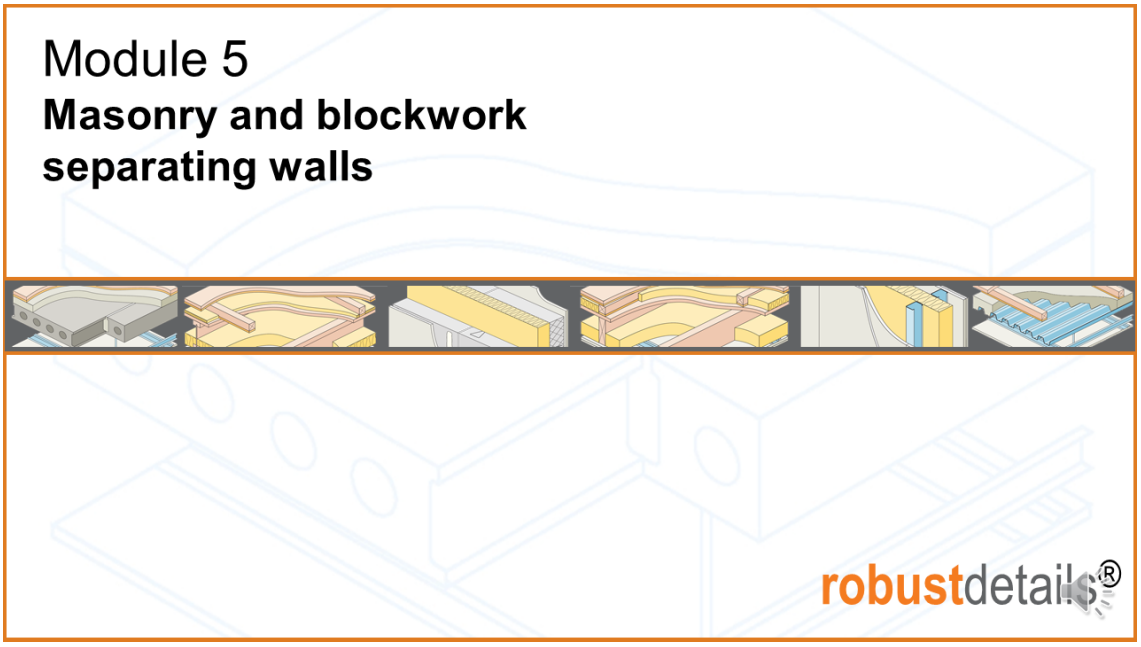
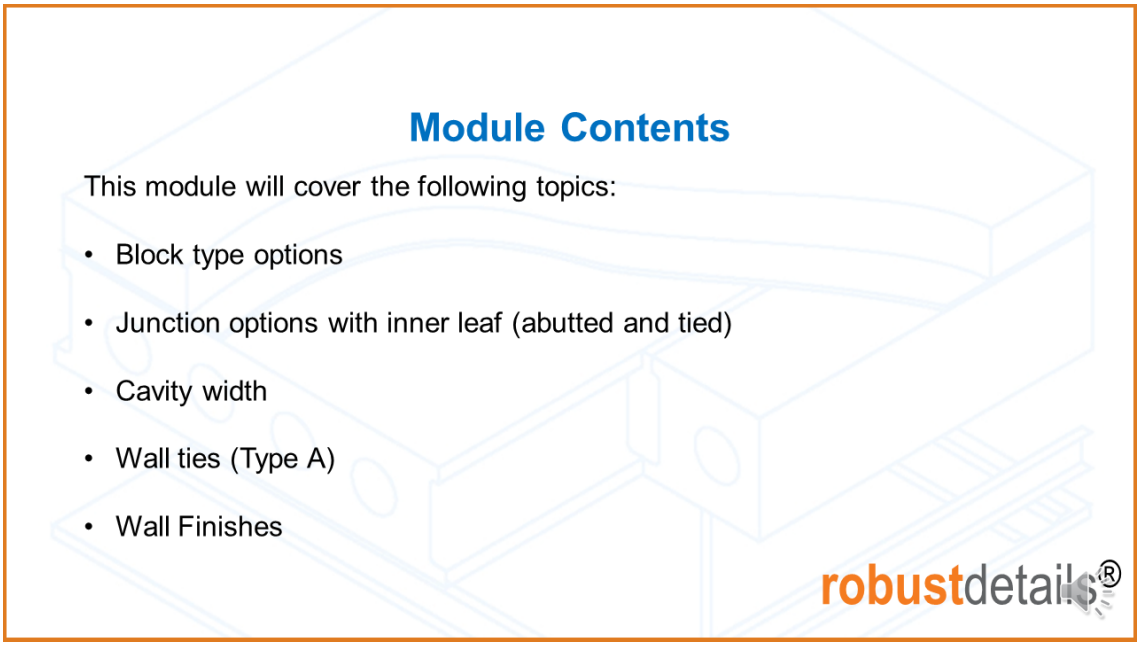
**Slide 1**




Welcome to Module 5 – Masonry and blockwork separating walls

Additional notes:

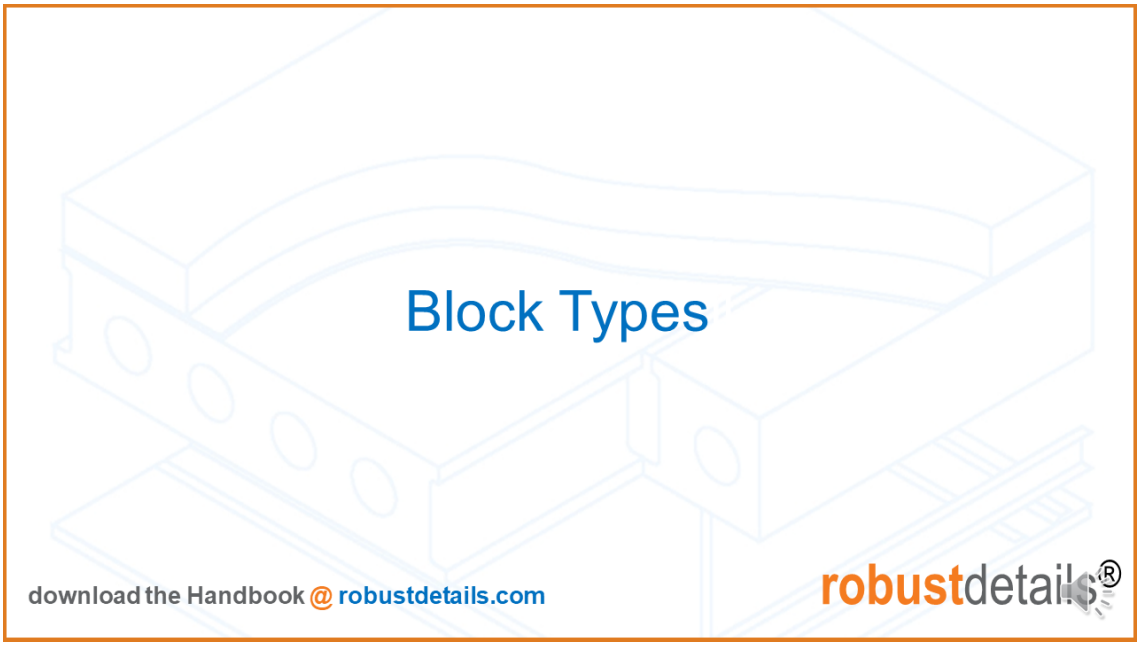
**Slide 2**




This Module will cover the following topics

Additional notes:

