20.09.2023

EAACA statement on the current RAAC topic in the UK

Ensuring the health and safety of building users is of utmost importance to the European Autoclaved Aerated Concrete Association (EAACA). The choice of the right building material is one of the key factors for sustainable buildings.

An investigation report from the UK shows various combinations of deficiencies in the application of the reinforced elements. In addition, basic principles such as maintenance or servicing of load-bearing structures were not observed. To our current knowledge, there are no comparable issues with reinforced elements made of autoclaved aerated concrete in EU countries.

Our association has identified AAC as one of the safest building materials available to consumers, both in terms of health and environmental impact.

Modern Reinforced Autoclaved Aerated Concrete elements (RAAC) must meet quality requirements according to the European building materials and structural design standard EN 12602, which was developed in the 1990s and published in 2008.

EN 12602 specifies the performance characteristics as well as the evaluation and test criteria for the performance resistance of reinforced aerated concrete elements.

Background

The European Association of AAC has followed the developments in the UK, where roughly 150 schools have closed their buildings due to safety considerations and lack of maintenance, which is linked to thin roof slabs made of RAAC in some public buildings dating from the 1960-80s.

In the UK, over the last few years, the Standing Committee on Structural Safety (SCOSS, part of the Institution of Structural Engineers) has been reporting on the 'Failure of Reinforced AAC planks'. In Feb 2022, the Institution of Structural Engineers published 'Reinforced Autoclaved Aerated Concrete (RAAC) Panels Investigation and Assessment'.

It has been reported that in the 1980s there were many instances of failure of RAAC roof planks installed during the mid-1960s. Several case studies revealed some primary deficiencies e.g., insufficient provision of crossbars for providing anchorage for the longitudinal steel with short bearing lengths, failure in performance of roof membrane and rapid worsening of local corrosion of steel.

The 'planks' in question where supplied, designed and installed pre-1990.

20.09.2023

In 1996, the Building Research Establishment produced an Information Paper (IP10/96) on the issue and made it clear that the matter does not apply to beam and block floors and walls which contain AAC (aircrete) blocks or to any other AAC components.

Based on the reports available to us, we come to the following assessments and indications:

What is RAAC?

The building material referred to as RAAC in the media is autoclaved aerated concrete reinforced with steel. Autoclaved Aerated Concrete is a building material that is usually made from natural sand, lime, cement and water. By adding a blowing agent, autoclaved aerated concrete is given a pore structure during production that enables very good thermal properties with low weight.

In order to be able to use the building material also in structural elements such as roofs and ceilings, which are primarily subject to bending stress, the mandatory use of corrosion-protected reinforcement began in the 1950s, as is also known from reinforced concrete elements.

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Why did deficiencies occur in some public buildings in the UK?

At this point in time, after reviewing all reports and documents, we assume that there were a variety of influences among them application deficiencies such as unauthorized shortening of the slabs, support lengths that are too short and damage to the slabs during conversions, subsequent application of additional loads.

Is reinforced aerated concrete a durable building material?

AAC was developed in the 1920s and has since been used in millions of buildings around the world. Reinforced aerated concrete has been around since the 1950s. The durability of AAC results from its stable mineral structure. An essential mineral component is tobermorite, which also occurs in nature and structurally belongs to the chain and band silicates. Studies show that even over a very long period of more than 80 years, the properties of AAC do not change.

The stable structure of AAC and RAAC is the prerequisite for maintaining performance characteristics over a long period of time. Investigations for assessing the usability of RAAC in buildings show that in accordance with the EN 1990 standard, a high reliability class is achieved easily, which allows it to be used in various types of buildings for more than 50 years.

20.09.2023

As with all other building materials, RAAC requires that the conditions of the buildings are sustained by maintenance measures. In many European countries, it is the duty of the building owner to arrange, construct, modify and maintain installations in such a way that public safety and order, in particular life, health and the natural basis of life, are guaranteed.

Are only buildings from the 1990s onwards safe?

Buildings constructed with RAAC before the 1990s can be absolutely safe. Shortly after the development of RAAC in 1950s, there was, for example, a technical rule in Germany (DIN 4223; released 1958) that regulated the manufacturing design of RAAC. In addition, national approval and certificates in Europe were issued, which enabled continuous in-house and external monitoring.

We have no evidence to suggest that the durability of RAAC produced and used on the basis of these technical rules should be questioned.

What is the EAACA recommendation for the UK case?

We recommend following the national guidelines of your responsible authorities.