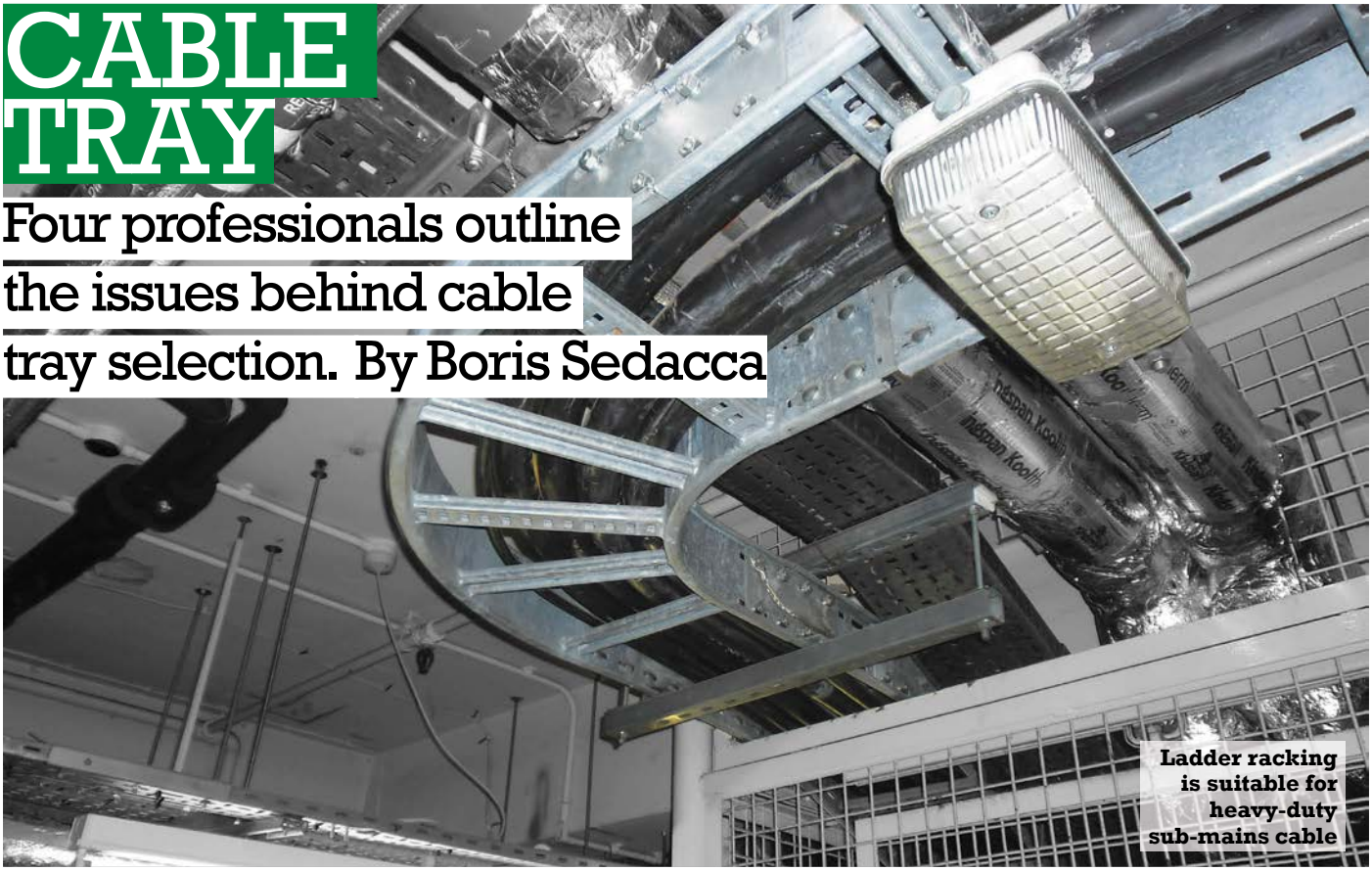
CABLE TRAY

Four professionals outline the issues behind cable tray selection. By Boris Sedacca



Ladder racking is suitable for heavy-duty sub-mains cable

THE BASIC selection criteria for cable trays fall under seven headings:

1) Equipotential bonding requirements
2) Space utilisation and sizing
3) Weight considerations
4) Fire rating
5) Cable ladders and support methods
6) Corrosion and other electrochemical reactions
7) Current capacity and de-rating factors.

A list is a useful start, but is inevitably short on detail and doesn't indicate degrees of importance between the different criteria. To help flesh out these crucial details, four professionals from the electrical installation industry were asked for their views on cable tray selection. The four experts comprised a consultant, an electrical installation contractor and representatives from NAPIT and the NICEIC.

The consultant

Barry Rendell, an independent electrical installation consultant, argues that cable can come crashing down if contractors get the cable tray fire rating wrong.

"A fire can last anything from half an hour to three hours," Rendell explains. "If the life-safety systems are installed underneath cable tray carrying ordinary circuits, then when there is a fire and the trays collapse, it's critical that they don't take out the life-safety systems with them. It is not so much damage from flames but from heat that causes problems. If you are carrying single-core 630mm cables, then you would probably want to use a proper cable tray rather than a wire basket.

He adds: "You can carry more weight by using more fixings but that can then get a little unsightly. Cable tray is often suspended by trapeze fixings from a ceiling but sometimes uses floor supports. Cables for data, emergency lighting and fire alarms can also be carried under false floors, particularly in data centres."

According to Rendell high-street multiples and stores are now using cable tray for light fittings, so it becomes a general-purpose highway carrying emergency lighting, fire alarm cables as well as low-voltage mains cables. An approach which he says "may be feasible for short runs".

Cable ladder is more commonly used where heavier cables need to be carried, but is more expensive. Apart from the choice between solid or perforated cable tray and wire basket, as Rendell explains, more expensive fibre glass tray may be needed instead of steel in where corrosion is an issue, e.g. refineries, offshore and marine applications. However, fibre glass tray has poor fire rating and will just shrivel up in a fire.

The contractor

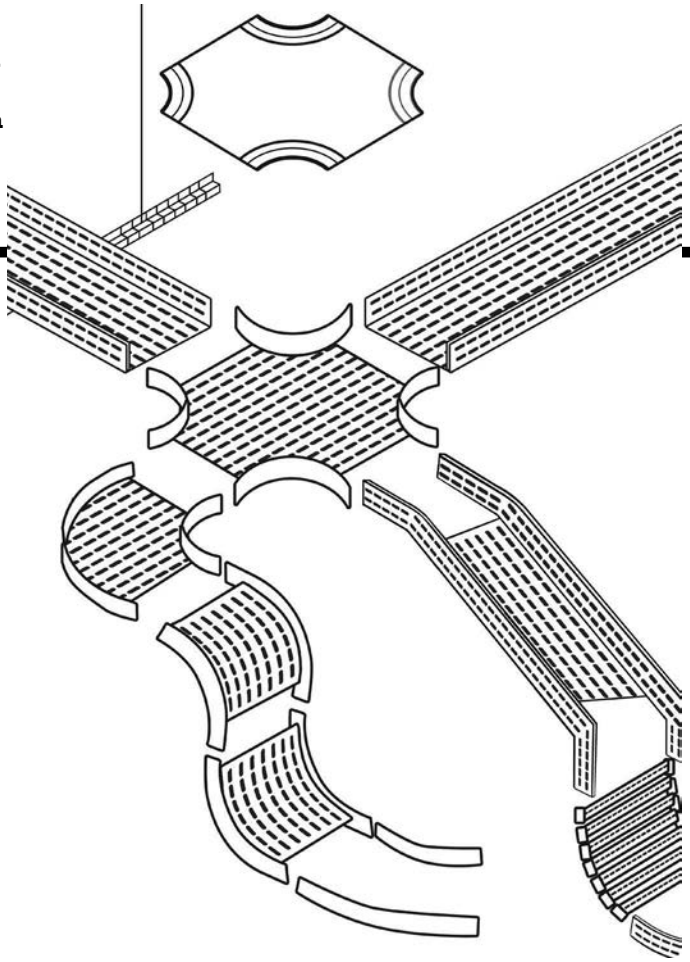
Paul Coffey is an electrical engineer at Lancashire-based William Dyer Electrical UK. Most of his company's cable containment fixing work is into steel purlins running across the top of a roof space or to the underside of mezzanine concrete floors in commercial installations.

Coffey explains: "Fixings are generally fastened to some part of the steelwork of commercial buildings, which is itself bonded back to the main earth bar anyway. Ladder racking can expand but jointing pieces can be used to overcome that. We always use steel cable tray for mains cabling, but for localised final circuit cabling, lighting trunking and data cabling we can use wire basket, which we tend always to fix with M8 threaded bar."

"The only time we would make calculations is for sub-mains, where we use ladder racking and heavy >

BARRY RENDELL, NAPIT

Various sections of cable tray are pre-manufactured for assembly on site, and perform similar functions to that of wire basket. An optional cover flange is shown for a four way junction and might be used where there is a requirement for cable tray to be covered. Cable tray is typically supported on suspended metal channel and fixed with Zebedee spring nuts. The springs put pressure against the sides of the channel, ensuring a tight fix when screwed down.



duty cable tray. In this case we take advice from manufacturers on fixing distances and loading because the Wiring Regulations do not cover specific scenarios. The manufacturers have experts available to help sell their kit, but at the end of the day it is up to the installation contractor to decide what to use according to his liability."

Coffey says that most of the cable tray used by his company is constructed from 316 stainless steel, which affords some fire and temperature resistance, as well as low temperature resistance. Cable tray made from lower-quality steel would tend to deform in the colder climate north of the UK.

Corrosion issues arise in some of William Dyer's industrial projects in factories where chemicals may be stored. "Obviously we have to find out what environment the client wants us to work in, and they need to advise us what chemicals they may have in that environment," says Coffey.

NAPIT

Frank Bertie, group technical director at the National Association of Professional Inspectors and Testers (NAPIT), explains that unlike cable trunking which requires an earth path, cable tray and wire basket does not need an earth path as it is only used as a support mechanism. However, equipotential bonding may still be needed, depending on whether it comes into contact with exposed or extraneous conductor parts.

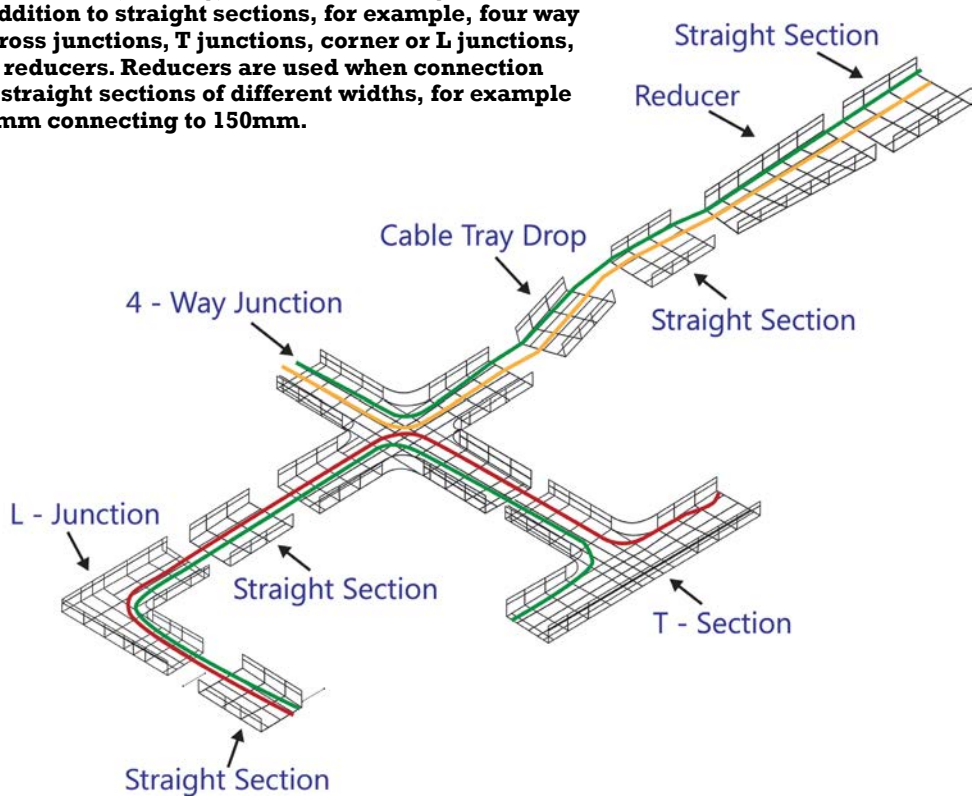
When it comes to support methods from high-level steel beams, Bertie says steel clamps and screwed rods are effective, as well as Unistrut or steel channel. Most cable trays are mounted at high level, but some are fitted under raised flooring usually because the actual concrete floor may be rough and uneven. Alternatively, protective rubber or cloth matting can be used, but cable tray speeds up the installation process. Regarding the choice between cable tray and wire basket, Bertie says the latter is simpler to install, so is better for some types of cable but not for others.

The NICEIC

Bertie's positive comments on wire basket are echoed by Matt Darville, engineering manager at National Inspection Council for Electrical Installation Contractors (NICEIC). "There is a certain amount of inertia among contractors who err on the side of caution and are reluctant to switch from heavy-duty cable tray to wire basket," says Darville. "Wire basket is cheaper, easier to install and lighter, and makes more sense if, for example, you are carrying lighter weight control wiring.

"If you look at the continuum from heavy cable tray and ladder through to wire basket, you may also want to look at the aesthetics as well as technical issues such as space utilisation and sizing," says Darville. Few people would consider cable tray as having any sort of aesthetic appeal, but far from concealing cable tray in false floors and ceilings, modern buildings sometimes deliberately show cable tray as a decorative feature, a fashion trend which, according to Darville, says is catching on rapidly in the like of pubs, clubs and restaurants.

Cable basket (and tray) comes in a variety of sections in addition to straight sections, for example, four way or cross junctions, T junctions, corner or L junctions, and reducers. Reducers are used when connection two straight sections of different widths, for example 300mm connecting to 150mm.

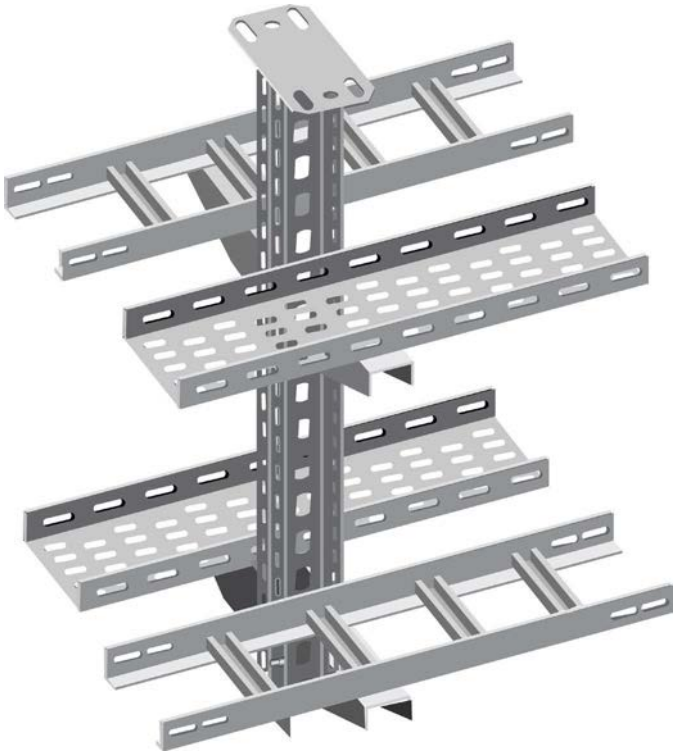


When it comes to fire rating, Darville maintains that all parts of the installation including clips and supports must have the same fire rating as the cable. Similarly, there is no point in carrying low smoke and fume (LSF) cable in non-LSF trunking.

On finishes, Darville argues that the many choice now available has done much to eliminate earlier problems with corrosion and electrochemical reactions, when users were limited to a handful of options like stainless steel and galvanised dip.

In the case of current capacity and de-rating factors, Darville reasons that cables in trays will have as good a rating as free air as long as they are not bunched too tightly.

On the issue of the need to earth cable tray, opinions are divided. Darville points to certain manufacturers like Legrand who recommend earthing while some contractor trade bodies like Select do not. He adds: "Some professional trade bodies have agreed to differ on whether you need to earth cable tray. You need to earth cable tray if you use steel wire armoured (SWA) cable or something with the equivalent of double insulation, but this is not necessary if you just use twin and earth cable. Electromagnetic compatibility (EMC) issues also need to be taken into account as control cables can go into separate compartments in the same tray as that used for mains cable and extra low voltage cable."



A typical support for cable tray and ladder shown in ceiling mount orientation. It may be mounted upside down instead and fixed to a concrete floor under a raised floor. Angle brackets may also be used for wall fixing from which screwed rods may be suspended to support cable basket, tray or ladder. Steel beams may be used for substation cabling.

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