

'Safe' rooflights for station refurbishment

With many station refurbishment programmes currently underway, one element of the structure that can bring dramatic and immediate improvement to the appearance and environment is the replacement of the old canopy glazing. Numerous station canopies are in a poor state of repair, with leaking roof glazing and low levels of light transmission. Replacing the worn out glazing with modern glazing materials can drastically change the atmosphere under the canopy, flooding the area with natural daylight and eliminating leaks.

There are a variety of glazing options available in polycarbonate in a range of multiwall and monolithic grades. These provide different levels of light transmission and solar control, the product ultimately specified depending on the requirements of the individual location. Where a glass-like appearance is required, 6mm polycarbonate can provide this. However, it can also give you a virtually unbreakable alternative to glass that, when glazed in a pre-assembled frame also meets the HSE requirements for Non-Fragile (NF) roofing assemblies

As part of a quick and easy pre-assembled panel system, polycarbonate glazing can be fitted rapidly in limited possession time whereas traditional glass and glazing bar systems require specialised fitting and much longer installation times.

Quick to fit Multi-Link-Panels

Due to their innovative 'fix and link' design Multi-Link-Panel rooflights from Twinfix are incredibly quick to install, taking only one-third of the time compared with a traditional split-bar system, and allowing contractors to make the very most of possession times. The panels are factory manufactured by Twinfix to size for each job and are delivered to site on a JIT basis, ready for quick and easy installation.

Twinfix offer a range of different glazing, and non-glazing, options for these rooflight panels.

- **Multiwall polycarbonate:** has the appearance of Georgian wired glass when viewed from below, but has a higher specification and better long-term



Above: Ealing Broadway station canopy refurbished with Twinfix Multi-Link-Panel NF rooflights



Stratford station recently refurbished with Multi-Link-Panels NF fitted with aluminium sandwich panels on the left and 25mm multiwall polycarbonate glazing on the right

performance. They can be classified as Non-Fragile within the Twinfix Multi-Link-Panel NF.

- **Solid polycarbonate:** looks like laminated glass but can be classified as Non-Fragile when fitted into the Twinfix Multi-Link-Panel NF.

- **Aluminium sandwich panels** are an alternative option to polycarbonate glazing where natural daylight is not required. A pitched roof can, therefore, be refurbished very quickly with a combination of polycarbonate glazing and sandwich panels in whatever configuration is required for that station (see photograph above).

Multi-Link-Panels use aluminium as the frame/

glazing bar. Aluminium is light in weight and can be powder coated to virtually any colour. It will not rust or require repainting, helping to cut down on future maintenance costs.

The polycarbonate glazing is very light in weight, making the Multi-Link-Panels easy to handle on site. Compare 6mm Georgian wired glass that weighs 15kg/m² with 6mm solid polycarbonate that weighs only 7.2kg/m², or 16/25mm multiwall polycarbonate that weighs 2.8 or 3.5kg/m² respectively, and you will understand that installing these lighter weight panels could help to extend the life of any older building. Their light weight also means that the contractor will not require heavyweight cranes for lifting the rooflights onto the roof for installation, and there will be no need for him to include a ten per cent installation breakage factor either!

Safe, or non-fragile roofing

Safety of people on roofs, whether they are working there legitimately, or whether they have gained access onto a roof for their own nefarious means, is of paramount importance and is ignored at your peril. CDM regulations state that it is the responsibility of the designer/specifier of replacement roofing to design out any future possible dangers in the area. Specifying Non-Fragile rooflights helps to do just that.

When fitted into the Twinfix Multi-Link-Panel NF, polycarbonate is incredibly safe should anyone trip up when they are on a station roof. The NF refers to 'non-fragile' and indicates that these panels have been tested to the Health & Safety Executive's recommended drop test, ACR[M]001:2000 Test for Fragility of Roofing Assemblies (revised in 2005). The wording of the document states that the test should be carried out on complete systems ('Roofing Assemblies') and not on individual components that might be installed on a roof. In all cases when specifying roof glazing it is essential that 'the system' has been tested, and specifiers should ensure they receive a statement from their supplier, together with the test documentation, confirming that the product meets the HSE requirements in the ACR[M]001:2005 test.

