Grenfell Tower Inquiry

Day 102

March 8, 2021

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Monday, 8 March 2021

(10.00 am)

SIR MARTIN MOORE-BICK: Good morning, everyone. Welcome to today's hearing. Today we're going to hear from a new witness, Mr Christopher Mort of Siderise.

I am, as usual, joined by my fellow panel members, Ms Thouria Istephan and Mr Ali Akbor.

MS ISTEPHAN: Good morning.

MR AKBOR: Good morning, everyone.

MR CHRISTOPHER MORT (called)

SIR MARTIN MOORE-BICK: We're now ready to meet today's witness, Mr Mort. I'm going to check that he can hear me and see me.

Good morning, Mr Mort. Are you there?

THE WITNESS: Yes, I am.

SIR MARTIN MOORE-BICK: And you can see me, can you, and hear me?

THE WITNESS: Yes, I can.

SIR MARTIN MOORE-BICK: Thank you very much indeed.

You should have on the screen in front of you a form of affirmation which I understand you're willing to make. Have you got it there?

THE WITNESS: I do.

SIR MARTIN MOORE-BICK: Can I ask you, please, to make the affirmation by reading out the words on the screen.

(Witness affirmed)

SIR MARTIN MOORE-BICK: Lovely, thank you very much indeed.

We need to run through a couple of things before you start giving your evidence.

Can I ask you, first, to confirm that you are alone in the room from which you're giving your evidence?

THE WITNESS: I am.

SIR MARTIN MOORE-BICK: Thank you.

Can you also confirm that you have no documents or other materials with you?

THE WITNESS: I confirm.

SIR MARTIN MOORE-BICK: Thank you.

Finally, can you confirm that your mobile phone is in another room and that you don't have any other electronic equipment with you which is capable of receiving messages?

THE WITNESS: That's correct.

SIR MARTIN MOORE-BICK: Lovely, thank you very much.

Now, you might like to know that your lawyers are in the virtual hearing room, in the sense that they can see and hear everything that's going on. They have the power to intervene if they think it essential to do so, but we have other means of contacting the Inquiry's lawyers, and I hope they'll use them. I've asked them to keep their microphones and cameras switched off to

avoid any technical difficulties.

I hope we shan't have any problems with sound or vision; if we do, I'll ask for a short break while they're ironed out by the technical support team.

If you have any problems, obviously just attract my attention and we will deal with them as best we can.

We're going to have a short break roughly halfway through each session. It will come around about 11.15 in the morning and around about 3.15 in the afternoon. So those are scheduled breaks, but if you feel at any time you need an additional break, will you just say so and we will do our best to accommodate you.

Before we start, is there anything you would like to raise or to ask me?

THE WITNESS: No, nothing at all.

SIR MARTIN MOORE-BICK: Lovely, thank you very much.

In that case, I will invite Ms Grange to put some questions to you.

Yes, Ms Grange.

Questions from COUNSEL TO THE INQUIRY

MS GRANGE: Yes, good morning, Mr Mort.

A. Good morning.

Q. Thank you very much for attending today to give your evidence. It is very much appreciated.

If you have any difficulty understanding anything

that I'm asking you in the course of your evidence, please just ask me to repeat the question or put the point in a different way, and if you need a break at any point, please do say so.

Can you also try and keep your voice up so that the transcribers can hear you and take a clear note of your evidence, and that also means not nodding or shaking your head but giving clear answers to the questions.

Now, you have made one witness statement to the Inquiry. If we can go to it, it will appear on the screen now. It's at {SIL00000298}. There is your statement.

If we go on to page 16 within that, we can see there that it's dated 27 September 2018. Is that your signature?

A. Yes, it is.

Q. Have you read that statement recently?

A. Yes, I have.

Q. Can you confirm that the contents of it are true and accurate?

A. Yes, they are.

Q. Have you discussed that statement or the evidence that you're going to give today with anyone before coming here?

A. No.

Q. Now, let's start with some questions about your background and your experience and qualifications.

Now, in terms of your academic qualifications, if we can look at paragraph 6 of your statement on page 2 {SIL00000298/2}, you tell us there that you have a Higher National Certificate in manufacturing which you obtained in 1997 and 1998; is that correct?

A. Yes.

Q. And you have also got a Higher National Diploma, HND, in fire engineering which you obtained in 2016; is that correct?

A. Yes.

Q. Where did you obtain that qualification from in 2016?

A. South Wales University.

Q. Just in very general terms, what did that qualification entail?

A. A broad spectrum of fire engineering, from how fires start, occur, through structural analysis, fire engineering mathematics, et cetera, et cetera.

Q. Yes, yes, thank you.

When did you begin studying for that qualification? You say that you obtained it in 2016; how long before that were you actually undertaking that qualification?

A. It was three years prior to that.

Q. Right. Yes. So from 2013 onwards?

A. Yeah. On a part-time basis.

Q. Yes, fitting it in with your day job; yes?

A. Correct.

Q. Yes.

Now, if we go back to page 1 {SIL00000298/1}, paragraph 4 of your witness statement, you tell us that you started in the façade industry in 1998 working for Denver Aluminium Limited; is that correct?

A. That's correct.

Q. What was your role there at Denver Aluminium Limited?

A. I was a façade designer.

Q. Façade designer?

A. Yeah.

Q. Yes.

Then in 2000 you moved to Vision Aluminium Limited as a façade design manager; is that correct?

A. That's correct.

Q. Were you involved in any fire testing in those roles, when you were the façade design manager?

A. At Denver, no. When I worked for Vision Aluminium, I was trained at Schueco Façades as being able to design their fire façade system, which was a curtain wall system.

Q. Right, yes. And how do you spell -- you said Schueco Façades.

A. S-C-H-Ü-C-O.

Q. Yes, thank you.

Then in 2002, you joined Siderise as the product manager and marketing manager for the technical and commercial departments; is that correct?

A. Yes.

Q. Can you explain what that role involved, that product manager and marketing manager for the technical and commercial departments?

A. It was basically looking after the Siderise customer base.

Q. Yes. And what was that Siderise customer base?

A. Predominantly curtain walling façade companies, other building envelope companies, architects, consultants.

Q. Yes. Thank you.

Is it right that you remained in that role at Siderise until 2007, when you want to work for Hilti?

A. That's correct.

Q. What role did you have at Hilti?

A. Building façade specialist, basically the same role as I had with Siderise. Hilti had formed a division --

Q. Yes.

A. -- which I joined.

Q. Yes. You stayed at Hilti until you then rejoined Siderise as their sales and technical engineer two years

later in 2009; is that correct?

A. That's correct.

Q. Yes.

Then two years after that, in 2011, you took on the role of technical officer for fire within Siderise; is that right?

A. That's right.

Q. So, just to summarise, would it be fair to say that you have around 20 years' experience working in the façade industry, either as a façade manager/designer through to being a technical officer?

A. Yes.

Q. Is it right that you were also employed by Alcoa for just under seven years between 1991 and 1998; is that right?

A. That's correct.

Q. What was your role at Alcoa?

A. I first joined as a toolmaker in the tool room and then progressed through to the design office.

Q. What kind of design work were you involved in at Alcoa?

A. Designing aluminium extrusions.

Q. Right, yes.

Then if we look at paragraph 6 of your witness statement now, on page 2 {SIL00000298/2}, if we could have that back up, you tell us that you sit on various

industry committees. So we looked at the first part of that ——
A. Yes.
Q. —— and then in the second line you begin to tell us what these committees are.
Just going through them, you sit on the Association for Specialist Fire Protection, known as the ASPF; yes?
A. The ASFP, yes.
Q. Sorry, ASFP.
You also sit on the British Standards Institution Standards Development Committee for non—loadbearing separating elements; yes?
A. Yes.
Q. That committee is called the FSH/22; is that correct?
A. Yeah, 22/—/7.
Q. Yes, 22/—/7, sorry.
You also sit on a European committee for standardisation, and you tell us that you sit on the committee for cavity barriers known as TG9 and the committee for façades known as TG8 on behalf of the BSI; is that correct?
A. That's correct.
Q. Is it right that you're also an affiliate member of the Institution of Fire Engineers?
A. Yes.

Q. At paragraph 7, below that, on the screen in front of us, you tell us what your role as technical officer for fire at Siderise has involved, and you describe that role as including product development, arranging and attending testing, including testing relating to fire, thermal or acoustics, and also dealing with customers. You say you get involved if a question or issue requires specific technical input.
Are you still in that role as technical officer for fire at Siderise?
A. The role has evolved. I'm now technical development director for Siderise.
Q. Technical development director. When did you take up that appointment?
A. Last January.
Q. Yes.
A. January 21.
Q. Can you help us, and we'll look at it in more detail later, but did you write or assist in writing any of the marketing literature or installation guidance that Siderise published for its cavity barriers?
A. I would have technically reviewed the documents.
Q. Yes, so you do a technical review of those documents?
A. Correct.
Q. Great.

Now, just some questions about previous cladding fires.
At the time you were involved in the Grenfell Tower project, that was in 2015 —— and, again, we'll come and look at your involvement in the Grenfell project later —— were you aware that there was a long history of external cladding façade fires on high—rise residential buildings, both in the UK and internationally, abroad?
A. I was aware of some UK fires that led to the authoring of BR 135 and the development of 8414.
Q. Yes.
A. I was aware of some fires overseas.
Q. Yes. Which domestic fires were you aware of that led to BR 135?
A. There was one in Scotland, in Stirling, from the top of my head, I can't remember the specific ——
Q. Yes, is that the Garnock Court fire in Irvine? Yes?
A. Yes.
Q. Had you heard of the Lakanal House fire in Southwark in London in 2009?
A. Yes, I had.
Q. In terms of the fires that you were aware of internationally, can you help us, what fires were you aware of at that time?
A. Just what came on news media. Specific dates I can't

recollect, but a fire maybe in Turkey, some in Dubai. But these were of what seemed to be flammable cladding.
Q. Right. I see. That was your understanding, was it, that that was ——
A. Yes.
Q. —— flammable cladding that had contributed to those fires?
A. Yes.
Q. So do I take it that you were aware of a spate of fires in high—rise buildings in the UAE in —— were you aware of those as early as 2012/2013, or would it be more like 2015 that you became aware of those?
A. I can't really recollect.
Q. Okay.
Did those cladding fires ever cause you or anyone else within Siderise to reflect and to question the way in which it was marketing and promoting its cavity barriers?
A. No.
Q. Now, when carrying out your role, did you have some familiarity with the Building Regulations and the associated practical guidance in Approved Document B on fire?
A. Yes.
Q. When undertaking your role as technical officer within

Siderise, were you familiar with the guidance in Approved Document B about the performance and location of cavity barriers?
A. Yes.
Q. Were you familiar with the guidance about the B3(4) functional requirement on internal fire and smoke spread in concealed spaces?
A. Yes.
Q. And the guidance in section 9 of ADB?
A. Yes.
Q. And were you also aware of the guidance about the B4 functional requirement on external fire spread in section 12 of ADB?
A. Yes.
Q. Were you aware that the guidance in section 9 of Approved Document B required, at paragraph 9.3, that cavity barriers should be provided to close the edge of cavities, including around openings?
A. Yes.
Q. And that guidance was also clear in diagram 33, wasn't it ——
A. Yes.
Q. —— of ADB?
Let's just have a look at that, just to remind everyone of that diagram. If we go to {CLG00000224/82},

here we have diagram 33 that appears in section 9 of Approved Document B dealing with effectively compartmentation. We can see that there's various shaded parts on this diagram, including some green, which indicates firestopping, and some grey shading which indicates cavity barriers.
So can I take it that you were familiar with this guidance when you were technical officer for Siderise from 2011 onwards?
A. Yes.
Q. Yes.
We can see that under the key to the diagram, where it says "Cavity Barrier" at the bottom, it's got reference there to table A1, item 15, in Approved Document B. I just want to go to that table now. It's at page 124 of ADB {CLG00000224/124}, if we could go on to that.
So this is table A1. We can see the title of it in green at the top:
"Specific provisions of test for fire resistance of elements of structure etc."
Again, can I take it that you were familiar with this table at the time you were technical officer?
A. Yes.
Q. Effectively, what we see is various different parts of

the building, and in this table it tells you what the fire resistance elements need to be for those parts of the structure. That's correct, isn't it?
A. Yes, it is.
Q. If we go over the page {CLG00000224/125}, just note at the top we can see it says "Part of building", and then we can see the heading "Minimum provisions when tested to the relevant part of BS 476", and there is a little footnote, which we'll come back to, and it also makes clear in brackets that the figures we're seeing here are minutes; that's correct, isn't it?
A. Yes, it is.
Q. Then if we go down to item 15 in this list, we get the reference that we saw earlier in diagram 33, taking you to cavity barriers. We can see that there it's saying —— and it's clear if we can see the top of the page as well —— that cavity barriers need to have 30 minutes' integrity and 15 minutes' insulation. That's correct, isn't it?
A. Yes, it is.
Q. Yes, thank you. So you can see the loadbearing capacity column isn't applicable, because cavity barriers are not loadbearing, are they?
A. No, they're not.
Q. And so the requirements of ADB were 30 minutes'

integrity, 15 minutes' insulation.
Then that footnote at the top, which relates to the part of BS 476 that's applicable, if we go down to that footnote 1 at the bottom of this page, we can see in the notes there, number 1, what it does is it tells you which parts of BS 476 may be applicable. You have part 21 for loadbearing elements, part 22 for non—loadbearing elements, 23 for fire—protecting suspended ceilings and 24 for ventilation ducts. Do you see that there?
A. Yes, I do.
Q. Now, it's right, isn't it, that BS 476—20 is the general British Standard which sits with those ones listed there, and that contains general principles relating to the method of determining the fire resistance of elements of construction?
A. Yes, part 20 is the parent test document, and then these are supplementary standards for testing supplementary elements.
Q. Yes, thank you.
A. They refer back to part 20.
Q. Yes, thank you, that's very helpful.
Now, what was your understanding when considering this table about which part of BS 476 in this series that we see at note 1 was relevant to the testing of

cavity barriers?
A. From 21, 22, 23, or 24, none of those are applicable because ——
Q. None?
A. —— 21 is for loadbearing elements, part 22 for non—loadbearing elements, but within the scope it's for testing roller shutters, partitions, et cetera, there is no mention of cavity barriers in there. So when in discussion with a UKAS accredited test laboratory, they test using the principles of part 20, but the failure criteria in 21, 22, 23, 24, in terms of integrity and insulation, are uniform, they're the same.
Q. They're uniform. Yes, I understand.
A. Yes.
Q. Yes, thank you, that's helpful. We're going to come on and discuss this in more detail, but just to summarise, what you're telling us there is that, although it refers to the relevant part of 476 in the table, in fact for cavity barriers, none of those parts actually refer to the testing of cavity barriers, do they?
A. No, that's correct.
Q. So I think what you're telling us —— and we'll come on to this —— is that for cavity barriers, testing has been done to the general principles contained in part 20; is that correct?

A. That's correct.
Q. Part 22 for non—loadbearing elements, would there be any aspects of that which you would consider relevant to the testing of cavity barriers?
A. Not particularly, because it's dealing with roller shutters and partitions. When I mean partitions, we mean partition walls, rather than small elements.
The pass/failure criteria in part 22 is referred back to part 20 of the insulation and integrity. It's the same within the EN suite of test standards that refer back to the parent, EN 1363—1.
Q. Yes. We will come on to see in some of the test reports the way in which the principles in the tests you've just explained have been used in the testing of cavity barriers; yes?
A. Yes.
Q. Yes.
Now, just to help the panel and anyone else watching, I just want us to be very clear what is meant by integrity and insulation, as we saw in that table.
Is it right that integrity, in crude terms, is the ability to contain fire and stop flames and hot gases from physically passing the material in question?
A. That's correct.
Q. A more technical definition, which we see in BS 476—20,

would be the ability of a specimen of a separating element to contain a fire to specified criteria for collapse, freedom from holes, cracks and fissures and sustaining flaming on the unexposed face; do you agree with that?
A. Yes.
Q. Then in contrast, where we talk about insulation, in crude terms, that's about the thermal transmittance of heat, isn't it, and the material's ability to prevent the passage of radiant heat?
A. Yes.
Q. And in technical terms, it's described in BS 476—20 as the ability of a specimen of a separating element to restrict the temperature rise of the unexposed face to below specified levels. Again, can we agree on that?
A. Yes, we can.
Q. Yes.
Just for completeness, in terms of definitions, if we can go back to ADB again and have the last document up on the page, {CLG00000224/143}, I just want to look at that page briefly.
This is appendix E of Approved Document B where we see some definitions, and I just wanted to draw attention to —— at the bottom of that first column, can you see there is a definition there of "cavity barrier"?

A. Yes.
Q. And it says:
"A construction, other than a smoke curtain, provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space."
Do you see that?
A. Yes.
Q. Again, were you familiar with that definition while you were technical officer?
A. Yes, I was.
Q. Now, I'm going to ask you in detail in the next section of my questioning about the testing which Siderise carried out on its open—state horizontal cavity barriers, those with an intumescent strip. Before we do that, I just want to remind the panel and the listeners exactly what these barriers are.
If we can go to Dr Lane's Phase 1 report, this is {BLAS0000008/42}, here we have two helpful figures. We can see at the top, at figure 8.45, this is one of the horizontal intumescent cavity barriers as installed at Grenfell Tower; yes?
A. Yes, looking at the picture, yes.
Q. Yes. We can see an extract from Siderise's product literature just below that, in figure 8.46. Again, that

is an open−state horizontal cavity barrier; yes?
A. Yes, it is.
Q. I just want to be absolutely clear what these are.
So you can see it from the label in the top picture, it states there in the label:
"Black weather resistant polymer film encapsulating leading edge. Continuous high performance intumescent strip installed behind this film."
Is it right that, at that leading edge, what you get with these barriers is a high−performance intumescent strip; yes?
A. Yes, it is.
Q. And the purpose of that strip −− is this right? −− is that upon heating, that strip expands to fill a gap that has otherwise been left within the cladding system?
A. Yes, it does.
Q. Indeed, you can see that gap perhaps more clearly in the product literature below, where you can see that gap just sits back from what might be the face of where the cladding panel would go.
These are to be contrasted, aren't they, with what are known as full fill cavity barriers, which are blocks of material that simply fill the whole space; yes?
A. That's correct.
Q. So just going back to these horizontal cavity barriers,

can you just explain in your own words how these are intended to work?
A. They're there installed with a nominal air gap to meet the functionality of the normal use of a rainscreen system, where the back of the rainscreen has to be drained and ventilated. Then, should there be a requirement for there to be a sealed −− full seal, then at between 125 to 130 degrees, the intumescent exfoliates, expands across the gap to seal the gap, to prevent the passage of fire to the higher levels for the duration of 30 minutes. That is providing that the external panel remains in place.
Q. Yes, and again, I think we'll come on to this, but that last sentence there that you have just stated, you said, "That is providing that the external panel remains in place", it's vitally important, isn't it, in terms of how these panels operate, that there is an external face for them to butt up against if they're to operate properly?
A. That's the fundamental principles of all firestopping, not just cavity barriers, that the substrate in which they're installed has to remain for the same duration of the fire period as the firestop or the cavity barrier.
Q. Yes. Yes.
So as I said, I'm going to focus a lot of my

questioning this morning on the testing of these open−state cavity barriers, these intumescent cavity barriers.
At this point, can we just look at Mr Swales' witness statement to the Inquiry. This is at {SIL00000306}.
Now, is it right, can you just confirm, that Mr Swales is the chief commercial officer at Siderise; yes?
A. Yes, that's correct.
Q. This is his witness statement to the Inquiry, and he tells us in this statement that he has been chief commercial officer at Siderise since 2013. For the transcript, that's at paragraph 5 on page 2 {SIL00000306/2}.
I want to look first with you at page 11 {SIL00000306/11}, paragraph 44. So he says:
"Prior to 2006 Siderise's cavity barriers were verified by the Loss Prevention Council ..."
We will come back to that in a moment. He says:
"The use of rainscreen was still relatively uncommon in the early nineties. Consequently, the demand for dedicated cavity barrier products was infrequent/negligible. Due to the paradox of cavity barriers needing to be installed with an air gap to

maintain ventilation versus the integrity criterion required for compartmentation, the advice at the time (from the Loss Prevention Council) was that it was not possible to satisfy both requirements. From the mid−nineties we received more enquiries for this type of application. As such, in July 1997, I requested that the LPC [Loss Prevention Council] confirm their position ..."
Then he refers to a document which I'll take you to in a moment.
"This was used to support the use of an ad−hoc assembly with standard cavity barriers fitted to leave a 25mm gap. From this time to 2002, from recall, there were a small number of projects (literally one or two) where we supplied product for a 'rainscreen' application. In March 2002, we prepared a data sheet, which illustrated standard 'CW' product with an integral intumescent material."
And he attaches that datasheet.
If we go on and read from 45, he says:
"Also from approximately 2002, in this early product development phase, we evaluated a number of different intumescent materials through ad−hoc 'material' testing."
Now, just pausing there, is it right that from

around 2002 onwards, when you first joined Siderise, the company was beginning to develop open-state cavity barriers for use in rainscreen applications?
A. Yes.
Q. Based on your own involvement in the industry in the mid-1990s, were you aware of a growing demand for such a product?
A. In the mid-1990s I was involved with predominantly curtain walling. We didn't --
Q. Right.
A. The companies I worked for, we were curtain wall specialists, not rainscreen specialists.
Q. I see. So approximately when did you start to become aware that there was a growing demand for open-state cavity barriers in the market?
A. When I joined Siderise.
Q. Were you aware, after you joined Siderise, that Siderise had sought advice from the LPC, the Loss Prevention Council, about these open-state cavity barriers?
A. Yes, I was.
Q. We're going to go to that letter from the LPC in a moment.
Just before we do that, we saw in the first sentence of paragraph 45 that Mr Swales was referring to ad hoc material testing of different intumescent materials.

Can you help us, what if any involvement did you have in such ad hoc testing of those intumescent materials?
A. Very little in the very early days. It was more 2006 onwards I was more involved with testing.
Q. Right. So do you know much about what that ad hoc testing was of different intumescent materials?
A. Not in the very early development phase.
Q. Okay.
If we go back to Mr Swales' witness statement, looking at paragraph 45 on page 11 {SIL00000298/11}, in the second sentence of paragraph 45 he says:
"We formally developed/re-developed the product in 2006 via a NPDI (New Product Development Introduction) project."
He goes on to say that there was a concept approval meeting on 1 July 2006.
Can we just look at the agenda for that concept approval meeting, {SIL00002586}.
Now, we can see there the heading and the date, 1 July 2006, on the right-hand side, and we can see that the meeting was called by you, and you appear to be the note-taker as well; yes?
A. Yes.
Q. The attendees included -- well, it says Steve Bond, technical director, and Chris Mort, technical manager.

