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the woodhorn wow factor

This stunning new building on the site of the former Woodhorn Colliery is a celebration of the traditions and lives of the mining community of Woodhorn, Northumberland.

This unusual project brings together a new county archives depository with a mining and social history museum on the site of the Colliery, part of which is now a country park. The site contains twelve listed buildings and the pithead itself has been designated as a Scheduled Monument.

Undoubtedly, it is the striking, sculptured roof structure that sets the building apart. The feature roof over the main entrance was inspired by the mechanical coal cutting machinery that was used in the past. The roof which gives the appearance of a dynamic fan configuration is formed by seven tapered steel roof blades each varying in length and pitch which cantilever up to a maximum of 22 metres. This iconic roof formation certainly provides the Woodhorn 'wow' factor.

The majority of the structural element in this extraordinary roof assembly has been manufactured and supplied by Architectural Profiles Limited. At Woodhorn, APL has provided the long span structural deck, the Tritherm spacer system for the 250mm insulated cavity between the roof deck and the standing seam external roof.



reducing emissions from cradle to grave

Since the introduction of Approved Document L2, the drive to create sustainable and low carbon buildings has grown rapidly. Specifiers and designers are increasingly looking towards sustainable building solutions to achieve government targets to significantly reduce the country's carbon emissions.

Architects and designers need to consider materials and structural systems which are sufficiently flexible and adaptable to meet future changes to the building function and which will facilitate the re-use and recycling of material at the end of its life. Whilst at the specification stage, designers should also take into

account the life cycle costs of the building, including the cost of manufacture, construction, operation, dismantling and disposal. The 'cradle to grave' analysis produced by Corus (below) explains these life cycle stages in detail.

As part of the construction industry's response to produce sustainable building solutions, Corus Colors in conjunction with the Carbon Neutral Company has developed a combined guarantee which covers the durability of the Colorcoat® pre-finished steel product and makes the pre-finished steel building envelope carbon neutral. Unavoidable CO₂ emissions from the

Cradle to Grave Analysis

The Cradle to Grave Analysis covers all life cycle stages.

Disposal

Includes impacts from:

- built-up system steel content 79% recycled, 15% re-used, 6% landfill.
- composite panel steel content 100% recycled, 0% re-used, 0% landfill.
- all insulation to landfill (foam and mineral wool).
- 95% recovery of composite panel blowing agent by fridge recycling process.

Use

As Colorcoat HPS200® and Colorcoat Prisma® are maintenance free, no significant environmental exchanges occur during the building lifetime.

System installation

Includes impacts from:

- allowances made for cladding side and end-laps.

Production of system components

Includes impacts from:

- production of pre-finished steel and spacer bars.
- production of insulation.
- production of fixings and plastic components.

Transport

Includes impacts from:

- delivery from Corus to system manufacturer.
- delivery to site.
- delivery of insulation and other system components to site.

The difference between the number of vehicles required to transport built-up and composite systems to site is also accounted for.

System manufacture

Includes impacts from:

- profiling of pre-finished steel for cladding.
- forming of spacer bars.
- composite panel manufacture (foam and mineral wool).
- 5% of composite panel blowing agent lost in manufacture.



pre-finished steel cladding system, including fixings and insulation are measured from cradle to grave, that is manufacture through to installation, use and end of life and the impact offset in climate-friendly projects overseas. However, there is more to specifying environmentally-friendly product than their off-setting potential. The aim is to encourage specification of the most sustainable pre-finished steel products and cladding systems.

Corus has been working for a number of years to reduce the environmental impact of their products beyond mere compliance. Sustainability initiatives include improved product formulations that deliver the longest periods of durability thereby increasing the life of the pre-finished steel. In addition, environmentally undesirable elements such as heavy metals,

organatins and phthalates have been removed from Colorcoat HPS200®. The new Confidex Sustain™ guarantee builds on these initiatives and is designed to reinforce the message that specifying steel-faced cladding solutions can be part of an environmentally-friendly building programme.

To benefit from the Confidex Sustain™ zero-carbon building envelope, building projects will need to ensure that the project uses a Corus Colorcoat® assessed cladding system. This 35,000m² distribution shed uses Colorcoat HPS200® as part of a Euroclad cladding system.



rooflights - a cost effective CO₂ emission rates

Last year's strengthening of the energy efficiency provisions (Part L) of the Building Regulations and the impending arrival of Energy Performance Certificates have certainly thrown down the gauntlet to the building industry on reducing carbon emissions.

For architects, the key challenge is how to achieve standards compliance by getting the Building CO₂ Emission Rate (BER) down to the Target CO₂ Emission Rate (TER). MCRMA members can now offer their clients a solution to achieve BER compliance.

The answer lies in offering complete envelopes which stipulate that 20 percent of a building's roof area should comprise rooflights packaged with efficient lighting control. Architects need to save at least 23.5 percent of CO₂ emissions over the designs of 2002 and this assumes that the design then had 20 percent rooflight coverage. If they revert to 10 percent coverage, energy use increases so the savings needed climb dramatically (to around 50 percent in many cases) and if they do not put rooflights in at all, the savings need to go up even further.

Rooflights, covering 20 percent of the roof area, and metal roofing form an excellent complementary package, and the ease of inclusion of large rooflight areas within a metal roof is a major benefit of this type of roof. However, their value is completely undermined if electric lighting control is not included in the design. The Simplified Building Energy Model (SBEM) for calculating energy performance assumes that without lighting control, lights stay on for longer with disastrous consequences for the BER.

The MCRMA has long championed the benefits of natural light in the workplace. As the Association says in its guidelines for daylighting in metal clad

buildings the light bulb is 'a poor substitute to the fulfilment of human requirements' (see MCRMA technical paper No 1). The improved productivity of a workforce working under natural light is only one of the bottom line benefits of specifying a 20 percent rooflight area. Others include the energy cost savings from less need for heating and air-conditioning when modern insulated rooflights are installed.

A popular misconception about rooflights is that they cause solar overheating while also being responsible for heat loss, when in reality the rooflights act as solar panels. They save on energy costs by letting natural light into the building and by providing free heating through passive solar gain. Doubts about the insulating performance of rooflights are fast becoming unjustifiable; all modern rooflights achieve the regulatory minimum of 2.2W/m²K, and for some rooflight types, U-values as low as 0.8 W/m²K are now available.

Passive solar gain means that increases in rooflight area will not increase energy use of the heating system during daylight hours even with rooflights that only comply with the regulatory minimum, whilst the savings in energy available from reducing load on the artificial lighting system are far greater than any increase in heating energy, even for 24-hour operation.

With improved standards too in non-fragility, the health and safety concerns about rooflights are no longer valid. The combination of better insulation and strength within the modern generation of rooflights suggests that designers and contractors can move from a traditional specification of a 10 percent roof area coverage for rooflights to 20 percent becoming

solution to comply with



the norm. As a result, they will have clients with happier and more productive staff whilst at the same time reducing their carbon footprint of their premises.



rainscreen technology

The latest in cladding technology has been used on the Auto Technium Business Innovation Centre in Llanelli, south Wales. A rainscreen façade system finished in an aluminium composite material was specified to provide a contemporary and striking façade for this multi-million pound research and development centre.

Located near the coast, the 2,200 square metre building is subject to harsh climatic conditions making aluminium the ideal choice. The LINEAR 3 rainscreen and bull nose soffits were manufactured in ALPOLIC/fr which comprises 0.5mm thick aluminium skins with a non-combustible core, meaning it is up to 15 percent lighter than solid aluminium. This lightness facilitates much easier installation, as well as ensuring less material is required for the supporting grid. The unique coating process ensures that the panel colour is consistent throughout and the level of flatness achieved is unparalleled.

The LINEAR 3 system offers design flexibility and speed of construction; the panels are positively fixed to support rails saving valuable time on-site. In a rainscreen façade, the panel joints are not normally sealed and a ventilation cavity of at least 25mm is allowed immediately behind the cladding panel. A ventilated rainscreen incorporating insulation on the outside of cavity or solid masonry walls will allow the building fabric to breathe without the risk of interstitial condensation or structural decay. External wall insulation used in this way offers a superior performance since it eliminates the condensation risks associated with internal cavity wall insulation.

The LINEAR 3 rainscreen façade system is manufactured by Euroclad Limited. LINEAR facades are also available in natural metals including stainless steel, copper, titanium and zinc.



developing the skills base

The pace of change within the construction industry is relentless; materials, manufacturing processes and installation techniques are being constantly revised and updated. It is therefore essential that MCRMA member company employees are kept fully up to date with the latest developments, for example the recent changes to the energy requirements of the Building Regulations.

As the trade association that represents the leading manufacturers of metal roof and wall cladding systems, it is not surprising that MCRMA places considerable emphasis on training. MCRMA has always taken a pro-active stance towards good design and workmanship and runs regular training courses for its members' employees.

The training course is wide-ranging and topics covered reflect the major concerns of the industry. Delegates attend sessions on thermal performance, acoustics, roof lights, gutters, fabrications and fire performance. Health and safety in the industry is paramount and the course covers the type of accidents that can occur and how best to prevent them.

Feedback from the training course has been so positive that several member companies now actively encourage contractors that install their products to attend the course. This is a new departure for MCRMA and is a clear indication of how contractors, as well as manufacturers, value the importance of good design and workmanship.

The importance of knowing how the construction process works from the specification of the cladding material through to completion on site cannot be underestimated.



MCRMA membership

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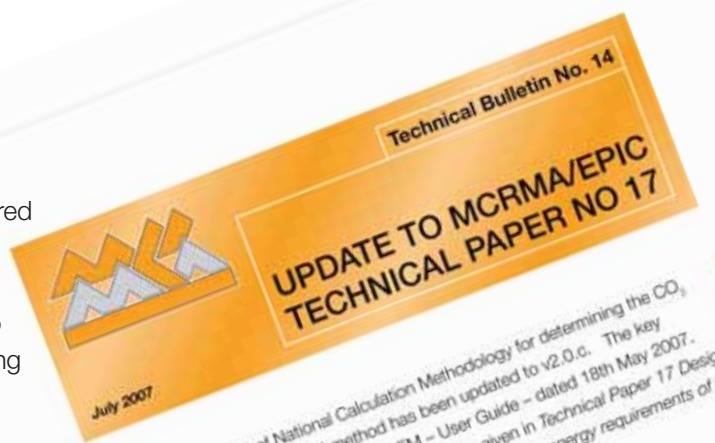
Corus Colors

AD-L2 Updated

Since publication of technical paper No 17, *Design guide for metal roofing and cladding to comply with the energy requirements of UK Building Regulations (2006)*, the National Calculation Methodology for determining the CO₂ emissions using BRE iSBEM method has been updated to v2.0.c. The key amendments are identified in the BRE iSBEM User Guide (dated 18th May 2007) and the principal changes which alter the guidance printed in technical paper No 17 are set out in the latest MCRMA technical bulletin.

Technical Paper No 17 is the official supporting document to the revised Building Regulations – Conservation of Energy and has been jointly prepared by the Metal Cladding & Roofing Manufacturers Association Limited (MCRMA) and Engineered Panels in Construction Limited (EPIC) as a guide to good practice and construction so that metal roofing and wall cladding can achieve compliance with the required 2006 levels of CO₂ emissions.

Both technical paper No 17 and technical bulletin No 14 are available in electronic format and can be freely downloaded from the MCRMA web site at www.mcrma.co.uk. The next revision of NCM and BRE iSBEM is scheduled for October 2007 and further updates to technical paper No 17 will be available from the web site at www.mcrma.co.uk.



Keep in Touch

Stay in touch with the latest developments in metal cladding by visiting the MCRMA web site. In addition to the 3D interactive construction details, the web site is regularly updated with MCRMA's latest technical publications, including technical paper No 17, the official supporting document to the revised Building Regulations – Conservation of Energy.

Visit www.mcrma.co.uk for the definitive guidance to all aspects of metal cladding construction.

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Whilst the information contained in this design guide is believed to be correct at the time of going to press, the Metal Cladding and Roofing Manufacturers Association Limited and its member companies cannot be held responsible for any errors or inaccuracies and, in particular, the specification for any application must be checked with the individual manufacturer concerned for a given installation.

The diagrams of typical constructions in this publication are illustrative only.