



Department
for Education

Reinforced Autoclaved Aerated Concrete (RAAC):

Identification guidance

April 2024

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Summary

This publication provides non-statutory guidance from the Department for Education (DfE). This guidance has been produced to help responsible bodies from the education sector (school, nursery and college leaders, staff and governing bodies) understand how to identify Reinforced Autoclaved Aerated Concrete (RAAC) and appoint an appropriately qualified building surveyor or structural engineer to confirm if RAAC is present in their settings.

Review date

This guidance will be reviewed no later than July 2025.

Who is this publication for?

This guidance is for:

- local authorities (for community, voluntary-controlled schools, foundation schools and maintained nursery schools)
- academy trusts (for academies and free schools)
- governing bodies (for voluntary-aided schools)
- school/college leaders, staff and governing bodies in; further education colleges and designated institutions, sixth form colleges, maintained schools, academies and free schools, pupil referral units, City Technology Colleges, non-maintained special schools and maintained nursery schools
- building professionals (e.g., structural engineers and building surveyors) who have been commissioned to assist the above clients regarding the identification of RAAC.

Academy trusts with a religious character and the responsible bodies for voluntary-aided and voluntary controlled schools should engage with the land/site trustees for their land and buildings and the relevant religious body, most often their Diocese.

Stage 1 of this guidance is useful to the wider education sector.

Stage 2 of this guidance is specifically for state-funded education estates in England.

Revision history

This table lists the key changes in each update.

ISO revision code	ISO status code	Date	Amendment
C01	A	2022-12-14	First issue of guidance
C02	A	2023-08-30	Removed reference to use of a 'hammer' in identification and layout updated
C03	A	2023-09-19	Minor typographical and terminology corrections, and changes to improve the accessibility of images
C04	A	2024-04-25	Additional information added to 'Who is this publication for?' on page 4, 'What is RAAC and why is it a potential risk?' on page 8 with an update to 'Stage 2: Actions to be taken' on page 16

Definitions

Terms and acronyms you may come across with respect to RAAC are defined below.

Bearing - The width or distance that a RAAC element (panel or plank) sits on the support, measured from the edge of the support to edge of the panel.

Bending - The force within a structural system that causes deviation from a straight line to a curve.

Compression - The force within a structural system that pushes down or into an element.

Panel - The term to describe the individual RAAC element. May also be referred to as a 'plank' when considering horizontal elements.

RAAC - Reinforced autoclaved aerated concrete.

Span - The horizontal (or vertical) distance between supports, typically measured from the centreline of the supports. Clear span is often used to describe the distance between the inner faces of the supports.

Shear - The force within a structural system that causes slippage on a plane of failure, typically close to a support.

Introduction

This publication provides non-statutory guidance from the Department for Education (DfE). It has been produced to help estates' teams/site managers understand how to identify Reinforced Autoclaved Aerated Concrete (RAAC) panels in floors, walls, eaves and roofs (pitched and flat).

This publication replaces previous guidance issued by the DfE entitled 'Reinforced Autoclaved Aerated Concrete (RAAC): Identification guidance' dated September 2023.

Introduction

What is RAAC and why is it a potential risk?

Reinforced Autoclaved Aerated Concrete (abbreviated as RAAC) is a lightweight, 'bubbly' form of concrete commonly used in construction between the 1950s and mid-1990s. It is predominantly found as precast panels in roofs (mostly flat, sometimes pitched) and occasionally in floors and walls.

RAAC panels are considerably weaker than traditional concrete and are now beyond their estimated service life, with concerns about their structural integrity.

In December 2018, the Department for Education (DfE) and the Local Government Association (LGA) made building owners aware of a building component failure in a property constructed using RAAC. In May 2019, the Standing Committee on Structural Safety (SCOSS) raised an alert to emphasise the potential risks from such construction, highlighting the failure of a RAAC panel roof construction within an operational school. This collapse was sudden and with no apparent warning.

Since then, DfE have been made aware of further sudden collapses of RAAC panels in roofs that appeared to be in good condition.

Prior to this, in the 1990s, there had been other concerns raised relating to structural deficiencies in RAAC by both the Building Research Establishment and SCOSS. It was recognised that the in-service performance was poor with cracking, excessive displacements and durability all being raised as concerns.

