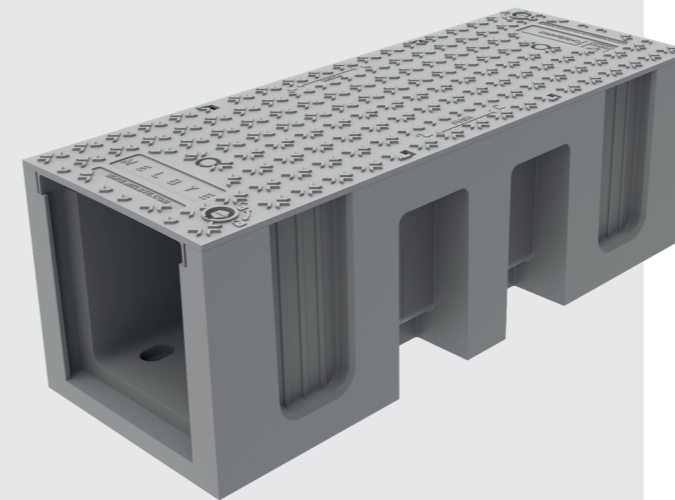
PROtrough 350

A new iteration offering increased internal capacity for larger projects.

Also features an integrated walkway configuration for dual functionality, plus secure turnkey locking.

Fast fact comparison:

- Larger profile for increased cable capacity
- Enhanced locking system for added security and stability
- Flat-sided design allows units to be laid side-by-side, forming an integrated walkway



How it works

PROtrough is a highly durable protection system that easily resolves engineering challenges for cable laying.

One-click connections

Simple slide and drop male to female connectivity with a unique one-click interlocking cover and sliding mechanism

Handy grappling points

Multi-point handle grips provide easy grab positions for installers, making manual handling simpler

Longer installed life