A. Yes.
Q. Was it just the two of you at this meeting?
A. Yes, it was.
Q. We can see from the agenda items below, agenda topics, that you were responsible -- we can see the initials "CM" -- for application description, that's the second one down, and then in the fourth one down we can see statutory regulatory requirements also has your initial next to it. Is that correct?
A. Yes, it does.
Q. So were you responsible for the statutory and regulatory requirements around this new product development?
A. Yes.
Q. Then if we turn to page 2 {SIL00002586/2}, we can see that there is a heading there "Agenda topics", and we can see the first part underneath that, there is a heading "Product/Concept Name", and then there's various notes under the discussion. So these appear to be minutes of the meeting.
Now, the rest of these minutes appear then in a different document, if we turn to {SIL00002587}. Would you agree these appear to be a continuation of the minutes of that meeting?
A. Yes, I do.
Q. Yes, thank you. Just to be clear, the agenda items

match up completely.
If we look at the heading at the bottom of the page, we can see the heading "Statutory/Regulatory Requirements" with your initials next to it, and under "Discussion" it reads:
"Product to meet with the requirements of a modified BS476 Part 20 test, and as a result of a positive test compliance with Approved Document B 2000 edition incorporating the 2000 and 2002 amendments, in particular sections '9 Compartmentation' and '10 Concealed Spaces (cavities)."
So that's what we see under the discussion, and as we've already discussed, BS 476-20, you described it very well as the parent of the fire resistant testing; yes?
A. Yes.
Q. Setting out general principles.
A. Yes.
Q. Can we agree that it describes a procedure for laboratory testing for the determination of fire resistance of elements of construction, including failure criteria for integrity and insulation?
A. Yes, it does.
Q. So looking back to the minutes of this meeting, can you explain precisely how you were going to modify that

British Standard when going about this testing?
A. We wouldn't modify the actual standard, because as a company you can't modify a standard. The test procedure has a requirement for integrity that you have gap gauges, and should a gap gauge be able to be applied to a specimen prior to the start of a test, then technically the test shouldn't be started.
Q. Yes. Now, just pausing there, you talk about gap gauges, and we'll come to that in the documents in a moment. Is a gap gauge effectively a metal rod that is inserted into the specimen and if it gets through gaps, that's a failure?
A. Yes.
Q. Yes. Thank you.
Sorry, carry on. What I'd like to understand is: how were you going to modify the requirements of that test to test the intumescent open-state cavity barriers?
A. It was a discussion between ourselves and Warringtonfire, a UKAS accredited laboratory, on how you can conduct the test for an open-state cavity barrier that's been demanded by the market of rainscreens and still be able to perform the test on a furnace. We came to an agreement that, whilst the integrity technically fails before you start the test, they would record and monitor the closure of the intumescent to reinstate the

integrity value of the product.
Q. Yes, I understand.
Again, we're going to come on to the testing that Warringtonfire did of these products for Siderise, but what you're explaining is that they agreed to take data following the closure of the cavity by the intumescent; yes?
A. Yeah, when you start the test, the recording starts from time zero. So they record all the data from time zero so they could monitor -- the thermocouple's actually attached to the cavity barrier itself.
Q. Yes.
So just looking back to the minutes, though, can you explain with that form of testing how you were going to modify the requirements of BS 476-20?
A. Like I said, we did not modify the requirements of BS 476-20. We had open discussions with the UKAS accredited laboratory of how we could use the principles of BS 476 in order to test the cavity barrier that was being requested by the market at the time, and we were fully aware that the integrity criteria was not met at the start of the test.
Q. Yes. So thinking back to these minutes, what principles of 476 testing did you think could be transposed into the testing of these cavity barriers?

A. All elements except for the gap gauge at the very start. Gap gauges, cotton pads for measuring integrity, could be introduced after the start of the test, no issues.
This is not uncommon across fire resistance testing. There are fire tests of other elements, like dampers, that need to activate and react to temperature, that the integrity criterion, whilst there for the duration of the test, in the first five minutes the laboratory have got the responsibility to establish a controlled furnace environment in terms of temperature and pressure. So in the first five minutes of a test, that is the fundamental principle of the test standard, and that allows for intumescents to react, it allows for intumescents around doors to react, it allows window -- when they test windows for intumescents, to react, dampers to activate. So it's not an uncommon principle.
Q. Okay.
Just going back to the minutes, if we could have the minute back up on the page that we were just looking at {SIL00002587/1}, we can see that it says:
"Product to meet with the requirements of a modified BS476 Part 20 test ..."
And then it says:
"... and as a result of a positive test compliance with Approved Document B ..."

And then it refers to various parts.
Why was it considered that that testing to some of the requirements of 476-20, but not all of them, would satisfy ADB? Can you explain that?
A. It would be proof of performance for both integrity and insulation to meet the 30/15 requirement once the intumescent has activated.
Q. I see. What had led you to the conclusion that testing in that manner could be satisfactory evidence of compliance with Approved Document B and the Building Regulations' functional requirements?
A. There had been various discussions with other bodies within industry, CWCT for one, on how, as a manufacturer of passive fire protection, could we meet the demands of cavity barriers within rainscreens, and this was a way of proving the performance as previously assessed by the LPC in the LPC assessment document.
Q. Right, I see. Well, we will come back to some of that in a moment because we're going to look at what the CWCT said a little later.
Staying with this document, can we turn to page 3 of it now {SIL00002587/3}. There is a heading in the middle of that page, "Project Assigned an Owner", and it says underneath:
"As the project is a Fire product then the best

owner would be Chris ... Chris to be project owner."
So can you explain, why were you the most appropriate person in 2006 to take on this fire product ownership?
A. Because I was involved in fire testing. That would have been -- I was in -- testing other products for the business.
Q. Right. What other products were you involved in testing?
A. Standard CW type products.
Q. Do you mean standard curtain walling type products --
A. Yes.
Q. -- when you refer to CW?
A. Yes.
Q. I see. So you had some experience of testing with curtain walling products, so that's why you were considered to be the appropriate person to take on this new product planning; yes?
A. That's correct.
Q. Yes.
We can see under "Action items", just below that in the same box, it says:
"Chris to complete the [new product information] Planning and Review Sheet for this product."
Yes?

A. Yes.
Q. Then the minutes conclude, under "Project Approved & Accepted For Development", under "Conclusions", so it's the second heading down in that last box, it says this:
"All business and ethical requirements are met, by this proposed product therefore this is approved for development."
Can you help us, what does that mean?
A. It meets with the compliance, it meets with what Siderise strive to do is offer fully tested products to the market.
Q. I see. Specifically, when there's reference there to meets all ethical requirements, what ethical requirements were considered at that stage?
A. I can't recollect.
Q. Let's turn now to the Loss Prevention Council letter that Mr Swales referred to in his witness statement. This is at {SIL00000285}. So this is a letter dated 29 July 1997 that was sent to Mr Swales. If we could see at the bottom, the author of the letter is somebody called RH Earle, who is a senior consultant at the Loss Prevention Council.
I just want to read the first paragraph at this stage. So the author says:
"The cavity between curtain walls and fire

compartment walls/floors need to be sealed within a cavity barrier to the same fire rating as the compartment wall or floor. In the national building regulations the exact requirements for these cavity barriers is ambiguous and no mention is made of movement between the curtain wall and the compartment wall/floor in a fire situation. In the LPC 'Design Guide for the Fire Protection of Buildings' it is assumed that the cavity barrier will take up any movement between the elements of construction. A particular problem is rainscreens where the cavity barrier cannot fill the full width of the cavity as the rainscreen requires a typical 25mm space to carry out its function. Where rainscreens are fitted, it is our understanding that the Fire Brigade assume that the cavity barriers between the rainscreens and the compartment floors are ineffective and that therefore up to four floors could be involved in a fire before it is brought under control."
Just pausing there, when it states there that the rainscreen requires a typical 25-millimetre space to carry out its function, is that because in some rainscreen systems it would need to be able to allow the drainage of water behind it and to provide ventilation to the system?
A. That's correct.

Q. Now, as to that information about how the Fire Brigade viewed cavity barriers and their effectiveness in a rainscreen system, can you help us, to what extent was that taken on board by Siderise when developing its products?
A. That's why we were looking to test the cavity barriers, to prove their performance.
Q. I see. So at the time this letter was written, is it your understanding that there was this general concern that cavity barriers would be ineffective in rainscreens?
A. At the time this letter was written, I wasn't part of Siderise.
Q. I understand.
Did you become aware of this letter when you began working at Siderise?
A. Yes, I did.
Q. And did you read it and take on board what it was saying?
A. To a point, yes.
Q. When you say, "To a point", what do you mean by that?
A. It's further down the letter where it confirms that the cavity barrier would restrict the movement of smoke and hot gases as much as practical.
Q. Yes. We'll come to that second paragraph --

A. That's the key part.
Q. Sorry. We'll come to that second paragraph in a moment.
Just sticking with that end part of that first paragraph:
"Where rainscreens are fitted, it is our understanding that the Fire Brigade assume that the cavity barriers between the rainscreens and the compartment floors are ineffective and that therefore up to four floors could be involved in a fire before it is brought under control."
Was that your understanding when you first began working for Siderise, that that was the Fire Brigade's assumption about cavity barriers in rainscreen systems?
A. I don't recollect making any specific attention to that ——
Q. I see. Can you help us as to whether that statement there and that assumption by the Fire Brigade was taken into account in terms of the way Siderise promoted and marketed its products for rainscreen systems?
A. I can't from the date of that letter, no.
Q. As you said, the letter goes on in the second paragraph. It starts by saying:
"We have looked at the Dane Architectural Systems Ltd drawings [and it gives the numbers of the drawings] for the contract at 9 Wellesley Road, Croydon. We

confirm that your MS cavity barrier system is suitable for this application for sealing the cavities between the curtain walling and compartment floors and the columns/compartment walls. Where the rainscreens are fitted a 25mm—wide gap must be left between the outer edge of the cavity barriers and the rainscreen so that the rainscreen can fulfil its function. Although the cavity barrier will not seal the cavity at the rainscreens, it will restrict the movement of smoke and hot gases as much as is practical."
Do you see that?
A. Yes.
Q. So are you saying that Siderise relied on that opinion by the Loss Prevention Council when it was developing its open—state cavity barriers?
A. Yes.
Q. So they're saying there, can we agree, that it's going to restrict the movement of smoke and hot gases as much as is practical, but that's all, isn't it?
A. Yes, it is.
Q. Did you ever consider how this new product that you were developing would address those concerns as expressed in the letter?
A. From 2006 onwards, when I was involved with the testing, and I pushed the laboratories to test the products, then

yes.
Q. You say there, "and I pushed the laboratories to test the products". We will come to this in a moment, but is it right that the laboratories were somewhat reluctant to engage in this testing at first?
A. The reluctance was based on the health and safety of conducting the test within the laboratory. It wasn't a reluctance to test the product, but it was —— they needed to justify how they could start a furnace that rises to 600 degrees in the first five minutes with a 25—millimetre open gap.
Q. Right.
A. So there was a clear understanding between us and Warringtonfire that the test would run. If there was any issues that would cause any health and safety issues to the laboratory, they would stop the test immediately through the emergency stop procedure.
Q. I see.
A. That was the only reluctance. There was a clear synergy, if you will, between ourselves and the test laboratories and others to try and get this sort of product tested, because there was more demand coming from the market for this type of product.
Q. Yes.
You have mentioned quite a few times now that demand

coming from the market. In reality, is that what was driving this, that there was a demand for an open—state cavity barrier, so you needed to go and do some testing to try and show that that was a safe product to be using?
A. Correct. If you were to use full fill cavity barriers, they were rejected on the fact that they trapped water and could cause other issues for a rainscreen, rather than the —— it was expected that the passive fire protection industry would come up with a way of allowing the ventilation and drainage of the system. So Siderise weren't alone in developing products for the market at around this time.
Q. I see.
Where you say, "it was expected that the passive fire protection industry would come up with a way of allowing the ventilation and drainage of the system", who was placing that expectation upon you?
A. It was coming directly from the façade industry, and other guidance out there, the likes of CWCT, where the —— a lot of rainscreen systems are drained and ventilated, as we've already discussed, through the back face of the system. There is a requirement to keep the insulation in the back face dry, the insulation that's keeping the building warm, that needs to be kept dry.

There can't be any capillary action going back to the structure which could allow for damp on the inside of the building, et cetera, et cetera.
Q. I see, yes, thank you.
Now, just sticking with this new product information planning, if we can turn to a document, {SIL00008401}, this is an NPI, new product information, planning and review sheet dated 15 July 2006.
Now, do you remember completing this document?
A. Yes, I do.
Q. And we can ——
A. If we look at the project owner, it had changed to Peter Batchelor.
Q. Yes.
A. This was finished when I had left the business.
Q. I see. So you began this ——
A. Yes.
Q. —— and then he finished it off ——
A. Yeah.
Q. —— when you moved to Hilti; yes?
A. Correct.
Q. Yes.
Then we can see identical wording on the left—hand side, third box down, under "Statutory/Regulatory Requirements":

"Product to meet with the requirements of a modified BS476 Part 20 test, and as a result of a positive test compliance with Approved Document B 2000 edition ..."
And then it refers to particular parts of that.
Had you done any further investigation between the concept approval meeting and completing this planning and review document as to the suitability of doing some modified BS 476—20 testing?
A. There was discussions between ourselves and Warringtonfire on how we could test a cavity barrier with an intumescent with a 25—millimetre gap. So, yes.
Q. Can you help us, who were you having those discussions with at Warringtonfire?
A. It would have been with Chris Johnson at the time.
Q. Yes. I see. So you had been having some discussions with Warringtonfire about how you could use parts of the BS 476—20 test principles in a test of these intumescent cavity barriers?
A. Yes.
Q. Yes.
If we just look at this point at your witness statement, paragraph 38, at page 10 of your statement {SIL00000298/10}. I think we've probably already covered this, but we can see four lines down, there is a line on the right beginning:

"Testing to BS 476 Part 20 has been established for many years, though it was recognised as not being ideal as the Standard cannot be applied directly to open state cavity barriers."
That's for the reason that we've already discussed, is it, that under part 20 of 476, these open—state cavity barriers would automatically fail certain requirements?
A. Yes, it's the gap gauge issue. The intumescents react on the furnace test very, very quickly, within 10 to 20 seconds of ignition of the furnace, so it's that initial —— before you start the furnace, you have an open gap.
Q. Right.
A. So technically you shouldn't start the furnace with an open gap.
Q. Right.
A. Because of the health and safety condition —— requirements.
Q. Yes, I see. Yes, and we're going to come on to look at some of the test reports in a moment to see what data you were getting from that.
Mr Swales says in his witness statement —— we don't need to go to it, but for the transcript that's at paragraph 39 {SIL00000306/10} —— that, to his knowledge,

Siderise were the first in the industry to test open—state cavity barriers; is that your understanding as well?
A. Yes.
Q. So when you were doing this, there was no precedent for testing open—state cavity barriers when you were embarking on this project?
A. Not that I was aware of.
Q. Just looking back at paragraph 38 of your statement {SIL00000298/10}, you go on in that paragraph, after the part that we read, to explain that the integrity condition in paragraph 10.3 of BS 476—20 —— now, that's the part that requires this gap gauge test; yes?
A. Correct.
Q. "... cannot be complied with until the intumescent closes the opening. The gap gauge required by 10.3.2(b) could pass through the opening — which is an automatic fail — until the intumescent closes. In other words, any open state cavity barrier would be subject to an automatic failure at the start of the test. Accordingly, testing to the principles of BS 476 Part 20 or 'ad hoc' testing to BS 476 Part 20 is usually referred to in reports."
Now, can you help us, I appreciate you were talking to Warringtonfire about this ad hoc type of testing; did

you ever check that approach with anybody else in the industry?
A. I can't particularly recollect any specific discussions.
Q. Can you recollect ever having any discussions with anybody within Government or anybody who was responsible for Approved Document B about how satisfactory it would be to test in this ad hoc way?
A. No.
Q. So does it follow that you were reliant on the advice you were getting from Exova in ——
A. That's correct.
Q. —— testing in this way?
A. That's correct.
Q. Yes, thank you.
If we can look back now at Mr Swales' witness statement, paragraph 46 on page 12 {SIL00000306/12}, he tells us there in the first lines:
"The demand for rainscreen cavity barrier products slowly increased to the point that in 2005/2006 we initiated discussions with Bodycote Warringtonfire (Exova) to undertake product testing."
Now, were you personally involved in those discussions?
A. Yes, I was.
Q. He goes on, picking it up in the third line:

"It took a lot of discussion with Exova to undertake the test, as they were nervous that they could safely permit the testing of an 'open' assembly. There was no precedent to this test and it was considered 'ad hoc'."
Then you go on, and we're going to look at some of these test reports in a moment.
Just going back, we had a discussion about whether or not Exova were reluctant; was the only reason they were nervous and reluctant about the health and safety aspects of performing this test, or were they also reluctant because they were concerned that they might be opening the door to some kind of compliance test for open—state cavity barriers that they didn't feel comfortable with?
A. No, it was purely down to the health and safety requirement.
Q. Did they ever express any concerns about whether it was appropriate to be testing in this ad hoc way, using principles of 476—20?
A. It's common to test —— to use part 20 or EN 1363—1 for a test that doesn't fall into one of the other prescribed test standards, so it's common.
Q. Yes, I understand that's your evidence. But my question was: did they, Exova, ever express any concerns about whether it was appropriate to be testing in this ad hoc

way using the principles of 476—20?
A. None at all.
Q. So they were entirely comfortable to go ahead with this testing, apart from the health and safety aspects?
A. That's correct.
Q. Did anyone from Exova ever express any concern that they didn't want to be seen to be endorsing the safety of open—state cavity barriers in circumstances where there was no accepted test for such a product?
A. No.
Q. Now, in a moment we're going to come to look at a number of the test and assessment reports which were produced for these open—state intumescent horizontal cavity barriers by Exova, and later by some others.
Before we do that, I want to put a number of propositions to you to see what we can agree at this stage.
Can we agree this: that prior to Siderise manufacturing and supplying open—state horizontal cavity barriers for use on Grenfell Tower, those products had only ever been tested for insulation and integrity between two concrete lintels or concrete blocks?
A. We are looking at, here, testing an element of material. When you're dealing with fire resistance tests to get

a fire resistance level of any form of passive fire protection, the general principles are to test between two elements of concrete, because the results are only applicable for that barrier in isolation. It is then for further fire engineering or fire engineers to take the test results of all the construction elements on a build—up, so any walls, floors, façades, et cetera, et cetera, to make their judgement for the building, because every manufacturer should have the fire resistance or reaction to fire properties of their products they are selling.
Q. Yes, thank you. Is the answer to my question: yes, that prior to Siderise manufacturing and supplying open—state horizontal cavity barriers for use on Grenfell Tower, those products had only ever been tested for insulation and integrity between two concrete blocks?
A. As per the standard, yes.
Q. Thank you.
It follows from that —— again, can we agree this —— that prior to supplying the horizontal open—state cavity barriers for the Grenfell project, those products had never been tested for insulation and integrity in a rainscreen system where the outer cladding was ACM, aluminium composite material?
A. There is no available test standard in which to test

what you have just described, other than an 8414 test that does not test the performance of a cavity barrier, it tests the performance of the system.

Q. I understand that's your answer, but again, is the simple answer: yes, that prior to supplying the horizontal open-state cavity barriers for the Grenfell project, those products had never been tested for insulation and integrity in a rainscreen system where the outer cladding was ACM?

A. That is correct, but then there are no available test standards as you describe there, to be able to test for fire resistance.

Q. Yes, I understand.

Can we also agree this: prior to being manufactured and supplied at Grenfell Tower, neither the horizontal nor the vertical cavity barriers had been tested in void sizes as large as those for which they were used at Grenfell Tower? Can we agree that?

A. Yes.

Q. And extended application assessments and tests for those larger void sizes were only carried out after the Grenfell fire?

A. Yes.

Q. Thank you.

Now, we're going to look at four Exova reports from

2007, 2009, 2010 and 2011 to see what testing and assessments were in fact done at Exova, or Warringtonfire as they then were, during that period. So this is 2007 to 2011.

If we can go to the first of those reports, if we can turn up {SIL00000290}.

So this, we can see, is the first test report. It's dated 1 February 2007, we can see that on the bottom right-hand side, and then if we go back to the top, we can see that the title is:

"Fire resistance test utilising the general principles of BS 476: Part 20:1987 on two specimens of floor mounted and two specimens of wall mounted cavity barriers."

Then if we turn to page 7 of this report {SIL00000290/7}, we can see who was present, and we can see in the middle of that page, under "Instruction To Test", it says:

"The test was conducted on the 3rd October 2006 at the request of Siderise ..."

Below that it tells us that the test was witnessed by Mr C Mort and Mr S Swales. So you were present at these tests; yes?

A. Yes, I was.

Q. If we can turn back to page 3 {SIL00000290/3}, and there

is a section "Summary of the Tested Specimens", here it is explaining what was being tested in these tests. If we look at the fourth paragraph down, it tells us that:

"Specimens C and D, referenced 'Lamatherm CW-RS' comprised a mineral fibre based insulation with polyethylene fibre reinforced aluminium foil facings and had overall dimensions of 225 mm wide x 1000 mm long x 75 mm thick. Specimens C, complete with a graphite based intumescent strip retained to one edge of the primary seal by folded returns of support brackets that penetrated full width of the specimen and Specimen D, complete with a palusol based intumescent sheet retained to one edge of the primary seal ..."

So in this description it's right, isn't it, that it was specimens C and D that were the open-state cavity barriers with intumescent strips; yes?

A. Yes, that's correct.

Q. And that's in contrast to specimens A and B, just to note above that, in the paragraph immediately above, they were directly bonded to the damp proof course and friction fitted; yes?

A. Yes.

Q. I read out the dimensions of the intumescent cavity barriers in that fourth paragraph: 225 millimetres wide, 1,000 millimetres long,

75 millimetres thick.

We can see in paragraph 2 of that section, looking back up, it says:

"The sections of wall and floor were formed from pre-cast reinforced aerated concrete lintels and had overall dimensions of ..."

And then it gives the dimensions.

So this is telling us that the cavity barriers were tested in wall and floor sections which were formed of pre-cast reinforced aerated concrete lintels; that is correct, isn't it?

A. Yes, it is.

Q. Those had apertures or gaps of 250 millimetres; is that right?

A. Yes.

Q. Yes. So effectively you have got concrete with rectangular gaps in them that you're testing these barriers in; yes?

A. That's correct.

Q. If we look at page 4 of this document {SIL00000290/4}, we can see a results table. If we could blow that up. We can see that for specimens C and D for integrity and insulation, they have 0 minutes and 0 minutes, because they have failed both the integrity and the insulation requirements; yes?

A. If you fail the integrity requirement of any test, even today, you automatically fail the insulation criteria.
Q. I understand.
There are two asterisks for each of those 0 minutes, and if we read down two paragraphs below, it says there:
"Due to the intended end use of Specimens C and D, both specimens were tested incorporating a 25 mm through gap along one edge, at the start of the test. As a result, both specimens automatically failed the integrity and insulation criteria of the test via penetration of a 25 mm gap gauge upon commencement of the test."
So you could put the rod through the 25-millimetre gap, it's an automatic fail if you were applying the 476-20 standard; yes?
A. Yes.
Q. In the paragraph below that, we can see it says this:
"After six minutes of testing, both specimens had fully sealed this gap and therefore if they were assessed against the integrity and insulation (maximum temperature rise only) performance criteria of BS 476: Part 20: 1987, from this point, then results of 46 minutes integrity and 32 minutes insulation (Specimen C) and 54 minutes integrity and insulation (Specimen D), respectively, would have been achieved."