In February 2021, DfE published technical guidance to assist responsible bodies identify, assess and manage RAAC. In 2022, DfE sent a questionnaire to all responsible bodies asking them to provide information on RAAC in their estate. All responsible bodies for schools and colleges with blocks built between 1930 and 1990, the era when RAAC was predominantly used, submitted responses to the questionnaire.

The DfE's RAAC Identification Programme is now complete, and the questionnaire closed. Any school or college that advised DfE that they suspected the presence of RAAC has now had a survey to confirm if RAAC is present.

It is important that responsible bodies remain aware of the possible presence of RAAC and understand how to identify it, following the stages outlined in this guidance.

Flowchart of guidance stages



Stage 1A
Initial RAAC identification

Refer to Stage 1A: Identifying RAAC to see if you may have RAAC in your education estate

Stage 1A may be undertaken by someone who has responsibility for building or estate management as well as the day-to-day running of the school. Depending on experience, advice may be required from a building professional (see Stage 1B).



Stage 1B
If unsure, or where RAAC is suspected, appoint a building surveyor or structural engineer

Refer to Stage 1B: Appoint an appropriately qualified building surveyor or structural engineer for advice on appointing a specialist consultant

Once RAAC has been suspected or if you are unsure, an appropriately qualified building surveyor or structural engineer should be appointed to confirm if RAAC is present in any of the buildings in your education estate.



Stage 2
For responsible bodies of state funded education estates
Actions to take if RAAC is confirmed and what happens next

Refer to Stage 2: Actions to be taken and inform DfE if RAAC is confirmed

Report immediately to the Department for Education if you have identified RAAC in your education estate via the Structural Issues form (see page 16). This form should be completed by a person or team responsible for the day-to-day running of the school and with some knowledge of the buildings.

Figure 1: Flowchart of guidance stages

Stage 1A: Identifying RAAC



Figure 2: A fragment of RAAC showing its 'bubbly' appearance

Identifying RAAC

This guide will help you identify where RAAC panels may be present in your buildings. In many cases, RAAC panels can easily be identified if a building's structure is not covered by finishes (such as ceilings) or decoration. RAAC panels have some distinctive features as shown on pages 12 - 13. If you are able to view the structure and identify one or more of these distinctive features, RAAC may be present in your building.

BE AWARE - if you need to look behind ceilings or finishes you should consult guidance about managing asbestos (see page 13) and the building's asbestos register beforehand.

RAAC Checklist

When looking directly at the structure (i.e., with no finishes or decoration), can you see one or more of the following?

(See overleaf for photographs)

- 1 600mm wide concrete panels (typically)
- 2 Distinctive V-shaped grooves at regularly spacing (normally 600mm in a floor, wall or ceiling)
- 3 Floors, walls or ceilings that are white or light grey (where they have not been painted)
- 4 Drawings of your buildings that refer to RAAC or mention any of the following suppliers Siporex, Durox, Celcon, Hebel and Ytong

Note that this is not an exhaustive list. Occasionally panels with square edges or narrower widths have been identified.

Where to look?

RAAC panels are most commonly found on flat roofs, they may also be found in pitched roofs, floors or walls.