There is sometimes a misunderstanding regarding the safety of people on roofs. Some specifiers think that by requesting a roof glazing system that conforms to BS6206 then they are providing a safe rooflight. This is not the case. It must be understood that the ACR[M] drop test is far more onerous than BS 6206 as it represents a human impact incident on a roof surface where a fall through (the glazing) might result in death or serious injury. BS 6206 was designed for vertical low-level glazing where the main objective is to prevent human injury from broken glass. Unfortunately, sometimes BS 6206 is mistakenly quoted as being a satisfactory standard for overhead glazing; this is not true.

The photograph shows the Twinfix in-house test rig, as specified by the HSE, where they test their rooflights. The test consists of a 45kg bag dropped from a height of 1.2 metres on to a sample, in this case their Multi-Link-Panel NF rooflight. Twinfix have tested their various grades of Multi-Link-Panel NF to the ACR[M]001:2005 test. They have also tested other products and glazing configurations, and the results are shown below:

1. 6.4mm laminated glass fitted into a standard glass glazing bar – the drop bag falls straight through the glass. 6.4mm laminated glass **fails** the test.
2. 16mm multiwall polycarbonate fitted into a glazing bar that is specifically designed to



hold this material – the drop bag causes the multiwall sheet to flex out of the glazing bars and the drop bag falls through the resulting hole. 16mm multiwall polycarbonate fitted into a glazing bar **fails** the test.

3. 16mm Multi-Link-Panel NF (16mm multiwall polycarbonate fitted into the Twinfix Multi-Link-Panel with the Non-Fragile fixing) – the drop bag bounces on the glazing. The Twinfix Multi-Link-Panel NF **passes** with a 'B' rating.

Both the Twinfix 25mm multiwall polycarbonate Multi-Link-Panel NF and the 6mm solid polycarbonate Multi-Link-Panel NF also pass this test with a 'B' rating.

From the above you can see why the HSE stress the importance of testing the complete system, rather than just individual components. Whilst polycarbonate glazing is often thought to be 'Non Fragile' due to its high impact performance, when installed in a standard glazing bar it is the actual glazing system that fails, with the polycarbonate sheet simply flexing out of the glazing bars under the severe impact imposed by the dropping test bag. Bear in mind that these glazing bars are designed specifically to hold polycarbonate and have a 30mm edge engagement that will hold polycarbonate glazing perfectly satisfactorily under normal circumstances. The Multi-Link-Panel NF consists of specially designed bars combined with a patented method of installing the polycarbonate that holds it in place when subjected to the drop test.

Specifiers can have real peace of mind when ordering the use of Multi-Link-Panels NF, as it means that any unauthorised access onto a station canopy will not result in a dangerous fall through the glazing. This is particularly important where an embankment and/or existing building design provide a

possibly tempting access point onto a roof.

Twinfix Multi-Link-Panels in both solid and multiwall polycarbonate have been used extensively in many rail and tramway applications, including Network Rail, London Underground and Metrolink. By careful selection of a suitable grade of glazing material to meet individual application requirements the designer can achieve the required level of light transmission, solar control and appearance. Where heritage is a

consideration the Railway Heritage Trust is able to approve the use of polycarbonate materials in appropriate applications.

Fire

Polycarbonate is a naturally self-extinguishing material and when the source of a fire is removed the flames will go out. The Building Regulations require that glazing materials do not contribute towards the spread of a fire, and this is covered under the Surface Spread of Fire Regulations, detailed in BS476 Parts 7 & 6 where polycarbonate achieves a Class 1Y rating.

Environmental considerations

In the case of enclosed areas, such as a railway depot, heat insulation may be a key requirement as denoted in the Building Regulations – Document L2A and L2B. Multiwall polycarbonate can achieve U values of 1.5W/m²K and, with careful selection of light transmission and solar control, specifiers can achieve a balance of natural light levels and manage solar gain.

Both the polycarbonate and the aluminium used in the construction of the Twinfix rooflights are 100 per cent recyclable, thus reducing their impact on the environment and limiting the whole-life cost of the glazing system. Polycarbonate systems offer a viable alternative to traditional glass rooflights, achieving a combination of benefits, particularly when used in the pre-assembled modular Multi-Link-Panel system. ■

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