Yes?
A. Yes.
Q. So we can see from that paragraph that it took six minutes for both specimens to fully seal the gap; yes?
A. Fully sealed, that's a depth -- fully sealed to the full depth of the 75 millimetres.
Q. Yes, so --
A. Not actually activate. The intumescents activate, like I said previously, between 125 and 130 degrees.
Q. I see. So --
A. So you would have activation at the bottom edge and then that would seal the furnace, and then over a period of warming, then you would get the full depth of the 75-millimetre thickness develop.
Q. Yes, I understand. So for the full width of that barrier --
A. Yes.
Q. -- to seal against the concrete face, that took six minutes; yes?
A. Yes.
Q. Is it right that only the maximum temperature rise requirements of BS 476-20 were used in this ad hoc testing?
A. Yes, it was.

MS GRANGE: We can see what the performance was that they achieved.
Then if we can look at page 28 of the report {SIL00000290/28}, we can see there's some limitations.
Mr Chairman, if I can just cover these limitations in this report, perhaps then we could break.
SIR MARTIN MOORE-BICK: Yes, that's all right.
MS GRANGE: So at page 28 we can see at the bottom it sets out ongoing limitations, and we can see at paragraph 1 it states:
"The results relate only to the behaviour of the specimens of the element of construction under the particular conditions of test. They are not intended to be the sole criteria for assessing the potential fire performance of the element in use, nor do they reflect the actual behaviour in fires."
Then we can see in the next paragraph it says:
"The results may not be applicable to situations where the joint widths, orientations and supporting construction vary from those tested."
Then in the third paragraph it says:
"As no movement was induced into the specimens during the test there can be no evaluation of the performance of the seals where movement is induced in a building under actual fire conditions."

So can you just help us, what did you understand that last limitation to mean?
A. It's a standard clause. It's a standard clause in fire tests even now. You're testing to get the performance of the element in isolation. It needs further assessing, as it says there, the fire performance of all the elements put together.
Q. Yes.
A. So you have the fire performance -- if we take rainscreen, for example, you'd have the fire performance of the supporting wall, whether that be concrete or SFS, you'd have the fire performance of the insulation in the cavity, you'd have the fire performance of the cavity barriers and you'd have the fire performance of the rainscreen panel, and then it's for the overall project fire engineer or consultant to assess all those products brought together, because you can't test all of them together on a fire resistance test, only through an 8414.
Q. Right. I see.
Then just to complete what we can see in this report, for our purposes, if we go to page 29 {SIL00000290/29}, the next page, at the top of the page, under "Review", it makes clear that:
"This report covers a test which was conducted to

a procedure which is not the subject of any British Standard specification, but the test utilised the general principles of fire resistance testing given in BS 476: Part 20 ..."

And it also refers there -- and you mentioned this standard earlier -- to the European equivalent, BS EN 1366 -- actually, that's part 4 on linear joint seals, isn't it, there?

A. Yes.

Q. Is it right that in this test you used the thermocouple locations from the BS EN 1366-4 for linear joint seals, you used the thermocouple locations on top from that standard and the heating from BS 476-20, and then you adapted the procedures from the two different standards for this test?

A. We didn't adapt any of the procedures, because we're in -- we do not run the test, Warringtonfire run the test, we only witness.

In terms of thermocouples attached to the product, the thermocouples for EN attached to the product, a copper disc with wires attached, and a non-combustible pad of about 30 millimetres square, they are the same or similar to the BS 476. So really there isn't any difference between the two measuring thermocouples.

Q. I appreciate that's your evidence, but is it right that

you effectively -- well, Warringtonfire used thermocouple locations from that 1366-4 standard and the heating requirements from 476-20?

A. Yes.

Q. Yes, thank you.

Then we can note -- just the final point -- that at the end of that paragraph it says:

"... it is recommended that the report be referred back to the test laboratory after a period of two years to ensure that the methodology adopted and the results obtained remain valid ..."

Yes?

A. Yes.

MS GRANGE: Thank you.

Mr Chairman, that's a good moment, I think, for a break, because I'm about to move on to another test report.

SIR MARTIN MOORE-BICK: Yes. All right. Thank you.

I said we'd have a break roughly in the middle of the morning, Mr Mort. We'll take it now.

We will come back at 11.40, please, and I have to ask you on this occasion, and indeed any other occasions when we have breaks, not to talk to anyone about your evidence, please, or anything to do with it while you're away from the room. All right?

THE WITNESS: Yeah, understood.

SIR MARTIN MOORE-BICK: Thank you very much. So we will see you at 11.40, then, thank you.

THE WITNESS: Thank you.

SIR MARTIN MOORE-BICK: Thank you.

(11.22 am)

(A short break)

(11.40 am)

SIR MARTIN MOORE-BICK: Welcome back, everyone. We're now ready to go back to Mr Mort to continue his evidence.

Are you there, Mr Mort? Can you see me and hear me?

THE WITNESS: Yes, I can.

SIR MARTIN MOORE-BICK: Good, thank you very much. Ready to carry on?

THE WITNESS: Yes, I am.

SIR MARTIN MOORE-BICK: Good, thank you very much indeed.

Yes, Ms Grange, when you're ready.

MS GRANGE: Yes, thank you.

Yes, Mr Mort. We were just looking at the 2007 test report from Warringtonfire before we broke off, and we looked at a number of the ongoing limitations that Warringtonfire had spelt out at the end of that report.

Can you just help us with this: to what extent did Siderise take on board those limitations that were spelt out in that test?

A. As with all fire tests, we take on board the limitations of the test.

Q. Yes. We're going to come to the marketing literature that Siderise produced later. To what extent were those limitations discussed when the marketing literature was being drafted?

A. I only technically reviewed the literature, I wasn't involved in the drafting of the literature.

Q. I see. So you don't recall any discussions at that stage about the limitations that were clearly spelt out in these reports?

A. No.

Q. No.

So let's go to the second Exova Warrington report that we have, this is from January 2009, {SIL00000223}. So we can see from the title that this is a report that considers "The Fire Resistance Performance of Siderise 'Lamatherm CW-RS" -- where we see CW-RS, is that curtain walling rainscreen?

A. That's correct.

Q. Yes -- "Cavity Barriers' complete with Tecnofire [and then a number] intumescent".

We can see that the report is dated 30 January 2009 from the bottom right, and we can see it's described as an assessment report.

Were you involved in the obtaining of this report?
A. In January 2009, I was working for Hilti.
Q. I see. But did you become aware of this report when you rejoined Siderise?
A. Yes.
Q. Yes, thank you.
If we go to page 3 {SIL00000223/3} under the executive summary, there is a heading there right at the top, "Objective". It says:
"This report considers the expected fire resistance performance of Siderise 'Lamatherm CW–RS Cavity Barriers' complete with Tecnofire ... intumescent, similar to those tested under the reference WF No. 157714 when increased in depth to 90 mm."
Now, that report reference, 157714, is the test report from February 2007 that we were just looking at a moment ago; that's right, isn't it?
A. Yes, it is.
Q. So this report was building on that work, but now the depth of the intumescent was increased to 90 millimetres; is that correct?
A. Upon reading this report, it would be –– yes, it was increasing the depth of the sealing from 75 to 90 millimetres for a different fire rating.
Q. Yes. So it's a deeper cavity barrier and a deeper

intumescent; yes?
A. No, the intumescent would be the same.
Q. Oh, I see. It's just for a deeper cavity barrier?
A. For a thickness of the cavity barrier, yes.
Q. I see, yes.
I appreciate you weren't there, but were you ever told why it was that Siderise commissioned this assessment report?
A. It would only be for requests from the market for a 60–minute insulation and integrity product.
Q. Right, I see.
Is it right that for this report there weren't further tests carried out, this was just an analysis of whether the intumescent should be capable of providing up to 60 minutes' integrity and insulation; is that right?
A. Yes.
Q. If we turn to page 5 {SIL00000223/5}, under the heading "Proposals", we can see effectively the proposition that's being tested and assessed in this report:
"It is proposed that [those] Cavity Barriers complete with Tecnofire ... intumescent, similar to those previously tested under the [previous test] ... but increased in depth to 90 mm, should provide up to 60 minutes integrity and insulation performance, [and

then note these words] when installed between concrete floor slab edges and concrete/masonry walls, if tested utilising the general principles of BS 476: Part 20: 1987."
Yes?
A. Yes.
Q. So, again, with this assessment report, it's premised on the basis that the product was held between two concrete slabs; yes?
A. For testing, yes.
Q. Yes, and if we turn to page 7 {SIL00000223/7}, we can see the report's conclusions, and the basic conclusion was that:
"Should the recommendations given in this report be followed, it can be concluded that [those cavity barriers] complete with the Tecnofire ... intumescent. Should be capable of providing up to 60 minutes integrity and insulation performance*, if subjected to a test utilising the general principles of BS 476: Part 20 ..."
Again, the little asterisk we can see caveats this and makes clear that it's after closure of the 25–millimetre wide air gap has occurred, and in brackets it says after approximately four minutes; yes?
A. Yes.

Q. So the report is not assessing integrity or insulation performance prior to the 25–millimetre gap being closed; no?
A. No.
Q. Again, the report contains a caveat. If we go to the very last sentence on page 7, under "Validity", it says:
"The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report."
So that's an assessment report that's obtained in 2009.
Let's move now to another test report. This is {SIL00000224}. We can see from the title there on the right–hand side this is:
"Fire Resistance Test Utilising The General Principles Of BS 476: Part 20 ... On Five Specimens Of Floor Mounted Linear Gap Seals."
We can see it's dated 26 August 2010, and so it would appear that Siderise had commissioned further testing to the principles of BS 476–20 which led to this report being produced; is that right?
A. That's right.
Q. If we look at page 2 of the report {SIL00000224/2}, under "Test Results", we can see that five samples were tested. Specimen E at the top there, we can see that

that was:

"... installed into the cavity on three brackets referenced 'Prototype RS' leaving an air gap of nominally 50 mm."

Do you see that there?

A. Yes.

Q. Then specimens F, G, H and I are all described below that, and they had an air gap of nominally 25 millimetres; yes?

A. Yes.

Q. So you're testing the barriers with different widths of air gap; is that correct?

A. That's correct.

Q. Turning just to page 12 {SIL00000224/12}, we can see at the bottom of page 12 at item 6, again, the apparatus used in this test included concrete lintels autoclaved aerated concrete; yes?

A. Yes.

Q. Then if we turn to page 23 {SIL00000224/23}, we can see a table of results. So here we can see that all the specimens when they have been tested to BS 476−20 have got 0 minutes integrity and 0 minutes insulation, and there is an asterisk, and we can see below, in the paragraph below the table, in the first paragraph, it says there:

"Due to the intended use of Specimens E to I the specimens were tested incorporating a through gap along one edge between 25 mm to 50 mm at the start of the test. As a result, the specimens automatically failed the integrity and insulation criteria of the test via penetration of a 25 mm gap gauge upon commencement of the test."

So exactly the same as last time; yes?

A. Yes.

Q. Then if we look at the paragraph below that, it states this:

"Between two and three minutes Specimens G, H and I sealed the gaps and therefore if they were assessed against the integrity and insulation (maximum temperature rise only) performance criteria of BS 476: Part 20 ... from this point, then results [are] ..."

And we can see that the results are 61 minutes' integrity and 23 minutes' insulation for specimen G, 61 minutes' integrity and 20 minutes' insulation for specimen H, and 61 minutes' integrity and 27 minutes' insulation, specimen I, respectively, would have been reported.

So just to summarise, and is this fair, in these tests, these samples have done quite well in terms of integrity, they've all got over 61 minutes, but they've

performed worse in terms of insulation, only 23 minutes, 20 minutes and 27 minutes respectively? Can you see that?

A. Yes.

Q. Is that a fair summary, the summary I've just given?

A. Yes.

Q. Then it tells us, right at the end of that paragraph, last sentence:

"Specimens E and F failed to completely seal the gaps."

So in respect of specimen E, that was with the 50−millimetre gap, the intumescent did not expand enough to fill that gap; is that right?

A. That's correct. These are purely R&D product development testing. We're trying out new intumescent technology to improve the product that's been supplied to the market. That's the purpose of these tests.

Q. Right, I see. So what was new in these tests compared with the ones that you did in 2007?

A. A new type of intumescent from a new intumescent supplier.

Q. Right, I see.

A. So it's −− yeah, it's product development.

Q. Yes, I understand.

Then if we go over to page 24 of this test

{SIL00000224/24}, we can see that exactly the same limitations and disclaimer are placed here by Warringtonfire as before:

"The results relate only to the behaviour of the specimens of the element of construction ... [and] are not intended to be the sole criteria for assessing the potential fire performance ...

"The results may not be applicable to the situations where the joint widths, orientations and supporting construction vary from those tested."

And then it's making clear in that final paragraph under "Limitations" that there was no movement, and therefore it can't be evaluating the performance where movement is induced in a building under actual fire conditions; yes?

A. Yes. Those are standard clauses in all test reports.

Q. Yes, I understand they're standard clauses, but they're pretty important clauses, aren't they, nonetheless?

A. They're standard clauses in the test reports. You were testing that single element, that single item, the −−

Q. Yes.

A. They'd need to be further assessed, as I've said previously, by a project fire engineer, who takes the fire resistance properties and fire reaction properties of all the elements being used in the construction to

come up with the correct products.
Q. Yes. Can we agree, though, that they're important limitations?
A. Yes.
Q. Yes.
Then in the fourth report, if we go to this now, this is from September 2011, if we look at {SIL00000211}. Under the title, we can see on the top right-hand side the title is, "The Fire Resistance Performance of Lamatherm Rainscreen Fire Barriers", and we can see below that that this is an assessment report again. We can see it's dated 20 September 2011.
Again, have you seen this report before and are you familiar with it?
A. Yes.
Q. Were you involved in commissioning this report?
A. Yes.
Q. Again, it's an assessment report, isn't it, not new testing but an analysis and extrapolation based on evidence presented to Exova?
A. Yes.
Q. If we go to page 3 {SIL00000211/3}, next to "Objective", what it's saying as the objective for this assessment report is that it:
"... considers the expected fire resistance

performance of Lamatherm Rainscreen Fire Barriers similar to those tested under the references ..."
And those are the two test reports, the first from 2007 and the second from 2010, that we've just been looking at; yes?
A. Yes.
Q. On page 4 {SIL00000211/4}, we can see the assumptions that this report is based on, and next to "Supporting construction", it says:
"It is assumed that the assemblies that the cavity fire barriers will be fitted to elements of construction that have at least 60 minutes fire resistance performance in accordance with BS 476: Part 21/22 ..."
So there it's making an assumption that the assemblies that they're going to be fitted to will have at least 60 minutes' fire resistance performance; yes?
A. Yes.
Q. Next to "Installation", two down from that, it says:
"It is assumed that the barriers will be installed by competent installers in a professional manner. The use of 3rd party certificated installers is recommended."
Do you see that?
A. Yes.
Q. It also says:

"It is also assumed that the gap between the end of the barrier and the element of construction is no greater than 25 mm."
Yes?
A. Yes.
Q. Then next to "Rainscreen", below that, it says this:
"This report does not consider the fire resistance performance of the rainscreen element or whether fire spread may occur as a consequence of collapse or failure of the rainscreen. The approving authority or regulator should decide whether it is necessary for the rainscreen to be 'fire rated', whether it is of an appropriate construction and whether separate test or assessment evidence is necessary."
Now, were you aware of that caveat at the time in this report?
A. Yes.
Q. If we can turn to page 7 of this document {SIL00000211/7}, in the top paragraph, we can see it says:
"It should be noted, that due to the performance criteria of the standard, the opening included at the start of the test must result in integrity and insulation failure, irrespective of how quickly the gap was closed, and the approving authority or regulator

should therefore consider the acceptability of this situation."
Now, we've seen two references there to the approving authority or regulator in this test assessment. Who did you understand to be the approving authority or regulator in this context?
A. On a project where product is supplied, there can be approval by the project fire engineer, could be approval by local building control, could be approval by other consultants. It's -- they're responsible for assessing every element. So if you had five different manufacturers of five different components, it's their responsibility to assess all five components to ensure that it meets with the fire strategy.
Q. Yes.
Was it Siderise's practice to bring these caveats to the attention of fire engineers or building control officers on projects that it was involved with?
A. We have, yes.
Q. When you say "We have", does that mean it was your practice to do that as a matter of course, that you would do that --
A. Whenever we were in discussions with a fire engineer, it's a case of, "This is the product test information, you need to satisfy yourselves that it's suitable for

the construction on site", because we're not in control of what it's being installed into.
Q. So does that mean you do routinely tell building control that the integrity and insulation failure would occur at the beginning of the test and that the test data only relates to what happens later?
A. They would have seen the test reports.
Q. When you say they would have seen the test reports ——
A. We share test reports to projects on a regular basis.
Q. Right, I see. Do you share test reports routinely on all projects ——
A. Yes.
Q. Or only when asked?
A. When asked or requested, our information, particularly since Grenfell, is readily available for download off our website.
Q. You say, "our information, particularly since Grenfell, is readily available for download off the website"; does it follow that some information wouldn't have been readily available prior to Grenfell?
A. All information was readily available. We were open in sharing our test evidence with any relevant body who would ask for the test evidence, quite often under confidentiality agreements.
Q. Yes, I see.

Then if we can go back to the report we were just looking at, in the next paragraph down from where I was reading on page 7 {SIL00000211/7}, it says this:
"Despite the effectiveness of the intumescent in this test, the insulation performance was worse than that of Specimen D in the test referenced [and then it's giving a reference to the February 2007 report] which achieved 54 minutes ..."
So it's saying the insulation performance was worse than that of specimen D.
A. Mm—hm.
Q. Then it goes on and says:
"Since the stone wool insulation is the same and the gap was closed more quickly in the test referenced [and then they're referring to the 2010 test], the earlier insulation failure must be due to other difference, the most likely cause being the splitting of the edge of the barrier by the pressure exerted by the intumescent strip."
Then it goes on:
"The use of a foil end cap in the test referenced [then it refers to the 2007 test] will have prevented or reduced this effect and therefore the inclusion of this detail with the proposed barrier would be expected to result in an insulation performance of at least

30 minutes in addition to the 60 minutes integrity performance already discussed."
Now, can you help us, what is a —— is it a foil end cap or a fell end cap?
A. Like I said, this test was —— the test was a product development test, and when we manufactured these barriers for this product development test, where you have a foil face on the top of the barrier and a foil face on the bottom of the barrier, in the previous test we had linked the two faces with foil tape over the end of the product to which the intumescent was applied. On this R&D test, we didn't use the same foil end closure to the seal, so we only had the foil on the top and the bottom of the product. What that resulted in is the intumescent, when it expands, produces hot gases, warm gases, and those gases, because stone wool can allow for gas to penetrate into it without any barrier, that's what happened, and we've proven on multiple occasions and we've actually had competitors copy our barriers, where you introduce a foil cap on the end to stop the intumescent effecting the insulation performance.
Q. I see. So does that mean that you now have —— is it a foil end cap ——
A. Yes.
Q. —— that was routinely provided as part of the barriers?

A. Yes. If you carried on through that report you were showing, it's got a drawing in there showing how the product was made up.
Q. Right, I see. Yes.
If we go back to those conclusions that we were just looking at, at the end of that page it says:
"Should the recommendations given in this report be followed, it can be concluded that Lamatherm Rainscreen Fire Barriers, as described in this report, should be capable of providing 60 minutes integrity and 30 minutes insulation performance (after closure of the ventilation gap has occurred), if subjected to a test utilising the general principles of BS 476: Part 20 ..."
Now, did Siderise agree with that conclusion, that the cavity barriers should be capable of achieving 60 minutes' integrity and 30 minutes' insulation performance?
A. Yes, and it's worth noting that is double the performance of the requirement for a cavity barrier as described in Approved Document B.
Q. Yes.
I want to put two pages on the screen side by side from the test reports, 2007 and 2010. If we could pull up the 2007 test report, this is {SIL00000290/4}, if we can have that, and on the other side of the page if we

can have the 2010 test report, {SIL00000224/3}. It's the last paragraph on both of those pages that I'm interested in.

So if we look first at the 2007 report on the left-hand side, we can see at the bottom paragraph of the page that the report set out that after six minutes of testing, we can see that specimen C has achieved 46 minutes' integrity and 32 minutes' insulation, and then it's got 54 minutes' integrity and insulation, so 54 for both, in specimen D; yes?

A. Yes.

Q. Then if we look on the right-hand side, in the 2010 test report, in that bottom paragraph, we can see that specimen G -- this is about halfway down, where it starts saying:

"... then results of 61 minutes integrity and 23 minutes insulation (Specimen G), 61 minutes integrity and 20 minutes insulation (Specimen H) and 61 minutes integrity and 27 minutes insulation (Specimen I) ..."

So those are the figures.

Now, we can see that for insulation the results were much better in the first test, and for integrity the results were much better in the second test; yes?

A. Yes.

Q. So is it right that in its assessment report from 2011

that we've just been looking at, Exova combined the favourable integrity results from the 2010 test report, the 61 minutes, with the favourable insulation results from the 2007 test report, 32 and 54 minutes, to conclude that Siderise open-state cavity barriers would achieve the 60/30 for integrity and insulation; yes?

A. Yes. As we previously discussed, the test on the right-hand side did not have the foil cap, the test on the left had the foil cap. That is the fundamental difference between the two. Also, the test on the right was using new high-performing intumescent we were trialling.

Q. But is it right that no specimen had actually achieved that result, 60/30, for both criteria? No single specimen had achieved that?

A. That's correct.

Q. Was this any concern to Siderise, that you hadn't got a single product that had got both 60/30, but you had to take results from two different tests to achieve that?

A. Like I've said, they were two totally different samples were tested. We have proven after this that the performance is even better than this again. These are R&D tests. This is learning. This is how products are developed. You test, you learn, you test, you learn, and you just don't stop learning. You continually test

and continually learn.

Q. I understand. So are you saying that you did re-test the products to see if you could get a single specimen to achieve 60/30?

A. At a latter date, yes.

Q. When was that later date?

A. I can't recollect from memory, but we have extensive tests on file that have been submitted to the Inquiry.

Q. Was that before or after the Grenfell fire?

A. Before.

Q. Right. What about before or after the product was supplied to Grenfell?

A. We've tested continually. We still continue to test.

Q. I see.

I want to ask you now some questions about testing to a standard known in the industry as TGD19.

If we can start by looking at paragraph 49 of Mr Swales' witness statement, this is at page 13 of his statement, {SIL00000306/13}. I just want to look at what he says in the first few lines of that paragraph 49. He says:

"The BS 476-20 and/or BS EN 1366-4 standards were not however deemed adequate by the Test Houses for the testing of open state cavity barriers. This was largely because the air gap requirements meant an automatic

failure of the test."

Just pausing there, when he says "were not ... deemed adequate by the Test Houses", do you know which test houses he is talking about there?

A. In the UK we have three -- or we did have three main test houses: we had Warringtonfire, BRE, and Chiltern Fire. Now we have two because Chiltern Fire are part of the Element Group which own Warrington.

Q. Do you know whether it was the view of the BRE and Chiltern Fire, as well as Exova, that --

A. That comment has come from -- at this time, I was sitting on ASFP technical committee working groups, and the working groups are made up of laboratories consultants, product manufacturers consultants, and suchlike. There would have been representation from the BRE there, there would have been representation from Warrington, representation from UL, although they don't have any laboratories in the UK, and representation from Chiltern at the time.