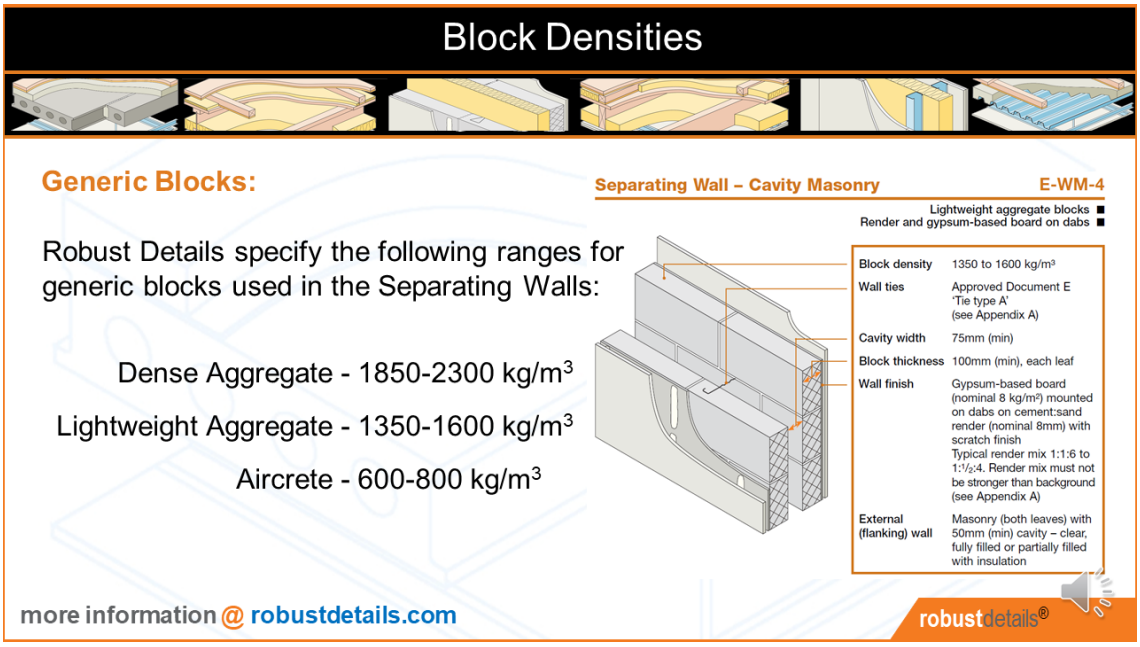
**Slide 3**




Read slide

Additional notes:

**Slide 4**



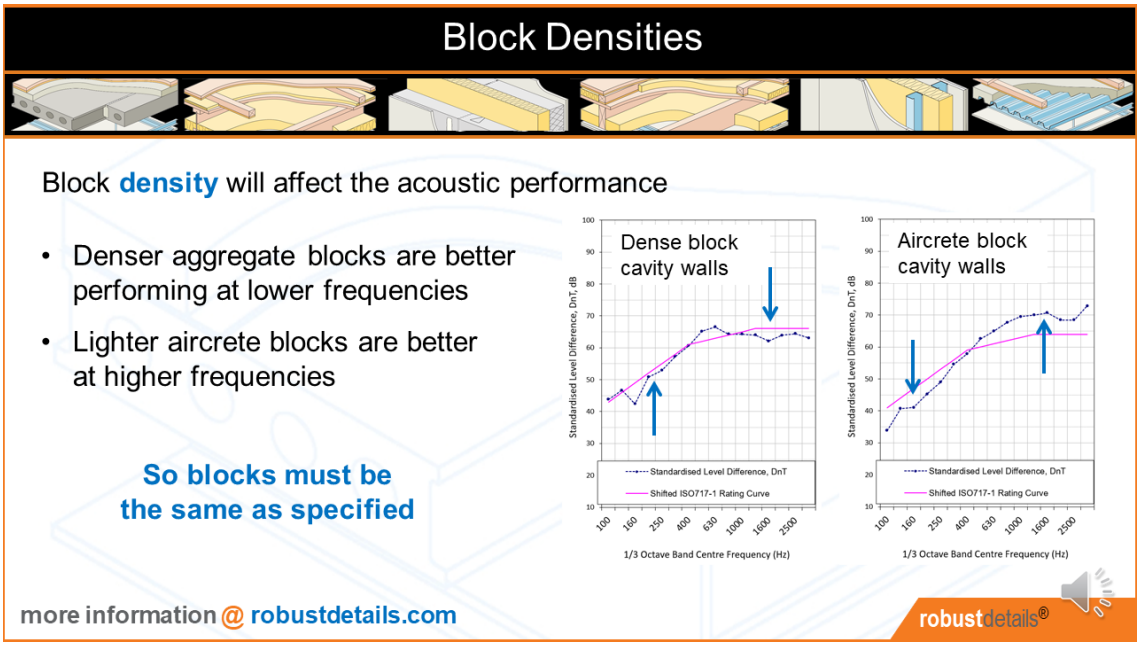

Reflecting guidance in Part E, Robust Details specify the following densities for generic blocks used in each of the Separating Walls:

Read slide

Blocks in these Generic walls can be sourced from anywhere, provided they meet the material description – so they must be “solid”; and be min 100mm thick… and of course, with the right density.

Additional notes:

**Slide 5**



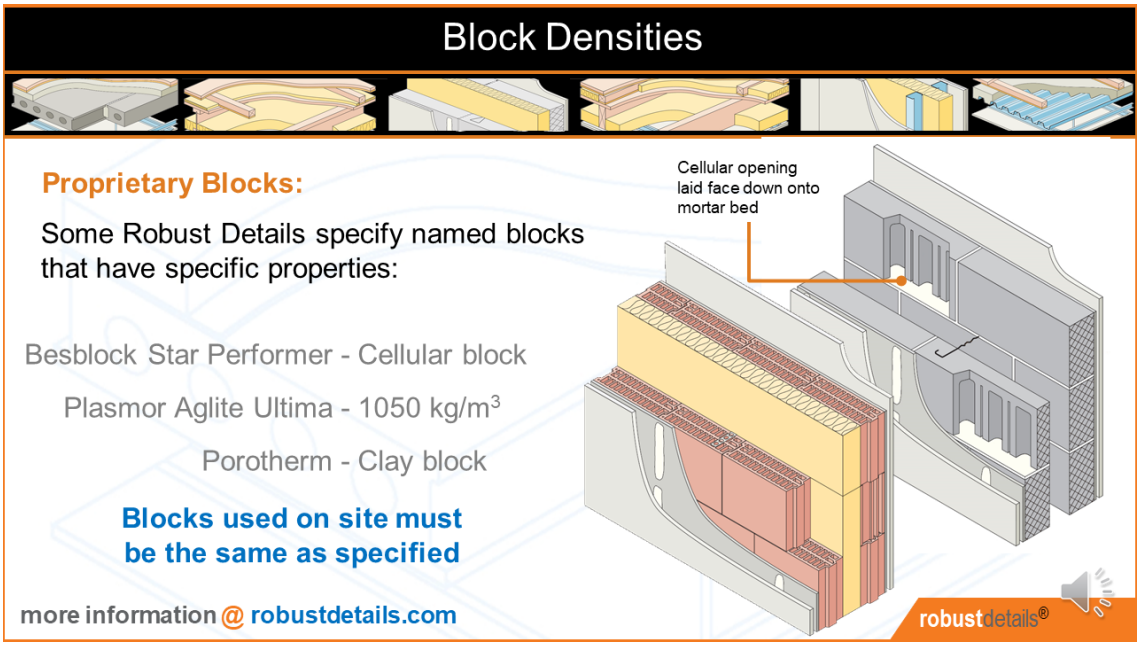

The Density of a block used in a separating wall will play a major role in the acoustic properties of that wall

Different blocks have different characteristics -
Dense aggregate blocks are good at resisting low-frequency; but sometimes being more porous, they can let high-frequency sound through
Conversely, the closed-cell structure of aircrete is better at stopping high-frequencies, but they don't have the mass to dampen the lower-frequencies

So if the expected performance is to be maintained, the specified density of block must be used in the Robust Details.

Additional notes:

**Slide 6**

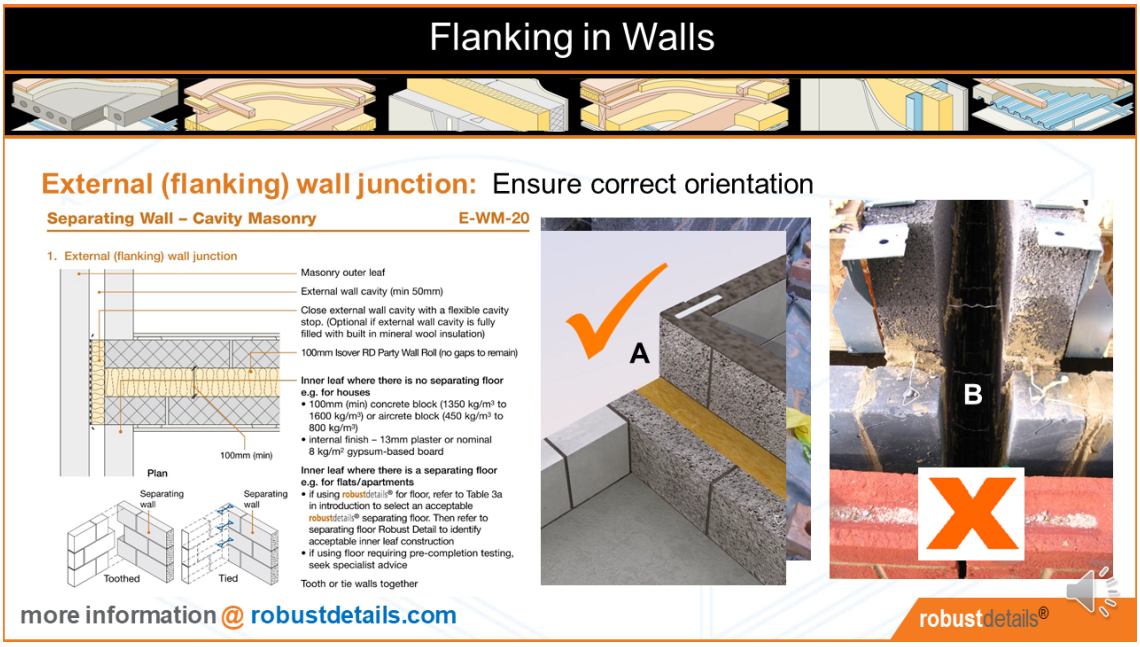



There are also proprietary Details.

These have block types that fall outside of the generic descriptors – so they could be cellular; an unusual density; or they could be a completely different material.
For example, we have… as slide..
As each of these will have very specific properties, it is critical that the specified block is used – and is not substituted.
For CELLULAR blocks they must be laid “frog / opening” facing down onto the mortar bed.
Where a product is named in a Robust Detail, there is no “or similar approved”.

Additional notes:

**Slide 7**

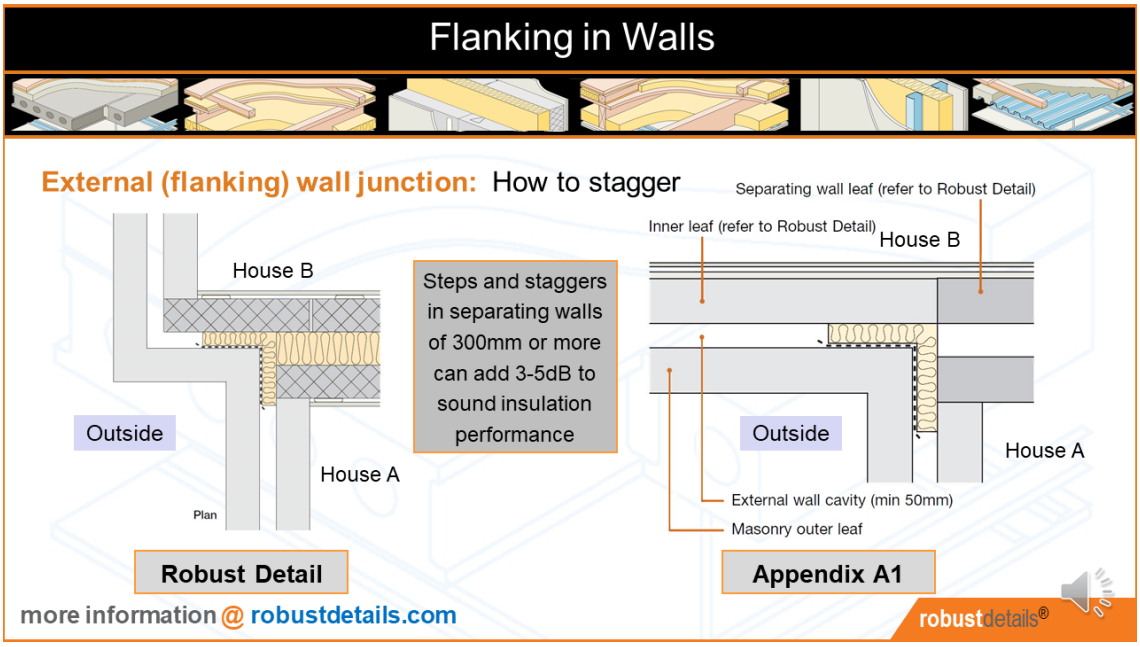



Here we see the end of an aggregate separating wall as it meets an aircrete inner leaf.
Inner leaf blocks can be abutted or tied to the separating wall block. The separating wall block MUST be taken to the edge of the cavity as is correctly shown in (A).
In (B) this site photo shows they've taken the thermally-efficient aircrete across the end of the aggregate to reduce the cold-spot.

However, the different block types will cause differential drying and cracking of the mortar, which can lead to a gap forming and give a straight-through path for sound.
If the blocks are the same, they could be toothed – but where different blocks are used, the separating wall leaf must go through the thickness of the inner leaf.
This doesn't stop the differential drying and cracking, but now the sound has to go into the external cavity; through the cavity closer; and turn 90 degrees. To get back in.

Additional notes:

**Slide 8**

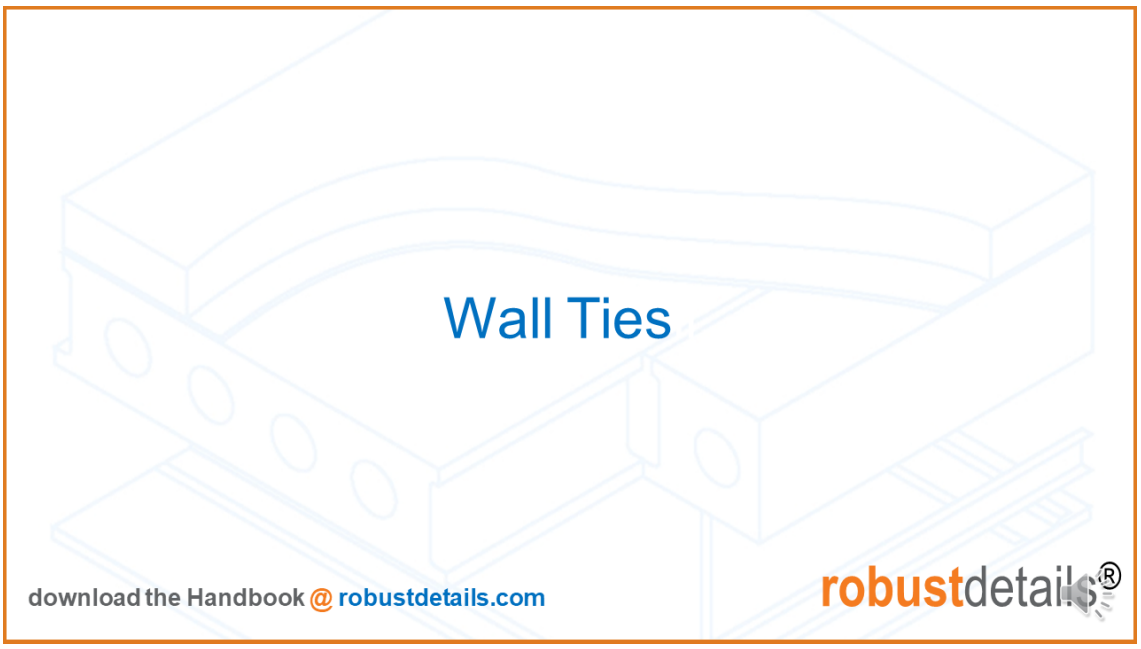



There's a couple of ways of forming a stagger:

Looking at what's in the Robust Detail first, and we can see one leaf continues…. However, a large stagger would be thermally inefficient, so we can refer to Appendix A1. But beware that this junction could suffer differential drying and cracking – so best to seek guidance from warranty provider.

