FUTURE proof

News, views and comment celebrating the UK's most versatile building solution

ROOFING EDITION FOR SPECIFIERS

Inside this issue

mac
Mastic Asphalt Council
Promoting excellence in construction

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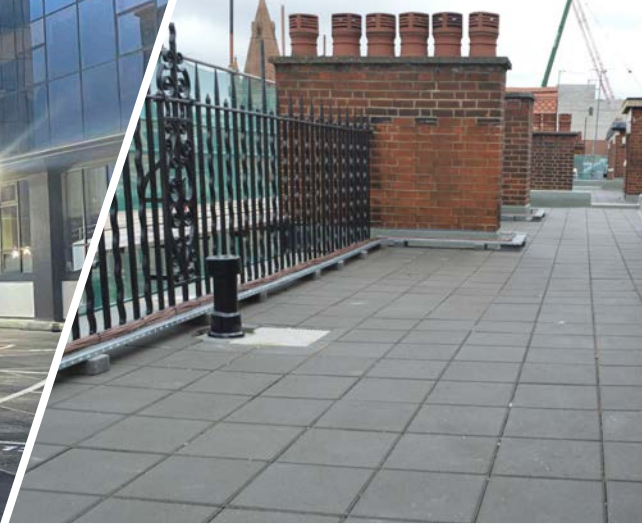

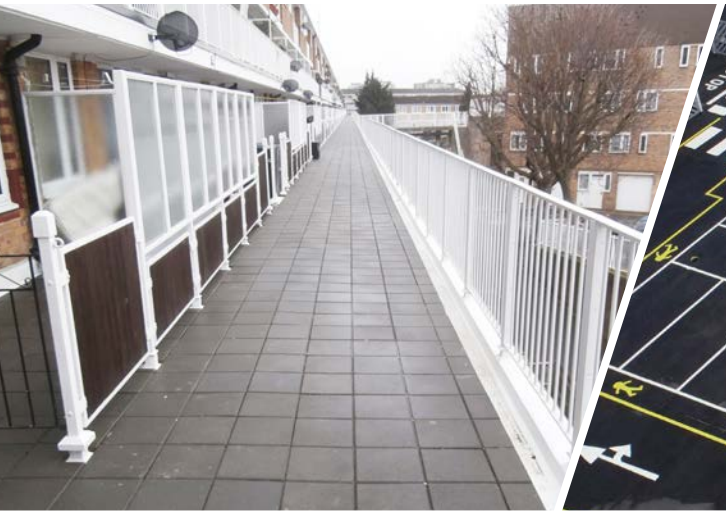

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welcome...

...to the roofing edition of *Future Proof* which is produced by the Mastic Asphalt Council (MAC), the official trade association for the mastic asphalt sector in the UK.

As a designer, my focus is on sustainable architecture and design, with an aim of creating beautiful, energy efficient buildings that age gracefully and don't cost the earth to build or maintain.

Increasingly as I detail my buildings I'm looking for the most robust way of achieving beautiful finishes. The work we're doing on life cycle carbon modelling shows that long lasting buildings that require less maintenance/replacement cycles are more sustainable, buildings have to last a long time.

We need to be thinking about finishes that last 100 years - not 20. We need to prioritise finishes that need minimum maintenance over the long term and can be efficiently recycled at their end of life. Clearly this has a cost implication but to fully understand this we need to think in terms of life cycle cost, not just installation cost. The life cycle cost of mastic asphalt is much lower than its competitors.

Mastic asphalt is often a 'go to' for my client projects. I've also used it on the construction of my own home, specifically on a complex waterproofing detail, where mastic asphalt was used to form upstands, sumps and drainage outlets.

Like many of my client led projects, building my own house became a journey to embrace re-imagined older materials. Even though mastic asphalt has been around for many years, it's being re-imagined as a highly relevant building material for today and this magazine is designed to give you a brief insight into its design and technical capabilities.

Mastic asphalt is 100% recyclable and inherently efficient to install. It was an eye opener on my build. The mastic asphalt guys used what they needed and took back what they didn't, to reheat and reuse. No waste at all.

