Lindner PRATER

PCS04:
NFRC PROJECT CASE STUDY

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Controlling the combustible insulation risk during construction–Inverted warm roof installation

Retail and office space, London

Figure 1: *Site frontage with artist impression of finished roof terrace.*

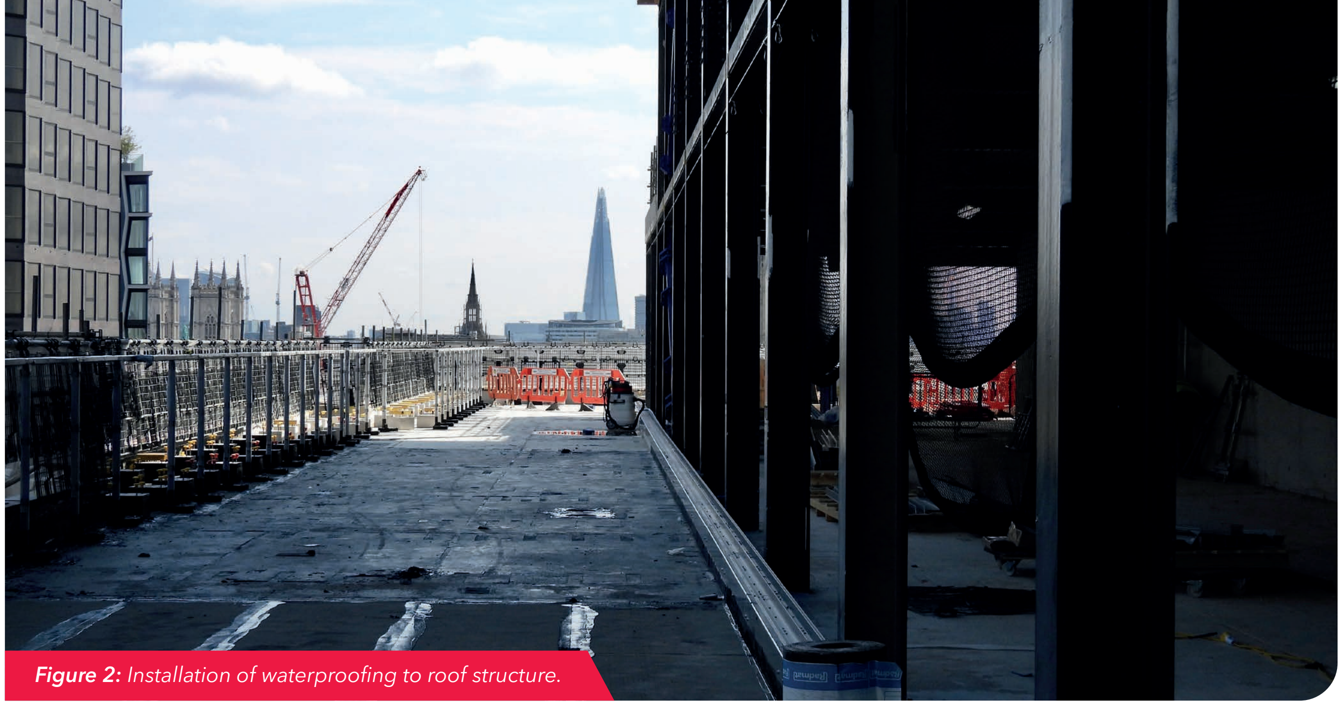

Figure 2: *Installation of waterproofing to roof structure.*

PROJECT OVERVIEW

Building: Commercial development

Location: 105 Victoria Street, London

Building Type: Retail and office space

Roof Area:
Approx 5,000 m^2 on numerous roof levels

Principal Contractor: Lindner Prater Ltd

Roof Build-Up: Inverted warm roof comprising a structural deck, waterproofing membrane, XPS insulation boards, WFRL, ballast, and a porcelain flagstone finish.

Environment: Construction site in the heart of City of London.

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Background

105 Victoria Street is undergoing redevelopment into a 16-storey mixed-use building. The building will primarily provide office space, with substantial ground-floor retail, community, leisure, and amenity facilities. Standing at approximately 68 metres tall, the project features extensive roof and upper-level terraces.