Additional notes:

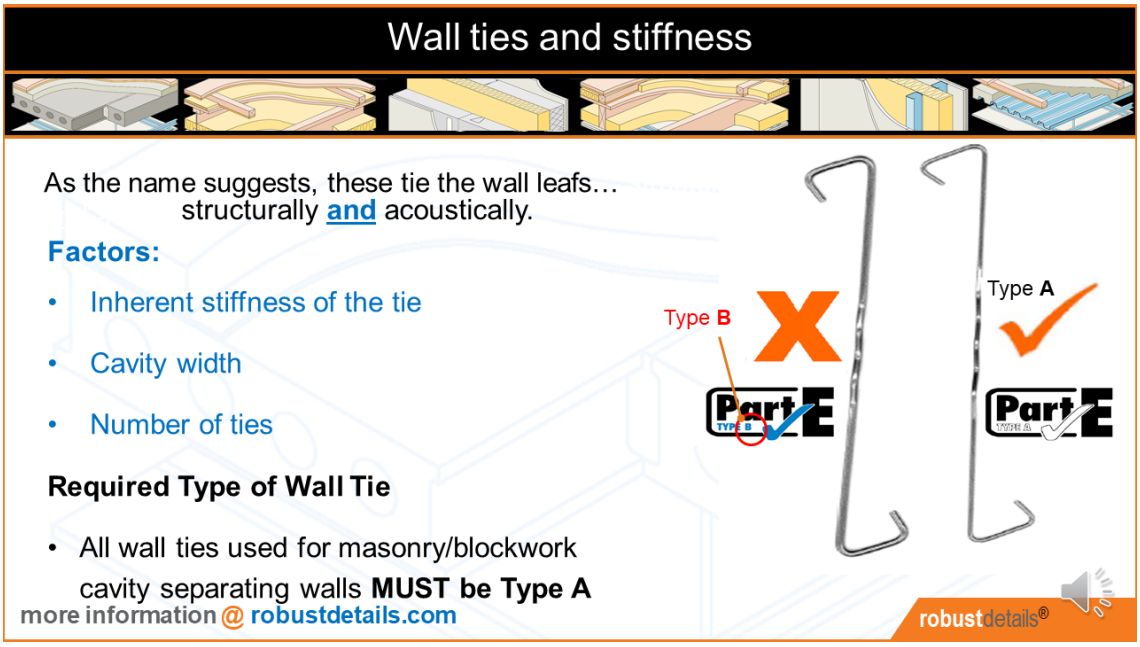
**Slide 9**




Read slide

Additional notes:

**Slide 10**



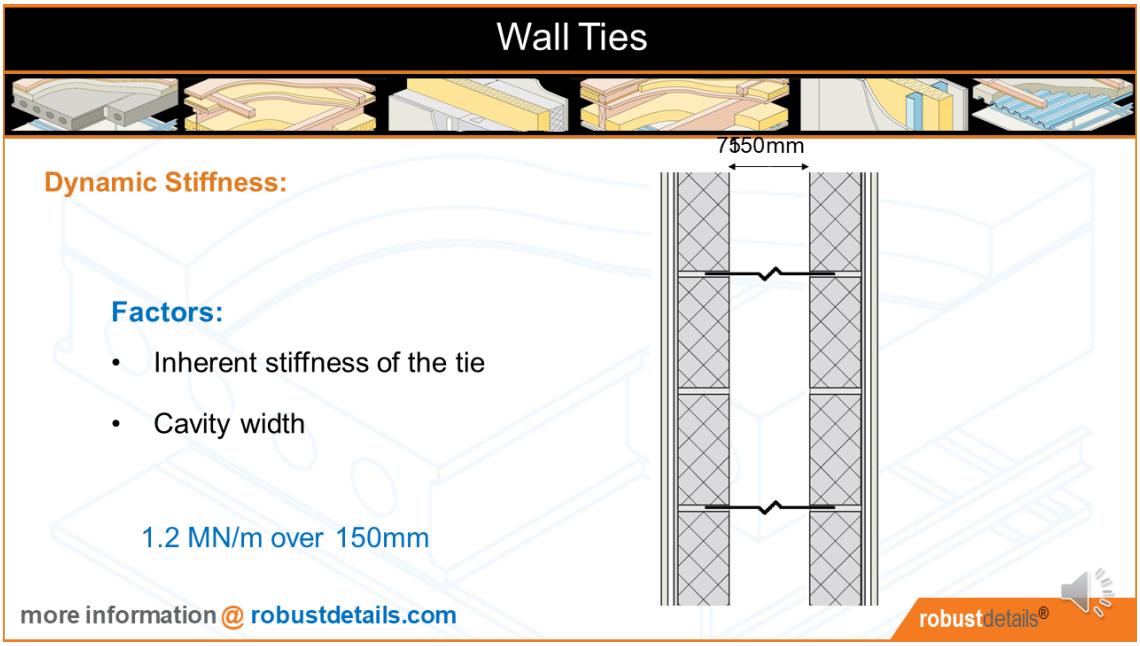

As the name suggests, these tie the wall leafs both structurally and acoustically
How rigidly they tie them together is dependent on 3 factors…

Inherent stiffness – as we can see here, these two look identical, but put side-by-side, we can clearly see one is thicker and hence, stiffer than the other

Cavity Width

Number of Ties

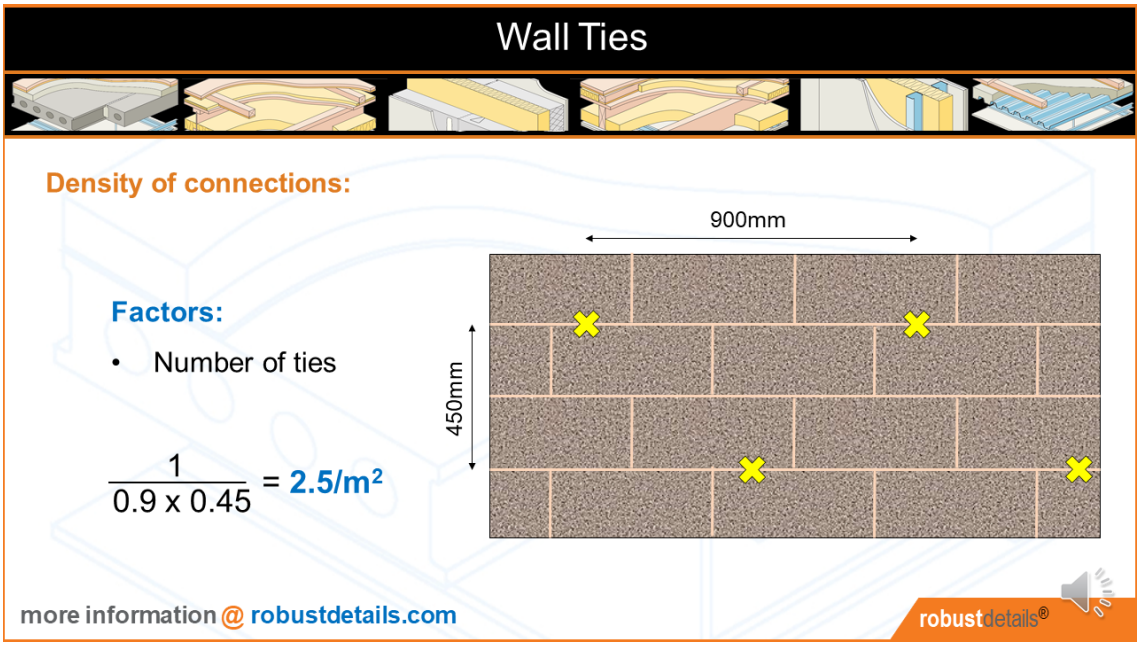
**Slide 11**
Additional notes:




So looking at the first two of these…
A term often used to describe the acoustic stiffness of a wall tie is the Dynamic Stiffness.
In simple terms, this is a laboratory measure of how much vibration is transferred from one end to the other.
It is dependent on…
Stiffness – imagine 2 tin cans and a piece of string – if tight, it works, if loose, no transmission
Span a 25mm batten over 6 feet – not too stiff… over 6 inches, really stiff.
So the dynamic stiffness value is always quoted with a specified cavity width.