Q. Right. When you say representation from UL, who are you talking about there?

A. Universal Laboratories, an American company. They have a certification / fire engineering division in the UK, although they don't have any test facilities at present.

Q. I see. So is it your understanding that all of the test

houses didn't consider the British Standards to be adequate for the testing of open−state cavity barriers?
A. Yes.
Q. Then Mr Swales goes on to say, if we pick it up three lines down from where we stopped before:
"Accordingly, in 2014, the Association for Specialist Fire Protection (ASFP) developed and launched a new test regime; namely Technical Guidance Document (TGD), specifically for the testing of open state cavity barriers. This is now known as ASFP Guidance: 'Open State' Cavity Barrier used in External Envelope or Fabric of Buildings, utilising principles of EN 1363−1 (TGD 19)."
Now, can I take it that you're familiar with that technical guidance document, TGD19?
A. Yes.
Q. We will go to it in a moment.
Mr Swales goes on to say, if we look at paragraph 50 on that same page, at the bottom:
"Siderise worked with the ASFP to develop TGD 19 and tested its cavity barriers to Draft Standard ASFP TG 3 N64: (Fourth draft Feb 2013), to the temperature and pressure conditions of BS EN 1363−1: 2012 on 15th May 2013 ..."
And then he gives reference to an Exova report.

Now, were you personally involved in developing TGD19?
A. As part of the technical working group for ASFP, yes.
Q. Yes.
A. Along with 11 other members.
Q. And I think that standard that I just read out, BS EN 1363−1:2012, that's the European equivalent of BS 476−20 setting out the general requirements for fire resistance tests; yes?
A. It's a higher standard than BS 476−20.
Q. I see.
A. But you −− if you have a product that is tested to BS 476, you cannot assume it will pass a BS EN 1363 test.
Q. I see.
A. If you've got a product that's tested to BS EN 1366 or similar, then it should pass the BS 476, due to how the furnace temperature is recorded and controlled. In BS 476 it's a simple bare wire; in EN standards there is a thermocouple in there, but it's a 100−millimetre square steel plate with a 10−millimetre calcium silicate board, and sandwiched between the steel plate and the calcium silicate board is the bare wire thermocouple. So the amount of energy needed in the first phase of the start of an EN test is 20 to 25% more than required in

a BS 476 test.
Q. Right.
A. That's a considerable thermal shock increase over BS 476.
Q. I understand.
Now, if we go to paragraph 39 of your witness statement, this is on page 10 of your statement {SIL00000298/10}, you explain there for us some of the difficulties in testing open−state cavity barriers. What you say in the beginning of that paragraph is:
" Difficulties in testing open state cavity barriers is not limited to the UK. European Testing Standards have also struggled as I set out below ..."
I wanted to look at what you say at subparagraph (c). If we look at that, you say:
"In October 2008, the European Organisation for Technical Assessment (EOTA) published a technical report (TR31) entitled 'fire resistance tests for cavity barriers'. As I understand it, TR31 was written because there was no relevant standard for testing cavity barriers. However TR31 excludes open state cavity barriers. It states at section 1: 'This method is not applicable to horizontal cavity barriers in e.g. rain screen cladding because it is difficult if not impossible to model the correct thermal exposure and

boundary conditions in a fire resistance type test. Such tests should be considered as part of a facades test.'"
Now, is that the view of Siderise, that it would be difficult, if not impossible, to model the correct thermal exposure and boundary conditions?
A. That there is the opinion of the EOTA committee that wrote the TR31. Members of the TR31 committee were also members of the ASFP, who were involved in writing TGD19. The difficulty being −− goes back to the fundamental principles of having an open gap on a furnace: how do you measure the temperature above that gap in order to keep the pressure and the temperature in the furnace balanced to allow it to follow the time−temperature curve?
Q. Yes.
A. That is the issue.
In terms of, "Such tests should be considered as part of a facades test", an EN test to −− using 1363−1, up to around five minutes it gets up to close to 600, 650 degrees, then to half an hour it gets up to 850 degrees, it's a logarithmic time temperature curve.
On a full façade test to 8414, the failure criterion at level 2, which is where it's measured at, does not exceed 600 degrees. So therefore an 8414 test failure

criteria at level 2 is less than what a furnace gets to in the first five minutes. So therefore if you test a cavity barrier on a furnace condition, the cavity barrier will not have any detrimental effect to a full-scale test of a façade to 8414.
Q. I follow that. My question was whether Siderise agreed with the position of the EOTA as expressed in that paragraph, that it would be difficult, if not impossible, to model the correct thermal exposure and boundary conditions in a fire resistance type test?
A. It's not just Siderise's opinion, it was the ASFP's opinion that you could model and get the furnace balanced.
Q. I think the short answer to my question is: yes, that was Siderise's opinion; yes?
A. Siderise's opinion as in we agree with the EOTA statement or not?
Q. All right. Well, please clarify ——
A. I don't agree with it. I don't agree with it.
Q. —— did Siderise agree with that opinion or not?
A. No.
Q. It didn't?
A. No.
Q. And it ——
A. A furnace test is harder than a façade test to 8414,

just purely to temperature exposure.
Q. Let's just go back to that bit of your statement {SIL00000298/10}. What's being said there, bottom of the page:
"In October 2008, the European Organisation for Technical Assessment (EOTA) published a technical report (TR31) entitled ..."
And there is the report, and then we go back over {SIL00000298/11}:
"As I understand it, TR31 was written because there was no relevant standard for testing cavity barriers. However TR31 excludes open state cavity barriers. It states at section 1: 'This method is not applicable to horizontal cavity barriers in e.g. rain screen cladding because it is difficult if not impossible to model the correct thermal exposure and boundary conditions in a fire resistance type test. Such tests should be considered as part of a facades test.'"
So taking that in stages, did Siderise agree that it was difficult, if not impossible, to model the correct thermal exposure and boundary conditions in a fire resistance type test?
A. No.
Q. And why did Siderise take a different view?
A. This was the view of a European committee who were not

aware of tests that would be undertaken in the UK in terms of trying to develop products. Once intumescent reacts and closes the gap, then in effect that is a full seal, then the full furnace conditions can be controlled.
Q. I see. So Siderise thought it would be possible ——
A. Yes.
Q. —— if, what, you ignore the first few minutes of the test, to model the correct thermal exposure and boundary conditions in a fire resistance test?
A. You don't ignore the —— (inaudible) is recorded from time zero, so it's not ignored, because if it was ignored then they wouldn't be putting 0/0, on the insulation/integrity on the test report. It's —— we were trying to come up with a way of the ASFP —— and, like I said, members of the ASFP actually were involved with TR31 —— to introduce additional thermocouples that actually measured the temperature in the 25-millimetre open gap.
Q. I see.
A. And that then assists the control of the furnace and running of the test.
Q. What about the part there, "Such tests should be considered as part of a facades test"? Did Siderise agree with that statement?

A. To an extent, yes, although the failure criterion on an 8414 test is never the cavity barrier, because the cavity barriers used in 8414 tests have been tested to a furnace condition which have temperatures that are higher than the failure criteria of an 8414 test, then the cavity barriers, the majority —— well, all the time form —— function as a cavity barrier. In all 8414 tests that fail, it's a combination of either the panel is on fire or —— with a fire within the panel, or there's thermal insulation and a panel fire. The cavity barriers function to the point of the panel failure.
Q. Right. Yes, I mean, I think we can agree, can we, that an 8414 test is not set up to measure the performance of the cavity barrier, is it?
A. That's correct.
Q. It's a system test.
A. It's a system test.
Q. And the data that you get from an 8414 test is very different from the data that you get from a fire resistance test; that's a reaction to fire test, isn't it?
A. They're two totally different tests. However, you need cavity barriers in an 8414 test in order for an 8414 test to function.

Q. Well ——
A. Even though they're not measured, they need to be part of the test in order for the test to function.
Q. Yes, I understand that, but going back to the European Organisation for Technical Assessment, what did you understand them to mean when they said, "Such tests should be considered as part of a facades test"? Forget 8414 for a moment, what did you understand them to mean by that?
A. That you can't just take a furnace test for a product, you need the furnace test and possibly a full façade test, although through EN standards there are no façade tests yet, there still aren't.
Q. I understand that, but I think you've just agreed that what they're saying is you can't just take a furnace test for a product, you need the furnace test and possibly a full façade test; yes?
A. But then the failure criteria of a façade test is nowhere near the level of performance of a furnace test, so therefore a cavity barrier that passes a furnace test it can be safely assumed will not be detrimental to the performance of a full system test.
Q. Yes, I understand that, if you think of them referring to a façades test as being an 8414 test. Is that what you understood them to mean? Did you ever clarify that?

A. I didn't clarify that, no.
Q. Right.
Now, if we go to paragraph 40 of your witness statement now, you address TGD19, this new test.
A. New guidance, rather than a test.
Q. It's on page 10 {SIL00000298/10}. Yes. Sorry, well, new guidance. You say this:
"Therefore the above—mentioned test standards do not address the requirements for testing open state cavity barriers. Accordingly, the ASFP, together with its Technical Committee of UKAS Laboratories, Certification Engineers, Manufacturers, CEN and BSI members authored a guidance document TGD19 that specifically addressed small scale furnace testing of Open State Cavity Barriers. The usual method of undertaking a test in accordance with TGD19 is again to undertake the test of the barrier by supporting it between two concrete elements. Until TGD 19 was published there was no test directly applicable and appropriate to Open State Cavity Barriers."
Now, in terms of that group that authorised TGD19, you talk about the fact it included UKAS laboratories, certification engineers, manufacturers, et cetera. Which manufacturers were part of that group?
A. Siderise, Hilti, Rockwool, Firetherm, Firestopit,

Promat.
Q. Yes.
Can you explain exactly what type of small—scale furnace testing was selected for open—state cavity barriers?
A. When we say small scale, we are still talking a significant, major test. It's small scale compared to a 10—metre high 8414 test rig. It's still a —— at least a 1—metre by 2—metre cube gas furnace that gets up to temperatures of 850 degrees over 30 minutes, 1,000, 1,100 degrees over two hours. It's still —— even though it says small scale, they're still major tests.
Q. I see.
Can you explain why that form of testing was considered appropriate by this group?
A. Because it gave clarification to the performance of the cavity barrier in isolation. So if you've got manufacturers A, B, C, D, E, who wrote every test to the same principles on there, and A, B, C, D, E, you all get 30 minutes on there, then it gives more clarity to the market as to the performance of those barriers, because they're all following the same standard, the same guidance.
Q. I see, yes.
You say in that part of your statement —— I just

read it out —— that the usual method of undertaking a test in accordance with TGD19 is again to undertake the test of the barrier by supporting it between two concrete elements; yes?
A. Yes.
Q. You describe that as the usual method; how many methods were there of undertaking a test in accordance with TGD19 when it came to the barrier's supporting elements?
A. You had concrete to concrete in there, and also you could erect a timber substrate protected with cement particle boards, which the barrier would be fixed to, but the intumescent would still exfoliate to concrete.
Q. I see. Yes.
Did Siderise ever test its cavity barriers to a test method which wasn't between two concrete elements?
A. Not on the furnace, no.
Q. No.
Let's turn to another Exova report now, this time from July 2013, {SIL00000212}. We can see from the title on the right—hand side that the heading is:
"The Fire Resistance Performance Of Four Specimens Of Floor Mounted 'Open—State' Cavity Barriers, Tested Utilising The General Principles Of Draft Standard ASFP TG 3 N64: (Fourth draft Feb 2013)."
Now, that was the draft standard that was the

precursor to TGD19; yes?
A. Yes, that's correct.
Q. Yes, and we can see from the bottom right-hand side of this first page that the date is 23 July 2013.
A. Yes.
Q. If we can turn on to page 6 {SIL00000212/6}, we can see next to the "Instruction to Test" in the middle that you were one of the witnesses to this test, you're listed there with Mr Carrick and Mr Szpak; yes?
A. Yes.
Q. Can you remember attending this test? Do you have a memory of it?
A. Yes, I do.
Q. If we turn to page 2 {SIL00000212/2}, we can see the description of the test set-up. Under the third heading down in the blue, "Summary of the Tested Specimen", we can see that, from the second paragraph down:
"The section of the floor had overall dimensions of [and it gives the dimensions] ... and was made up of autoclaved aerated concrete lintels arranged to provide 300 mm wide by 1200 mm long and one 25 mm wide by 1200 mm long apertures."
Yes.
A. Yes.
Q. So, again, we have rectangular apertures cut into

concrete lintels; yes?
A. Yes. The precedent for testing between concrete to concrete elements started a long time before I joined the industry. BS 476-20 was published in 1987, so from 1987 onwards, to isolate elements that you want to test, you tested between concrete elements. So the concrete -- so the weakness is your product, not the concrete.
Q. Right.
Just to be clear, here we have three 300-millimetre wide openings and one 25-millimetre wide opening; is that right?
A. Yes.
Q. If we turn briefly to your witness statement at paragraph 10 -- we will come back to this in a moment -- {SIL00000298/3}, you tell us at paragraph 10 what the types of cavity barriers were that were supplied to Grenfell Tower. We can see you have got reference there in the bullet points to RH25G-090/30/264-325, and then a slightly different barrier below.
Just to explain how this product is named, the RH at the beginning means rainscreen horizontal; yes?
A. Yes.
Q. And the last two bullet points, it's rainscreen vertical; yes?

A. Yes.
Q. So RH or RV tells you whether it's horizontal or vertical.
The 25 for the horizontal, that's the 25-millimetre air gap; yes?
A. Yes.
Q. And then G stands for galvanised; is that right?
A. Correct.
Q. And then you've got the minutes that it's rated to, so for integrity and insulation, 90/30 we can see at the top; do you see that?
A. Yes.
Q. Then the final numbers at the end, they represent the void size, the overall void size that the barrier's been used in; yes?
A. Yes.
Q. So you supplied barriers at Grenfell Tower, horizontal barriers, for a void size of between 264 and 325 millimetres, and also between 326 and 425 millimetres; yes?
A. Yes.
Q. Yes. We're going to talk about void size a little bit later, but it's worth noting those at the moment, they go up to 425.
Now, if we go back to the test report we were

looking at, {SIL00000212/2}, we can see in the third paragraph down in that part of the page, beginning, "Specimens A to C", basically we get various dimensions of cavity barrier given in this section, and specimen A -- they're all foil-faced rock fibre lamella rainscreen cavity barrier, and then they give the reference:
"... which had a nominal density of 75 kg/m3 and overall dimensions of 275 mm wide by 1200 mm long by 120 mm thick (Specimen A), 90 mm thick (Specimen B), and 75 mm thick (Specimen C)."
Mr Swales has confirmed at paragraph 51 of his witness statement {SIL00000306/14} that the two types of horizontal cavity barrier that were used on cavity barrier were specimens A and C. Does that sound right?
A. Yes.
Q. Yes. So A was 120 millimetres thick and specimen C, 75 millimetres thick.
Now, if we turn on to page 31 of the test report {SIL00000212/31}, I want to look at the section headed "Integrity" first at the top of the page. It says there:
"It is required that the specimen retains its separating function, without either causing ignition of

a cotton pad when applied as specified in BS EN 1363−1: 2012, or resulting in sustained flaming on the unexposed surface. These requirements were satisfied for the periods shown below:

"Technical failure of integrity of Specimens A to D would deem to have occurred at the start of this test due to the open void required for such seal types. However, following expansion of the intumescent layer, full closure of each cavity was deemed to occur between 1 minute and 4 minutes 38 seconds."

Just on that, can you help us with why the intumescent layer was deemed to have closed the cavity at these time periods?

A. You would need to −− or I would need to see the thermocouple, suspended thermocouple data for each of the cavities, which are appendixed to this report. In there, in the ASFP TGD19, there is a requirement that, whilst it's accepted that the thermocouples that are suspended may peak over the 180 degrees in the first initial lighting of the furnace, but they drop back very rapidly. From the thermocouple data, you need to establish not only when the insulation criteria 's re−established, but when the integrity criteria is re−established, because as soon as that drops below 180 degrees then the integrity is there.

Q. I see. So what you're saying is the test assumes that as soon as it drops below 180 degrees, then it's assumed that the intumescent layer has sealed the cavity?

A. Yes.

Q. And that was deemed to have occurred between 1 minute and 4 minutes 38 seconds in this testing.

A. Yes.

Q. Yes.

Looking at the two tables on this page, so looking at this table for integrity first, we can see that −− so we're concentrating on specimens A and C. These are the barriers that were used at Grenfell Tower. Specimen A achieved 136 minutes' integrity, and specimen C, 116 minutes' integrity.

Then if we look down to the table below, which deals with insulation, we can see that specimen A has achieved 81 minutes' insulation and specimen C, 57 minutes' insulation. Is that right?

A. Yes.

Q. If we turn to page 32 {SIL00000212/32}, under "Ongoing Implications", we see the "Limitations" section. Again, we see very similar −− in fact identical −− limitations, to those that we saw in the earlier Warringtonfire test reports; yes?

A. Yes.

Q. So:

"The results relate only to the behaviour of the test specimens ... under the particular conditions of this test. They are not intended to be the sole criteria for assessing the potential fire performance of this element in use, nor do they reflect the actual behaviour in fires.

"The results may not be applicable to situations where joint widths, depths, orientations and supporting construction vary ..."

And it also makes the point that there was no movement induced, so it's not telling you about how they would perform where movement is induced in a building under actual fire conditions.

Then if we go to page 34 {SIL00000212/34}, we can see there is a heading on this test report headed, "Field of Direct Application", and it says that:

"The results of the fire test are directly applicable to similar constructions where one or more of the changes listed below are made:

"A) increase in the thickness of the cavity barrier;

"B) Decrease in distances of fixing centres.

"C) Decrease in width (front to back) of the air gap ..."

And then it says:

"D) Void size can be interpolated between minimum and maximum voids.

"E) If a single void size is tested, the result is only applicable to that void size."

Do you see that at E?

A. Yes.

Q. Again, did you note and understand those limitations of this test reporting at the time?

A. Yes, because that is a direct field of application applicable to that test report only.

Q. Did you make your colleagues in the sales and marketing team at Siderise aware that the results of these tests were only applicable in those circumstances?

A. They would have been aware, yes.

Q. When you say they would have been aware, what makes you say that?

A. Well, the test reports would have been reviewed by the Siderise team.

Q. Including all of those in the marketing team?

A. Yes.

Q. Directly underneath that, if we go back to that page, under the heading "Supporting construction", it says:

"The test results obtained with autoclaved aerated concrete standard supporting constructions apply to concrete, block work and masonry separating elements of

a thickness and density equal to or greater than that tested."

Do you see that?

A. Yes.

Q. So the test results are limited to concrete, blockwork and masonry front and back; yes?

A. For -- if you were to test that product on a furnace, yes.

Q. Yes. Just to be absolutely clear, this test did not extend to considering the use of open-state cavity barriers in a rainscreen system, did it, ie where the wall in front of the barrier is not concrete or blockwork but, for example, a metal or terracotta panel?

A. No, it does not, because the test standard is to confirm the performance of the cavity barrier in isolation from any other construction elements. It's the responsibility of the fire engineer on the project to take the test data from all other products to come up with the overall fire performance. And that's applicable to any passive fire protection, not just cavity barriers.

Q. Yes, thank you.

Now, returning to Mr Swales' witness statement at paragraph 50 on page 13, that's {SIL00000306/13}. When discussing this draft standard -- we looked at this part

earlier -- he says that it was tested to the temperature and pressure conditions of BS EN 1363-1. Can you just explain to us precisely how that testing used the temperature and pressure conditions of that European Standard?

A. Okay. BS 476-20 and BS EN 1363-1, both those documents utilise what they call the cellulosic time-temperature curve. When you're dealing with fire testing, there is three major time-temperature curves. There's a slow burn time-temperature curve which maxes out at around 650 degrees, then there's a cellulosic time-temperature curve, and then you have the hydrocarbon temperature curve, which is extreme, for oil refineries, oil rigs, et cetera.

So the cellulosic curve also is known as the ISO 834 time-temperature curve. So both BS 476-20 and EN 1363-1 use ISO 834 time-temperature curve.

Q. Yes.

A. That's a logarithmic equation. It could be looked at in any of the standards, but it's basically temperature is equal to a log of time plus temperature rise, and it plots out and controls the furnace and the graph.

In terms of pressure conditions, both 476 regimes in all guises for fire resistance tests and EN 1363-1, you have to establish a 20 pascals plus or minus 3 pascals

100 millimetres below the seal that is being tested. Now, that gives you a positive pressure on the furnace.

Q. I understand. So I think what you're saying is you have used the time-pressure curve from that European Standard in this test; yes?

A. Yes.

Q. But only once the seal has activated?

A. No, the time-temperature curve is used from time zero.

Q. Right, I see. And then --

A. As soon as the furnace is turned on, the time-temperature curve is worked.

Q. Yes. Then the pressure requirement, the positive pressure on the furnace that you were explaining, is that used throughout or just for part of the test?

A. No, in EN standards, and in BS standards, in the first five minutes of any test, the laboratory has to establish temperature control to the curve within agreed tolerances and pressure control within agreed tolerances. Now, in the first five minutes, they have to get 20 pascals plus or minus 5, then after the five minutes it drops to 20 pascals plus or minus 3. So that is measured from time zero.

Q. Right, I see. So it's using the temperature curve requirements and the pressure standards from that European Standard?

A. Yes.

Q. Yes.

Then Mr Swales goes on and he says -- so he's explaining that that was a draft standard, and we saw some testing to that just now, and then he says this, picking it up in the fourth line:

"I confirm for the avoidance of doubt that although it is called a 'draft standard', there are very few differences to the actual test to what was later termed 'TGD 19'. The only significant difference is to the standard thermocouple arrangements."

Can you explain what that means? What were the differences in the final standard on thermocouple arrangements?

A. Okay. In the draft there were suspended thermocouples above the air gap, nominally at the centre of the seal and at a third either side. On the cavity barrier itself, there would be similar thermocouples affixed to the top surface of that, and where you got a joint in the seal there'd be a thermocouple affixed adjacent to the joint to measure the performance of the joint.

In the very early draft, from memory, we didn't have any further thermocouples on the insulation above the cavity barrier. However, on our test, and it went forward with the final draft of TGD19, where you're

using thermal insulation above and below a cavity barrier, the thermal insulation directly above the cavity barrier also had thermocouples affixed to it ——

Q. I see.

A. —— to measure the performance of that, so that if at any point the cavity barrier started to break down where it abutted the concrete on the back wall —— so not where the intumescent is, on the opposite end to the seal —— there could have been a potential route for fire to pass up the back of there. So by having the thermocouple on the insulation, you could measure that also. And it's ——

Q. I see. So I think you're saying the final test standard had an additional location for thermocouples. You had already got a thermocouple in the gap, and you've explained what happens about how you treat the temperature that that thermocouple detects; you've got a thermocouple on top of the barrier on the unexposed side; and then the final version of the test also included the thermocouple in the insulation itself?

A. Yeah, in reality you would have somewhere just on the specimen itself to —— insulation, cavity barrier, air gap, around ten thermocouples.

Q. Right.

A. You would also have thermocouples on the concrete measuring the performance of the concrete as well.

Q. Can we turn to another test report. This is a Chiltern International/BM Trada report, {SIL00000288}, this is from 24 April 2014.

So we can see from the top in the green box this is written by Chiltern International Fire Ltd. It's dated, we can see from the test date towards the bottom of that writing, 24 April 2014, and it's called:

"A fire resistance test performed three horizontal ventilated cavity fire barrier seals within a concrete supporting construction."

A. Yes.

Q. We can see that below that it says:

"Test conducted in accordance with the test standard:

"ASFP 'Open State' Cavity Barrier used in the external envelope or fabric of buildings, and utilising the principles of BSEN 1363—1:2012."

So just for clarity, was that the TGD19 test?

A. Yes, it was.

Q. Yes.

Then if we turn to page 4 {SIL00000288/4}, we can see under the description in section 3, at the bottom there, "Description of supporting construction", it says

there:

"The supporting construction comprised 150mm thick lightweight aerated reinforced slabs, built on top of a 1500mm x 1500mm furnace. The exposed area of the supporting construction included 3 No. apertures 300mm wide x 600mm deep x 1300mm long, exposed to the fire, to accept the cavity fire barrier seals."

So, again, a familiar construction in terms of the test apparatus; yes?

A. Yes, it's the —— it's a standard construction offered by all test labs right across the world.

Q. Yes, and the barriers are being tested between aerated reinforced concrete slabs; yes?

A. Yes.

Q. And they were constructed to provide 300—millimetre voids into which the barriers were placed; yes?

A. Yes.

Q. Then if we go to page 5 {SIL00000288/5} under section 4.1, at the bottom of that page, we can see that cavity barrier A —— we only need to look at the end of this, we don't need all the detail —— that had a free air gap of the cavity 50 millimetres wide; yes? Can you see the very final sentence, "The free air gap of the cavity was 50mm wide"?

A. Yes.

Q. At page 6 {SIL00000288/6}, "Cavity barrier B", we can see at the end of the text on cavity barrier B that that had a free air gap of the cavity of 44 millimetres wide.

Then at page 7 {SIL00000288/7}, we can see that cavity barrier C also had an air gap of 50 millimetres wide.

A. Yes.

Q. Is that correct?

A. Yes.

Q. So in April 2014 Siderise were testing its cavity barriers to this standard with air gaps of up to 50 millimetres; yes?

A. Yes.

Q. Then if we go to page 18 {SIL00000288/18}, this is where we get a section called "Expression of results", and then if we go to the first paragraph of that, it says:

"Technical failure of integrity and insulation would deem to have occurred at the start of the test due to the open void required for such seal types. However, following the rapid expansion of the intumescent layer, the gap becomes fully sealed and the product achieved the integrity stated below.

"Due to the nature of ventilated/open state cavity barrier seals, an initial spike in temperature is recorded by the thermocouples positioned in the air gap

adjacent to the seal as it is open to the furnace. The temperature is rapidly reduced once the seals react and fill the whole cavity. The 'air gap insulation' figure quoted in the results disregards this initial spike in temperature provided the temperature returns to below 180 degree C rise within the first five minutes of the test."

Do you see that?

A. Yes.

Q. So that is quite a good description, isn't it, of how this test is attempting to take temperature readings, given the initial spike in temperature that's experienced; yes?

A. Yes, but -- and also this test, as in the previous pages, you will see it has PIR combustible insulation above and below the seals, so that in the first five -- well, at any point during the test, should the combustible insulation above the cavity barrier catch fire, or increase its temperature above the 180, then it's a fail. So it also measures that element.

Q. Yes, I understand.

In the table, then, we can see the results for integrity and insulation. Just focusing on the right for the moment, under "Insulation", it says, "Insulation (fixed thermocouples)", and then "'Air gap' Insulation

(Suspended thermocouples)".

Can you just accept us as to why we're seeing different figures there?

A. Okay, this has been clarified further in TGD19. The air gap insulation suspended thermocouples are only there to measure the closure of the intumescent. Intumescent by its nature expands, and it expands multidirectional. So these thermocouples are suspended above the cavity. When, during the test, the intumescent continues to expand and does -- can engulf the thermocouples.

Q. Right.

A. So --

Q. So in terms of what we're looking at, the insulation figure that you would take and you would take forward from this, are we looking at the one in the left-hand column or the right-hand column?

A. The fixed thermocouples.

Q. Yes. So barrier A would have 39 minutes' insulation, B 46, and C 53; yes?

A. That's correct.

Q. I see. So on the right we're just seeing some extra measurements that are taken through that air gap insulation process?

A. Exactly that, and they're there to assist the assessment by further fire engineers or project consultants on

suitability of products.

Q. Yes.

Then on the left we've got integrity. We can see in the middle gap gauge is not applicable, that's the poker stick which would have previously given a fail, so that's held not applicable.

A. And --

Q. And then we've got cotton pad and continuous flaming.

Again, can you help us, which is the integrity figure that you would use based on these tests?

A. The lesser figure of either.

Q. Right, I see. So if either a cotton pad were ignited or there was continuous flaming, whichever happens first, that's your integrity figure; yes?

A. Yes.

Q. I see, yes.

Then underneath that table we can see we get some helpful data about the time that was taken for the ventilated cavity to be sealed; yes?

A. Yes.

Q. So we can see with the first asterisk it's refer to cavity barrier A, it was sealed at 2 minutes 22 seconds; cavity barrier B, it says the failure criteria was not achieved upon termination of the test at 62 minutes; yes?

A. Yes.

Q. And then we've got a --

A. Hash tag.

Q. -- hash symbol for continuous flaming for cavity barrier B. It says:

"Failure after ventilated cavity was sealed at 1 minute 44 seconds."

So what's that telling us?

A. Basically if you look at cavity A, it was a 50 millimetres gap, it closed it 2 minutes 22 seconds. In cavity B it's a 44-millimetre gap, so by reducing it by 6 millimetres, you're increasing the performance of -- the rapidness for the intumescent seal.

Q. Yes, and cavity barrier C was also a 50-millimetre cavity, wasn't it?

A. Yes.

Q. And that sealed at 3 minutes 19 seconds; yes?

A. Yes.

Q. Yes.

A. And again, these are R&D tests to establish product development.

MS GRANGE: Yes.

Mr Chairman, I think that's probably an appropriate moment. I'm still kind of midway through this topic, but I'm about to refer to some other testing.

SIR MARTIN MOORE-BICK: If that suits you, we'll stop there.
MS GRANGE: Yes, it does, thank you.
SIR MARTIN MOORE-BICK: All right.
Mr Mort, we're going to have a break now so we can all get some lunch.
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: We will come back at 2 o'clock, please, and I have to remind you, please, not to talk to anyone about your evidence or anything to do with it over the break. All right?
THE WITNESS: Okay, understood.
SIR MARTIN MOORE-BICK: Thank you very much. See you at 2 o'clock, then.
THE WITNESS: Thank you.
SIR MARTIN MOORE-BICK: Thank you.
(1.00 pm)
(The short adjournment)
(2.00 pm)
SIR MARTIN MOORE-BICK: Welcome back, everyone. We are now ready to continue taking evidence from Mr Mort. So, I'm going to just check that Mr Mort is there and he's able to see me and hear me clearly.
Are you there, Mr Mort?
THE WITNESS: Yes, I am.
SIR MARTIN MOORE-BICK: Good. Hello, welcome back. Thank

you very much. Are you ready to carry on?
THE WITNESS: Yes, I am.
SIR MARTIN MOORE-BICK: Right. In that case, I'll invite Ms Grange to put some more questions to you.
When you're ready, Ms Grange.
MS GRANGE: Yes, thank you, Mr Chairman.
Yes, good afternoon, Mr Mort.
Just carrying on now with the subject of testing and whether or not there was other testing being done by Siderise at this time, can we just look at this point at Mr Barnaby Carrick's witness statement, this is {SIL00000295/2}, and I want to look at paragraph 5(c) in his witness statement.
Now, Mr Barnaby Carrick, he was a technical applications engineer for Siderise at the time of the Grenfell refurbishment; is that right?
A. Yes.
Q. We can see in paragraph 5 here of his witness statement he's explaining what his duties and responsibilities were, and at subparagraph (c) he says:
"To attend test houses for product testing. From August 2012 to January 2016, I attended approximately 4 product tests alongside Mr Mort."
Now, in terms of the Siderise cavity barriers that were used on Grenfell Tower, we can only identify the

tests that we've looked at already today in that period, ie two tests, one in July 2013 and one in April 2014.
Can you help us as to what the four tests were that -- well, he says approximately four tests that he attended alongside you in that period. Can you help us as to what he might be referring to?
A. They would have been other furnace tests for other product lines. I couldn't specifically say what tests, but they would have been tests to EN 1366-4.
Q. Right. That's the linear joint seals test?
A. Yes.
Q. Yes, I see. So there would have been other Siderise products. Likely to be horizontal or vertical cavity barriers or could they have been firestops?
A. They could have been firestops, they could have been cavity barriers, we continually test products.
Q. Yes, I see.
I now want to turn to the TGD19 standard itself. This is at {SIL00001540}. We can see from this first page that this is the July 2014 version, so that's the first version that was developed; is that correct?
A. Yes.
Q. Its title is "Fire Resistance Test for 'Open-State' Cavity Barriers used in the external envelope or fabric of buildings."

If we can go to page 3 of this document {SIL00001540/3}, I want to look at the first two paragraphs in the foreword at the top. It says here:
"This test method has been drafted by, a sub-group of ASFP Task Group 3 (Fire stopping) which in turn reports to the ASFP Technical Committee. It has been drafted in response to a need identified by the membership of TG3 for a test method to evaluate the fire resistance of 'open-state' cavity barriers, such as those used in rain-screen cladding systems. The method is also intended to assist certification bodies to develop technical schedules allowing for the third party product certification of 'open-state' cavity barriers."
That's what it says there.
In the second paragraph it goes on:
"This test method is only intended to evaluate the fire resistance performance of the open-state cavity barrier against fire exposure from below, in terms of the time from ignition necessary to effectively seal the cavity, and to maintain that seal. To evaluate the performance of open state cavity barriers within a complete cladding system, a large scale test, such as BS 8414 'Fire performance of external cladding systems' should be considered."
Then it also says that:

"A European Standard for cavity barriers is also being developed including 'open−state' barriers."

We see that there.

A. Yes.

Q. We've discussed this before, haven't we, and although we've got reference there to the BS 8414 test, it's right that in that test the performance of the cavity barriers is not specifically measured, is it?

A. That's correct.

Q. Yes. That's a large−scale reaction to fire test, and what it measures is in terms of the extent of flame spread across the façade, and that's not the same as what's measured in the smaller scale fire resistance tests, is it?

A. That's correct.

Q. Can you just explain to us −− you were involved in the committee who drafted this TGD19 standard; yes?

A. Yes.

Q. Can you just explain the reason why it's stated there that, to evaluate the performance of open−state cavity barriers within a complete cladding system, a large−scale test such as 8414 should be considered?

A. Well, as discussed earlier, you can prove the performance of a cavity barrier on a furnace test, but that furnace test does not prove the overall performance

of the complete building envelope system, and the only way to prove the complete building envelope system is to carry out an 8414 test of many different components from many different manufacturers.

Q. Yes. But can we agree that even if you pass a successful 8414 test, that doesn't necessarily tell you everything you need to know about the performance of the cavity barriers, for example in terms of how they contain smoke spread or radiant heat behind the scenes?

A. The performance criteria you're looking at there, integrity and insulation criteria as set from a fire resistance test, the cavity barrier in an 8414 test is needed in order for the test to function. If you don't have cavity barriers then the test would fail within the first two to three minutes through hidden flame spread within the cavity.

Q. Yes, I follow that, but I think what I'm putting to you is that even if you had a successful 8414 test, that doesn't necessarily tell you everything you need to know about the performance of the cavity barrier, does it?

A. No, that's correct.

Q. Yes.

Now, if we look back at TGD19 itself, and as we've already explored, the usual way of testing in accordance with that standard is to undertake the test between two

concrete elements, and we can see that if we look at pages −− this is set out in pages 6 to 11, but I want to look, for example, at page 6 of this test standard {SIL00001540/6}.

We can see at the top, here is a cross−section of a block, and there we can see that that's a test for the barrier simply between non−combustible cladding, isn't it, or −− well, it's actually between concrete blocks; yes?

A. Yes.

Q. You mentioned earlier that one of the things TGD19 does is also allow you to test with insulation either side of the cavity barrier. Let's look at page 10 {SIL00001540/10}, at the bottom of the page. There we've got, for example, uninterrupted insulation; yes?

A. Yes.

Q. And I believe that there's also diagrams, I think somewhere else, of interrupted insulation in the test; yes?

A. Yes.

Q. Yes.

Now, we have been through the tests that Siderise carried out. They were all carried out between two concrete blocks, weren't they? They didn't incorporate other materials such as timber as you referred to

earlier?

A. No.

Q. Just to be absolutely clear, that build−up is not representative of the products being used in a rainscreen application, is it?

A. It's purely to test the performance of the product.

Q. Yes. And TGD19 made expressly clear that it couldn't be used to assess the performance of a whole cladding system, could it?

A. That's correct.

Q. Can we agree that if horizontal open−state cavity barriers are used with ACM rainscreen cladding panels, the ACM panels may distort due to heat and thus compromise the effectiveness of the cavity barriers?

A. There is potential for that, yes.

Q. Just to illustrate that point, I just want to look at some extracts from Dr Lane's Phase 1 report again. If we can go to {BLAS0000010/20}, and I want to look at figure 10.19 at the bottom of page 20.

So you can see that at the top, this is paragraph 10.3.39, horizontal and vertical barriers, and Dr Lane is explaining that rainscreen cladding panels can distort when heated, either through heating of the panel itself or by failure of the supporting fixtures, and this can allow further gaps between the

cavity barriers and the rainscreen cladding panels to form, and she has illustrated that in figure 10.19 below. Do you see that?
A. Yes.
Q. You can see in the labels she's then got next to that diagram and the photograph, she's giving an example of this mechanism of failure: the rainscreen cladding panel distorts due to exposure to heat or failure of the fixings; there is then a route around the intumescent layer becomes available, even if the intumescent has expanded; and then distortion of the panels with the PE core outwards due to exposure to heat and flames; yes?
A. Yes.
Q. Now, in general terms, that risk of the way in which these cavity barriers might behave in combination with rainscreen cladding panels, did Siderise appreciate that risk prior to the Grenfell project?
A. Yes, totally, and we have openly in open forum requested that cladding manufacturers assist us with cladding testing.
Q. I see, and when you say "assist us with cladding testing", what kind of cladding testing do you mean there?
A. 8414.
Q. Right.

Prior to the Grenfell Tower project, to what extent had Siderise done any testing which assessed the extent to which the open-state cavity barriers could perform with metal composite rainscreen panels?
A. Siderise would not have undertaken 8414 testing in its own entity. However, there have been a number of 8414 tests carried out with our materials in there, where we just supplied the materials. We had no financial involvement in the tests.
Q. But were any of those 8414 tests where the Siderise materials were used with metal composite rainscreen panels?
A. I believe there's one with FR/A2 ACM in 2016 that was carried out in Dubai and it passed.
Q. Right. So prior to the supply on Grenfell Tower -- so that's 2015; yes?
A. Yes.
Q. There had been no testing done by Siderise or anyone else using a Siderise product that you were aware of showing the extent to which the cavity barriers could perform with metal composite rainscreen panels?
A. That's correct.
Q. Yes.
Now, going back to TGD19, if we can look at page 14 of that standard, {SIL00001540/14}, at the bottom of the

page we get the performance criteria in section 11, and we can see it says:
"11.1. Effective Closure of the 'open-state' cavity barrier.
"The time taken for the cavity barrier to close, as defined in clause 10.4 shall be measured and recorded.
"Cavity barriers must close within 5 minutes from the start of the test as determined above or they will have been deemed to have failed the test."
Then if we can go over the page {SIL00001540/15}, we can see under "Insulation" it says:
"Transmission of heat through the test construction shall not raise any one of the thermocouple temperatures of the unexposed surface of the test specimen more than 180 K above its initial temperature. However, any failure before 5 minutes shall be disregarded."
Then if we go down to "Integrity", 11.3:
"Integrity shall be determined in accordance with EN 1363-1 except that any failure before 5 minutes shall be disregarded unless any area of any surfaces exhibits sustained flaming above the seal within that period."
So is it right that effectively this test standard permits there to be a disregarding of the first five minutes of the results of the test?
A. Yes, and you will see there, under the integrity, it's

not uncommon. It's also within another standard.
Q. Can you explain how and why that was determined to be appropriate?
A. It's -- as I discussed earlier on today, there are other elements of construction that are tested in a similar way, and there has to be given time for them to either mechanically or intumescent-wise react to the temperature being exposed, as in the fire resisting damper standard there. Within the first five minutes, and it actually says there "exhibits sustained flaming above the seal", this is why you -- if you test with combustible insulation above, if there was any shortcomings, that insulation would ignite.
Q. Yes.
A. And fail the test immediately.
Q. Right, I see.
But where did the five minutes come from? What was the scientific basis for choosing that five-minute period?
A. As I said, it's in there from the standard for dampers. There's a clause in there, for the first five minutes.
Q. I see. So, what, in a different British Standard dealing with dampers, there's a similar clause in there relating to the first five minutes being disregarded; yes?

A. Yes.
Q. Can you help us with which particular British Standard that is?
A. It was on that page in 11.3.
Q. I see. If we go back to it, sorry. Just go back to that page.
A. And all these five minutes are for the laboratory to be able to establish a controlled furnace.
Q. I see, you're talking about the damper standard in EN 1366-2; yes?
A. Yes.
Q. I see.
We've seen from some of the tests that some of the barriers, not all, closed within one minute; why disallow five minutes in those circumstances?
A. They reacted faster than the five-minute period. The temperature rise on the actual cavity barrier -- the thermocouples are affixed to the actual cavity barrier itself -- are recorded from time zero. The thermocouples attached to the insulation above the cavity barrier are recorded from time zero.
Q. Yes, I appreciate that, but it's very clear here that any failure before five minutes shall be disregarded; yes?
A. You would not get any failure on fixed thermocouples

within the first five minutes. If you had failure of fixed thermocouples within the first five minutes, then you seriously have something wrong with the product that's installed.
Q. Right.
A. This is purely relating to the suspended thermocouples directly above the open cavity that are exposed to direct heating from the furnace during the closing phase.
Q. Right, I see.
A. So it does not discount the thermocouples that are on the cavity barriers themselves, because they're recorded from time zero, as in all tests.
Q. But you said earlier that that five-minute approach is included in the fire resisting damper standard. Did somebody do an analysis as to whether or not that was a comparable situation to these and therefore could be read across?
A. It was done by consensus of committee.
Q. I see.
Then can we go to page 16 of this {SIL00001540/16}. We can see there is a heading, "Direct field of application of the test results", and it says underneath "General", 13.1:
"The results of the fire test are directly

applicable to similar constructions where one or more of the changes listed below are made."
Then we can see what the changes are that make the test results directly applicable:
"a) Increase in the length of the cavity barrier ...
"b) Decrease in the distance of fixing centres.
"c) Void size can be interpolated between minimum and maximum voids tested.
"d) If a single void size is tested, the result is only applicable to that void size."
Again, do you see that?
A. Yes.
Q. Then:
"e) A decrease in the gap between the seal and any external cladding subject to any minimum requirements for ventilation purposes ..."
So that's explaining in what way the tests are directly applicable to similar constructions.
Then if we could go to page 17 {SIL00001540/17}, we get annex A on page 17. There is some what's called "Informative Commentary" at the back of this part of TGD19 and it says:
"Below is some information taken from various third party publications. It is provided for information only."

We can see, if you look in the third paragraph down, an extract has been provided from BR 135, second edition, which reads:
"In practice it's been found that small-scale tests do not reflect the fire hazard associated with full-scale cladding systems and the only effective method of assessing the fire performance of the fire barriers is to test a complete system at large scale."
Now, did Siderise appreciate the importance of that guidance prior to the Grenfell Tower project?
A. Yes, and openly, in public forum, had requested that the cladding industry engage with ourselves to test. Nobody came forward.
Q. Right. So you're saying:
"... openly, in public forum, [we] requested that the cladding industry engage with ourselves to test [but] nobody came forward."
So in what public forums did you request that people came forward and test with you?
A. We held some conferences on façades and our systems, and our Steve Swales, openly to audience, including CWCT, Arup, façade contractors, openly requested that people engage for testing.
Q. When you say "openly requested that people engage for testing", are you saying he was openly asking for

partners in large−scale testing −−
A. Exactly that.
Q. −− so that the performance of these cavity barriers could be better understood?
A. The performance of the complete systems be better understood. As we established earlier, 8414 does not ratify the performance of cavity barriers. However, it does ratify the performance of the full system.
Q. Yes. I see. So you say Mr Swales was making an open request for assistance with testing that would help these systems to be better understood; yes?
A. Yes.
Q. In those circumstances, where there was the clear identification of a need for further testing, why did Siderise −− and we will come to your marketing material later −− feel it was appropriate to be marketing these open−state cavity barriers in rainscreen systems?
A. If I go back to the failure criteria of an 8414 test, there's a maximum temperature of 600 degrees at level 2, and the cavity barriers are exposed to temperatures in excess of that for the duration of the test, then the cavity barriers would never be the weak link in an 8414 test, because the temperatures that they're exposed to and not of the same magnitude as they're exposed to in a furnace test.

Q. That may well be right, the cavity barriers might not be the weak link, but if the system may well be weak and the cavity barriers can't perform properly, I'd ask my question again: in circumstances where the need for further testing of those systems was identified, why did Siderise feel it was appropriate to be marketing these open−state cavity barriers in rainscreen systems?
A. They had been tested on a few occasions in rainscreen systems, and again I would say we openly requested from industry to partner with us in testing and nobody came forward. We are no experts in building rainscreens. You need the expert partners in other parts of the industry to come forward to the table to assist.
Q. Right, okay. Well, this is a theme we will keep coming back to. Let's move on for now.
Let's look at Technical Note 73 produced by the CWCT, the Centre for Window and Cladding Technology, that's at {CWCT0000019}.
Just before that standard comes up, were you aware of the CWCT in 2014/2015 or thereabouts?
A. Yes.
Q. Was Siderise a member of the CWCT at that time?
A. Yes.
Q. And were you aware that the CWCT produced notes such as Technical Note 73 to assist the industry?