Glass Reinforced Polyester Resin (GRP) outperforms traditional construction methods for chemical resistance during its buried life

Optional divider panels

Enabling installers to contain multiple services all running alongside one another

Protected against velocity

Robust linear ballast anchor points ensure your installed units aren't displaced by the velocity of passing trains or vehicles

Rib design for vertical loading

Designed with optimum sidewall strength performance, meaning minimal flex when back-filled and strength that meets the vertical load class of A15 set by EN124

Backfill ingress protection

The uniquely designed cover ensures no material ingress when access is required

Integrated Panduit cable ties

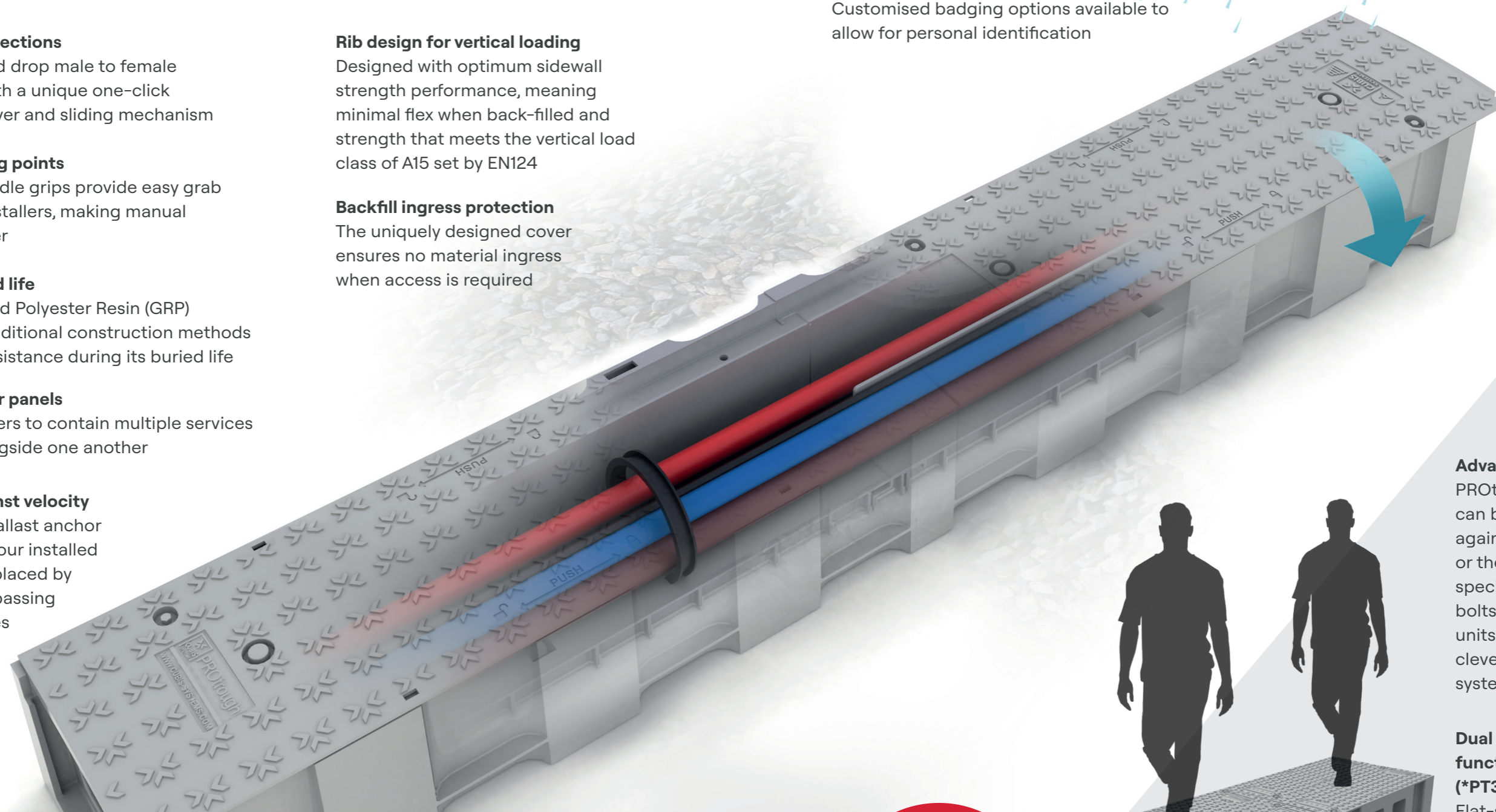
Offering convenient cable management and extra security of cables within units