Additional notes:

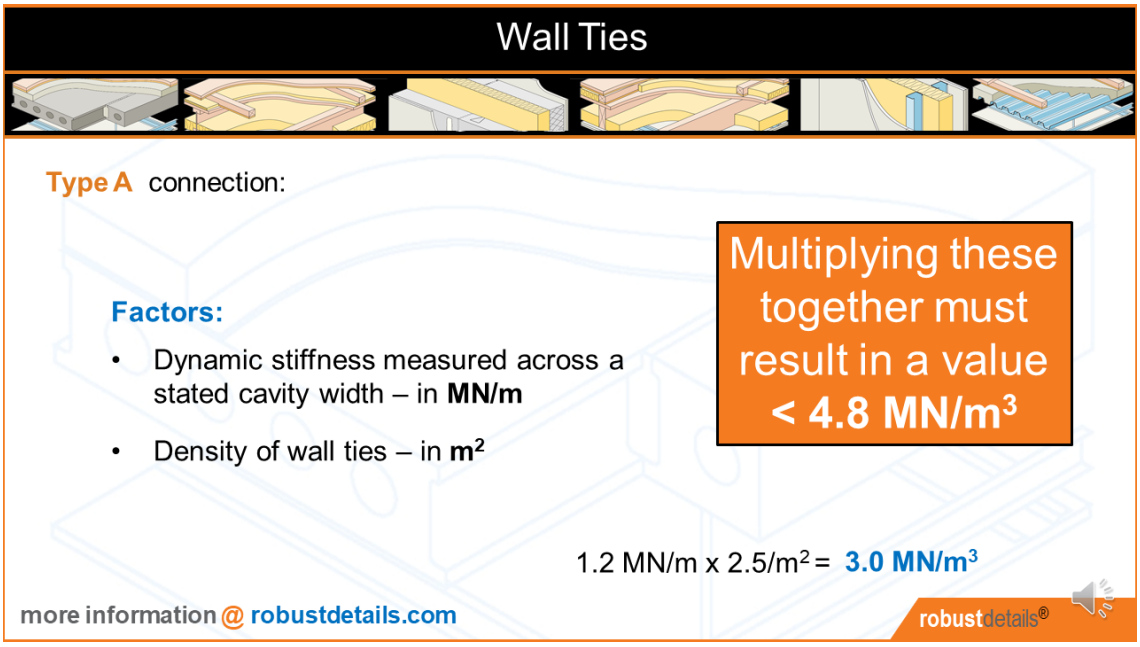
**Slide 12**




The third part of the equation is the number of connections – or number of ties.
As we all know, the standard spacing for the ties is 900mm horizontally, and 450 vertically
Doing the calculation, this results in a density of 2.5/m2

Additional notes:

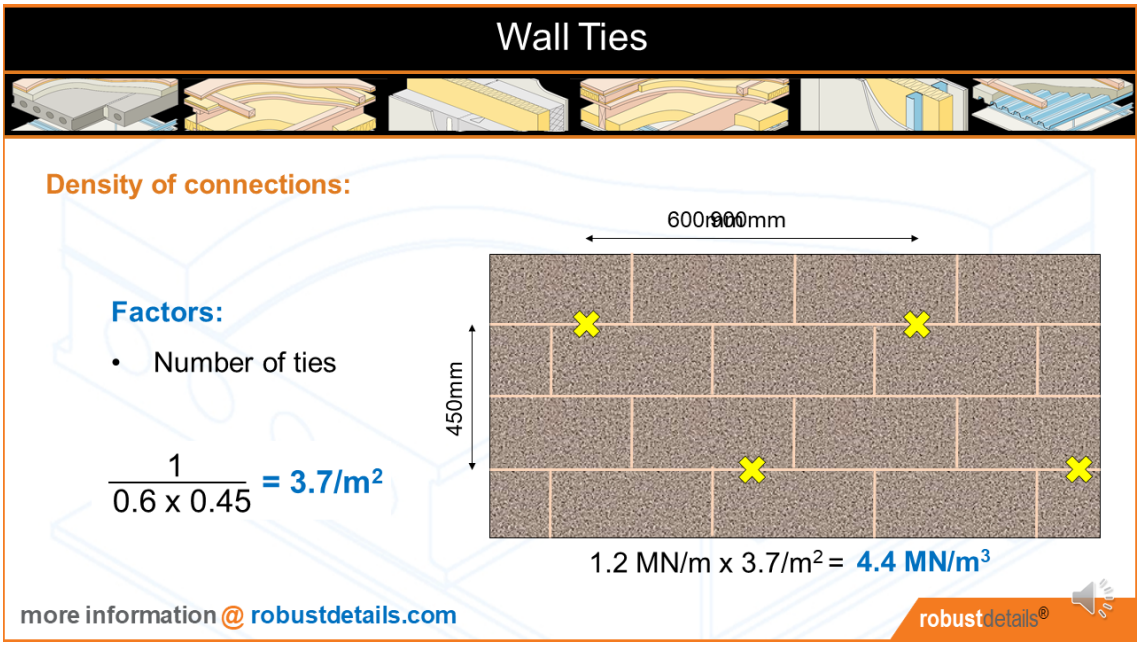
**Slide 13**




So this brings us back to the question of how rigidly are the 2 leafs connected?
And more importantly, is it Type A ?
In ADE, it states that when we multiply the dynamic stiffness by the density, it must give a connection value less than 4.8 Meganewtons/ metre squared
Assuming a Dynamic stiffness of 1.2 MN/m – multiplied by 2.5 gives 3.0

Additional notes:

**Slide 14**

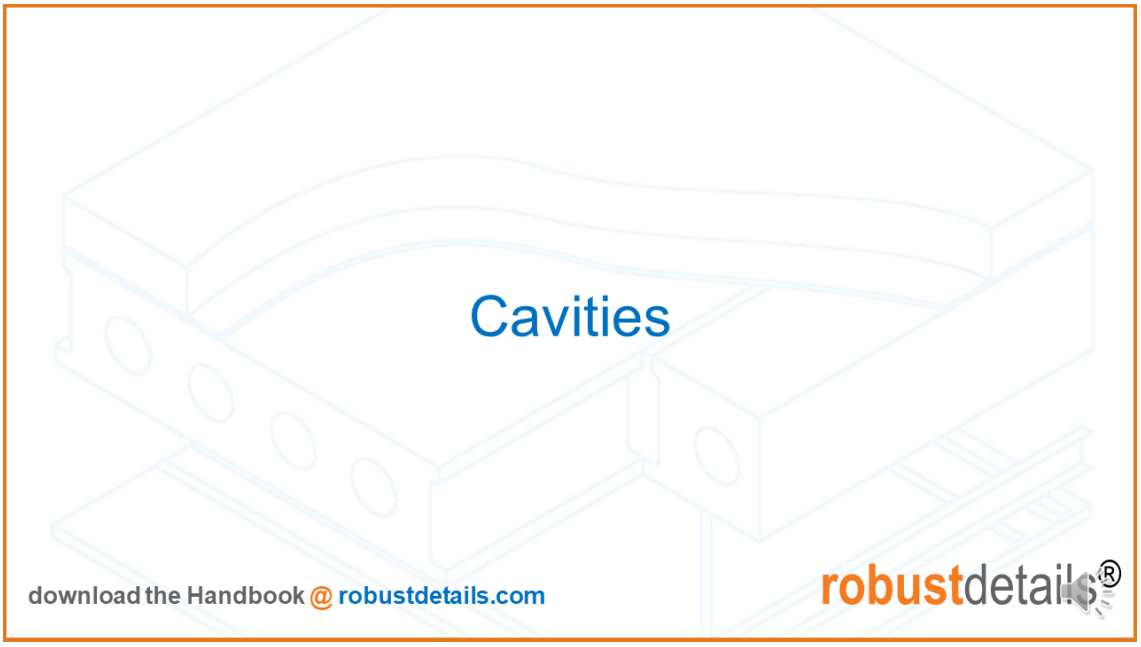



If wall ties are at 600x450 instead of 900x450, does this mean the wall is non-compliant?

