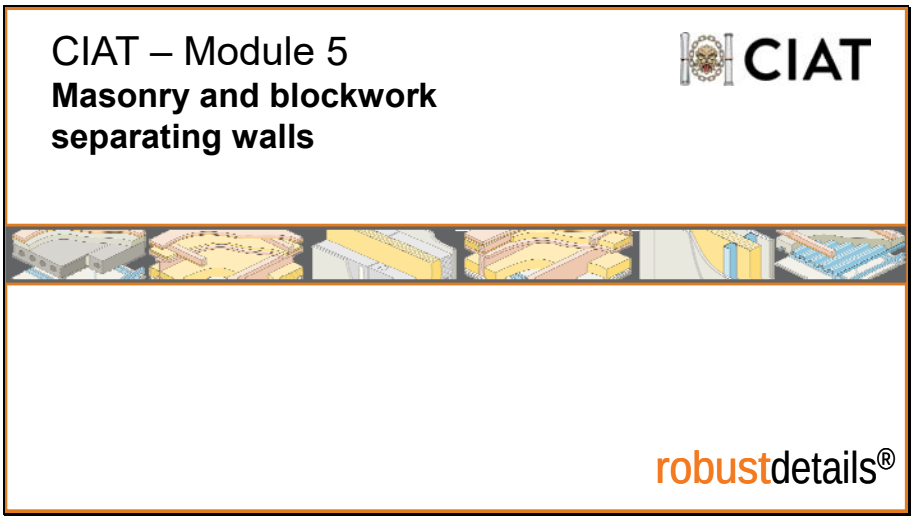
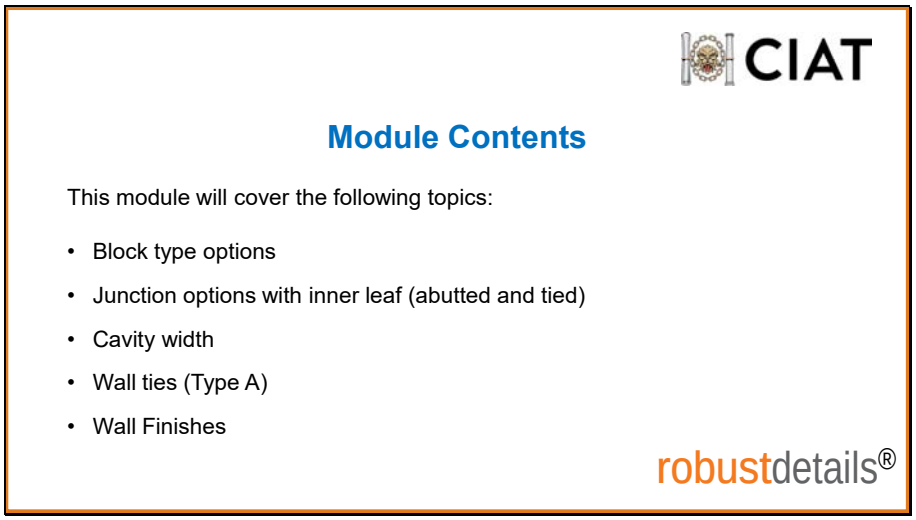
Slide 1



Welcome to Module 5 – Masonry and blockwork separating walls

Additional notes:

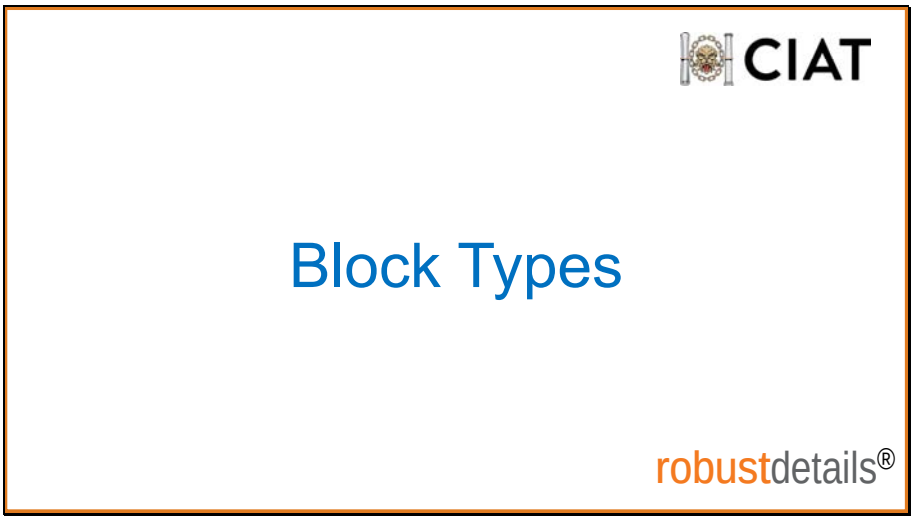
Slide 2



This Module will cover the following topics

Additional notes:

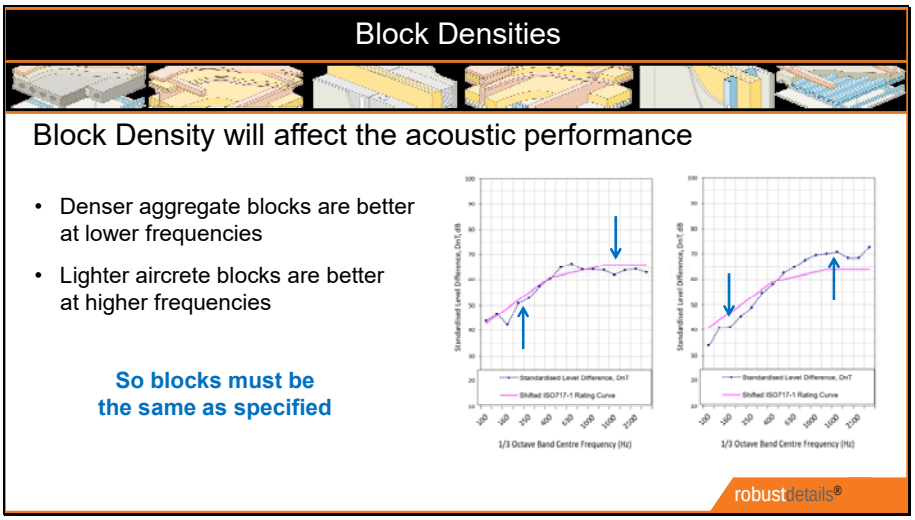
Slide 3



Read slide

Additional notes:

Slide 4



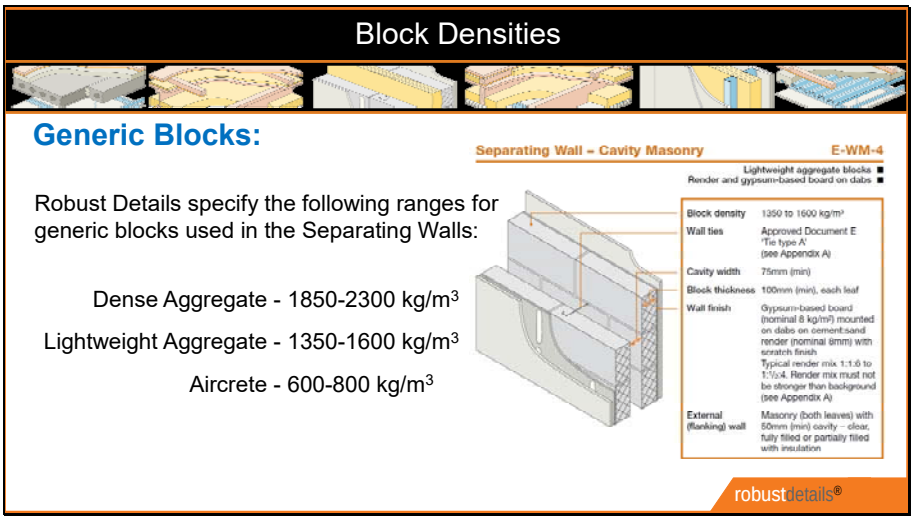
The Density of a block used in a separating wall will play a major role in the acoustic properties of that wall

Different blocks have different characteristics -
Dense aggregate blocks are good at resisting low-frequency; but being 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 damp 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 5