Many alternative materials such as complex multi-layered roof membranes can be incredibly difficult to recycle and this is not likely to change anytime soon. We need to reduce waste first. Waste during build is hard to control but waste before installation is a huge issue too, with 10% of materials coming to building sites leaving in a skip.

Some of the most interesting and best materials we are using in our architectural practice are the old ones, updated for the 21st Century. Sometimes you can think you're looking backwards and it turns out you're staring at the future.

We hope you enjoy reading this issue of Future Proof. If you have any technical queries, the Mastic Asphalt Council team would be very happy to help and you can email them at info@masticasphaltcouncil.co.uk

"Mastic asphalt is often a 'go to' for my client projects."

Charlie Luxton

Versatile Roofing Options with Mastic Asphalt

Mastic asphalt is often considered the traditional choice of specifiers due to its long history as one of the world's oldest construction materials. However, it can sometimes wrongly be perceived as a one-dimensional waterproofing product only available in a standard black finish, but that is far from the truth. Mastic asphalt has evolved to meet the needs of modern construction and offers tremendous versatility.

Most commonly associated with flat roofing applications due to its waterproofing properties and durability, mastic asphalt is now being specified across a whole range of construction applications where a seamless, durable surface is required. Able to meet a range of specification requirements, mastic asphalt is being specified more and more for use on modern buildings and can be applied to most substrates, including concrete, metal, timber and plywood decks.

It forms a continuous waterproof covering over flat, sloped or curved surfaces in warm, cold and buried roof applications and can be moulded around pipes, roof lights and other projections to provide a completely seamless membrane. Thermal insulation materials can be easily laid as part of a mastic asphalt roofing specification to provide any required U-value.

Balconies and Terraces

Mastic asphalt finishes are proving very popular for balconies and terraces, as it offers such a hard-wearing surface ideal for regular foot traffic. It can be laid as the surface finish or beneath promenade tiles or paving slabs. Typical applications range from balconies in housing association or local authority projects, to more decorative applications.

A recent trend has emerged for external applications whereby a traditional mastic asphalt base is used, but incorporating terrazzo to create a more aesthetic, bespoke finish. This is proving popular

for outdoor terrace and walkway areas in university buildings, as it requires little maintenance and can simply be re-ground in years to come to give the finish a new lease of life.

This type of mastic asphalt terrazzo is often used in European countries such as Sweden, France and Germany, and more UK specifiers are now realising its specification potential. It can be found on the Pope Building at the University of Nottingham and the White Knights Building at Reading University.

Green Roofs

Mastic asphalt isn't perhaps typically associated with green roofing, but it actually offers an ideal waterproofing solution for extensive green roofs, intensive roof gardens and biodiversity roofs. A green roof system laid with a mastic asphalt waterproofing system can enhance environments, control water run-off, improve insulation and reduce noise transmission. It is resistant to root penetration and does not require an additional anti-root barrier.