Weather-resistance

Our distinctive tread pattern increases water run-off and resists ice build-up, while moulded slots within the base allow for drainage

Configurable customer branding options

Customised badging options available to allow for personal identification



Smooth Internal Walls

PROtrough's unique smooth internal walls allow for easier cable pulling, improved water drainage, and superior cable protection with no sharp edges.

Fire Retardant

PROtrough is a GRP cable management trough that has been designed to comply with all European fire retardant specifications, including those for tunnels and stations.

Contact us for technical project support, BIM library and design guidance, and installation info.

Advanced security

PROtrough units can be secured against vandalism or theft with specialist security bolts, while PT350 units come with a clever turnkey lock system

Dual walkway functionality (*PT350)

Flat-sided design means multiple units can be placed side by side to create a stable, durable walkway that enhances accessibility and safety

Project spotlight



Location: Sweden

Solution: PROtrough

Highlight: Specified to protect bridge cables – with lightweight, flame-retardant design enabling safe installation across the structure.



Location: UK

Solution: PROtrough

Highlight: Used along a rail lineside project to provide secure cable protection – all while enabling minimal disruption to live operations.



Location: Northern Ireland

Solution: PROtrough

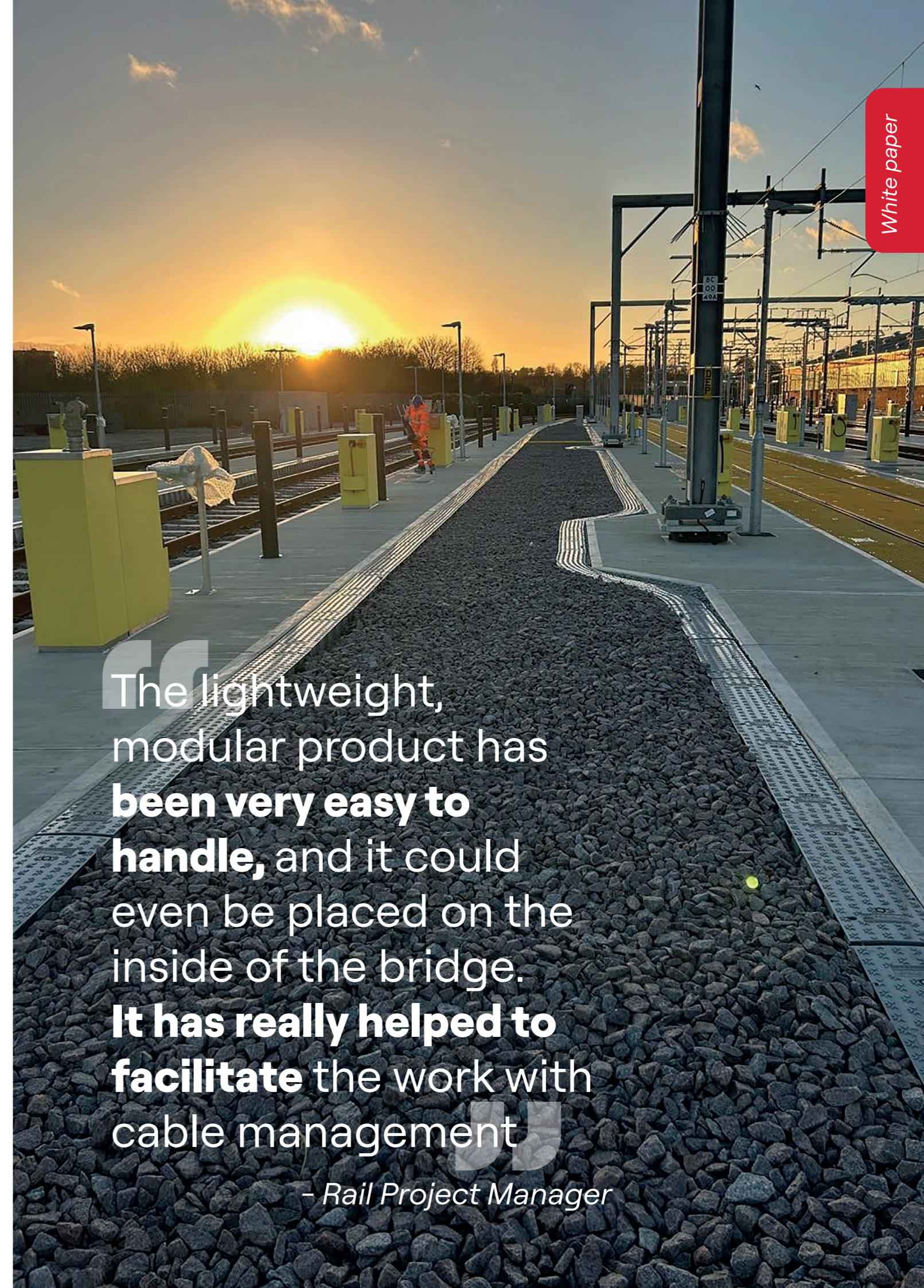
Highlight: Underpinned an 840m infrastructure upgrade, providing critical cabling with lasting protection against environmental and mechanical stresses.



Location: Luxembourg

Solution: PROtrough 350

Highlight: Provided high-capacity but sustainable cable management – helping the client achieve their decarbonisation agenda.



White paper

The lightweight, modular product has **been very easy to handle**, and it could even be placed on the inside of the bridge. **It has really helped to facilitate** the work with cable management

– Rail Project Manager

A complete rail infrastructure offering

The rail industry is already investing heavily in safer, smarter, and more resilient infrastructure.