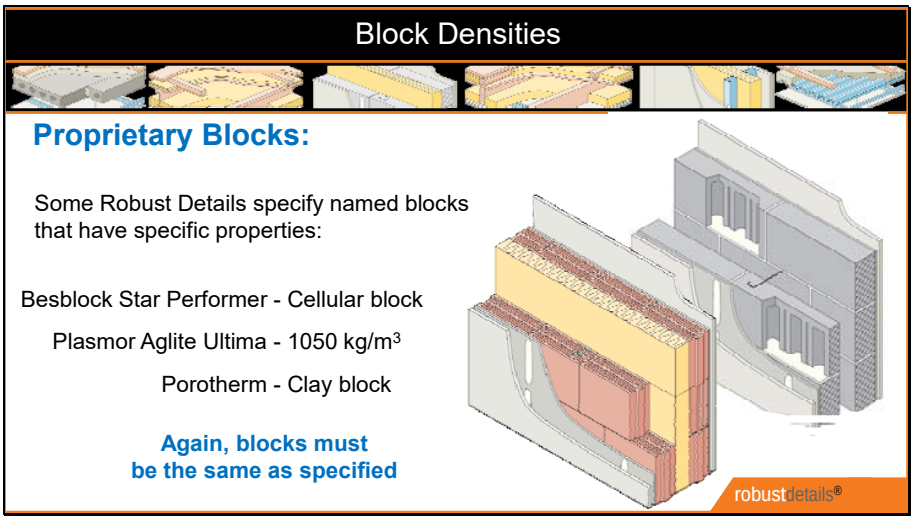
Reflecting guidance in Part E, Robust Details specify the following densities for generic blocks used in each of the Separating Walls:

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 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…

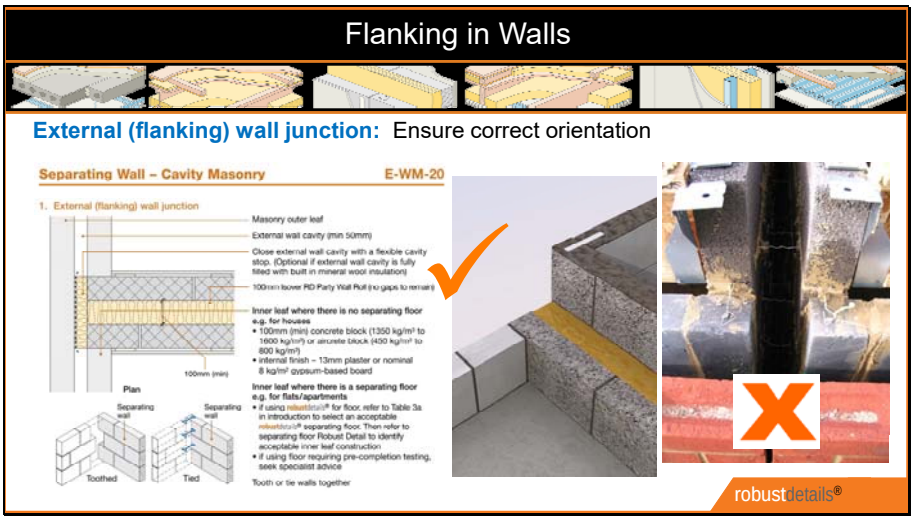
Read slide

As each of these will have very specific properties, it is critical that the specified block is used – and is not substituted.

Where a product is named in a Robust Detail, there is no “or similar approved”.

Additional notes:

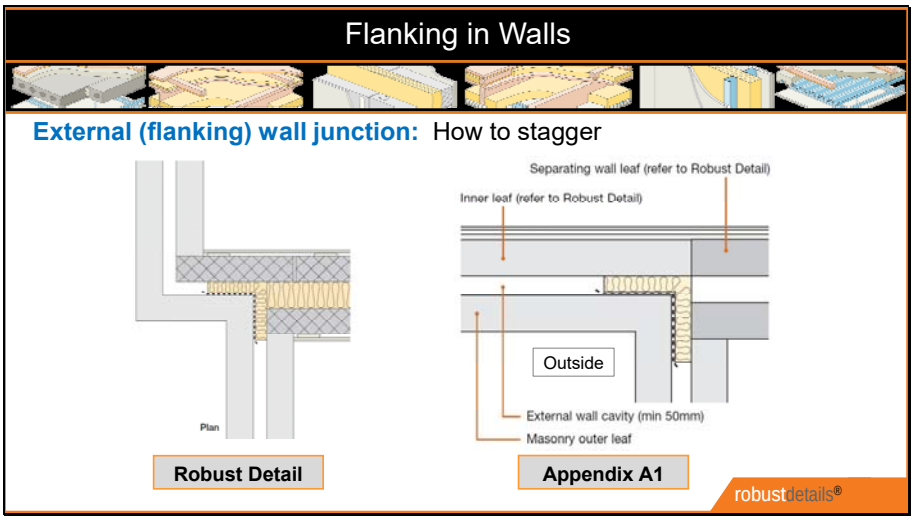
Slide 7



Here we see the end of an aggregate separating wall as it meets an aircrete inner leaf.
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 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 degs. To get back in.