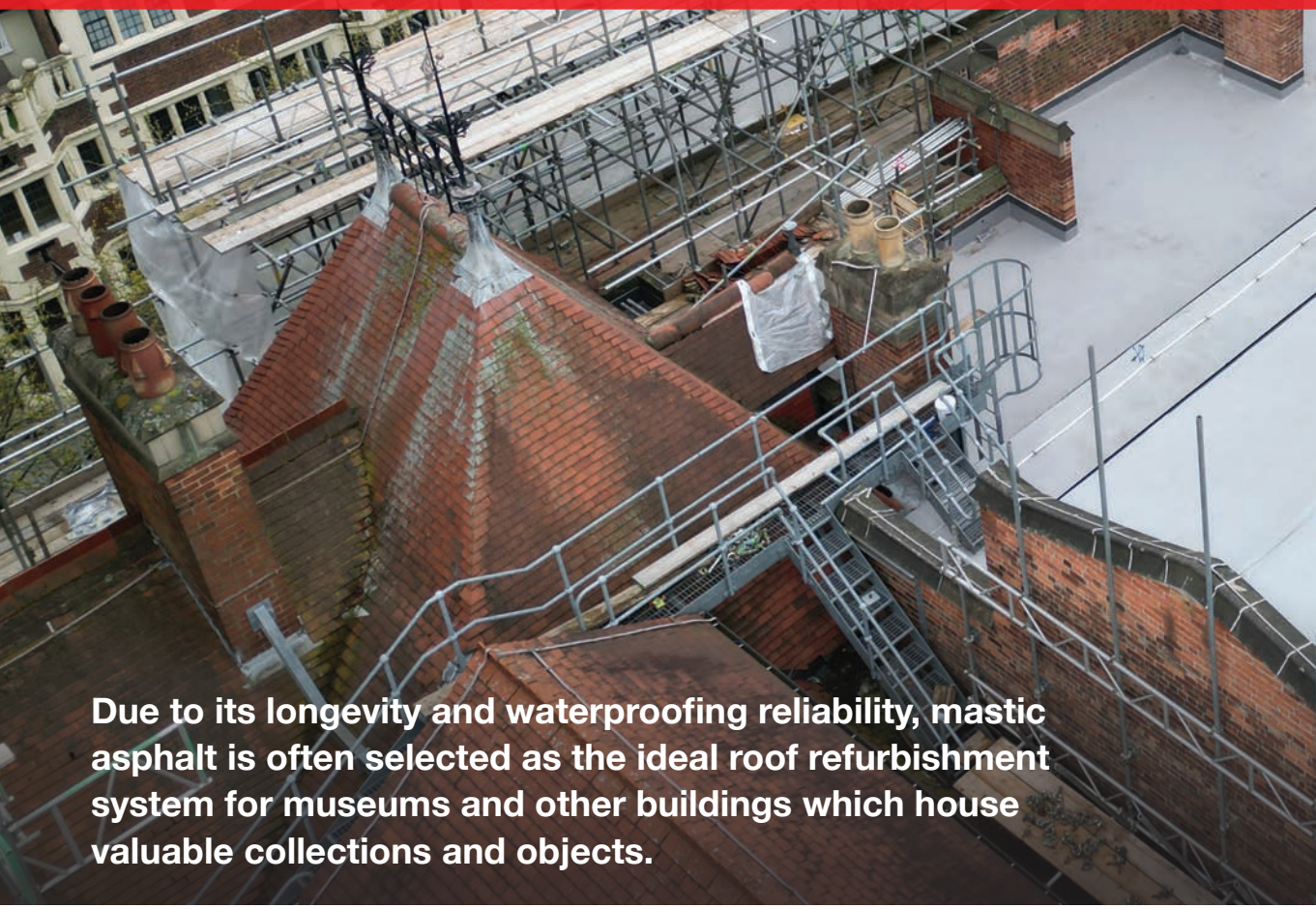
Blue Roofs

Blue roofs are designed for the control and temporary attenuation of storm-water during periods of heavy rainfall, before releasing it at a controlled rate back into the environment and site. Depending on design, blue roofs can provide a number of benefits such as temporary storage of rainfall to mitigate runoff impacts, or storage for reuse such as irrigation or cooling water make-up. Mastic asphalt is ideal for incorporation into the design of a blue roof.

New Build and Refurbishment

One common misconception about mastic asphalt is that it can only be used for refurbishment projects. In actual fact, mastic asphalt is increasingly being specified for new build roofing, especially when life cycle costs are considered. When compared with alternative waterproofing systems, mastic asphalt can offer the lowest life cycle costs over a 60 year period, when the typical refurbishment and replacement requirements for each system are taken into consideration.

PROJECT IN FOCUS:
DERBY MUSEUM AND ART GALLERY



Due to its longevity and waterproofing reliability, mastic asphalt is often selected as the ideal roof refurbishment system for museums and other buildings which house valuable collections and objects.

An award-winning project has been carried out by MAC contractor member NRA Roofing and Flooring Services Ltd at Derby Museum and Art Gallery which is home to a range of nationally important collections, including the world's largest collection of work by the 18th Century artist Joseph Wright of Derby.

The building has a number of roofs cascading from upper to lower areas, as well as a highly unusual pitched mastic asphalt roof, adding a level of complexity to the design and installation process.

It had come to the end of its serviceable life and required a complete strip out and re-installation of a thermally improved mastic asphalt system. The client wanted the most robust and durable roofing system available, as there are £70 million of paintings located in the rooms below.

NRA chose to partner with IKO as the company had the technical knowledge to assist on the complex design elements and offered the resilient, long-lasting products needed to give the client the peace of mind they were seeking. Furthermore, all areas had to achieve the client's target U-value, whilst maintaining the integrity of the building and minimising impact on existing details.

An IKO board system was utilised as part of the mastic asphalt solution, and a new ballasted man-safe system was installed to ensure all future roof maintenance could be carried out safely. NRA finished the roof area with heritage grey paint.

The mastic asphalt application at Derby Museum and Art Gallery was considered so impressive that NRA Roofing and Flooring Services Ltd won the accolade of 'Best Small Works Project' at the MAC Awards 2023.

"In reality, there is no naked flame at the point of installation and because mastic asphalt is so highly flame resistant, there is little or no potential of fire risk."

For these projects, fire safety is often a major consideration and the high mineral content of mastic asphalt renders it virtually incombustible. Mastic asphalt fulfils all the external fire resistance required for a roof covering and achieves the highest rating (AA) when tested in accordance with BS 476: Part 3. It has also been tested in accordance with the European standard for external fire exposure to roofs CEN/TS 1187:2012. No significant spread of flame was observed and no flame penetration occurred.

As mastic asphalt is laid in molten form, it is often confused with other types of waterproofing membrane that require naked flame or torch on application. In reality, there is no naked flame at the point of installation and because mastic asphalt is so highly flame resistant, there is little or no potential of fire risk.

Mastic asphalt's green credentials are also another benefit. It is carbon neutral and when it has reached the end of its useful life, it can be recycled or used as roof screed. Well over 10 years ago the mastic asphalt sector became the first industry in the world to achieve the CarbonZero standard.

SUSTAINABLE WATERPROOFING WITH *ZERO WASTE*

WITH THE GOVERNMENT SETTING A TARGET OF NET ZERO CARBON EMISSIONS BY 2050, PROCURING SUSTAINABLE BUILDING MATERIALS HAS NEVER BEEN MORE IMPORTANT. VIRTUALLY ALL EMISSIONS ARISING FROM THE BUILT ENVIRONMENT MUST BE ELIMINATED TO MEET THE GOVERNMENT'S TARGET.

Mastic asphalt is well known for being durable and long-lasting, but what is perhaps less well known is that it is one of the most sustainable and greenest building materials currently available with zero waste.

More specifiers are choosing mastic asphalt for a range of green roof applications - from schools to hospitals, office buildings to apartment blocks. Whether intensive or extensive, biodiverse or brown, it is critical that green roofs are built on a solid waterproofing foundation.

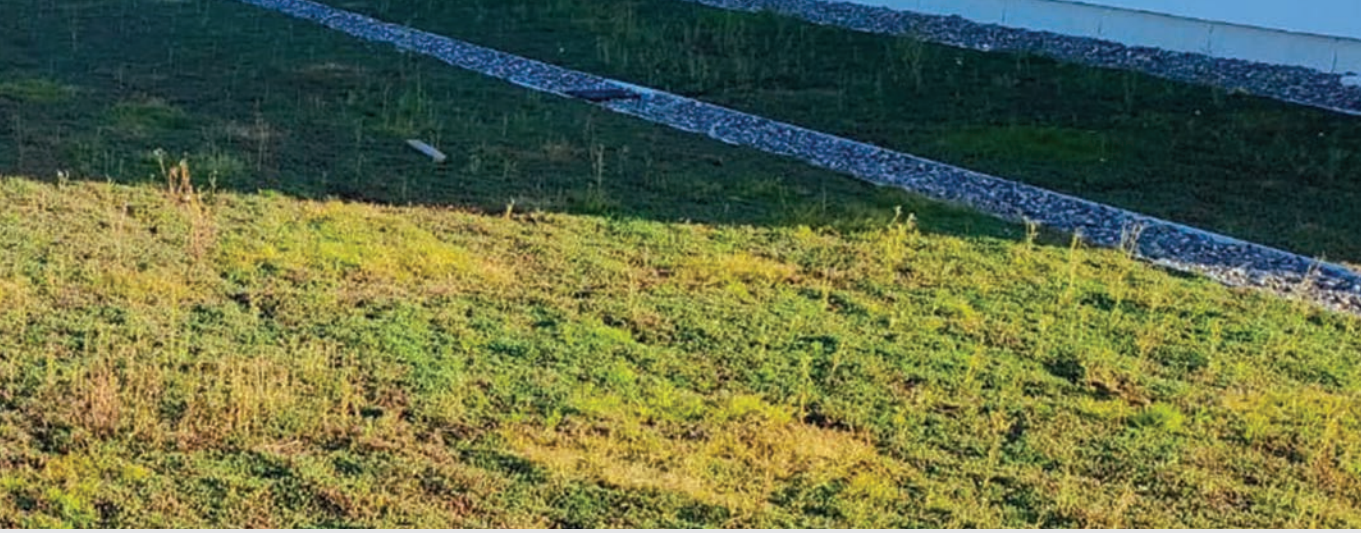
Recognised for its environmental performance and aesthetic properties, a green roof system laid with a mastic asphalt waterproofing system enhances the environment, controls storm water run-off and reduces noise and heat transmissions by upgrading the acoustic and thermal performance of a roof. When contractors use mastic asphalt for a green roof system, it also eliminates the need for root barriers, which may well have been necessary had a substitute material been used.

The concept of green roofs has been around for several years, with the first green roofs appearing in northern Europe. Countries such as Scandinavia, Germany, Austria and Switzerland have a long tradition of using green roofs.

In some countries, legislation has been actually been introduced to encourage the installation of green roofs, with many German cities for example providing incentives for green roof installation. Around 10% of all German roofs are now green and in France a law has been passed dictating that rooftops on new buildings built in commercial zones must either be partially covered in plants or solar panels. Outside Europe, Canada, USA, Japan and Singapore have all experienced significant growth in green roofs.

In American cities such as Washington DC, Chicago, Philadelphia and New York City, financial incentives have been offered for installing green roofs. Closer to home, there is now an array of planning policies and environmental agendas pushing for green elements to be included in new build projects in particular.

In the UK, green roofs are most popular in the City of London. According to Footprint Magazine, there are now more than 1.5 million square metres of green roofs across London. Within densely built-up areas such as London, it is important that buildings are environmentally sustainable. With the close proximity of the River Thames, the abatement of flood risk is also a significant issue. Green roofs in the City of London minimise the urban heat island effect, whilst also providing rainwater run-off attenuation and reducing the risk of flooding.



Mastic asphalt has one further advantage over other types of waterproof membrane - it is carbon neutral - a massive bonus for any building owner anxious to show their green credentials and, when it has reached the end of its useful life, it can be recycled or used as roof screed, minimising the impact on the environment.

MAC manufacturer member IKO has been involved in many CarbonZero projects across the UK, where the net carbon footprint of projects is entirely offset using internationally approved carbon credits, which means for every tonne of mastic asphalt made, IKO is helping to fund environmental and humanitarian causes.

One example is Westminster Cathedral. On this project, the existing mastic asphalt was renewed on the roof of the cathedral and during the works some 35 tonnes of mastic asphalt was installed, equating to 5.5 tonnes of CO_2 offset. Another example is London's Tower Bridge, where MAC contractor member Infallible Systems installed over 400 tonnes of mastic asphalt, equating to 50.11 tonnes of CO_2 offset.

"Mastic asphalt has one further advantage over other types of waterproof membrane - it is carbon neutral."

With the future of roofing looking green, the reliability and integrity of mastic asphalt has seen more and more architects and designers specifying this waterproofing membrane for a wide range of green roof applications - from schools to hospitals, office buildings to apartment blocks - making it their preferred choice for biodiverse habits that will indeed benefit us all both now and in the future.

MASTIC ASPHALT WAS USED AS WATERPROOFING WITHIN ONE OF LONDON'S VERY FIRST GREEN ROOFS AT THE DERRY & TOMS DEPARTMENT STORE

PROJECT IN FOCUS: HAYMARKET DUBLIN GREEN ROOF

The fact that mastic asphalt is being widely recognised as an effective green roofing solution was evident at the recent Mastic Asphalt Council (MAC) Awards.

The winner of the Development and Hybrid Project of the Year was John Fetherston Roofing for the green roofing installation completed at the Haymarket project in Dublin.

The Smithfield district of Dublin was being regenerated and John Fetherston Roofing completed the Haymarket project as part of the regeneration works. Several IKO mastic asphalt systems were specified for various roof areas. The main roof comprised 1,400m^2 and involved the installation of IKO's Permaphalt mastic asphalt system, and there was also a section where an IKO Extensive Green Roof was installed.

With a shallow soil layer supporting moss and grass, the green roof system was chosen to enhance the client's sustainability credentials, reduce storm water run-off, to support the wildlife habitat, improve the air quality and to protect the waterproofing membrane from UV degradation. Furthermore, there was an additional terrace roof area, whereby mastic asphalt waterproofing was used as part of a paving system.

The Mastic Asphalt Council (MAC) is an associate member of the Green Roof Organisation (GRO), an independent trade association dedicated to supporting and developing the green roofing industry in the UK.

The Green Roof Organisation represents all elements of the green roof sector including manufacturers of waterproofing and green roofing products, suppliers of green roof systems and components, specialist contractors from the roofing and landscape sectors and associates including other trade associations, designers and architects.

The vision of the Green Roof Organisation is for every city and town in the UK to require high quality green roofs on new build flat roofs - whether for amenity, biodiversity gain, rainfall management or aesthetics. Another aim is to drive the retrofitting of green roofs to existing buildings where structurally possible.

The vision of the Green Roof Organisation is for every city and town in the UK to require high quality green roofs on new build flat roofs.

Understanding Fire Regulations in Flat Roofing

It's crucial that specifiers and building owners understand the latest fire safety regulations, to enable them to make informed choices about the safest and most effective flat roofing products to use. This is particularly important in light of the tragic Grenfell Tower fire in 2017.

Flat roof waterproofing systems must comply with all current building regulations, as well as a number of other tests and standards - all of which could be considered potentially confusing. This article will provide a brief overview of the relevant fire standards and summarise key developments and legislation.

Fire Ratings Explained BS476: Part 3: 2012 & BS EN 13501-5

The regulations for flat roofs on buildings require that the specified flat roofing system provides external fire protection from 'spread of flame' and 'penetration of flame'. For many years, the standard flat roof fire certification in the UK was in accordance with BS476: Part 3: 2012 (originally created in 1958) and the highest fire rating was EXT.F.AA.

In 2018, a new European fire rating standard - EN 13501-5:2016 - was first introduced. This incorporates four different European test methods for external fire exposure to flat roofs. These European test methods are known as Broof t1, t2, t3 and t4.

The high mineral content of mastic asphalt renders it virtually incombustible.

It was subsequently agreed that all future UK external fire exposure ratings for flat roof systems would conform with the new set of European fire standards. Flat roofing system external fire tests are performed by the BRE or Warringtonfire - both of which have specialist testing facilities which expose the full roof system assembly to flame and radiant heat in accordance with the CEN/TS1187: 2012 testing methodology.

What Does Broof (t4) Mean?

Broof (t4) is the closest to the original UK standard and it is the most stringent fire rating to achieve. The classification system EN 13501-5 refers to four separate roof tests designed to establish the performance of a roof's resistance to fire. These tests measure the penetration through the roof construction of external fire exposure, and measure the spread of flame over the roof's surface.

The high mineral content of mastic asphalt renders it virtually incombustible. Mastic asphalt achieves Broof (t4) rating, whereby no significant spread of flame was observed and no flame penetration occurred.

Mastic asphalt is often mistaken for other waterproofing membranes that require a naked flame or torch for application, as it is laid in molten form. However, there is no naked flame used during the installation of mastic asphalt. Additionally, mastic asphalt is highly flame-resistant, resulting in minimal to no fire risk.

