Install, Protect and Comply

Best Practice for BS 7671+A3

The Installation and use of metal fixings to support cables in all areas.

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THE NEED FOR CHANGE

This document is being produced in order to bring all of the knowledge that we have, in relation to the use of metal fixings for cables, within one document.

Many electricians and fire alarm installers do not know, understand the need for, or the correct way to install these clips to fully comply with BS7671 Amendment 3.

In the following pages, we cover:

- Why the changes to the regulations are necessary
- How they affect the electrical installer
- How firemen can and have been killed by entanglement
- How others may be killed if we do not adopt the changes
- How these regulations need to be enforced and monitored
- How electrical installers are being let down by the groups they rely on for help
- How and where to use the metal fixings
- How to install them correctly
- The need to consider those that come after you and add to the circuits
- When to use plastic plugs with screws and when not to
- What happens when you walk away from the installation?

- **2nd February 2005 – Harrow Court**
  A fire at the eighteen-storey Harrow Court residential tower block in Stevenage, Hertfordshire claimed the lives of two firefighters and a member of the public. One of the firefighters had become entangled in fallen wiring in one of the block's communal areas.

- **2nd November 2007 – Atherstone-on-Stour**
  Four firefighters died. Witnesses stated that there were hanging cables which the firefighters were tangled in.

- **6th April 2010 – Shirley Towers**
  Two firefighters died whilst fighting a fire within a high-rise building in Southampton, both were trapped in fallen cables.

Harrow Court was a turning point. At the inquest that followed, the coroner, Mr. Edward Thomas, recommended that all plastic conduit and trunking should be removed and the cables fixed using metal fixings[1].

Eight years later, at the Shirley Towers inquest, the coroner, Mr. Wiseman made a further recommendation to have *"… Building Regulations amended to ensure all cables, not just fire alarm cables are supported by fire-resistant cable supports"*. Mr. Wiseman recommended an amendment to BS 7671 (2008) to achieve this. He then sent these recommendations in a letter to the Secretary of State for Communities and Local government, Eric Pickles MP.

This culminated in the publication of Amendment 3 to the 17th Edition (BS7671:2015) Wiring Regulations stating that after 1st July 2015; *"Wiring systems in escape routes shall be supported in such a way that they will not be liable to premature collapse in the event of fire".* In other words, by using fire-resistant metal supports for trunking and conduit.

Eighteen months later, the question remains; what have we done in the United Kingdom to change the installation methods we use to protect others?

In the following pages, we will show the answer to the above question is very little. We will show how the guidance offered by the groups electricians turn to for help is incorrect, and we will also show how simple it would be to put this right. We will also look at modern installation methods, and discuss whether these need metal fixings, showing how with the use of good techniques, no person, firefighter or otherwise should die due to entanglement.

[1] "The supports to fire alarm cables must conform with (as a minimum) BS5839 - part 1 2002: clause 26.2(F [3]

The following is a quote from an Electrician on the IET forum regarding BS7671+A3

"We were discouraged years ago from using metal clips on cable, if memory serves me, because of the danger of it cutting the sheath. But the bottom line is this will have little or no effect for at least 30 years, it is window dressing. Especially given that nobody has come up with decent alternatives. Tray and baskets are NOT an option where a single new cable is involved. Your new light is to cost £600 rather than £60! Know what many of my customers would say - but the qualified electrician who doesn't care about regs is only going to charge me £100. That is the biggest issue today, not d-i-yer's but time served qualified sparks who worked to the 15th 16th 17th whatever is easiest. That is ignoring the CCTV installers and burglar alarm installers who believe bs7671 doesn't apply to them"[2].

Having spoken to many electricians over the last few months, we can say that this mentality is prevalent amongst installers throughout the UK. The regulations are being undermined and questioned by many, because they do not feel that everyone is following the same path and those that do, are at a disadvantage. Their jobs are now at higher cost and take longer than those that are not complying. They know that these regulations are now mandatory but they also know that the works are not being policed properly.