Additional notes:

Slide 8



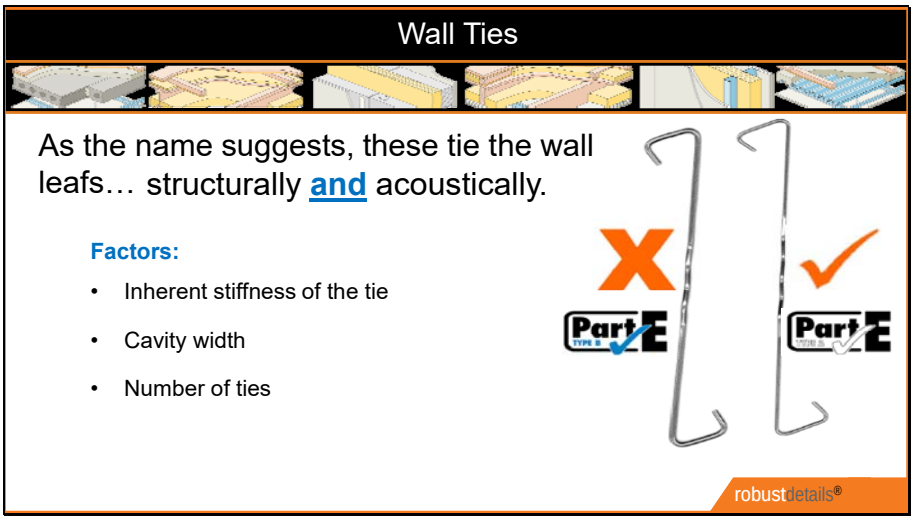
There's a couple of ways of forming a stagger:
Looking at what's in the Robust Detail first, and we can see one leaf continues….
However, a large stagger would be thermally inefficient, so we can refer to Appendix A1. But beware that this junction could suffer differential drying and cracking – so best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

Additional notes:

Slide 9

Additional notes:

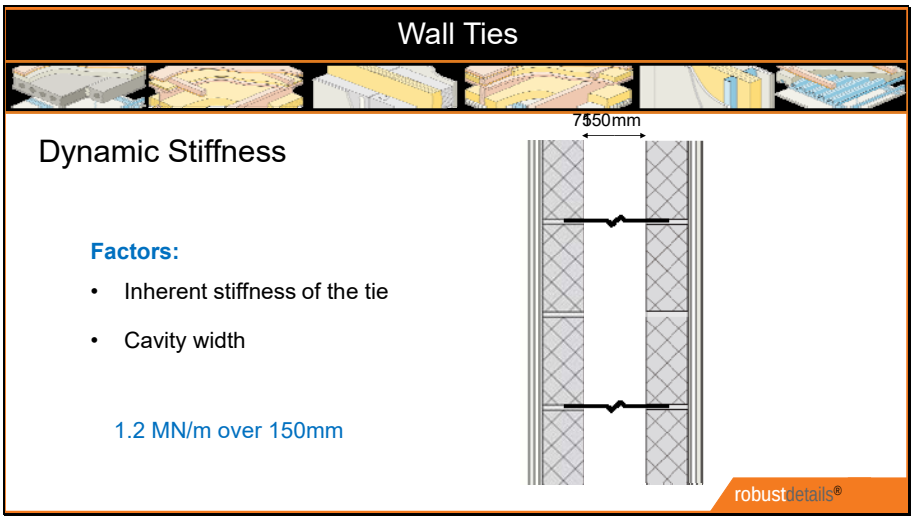
Slide 10



As the name suggests, these tie the wall leafs
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

Additional notes:

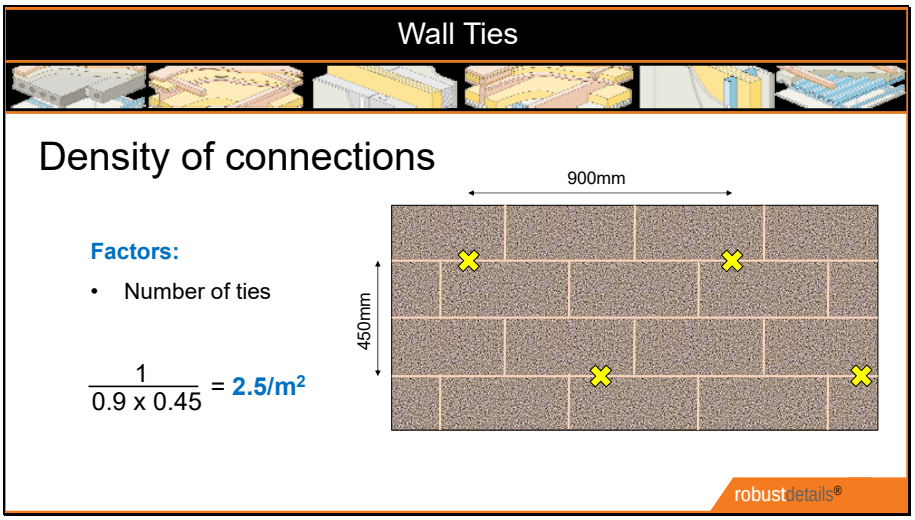
Slide 11



So looking at the first two of these…
A term often banded about is 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:

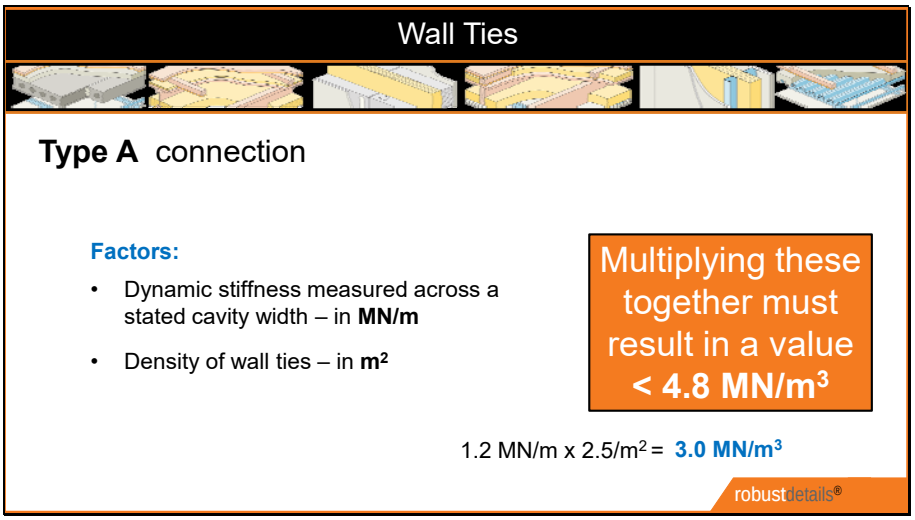
Slide 12



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/m^2

Additional notes:

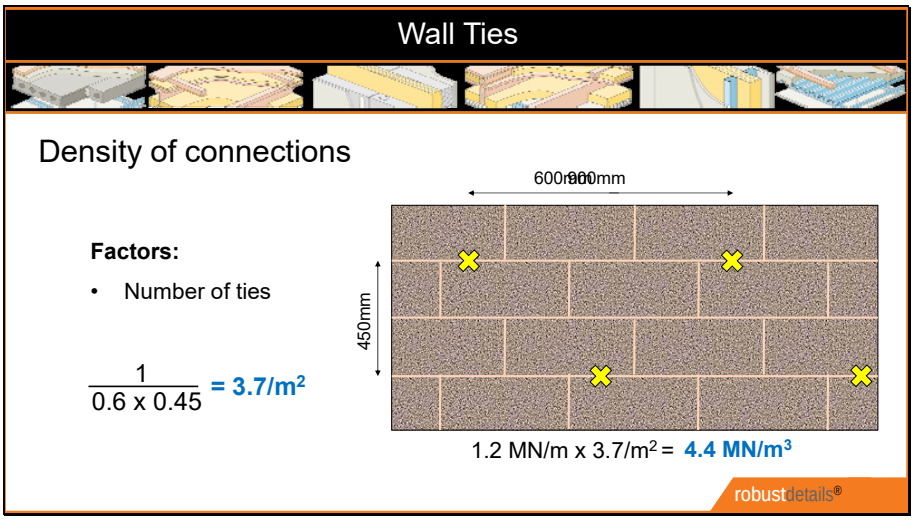
Slide 13



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 MN/m3
Assuming a Dynamic stiffness of 1.2 MN/m – multiplied by 2.5 gives 3.0 MN/m3