A. Yes.
Q. And were you aware of this note, Technical Note 73? We can see it's dated March 2011 in the bottom right−hand corner. Were you aware of this technical note when it was first published?
A. Yes.
Q. We can see it's "Fire performance of curtain walls and rainscreens". If we can look at page 5 {CWCT0000019/5}, and I want to look at the last paragraph of that left−hand column and over to the top of the right−hand column. So picking it up right at the bottom of that screen, it says:
"Cavity barriers may be tested following the principles of BS 476−20 or BS EN 1366−4. Tests are generally conducted with the barrier in a cavity between walls of fire resisting construction and performance with rainscreen panels may be different."
Now, were you aware of that particular piece of guidance by the CWCT from 2011 onwards?
(Pause)
Mr Mort, are you there? Can you hear me?
A. Yes.
Q. Sorry.
Were you aware of that particular part of this CWCT guidance −−

A. Yes.
Q. −− where it makes clear that they're tested between walls of fire resisting construction, but performance with rainscreen panels may be different?
A. Yes, I was.
Q. And that's making a similar point to the one we saw in the technical guidance TGD19, isn't it?
A. Yes, it is.
Q. If we carry on with what it says in that top right−hand paragraph, in the next sentence, just picking it up there, it says:
"Intumescent materials react at approximately 150°C thus allowing passage of cool smoke. When the temperature does rise they may take a significant time to form a seal. This time delay may not be significant in a test where the cavity is empty but may be significant in practice if there is combustible insulation in the cavity which could be ignited in the time taken to seal the cavity."
Again, were you aware of that guidance at the time you were developing the testing of the Siderise open−state cavity barriers?
A. Yes, as we established this morning, we test with combustible insulation above and below the cavity barrier for that actual reason.

Q. Can we agree, therefore, that these considerations, ie use in a rainscreen and with combustible insulation, could dramatically impact the performance of open-state cavity barriers?
A. The -- all cavity barriers need two resilient surfaces in order to perform. The cavity barrier is not the weak link in any rainscreen system. The weak link is the rainscreen itself.
Q. Yes. Can I just ask that question again: can we agree, therefore, that these considerations, ie the use in a rainscreen and with combustible insulation, those two factors could dramatically impact on the performance of open-state cavity barriers?
A. If tested to an 8414 test, yes.
Q. Well, and also, whether tested to 8414 or not, in a real-world situation, the rainscreen and the presence of combustible insulation could dramatically impact on the performance of open-state cavity barriers in a real-world situation; yes?
A. I will reiterate: the cavity barriers will still perform to the level of performance testing providing the bounding structures remain in place. So, therefore, yes, if one of the bounding structures fails, then the cavity barrier is redundant.
Q. Yes. If there is no external surface there for it to

butt up against, it's ineffective; yes?
A. Yes, and that is the same for all passive fire protection. The bounding structures have to remain in place.
Q. If we look back at that paragraph, we can see in the last sentence it says:
"The Association for Specialist Fire Protection [ASFP] is currently investigating the development of a test procedure specifically for rainscreen cavity barriers which will address these issues."
Was that referring to the TGD19 test that was subsequently developed?
A. Yes, it was, and the CWCT were present at the drafting of the document as well.
Q. Yes.
Can you just help us, so far as you were aware, were there ever any discussions with the Department for Communities and Local Government or, you know, MCHLG as it now is, about adding TGD19 to Approved Document B? Are you aware as to whether --
A. I'm not aware.
Q. -- there have been such discussions?
A. I'm not aware of any discussions.
Q. Okay, thank you.
I'm going to ask you some questions at this point

now about Celotex's BS 8414-2 tests that were carried out in 2014.
If we could look at Mr Swales' witness statement first on this point, that's at {SIL00000306/17}, and I want to look at paragraph 63, he says there:
"Up to the date of the refurbishment [and he is referring there to the Grenfell refurbishment], Siderise had actively participated in six BS 8414-1/BS 8414-2 system tests in the UK and the UAE. When I state 'actively', I mean that Siderise were invited to participate by the test owners (such as Celotex, Xtratherm and Kingspan). These occurred between 2012 and May 2015. The cladding utilised for these tests were either rainscreen boards or terracotta tiles. The insulation was either PIR, Phenolic or stonewool insulation. All of the tests were passes. Other system tests may have been carried out using the Siderise product without our knowledge, which is not unusual."
Now, just on that, he says there that there were these six 8414 tests and all of the tests were passes. We will come on to it in a moment. It's right, though, isn't it, that the first Celotex test that Siderise had its cavity barriers in was a fail in February 2014; yes?
A. Yes, it failed through a panel failure, I believe.
Q. Yes. So that's not quite correct, is it, that all of

those tests were passes?
A. That's correct.
Q. Now, Mr Swales says on the previous page, if we look at page 16 {SIL00000306/16}, at paragraph 61, first sentence -- and this is just for the avoidance of doubt, really -- he says:
"To my knowledge, a system test incorporating ACM panels did not take place before 2016."
Do you see that?
A. Yes.
Q. I think that accords with the evidence you just gave to us, but can you just confirm that?
A. Yes, it does.
Q. So when Mr Swales is saying in that paragraph before that we just looked at, 63, that the cladding used for the pre-refurbishment tests was either rainscreen boards or terracotta tiles, to be absolutely clear, none of those were ACM products, were they?
A. That's correct.
Q. And they were all, can you confirm, non-combustible cladding products?
A. I can't confirm that they were totally non-combustible without seeing the European designation for each of the boards.
Q. I see.

A. But I suspect that they were of a high performance.
Q. Yes. Okay.
Now, to your knowledge, did those pre-Grenfell refurbishment tests involve open-state cavity barriers or only full face horizontal cavity barriers?
A. Open state. Open state horizontally and full fill vertical.
Q. Right.
Do you recall when you first met with Celotex to discuss BS 8414 testing?
A. I didn't meet them until after the first test.
Q. I see. Okay.
Let's look at Mr Roper's witness statement at this point. This is at {CEL00010052/8}, and I want to look at paragraph 5.6. So he's talking about sometime around 2013 here in his witness statement. You can see that from the next paragraph, 5.7, where he goes on to October 2013. But he says in 5.6 before that:
"It was around this time that I was first introduced to Chris Mort of Siderise who wanted to install the fire barriers free of charge. He wanted to team up with a well-known insulation provider. His suggestion was that he would install the fire barriers free of charge if we mentioned his company in the literature which we did."

Now, he is talking, as I said, about a time period that appears to be around October 2013. It's not entirely clear. But do you recall either meeting or being put in touch with and introduced to Jonathan Roper at that time?
A. Our initial discussions were only via email, and his statement there suggesting we would install the fire barriers free of charge is categorically wrong because we do not install fire barriers on 8414 tests. That is the specialist work of the cladding installer. We're not licensed on the access equipment, so we wouldn't install the cavity barriers at all ourselves. They would have been installed by their cladding installer. And, like I said earlier, our all our correspondence was via email in the first instance.
Q. I see.
Is he right that you were keen on teaming up with another company in order to undergo BS 8414 system testing?
A. As I said earlier, we were keen to team up with anyone who was willing to undertake an 8414 test in the industry.
Q. Did you offer him your products free of charge for that testing? You said you wouldn't install them free of charge --

A. We --
Q. -- but did you actually offer to provide them free of charge for somebody else to install?
A. Yes, we still do that today.
Q. Right. So you didn't charge him for the products --
A. Yeah.
Q. -- for that testing?
Was there ever a plan for Siderise to install them, or was your understanding that it would always be installed by Celotex's façade fitter?
A. Correct. We wouldn't install barriers, no.
Q. No.
Moving on, if we look at page 12 now of Mr Roper's statement {CEL00010052/12}, paragraph 5.26, he says:
"I visited the BRE facility in Watford prior to the first test whilst construction of the test rig was ongoing - a process which took several days. Rob attended with me."
That's Rob Warren.
"The rig was constructed by Patrick 'Patch' Jones who was a contractor provided by Simco. I believe that he may have had assistance from one other person but I cannot remember who this is. Chris Mort of Siderise installed the fire barriers."
Now, to the best of your recollection, what role did

you have in terms of the fire barriers in relation to that first February 2014 test?
A. Supply only. I would not have installed the fire barriers. I wouldn't have been licensed to use the access equipment to install the cavity barriers. If I had attended the BRE, it would have been to carry out a toolbox training for Pat Jones, but my feet would have remained on the ground and I'd only have been there to explain to him how the barriers should go together. Other than that, I had no involvement whatsoever, and I cannot confirm if I did attend or not for that toolbox talk. I have no record of it.
Q. Yes. You began that last part of your answer, "If I had attended the BRE"; do you have any recollection of attending the BRE in relation to that February 2014 test?
A. Our email chain with Celotex is quite well documented, and they were very keen to keep us at arm's length, away from anything to do with the test, because of confidentiality.
Q. Did you provide Patrick Jones, who was there on behalf of Simco, with guidance on how to install the cavity barriers?
A. I can't recollect specifically giving Patrick Jones guidance. I could have, or may have. The description

that he gave the Inquiry last week of the person attending certainly wasn't me, because I was in my early 40s and certainly not balding. And the photographs I've seen since Grenfell of the installation of the cavity barriers, there's a number of issues there that I certainly wouldn't have permitted to go ahead if I had seen the quality of the installation.

Q. Okay. As you say, Mr Jones has said in his oral evidence to the Inquiry that someone from Siderise showed him how to install the cavity barriers, including, he said the phrase, "how to bend the tabs on the fire barrier", that somebody was there showing him that. Is it possible that somebody else from Siderise was there showing him how to install those barriers?

A. It is possible.

Q. Right. But you don't think it was you?

A. I don't think it was me, because I can't find any email correspondence, because there was a strong email correspondence between ourselves and Celotex on this test, and certainly we did not check or witness the completed installation of the cavity barriers, because as I've said, there's a number of -- well, there's at least one fundamental flaw in the installation of the cavity barriers.

Q. Yes. So going back to that other part of your answer,

and you've just referred to it there, you said:

"And the photographs I've seen since Grenfell of the installation of the cavity barriers, there's a number of issues there that I certainly wouldn't have permitted to go ahead if I'd seen the quality of the installation."

Are you referring specifically to the first Celotex test in 2014, that you've seen photographs of that test?

A. Yes.

Q. What is it that you have noticed about the cavity barriers that you say you wouldn't have allowed to go ahead?

A. The normal installation of rainscreen systems are the vertical barriers run continuous, and the horizontal are cut between the vertical barriers. On the Celotex installation, it's quite apparent that the horizontals run through the verticals on there. And also, from the photographs, they either haven't got sufficient compression on the vertical, or the 25-millimetre air gap wasn't maintained --

Q. I see.

A. -- or introduced.

Q. When you say they haven't got sufficient compression on the vertical or the 25-millimetre air gap wasn't maintained, are you saying there should have been a 25-millimetre air gap for the vertical cavity barrier?

A. No, for the horizontal cavity barrier. But where they intersect with the vertical, either they haven't got sufficient compression on the vertical, or the horizontals are not maintaining the 25-millimetre gap.

Q. I see.

A. Because there should be at least 35 millimetres in front of the horizontal cavity barrier of exposed --

Q. I see.

A. -- (inaudible) for compression.

Q. Yes.

I appreciate you say you can't recall attending to assist Mr Jones prior to the test. Were you made fully aware of the set-up of the test rig for that first test prior to the test going ahead? Were you given drawings, details?

A. I saw drawings for it. Those drawings were used to take off the quantity of cavity barriers required.

Q. I see, yes.

Now, in terms of the test itself, did you actually witness that test happen in February 2014?

A. Not at all. I was -- there's an email on the system that I was requested to be excluded from witnessing the test for confidentiality reasons from Jonathan Roper. He had discussions with the head of marketing and they didn't wish for me to be present.

Q. I see.

Were you made aware of the results of that test by Celotex after it had been carried out?

A. Yes, I was, but as to the timescale, I couldn't say.

Q. Was it Mr Roper that spoke to you after that test and told you about the results?

A. I would imagine it would have been.

Q. Were you made aware that the Marley Eternit panels had pulled away from the rig and distorted, rendering the cavity barriers ineffective because they had nothing to activate against?

A. Yes.

Q. Can you remember who it was who told you that?

A. It would -- my correspondence was only with Jonathan Roper.

Q. Right.

Just for clarity, did you ever have any discussions with any other parties involved in that test, including the BRE? Did you ever speak to anyone at the BRE?

A. No.

Q. No?

A. No.

Q. The failure of that test, did that strike you as a salutary lesson about how ineffective open-state cavity barriers could be in a rainscreen system if the

failure of the panels occurred?
A. The fundamental function of a rainscreen cavity barrier is not to enhance the performance of the panel. So the performance of the cavity barrier is compromised by the inadequacies of other elements. It's not the cavity barrier that is inadequate, it is the panel that is inadequate. That is something we can't control.
Q. But nevertheless, whether you say it's the panel that's the problem or the cavity barrier that's the problem, did you appreciate following that test that cavity barriers might be rendered ineffective if there was failure in the panel?
A. That is common knowledge, yes.
Q. Did that make you or anyone else at Siderise question whether cavity barriers should be being used in rainscreen systems at all at that point?
A. No.
Q. Why not? Can you help us as to ——
A. There's a ——
Q. —— why that wasn't something that was thought about?
A. There's a demand from the marketplace for cavity barriers, and regardless whether they're open state or full fill, if you were to conduct exactly the same test with a full fill cavity barrier, the mode of failure would have been exactly the same. It's the

failure of the panel, not the cavity barrier. So it's irrespective of whether it's open state or full fill. The failure mode of rainscreen systems is the failure of the panel system.
And that, going back to my statement earlier of firestopping, regardless of how it's tested, it's only as good as its bounding structure. So if you have a four—hour wall and you have a penetration going through that four—hour wall and you firestop it, and then it —— for whatever reason, that wall it's compromised and it's no longer a four—hour wall, that firestop, although it's been tested for four hours, is only as good as the performance of that wall.
Q. I appreciate that's your evidence, but I'm interested in understanding whether anyone within Siderise ever gave consideration at this stage to whether there had been adequate and sufficient testing of open—state cavity barriers to justify their safe use in rainscreen systems?
A. We'd —— again, we've requested on many occasions to be involved with 8414 testing. We see it as: we were meeting the requirements of Approved Document B, appendix A and table 15, we were meeting the requirements of that element. The responsibility in section 12 of Approved Document B of the external part

of the building is not Siderise's responsibility. That's the responsibility of the full project make—up. So we understood we complied with Approved Document B, appendix A, 15, for cavity barriers.
Q. I understand.
A. And we actually overengineered it. The requirement is 30/15, we were supplying barriers at 90/30.
Q. Right.
A. We knew the cavity barrier was overengineered for its purpose. But the façade industry, whether they turned a blind eye or didn't understand the fact it's their responsibility to ensure the panels were of equal performance to the cavity barrier.
Q. I see.
Now, is it right that in March 2014, so after that first failed test in February 2014, you arranged a meeting with Mr Roper of Celotex in relation to that February 2014 failed test?
A. Yes.
Q. You don't make any mention of that meeting in your witness statement, so I do want to ask you about it.
We can see confirmation of that meeting taking place if we go to {CEL00001976}. We can see that this is a meeting request from Jon Roper. It's sent to himself, to Jamie Hayes and to you. We can see it's sent on

26 February 2014, and it refers to a meeting that's going to take place at 11 o'clock on 13 March 2014, and the subject is "Rainscreen Fire Development Project"; do you see that?
A. Yes.
Q. Is it right that you did have that meeting with Mr Roper on 13 March 2014 at Celotex's premises?
A. Yes, I did.
Q. Was Mr Jamie Hayes present at that time as well?
A. I cannot recollect.
Q. Can you recall what was discussed at that meeting?
A. Basically, he explained that the first test didn't go according to plan. I wasn't shown any information at that time in terms of installation of barriers, et cetera, et cetera. It was more a case of, "Can you support us on another test? Can you supply us with barriers for another test?"
Q. I see. And in terms of, "Can you support us on another test", was it just simply a request for more barriers ——
A. Supply of material.
Q. —— or did you have a more in—depth discussion about how those barriers might perform better in a second test?
A. All that would have been discussed would have been the weakness in the test was not the cavity barriers, because we've proven from furnace tests that they

perform. It would have been discussed that unless you can have a panel that can last for the duration of the test, you were not going to pass this test. That's the extent of the discussion. There was no discussion on materials, supply, et cetera, et cetera. It was just purely a case of they wanted to understand how the cavity barriers worked, so I walked them through how you fire test the cavity barriers, and that the cavity barrier is not the weak link in the chain. They're not magic, they can't turn a non-fire-rated panel into a fire-rated panel.

Q. Right.

You say that there was a discussion about the fact that unless you can have a panel that can last for the duration of the test, you're not going to pass the test.

A. Yes.

Q. Did you suggest that there needed to be a stronger panel outside the cavity barrier to enable it to pass the test?

A. Not at all. We don't get involved in panel specification.

Q. Did you review the test footage at that meeting?

A. No.

Q. Were you given a detailed account as to how the first failure had occurred and the falling away of the panels?

A. I was just told that it failed and how can you improve the cavity barriers to get it to pass the test, and this is when we went into the discussion of: it's not the cavity barrier that is the issue. This is how cavity barriers are tested, you need a substrate that's not going to fall away.

Q. I see. And you remember saying that, do you, saying, "You need a substrate that's not going to fall away"?

A. Yes.

Q. Yes.

Did Celotex seek any advice from you as to what that substrate might look like?

A. Not at all, because we are not panel manufacturers. We wouldn't give advice on panel material type, manufacturer, thickness or anything. That's not our area of expertise.

Q. Yes.

Can we just look at what Mr Roper said about this meeting. If we go to {Day71/89:10}. So Mr Roper's asked by Mr Millett:

"Question: Had there been any concerns as a result of the February test about the cavity barriers that had been used?

"Answer: Erm ... I think what became apparent is that the fire barriers that were installed on the first

test only worked by being activated by heat or smoke or fire, and expanding upon the inside face of the cladding panel, and I think there was some concern around the ability for that intumescent on the end of the fire barrier to expand and close the cavity. So there were some reservations around there.

"Question: Did you discuss fire barrier designs alongside the use of 6-millimetre magnesium oxide?

"Answer: Yes, I believe we did, yeah.

"Question: So was the use of magnesium oxide a way of overcoming the problem with the cavity barriers not expanding fully?

"Answer: Yeah, I think what I learned at the time, and what I still believe now, is that the performance of those fire barriers are entirely dependent on the fire resistance of the cladding panel that they expand onto.

"Question: Do you remember having a meeting with a cavity fire barrier manufacturer?

"Answer: Yes.

"Question: Who was that?

"Answer: Siderise.

"Question: Did you go to the meeting with Siderise?

"Answer: Yes.

"Question: Do you remember what you discussed?

"Answer: I think -- I believe Jamie was present there as well. I think we discussed our concerns with Chris of Siderise.

"Question: Was that Chris Mort?

"Answer: Chris Mort, yes.

"Question: Yes.

"Answer: About the ability for their product to firstly expand sufficiently to close the cavity, and then to work if the cladding panel wasn't there in the first place.

"Question: Did you have any discussion with Chris Mort about the proposed use of 6 millimetres magnesium oxide?

"Answer: I don't know, if I'm honest with you, I don't know."

Now, having seen that, can you recall whether you had any discussion with Mr Roper about the use of a magnesium oxide board to strengthen the cladding panel at the location of the cavity barriers?

A. Certainly not, and if you look back through his transcript, he had this fixation that the intumescent didn't expand and that the cavity barrier should be protecting the façade after the panels had fallen away, which I would have gone and strongly discussed with him the fallacy of that. It's that any form of firestopping

is only as good as its bounding structure, and that's proven from furnace test, and I would've shown him furnace -- or discussed furnace test scenario of the intumescent expanding against structure and remaining in place for the duration of the test.

So here you see from his discussion he didn't understand how intumescents worked.

Q. Right. I see.

A. So he needed(?) an education of how intumescents worked.

Q. Even if you didn't mention magnesium oxide board specifically, did you have any discussions along the lines of using a two-panel solution, ie having two thicknesses of panels in the cavity barrier location?

A. Not at all. We wouldn't get involved with panel discussion. We do not manufacture panels, we do not supply panels, so I would not have got into a discussion with a material that I wouldn't have known any material properties about, and certainly wouldn't have been involved in any sale of material.

Q. Just to look at Mr Roper's witness statement at this point, {CEL00010052/13} at paragraph 5.31, he says here:

"Following our internal discussions, I sought some advice from IFC and the BRE. I spoke to Phil about thickening the cladding panel to 12mm."

I think he means Phil Clark there. Then he says:

"I believe we also spoke about the option of strengthening the fire barrier level with a two panel solution because it appeared from the February test that the cladding panel had cracked and fallen away which enabled the fire to jump around the fire barrier at level 2. I do not think that Phil suggested anything specific in this regard."

So, just to be absolutely clear, did you ever, whether at that March meeting or at another time, have any discussions with Mr Roper at Celotex about using a two-panel solution to strengthen the fire barrier level?

A. Not at all.

Q. Now, we know that Celotex did go on and they re-tested the RS5000 in a second BS 8414 test in May 2014. Did you have any involvement in that second test?

A. Only in supply of samples.

Q. Were you made aware of the precise build-up of that test rig?

A. No. We were just asked for a repeat of the quantity of samples supplied for the first test.

Q. Right. So you merely supplied -- again free of charge, yes?

A. Yes.

Q. -- some cavity barriers to use in that second test; yes?

A. That's correct.

Q. Were you at any point, either prior to the test or after the test, made aware that magnesium oxide boards had been installed behind the Marley Eternit cladding in order to boost the system's fire performance at the top levels of the rig?

A. Not at all.

Q. So when was the first time that you learned that there were magnesium oxide boards that had been used in that test rig?

A. It was after the Grenfell fire when the test reports became available.

Q. Yes.

If we could look at Dr Lane's Phase 1 report again, briefly, now, this is {BLAS0000026/40}, at paragraph E4.5.21, Dr Lane has pointed out here that in the final test report -- and I can take you to that shortly:

"The provision of cavity barriers is different in the photograph (Figure 2 in BRE report) relative to the design drawings (Figure 7 in BRE report).

"a) Additional vertical cavity barriers were installed in the test above level 1, but are not shown on the test drawings;

"b) An additional 3rd horizontal cavity barrier was

installed in the test, but is not represented in the test drawings."

Now, do you remember being sent test drawings in advance of this second test?

A. No.

Q. If we can go to the final report, this is at {BRE00002497}, this is a copy of the finally issued report from 1 August 2014. I'm going to take you to the two figures that Dr Lane has picked up on.

If we go to figure 2, which is on page 12 {BRE00002497/12}, what we can see in this photograph is that there were four horizontal cavity barriers: there is one right at the bottom, you can just see it in the very corner of the page above the crib, another one at level 1, another at level 2 and another one right at the top of the rig. Can you see that?

A. Yes.

Q. Then there's four vertical cavity barriers. So the horizontal ones are in green and the vertical ones are in blue; yes?

A. Yes.

Q. Now, you said that there were some problems with the way in which the cavity barriers had been installed in the first test. Did you spot that there were difficulties with the way they had been installed in this test?

A. Only after we had the test report after the Grenfell fire.
Q. I see.
A. And it was the same for both.
Q. Is it the same problem, that what you're saying is the horizontal had been cut through the vertical?
A. Correct.
Q. I see.
Going back to this discrepancy that Dr Lane picked up on, there we can see clearly four horizontal, four vertical cavity barriers, but if we go to figure 7 on page 17 {BRE00002497/17}, and it's not easily clear from this because we can't see all the labels, but in essence what she has picked up on is that the vertical and horizontal cavity barriers marked in these drawings are not the same as what's in the photograph.
Now, can you help us, do you know who made the decision to install more cavity barriers in the test rig than were shown in the specification drawing?
A. No, I don't.
Q. Were you asked for any advice about how many cavity barriers ought to be installed in this test rig?
A. No.
Q. Did you have any involvement with Celotex after that second May 2014 test?

A. No, not from recollection, no.
Q. Siderise included Celotex's BS 8414—2 test of May 2014 on its website as a successful test in which Siderise cavity barriers had been used. Is that right?
A. Yes.
Q. Is it also right that more recently that webpage has been taken down and replaced with a screen requiring log—in details to progress further on to the website?
A. I don't believe so, no. I believe it's open forum. I don't know. It's marketing, I don't get involved in the marketing of the website.
Q. Okay.
Is it correct that the public no longer has access to the Siderise product test reports which were previously accessible to the public on your website? Is that a decision that's been taken by Siderise?
A. They're still available on the website.
Q. They're still available, are they?
A. Yes.
Q. All the product testing of the Siderise products?
A. For the rainscreen systems, yes.
Q. I see.
Now, if we can turn to {CEL00003214}, there is a Celotex monthly report that I just want to take you to. This is from June 2014. So we can see "Celotex

Monthly Report — June 2014", and if we go within this report to page 9 {CEL00003214/9}, we can see under the heading "5.5" it's got "NPD Update", possibly, "New product development update".
We can see it says in the first bullet:
"RS5000 — Above 18m solution — due for launch 4th August at regional meetings."
And then in the second bullet it says:
"Full—fill cavity — in—house testing commenced, spoken with Siderise re assisting with manufacture, first test cycle due early August."
Can you help us as to what that's referring to?
A. If it's full fill cavities, I would imagine they have product ranges that go into masonry construction.
Q. Right. So can you remember there being some form of collaboration between Siderise and Celotex about full fill cavity barriers at this time?
A. It might not have been with myself, it might have been with the sales team.
Q. So does it follow you have no recollection of this?
A. That's correct.
Q. I want to ask you now about some meetings you had or a meeting with Arup that you refer to in your witness statement. If we can go to {SIL00000298/13}, and I want to turn to paragraph 47 of your statement.

Here you are describing a meeting that took place with Dr Barbara Lane and her colleague Charlotte Roben, and yourself and Andrew Kay of Siderise, on 1 December 2014. Is that correct?
A. Yes.
Q. Can you recall that meeting?
A. Yes, I can.
Q. Now, prior to that meeting, you had sent a preparatory email. If we can turn to it, {SIL00000323/2}. This is an email from you to Dr Lane on 16 September 2014, and you can see that from the date sent. You have said at the beginning of that:
"Dear Barbara,
"In preparation for our meeting on Thursday I have attached some typical test reports & engineering judgment document for background information, and a list of discussion points below."
Then we can see from the first heading that obviously a key part of your meeting appeared to be discussing the requirement for testing for firestops in curtain walling. Is that right?
A. Yes.
Q. Then we can see there is a second heading at the bottom of that page:
"Open State Cavity Barriers as utilised in

Rainscreens."
So is it right that was a topic that you were wanting to discuss at this time; yes? This is in September 2014.
A. Yes. This was a follow-on to a CWCT meeting that had occurred at Arup Fire some weeks previous.
Q. Right.
A. Which is minuted.
Q. I see, yes. Thank you.
We can see that you say in the following bullet points, in the first point:
"▪ Currently there is no official BS or EN standard for testing these products, what is [your] view?
"▪ ASFP have published a technical test standard attach, do you see this as an acceptable test methodology for cavity barriers?"
Then you say:
"▪ CEN TC127 WG1 TG9 – working on test standard.
"▪ BSI ... also starting to work on a [test] standard.
"▪ Basis of reaction to closure time of seal sub 5 minutes, do you think this is suitable?"
So from those bullet points, would it be fair to say that at this stage, the testing that was being developed was certainly not standardised and it was very much

still developing? Would you agree?
A. Yes.
Q. If we turn to the next page of the email {SIL00000323/3} there are more bullet points. You say in the first bullet:
"▪ BS8414 testing, it appears that there is an increase in the number of tests being carried out, however how real is the data, as tested materials are not being utilised on projects?
"▪ Misinterpretation of Cavity Barriers vs Fire Stops, into external cavities, discussion."
Then in the fourth bullet you say:
"▪ Products being utilised that either have no testing or very subjective testing; what is Arup's view?"
Now, can you just help us, would that first bullet at the top of the page:
"BS8414 testing, it appears that there is an increase in the number of tests being carried out, however how real is the data, as tested materials are not being utilised on projects?"
Can you remember what the concern was that you wanted to discuss with Dr Lane?
A. Yes, I know that Siderise barriers had been used in some 8414 tests, as we've previously discussed, but

Siderise -- we were not seeing an increase in sales against projects that we knew cavity barriers were being used in, so materials were being substituted, et cetera.
It's just highlighting the issue to them that they may be specifying barriers on a project, but the barriers that they're specifying aren't necessarily being used.
Q. I see. So are you saying that substitute cavity barriers were being used from the ones that had been tested in 8414 tests?
A. Yeah, or none at all.
Q. I see.
Were you also drawing attention to the fact that some of the cladding panels that were tested materials were not being utilised on projects, ie they weren't realistic cladding panels?
A. Back then, at that stage, probably not.
Q. I see.
You're obviously drawing attention to the fact that there isn't a standardised test standard for these types of open-state cavity barriers.
Did you ever have any discussions with anyone within Government or those drafting Approved Document B to that effect, that there was no recognised standard for testing of open-state cavity barriers?

A. No, I hadn't.
Q. Now, you sent a summary email the next day after the meeting on 2 December 2014 to Andrew Kay and Stephen Swales. If we go to that, that's at {SIL00000331/2}. If we could look at the top half of that page, it's from you to your colleagues internally within Siderise. It's dated 2 December 2014, and its subject, "Arup Fire Key Points". This seems to be a bullet point summary of the meeting. You say:
"Hi Steve/Andy,
"Yesterday I feel we had a very successful meeting with Prof. Barbara Lane and Charlotte Roben with regards to fire issues that exist for facades and key points below."
If we can go to page 3 of this document {SIL00000331/3}, about halfway down the page we can see a bullet point which begins:
"Arup agree that the ASFP test guidance for open state cavity barriers, although not perfect is a good step forward in terms of testing and they will request this on all projects that they are working on."
Now, can you help as to why Arup had said that it was not perfect but a good step forward, that test guidance? Can you recall what you were told?
A. Fire test standards are continually reviewed. They are

never perfect, even now. So any published EN standard would be published, as it starts to get used, then you find out some of the imperfections, and when it comes back for re-review, those imperfections are tried to be ironed out.

Q. Yes, I understand that, Mr Mort, but can you think back to this meeting and the notes of this meeting. Can you recall what you were told by Arup about why it was not perfect but a good step forward?

A. They didn't elaborate anything more than that statement.

Q. I see.

Immediately below that, there is a sentence which begins:

"They were encouraged of our involvement in CEN/TC127/TG9 and BSI/FSH22/7, as this actually may allow for standards to be developed that reflect real world scenarios, and would gladly comment on any development work, which I will present to CEN [and] BSI at the next meetings, as experts can be drafted into developments for comments on standards."

Would it be fair to say that you had discussed with Arup that there needed to be the development of real-world scenarios in terms of this testing?

A. Testing of products, yes, and it was more of an invite to try and get Arup to become involved with

British Standards, to comment on the actual standards.

Q. I see.

A. Not comment after they'd been published, but comment during they were being developed.

Q. At this point, and thinking back to the state of play when you wrote these notes, were you of the view that Siderise's open-state cavity barriers had been appropriately, comprehensively and reliably tested such that they could be marketed for use in rainscreen systems?

A. To the standards that we needed to comply with, with Approved Document B, appendix A, in terms of the 30/15 requirement, yes.

Q. But what about for real-world scenarios? Did you think that the cavity barriers had been appropriately, comprehensively and reliably tested for the real-world scenarios that they were going to encounter in rainscreen systems?

A. That's a bigger question for the rainscreen cladding panel market. We have openly requested to participate in testing, and nobody came forward. So unless the industry move forward together, we can only test to the standards that are available to us.

Q. I appreciate you say that's a bigger question for the rainscreen cladding panel market, but does it follow

from the fact that you say you were openly requesting to participate in testing that you did think that it was important that there were more comprehensive tests carried out of these open-state cavity barriers in rainscreen systems?

A. The performance of the rainscreen cavity barriers, as I've previously stated, is not a function of an 8414 test. The function of an 8414 test is to test the complete system, and the mode of failure on 8414 tests are the panels. So whilst Siderise have tested to a furnace test where the temperatures are higher than those exposed to on an 8414 test, the cavity barrier isn't the weak link, and that is acknowledged across the industry.

Q. Yes, but just to ask it in a different way: did you think at this time that it was important that Siderise's cavity barriers were tested in real-world scenarios to see whether they could be appropriate for rainscreen systems?

A. We had tested as far as we could on our own. We needed partners from the industry to partner with us to test further. Only a handful of partners came forward, as has been highlighted in Steve Swales' witness statement. We can't force the rainscreen manufacturing industry to test with us, and we are not the experts in rainscreen

panels. So it needs the expertise from that market to design their panels and how they retained on to the test wall.

MS GRANGE: Yes, I see.

Mr Chairman, would that be an appropriate moment for the afternoon break?

SIR MARTIN MOORE-BICK: Yes, I think it would.

We will have a break now, Mr Mort. Please remember what I have said to you earlier about the importance of not discussing your evidence with anyone else, and we will come back at 3.35, please. All right?

THE WITNESS: Okay.

SIR MARTIN MOORE-BICK: Thank you very much.

(3.18 pm)

(A short break)

(3.35 pm)

SIR MARTIN MOORE-BICK: Welcome back, everyone. We are ready to continue with the evidence of Mr Mort.

Mr Mort, are you there? Can you hear me, can you see me all right?

THE WITNESS: Yes, I can, thank you.

SIR MARTIN MOORE-BICK: Thank you very much. Ready to carry on then?

THE WITNESS: Yes, I am.

SIR MARTIN MOORE-BICK: Thank you.

Well, Ms Grange, when you're ready, then.
Thank you.
MS GRANGE: Yes, thank you.
At this point, I want to go back to Dr Lane's Phase 1 report and look at {BLAS0000011/77}. I want to look at what she says at 11.20.45 and following. Right at the bottom of that page, there's three paragraphs I want to read.
So Dr Lane here has reviewed the test report information for the Siderise cavity barriers, and she says at subparagraph 45 there:
"Both test reports ... "
And then she gives the names, and those are the test reports or some of the test reports we've looked at today:
"... and both assessment reports ... only consider the performance of the Lamatherm CW−RSH cavity barriers installed in cavities formed between two autoclaved aerated concrete lintels."
Then she goes on:
"This construction is substantially not representative of the onsite Grenfell Tower installation where the cavity barriers are installed between concrete and polymeric ACP rainscreen cladding panels."
Then at 47 she says:

"I therefore conclude none of the disclosed evidence received to date for the horizontal open state cavity barriers is representative of the construction at Grenfell Tower and therefore cannot be relied upon as evidence of their suitable fire performance in that context."
Now, do you agree that none of the testing undertaken by Siderise provided a sound basis upon which to conclude that Siderise's open−state cavity barriers were safe to use in a rainscreen application involving ACM panels?
A. Not at all. The whole premise of testing cavity barriers to published and developed standards is to ascertain that the performance of the cavity barrier in isolation, not in its finished state. It's the responsibility of the fire engineer on the project or consultants on the project to take all the fire resistance and/or reaction tests for all the elements to come to that conclusion.
Q. I see.
A. There is no test available for Siderise to be able to test cavity barriers between concrete and what she is describing here as polymeric ACP. There is no test available to do that from a furnace perspective.
Q. I appreciate that's your answer, but just going back to

my question, can we agree that none of the testing undertaken by Siderise provided a sound basis on which to conclude that Siderise's open−state cavity barriers were safe to use in rainscreen applications involving ACM panels?
A. I disagree. As I've stated and I'll state again, the purpose of testing cavity barriers on a furnace is to test that as a unique element of construction. It is the understanding and the need in the industry that other engineers, other fire engineers or consultants, take every element of fire performance of every element of construction to bring them together as an overall assessment for a project to say, "Yes, that is fit for purpose".
You don't test −− the ACP panel is only tested for reaction to fire, it's not tested for fire resistance. So the fire engineers on the project or the consultants on the project or whoever's responsible for bringing all that information together, they're responsible to assess the whole package or insist on an 8414 test.
Q. Yes. I fully appreciate that you're saying it was somebody else's responsibility on the Grenfell project −− this is your evidence −− to make a holistic assessment of that system, looking at all the elements and the fire performance. But just standing back and

thinking about the test evidence that was available on the cavity barriers, can we agree that the evidence that was provided didn't provide a sound basis on which someone could conclude that those barriers were safe to use in rainscreen applications involving ACM panels?
A. No, we can't conclude on that, because we have tested to comply with Approved Document B, appendix A, tested on the furnace test. It is somebody else's responsibility within the project team to make that connection.
Q. Yes.
Is it fair to say that at the time the panels were provided on the Grenfell project −− and we'll come to your specific involvement in the project in due course −− you were aware that there was a significant risk that the product might not perform properly in such an arrangement if there was a failure of the cladding panel external to it?
A. But then I come back to my previous statement: firestopping or cavity barriers are only as good as the bounding structures, and that's right across passive fire protection. If a bounding structure is the weakness, then that is the weakness. We cannot control those weaknesses.
Q. Yes. Did you ever say that to any of the professionals on the Grenfell project, that the product is only as

good as the bounding structures?
A. I can't recollect. Unless it's in the documentation, I can't recollect that.
Q. I don't think we see Siderise saying that at any stage, saying clearly to the professionals on the project, "By the way, our products are only as good as the products which bound them, and they may not be able to work effectively if those other products do not stay in place in, say, a rainscreen system"?
A. I wasn't aware of what the panels were on the Grenfell project.
Q. Well ——
A. So I could not make that assumption.
Q. Are you saying you weren't aware that these were aluminium composite material panels?
A. Correct.
Q. Okay. Well, we'll come to your specific knowledge later.
I want to ask you at this point some questions about extended application assessments.
First of all, can you explain what's meant by that term, in the way that Siderise have used them, extended application assessments?
A. You can, within reasonable —— within reasonality(sic), you can extend the application of a product if you have

other supporting evidence to support that extension in sort of extended field application, EXAP. So in terms of Siderise, we have on file test evidence and supporting evidence that the products work in larger voids than what we had tested for with the open—state cavity barrier. The intumescent gap remained the same. The intumescent type remained the same. The extension was to the stone wool part of the barrier, and we had evidence that supported us to extend that to stone wool.
Q. Yes, I understand. You are slightly anticipating some of my questions there, but I think what you mean by an extended application assessment is you take data and you work out whether the product can be used in other scenarios other than the scenarios in which you have tested; yes?
A. Exactly that.
Q. Yes.
If we look at Mr Swales' witness statement at this point, if we go to {SIL00000306/14}, paragraph 52, we can see that he says:
"With the above test results ..."
And that's the results we have been going to with the test evidence we looked at earlier:
"... Siderise were able by extended application (EXAPs) to assess the performance of the barriers in

larger cavities."
If we turn now to a document, {SIL00000204/22}, this is the extended field of application assessment for Siderise's horizontal 25—mil 90/30 cavity barriers.
We can see in that very top left—hand corner it says Siderise RH, horizontal, 25, galvanised, and then it's the 90/30—minute cavity barriers.
A. Yes.
Q. And we can see the void size: 301 to 425 millimetres; yes?
A. Yes.
Q. So this is an extended application assessment for void sizes of that extent. If we look in the bottom left—hand corner, we can see that you have signed this as the group technical officer. Can you see that? And it's dated 23 June 2017, so just after the Grenfell Tower fire; yes?
A. Yes.
Q. So is it right that you completed this EXAP assessment for this cavity barrier for use in voids between 301 and 425 millimetres at this time?
A. We had an unofficial extended field of application within our system, this was actually formalising it.
Q. Yes. Can you explain why it was that an extended application assessment was carried out at this time on

23 June 2017? What had prompted it?
A. It was just requested from the business.
Q. Was that in response to the Grenfell Tower fire that it was requested?
A. I couldn't say.
Q. You were never told that, no?
A. No.
Q. We can see at the top of the page, under the heading "Scope", it states:
"This document relates to the production of EXAP assessment which are offered in the absence of specific fire resistance test results, following the guidance given in Passive Fire Protection Federation 'Guide to Undertaking Assessments in Lieu of Fire Tests.'"
Yes?
A. Yes.
Q. Underneath the bullet points it says:
"EXAP assessments will vary from relatively simple judgements on small changes to a product or construction through to detailed and often complex engineering assessments of large or sophisticated constructions, this document is set out to assess the non—complex changes and or assessment, for complex assessments on a project or product basis a full Engineering Judgement would be undertaken."

Now, what steps did you take when preparing this EXAP to ensure that you were following the Passive Fire Protection Federation guide to undertaking such assessments in lieu of fire tests?
A. We had —— further down the page you will see we had test evidence of the parent stone wool product being certified for larger voids than what we had tested.
Q. Did you consider that you were appropriately qualified to conduct an assessment of this nature where you're extrapolating from data and applying it to larger void sizes?
A. Yes.
Q. Did you seek any outside or third—party assistance when producing this assessment to validate the conclusions that were drawn in it?
A. No.
Q. Can you help, why not? Why not get a third—party to validate this?
A. It wasn't required at the time.
Q. As in not required by Siderise in terms of its internal processes or ——
A. It wasn't required by Siderise, not required by Approved Document B.
Q. And is it right that these EXAPs were conducted by Siderise on a product—by—product basis rather than doing

a generic EXAP?
A. Correct.
Q. Is that right?
Did it ever occur to you that there might be a difficulty with Siderise essentially certifying their own products for use in these extended applications without any external third—party sign—off or check?
A. No.
Q. And is it right that you concluded —— if we go back to the document, under the heading "Conclusion" —— that an extended application to voids up to 425 millimetres could be permitted?
A. Yes.
Q. So you can see under "Conclusion":
"Siderise [horizontal barriers] 90/30 maximum permissible void size of 425mm.
This EXAP postdates the supply of horizontal cavity barriers at Grenfell for voids of between 326 and 425 millimetres; yes?
A. Yes.
Q. Had any EXAP assessments been conducted on Siderise open—state cavity barriers prior to 23 June 2017?
A. Yes, they had, but not in this formal way.
Q. When you say they had but not in this formal way, were they documented, those EXAP assessments?

A. They would have been through electronic way, through a bill of materials through an electronic system. This is more of a formal documentation of that.
Q. What does that mean, "They would have been through electronic way, through a bill of materials through an electronic system"? Was there actually a documented analysis of how these products could be used in bigger void sizes?
A. As I said, there would've been a discussion on: can we supply these larger sizes? We have the supporting evidence, so it was done in a factory controlled electronic format rather than in a formal document.
Q. I see.
Can we now turn to page 29 of this document {SIL00000204/29}. This is the EXAP for the horizontal cavity barriers 120/60 product.
Again, was it the same process? We can see at the bottom in the conclusion you have signed off on this.
A. Yes, exactly the same process.
Q. Exactly the same process, and you have concluded that these 120/60 horizontal barriers can be used up to void sizes of 425 millimetres; yes?
A. Yes.
Q. How could Siderise have been sure, prior to these EXAPs, that the products could be used in void sizes up to

those dimensions without having either conducted some testing or conducted a rigorous EXAP assessment?
A. We had carried out an EXAP assessment, however it wasn't in this format. So we have the historic data, all we've done in this form is formalise it into a formal document.
Q. Right.
Is it right that some subsequent testing did take place in October 2017 and November 2017 ——
A. Yes.
Q. —— to validate this in an actual test condition?
A. Yes.
Q. Can you explain how Siderise were able to supply cavity barriers for voids between 326 and 425 millimetres at Grenfell Tower when it appears that no testing to those void widths or any extended application assessments had been undertaken at that time?
A. As I just stated, the EXAP applications had been undertaken but not in that formal form. So they had been undertaken previously.
Q. I see.
We're not aware of any documentation being provided to the Inquiry that supports these informal assessments having been made. Would there be such documentation in

existence?
A. Without looking into -- I wouldn't say there was actual formal documentation. It's within an electronic system --
Q. I see.
A. -- (inaudible) system.
Q. Just turning now briefly, and I don't think I need to go through this exercise in detail again, because I think you will agree most of this, in terms of the testing and certification of Siderise's vertical cavity barriers this time, not the horizontal ones, can we agree that those were also the subject of extended application assessments for the void sizes used at Grenfell, but those assessments were only carried out after the Grenfell fire in June 2017; yes?
A. As I've said previously, the formalisation of those assessments into the form that you are presenting were carried out after the Grenfell Inquiry as dated on the forms, but we had, through our electronic process, that process in the background for existing products.
Q. Just breaking that down -- sorry, carry on.
A. It's common across the fire industry, you test X, Y and Z, and a project comes up asking for X plus Y plus. Because of the need to supply the project with the -- you haven't got the timeframe with the test laboratories

in order to get in to test all these things all the time, so that's where it comes from.
Q. Yes, but we did see in a number of the test reports earlier, and I specifically drew your attention to it, that it made clear that those test reports could only support the use of the products up to those void sizes; yes?
A. Yes. Now, that's where the PFPF document and others, we had that test evidence that said it was tested to that size, then we had other supporting evidence that said the stone wool part of it had been tested and certainly went for larger, so therefore that was the changing element, not the intumescent. The intumescent remained the same. We had other supporting evidence saying that the stone wool was suitable for larger voids, so therefore we made the assessment that you introduce that larger stone wool element in there, including the same standard size of the intumescent, then you can extend the scope, and we have proven by future testing that our validation is correct.
Q. Right, yes.
For the vertical cavity barriers, it's right, isn't it, that you'd only tested up to a void width of 300 millimetres prior to the Grenfell fire?
A. From memory, possibly, yes.

Q. Then after the fire, what we see in the documentation on 23 June 2017, you did extended applications for voids between 301 and 400 millimetres; yes?
A. Yes.
Q. And they're signed by you, again, no third-party validation.
A. No, there is no need for third-party validation. There is no requirement for it.
Q. Then with vertical cavity barriers some testing was done in April 2018 for voids of 450 millimetres; yes?
A. Yes.
Q. And the void sizes at Grenfell for the vertical cavity barriers were between 391 and 425 millimetres; yes?
A. I rely on your information on that. That is the product code range by the sounds of it.
Q. Yes. Again, can you explain how that came about, how you were able to sell those vertical cavity barrier products for use at Grenfell Tower when there had been no tests or formal extended application assessments for those void sizes before that?
A. We had third-party certification for voids up to those sizes.
SIR MARTIN MOORE-BICK: Excuse my interrupting, Ms Grange. I wonder whether you can help me, Mr Mort. I'm sure

the confusion is entirely my fault, but I'm trying to understand how you can have an extended application for vertical cavity barriers which I think by definition don't have intumescent properties, do they?
A. No.
SIR MARTIN MOORE-BICK: They're solid barriers.
A. Yes.
SIR MARTIN MOORE-BICK: And presumably they close off the whole of the distance between the substrate and the cladding panel?
A. Correct.
SIR MARTIN MOORE-BICK: Well, I don't understand, then, how we have extended application. If you have got a 250-mil cavity barrier, it's a 250-mil cavity barrier. But I obviously don't understand, so ...
A. We have third-party certification on other products that use the same parent stone wool that allowed us to extend the scope of that --
SIR MARTIN MOORE-BICK: I'm just thinking as a matter of fact, I don't understand how you have an extended application for a 250-mil cavity barrier which is solid in relation to a cavity of much larger width.
A. You have test evidence and you have the third-party certification evidence that allowed you to extend the scope of that. And we have proven, without any doubt,

that these -- that our assessments that were made historically are proven to be correct. We have tested 450-millimetre voids and proven that our assessments are correct.

SIR MARTIN MOORE-BICK: All right. What do you put into the 450-millimetre void?

A. Stone wool barrier. Our lamella stone wool barrier.

SIR MARTIN MOORE-BICK: Are you just saying as the extended application, you make a bigger barrier with the same material?

A. Yes, exactly that.

SIR MARTIN MOORE-BICK: Good, thank you. I now do understand it and I'm grateful to you. Thank you very much.

A. Okay.

MS GRANGE: Thank you. Yes, that's helpful.

Marketing material. I want to ask you some questions now about Siderise's marketing material and product information. I'm going to try and do this broadly chronologically, looking at some of the older marketing material and then some of the more recent, and focusing predominantly on the marketing material that was in place at the time the barriers were selected for use at Grenfell Tower.

Now, I want to start with something called

datasheet 0314. If we can go to {SIL00002588}, this is an early datasheet that Siderise produced. We can see that in the bottom right-hand corner it says 0314, and our understanding is that this was drafted in March 2002. Does that sound right?

A. From the livery, yes.

Q. Yes. We get that, for the transcript, from paragraph 44 of Mr Swales' witness statement on page 12 {SIL00000306/12}.

If we pan back out again, we can see that this datasheet explained, under the heading "Introduction" -- I'm going to read out what it says. It says:

"The cavity between curtain walls and fire compartment walls/floors needs to be sealed with a fire stop to the same fire rating as the compartment wall or floor. A particular problem is posed by the use of 'rainscreens' where the fire stop cannot fill the full width of the cavity as the rainscreen requires a typical 25mm aerospace to carry out its function.

"LAMATHERM have developed a solution that can be used to overcome this problem. Standard CW [curtain wall] 'Fire stop solutions for curtain walling', fire stops are modified at our factory to include an aluminium foil face to the outside edge, to which is bonded a continuous intumescent strip. In the event of

direct exposure to fire, when subjected to heat, the intumescent strip will expand and fill the air gap left within the void."

Then it says:

"Although the fire stop will not seal the cavity at the rainscreens, it will restrict the movement of smoke and hot gases as much as is practical."

Then it says:

"The Loss Prevention Council [reference] ... refers."

That was the letter that we looked at earlier from the Loss Prevention Council; yes?

A. Yes.

Q. Where they said it will restrict the movement of smoke and hot gases as much as is practical.

So is it right that at this stage Siderise was marketing its cavity barriers in rainscreen applications based solely on that letter received from the Loss Prevention Council?

A. Back in 2002, I had only just joined Siderise so, yes, I believe it was.

Q. Yes.

It's right, isn't it, at this point, that Siderise haven't carried out any testing of those open-state cavity barriers at all? The tests that we saw, they

began in 2007; yes?

A. Well, the (inaudible) started in 2006, the tests started in 2006.

Q. Well, yes, either way, that's several years after this marketing literature; yes?

A. Yes, due to the lack of availability of a specific fire test.

Q. Yes, I appreciate that, but I think we can agree that Siderise was marketing its cavity barriers for rainscreen systems as early as 2002; yes?

A. Yes.

Q. Can we now turn to a technical paper on cavity barriers in rainscreen façades. This is at {SIL00002428}, and this is a technical paper which was presented at a façade conference on 1 November 2012 at BRE Innovation Park. We can see that at the top there:

"Siderise. Technical paper. Fire. Cavity barriers in rainscreen façades. Façade conference. 1st November 2012. BRE Innovation Park."

Were you present at that conference? Do you remember attending that?

A. Yes, I was.

Q. Do you know who presented this paper? Was that you or somebody else?

A. That would have been Steve Swales.

Q. Mr Swales, yes.
If we go to page 8 {SIL00002428/8}, and we look in the fourth paragraph down, under the broad heading "Design of Cavity Barriers":
"Proprietary cavity barriers such as the Lamatherm CW−RS (Rainscreen Cavity Barrier) are available which partially block the cavity and have a strip of intumescent material at the front that can expand to block the cavity in a fire."
Then there is reference to figure 4, which I think we see, if we could just come out again, in the bottom right−hand side of this page. We can see there's the figure showing a cavity barrier being installed to maintain a residual gap of 13 to 25 millimetres, depending on the type of project.
Then if we go back up to the words of this technical paper, after that paragraph it then says:
"Cavity barriers may be tested following the principles of BS 476−20 or BS EN 1366−4. Tests are generally conducted with the barrier in a cavity between walls of fire resisting construction and performance with rainscreen panels may be different."
Do you see that there?
A. Yes.
Q. Now, that last part of the wording is identical to that

which we saw in the CWCT Technical Guidance Note 73; yes?
A. Very similar, yes.
Q. Yes. So can we take it that Siderise had −− was it this way round? −− taken on board the view of the CWCT that performance with rainscreen panels may be different?
A. I think it's bidirectional. I think the CWCT take on board what we were saying and we were taking on board what they were saying.
Q. I see.
A. They were present at this conference.
Q. Do you know whether at this conference any more information was provided to attendees about how performance with rainscreen panels might differ, or was it just that bald statement?
A. There was a presentation made, which I believe is still available on YouTube.
Q. I see.
Then slightly further down that column, if we can look at that column again, we can see, two paragraphs below the one we were just reading, it says:
"When the temperature does rise they may take a significant time to form a seal. This time delay may not be significant in a test where the cavity is empty but may be significant in practice if there is

combustible insulation in the cavity which could be ignited in the time taken to seal the cavity."
Now, again, pausing there, that wording is exactly the same as that which appears in CWCT Technical Note 73; yes?
A. It would seem to be, yes.
Q. Then the presentation continues. It says below that:
"Consequently, the intumescent activation and volume expansion are key properties as the time to full cavity closure is considered critical."
Note it says there, "the time to full cavity closure is considered critical".
Then it says:
"The Lamatherm CW−RS is designed to fully close the cavity in under two minutes in fire test conditions."
Yes?
A. Yes.
Q. So we can see it's representing that closing the cavity within two minutes would be sufficient to protect against the risk of combustible insulation; yes?
A. Well, as we explored earlier on in the day, our tests at this stage included combustible insulation above and below the cavity barriers, so the evidence is there from test reports that it does work and does protect the insulation above the cavity barrier.

Q. Did you have that in 2012? This is November 2012. I think you may have had that slightly later than this.
A. Possibly.
Q. 2013 and 2014 was what we looked at earlier.
A. Yeah.
Q. Yes.
I now want to ask you about something called datasheet 2110.
Now, you can take it from me that in 2013 Siderise was sending this datasheet to Harley, to Harley Curtain Wall at that stage. You can take it from me, for example, that on 5 August 2013, Ricky Kay of Siderise emailed Tim Lovell of Harley in relation to a project at 10 Trinity Square, and this datasheet was attached. Then on 19 August, Ricky Kay also emailed Mark Harris of Harley in relation to the Waylands House project, and again datasheet 2110 was attached. So it's a datasheet that was being used by Siderise and sent to Harley in 2013.
If we can go to that document now, it's at {SIL00004672}. We can see that the heading of this is, "Lamatherm. CW−RS [curtain wall rainscreen] Cavity Barriers for Rainscreen Cladding". Do you see that?
A. Yes.

Q. It's datasheet 2110.
Are you familiar with this datasheet?
A. Yes, I am.
Q. Did you technically review this datasheet to ensure that it was accurate?
A. I would have at the time.
Q. I want to look at the introduction, this introduction section on the page, and if we look on the right-hand column at the bottom, we see in the final paragraph it says this:
"Lamatherm CW-RS has been tested by Warrington Fire Research Centre (WFRC). In their opinion the product represents a practical fire cavity barrier solution for this particularly demanding condition."
We can see that two Warringtonfire test reports are referred to in the next section, if we go down the page. In the middle column in bold there's specific test data referred to, and that test data is the first two tests we looked at today from February 2007 and August 2010. Yes?
A. Yes.
Q. Going back to that paragraph that I just read about Warringtonfire's opinion, can we look back at that again, top of the page, we have already looked at the documents stemming from those tests and nowhere does it

say that the product represents a practical fire cavity barrier solution for this particularly demanding condition, ie for rainscreens.
Can you help us, what was the basis for claiming that this was Warringtonfire's opinion of your products?
A. On the next -- on the section below, there's two separate assessment documents. You've only referred to the test reports, you haven't referred to the assessment documents.
Q. Yes. If we go below, are you referring to the assessment reports --
A. On the right-hand --
Q. -- on the right-hand side?
A. Yes.
Q. Yes, and that second assessment report dated 20 September 2011, again, they're the ones we've already looked at today; yes?
A. Yes.
Q. Yes. Nowhere -- and we'll go to those assessment reports, I can take you in particular to the second one -- nowhere in those assessment reports does it say that, in the opinion of Warringtonfire, the product represents a practical fire cavity barrier solution for this particularly demanding condition, does it?
A. Without reading the documents 100% front to back,

I couldn't answer that question.
Q. Well, you can take it from me that nowhere do we see that phrase. In fact, what we see in those Warringtonfire assessment reports -- and I was careful to take you to them this morning -- were quite significant limitations of use again and again repeated in those assessment reports, making clear that the tests that had been carried out and the assessments that had been carried out were only applicable to the construction that was being dealt with in those tests; yes?
A. On the test reports, yes.
Q. In fact, let's look at that second assessment report. This specifically does touch on rainscreens, and let's see what it says: {SIL00000211}. This is that assessment report, 20 September 2011. If we go to page 4 {SIL00000211/4}, under "Rainscreen" -- we did look at it earlier today, but I want to remind you of it -- at the end of this page:
"This report does not consider the fire resistance performance of the rainscreen element or whether fire spread may occur as a consequence of collapse or failure of the rainscreen. The approving authority or regulator should decide whether it is necessary for the rainscreen to be 'fire rated', whether it is of an appropriate

construction and whether separate test or assessment evidence is necessary."
Now, that is all that this report said about rainscreen specifically.
So going back to the marketing material, datasheet 2110 now, if we can go back to that again {SIL00004672/1} --
A. Yes, you are asking me to comment on the non-technical marketing section. Technically, I'd have reviewed this from the tables of materials. I wouldn't be -- I am not a marketer, I'm not into marketing, I wouldn't have reviewed this from a marketing perspective.
Q. I see.
A. I'd have reviewed the table of the contents of fire ratings and void sizes, et cetera, et cetera.
Q. Can we agree that that's not an accurate statement of the opinion that Warringtonfire expressed in any of those test or assessment reports?
A. That opinion could have been expressed verbally, I can't confirm that.
Q. But if that opinion had been expressed verbally, you would have known about it, wouldn't you, as technical officer for Siderise?
A. I did not write this test report, like I've said. I have been asked -- I was probably -- I was definitely

asked to review this technically. Technically I would have reviewed the fire ratings and the fire performance. I would not review marketing.
Q. Can we agree now, sitting here today, that that statement, "In their opinion the product represents a practical fire cavity barrier solution for this particularly demanding condition", is certainly not something that we see in any of the test reports or assessment reports that we have looked at today?
A. I can agree it doesn't come up in any of the test reports and the assessments, but I cannot agree that it has not been discussed in other areas.
Q. So ——
A. Because I may not have been party to the discussions.
Q. I see. So are you saying that there were parallel discussions going on between your marketing department and between Warringtonfire about how those tests could be represented?
A. I don't know, because I wouldn't have been involved in it. If there were discussions, I wouldn't have been involved in them.
Q. It's not likely, though, is it, that there were those parallel discussions and you not knowing about them, surely? You're the technical officer who has commissioned those assessment reports. You confirmed

that this morning.
A. Yes, but I —— there's delegation, there's other areas. I work on the technical aspect and the testing aspect of the business, I do not work on marketing. I'm not a marketeer.
Q. I see. So your remit was solely to check the figures that were being quoted in the tables in this marketing literature and not to look at any of the written statements that were being made?
A. That's generally what happens in technical reviews, I review the technicality of it.
Q. But in those circumstances, isn't there a risk that what's being said in the marketing literature is technically inaccurate or misleading?
A. I don't believe it is misleading. I believe it was a genuine understanding at the time. I don't see that as misleading.
Q. Just to be clear, you believe it's a genuine understanding because you think, do you, that there would have been some verbal statement by Warringtonfire that was the origin of that statement; yes?
A. Quite possibly.
Q. And yet we don't see that written down in any emails or any documents that have been disclosed to the Inquiry.
A. There's lots of discussions of lots of different levels

that went across the industry in all levels. It's been proven time and time again that cavity barriers function for the use in rainscreen. We have over 200 8414 tests on record, and the lion's share of those, as you said this morning, there's only a handful carried out before Grenfell. These are all post—Grenfell. The project teams are now waking up to the fact that they have to demonstrate that the systems work for compliance.
We haven't changed what we do; the façade industry have changed what they do.
Q. Yes, thank you, I understand that, but I'm just seeking to get to the bottom of how a statement like that can have appeared in Siderise's literature.
A. I can't answer it.
Q. You can't answer that?
A. No.
Q. If we look at page 2 of this datasheet {SIL00004672/2}, we can see in the table at the bottom, right at the bottom there, there's a number of statements made about the maximum void sizes for the products. Do you see that there?
A. Yes, but that's actually for the brackets type.
Q. I see. So where it says it's for use in voids of up to 325 millimetres and 425 millimetres, you're talking about the brackets, are you, and not the cavity barriers

themselves there?
A. Yes, because if you look on the left—hand side it says "Bracket Reference".
Q. I see.
We've looked at the express limitations that were in the Warringtonfire test reports and assessment reports. For example, it was clear that they'd been tested only between concrete elements and those limitations were spelt out in the report again and again.
Can you explain why this datasheet doesn't spell out any of the limitations of the Siderise testing that had been undertaken?
A. If you look at any passive fire protection datasheets from any manufacturer anywhere across the world, they do not relate back to that. You're testing an element to give you that element's performance. It is then for the fire engineers on the project to take on board all the fire resistance tests, all the reaction to fire tests, all the bounding conditions, to deem if a product is suitable for use or not. This is about the performance of the barrier in isolation. It doesn't say anywhere within the test reports, "It should be used —— can be used in this, this and this". It is the responsibility of the fire engineer to take on board all the test evidence from all the elements of construction to decide

if the building is deemed suitable.
Q. I see. So are you saying —— if we go back up to page 1 {SIL00004672/1}, where the test report numbers are given, are you saying that it was incumbent upon anybody using this datasheet to —— I think it's in the section below, we see the test reports given —— obtain copies of those test reports and work out from those test reports what the limitations were of the tests that had been carried out; yes?
A. As published on our website even now, we freely share our test data of the products.
Q. Yes. But ——
A. We share this data even with the likes of Arup. Arup come to us asking us for test data, we supply them the test data, they analyse the test data and then they make their assumptions and their analysis on the data we supply them.
Q. Yes, I understand that, but can you just explain —— I realise what you have said about what the industry generally does, but why did Siderise choose not to set out any of those limitations, including the fact that it had been tested between concrete blocks and that the test report made clear it couldn't verify the use of such barriers in any other configurations other than the ones tested? Why is that not spelt out very clearly in

this type of datasheet?
A. In there it says tested using the principles of 476—20, EN 1364—4, et cetera, et cetera. The reader of anything needs to understand what the limitations of those test standards are, and it's known across the industry that passive fire protection generally is tested concrete to concrete. It's a known fact. The fire engineers know about it, Barbara Lane certainly was clear on it from the meeting I had with her in 2014. They understand the fact you're testing a component to get the fire resistance performance of that component on its own. It has no reflection on the fire performance of any other element of that construction.
MS GRANGE: Yes, I see.
Let's look at another document just before we break for the day.
Mr Chairman, I'm doing reasonably well but I'm afraid I am going to go into tomorrow. But if I can just look at another piece of marketing material before we break.
SIR MARTIN MOORE—BICK: Yes, that's all right, but let's not push it too far, if we're going to come back tomorrow anyway.
MS GRANGE: I understand.
If we can look at {SIL00000227}, this is a marketing

document entitled "Cavity barriers for rainscreen cladding". We can see from the top right—hand side it's dated November 2013, issue 1.
Again, are you familiar with this document?
A. Yes, to a point.
Q. When you say "to a point", do you remember being asked to check the technical content of this document?
A. I would have checked the tables, et cetera, on that, yes. This is a refresh in livery of an older datasheet.
Q. If we turn to page 3 of this document {SIL00000227/3}, we can see text in the right—hand paragraph at the top of the page. It says this:
"SIDERISE have tested a range of horizontal cavity barriers to the above mentioned standards with seal reaction times of 1 minute and seal temperatures remained below 180ºC and maintaining the [integrity] requirements as detailed in Table 1 ..."
Test report WF 328279/A is referred to at the end there, saying, "shows evidence of this". We have already reviewed that test report. It's dated 23 July 2013. If we can briefly turn to that again, {SIL00000212/31}, if we look at the second paragraph down at the top there —— we looked at this earlier but just to remind you —— in that report, what it says is that full closure of each cavity was deemed to occur

between 1 minute and 4 minutes 38 seconds.
A. Okay, as I previously went over with you, there are many thermocouples on these tests. If you actually scroll to the bottom of the page, there is more of an explanation towards the bottom.
Q. Yes. The bottom of this page here?
A. Yes.
Q. So it says there:
"The test duration ... The test was discontinued [for one of them] after a period of 136 minutes."
Then it says:
"The failure criteria of each specimen was measured after the ventilated cavities had an effective seal by the means of the intumescent properties of the products and the findings were as follows:
"i. At 1 minute of testing, the suspended thermocouples reached their peak temperature ...
"ii. At 1 minute as the peak temperatures indicate an effective seal had formed, although not full developed to the full 75 mm depth."
Is that what you're referring to?
A. You actually need to finish reading point i, because point i clearly states in there:
"At 1 minute of testing, the suspended thermocouples reached their peak temperature, with seal A, B and C not

breaching the ASFP requirements of 180 [degrees] ..."
So the suspended thermocouples have reacted, they haven't risen above 180 degrees in the closing phase of things, so they are -- they've closed effectively in around the minute or less than a minute.
Q. I see. That's how you interpret that, is it, that they've --
A. That's how -- if you had the time to go into the thermocouple numbers and -- within this test report, there are thermocouple graphs and thermocouple data and we can analyse that. This test report was written by a test engineer at Warringtonfire.
Q. Yes, I understand that, but going back to the words earlier in the page, what it says is --
A. Yes, this is where we talked about --
Q. Sorry, go back, full closure of --
SIR MARTIN MOORE-BICK: Sorry, you can't both talk at once.
What did you want to say, Mr Mort?
A. Yes, let me finish this off. Full closure is deemed to have occurred between 1 minute and 4 minutes 38 seconds.
MS GRANGE: Yes.
A. What that doesn't say is that the -- what that says there is full closure. That is the intumescent has developed to the full depth of the seal being tested.
Q. Yes.

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A. So if the seal is 75 millimetres in depth, that the full depth of the 75 millimetres has been developed.
Q. Yes.
A. But when you look at the requirements below, right at the very bottom, from the suspended thermocouples, because this is a combination of thermocouple data and observation, so a person having to observe this, the thermocouple data has clearly shown that the seals reacted in less than one minute because the 180-degree rise as set by the test guidance was not reached.
So the intumescent at the bottom of the seal has reacted to close the cavity and introduce the integrity and insulation criteria for that, and then over a period of 1 minute to 4 minutes, through separate observations -- which, if we went into the report, there's a section on observations themselves -- a person, the engineer, would have been making an observation as to how that intumescent has developed at the full depth of the seal. So of the 75 millimetres it's 75, for the 90 it's 90, for the 120 it's 120. That's what that refers to.
Q. Yes, I think I understand what you're saying. I think you are saying that you can tell from the thermocouple data that a form of seal has occurred. It's reacted and a form of seal has occurred within one minute of the

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testing; yes?
A. Yes.
Q. But then it has taken, just going back to the language at the top of the page, up to 4 minutes 38 seconds for full closure to occur, ie the whole depth of the cavity barrier to seal; yes?
A. Yes, but the insulation/integrity criteria was restored in less than one minute because the thermocouples have measured that.
Q. Yes, I understand that, but going back to the statement made in your -- if we go back to the product literature we were looking at, {SIL00000227/3}, you talk there about seal reaction times of 1 minute, and I appreciate it says seal reaction times, but why not state in there clearly that in terms of fully closing the cavity, that was deemed to occur between 1 minute and 4 minutes 38 seconds?
A. Because the insulation and integrity criteria was reestablished within the 1 minute the seal reacted. The fact that it developed further -- intumescents don't stop developing, they naturally replenish themselves, they continually develop through the duration of the fire test. So at the start of the test, at time zero, the suspended thermocouples are at ambient air temperature. They did not rise above 180 degrees, and

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sealed within a minute. So therefore the insulation and integrity criteria as set in EN 1363-1 or even BS 476 is reintroduced at that point.
Q. Yes.
A. This is an observation in the test that it continued to grow through that period of time. And --
SIR MARTIN MOORE-BICK: I wonder whether that's a good point, Ms Grange.
MS GRANGE: Exactly, that's what I was about to say.
SIR MARTIN MOORE-BICK: I think if I understand Mr Mort correctly, what he is drawing a distinction between is the creation of a seal, which he says occurred very quickly, and the complete development of the intumescents, which takes longer.
MS GRANGE: Yes.
A. Correct.
SIR MARTIN MOORE-BICK: Okay.
We're going to stop there for the day, Mr Mort. I am afraid I think Ms Grange has some more questions for you.
Do you, Ms Grange?
MS GRANGE: I do, because I still need to cover some specific questions -- well, there is a little bit more on the marketing material, and then I have to ask some specific questions about the Grenfell project, but

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I will review those overnight and I will try and do them as quickly as I can tomorrow morning.
SIR MARTIN MOORE-BICK: Yes. I'm sure Mr Mort would like to have some idea of when he can finish this exercise. Can you give us any help on that?
MS GRANGE: Yes, I would hope that we would be substantially finished by the first break, there or thereabouts.
SIR MARTIN MOORE-BICK: Well, let's make an effort to finish him by the first break, then.
Well, Mr Mort, I'm very sorry that we have to ask you to make yourself available again tomorrow. I think you may have been warned that that might be the case.
THE WITNESS: It's understandable, it's not a problem.
SIR MARTIN MOORE-BICK: Thank you very much.
Anyway, we're going to break now. Please remember what I said to you earlier: it's very important that you don't discuss your evidence or anything related to it with anyone else at all over the break, and we will resume at 10 o'clock tomorrow morning.
THE WITNESS: Okay, thank you.
SIR MARTIN MOORE-BICK: Look forward to seeing you then.
THE WITNESS: Thank you.
SIR MARTIN MOORE-BICK: Thank you very much. Bye.
(4.35 pm)
(The hearing adjourned until 10 am

on Tuesday, 9 March 2021)

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