This is where the NIC and NAPIT should be stepping in and supporting electricians from the confusing muddle of the regulations, explaining the reasoning behind them and practical methods of installation.

The regulations as they are written are ill-formed and not defined properly, they do not explain for example; what a fire escape route is and although this may seem obvious, the wording is creating ambiguity amongst installers. They do not know where or on what occasions to install metal fixings. This document is an attempt to provide answers to their many questions.

It should be noted that whilst this document is written by the manufacturers of FIreFly Fixings, it is in no way intended to be advertising material for our products. It is instead an advisory to the issues we are being asked both by our suppliers, our wholesalers and electricians themselves due to the lack of coherent information available. Many other metal fixings are available.

It should also be noted that we anticipate the 2018/version 18 of the regulations to amend this ambiguity by explaining that ALL low voltage cables should be supported with metal fixings. This document is an attempt to bridge the gap between here and there.

[2] Quote from IET.org forum

Regulation BS7671:2011 +A3

521.11.201 *Wiring systems in escape routes shall be supported such that they will not be liable to premature collapse in the event of fire. The requirements of Regulation 422.2.1 shall also apply, irrespective of the classification of the conditions for evacuation in an emergency.*
NOTE 1: *Non-metallic cable trunking or other non-metallic means of support can fail when subject to either direct flame or hot products of combustion. This may lead to wiring systems hanging across access or egress routes such that they hinder evacuation and firefighting activities.*
NOTE 2:
This precludes the use of non-metallic cable clips, cable ties or trunking as the sole means of support. For example, where non-metallic trunking is used, a suitable fire-resistant means of support/retention must be provided to prevent cables falling out in the event of fire.

What are the issues identified by speaking to installers?

1. What is an escape route?
2. What is a metal fixing and how do we prove it will support the cables?
3. What testing can we use to confirm this?
4. Should metal fixings be supported with the use of plastic plugs?
5. Information provided to electricians by NAPIT and NICEIC
6. Why metal fixings in all areas, all of the time?
7. How do we rectify the situation?

1. What is an escape route?

An escape route is a route designated for escape to a place of safety in the event of an emergency.

"Escape routes may include not only defined routes such as corridors, stairways and hallways, but also open areas through which escaping persons might reasonably be expected to need to pass on their way to a place of safety".

What defines the fire escape route? Is it the corridors only leading from, say, the bedroom to the place of safety or does it include the bedrooms and lounge and other rooms that you must cross to escape?

It is possible that Every. Single. Room. in a tower block such a Shirley Towers, or any building, could be classed as part of the Fire Escape route and this where installers are becoming confused. The ambiguity of the wording allows a number of responses and NICEIC and NAPIT should be giving a definitive response and enforcing it.

The answer to this question is ALL LOW VOLTAGE CABLES in ALL AREAS should be supported with metal fixings.

2. What is a metal fixing and how do we prove it will support the cables?

A metal fixing is a fixing that is designed to retain the weight of the cables it holds in the event of a fire, rather than have them drop to the floor causing entanglement issues. It should be tested to the same rigorous levels of the cables it supports and fixed in such a way as to be in position after the cables have failed.

This also includes the fixings for all cables that are supported within Plastic conduit / plastic trunking.

3. What testing can we use to confirm this?

All of Firefly's cable-retaining clips have been tested and passed by Exova Warringtonfire, the leading fire test company in the UK, using the same rigorous testing as the cables used in fire alarm circuits. To achieve this, a special test was undertaken (the first of it's kind), which they referred to as an ***"Ad-hoc investigation to determine the fire performance of a cable retaining clip"***.

The test entailed heating the cable AND the clips to 970 degrees Celsius, whilst at temperature, they were then repeatedly struck with a weighted metal hammer for sixty minutes. Following this they were then rapidly cooled with water, whilst continuing to be struck. This test, originally designed to test FP-Plus-type cables (those used in Fire-Alarms systems), was designed to simulate the potential stresses that could be placed upon both cable (and now clip) during a fire situation.

Having passed, Firefly is the only clip for sale in the UK that has had this rigorous level of testing[3].

