M&J GROUP
CONSTRUCTION & ROOFING

PCS01:
NFRC PROJECT CASE STUDY

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Reinforced Autoclaved Aerated Concrete (RAAC) Removal

BEDFORD MODERN SCHOOL (BMS), Manton Lane, Bedford, MK41 7NT

Figure 1: Crumbling RAAC plank

PROJECT SPECIFICATION

BMS–Junior School: 960 m²

BMS–Sports Complex: 1088 m²

Removal of existing Reinforced Autoclaved Aerated Concrete (RAAC) planks.

**D60 Steel Deck (Junior School);
D100 Perforated Steel Acoustic Deck (Sports Hall).**

Self-adhesive AVCL.

Tapered Insulation Scheme.

Self-adhesive RBM Underlay and Capsheet.

Installed as a fully flame-free system, utilising innovative tooling such as electronic torches and hot air guns.

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Figure 2: Section of crumbling RAAC

In the autumn of 2023, the government ordered 104 English schools, nurseries, and colleges with RAAC to close affected buildings immediately until safety measures are introduced. The number of schools around the UK that have been impacted by the RAAC crisis, has risen to 214 according to new information from the Department for Education *(as at May 2024).*

NFRC Member M&J Group *(Construction and Roofing)* Limited invited NFRC to visit Bedford Modern School where they were undertaking the removal of failing RAAC (Reinforced Autoclaved Aerated Concrete) planks which were being replaced under the safety measures issued by the Department of Education.

In ***figure 1*** you can see the extent of the failure to the RAAC, meaning the team at M&J Group had to work fast. In conjunction with Bedford Modern School, they introduced safety measures until the removal of RAAC planks to the affected roof areas could be managed safely.

What is RAAC?

RAAC is a building material used in some buildings between the mid-1950s and mid-1990s to form roof planks, wall panels, and sometimes floor planks. RAAC is a highly-aerated, lightweight, concrete-based material ***(highlighted in figure 2)*** with different material properties to conventional concrete. Problems associated with older forms of the construction include high deflection, corrosion, spalling, and, where there is a low-end bearing, the possibility of sudden collapse due to cracking. Its presence has been confirmed in a range of public sector properties including schools and hospitals across the United Kingdom.

The issues to be considered with respect to RAAC include excessive ponding and modifications to planks—such as service penetration. Visual surveys can help assess the condition of panels, however, not all defects are visible.

M&J Group provided Bedford Modern School a detailed specification to their critical structural problem caused by the failure of the existing RAAC roof, including installing a new 60 mm profile metal structural deck and totally flame free Reinforced Bituminous Membrane (RBM) warm roof system. This highly specialist work, required significant risk management controls by the M&J project management team that consisted of an onsite Contract Manager overseeing the safe removal of the planks and the roofing install team.

Figure 3 shows the RAAC planks exposed once the existing waterproofing had been removed. The planks interlock so they had to be separated before they could be lifted out of position. Work was undertaken using appropriate personnel protective clothing and correct handling techniques. Soft-landing systems were installed in the classroom below to provide passive, collective fall arrest for their operatives removing the planks.

Figure 3: *exposed RAAC planks during removal*

Installation of Structural Deck and Roof System

M&J Group worked closely with the roof system supplier to develop a new roofing specification that would provide the school with a 30-year warranty. This compromised of a new 60 mm steel roof deck to the Junior School, and a 100 mm perforated acoustic deck on the sport halls. A fully self-adhesive Reinforced Bituminous Membrane **(RBM)** warm roof system, consisting of a self-adhesive Air and Vapour Control Layer (AVCL), tapered insulation scheme *(achieving the required of thermal performance as set out in Part L2 of the building regulations)* was then installed complete with a self-adhesive RBM underlay and mineral finish capsheet.

The RBM roof system was installed completely flame-free, without the use of propane gas torches, thus alleviating the fire risk, and allowing the school to function as normal. M&J Group have led the way in removing the need for naked flames when installing RBM systems–investing heavily in new tooling and equipment, including upskilling their work teams in flame-free installation techniques at their training facility.

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Figure 4: *Completed roof system*

Further information

NFRC Safety Alert SA02 Reinforced Autoclaved Aerated Concrete:
view.protectedpdf.com/bAy4wg

NFRC Safe2Torch guidance:
nfrc.co.uk/media-centre/campaigns/safe2torch

Collaborative Reporting for Safer Structures:
www.cross-safety.org/uk

Conclusion

Removal of RAAC should not be attempted without the advice of a professional and should be planned and managed by a specialist contractor, with a high degree of caution as outlined in this case study. NFRC worked with Collaborative Reporting for Safer Structures (CROSS-UK) and the Department for Levelling Up, Housing and Communities (DLUHC) to produce a Safety Alert outlining the cautious approach that should be adopted if a roofing contractor suspects RAAC planks are present on a flat roof refurbishment.

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