Additional notes:

Slide 14

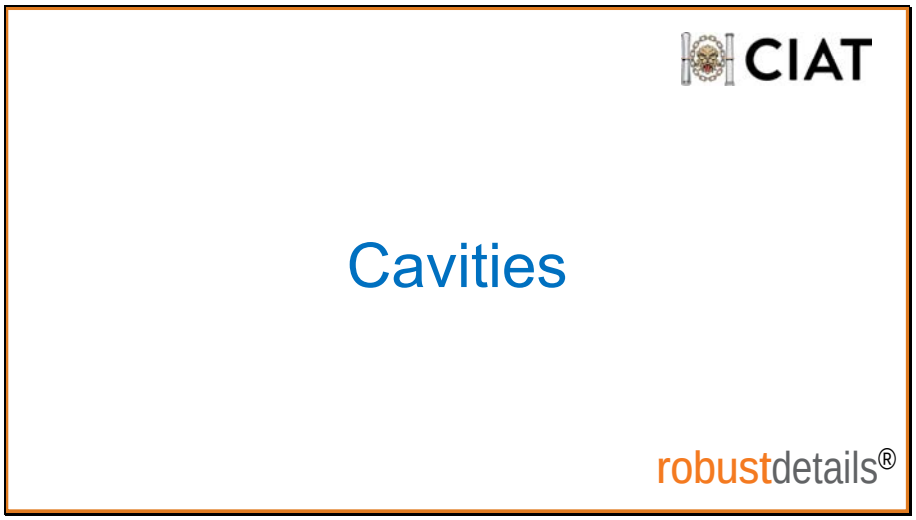


If wall ties are at 600x450 instead of 900x450, does this mean the wall is non-compliant?

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



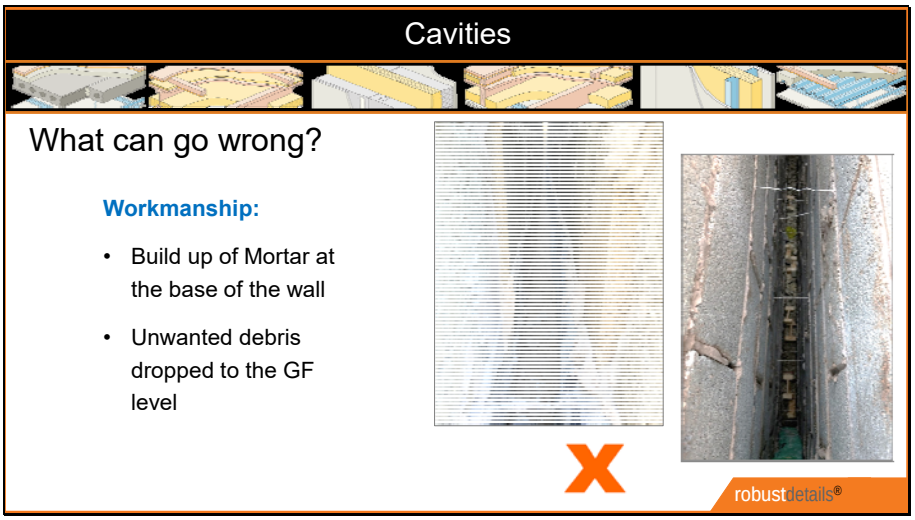
Additional notes:

Slide 16

We've just spoken about the importance of 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.

Additional notes:

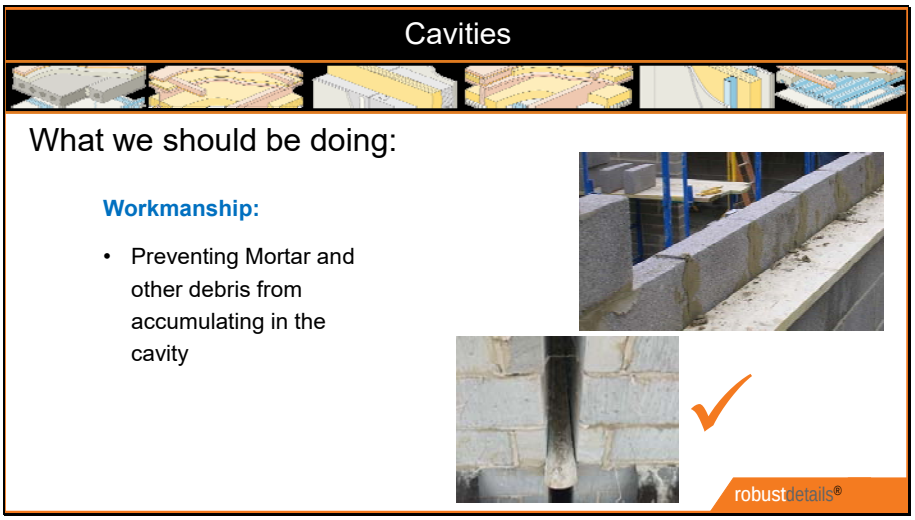
Slide 17



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.
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



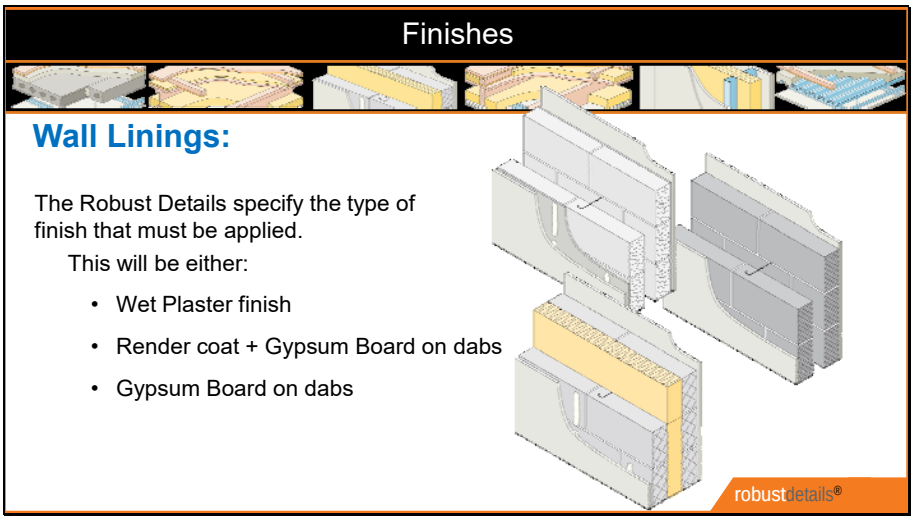
We could look to clean the mortar off the ties; and clear the base of the cavity every couple of hours,
But it's much simpler to prevent it getting in there in the first place – and this can be done in a number of ways, as we can see here.

Additional notes:

Slide 19

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.

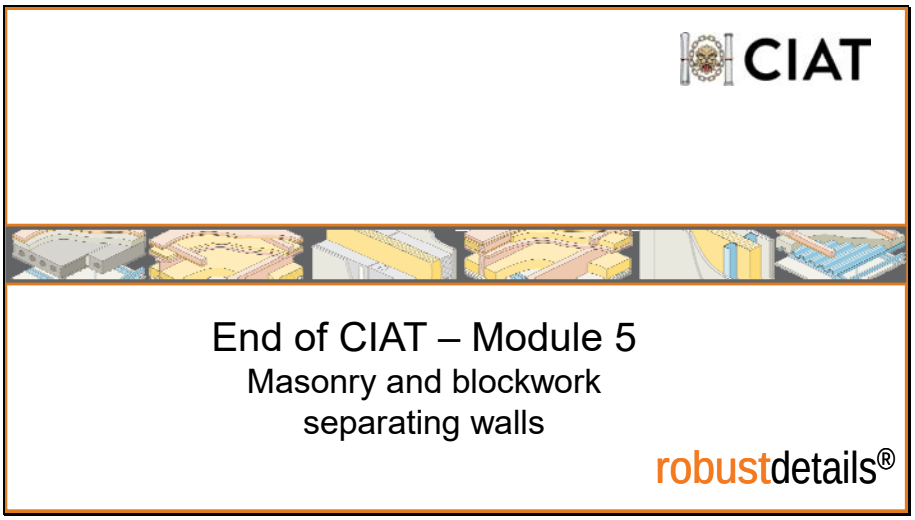
Adding a wet plaster finish, or a render coat will help all frequencies, as it will “seal” the denser blocks, to help with upper frequencies
And will add mass to lightweight walls to help with lower frequencies.

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



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

Additional notes: