



The Kissing Roofs of Coal Drops Yard

A remarkable design for a pair of London roofs, this striking project has now been signed off. Here, we reveal how Attley Roofing, using Welsh slate, created the breathtaking kissing roofs of Coal Drops Yard.

Formerly an area to avoid, London's Kings Cross has now been transformed into a go-to destination for Londoners and visitors. Developer Argent's regeneration of the area has sensitively re-purposed the Victorian railway buildings into a college campus, supermarket and offices, in which the interior changes are radical, while the exteriors have been left largely unaltered.

Not so for Coal Drops Yard, a pair of elongated Victorian coal warehouses, originally built to distribute coal from the North of England across London. Here, the pitched roofs of the two almost-parallel buildings, 150m and 100m in length and 39m apart, have been reconfigured to curve up at their northern ends and gently 'kiss' each other.

Designed by Heatherwick Studio, the roofs peel upwards and extend into the middle of the space between the two buildings. A new floor sits below the roof structure, with glazing filling the gap between the two, creating a third level used for retail businesses.

The new roofs of the ornate cast-iron and brick structures have been slated with 92,000 new replacements of the original Welsh Slates – 500mm x 250mm Cwt Y Bugails from the manufacturer's Llan Ffestiniog quarry in North Wales – by Banbury-based specialist sub-contractor, Attleys Roofing.

Attleys Roofing already had some Kings Cross experience, using 6,400 500mm x 300mm Heather

Blues from Welsh Slate's main Penrhyn quarry for the re-roof of the nearby German Gymnasium - the first purpose-built gym in England - which is now enjoying a new lease of life as a designer restaurant.

Coal Drops Yard was a whole new ball game, testing Attleys to the limit, but the result is an extraordinary reinterpretation of the canal-side site.

Structure

Main contractor, BAM Construction was responsible for the structure of the new roofline. More than 50 new steel columns were carefully threaded through the existing structure to support the roof independently of the building.



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Primary support is provided by a set of large cranked beams supported on cores in each building which join in the middle over the yard. There are four primary beams, two on each building. These dip down towards the centre to create the valley between the two roof structures

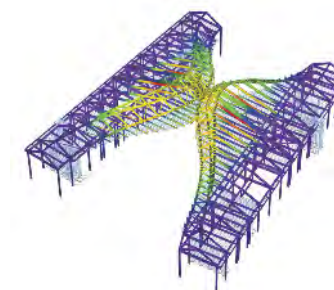


and have been nicknamed 'giraffe beams', in reference to their angled neck and head - the structure looks like two giraffes rubbing noses together. Tie beams at floor level take the tensile loads generated by the weight of the roof.

The giraffe beams support two ribbon trusses that define the upper and lower edge of each roof structure and connect in the middle over the yard at the lower edge. These are 7m deep in the middle and taper to 5m at the ends where they join the existing roof. Tubular steel sections were used to create the trusses because of the complex geometry.

The new floorplate below the roof is suspended from above using macalloy bars and is tapered towards the perimeter to minimise the impact on the view, seen through 60 panels of full-height structural glazing.

Temporary trusses were first erected to support the giraffe beam assembly and ribbon trusses during construction. The ribbon trusses were brought to site as components, bolted together on the ground into fully-assembled sections complete with rafters, craned into position and bolted together where they meet in the middle. The whole roof structure was then de-propped.



The complex geometry of the cranked beams and roof trusses.

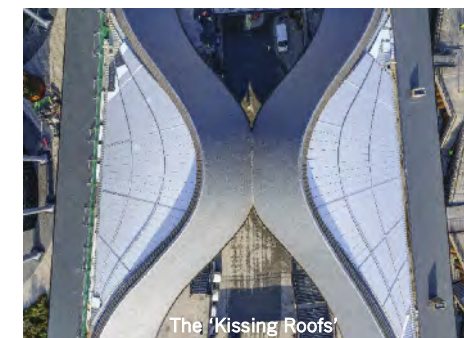
“Our challenge was to radically remodel this Victorian infrastructure to meet the needs of a modern urban development without losing what made them special.”

Visually, it was important to maintain a seamless transition from the existing roof to the new section so the original timber roof trusses were retained where possible, with some localised strengthening required where the timber had been damaged. The gap between the existing and new roof structure was then boarded over, ready for the new Welsh slates.

The two roofs are bolted together where they meet in the middle.

Remodelling

Heatherwick Studio chose to position the new roof element at the northern ends of the two buildings as the eastern building had been



devastated by a fire in 1985. Used more recently for warehousing and nightclubs, they were largely abandoned in the 1990s.

Heatherwick Group Leader, Lisa Finlay said: “Our challenge was to radically remodel this Victorian infrastructure to meet the needs of a modern urban development without losing what made them special.

“To do this, we focused on understanding their original function and how they were adapted over time so we could appreciate how best to preserve and reuse the existing fabric, whilst also introducing new elements. One of these is an entirely free-standing new structure threaded through the historic buildings, from which a spectacular new third level is suspended.”

Delivering the vision

Delivering this vision, Attleys were on site for almost 18 months.

The roof pitch of the original sections of roof was 28°, but as the curves sweep round and meet in the middle this changes to 47°. The roof's length also decreases from 8.4m to 6.9m at the roofs' kissing point, but the same number of slate courses (44) had to be maintained.

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|| This meant Attleys had to decrease the gauges and not only cut the sides of the slates to take them around the curve, but also the tops of the slates to maintain the same number of courses. No clever nailing or hidden bibbing was required to stop rainwater flowing diagonally at this point, as the pitch was so steep.

Attleys' Managing Director, Shaun Attley met with Heatherwick Studio and BAM's design team two years before starting on site to discuss the design issues and how to achieve the aesthetics requested while using the products selected.

Shaun advised the project team that the Cwt Y Bugail slates could not be used for their initial roof design which exceeded a 90° pitch so it was re-designed to ensure that, where the eaves met, it was at a pitch commensurate with Welsh Slate's fixing recommendations and warranties.

Due to space being at a premium, all the Cwt Y Bugail slates were cut off-site at Attleys' depot in Banbury. To do this, Attleys had to calculate how much of the slates to trim. This was done by taking measurements from the steel work underneath - from steel to steel at the eaves and steel to steel at the ridge, which was generally over 10-15m depending where you were on the curve (on the internal curve or external curve).



The kissing point determined how the slates were cut to ensure the perp lines and side laps were maintained.

And because the roof pitch was increasing while the rafter length was decreasing, Attleys also had to cut the tops of the slates down so they fitted the decreasing gauges. A total of 32,000 of the 90,000 slates used on the project had to be



Shaun Attley, Managing Director of Attley Roofing (left) with Mark Head, Team Supervisor, who worked on Coal Drops Yard.

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delayed due to previous issues in the construction of the steel frame prior to us starting.

“This meant we were up against the clock in trying to pull back time to ensure the overall programme was still met. We were asked by BAM to find ways of doing as much as possible off-site and increasing labour and production on-site to pull back the time lost. By working together with other sub-contractors and the main contractor, we managed to finish a week earlier than our anticipated 43-week overall programme.

“The project was challenging at the beginning to ensure we set the roof out properly but, as the contract progressed, it became easier. Welsh slates are easy to work, and we work with them all the time, but in this case it was challenging getting the slates to course all the way round,” Shaun explained.

Safety and production

Attleys' SMSTS-trained supervisor ran the day-to-day safety, conducting Toolbox Talks every morning and attending daily safety briefings by BAM Construction staff and supervisors from all trades on site, to brief each other of any risks and ensure trades were not disrupting one another.

The team of 10 Attleys operatives, which included two NVQ Level 2 apprentices, carried out daily safety checks and Shaun Attley visited weekly to inspect the job for workmanship and production and also to gather feedback on any safety issues.

After a year and a half on site and successfully completing this challenging project, Shaun and his team can be rightly proud of the remarkable kissing roofs at Coal Drops Yard - which are now sure to impress a forecasted 12 million visitors a year. |||

cut with hand guillotines so the dressed edge could be maintained around the curve which comprised 1,600m² of the total 4,600m².

Shaun Attley said: “Our timescale for the sections of roof was provided to BAM Construction and this was put into their overall programme with all other sub-contractors, but unfortunately our commencement on site was

WestWood Liquid Technologies Overcomes Winter Weather to Take Home Project of the Year

WestWood Liquid Technologies Ltd was a 2018 winner at the Liquid Roofing Waterproofing Association (LRWA)'s Awards, taking home the prestigious accolade of Liquid Waterproofing Project of the Year.

WestWood's award win was for Onslow Square, in Kensington, London, an impressive Grade II listed Georgian property comprising several apartments.

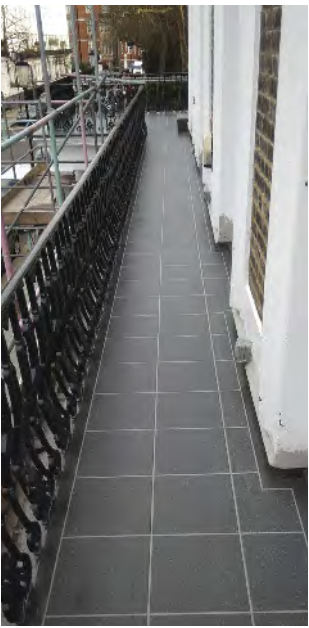
As part of a wider renovation project, repairs were required for the building's roof, numerous portico roofs and a balcony that extends the length of the entire building featuring more than 100 ornate railings. The project totalled 100m² altogether.

To create a robust waterproof and wearing system for each area, a range of different PMMA resin layers were installed. Uniquely, these resins have created a stunning tile effect, providing a highly aesthetic finish and demonstrating outstanding levels of workmanship from the roofing contractor, London Seamless Flat Roofing who used WestWood's Wecryl Waterproofing System.

The Challenge

The existing asphalt on the roofing areas and balcony had started to deteriorate and leak. This not only had to be replaced with a more robust waterproofing system, but a unique tile effect was created to complement the historic architecture. As if this wasn't enough of a challenge, all the work was carried out in the winter when the UK was experiencing some of its most severe weather conditions.

The specification of a range of different PMMA resins ensured these requirements could be



“WestWood's Wecryl 230 high-grade, PMMA-based waterproofing resin can be installed in temperatures below freezing, so was ideal for the winter installation.”

met and all challenges successfully overcome.

The installation began with the stripping back of the existing asphalt to the concrete and timber decks. The concrete substrate was completely saturated with water so had to be thoroughly dried. The Wecryl 276 primer from WestWood Liquid Technologies was then installed across the prepped concrete and timber substrates to form a secure bond.

Sub zero temperatures

WestWood's Wecryl 230 was used for the waterproofing. This high-grade, PMMA-based waterproofing resin can be installed in temperatures below freezing, so was ideal for the winter installation.

To ensure watertight junctions at the bottom of each of the complex balcony railings, Wesel 815 Reinforced Putty was sculpted around each one.

London Seamless Flat Roofing then had to leave site to allow the plasterers to install new render over the top of the recently waterproofed upstands to the building. When they returned, they applied Wecryl

care and attention, 6mm masking tape was then used to meticulously measure and mark out the tile pattern in sections.

Once the tape was down, Wecryl 288 in grey was applied to create the look of the main tile. Only a small section at a time could be completed because the tape had to be removed before the 288 resin cured.

To complete the look, black and grey 'Weplus Chips' were spread evenly into the resin whilst it cured. These special toppings provide an aesthetic and non-slip finish.

The area around the railings was then finished with the



233, a self-levelling wearing layer, using a notched trowel to achieve the correct coverage rate.

The next step was to create the tile effect, which due to the contours of the balcony and roofs, had to be set back by at least 50mm onto the flat surface. Working in very narrow spaces, the contractor applied Wecryl 288 (a solvent-free PMMA-based wearing layer) in pebble grey which would become the grout lines for the tiles. With a lot of

same Wecryl 288 sealer coat in grey.

The completed project has combined a range of advanced liquid technologies to deliver both a durable waterproofing solution and highly aesthetic finish.

The different resins have homogenised to form one watertight membrane which is weather and slip resistant, while at the same time creating a stunning tile effect for this prestigious building. |||