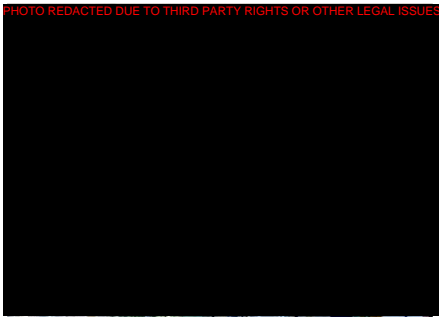


Figure 3: Example of RAAC in flat roofs/floors

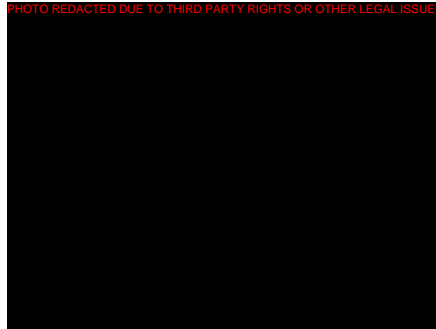


Figure 4: Example of RAAC in walls

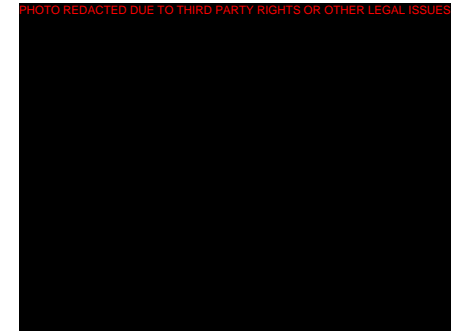


Figure 5: Example of RAAC to an internal wall face

Appearance and texture

RAAC panels are light grey or white in appearance, the underside of the panels will appear smooth. The inside of the planks will appear bubbly, often described as looking like an Aero bar. Unlike traditional concrete, there will not be visible stones (aggregate) in the panels.

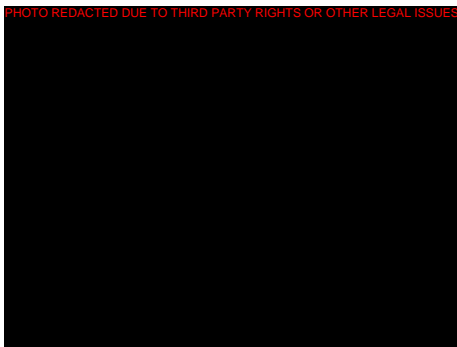


Figure 6: Aerated appearance of RAAC

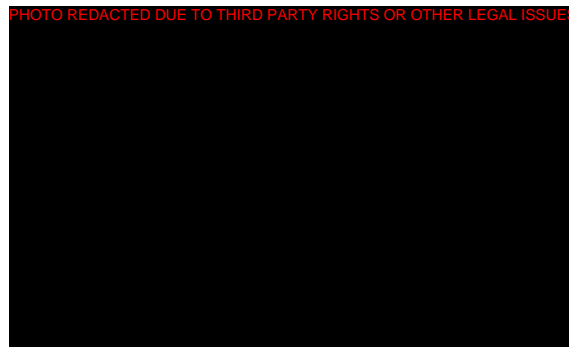


Figure 7: Underside of a cracked RAAC panel

Stage 1A

Drawings

If you have drawings from the time the building was built or modified, you should review these. Common manufacturers of RAAC panels are Siporex, Durox, Celcon, Hebel and Ytong.

Panel size and profile

RAAC panels are typically 600mm (approximately 2 feet) wide although this has been known to vary. Their length will vary, typically up to 6 metres. RAAC panels typically have a chamfer along their edge meaning there is a distinctive V-shaped groove every 600mm in the surface of the roof, floor or wall.

Softness

RAAC panels are very soft. If you press a screwdriver, screw or nail into the surface of a RAAC panel you will be able to make an indentation.

BE AWARE - if there is a surface covering to the panels you should not try to make an indentation as the covering may contain asbestos.

PHOTO REDACTED DUE TO THIRD PARTY RIGHTS OR OTHER LEGAL ISSUES

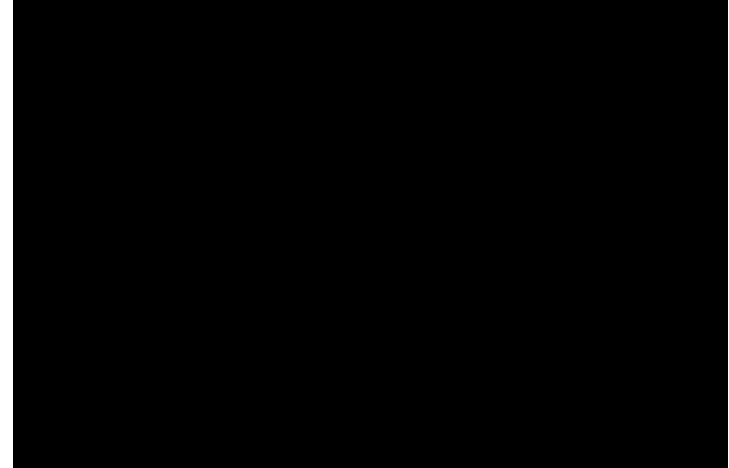


Figure 8: Typical profile of RAAC panels

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Figure 9: V-shaped grooves at 600mm spacing

Stage 1A

Bowing and deflection

RAAC panels may bow or deflect. From the underside of the roof or floor you may see a 'gap' between two adjacent panels.

Further information

The following documents provide background information about RAAC and give advice on how you can safely identify RAAC panels in your buildings.

[Failure of reinforced autoclaved aerated concrete \(RAAC\) planks \(cross-safety.org\)](https://www.cross-safety.org/)

[Managing asbestos in your school or college - Guidance - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/managing-asbestos-in-your-school-or-college)

[Introduction to asbestos safety: Overview - HSE](https://www.hse.gov.uk/overviews/asbestos-overview.htm)

[Safe use of ladders and stepladders: overview - HSE](https://www.hse.gov.uk/ladders/)

[Maintenance and Access into Suspended Ceilings - FIS \(thefis.org\)](https://www.thefis.org/maintenance-access-suspended-ceilings)

If you have further queries, please email:

RAAC.Awareness@education.gov.uk

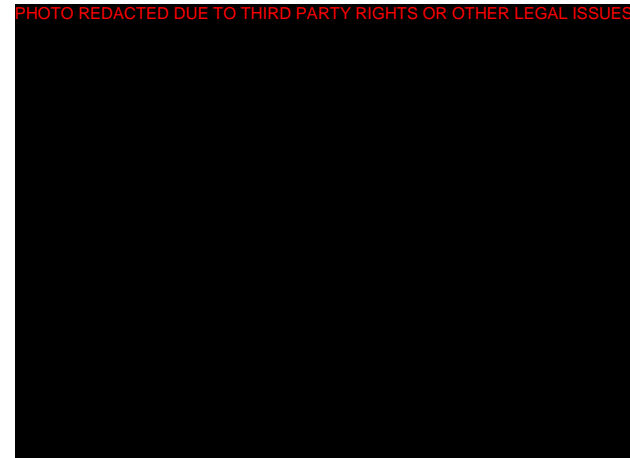


Figure 10: Example of deflected RAAC panel

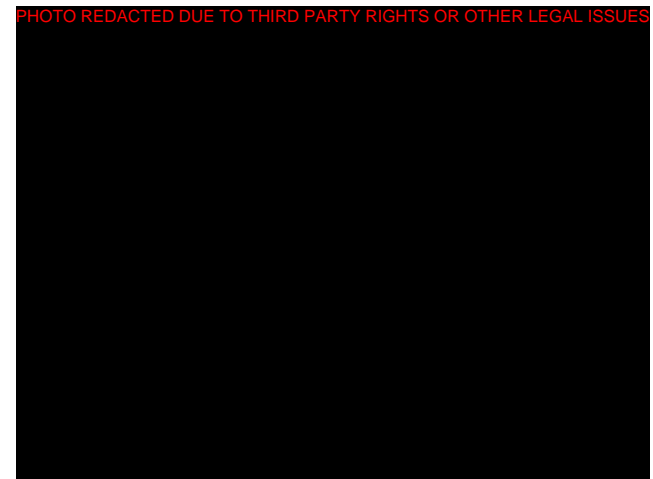


Figure 11: Example of deflected RAAC panel

Stage 1B: Appoint an appropriately qualified building surveyor or structural engineer

If you identify potential RAAC, assistance should be sought from an appropriately qualified building surveyor or structural engineer with experience of RAAC to confirm if RAAC is present in any of the buildings in your education estate. This section provides advice on appointing an appropriately qualified building surveyor or structural engineer.

Appointing a building surveyor

Building Surveyors for RAAC identification require:

- a relevant degree e.g., BSc (Hons) Building Surveying
- 3 years relevant experience assessing building condition - this can be measured in the time elapsed since completion of an appropriate industry related degree or qualification e.g. BSc (Hons) Building Surveying
- evidence of one-year minimum relevant RAAC project/commission experience
- membership of the Royal Institution of Chartered Surveyors (RICS) with Building Surveyor designation

Appointing a structural engineer

To ensure that the Structural Engineer has the appropriate qualifications, their credentials should be requested and include:

- Chartered Membership of the Institution of Structural Engineers (CEng MIStructE)¹, and/or
- Chartered Membership of the Institution of Civil Engineers (CEng MICE)

Evidence of experience of the following (**RAAC is essential**):

- surveying, assessment and design/specification of remediation works to existing buildings
- visual inspection works and desk-study works
- physical inspection works, either specification and management or physical works
- management/post-completion evaluation of remedial works

¹ Members of The Institution of Structural Engineers may be found here: [Find an Engineer - The Institution of Structural Engineers \(istructe.org\)](https://www.istructe.org)

Stage 2: Actions to be taken

Actions to be taken by responsible bodies of state-funded education settings in England if RAAC is confirmed

Having taken steps to confirm RAAC is present using a suitably qualified building professional, **you should immediately inform the Department for Education using the [DfE Structural Issues](#) form.**

Further information

Further guidance on the actions you should take if RAAC is confirmed in your buildings can be found at [Guidance for Responsible Bodies and education settings with confirmed RAAC in their buildings](#).

If you have any questions regarding RAAC identification, please email: RAAC.Awareness@education.gov.uk

Appendix A: Checklist of information if commissioning a professional RAAC survey

If you have identified potential RAAC and are commissioning a building professional to confirm whether RAAC is present, you should:

- gather and supply relevant information about your buildings (see Appendix B)
- list all spaces where additional measures will be required to enable the surveyors to see the surfaces clearly (see Appendix C)

These actions may be undertaken by someone who has responsibility for building or estate management as well as the day-to-day running of the school.

Appendix B: Gather information

Index	Item	RB issued to DfE (Yes/No)	Notes
1	<p>Construction dates for different blocks/parts of school, alterations, extensions or interventions</p> <p>i.e., where RAAC panels may have been used, or an adaptation to RAAC panels within existing buildings. Information may be via correspondence, drawn information (see below), local authority (LA) planning or building control applications, aerial photos, historic maps.</p>		
2	<p>Drawn information</p> <p>Including historic building plans, sections and elevations together with any detailed construction drawings, re-roofing works, confirmation of any works that may have been undertaken and the reasons why (e.g., ponding or leaking).</p>		
3	<p>Record photographs</p> <p>Photographs during construction, rebuilding works, alterations, repairs etc.</p>		
4	<p>Specifications and/or reports</p> <p>Building specifications, condition, or investigation reports.</p>		
5	<p>Building services systems and revisions</p> <p>i.e., any adaptations that may have altered loading, required fixings into roof or floor systems, or altered internal environments within a space (e.g., humidity, temperature etc).</p> <p>Examples include PVs added to roof; conversion of upper floor to library/science lab; new kitchen.</p>		
6	<p>Asbestos register</p>		
7	<p>Evidence associated with any application for School Rebuilding Programme</p>		

Appendix C: Access requirements

List all spaces where access arrangements are needed to see the surface clearly. Refer to example below.

Room ID / name	Accessibility during term time	Accessibility during school holidays	Height >3m	Surface concealed by covering or coating e.g., <ul style="list-style-type: none"> • Covering: Suspended ceiling • Covering: Plasterboard • Coating: plaster • Coating: asbestos • Coating: unknown 	Asbestos register notes	Roof access e.g., Staircase, guard rails around perimeter	RB notes	Notes *Links to documents with information on how you can safely identify RAAC panels in your buildings are on page 14
e.g., 1 Sports Hall	Wednesday/ Thursday 8am - 2pm	12 - 16 February 8am - 5pm	6.7m	n/a		Roof access via staircase, 1.1m guard rail	No scaffold tower	To provide mobile scaffold tower
e.g., 2 Entrance area	Before 8.30am and after 4pm	12 - 16 February 8am - 5pm	4m to underside suspended ceiling	Suspended ceiling tiles		n/a (ground floor of 3 storey block)	Caretaker can be available 8am to 5pm to remove tiles as required	To provide mobile scaffold tower
e.g., 3 Classroom 2A	Monday - Wednesday before 8.30am or after 3.15pm Thursday - Friday before 8.30am or after 1pm	12 - 16 February 8am - 5pm	3m to u/s of soffit	Unknown coating, no ceiling void	Not available		School risk assessment doesn't permit TA use of ladders	To provide ladders. Sample of coating tba*, and coating confirmed prior to visit date

Image credits

Figure 1: Department for Education

Figure 2: Department for Education

Figure 3: Mott MacDonald

Figures 4 to 6 (inclusive): Ove Arup and Partners Ltd

Figures 7 & 8: Ove Arup and Partners Ltd

Figure 9: David Robertson

Figure 10: Ove Arup and Partners Ltd

Figure 11: Mott MacDonald



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