Whilst we are proud to be the first, we also believe that ALL metal fixings and cable retention clips should have to undergo this level of testing before they are allowed in the marketplace.

4. Should metal fixings be supported with the use of plastic plugs?

NO. Several reports, the most notable of which was by the BRE has shown that at temperatures of 300 degrees (a temperature at which a firefighter could and would still be moving within the building), plastic wall plugs will start to fail, thus potentially dropping cables upon them[4].

[3] Certification available upon request

[4] " http://electrical.theiet.org/wiring-matters/58/bre-report/index.cfm

5. But NAPIT have said that they can be used?

During their recent "NAPIT Expo On The Road" series, NAPIT have said that**: "***Plastic Rawlplugs are not excluded from use as it is generally accepted that the thermal mass of walls and ceilings will provide some protection against premature collapse.*[5]*"*

THIS. INFORMATION. IS. WRONG.

Despite what NAPIT have said in their literature, the above statement is wrong and such information could be fatal if followed. We have documented evidence to show that at standard fire-temperatures, Plastic Wall Plugs will melt, and thus not provide any protection to the Firefighters working around them.

The ONLY method of retaining cables, is with a metal cable support AND with a METAL fixing.

6. Why metal fixings in all areas, all of the time?

Whilst we have explained that there are as many fire-escape routes as there are buildings, we also do not believe the methods of cable retention within the UK for ALL low-voltage cabling is suitable to protect both the occupiers or the fire service in the event of a fire in its current form.

For example, we are told that metal fixings are not required on plastic trunking unless it is within a fire escape route, yet we have evidence that in many fires, the lid of the trunking can be forced off at great distances, where the heat and hot air travel within it. This can lead to the cables falling over doorways and windows and in the dark, smoke filled corridors causes a danger of garroting any person caught by the falling cables or trapping the public or firefighters within the building.

This is just one, very common, example. We think the easiest way to solve this issue is for metal fixings to retain ALL low voltage cabling so that in the event of a fire, it is not even a consideration as a danger.

7. How do we rectify this situation

We believe that the information the various trade bodies have been giving out is incorrect, we also believe that electricians should have a better understanding of modern building techniques so that they understand how and why metal fixings should be used.

Modern building methods mean that many electricians are often unable to identify whether a standard ceiling is being installed, or a fire break between floors or stairways, they simply want to get their cables in as quickly as possible to allow other trades in behind them.

[5] NAPIT Expo On The Road "Your Questions Answered on Non-Combustible Cable Supports"

For that reason, again, we believe Metal Fixings should be used *EVERYWHERE.* Electricians must be given simple guidance that ensures what is above the ceiling provides the same level of protection as the ceiling itself.

We believe that better support should be given by the trade associations, the education centres and groups such as the IET, we also believe that the 18th edition of the regulations should state **METAL FIXING IN ALL AREAS. ALL OF THE TIME** and with the run-in to that edition being published being less than a year and a half away, we should be starting to use this method NOW.

Other questions we have received from electricians:

Are metal fixings required for all cables above a suspended ceiling?

Yes all low voltage cables, including data and telephone cables, must be fixed with metal fixings.

Do we need metal fixings on metal cable tray?

Generally, no as long as the fixing of the tray to the ceiling / wall etc are via concrete screws / metal fixing with no low temperature plastic plugs that can fail.

Secondly the cables upon the tray should be fixed with metal fixings / metal cable-ties or similar as is current.

Can the fixings go within trunking / conduit or around trunking / conduit?

The fixings can be installed within cable trunking or externally, they can even be fixed externally surrounding cable trunking or conduit, as long as they are suitably fixed using metal fixing and not plastic plugs.

Finally

When an electrician is called to a new job, how does he know if the site has full metal fixings, partial installation in some areas or none at all?

The use of full metal fixings could be referenced at the fuseboard with a small label identifying that the site is secure.

Similarly a small label could give the areas protected (Hall, Common areas and landings for example), but we would prefer;

METAL FIXING IN ALL AREAS. ALL OF THE TIME