BriggsAmasco recently installed mastic asphalt onto Sumburgh Lighthouse & Visitor Centre when the existing overlay system failed after just seven years.

Overlaying Existing Asphalt Roofs

When a mastic asphalt roof reaches the end of its incredibly long working life (at least 50-60 years as independently verified by the Building Research Establishment), there may be a temptation to overlay it using cheaper roofing products. This approach, however, can prove to be an expensive mistake in the long-term.

Though alternative waterproofing membranes may initially appear to offer better value, many of them have life expectancies of around 15-20 years, and they can often fail within a fraction of this time due to incompatibility or other performance related issued.

Another important consideration is the environment. Mastic asphalt systems offer carbon neutrality and can be fully recycled into other useful construction products once they have been stripped up. However, as soon as an asphalt system is overlaid, this benefit disappears with future waste materials needing to be sent to landfill instead.

It is also worth noting that the quality and reliability of any chosen waterproofing system is only as good as the quality of installation. Unlike many other systems, mastic asphalt is only ever installed by reputable and skilled crafts people, and The Mastic Asphalt Council ensures that every installer has achieved an NVQ level 2 qualification in the mastic asphalt craft.

Waterproofing in Cold Weather

Some waterproofing products have limitations in that they cannot be applied in cold weather conditions, but that's not the case with mastic asphalt.

It can be applied all year round - even when the temperatures plummet and there is extreme wind. Specially formulated grades of polymer modified mastic asphalt offer both reliable stability at high operating temperatures and flexibility at low temperatures.

There are also mastic asphalt screeds available that cure so rapidly they can be walked on within just 60 minutes, making them ideal for fast-track projects where other trades are waiting to get to work. These screeds contain zero water content, eliminating the time taken for moisture to evaporate in traditional screeds and eradicating the risk of cement-stained water penetrating into the underlying structure.

The flexibility and fast curing times of mastic asphalt screeds enable contractors to achieve precise drainage falls quickly and more efficiently. Laid at a minimum thickness of 10mm, the screed thickness is also up to 80% less than traditional materials, making it much lighter and equally suited for both refurbishment and new build projects.

A CRAFT TRADE SUPPORTING THE *Future of Roofing*

Mastic asphalt has stood the test of time with some applications providing effective waterproofing for an astounding 100 years or so, but effective installation is critical to ensure longevity and performance.

Frankie Storrie from Oxley Asphalte won the 'Young Roofer of the Year' accolade at the prestigious NFRC Roofing Awards.

There are many time-served mastic asphalt roofing applicators working across the country and the Mastic Asphalt Council (MAC) carries out a great deal of work to raise awareness about the benefits of learning to apply mastic asphalt and the career opportunities available for both younger and older apprentices.

The skilled work involves heating the asphalt to the correct temperature and then spreading it using traditional techniques to carefully coat a surface. A thermoplastic material that will change shape when heated, mastic asphalt cools to form a hard, durable and waterproof coating.

Delivering quality workmanship

Malcolm Grinstead, Director of MAC said: "Mastic asphalt is a highly-respected product and the continued choice of specifiers for roofing applications but it's absolutely critical that we build an industry fit for the future with a growing workforce dedicated to quality - delivering quality workmanship that supports the quality of the product. This will help to ensure that the next generation of craftspeople can work to the same high standards that have given mastic asphalt the reputation it enjoys today. Once mastic asphalters have successfully completed an apprenticeship, they are fully competent in the occupation and have recognised apprenticeship qualifications, plus fully transferable skills, enabling them to work for a full range of employers, from self-employment, to SME's and large multi-national companies," he continued.

"By learning to apply mastic asphalt, individuals can gain a much-needed skill, earn a decent wage and have plenty of job opportunities across the UK."

Dedicated training facility

The Mastic Asphalt Council is closely aligned with New City College Hackney which is the national centre for mastic asphalt education and training. The mastic asphalt craft is taught by professional tutors and the traditional time-served apprenticeship is now incorporated into national vocational qualifications, leading to a Level 2 qualification.

MAC aims to protect the future of the industry by supporting apprentices through an intensive three year training programme that will ensure they can install mastic asphalt to the highest standards.

The craft training programme is said to be one of the most demanding in the construction industry, and includes practical and theoretical training to use mastic asphalt across a wide range of applications involving roofing, balconies, terraces and green roofs. Students can utilise state-of-the-art facilities at New City College Hackney which include a workshop replicating a real work site and a one-tonne asphalt mixer.

Malcolm Grinstead continued: "An apprenticeship combines learning at college with on-site experience to give apprentices the right mix of technical and practical skills. Several MAC members have apprentices on the mastic asphalt course at New City College Hackney and we receive some great feedback about how keen and motivated the apprentices are. Many former apprentices now head up their own roofing contracting companies specialising in the application of mastic asphalt."

SHIELD MEMBRANES

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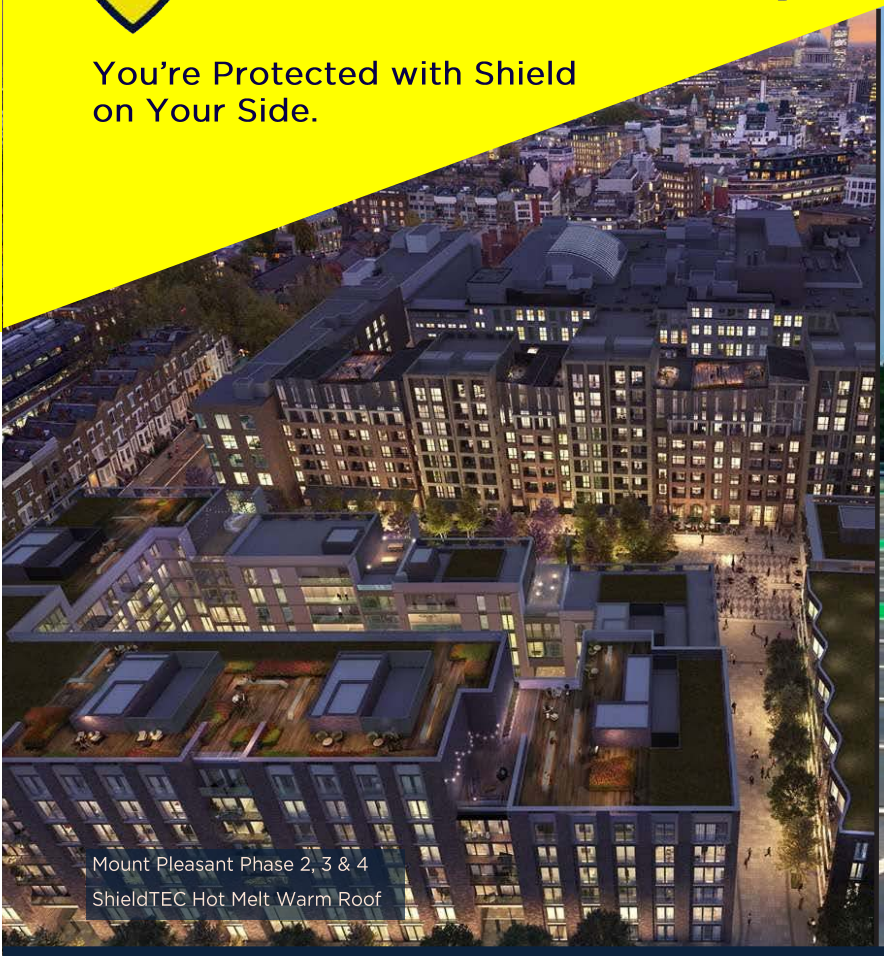

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Technical Resources

To assist the specification of mastic asphalt across various applications, the Mastic Asphalt Council offers a range of technical guides. These can be downloaded free of charge at https://masticasphaltcouncil.co.uk/technical-guides-new.

We also offer a free, no obligation technical information service to specifiers relating to the design of all types of mastic asphalt installation.

For technical assistance, contact us on:

 01273 242778

 info@masticasphaltcouncil.co.uk