RAAC and Ruin - the sequel

Monday 4 September, 2023

Media:

Related Sectors:

Construction & Property :: Public Sector & Legal ::

Related Keywords:

Building Surveying :: Project Management :: Cost Management :: Development :: RAAC :: Cost Management :: Public Sector ::

Scan Me:

RAAC and Ruin – the sequel.

The disclosure on the 31st of August that circa 105 schools have had to be closed or had classrooms taken out of use due to RAAC ignited a media storm; inevitable questions over Government Policy and concern over the implications for the safety and health of the public at large, the extent of the problem and whether more should have been done sooner.

Inevitably those quarters of the press with a political agenda were keen to exploit failings of the industry or public bodies and even to explore whether the wider social housing stock was in danger of collapse.

There is no doubt that for the schools affected, the impact of the requirements is devastating; teachers, parents and students are entitled to question how something like this could appear from left field, seemingly without notice and with such profound consequence. Being told that your building might collapse is certainly headline grabbing news and quite rightly those worried by this and responsible for the building or its occupants will be profoundly affected.

Faced with a highly charged story it is hardly surprising that there has been considerable media attention; this commentary is intended to look at some of the facts and issues at play and the implications for property owners, tenants, and users over the wider building stock.

The material

First, and very briefly, RAAC panels (or planks) were in common use through the late 1950s through to around the late-1980s (there may be some uses into the early 1990s, but the extent is unknown). The basic autoclaved aerated concrete product (AAC) is still used for the manufacture of thermally insulating blocks for building, but these products exhibit totally different characteristics from Reinforced Autoclaved Concrete and need not concern us. RAAC planks were typically around 600mm width and up to 6m in length. White or greyish in colour according to the manufacturer, the product is around 1/3rd of the density of normal concrete so it is much lighter and has higher insulating properties. But the low density also means that it has a low compressive strength; the material can be scratched and carved easily with a screwdriver or other probe – one feature, together with its bubble structure, which makes visual identification fairly straightforward.

RAAC panels were commonly used to form flat roofs (up to around 6-degree pitch) but uses such as wall panels and floor panels are not unknown. They were often used in schools and healthcare buildings that required reasonably clear spans and often in conjunction with steel lattice beams or similar engineered supporting structures.

During the early 1990s, concerns began to be expressed that the panels were not performing as originally intended. Instances of severe deflection and transverse cracking were observed, whilst lack of corrosion protection to reinforcement created durability issues. Most importantly, the low strength of the AAC concrete resulted in low bond strength between the concrete and the reinforcement, meaning that in certain circumstances the reinforcement could tear out. BRE and others concluded that the materials should be considered to have a short life of circa 30 years.

At this time and certainly during the period leading up to 2018, the received wisdom was that whilst deflection and cracking was a problem (and that severe cases needed to be addressed) it was unlikely that the product would fail catastrophically, at least without some warning.

Throughout the intervening years, occasional alerts from the Standing Committee on Structural Safety (SCOSS) continued to draw attention to the poor performance of the material and the need for vigilance.

However, in 2018, a structural failure of a school in Kent lead to the partial collapse of an RAAC roof. Fortunately, there were no injuries as the failure occurred over a weekend. Investigations that followed identified potentially serious problems with shear reinforcement at the bearing ends of the planks. Typically, the end bearing of many panels is only around 40mm or so; this means that correctly placed reinforcement is essential in order to resist shear (slicing) forces and prevent the planks from failing. Shear failure can be sudden and is not necessarily accompanied by deflection or other indications of a developing problem. (Deflection and long-term creep are common; this can lead to water ponding on flat roofs and increased live loads).

Investigations by a working party led by IStuctE and representatives from Loughborough University resulted, in May 2022 in the publication of a new guide on RAAC advising on the identification, characteristics and risks involved and recommendations for repair or other remedial action. In November of that year, the Office of Government Property issued a letter advising departments, local authorities and other arm's length bodies of the dangers associated with RAAC and the risk of sudden collapse. Organisations such as DFE have been actively compiling information on schools, with healthcare following closely behind.

One question that has been asked is if the problem has been known for 5 years why only act now? I make no attempt to justify or criticise actions here; it takes time to assess the risks; in simple terms a few cases of disease do not make a pandemic; these issues are complicated and with a lack of information as to the extent it makes sense to investigate thoroughly. Indeed, the current IStruct E publication is work in progress with more work to follow.

Whilst the scale of the problem in schools and the healthcare estate is beginning to become apparent; the same cannot be said for the wider building stock; there are no current registers or sources of information as to the use of the product and therefore it is up to owners, operators, tenants, or landlords to establish the materials used in construction. Government Owned properties need to record the detail of their assets and the materials used, the same cannot be said of the wider non-domestic stock.

RAAC is not just a problem for educational establishments and healthcare trusts; it may be found in a variety of other types such as retail buildings, offices, recreational buildings and so on. The same risks of collapse exist in these buildings and therefore it is important that the use of the product is identified and recorded.

Perspective.

According to NAO statistics there are circa 21600 school buildings in England and of that number around 156 have been identified as containing RAAC with circa 105 earmarked for urgent action. That suggests that of the total only around 0.75% are affected. Some caution is needed as to interpretation as it is currently unclear as to whether results from all schools are included and there remain a significant number of academy schools and other establishments that could contain RAAC. However, although not to undermine the seriousness of the situation and the effects on the affected schools, 0.75% is a relatively low number.

The proportion of healthcare buildings is not yet known although there are some reports that seven hospitals have been found to be unsound and 34 more that contain RAAC. By comparison (and again comparing with NAO statistics) there are circa 26,000 healthcare buildings in the country so that is around 0.03% of the total. These figures need to be treated with caution, but my feeling is that although it is a serious problem, it's not necessarily a problem on the scale of the current cladding problem.

But what of the circa 335,000 offices, 476,000 shops and 162,000 hospitality buildings[1]? The number of affected buildings is impossible to predict at this stage; there is no doubt that a large proportion of these buildings will have been constructed before or after the relevant time and of the remaining at risk I would hazard a guess (based on my experience of commercial buildings) that a small number are affected. Certainly, over the last 40 years and inspections of hundreds of commercial buildings I have only come across a handful of cases where RAAC has been used and in those cases two were wall panels rather than roofs. Mostly, the panels were in buildings such as plant roofs or ancillary spaces rather than predominate areas; that of course is only my experience; others may disagree.

Similarly, observers have expressed concerns for the social housing stock – all I can say is that I have never come across examples in housing – an experience echoed by Gary Strong, RICS Global Building Standards Director. One can never say never of course, and it is interesting to note that a BRE investigation in 1996 appears to have investigated samples taken from a social housing development.

Identification

Identification is straightforward if the material is exposed, but frequently it will be obscured by suspended or fixed ceilings or other finishes requiring removal or the formation of access panels. Beware of the risk of asbestos in these situations and check management plans beforehand; asbestos was finally banned in buildings in 1990, so many buildings constructed from RAAC may also contain asbestos.

A helpful guide may be found on line at Reinforced autoclaved aerated concrete: identification guidance - GOV.UK (www.gov.uk)

Remediation.

The mere existence of RAAC does not automatically mean that there is a need for significant structural works or alterations, but it does mean that a careful structural and durability assessment is needed – this is something that would commonly demand engineering advice. We have heard numerous comments that the buildings are past their sell by date and need to be demolished. In reality, we are dealing, in the main, with component parts of a building and whilst those components do have a structural function it is by no means the case that they will need to be “torn down and replaced”. Measures such as the provision of span breakers and secondary support structures or bearing extensions may be possible. Temporary propping may also be appropriate as would a programme of regular monitoring; all depends upon the condition of the product and critically upon the condition and positioning of the reinforcement.

Investigations by IStuctE and others has shown wide variations in quality control leading to critical shear reinforcement being incorrectly located or compromised. Further, corrosion of the steel can also be a problem since the compressible nature of the concrete may absorb the expansion forces that would cause spalling in conventional concrete. All of these factors require careful assessment and are usually outside the remit of surveyors.

Audit

As noted earlier, visual identification is usually straightforward once the material has been exposed. However, gaining access to check might be problematic; finishes may well conceal the slabs together with the ever-present risk of asbestos. A crude check would be to assess the age and style or likely type of construction; this might serve to narrow down the number of buildings that need to be inspected. Review of as built drawings might identify trade names such as Celcon, Durox, Sipporex etc. although given the general poor standards of record keeping in the industry this is an optimistic hope. The initial identification of the product and the audit trail is or should be well within the skill set of building surveyors.

Responsibility

Unlike for example the existence of asbestos, there is no specific legislation that requires the identification of RAAC in commercial buildings, but owners and responsible persons do have a well-established duty of care to protect the health and safety of individuals using the building, visitors, and members of the public. In my view this means that if there is a reasonable possibility that RAAC could have been used (for example depending upon the age and type of building) that is existence ought to be identified in the first instance pending a more detailed study if identified.

Given the current media focus but also the clear warnings issued by SCOSS and others, there would seem to be little to be achieved in claiming ignorance of the situation. The point is that although the number of affected buildings may be low in overall terms, the risks of harm are still high enough to warrant careful consideration. Responsibility for these matters may rest with tenants rather than landlords depending upon the lease provisions; arguably unless the material has deteriorated from a former better condition a tenant may argue that there is no need to undertake work – but each case would need to be examined according to the facts of the case. The first step must surely be to identify whether the product is present. The risks and responsibilities for action can then be considered.

Watts is recognised as as one of the UK’s leading independent building surveying led property and construction consultancies and is well placed to provide appropriate professional guidance on audit measures prior to remedial action to make the buildings and those occupying them safe.

[1]
Information based upon ND-NEED 2022 data

Company Contact:

Watts Group Limited

T. 07540794502
E. emma.cox@watts.co.uk
W. https://www.watts.co.uk

View Online

Additional Assets:
https://watts.co.uk/raac-and-ruin-the-sequel/

Newsroom: Visit our Newsroom for all the latest stories:
https://www.watts.pressat.co.uk