Well if we do the calculation again, this gives 3.7 ties/m2, so using the same 1.2MN ties gives us 4.4MN/m3, which is still a Type A connection.

Additional notes:

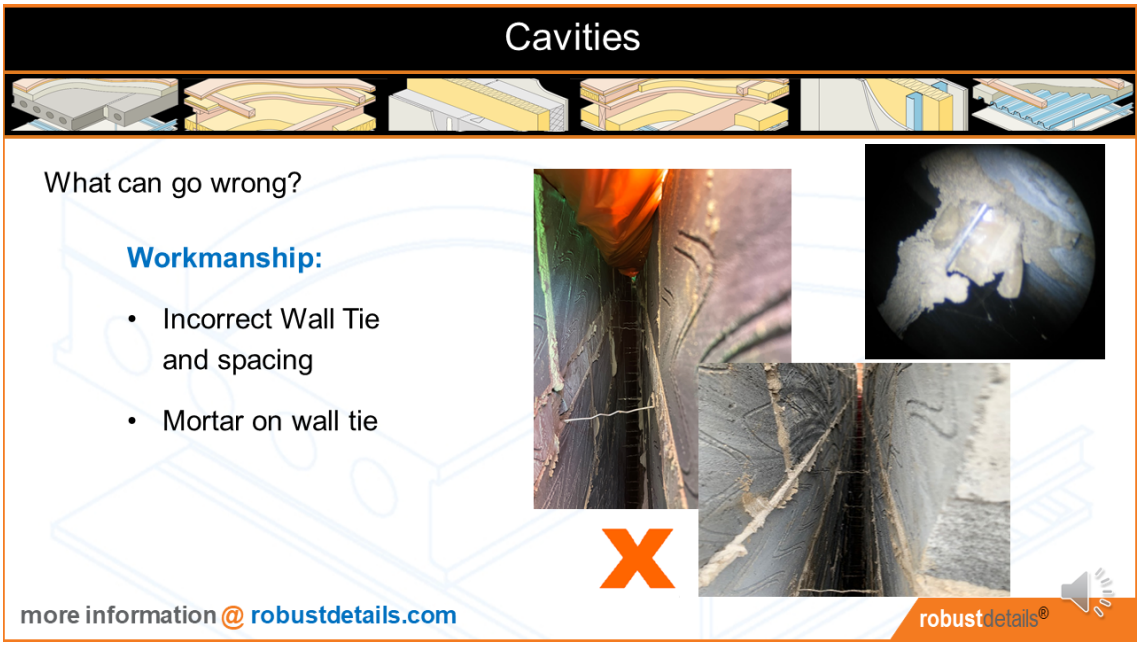
**Slide 15**




Now for the third factor; cavities

Additional notes:

**Slide 16**



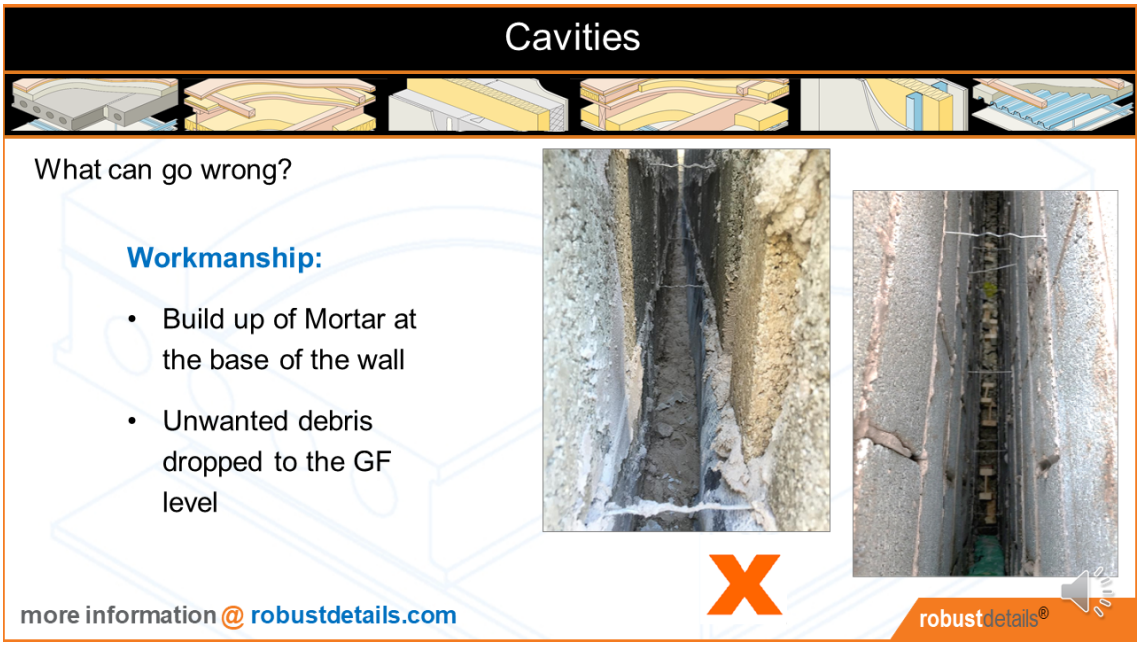

So what can actually go wrong with wall ties? Well a few things really.

It is really important NOT using ties that are so long they have to be put in diagonally;
And that they go in at 900mm centers horizontally and 450mm vertically – NOT 450mm horizontally, as seen here.

But the ties also have to stay clean – allowing mortar to build up on a tie will significantly increase its dynamic stiffness and THUS increase sound transmission from one wall leaf to the other.

Additional notes:

**Slide 17**




As well as mortar collecting on wall ties, a much more significant issue is allowing it to accumulate at the base of the wall, as it creates an acoustic bridge for the whole length of the wall – which can lead to high levels of sound transmission across ALL frequencies.
This is a particular problem where membranes are continuous across the cavity, as the bridging effect is now apparent at superstructure level

This can give the biggest reduction in performance, and aircrete is much less tolerant to this bridging than aggregate.
It's not just mortar… these are offcuts from over-sized joists

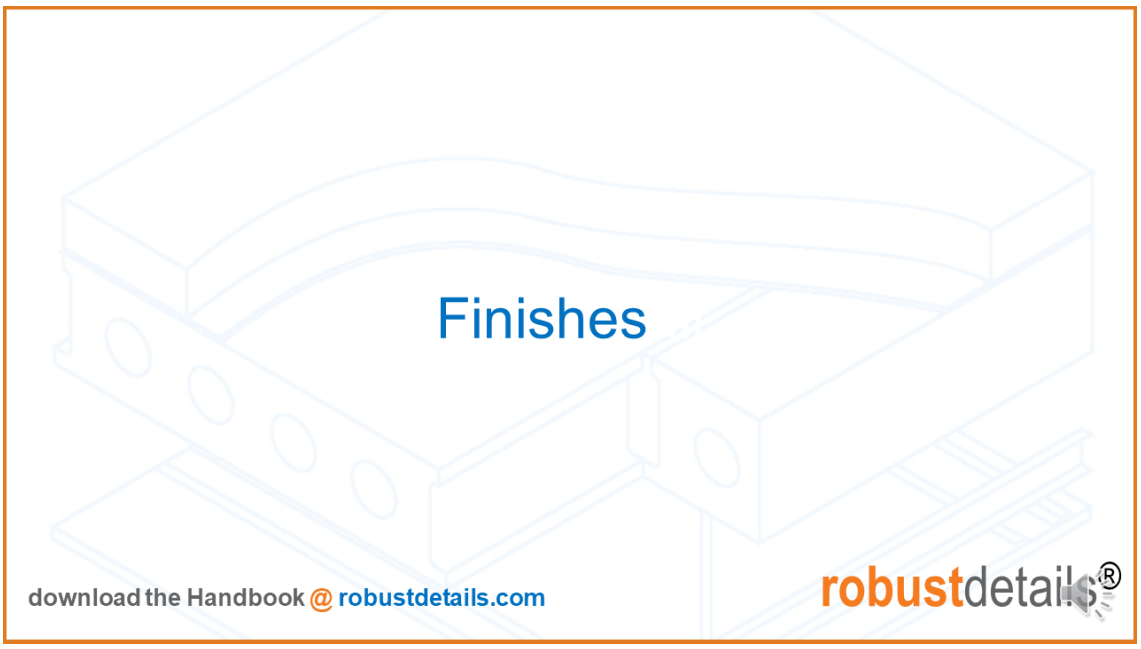
Additional notes:

**Slide 18**


We could look to clean the mortar off the ties; and clear the base of the cavity every couple of hours,
But it's much simpler to prevent it getting in there in the first place – and this can be done in a number of ways, as we can see here.