XPS insulation was selected for the inverted warm roof system because of its high compressive strength, and excellent resistance to moisture ingress, XPS making them appropriate for roof terraces subject to regular footfall and long-term use. These performance characteristics ensure durability and thermal efficiency in an environment where the roof build-up must withstand repeated loading and weathering over its design life.

However, XPS is a combustible polymeric insulation material, and while it performs safely and effectively once fully encapsulated within the completed roof system, during the installation phase unfixed boards or boards not covered by ballast presents a temporary fire risk. Given the project's dense urban location and close proximity to neighbouring buildings, public spaces, and sensitive infrastructure, the project team implemented stringent fire safety controls to manage and mitigate this risk during construction.

Key Challenges

The primary challenge was managing the fire risk associated with installing a combustible insulation material within central London. The constrained site conditions, limited storage space, increased the potential consequences of any fire incident. Co-ordinating just-in-time deliveries, sequencing works to minimise exposed insulation, and enforcing strict controls on temporary storage required a high level of planning, supervision, and contractor discipline.

These challenges were compounded by the need to integrate fire safety controls without impacting programme or quality.

Figure 3: *Roof terrace ready for installation of insulation and roof finishes.*

Figure 4: *Insulation stored safely underneath flame-retardant covers.*

KEY RISK MITIGATION MEASURES

Where temporary storage was unavoidable, insulation boards were kept within a clearly defined and segregated storage area, formally agreed between the contractor and the Principal Contractor. The boards were immediately protected using approved fire-retardant covers, specifically designed for packaged insulation materials. These covers provided enhanced fire resistance as well as effective weather protection, which was particularly important given the exposed conditions and constraints associated with a dense urban environment.

The contractor's safe system of work ensured that the insulation and Water Flow Reducing Layer (WFRL) were immediately protected through the prompt installation of 25 kg ballast bags laid across the roof surface. These were used as a temporary non-combustible encapsulation layer, providing early protection to the insulation and ensuring that it was adequately weighted to reduce the risk of wind uplift whilst the roof build-up remained in a temporary state. This approach minimised the period during which combustible materials were exposed and reduced fire loading at roof level, pending the installation of the permanent supporting framework and paving.

By ensuring that the insulation and WFRL were promptly protected, follow-on activities, such as installing insulation boards around roof details and upstands, including plinths, could be undertaken with confidence that the insulation was already encapsulated beneath a non-combustible protective layer.

Finishing trades were able to install the framework for the porcelain flagstone finish without compromising the fire performance of the roof system. This sequencing ensured that subsequent works could proceed without re-exposing combustible materials, maintaining the integrity of the fire strategy throughout the construction phase.

It also reduced the need for additional temporary fire controls, improved coordination between trades, and provided assurance that the roof system's fire performance was not adversely affected during the installation of the final terrace finishes.

Figure 5: Immediate covering of insulation and WFRL with ballast

Figure 6: Installation of insulation around plinth details.

Lessons Learnt

The contractor demonstrated a forward-thinking approach to fire risk mitigation by proactively adopting innovative materials and methods of work beyond standard practice. This included the use of purpose-designed, approved fire-retardant covers to protect combustible insulation during temporary storage and installation, significantly reducing ignition and fire spread risk at roof level.

These measures were embedded within a carefully sequenced method of work that prioritised early encapsulation of combustible elements, minimal exposure time, and close co-ordination with the principal contractor. By integrating innovation with disciplined site controls, the contractor not only enhanced fire safety during the construction phase but also set a benchmark for good practice when working with combustible materials complex, high-risk urban roofing projects.

Figure 7: Porcelain roof finish being installed

Figure 8: *roof terrace nearing completion.*

Conclusion

This case study demonstrates that XPS insulation can be safely and effectively incorporated within an inverted warm roof system, provided that construction-phase fire risks are explicitly identified and robustly managed.

The successful delivery of the project was underpinned by the contracts team reviewing early design, ensuring rigorous planning, and the implementation of stringent procedural and physical fire safety measures, including just-in-time delivery, controlled storage, and strict mitigation measures within the safe system of work.

Overall, it highlights the successful management of construction-phase fire risk relied on a high degree of communication, co-ordination, and co-operation between all relevant duty holders. Clear roles and responsibilities, regular co-ordination meetings, and shared understanding of the fire strategy were essential to ensuring that appropriate controls remained in place at all times, particularly while combustible elements were temporarily exposed.

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