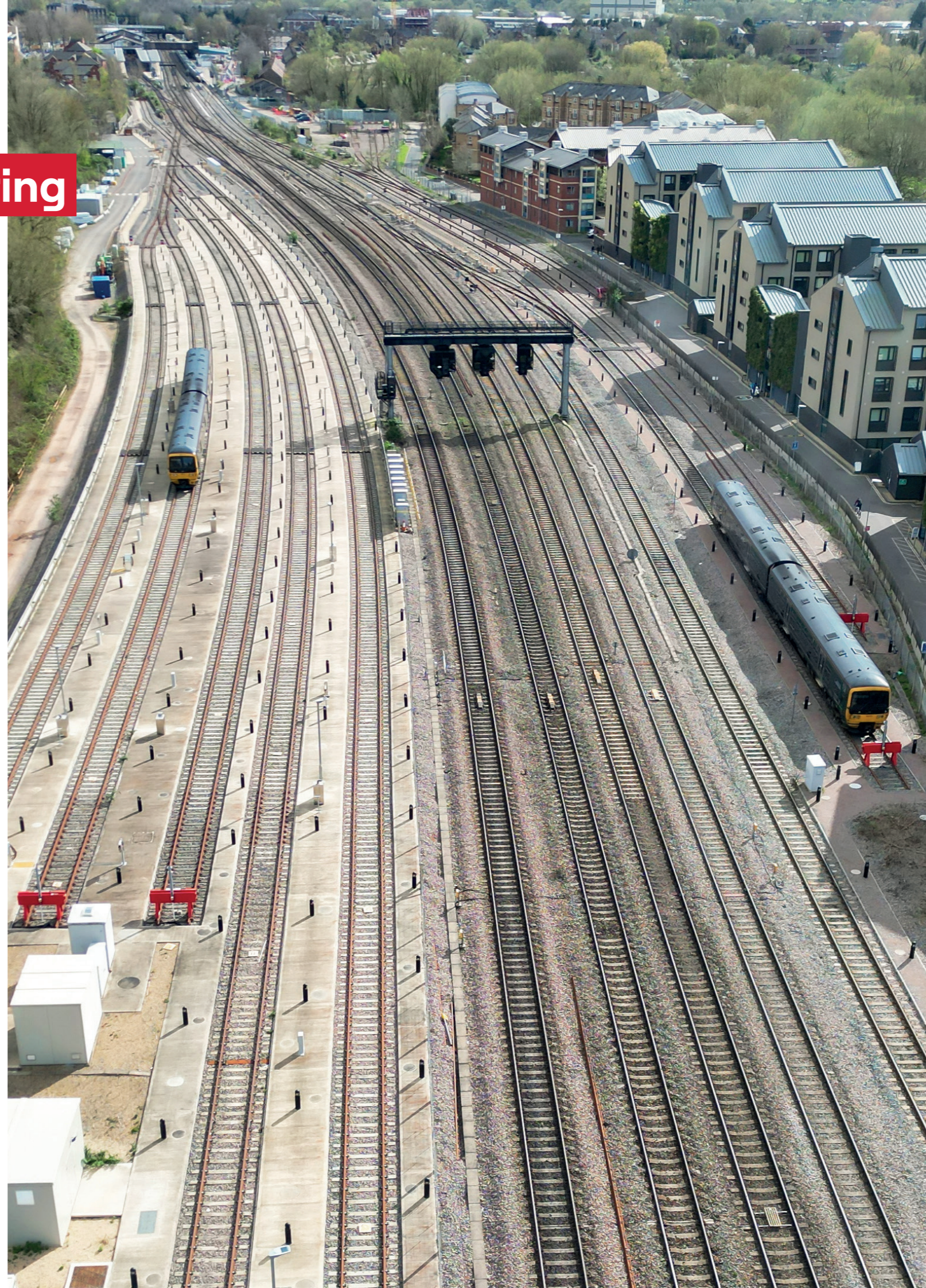
As designers place increasing focus on fire performance across the wider network, troughing systems should not be overlooked.

A modern cable route should do more than simply protect cables mechanically. It should also support:

- Safer infrastructure design
- Improved rail fire safety credentials
- Improved installation efficiency
- Lower whole-life maintenance demands

Ultimately, specifying a flame-retardant, non-cementitious trough in a modern rail environment simply makes good engineering sense.

While PROtrough is designed specifically for high-performance cable troughing, it forms part of a wider rail infrastructure portfolio from Cubis Systems.



Across major rail and light rail projects worldwide, Cubis Systems supports operators, contractors, and designers with:

- Trackside drainage
- Under track and road crossings
- Fixed telecoms network
- Rail cabinet base
- Buried cable routes
- Connecting, sealing, and protecting cables and ducting
- Innovative pole foundations
- Station platform access chambers

From trackside signalling and telecoms to power and station infrastructure, the focus remains the same:

Delivering modern infrastructure solutions that improve safety, installation efficiency, and long-term network resilience.





Contact Us

Head Office:
4 Silverwood Industrial Estate,
Lurgan, Co. Armagh,
BT66 6LN,
Northern Ireland
Telephone: +44 (0)28 38 313 100
Email: info@cubis-systems.com

www.cubis-systems.com

Driven by *Innovation*

Cubis is Europe's leading manufacturer of network access chamber and ducting systems, used in the construction of infrastructure networks for rail, telecoms, water, construction and power markets.

Cubis has developed an innovative approach in an old-fashioned industry. This has been achieved by developing quality products which replace traditional construction materials, like bricks and concrete, with lightweight plastics incorporating intelligent design features. These can then be installed faster and ultimately save our customers both time and money.

Cubis manufactures preformed network access chamber systems STAKKAbox™, AX-S™ access covers, MULTIduct™ multiple duct system and RAILduct™ cable trough at its manufacturing sites throughout the UK and Ireland these products are exported to more than 25 countries throughout the World.

At Cubis we pride ourselves on delivering technical customer support, new innovation, product quality and the highest levels of customer satisfaction.