Additional notes:

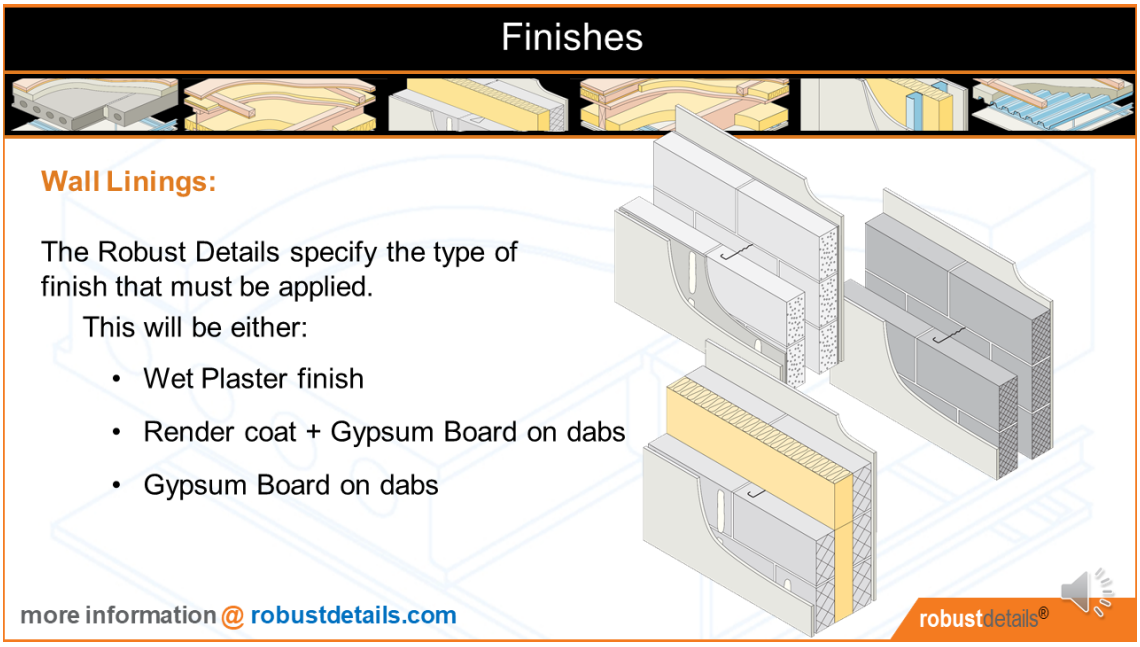
**Slide 19**




Read slide

Additional notes:

**Slide 20**




We need to address a spectrum of sound frequencies, and as mentioned in the Block Types section, more density helps with the lower part of the spectrum; and lack of porosity helps with the upper frequencies.

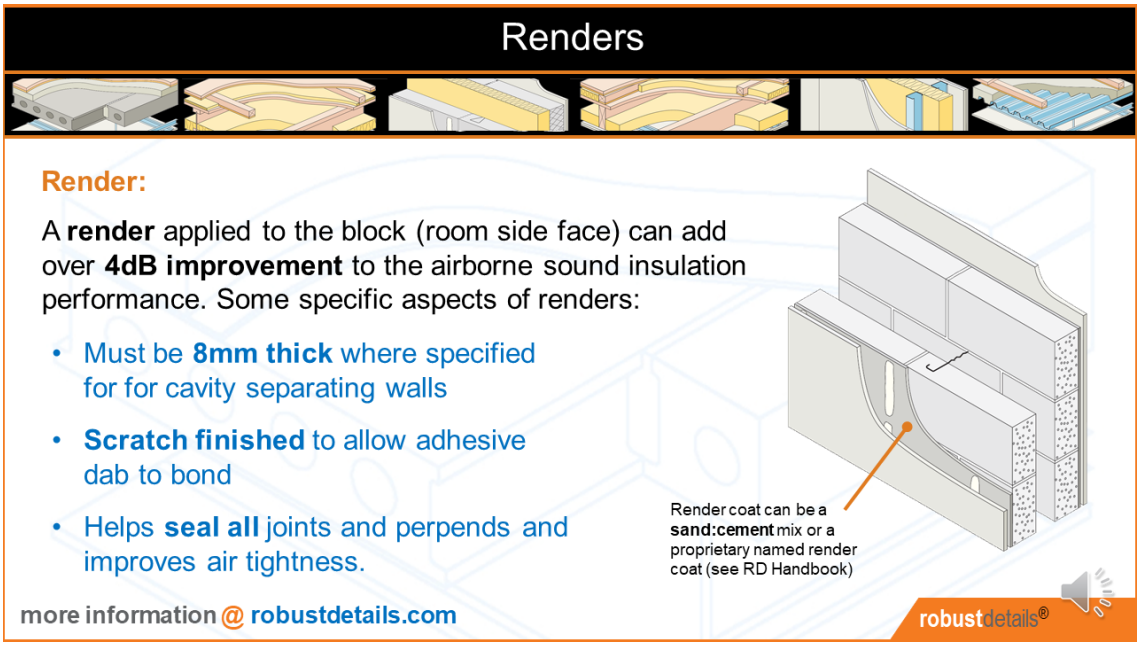
Adding a wet plaster finish, or a render coat will help all frequencies, as it will “seal” the denser blocks, to help with upper frequencies
And will add mass to lightweight walls to help with lower frequencies.

If there are no wet treatments to seal the blocks, mineral wool insulation will absorb high frequency sound getting through the blocks.

In all instances you need to ensure that the specified weight of gypsum board is applied – this can vary by wall type.

Additional notes:

**Slide 21**

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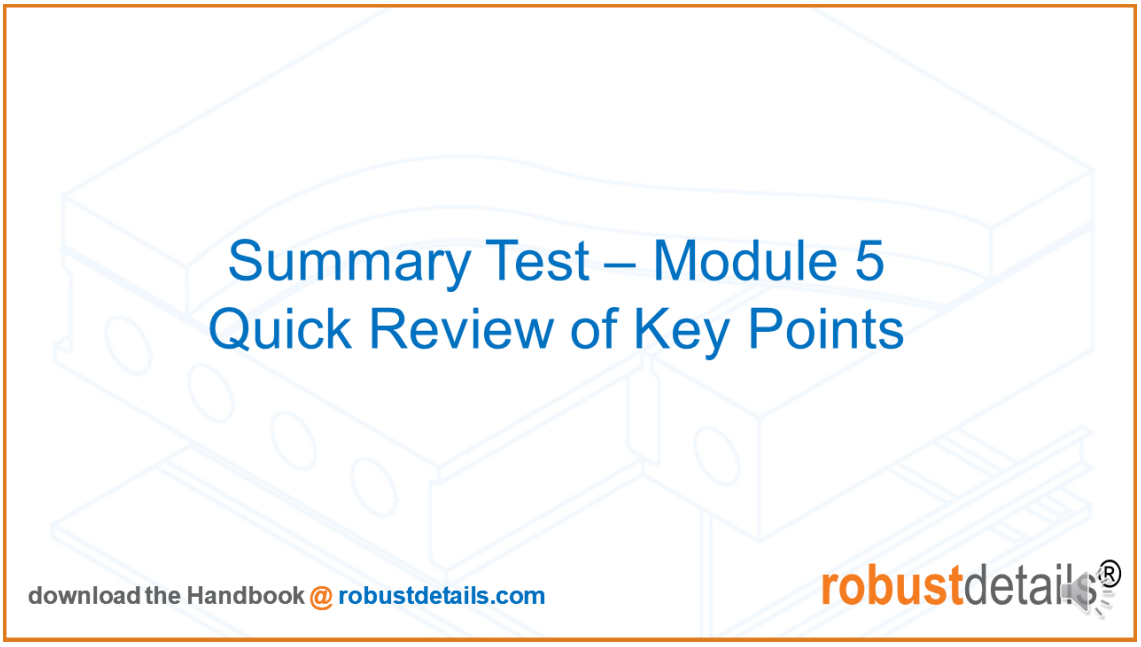
Additional notes:

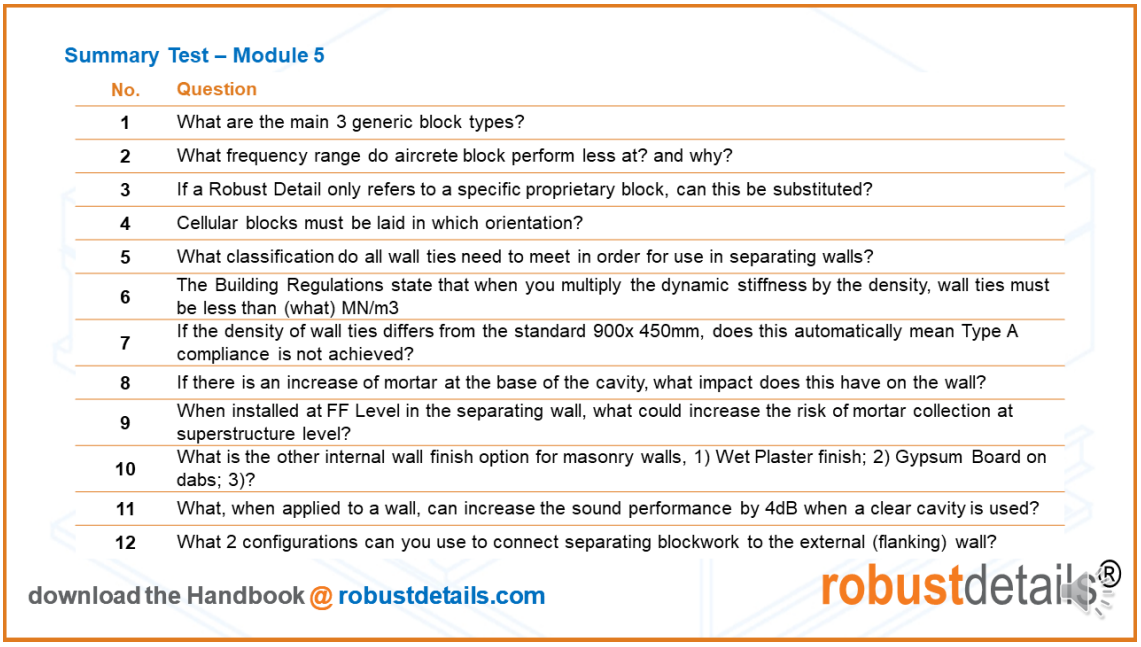
**Slide 22**




Now for a quick TEST to recap on Module 5

Additional notes:

**Slide 23**



**Summary Test – Module 5**

| No. | Question |
|---|---|
| 1 | What are the main 3 generic block types? |
| 2 | What frequency range do aircrete block perform less at? and why? |
| 3 | If a Robust Detail only refers to a specific proprietary block, can this be substituted? |
| 4 | Cellular blocks must be laid in which orientation? |
| 5 | What classification do all wall ties need to meet in order for use in separating walls? |
| 6 | The Building Regulations state that when you multiply the dynamic stiffness by the density, wall ties must be less than (what) MN/m3 |
| 7 | If the density of wall ties differs from the standard 900x 450mm, does this automatically mean Type A compliance is not achieved? |
| 8 | If there is an increase of mortar at the base of the cavity, what impact does this have on the wall? |
| 9 | When installed at FF Level in the separating wall, what could increase the risk of mortar collection at superstructure level? |
| 10 | What is the other internal wall finish option for masonry walls, 1) Wet Plaster finish; 2) Gypsum Board on dabs; 3)? |
| 11 | What, when applied to a wall, can increase the sound performance by 4dB when a clear cavity is used? |
| 12 | What 2 configurations can you use to connect separating blockwork to the external (flanking) wall? |



Here are the questions – you may wish to PAUSE the recording and test yourself against these questions.

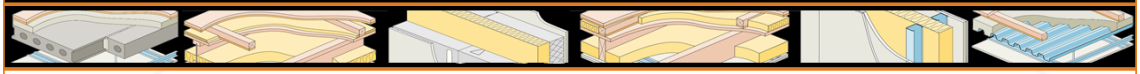
Once you have answered all of them – the next slide provides the answers.
In 10 seconds the slide will change so press pause now if you want to test yourself first.

Thank you for following Module 5.

Additional notes:

**Slide 24**

## Summary Test – Answers



| No. | Answer |
|---|---|
| 1 | Dense aggregate, Lightweight aggregate and Aircrete |
| 2 | Low frequencies - Low mass for damping sound transmission |
| 3 | No - only details that provide generic block types can be substituted |
| 4 | Cellular opening facing down onto the mortar bed |
| 5 | Type A approved |
| 6 | 4.8 MN/m$^3$ |
| 7 | No - multiply the stiffness by the Density to see if they are under the 4.8 MN/m$^3$. Extra guidance - Speak to the tie manufacture for additional assistance |
| 8 | Mortar bridges the cavity giving a reduction in the flanking path, allowing sound to transfer more easily from one leaf to the other |
| 9 | DPM / Gas membrane |
| 10 | 3) Render coat + Gypsum Board on dabs |
| 11 | Render coat |
| 12 | Either toothed or tied |

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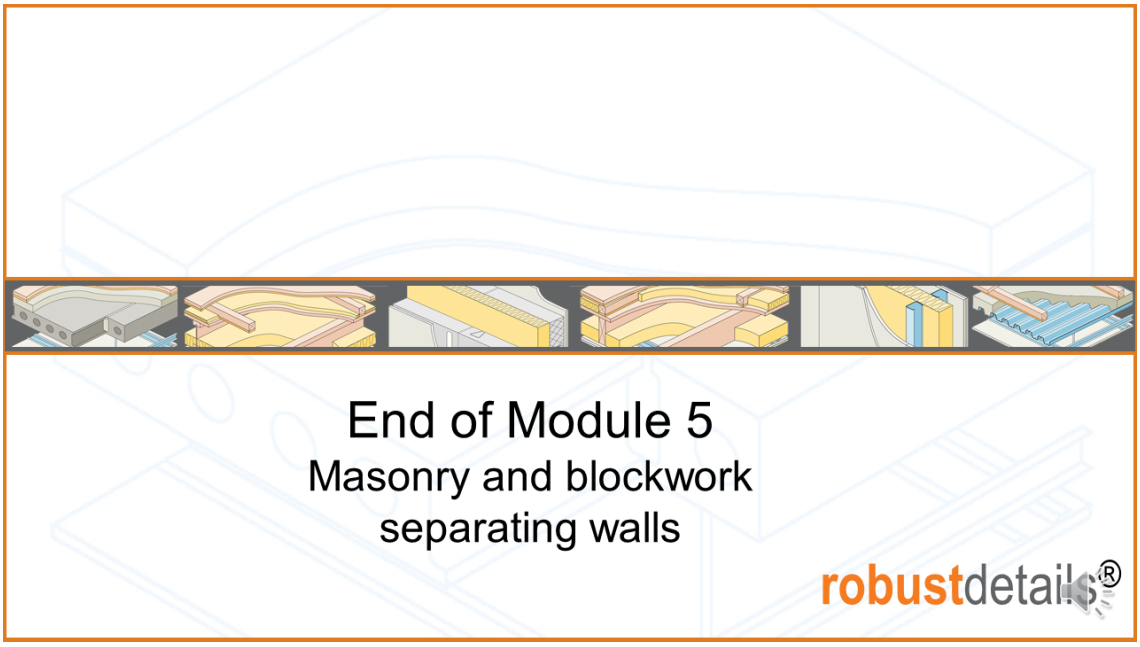
Here are the answer to Module 5's quick test.
How did you do?

Thank you for following Module 5

Additional notes:

**Slide 25**




This is the end of Module 5 – Masonry blockwork separating walls

Additional notes:

**Slide 26**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Additional notes: