Grenfell Tower Inquiry

Day 10

March 9, 2020

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Monday, 9 March 2020
(10.00 am)
SIR MARTIN MOORE-BICK: Good morning, everyone. Welcome to today's hearing. We're going to continue hearing evidence from Mr Crawford in just a moment, I think. So could we have Mr Crawford in, please.
MR NEIL CRAWFORD (continued)
Questions from COUNSEL TO THE INQUIRY (continued)
SIR MARTIN MOORE-BICK: Good morning, Mr Crawford.
THE WITNESS: Good morning.
SIR MARTIN MOORE-BICK: I hope you're ready to carry on.
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: Thank you.
Mr Millett.
MR MILLETT: Mr Chairman, thank you.
Mr Crawford, good morning.
A. Good morning.
Q. I want to turn next to Exova and your dealings with them.
You worked with Exova on the KALC project, didn't you?
A. That's correct.
Q. Was it you who recommended Exova, that they work on the Grenfell Tower project?
A. No.

Q. Do you know who did?
A. No.
Q. Do you know anything about how Exova came to be involved on the KALC project at all?
A. I believe there was ... I believe there was an indication early on that there was a certain convenience in transferring the same consultant team across. I think we had that from the earlier --
Q. On the KALC project, I meant. Who got Exova involved originally on the KALC project?
A. Oh, sorry. Gosh. I don't recall.
Q. Okay.
What was your overall impression of the quality of Exova's work on the KALC project?
A. The project was complicated by the fact that there was a requirement for -- there is -- well, there's discussion of various strategies in terms of escape that involved sprinklers or not using sprinklers, and then there were complications in relation to the engineering strategy to accommodate that. So it wasn't straightforward. There were a number of revisions done to the strategy to get that resolved.
Q. Can we please go to {SEA00004053}, please.
This is an email dated 24 April 2012, and you are copied in on it, if you see the list of copy-ees.

A. Yes.
Q. It's sent to Terry Ashton of Exova. You can see the attachments and the subject matter, it's "KALC & Grenfell Tower upgrade", so it's at a time when both are being considered.
In the second paragraph you see that Bruce Sounes says to Terry Ashton:
"We have thus far had no commitment in writing from you to a fire strategy on either the KALC leisure centre, Academy, Residential development or the Grenfell Tower upgrade. We have had no concrete input by way of drawing markups or draft reports to support the developing designs. This is becoming critical for us with three weeks to go before we submit the Stage D Report for KALC, with much of the work undertaken so far by the whole team relying on the fire safety advice we've received at meetings. We fear that the designs have not had adequate scrutiny and that we are at considerable risk at this late stage of late changes, abortive work and possible cost implications to the project."
Then in the third paragraph, Mr Sounes says:
"If you are unable to reassure us that you are committed to the two projects by the end of this week -- both agreeing contract terms and providing detailed

advice - we will regard this as a renunciation of the commission and be forced to look elsewhere for fire safety ..."
My first question, Mr Crawford, is: when you were copied in on that email, did you read it?
A. That's eight years ago. I mean, probably.
Q. Do you remember reading it, do you think?
A. I don't. I mean, I have to say, Andrzej and Bruce were more involved with setting up the projects, in terms of managing consultants and bringing them in. I would have been copied in -- I would have -- I probably would have read it, yes.
Q. Right.
Now, it was Mr Sounes' evidence that he was passing on a concern to Mr Ashton from the KALC team. Was that your concern, that Exova had not provided adequate scrutiny of the drawings for KALC?
A. I can't recall.
Q. Was it your concern that Exova had put in no concrete input on KALC at that stage?
A. I don't recall.
Q. Did you have any discussions yourself with Mr Ashton or anyone else at Exova at that time regarding resourcing issues?
A. Not that I'm aware of.

Q. Did you discuss the contents of this email with Mr Sounes at all?
A. I can't recall.
Q. Okay. I mean, against the background of what is said in this email to be Studio E's, at least, dissatisfaction with Exova's work on the project in the way they set out there, do you know why you recommended them for the Grenfell Tower project?
A. I didn't personally recommend them.
Q. You didn't.
Do you know why you were content with them to be the fire engineer on the Grenfell Tower project?
A. I would have said the job they did ultimately in KALC was pretty good.
Q. Did Exova do anything in response to this email to allay your or Mr Sounes' concerns as expressed there in that email?
A. I couldn't recall.
Q. Could we please turn to {LBI00000620}, and go to the bottom email in the chain, which is at the bottom of page 2 {LBI00000620/2}.
Now, this is an email of 10 October 2012 from Colin Chiles of Leadbitter to Andrzej Kuszell. Now, you weren't copied in on that email; you were copied in on the email above it, but I'll just show you this one to

start with. This is from Colin Chiles:
"Andrzej
"I have still to receive a satisfactory response from the design team with reference to the concerns raised by the GAG. Our client requires us to deal with this and I am not willing to commence the works until I receive demonstration that the fire safety of the estate has been considered with on the design. This is a clear requirement of the CDM Regulations. The response received from Exovia[sic] is in my opinion casual, should I issue this to GAG it would further exacerbate an already high project risk.
"I must have a proper response regarding consultation with BC and LFB by return.
"Regards.
"Colin C."
Then if you look above it {LBI00000620/1}, Mr Kuszell replies, and you were copied in at that point. If you go to the top, you can see, just running right from the very top of the page, Colin Chiles sends the email string below it to you, and then, two below that, you can see that Andrzej Kuszell responds to him, and above that is your response to Andrzej Kuszell and Colin Chiles, just to set the context.
What Mr Kuszell says -- if the operator can move

down to that one, "Colin", that's right -- if we look at that:
"The safety of the estate has been considered ..."
If you look six lines down you can see that Andrzej Kuszell says:
"As you know the separate Grenfell Tower commission is running behind KALC, with designs currently sitting at stage C and BC/LFB consultations still to occur. As far as we are aware, with the proviso on the Grenfell landscape, the proposed Academy and Leisure developments are not impacting on the fire safety of the estate. I have asked Neil to get back to you on the details of the KALC BC/LFB consultations held to date."
You then write to Andrzej Kuszell and Colin Chiles on the same day, 10 October, and you say:
"Colin
"Our contacts at RBKC have been John Allen and Dave Gammon ..."
And you explain that. Then you say:
"Following an initial meeting with building control on 28th October 2011 I did ask the question in relation to fire access to and around the Tower (see attached) however this was not formally responded to although we were led to believe all access is from Grenfell Road."
Then Colin Chiles' response to that, above that on

the page, as you can see there:
"Thanks Neil.
"I'm afraid we need a formal response from RBKC please chase this."
Now, I've shown you the whole email string. Do you remember reading Mr Chiles' email when you received Mr Kuszell's reply?
A. From eight years ago, no.
Q. No.
Do you accept that Mr Chiles' concerns about Exova's performance, which are set out at the bottom of page 2 {LBI00000620/2}, which I read to you, should have put you on notice as to Exova's somewhat less than thorough approach at that stage?
A. Well, certainly they might not have been as mobilised to the extent that they might have been at that point.
Q. Right.
Going forward in time just under two years to the summer of 2014, when you took on the Grenfell Tower project, do you remember whether, during your handover discussion with Mr Sounes, you had a conversation with him about the involvement of Exova in the Grenfell Tower project?
A. Possibly. I was aware of the fire report.
Q. Was it your understanding at that stage that Exova had

been instructed to assess fire safety issues as they pertained specifically to the overcladding of Grenfell Tower?
A. I understood that they produced a high-level fire strategy report.
Q. Is that something that Mr Sounes told you?
A. It's pretty much mandatory in any project of that nature and complexity.
Q. Right.
When you came into the project -- so we're looking at July/August 2014 -- did you ask Mr Sounes to see the fire strategy reports that Exova had produced so far on Grenfell Tower?
A. I'm not sure if I asked him, but I would have read them at some point.
Q. Do you remember when you read them?
A. Specifically, no.
Q. Was it your understanding that Exova would in future be producing advice on the application of regulation B4 of the Building Regulations 2010, "External fire spread"? Is that your understanding at the time?
A. I'm not sure.
Q. You're not sure as in you can't remember, or you can remember not being sure?
A. Well, my understanding is they would have had the

fire strategy report and I would have read that fairly early on. It's always a priority to understand -- I mean, specifically B1 and B5 issues. I mean, they're very primary to any scheme, particularly where there is any complexity, so you would look at those and understand those and get your head round them as part of coming into the project, if you like. So you would understand this.
In terms of specifics to the façade, where it was relevant, you would also expect commentary on that.
Q. Yes.
Again, I'm just focusing on the moment you came into the Grenfell Tower project, July/August 2014. Did you think or expect that Exova's work would cover the entirety of the Grenfell Tower project or just a part of it?
A. I would expect it to cover where it was relevant.
Q. Where it was relevant?
A. Yeah.
Q. So all of it, where it was relevant?
A. Yes.
Q. I see, thank you.
Now, when you came into the project, summer of 2014, did you know that Exova had at that point, so far, produced five fire safety strategy reports? I'll just

list them for you: there's a report on the existing fire strategy for Grenfell Tower of August 2012; a design note in September 2012; issue 1 of the outline fire safety strategy for the refurbishment, 31 October 2012; issue 2 of the outline fire safety strategy for the refurbishment of 24 October 2013; and then issue 3 of the same strategy dated 7 November 2013. I should also just be clear, the initial design note was also for the refurbishment.
Now, there are five of those. Do you remember that at that stage, when you came in, there were five such reports which Exova had done?
A. What I would do when I come into any project is look at the most recent fire report to understand the status of the project relative to the fire strategy at that time. Would I have gone back and read the historical ones? Not necessarily.
Q. I see. We will come back to that in a moment.
If you can go, please, to paragraph 71 of your witness statement, {SEA00014275/28}, you discuss an email exchange in September 2014 between Harley, Rydon and Studio E in relation to a request for information, an RFI, regarding horizontal firebreaks in relation to cavity barriers, and we will come back to that later in your evidence.

Can I ask for you to be shown page 29 {SEA00014275/29}, within the same paragraph, where you say, third line down:
"... in short, I contacted Exova, which was the fire engineer on the Project and produced the fire strategy reports."
Do you see that?
A. Yes.
Q. "I would have contacted Exova as it is an authority on all things fire related."
A. Yes.
Q. Now, my question is: was it your understanding at that time that, prior to Studio E's novation, Exova was the "authority on all things fire related" -- your words -- in respect of the refurbishment at Grenfell?
A. Yes.
Q. Did you have any reason to believe at that time that Exova's role had changed post-novation?
A. No.
Q. So when you refer here to the fire strategy reports, can you just be clear what you're referring to?
(Pause)
A. All the reports that they had created.
Q. All the reports? Thank you. I think you say you had read those as part of -- is this right? -- your coming

into the project?
A. It's part of coming into any project. Personally, that's what I always do, go straight to the fire strategy to understand the fire strategy of the project at the current time.
Q. Right.
A. I would have seen -- normally the way we file things, we would have had a consultant folder and it would have been labelled "Harley", "Exova", whoever it was, and you navigate to there and look at the dates and read them. Whether you would go back and read them all from the start, as in revision 1, revision 2, revision 3, possibly not. You would certainly look for the latest. I may also have read it as part of the stage E employer's requirements tender set that Bruce had as a physical set on his desk.
Q. Yes, I see.
Now, let me take you, then, to the latest that you say you would have read. In fact, I think you said on Thursday afternoon last week that you had in fact read it. That's, just for our own records, {Day9/136:13-20}.
If I can ask you to look at it. It's {EXO000001106}. You can see there it's dated 7 November 2013, it's I shall number 03, and it's a report to Studio E. Do you see that?

A. Yes.
Q. When you first read that as part of your handover from Mr Sounes, do you remember discussing its contents with Mr Sounes?
A. Remember? No.
Q. Do you remember discussing anything with Mr Sounes about Exova's input at that stage?
A. I can't recall, but it doesn't mean that I didn't or ...
Q. Can I ask you, please, to go to page 4 {EXO000001106/4} under the introduction. It says there, do you see:
"The refurbishment comprises ..."
Just look with me, if you would, at it. There are five bullet points. Bullet point 1 is "ground storey level"; bullet point 2 is "mezzanine level"; bullet 3, "walkway level"; bullet point 4, "walkway +1 level" and "the creation of four new residential apartments"; and bullet 5, "generally - improvements to the building services".
Then it says:
"This report details the applicable statutory controls in respect of fire safety and contains an outline fire safety strategy for compliance with these statutory controls.
"The report is based on discussions held with the design team, the Royal Borough of Kensington & Chelsea

and on fire access and fire strategy drawings produced by Studio E LLP."
Do you see that?
A. Yes.
Q. We can see, can't we, that the introduction section doesn't make any reference at all to the overcladding of the exterior of the building, does it?
A. No, but the last section does.
Q. The last section does?
A. As to the whole report.
Q. Okay. But when you're looking at the summary of what the refurbishment comprises, and we can read it together, we can see that it doesn't make any reference to the overcladding.
My question is: did you note the scope of the summary of Exova's report when you read it?
A. I believe it was within their terms of appointment that they were to look at the cladding, or the external façade.
Q. Indeed. Did you look at the terms of appointment when you read this report? Did you put the two side by side?
A. I don't recall putting the two side by side, but Bruce may have mentioned the terms of appointment.
Q. Bruce Sounes mentioned to you --
A. No, he may have mentioned.

Q. Right. Let me just be clear. When you had a conversation with Mr Sounes at the handover, do you remember having a conversation with Mr Sounes about the terms of appointment?
A. As I mentioned earlier, I don't specifically remember anything specifically in relation to the Exova report. That's not because it didn't happen, but it's because it's eight years ago and I don't have that level of recollection.
Q. Okay, I understand.
Let me see if I can get at it this way: when you, as you say you did, read this report and you looked at "Introduction", do you remember what your thoughts were about the scope of the work Exova had been asked to do?
A. I don't know. To me, it just reads like a fairly standard sort of generic introduction description of the project.
Q. Right.
You knew -- and I'm suggesting this because I think it's common ground between us, Mr Crawford -- when you came into the project, one of the significant elements of the project was the overcladding of Grenfell Tower; yes?
A. It was one of the elements, yes.
Q. Yes. So when you read this report and saw the

introduction and the description by Exova of what the refurbishment comprises, did it strike you as complete, or did it strike you as incomplete?
A. I don't recall. I mean, I just read the report. I mean, I read the report from start to finish, and I wouldn't -- I don't think -- I wouldn't analyse it in that way, I wouldn't be marking it or saying -- you know, I would just be -- because this was the third revision, this is where it was, I would just read it, assume it, look at fire strategy drawings, look at the project. I don't think I would look at in the terms you're sort of indicating.
Q. So can we take it that you didn't think to yourself when you read this report, "Oh, they've missed out the overcladding in their description of the refurbishment"?
A. But they didn't because it was later on.
Q. Well --
A. In the introduction, it's not there, but there are many things that are potentially not in there.
Q. So is the answer to my question no?
A. What was the question?
Q. Yes, of course. Can we take it that you didn't think to yourself when you read this report, "They have missed out the overcladding in their description of the refurbishment"?

A. Well, I guess not, because I read it at the end.
Q. Right.
Maybe you don't remember, but did you have a discussion with Mr Sounes about the precise scope of what Exova were asked to do?
A. I don't recall.
Q. What about a conversation with Mr Ashton? Did you have a discussion with him about the precise scope of what Exova were asked to do?
A. I don't recall.
Q. Do you remember discussing with either of those two gentlemen where Exova had got to in Exova's assessment of the issues pertaining to external fire spread at the time of your handover?
A. I would have understood it as per the line at the end of the report.
Q. We will come back to the end of the report in a moment, because I know you keep referring to it and we will look at it.
A. I suppose what I'm trying to say is at this point, when I took over the project, I would have had an introduction, I would have been concerned with certain things. The things I would have been concerned with were essentially M1 and M5 issues, because, for example, I knew some changes were happening at the

lower levels. The lower levels from a fire strategy perspective were much more complex, in my view, and I would have been aware of those and focusing on those. Then I would have read the whole report. I would have read the whole report in the context that it was the third version of the report, and that's where it was at the point in time. I wouldn't be going back and analysing it from the perspective of completeness of brief as you would at the start of a project.
Q. Right. You mentioned M1 and M5. What are they?
A. Sorry, B1 and B5.
Q. I see.
Do you remember ever discussing with Mr Sounes or indeed Mr Ashton where it had got to in its assessment of issues pertaining to external fire spread?
A. I'm sorry to say this, but, again, my understanding was what it said in the document, which was at the end of the document, the statement at the end of the document.
Q. All right. We will look at that.
If you could turn the page to the next page {EXO000001106/4}, please, at paragraph 2.1(d). It's on the screen now. Section 2 is headed "Statutory Considerations", and 2.1, "The Building Regulations 2010", and then you can see that the five requirements of schedule 1 are set out. There is B1 at the top and

B5 at the bottom, and between them we have:
"b) 82 (internal fire spread (linings));
"c) B3 (internal fire spread (structure));
"d) B4 (external fire spread) ..."
Was it clear to you from reading that that the report was going to deal with each of those regulations or each of those requirements within schedule 1 so far as the refurbishment of the tower was concerned?
(Pause)
A. Yeah, my understanding would be that the report would deal with them in the terms in which they were applicable.
Q. Can we look at page 9 {EXO000001106/9}, please, and this should be paragraph 3.1.4, "Compliance with B4 (external fire spread)", do you see that?
A. Yes.
Q. It says:
"It is considered that the proposed changes will have no adverse effect on the building in relation to external fire spread but this will be confirmed by an analysis in a future issue of this report."
When you read this report, did you notice that paragraph?
A. Erm ... I would have noticed it. I mean, if I read the report, I would have noticed it.

Q. Yes. Did you consider or do you remember considering Exova's progress in relation to its advice on compliance with B4, "External fire spread"? Did you consider how it would progress, what it says there?
A. I'm not sure. I may have discussed with Bruce in the handover what his understanding was or where he saw the level of compliance at that point.
Q. Right.
Do you remember having a discussion with Mr Sounes on when Studio E expected to receive the future issue of this report?
A. I don't recall having a specific --
Q. Did Mr Sounes tell you to progress the next issue of this outline fire safety strategy with Exova once the cladding subcontractor had been engaged and further detailed design had commenced?
A. I don't recall.
Q. Did you ask Mr Sounes what documents Exova had in order that they could complete the analysis they indicated would be provided?
A. I don't recall.
Q. Did you yourself conduct any checks to see whether Exova had the documentation it needed to complete the analysis they said would be provided?
A. I don't recall.

Q. Did you ask Mr Ashton whether there was anything Exova needed so that they could complete the analysis that they had indicated would be provided in a future issue of that --
A. I don't recall.
Q. Were you not in some way concerned that by August 2014, which was some ten months or so after issue 3, perhaps nine months after issue 3 of this report, that an analysis of the compliance of the overcladding scheme with regulation B4 of the Building Regulations had not at that stage been completed?
A. My understanding was that the cladding is detailed in the employer's requirements and stage E in the tender set was compliant, and that the options were also compliant.
Q. Where was that understanding from?
A. I guess that would have been from conversations with Bruce, and also I would have expected any scheme at tender stage to be compliant relative to that stage.
Q. So let's just try and be clear here. Are you saying that Mr Sounes told you that the cladding as detailed in the employer's requirements and the stage E tender was compliant with the Building Regulations?
A. My understanding was that his understanding was that it was compliant.

Q. If that was so, Mr Crawford, do you know why, or do you remember asking yourself why it was that, as at November 2013, Exova were saying that they would confirm by an analysis in a future issue of this report whether the proposed changes would have any adverse effect on the building so far as external fire spread is concerned?
A. It's possible, because there was a number of options and final decisions hadn't been made, particularly in relation to planning, what decisions came out of planning, that they wouldn't have done that final issue until, let's say, maybe they had more detail, I don't know, possibly.
Q. Are you telling us that Mr Sounes had told you that, even though Exova had said in their 7 November 2013 report that whether the proposed changes would have an adverse effect on the building in relation to external fire spread would need to be confirmed by an analysis in a future issue of the report, nonetheless there was no reason any longer to pursue such an analysis with Exova?
A. I don't recall.
Q. If Mr Sounes had told you that you needn't worry any more about compliance with B4, as indicated in this report, because he had already had the confirmation

needed, you would remember that, wouldn't you?
A. Possibly.
Q. But you don't?
A. No.
Q. On the assumption -- and bear with me on this -- that Exova had not, as at the summer -- July/August -- 2014, given any confirmation by an analysis, whether in a report or otherwise, that the proposed changes would have no adverse effect on the building so far as external fire spread was concerned -- on that assumption -- it's right, isn't it, that Exova still had significant work to do as at that date in respect of assessing the compliance of the overcladding scheme with the Building Regulations?
A. Not necessarily. I mean, my understanding was that they had been kept abreast of the development of the project and the scheme, and therefore they knew exactly what was going on with the scheme and what the proposals were. So the fact that they -- I mean, they might leave that statement in the report, but it didn't mean -- it doesn't necessarily mean that what was proposed was in their view not compliant or compliant.
Q. You say that that was your understanding.
A. Yes.
Q. Was that an understanding which you had from being told

that by somebody or was it an assumption that you made?
A. I think this understanding I had from Bruce. I mean, I think Bruce was pretty clear that Exova knew what was going on and what was being proposed, and that's -- I'm sure that's the understanding I had.
Q. Did -- I'm so sorry, do you want to finish your answer? I don't mean to interrupt you.
A. That's it.
Q. Okay.
Let's just be very clear about this, Mr Crawford. Are you saying that Mr Sounes told you that Exova knew what was going on and -- let's just be clear about this -- were satisfied that the proposed changes to Grenfell Tower were compliant with the Building Regulations, specifically B4, "External fire spread"?
A. Can you phrase that again, sorry? It was quite long.
Q. Yes, I will.
Are you saying that Mr Sounes told you that Exova were satisfied that the proposed changes to Grenfell Tower would have no adverse effect on the building so far as external fire spread was concerned?
A. I think that was his belief. Whether -- how he communicated that to me, I can't specifically recall, but I do believe that was his belief.
Q. Did you ever see a document that confirmed what you

understood to be his belief?
A. No.
Q. Did you ever ask him to get a document like that from Exova?
A. I don't recall.
Q. Given its importance, can you explain why you didn't ask Mr Sounes to get a document like that from Exova, or indeed seek one yourself?
(Pause)
A. Perhaps it was a feeling that -- well, I'm not entirely sure, but I think, as I stated earlier, my impression was that Bruce understood what had been proposed up to then in his eyes and Exova's eyes was compliant.
Q. Do you agree that Exova's work at the tender stage -- so late 2013, Mr Crawford -- had not been brought to a state of completion so as to form a satisfactory basis on which to proceed with further design and specification of products?
A. I couldn't comment on that, because I was not involved in that period of works. I think that's a comment -- a question for Bruce.
Q. A question for Bruce, all right. But would you agree that unless you knew whether or not for sure the cladding design was compliant with B4, you couldn't really make any progress yourself?

A. Well, as I stated, my understanding was from Bruce that he believed that it was compliant.
Q. Right. But you never really interrogated Mr Sounes -- perhaps that's a harsh word. You never scrutinised with Mr Sounes what the basis of his belief was? You just took it --
A. Well, not in the way you are now, no.
Q. No, but in any other way?
A. I don't recall. I mean, generally when you have these conversations, they're fairly informal, and you look at the reports, you look at the drawings and you satisfy yourself that -- of what the issues are and where the project is at.
Q. Can I ask you to look at --
SIR MARTIN MOORE-BICK: All right, before we do that, can I just ask a question on the one that's on the screen at the moment.
You can see, Mr Crawford, in paragraph 3.1.4 that Exova write:
"It is considered that the proposed changes will have no adverse effect ..."
Do you recall what you understood the proposed changes to refer to?
A. I would understand that is the general proposition to overclad, and with all the options that we had provided

to date.
SIR MARTIN MOORE-BICK: Even though, as far as we can see, there is no reference in this report to overcladding at all?
(Pause)
A. Yes, because my belief was that Bruce had kept them abreast of where the project was. I mean, there had been regular design team meetings.
SIR MARTIN MOORE-BICK: This is a fairly formal document, isn't it?
A. Yes.
SIR MARTIN MOORE-BICK: If Exova had the overcladding in mind, would you not have expected them to have made a reference to it somewhere?
A. Well, it does mention -- well, B4 is external fire spread, so that is external materials or cladding.
SIR MARTIN MOORE-BICK: All right. Thank you.
MR MILLETT: Can I ask you to go to {SEA00011473}, please, Mr Crawford.
Correct me if I'm wrong, but I think these are your handwritten notes of a design team meeting of 13 August 2014 --
A. Yes.
Q. -- at 10.00 am. You can see who was present. "SL", that's Simon Lawrence, isn't it?

A. Yes.
Q. Of Rydons. And then something else below it, "S", and it looks like, "PM Rydons, Harleys".
A. That was probably Simon O'Connor.
Q. Okay.
A little bit below that, after "KL" and something and then "/NC" --
A. That looks like "BS/NC".
Q. Ah, okay. BS would be Bruce Sounes, I imagine?
A. I'm guessing, yeah.
Q. Then you see underneath that a line, and then it says "Cassette fix", and then underneath that, "Fire strategy not approved".
Do you remember what that meant, "Fire strategy not approved"?
A. Possibly with building control.
Q. You say possibly building control; are you --
A. Well, the reason I'm saying that is there were several iterations of the fire strategy plans that were commented on by building control and that went backwards and forwards a few times. In fact, it went backwards and forwards right until the end of the project, as I recall.
Q. Right. To be clear, are you saying that the Exova issue 3, 7 November 2013, of the outline fire safety

strategy had gone to building control and they had not approved it?
A. I think in the context of what's written there, I would have meant the fire strategy drawings. As I mentioned earlier, there were comments being made on them that were going backwards and forwards. I mean, the fire strategy drawings are pretty much inextricably linked with the document itself.
Q. And we will see, perhaps later, what did go to building control. But can we be clear that it's not the fire strategy set out in the Exova report which we have just looked at from November 2013?
A. Reading that now, I don't think it is.
Q. While we're on it, do you know who had not approved the fire strategy, which individual?
A. Well, Paul Hanson was looking at means of escape, B1 and B5 issues, so he was commenting generally on the fire strategy drawings in that respect.
Q. Okay.
Whose responsibility did you think at the time it was to get the fire strategy approved?
A. Post-novation, Rydon, although we were doing it on their behalf.
Q. Right.
A. Or we -- doing part of it on their behalf.

Q. Right.
Was there any discussion that you had with Rydon about how the fire strategy, as referred to there, would be approved?
A. Well, they were fully aware of it because they were sitting in all the meetings. You notice Simon Lawrence at the top there. So, for example, Simon's very much aware of, let's say, the issues in relation to smoke vents and so on.
Q. Were you told at this design team meeting whether the work on the fire strategy had been completed by Exova subject to approval?
A. No.
Q. Were you told whether Exova was expected to produce an updated or final outline fire safety strategy?
A. Not that I recall.
Q. Can I go back to your witness statement at {SEA00014275/61}.
This is paragraph 188. You say there, under the heading "Exova" -- I'll take it from the top:
"As above, Exova, the KCTMO's fire engineer, continued to provide advice on fire safety and fire engineering issues throughout the Project. I did know that Exova was not appointed by Rydon as at 19 September 2014. It was possible that Exova remained appointed by

KCTMO, due to the nature of some of the contemporaneous correspondence and Exova's lack of objection to assisting, which I have summarised below."
Do you see that?
A. Yes.
Q. So is it right that you knew that Exova had not been appointed by Rydon?
A. Yes. That reference to that email, Simon Lawrence brought it to my attention that they hadn't appointed them, yes.
Q. Yes. We may come to that if we need to shortly.
Is it right that you didn't know for sure, as of September 2014, whether Exova had been retained by the TMO?
A. I knew that we had recommended repeatedly that a fire consultant was used at the start of the project, and also believe Bruce recommended they were used in the post-novation stage. I didn't know categorically whether they were employed by KCTMO, although the fact that they responded to all my queries to me suggested they were being employed by somebody. In some sense, it was none of my business who was paying them, so long as they were responding to my questions.
Q. Was it not your job to find out who Exova had been retained by so that you knew who was responsible for

them?
A. I would have only queried that if they had brought it to my attention. For example, if they weren't being paid or they weren't employed, you would normally expect the consultant to say, "Well, I actually haven't been appointed for this phase of works so I will need to get back to you", and that would send an alarm bell, perhaps, that well -- well, actually, in the context of Simon Lawrence's email, you can -- if you pull that up, you can see that he asked me to go back to him if they aren't responding, but they were responding, so I had no reason to believe that they weren't employed by KCTMO or another entity.
Q. So does it come to this: you knew they weren't appointed by Rydon so you assumed they had been appointed by --
A. Someone else.
Q. -- the TMO?
A. Yeah.
Q. I see.
Did you think to explore with the TMO or Exova what the terms of their appointment were?
A. Frankly, that wouldn't have dawned on me. I mean, I would expect -- I mean, the report's the report, the continuation of the work is the continuation of the work. If I was to make a query and they were to

suddenly say, "Actually, we're not appointed to comment on this aspect of work", then that would have flagged something up to me.
Q. So I think we can agree at least this: you realised that Exova weren't subcontracted to Studio E.
A. I knew that, yeah.
Q. So although they were, as you put it, the authority on all things fire related in respect of the Grenfell Tower project, that would depend on what they were asked to do, wouldn't it?
A. Yes.
Q. And you had no control over that, because you, Studio E, hadn't appointed them.
A. We hadn't appointed them, but we could ask any question of them that we wanted.
Q. Well, you say that. It's right, isn't it, that if in fact you had a query about anything specific, they were only as accessible to you, Studio E, as their relationship with the TMO permitted?
A. Correct, except I never remember being told when querying anything that they couldn't respond to it.
Q. I see. So Exova essentially remained available to Studio E really regardless of what questions you had for them in relation to the project?
A. Yeah, and in the capacity that I would have expected.

Q. And is this right: you understood that they were really available to Studio E as a resource that you could use on an as-and-when basis?
A. Yes.
Q. I see.
Did you ever raise any concerns regarding the nature of Exova's appointment during the construction phase, either with Mr Sounes or with Rydon?
A. I didn't see that as something for me to be concerned with, unless I had an indication that something wasn't right, which is what I kind of referred already.
Q. Can I ask you to look at your statement at paragraph 197. This is on page 63 {SEA00014275/63}. Thank you. You say at the start of that paragraph -- and I should just point out, this is under the heading "Revision B drawings":
"On 19 September 2014, Simon Lawrence (Rydon) emailed me and said, regarding Exova, 'I know that they provided information in the tender for KCTMO but I don't know if they are still working for them. I know that we haven't employed them. So if you are getting some free advice then great otherwise we will need to look at this.'"
Then you say:
"I replied on 22 September [saying] 'Thanks for the

heads up' and again flagged the importance of getting Building Control to agree the fire approach, to which Simon Lawrence said we would chat about [sic] after the design team meeting on 23 September 2014."
Now, I show you all of that. I have just one or two questions about that there.
Do you remember, did you impress upon Mr Lawrence at that time or at the design team meeting you referred to, 23 September, that Exova at that stage had not provided any analysis of the compliance of the proposed overcladding scheme with the Building Regulations as they had promised to do or indicated they would do some ten months earlier?
A. I don't recall doing that, but the line in the report does state that the current proposal will have no adverse effects.
Q. Subject to confirmation by way of an analysis in a future issue of the report, is what it says, doesn't it?
A. Yes.
Q. So my question again: did you impress upon Mr Lawrence that Exova hadn't provided at that stage the promised analysis?
A. I don't recall, no.
Q. Did you impress upon him that significant further work

needed to be done in respect of the fire safety issues as they pertained to the proposed overcladding?
A. I don't recall, no.
Q. You told the Chairman that you understood that, even though the scope of the work identified by Exova in the introduction did not include overcladding, your understanding of their work is that it would do by reference to the paragraph we looked at and the reference to B4.
A. Yeah.
Q. So my question is: did you not tell Rydon, "Look, we need to push Exova to produce the promised analysis on external fire spread"?
A. No, but I sent them details later.
Q. Did you ever tell anybody or seek to speak to anybody at the TMO of the heads-up that you had received, as you put it, from Simon Lawrence?
A. I'm not sure I had any contacts at the TMO -- direct contacts at the TMO.
Q. No. In general terms, is that true post-novation, that you had no contact with the TMO?
A. With the exception of Claire, I'm not aware of any.
Q. Can we take it that you didn't take any steps yourself to tell the TMO that Exova had not provided a detailed fire strategy in respect of the proposed overcladding?

A. No.
Q. Given your understanding that Exova were, in your words, the authority on all things fire related, did you not seek to get to the bottom of what Exova's role actually was?
A. In respect of?
Q. Well, at least in respect of providing the analysis which would confirm their view that the proposed changes would not affect the risk of external fire spread?
A. Sorry, can you ask the question again?
Q. Yes.
Given your understanding that Exova was the authority in respect of all things fire related, why didn't you seek to get to the bottom of what their role actually was, given that they had not produced the promised analysis that they said they would do?
A. Well, I saw the consultation with Exova as ongoing. So, for example, as the details of the cladding became more apparent, I sent them to them.
Q. Did you not at some point at least think it appropriate to tell Rydon or advise Rydon in pretty strong terms that a fire consultant, a specialist fire consultant, should be engaged, if not by Rydon then by Studio E, in order to get to the bottom of the external fire spread questions, given that Exova hadn't produced any?

A. But I understood that Exova were engaged by someone else.
Q. You understood that they were engaged by someone else, and therefore it was someone else's problem; is that it?
A. No, no, no, no. It's only a problem to me so far -- if they didn't answer, for example, any queries that we had. If they were to, for example, turn round and say, "Oh, we can't respond to your question or your queries because we're not appointed to do this work", then I would have said, "Well, okay, there's something wrong".
Q. I mean, at this point, really, you're getting, as Simon Lawrence has told you, free advice, weren't you, from Exova?
A. No, he says, "I know that we haven't employed them", meaning Rydon.
Q. Yes, "So if you, Studio E, are getting some free advice, then great, otherwise we will need to look at this".
Let me put a question to you: did you think at that stage, September 2014, that Studio E, when it asked Exova for advice on an as-and-when basis, would get it for free?
A. No. If you look at what he says, he actually says, "I don't know if they're still working for KCTMO". My assumption was that they were still working for the

KCTMO. So it's not free advice.
Q. But it's advice that you weren't paying for, wasn't it?
A. But why would we? I mean, if you look at the diagrams at the start of my witness statement, section 10, there were a number of specialists and consultants that were contracted direct to -- or were client-side, and by that I mean KCTMO-side as opposed to Rydon-side.
Q. You see, the advice that you were getting or could get from Exova would come to you.
A. Yes.
Q. But if you didn't actually know who they were employed by, would it follow that you wouldn't know the basis on which you were entitled to ask for that advice?
A. Well, let me phrase it another way: if I was seeking advice and it was never -- there was never any, let's say -- if I asked for advice and it was given, then I had every reason to believe that I was getting all advice that I required; therefore, why would I question the scope of the advice they were being asked to give, because it was satisfying everything I was asking for.
Q. How would you know whether TMO themselves knew that a future analysis had been promised by Exova in November 2013 and not, as at September 2014, yet delivered?
A. Well, all of that was pre my involvement in the project,

so --
Q. Except that it wasn't, was it, because in September 2014, the advice hadn't been delivered.
My question again: how would you know whether TMO knew that?
A. Well, I'm not a mind reader; I wouldn't.
Q. Would you not think to check with Rydon that TMO had known that fact so that TMO could give the right instructions to Exova?
A. In a certain sense, I didn't consider it any of my business who was employing who. I came into the project, I knew I had to get certain advice, I sought that advice, I got that advice.
Q. Right.
A. I mean, that's my position.
MR MILLETT: Mr Chairman, we are going to move to a different topic and it's 11 o'clock. I wonder whether now may be a convenient moment for a break.
SIR MARTIN MOORE-BICK: Yes. Would you like a break now, Mr Crawford?
THE WITNESS: Yes, please.
SIR MARTIN MOORE-BICK: Yes. We will stop now for ten minutes or so.
Please don't talk to anyone about your evidence or anything related to it while you're out of the room. We

will return at 11.10, please.
Thank you very much, if you would like to go with the usher.
(Pause)
11.10, please.
(11.00 am)
(A short break)
(11.10 am)
SIR MARTIN MOORE-BICK: All right, Mr Crawford?
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: Good.
Yes, Mr Millett.
MR MILLETT: Mr Crawford, I'm now going to ask you some questions about the envelope insulation, if I may; that is the insulation applied within the new cavity which was formed by the rainscreen cladding system. All right?
A. Mm-hm.
Q. Now, I think we can agree that there were two insulating products ultimately used as envelope insulation material on Grenfell Tower: RS5000, Celotex, and Kingspan Kooltherm K15. Yes?
A. We weren't aware of the Kingspan product being used until after --
Q. We will come to that later on, but I think we can agree

that they were used.
A. Ultimately, yes.
Q. As we have already discussed between us, when you came into the refurbishment project, Celotex FR5000 had been specified in the NBS spec --
A. Yes.
Q. -- as the thermal insulation to be used in the cladding system. Yes?
A. (Witness nods).
Q. If you nod, it won't go on the transcript.
A. Oh, sorry, yes.
Q. Can we go now back briefly to Approved Document B, which is {CLG00000224/96}, please. I just want to remind you of paragraph 12.7 of Approved Document B. We looked at it last week. It says, under the heading "Insulation Materials/Products":
"In a building with a storey 18m or more above ground level any insulation product, filler material (not including gaskets, sealants and similar) etc used in the external wall construction should be of limited combustibility (see Appendix A). This restriction does not apply to masonry cavity wall construction which complies with Diagram 34 in Section 9."
Now, it's right, isn't it, that Celotex FR5000 is a rigid polyurethane foam board or PIR product?

A. Yes.
Q. And PIR products are not generally regarded as materials of limited combustibility.
A. They can be.
Q. If you go to the BCA -- you say can be. They can be regarded as materials of limited combustibility; is that your experience?
A. I believe they can be, yes.
Q. Let me be clear, because I may have misled you by my question. I said polyurethane. In fact, PIR is --
A. Polyisocyanurate, yes.
Q. -- polyisocyanurate, isn't it? So your answer is still the same, isn't it, or is it?
A. It is still the same.
Q. Okay.
You say they can be. What are the circumstances in your experience as at July/August 2014 in which a polyisocyanurate product could be a material of limited combustibility?
A. Well, it's a plastic foam, essentially, and it's impregnated with a fire retardant to potentially make it compliant in that manner.
Q. So are you saying that, as at the summer of 2014, you had come across PIR foam products for use as insulation that were of limited combustibility? Was that your

experience?

(Pause)

A. I don't recall precisely.
Q. No.
A. I mean, I understand the definitions in table A7, for example.
Q. Let's just look at those so we're clear, it's page 132 {CLG00000224/132} of the same document on the screen, please. Here is table A7, "Use and definitions of materials of limited combustibility".

Take a moment, if you would, please, Mr Crawford, just to look at that. Just to help you with it, because it's a document in a number of parts, the left-hand column is "References in AD B guidance to situations where such materials should be used", and there are nine instances of that. Then the definitions on the right-hand side of the page --

A. So 8, for example, would apply in the definitions on the left.
Q. Yes, and did you know at the time that in order to be a definition of -- as a material of limited combustibility, it either had to be classed in the European class under a or b --
A. National class, yeah.
Q. -- or any of the national classes set out in a, b or c

or --

A. Or d.
Q. -- d, and d compares with c because it's about density.
A. Yes.
Q. So were you familiar at the time with table A7?
A. I was aware of the table. I'm reluctant to use specific words like "familiar"; it kind of implies that you know everything specifically that's in it.
Q. Right.

Do you recall when Celotex RS5000 as opposed to FR5000 was specified for the Grenfell project in place of Celotex FR5000?

A. Do I recall the period when it was specified?
Q. Yes.
A. Yes, it was forwarded to me by, I think, Ray, Harley, 17/18 September, thereabouts, I think, 2014.
Q. What makes you recall that so specifically?
A. Because we were having a conversation -- I think they had raised their RFI1 in relation to the cavity barrier strategy.
Q. Yes.
A. And as with much -- many things in architecture, they're all interlinked. So, for example, how you may go about cavity barrier strategy, you have to consider the whole build-up of the wall, let's say, and Ray forwarded that

information, I think in the belief that -- I can't remember whether I asked for it or not --

Q. Okay. I see. All right. So we will come back to look at that chain of email correspondence in detail very soon.

So you say it was Harley who specified RS5000 in place of FR5000.

Do you know the circumstances in which that substitution took place?

A. Meaning the reason for it?
Q. Yes. Well, the reasons and the reasons surrounding it.
A. No.
Q. Was it not your business to know that?
A. Well, I suppose, as the specialist subcontractor was proposing a product that on the face of it looked very similar to specified product.
Q. On the face of what?
A. Description.
Q. I see. All right.
A. Just to interject, it's worth bearing in mind, products were changing all the time, they were changing their names, their brands, their labelling. So, for example, RS could have been the same as FR, for example.
Q. Did you at that time have a discussion with Ray Bailey or anybody else at Harley about why FR5000 was being

replaced by RS5000?

A. I don't recall, except that that's what they were proposing, and the nature of design and build gives them that entitlement to some extent.
Q. So do we take it from that answer -- and I don't want to put words in your mouth, correct me if this is wrong -- you simply took on trust from Harley that if they thought RS5000 was compliant, that was fine by you?
A. I guess, yeah.
Q. Yes? Really? Okay.

Let's go back a question or two then to table A7.

Were you aware or did you have any thoughts at the time about whether Celotex RS5000 was a material of limited combustibility, having regard to the matters in table A7, which you say you were familiar with?

A. Well, the information, for example, on the technical sheet that Harley forwarded on the RS5000 product makes reference, for example, to BS 476, which cross-references with limited combustibility testing.
Q. I note your answer. You say it cross-references with limited combustibility testing. Where do you see that on table A7?
A. For example, d.
Q. Yes. And that's, to be clear, 476-11; yes?
A. Yeah, it does state 11.

Q. 11. Do you know what testing to BS 476-11 involved?
A. I understand the basic principles of BS 476 testing, but I wouldn't presume to assume that I knew anything specifically technical as that; therefore, I would refer it to the fire specialist, which I did.
Q. Did you know that there was a difference between testing to BS 476-11 on the one hand and BS 476-6 and 7 on the other?
A. I would always refer to fire specialist interpretation, particularly with this kind of information, because technically -- the use of the words, "thermocouples", in my opinion, is in many ways beyond that of an architect. Additionally, I would state -- I would point out there are over 100 BS references within part ADB2 alone. The idea that somehow you would have complete knowledge of all of them is absurd, in my view.
Q. There is only one BS 476 reference under the national class for materials of limited combustibility, though, isn't there?
A. Well, yes -- well, unless you did BS EN 13501 under European class.
Q. I was talking about national class.
A. In national class, yes.
Q. So one wouldn't have to worry about all the other BSs, only that one, when one was looking to see whether

a material was or was not a material of limited combustibility; do you agree with that?
A. I would agree that you needed to have a sufficient knowledge of technical interpretation to be able to interpret the complexities that are implied in that.
Q. Did you know or give consideration at the time to whether RS5000 was the same product or a different product from FR5000?
A. I don't recall.
Q. It's right, isn't it -- I think we can agree with each other -- that Celotex RS5000 was also a PIR product?
A. Polyisocyanurate, yes.
Q. Yes?
A. Yes.
Q. Do you happen to know what "FR" in FR5000 stands for?
A. No.
Q. Would it be surprising if I said "flat roof"?
A. It would be, yes.
Q. Right.
Now, did you know that RS5000, like FR5000, did not meet the requirements for limited combustibility as set out in Approved Document B, table A7, that we have on the screen?
A. I didn't know that categorically, no.
Q. You didn't know it categorically; did you know it a bit?

A. No. As I think I've stated, and in my witness statement, I referred to the fire specialist to check its compliance.
Q. So just to be clear, would it follow from your answer that you didn't know that FR5000 should not have been used as an insulation product on Grenfell Tower unless either it was tested under a large-scale test under BS 8414 to the BR 135 criteria, or there was a desktop report, or a holistic fire engineered approach had been taken?
A. My understanding of the FR product was that it had been proposed by Max Fordham originally, and from the conversations I had with Bruce, his understanding of it was that it was compliant. And then when I received the information from Exova, I sought to confirm to myself that -- from Harley, I sought to confirm to myself that it was compliant by checking it with the -- what I considered to be the higher fire authority, which was Exova.
Q. Right. We will come back to that in due course.
If we could look at your witness statement, please, at page 62 {SEA00014275/62} and look at paragraph 192, you refer to an email, and this is in the middle of an email string, and you say in response to the comment:
"... Daniel Anketell-Jones (Design Manager at

Harley), stated 'The insulation is class 0... Therefore after reading the correspondence below; I believe that the fire barrier in these locations, will not be necessary. Can you confirm that this is acceptable?'. Again, I forwarded the comment to Exova, together with the datasheet for Celotex RS5000 dated August 2014 that Daniel had attached to his email."
Now, if we can look at that, it's {SEA00011724}, as you have referred to it there at paragraph 192. Let's look at the second email in the chain. This is the email from Daniel Anketell-Jones to you, Mr Crawford, on 18 September 2014 at 16.03, copied to various people, including Simon Lawrence at Rydon:
"Neil.
"Thank you for your response.
"The insulation is class 0."
Et cetera, as you have quoted in your statement.
Now, there is no reference in that email to the data sheet, is there?
A. Not that I can see, no.
Q. No. We will come back to that precise issue shortly.
Can we look at the data sheet itself, which you didn't refer to but which your statement says you forwarded. It's {CEL00000411}, please.
Is this the document that you were referring to in

your statement?
A. Yes.
Q. Did you read it at the time --
A. Yes.
Q. -- of the email correspondence? Did you read it all?
A. I read enough to be convinced that I thought it was appropriate to use.
Q. Right.
Now, if you look at the first page, which is the page in front of us -- and we will come back to the email chain later, let's just look at the documents -- it says at the third paragraph down:
"With Celotex RS5000 you are specifying an insulation board ..."
Then in the second bullet point it says:
"Is the first PIR insulation board to successfully test to BS 8414 ... meet the criteria set out in BR 135 and therefore is acceptable for use in buildings above 18 metres in height."
Then it says:
"Has Class 0 fire performance throughout the entire product in accordance with BS 476."
Now, we know that Mr Anketell-Jones had said in his email that it was class 0. My question is: what did class 0 mean to you at the time?

A. I understood class 0 in relation to diagram 40 and where it should be applied in relation to diagram 40. I think they've linked class 0 to BS 476. You can see that in the third dot down.
Obviously, I mean, the way this information is presented, there's repeated use of "applicable for use in buildings over 18 metres". I mean, everything in this document to me suggests that the product is appropriate in rainscreen use -- that's its opening line -- in buildings of more than 18 metres in height. I had no reason to suspect that it wasn't, based on the information that I read, and I forwarded it to Exova for confirmation.
Q. So to answer my question, you say that you understood class 0 in relation to diagram 40, and it should be applied in relation to diagram 40?
A. But it also cross-references BS 476 there, which is also referenced in limited combustibility testing.
Q. I see. It doesn't say which 476, though, does it?
A. Well, as I said, I don't consider myself a specialist in that level of testing.
Q. Right.
A. I mean, if it says BS 476, then that's what I understood by it.
Q. You refer to diagram 40. Did this thought go through

your mind at the time: what had diagram 40 got to do with the use of insulation?
A. Well, it talks about class 0 surfaces. We mentioned before the internal surfaces.
Q. Right. What would class 0 in the context of an insulation product to be used within a rainscreen mean?
A. Well, it's a surface flame spread classification.
Q. Yes, and how would that be relevant to an insulation product that you knew was being applied within the rainscreen and not as the external surface?
A. Well, they use deliberately -- well, in my view, they talk about class 0 through the whole product, which I think is misleading. I can't actually see that here, but it was in the first line.
Q. It does say it.
A. Where does it say it?
Q. Third bullet point down, "Has Class 0 fire performance throughout the entire product" --
A. Oh, yes, "throughout the entire product", yes. Sorry, yes.
Q. What does that mean to you?
A. It suggests to me that ... it's retarded and reduced flame spread throughout the product.
Q. Right.

A. I mean, to be blunt about it, we've obviously seen the recent emails in terms of the internal correspondence within Celotex, and clearly they sought to deceive, and they calculatedly sought to deceive, based on the understanding that an average architect would have, with the way they have worded this document.
Q. Mr Crawford, I'm going to cut across this answer --
A. That's apparent by that reference to BS 476, and the way it cross-references with limited combustibility. It's deliberately misleading. It's masquerading horse meat as a beef lasagne, and people bought it.
Q. Mr Crawford, I'm interested in your recollections as they happened at the time and not in what you now say about the behaviour of other people. Okay?
So what I want to know is what you thought on reading this document at the time; do you understand?
A. Yeah.
Q. What I want to know is, when you read, as you say you did, this data sheet, what you took from the third bullet point down:
"Has Class 0 fire performance throughout the entire product in accordance with BS 476."
Do you understand my question? At the time, what did that mean to you?
A. All I can say is the totality of what was written there

made me understand that this product was compliant in that use, and for me to verify that, knowing the technicalities that are involved in limited combustibility testing, was to confirm that with Exova, which I did.

Q. This data sheet is not, is it, presenting this product as a product of limited combustibility in accordance with section --

A. No, it's presenting it as a product suitable for buildings -- rainscreen in buildings above 18 metres.

Q. Certainly that is what it says at the very top.

A. No, it says it repeatedly through --

Q. All right. Can you identify -- well, take it from me, because it's not from there, that nowhere in this document does it say that RS5000 is a product of limited combustibility.

A. You're telling me that, so I'm taking your word on that.

Q. Nowhere in this document does it say that it is a product of limited combustibility in accordance with section 12.7 and table A7 of Approved Document B.

A. If you're telling me that, yes.

Q. Well, do you recall ever reading it in there?

A. Well, I've told you how I read it. I told you how I understood the document and how I checked the document.

Q. So just so I've got your evidence clear on this, it's the class 0 fire performance throughout the entire product which to you meant that it was safe to use on buildings above 18 metres as an insulation product?

A. No, no, it's the entire presentation material. I then sought to check that interpretation with Exova, which I did, and which I understood from what was fairly emphatic confirmation from Exova that it was applicable and that it could be used.

Q. Let's look --

A. Their understanding of how it was and how it could be used may have been different from mine. They may have had -- they work on hundreds of buildings. They may have had knowledge of BR 135 testing, for example, that led them to believe that it was applicable in this particular build-up.

Q. But you don't know that, do you?

A. No, but what I know is from the conversations I had with Exova, they were emphatic -- fairly emphatic about the fact that it was appropriate to use, and that's what they suggested to me. I mean, that was my understanding from the conversations I had with them. I asked them to put it in writing, they put it in writing, the contacts with the cavity barriers. On reflection, it is a tacit approval in writing, but from the conversations I had

with them, I understood that it was appropriate to use.

Q. Right.

Now, looking at the data sheet, page 1, just above the bullet points, it says:

"With Celotex RS5000 you are specifying an insulation board that ..."

Then the second bullet point says:

"Is the first PIR insulation board to successfully test to BS 8414 ... meet the criteria set out in BR 135 and therefore is acceptable for use in buildings above 18 metres in height."

Now, do you remember seeing that?

A. Yes.

Q. Did it not occur to you at the time when you saw that that the reason why this material was acceptable for use in buildings above 18 metres in height was because it had, as it said, passed a BS 8414 test and met the BR 135 criteria?

A. I think I've explained this several times now, there's multiple ways in which a product can be compliant, through various tests: the BS 476, the BS EN 13501, the BS 8414. I understand there's different routes which effectively prove that compliance. I don't think an architect has the technical ability to analyse all that. It's a highly specialist and technical set of

information. Obviously doesn't help when it's misrepresented.

So my first port of call was to send it to what I considered a higher fire authority, ie the fire specialist, and ask them to evaluate it.

Q. You say it's misrepresented. Can we just be clear, what do you say was misrepresented?

A. To me, the suggestion is that this product is appropriate for use in buildings over 18 metres, and everything about it suggests to me that it's -- that it can be used potentially under BR 135 or as limited combustibility.

Q. You say "or as limited combustibility", does that tell us that you knew there was a difference?

A. I think the "Class 0 performance throughout the entire product", when it is worded in those terms it's ambiguous, and when it relates it to BS 476 in those terms it's ambiguous.

Q. Let's read on, then. If you go to page 2 {CEL00000411/2} of this document, in the middle of the page it says "Physical Properties", and underneath that it says:

"Fire propagation. BS 476: Part 6. Pass.

"Surface spread of flame. BS 476: Part 7. Class 1."

Do you remember looking at that detail when you saw this data sheet in September 2014?
A. I don't specifically, no.
Q. Had you done, you would have noticed, no doubt, that it did not say that it had passed a test under BS 476-11, which you told us earlier was the test for limited combustibility under table A7.
A. Yeah. I think I would go back to my original point, which is that I would always forward this to a fire specialist, a higher authority, to get their understanding in the context of the whole build-up of the façade.
Q. Then if we go to page 3 {CEL00000411/3} at the very top, " Certification ":
"Celotex RS5000 is a premium performance solution and is the first PIR board to successfully meet the performance criteria set out in BR 135 for rainscreen cladding systems."
Then it sets out what the test was.
Did you read that at the time, do you think?
A. I don't recall.
Q. Did you notice what the system tested was?
A. I don't recall.
Q. Did you notice the wording at the bottom:
"The fire performance and classification report

issued only relates to the components detailed above. Any changes to the components listed will need to be considered by the building designer."
Did you read that at the time?
A. I don't recall reading that.
Q. Did you understand from this document that the only basis for Celotex's claim that RS5000 was suitable for use on buildings over 18 metres in height was that it had, as Celotex said, satisfied the BR 135 criteria by way of a full-scale BS 8414 test?
A. No, I don't think I understood the product as being -- as compliant only under -- necessarily compliant only under the BR 135 test. I understood that it could be compliant, and in order to check that compliance I forwarded it to the fire consultant.
Q. So do we take it from that that the actual basis of Celotex RS5000 as suitable for use above 18 metres, as set out there -- namely, in accordance with the test identified -- was not something that you thought needed to be considered by the building designer, because you didn't check it yourself?
A. Like I said before, I think the interpretation specifically of parts of Approved Document B are extremely difficult and I would forward them to a fire specialist, or at least seek fire specialist advice,

which I did.
Q. Just taking it in stages to see how far we get, do you accept that the configuration and the materials that were used in the BS 8414 test as set out in this data sheet as we can see on page 3 was not the same as that proposed and in fact used at Grenfell Tower, was it?
A. No. It doesn't necessarily mean they wouldn't behave the same way, but no, they're not the same.
Q. Therefore, it was a change to the components which would need to be considered by the building designer. Did that occur to you at the time, that because the system was different ...?
A. If you're assuming a BR 135 test in relation to that -- and, again, as I have pointed out, Exova have authority in fire and have a massive number of desktop studies and tests which they can call upon, and I suspect that is what they used to inform the fact that they believed it was compliant.
Q. When you read this document, did you think to yourself, "It is compliant and I can use it above 18 metres in height", or did you think to yourself, "I'm not sure, I had better ask Exova"?
A. I wouldn't assume anything in part B, in many ways. I think from what I saw in the literature on the front of the product, I did pretty much assume that it was

appropriate for use, but I sought to check that with the fire specialist.
Q. The basis of your what you call pretty much assume, your assumption, just so that I'm clear, is what, the reference to class 0? Is that it?
A. It's as set out in my witness statement. It's all those statements combined.
Q. I see.
Can I ask you to be shown a document which you may not have seen, and if you haven't we'll think again. Look at {CEL00000012}, please.
Now, this is something called a "Rainscreen cladding compliance guide when specifying Celotex RS5000 in buildings above 18 metres", and it's dated, although I don't think you can see it on the screen, August 2014.
At the time of your coming into the project, or indeed at any time, did you see this document?
A. No.
Q. Right.
Now, in September 2014, on 2 September, you I think attended a design team meeting, design team meeting number 2; do you remember that?
A. Yes.
Q. Okay, I'll show you a document. If you can go, please, to {SEA00011581}, these are the minutes of the meeting.

You can see that it was held on site at 10.00 am on that day, 2 September 2014. Mr Lawrence was there, Mr O'Connor was there from Rydon, and you were there as the project architect, Studio E; do you see that?
A. Yes.
Q. Mr Anketell-Jones and Kevin Lamb were there from Harley as well.
Now, can I ask you, please, to go to item 3.62 on page 4 {SEA00011581/4}. It's under the heading against 3.60 "Cladding (insulation, fixings, panels, etc)", and 3.62 discusses U-values. Do you see that?
A. Yes.
Q. It says:
"U-values were discussed with SL asking how the figures in the spec, were arrived at and whether they need to be rechecked from an M&E and insulation point of view. Is the insulation thickness show on Architect drawings, correct. DAJ confirmed that he had checked them but with the assumption that RML were fitting further insulation internally. SL didn't believe this was part of the spec. All parties agreed to check their documents."
Do you see that?
A. Yes.
Q. Then there is a PMN, which I think is a post-meeting

note, which says:
"... Max Fordham tender U-Value document was shared to team via email. External wall construction was checked against all tender information and all information shared."
Do you know or do you remember what figures in the spec exactly were checked?
A. No.
Q. Do you know why Mr Lawrence wanted to recheck the U-values?
A. I don't recall.
Q. Do you know what had changed, perhaps, that made him do that?
A. I don't recall.
Q. Did you review the Studio E tender information in respect of the insulation at the time?
A. I can't recall. I can't recall whether this went back to Max Fordham as a discussion or not, I just -- without seeing the associated correspondence.
Q. Do you remember, did you have any discussion with Mr Sounes about how the U-value was decided upon?
A. I knew it had been derived from the original in the original Max Fordham report.
Q. It had been derived from that? Did you have a discussion about it?

A. I knew there was a U-value target and there had been a proposal to achieve that U-value target. I don't recall any specific detail, if that's what you're asking.
Q. Do you remember whether you checked the U-values with Mr McQuatt or anybody else at Max Fordham?
A. I can't recall at this particular instant, to be honest.
Q. Did you look back through the records you had, like emails, to understand how the target U-value had been decided?
A. I may have done, I just ...
Q. Do you remember any discussion historically in the project, before you came on the scene, of the use of mineral wool as an insulation product?
A. No.
Q. So you can't help us as to why it was that mineral wool had been discounted for use as insulation?
A. I understood that the thicknesses were impractical to achieve that U-value, the bracketry ...
Q. Who did you understand that from?
A. I think Bruce.
Q. I see.
Now, can I take you on a little to {SEA00009561}. This is an email of 1 November 2013, and it's an email from Tom Ashton at Curtins to Artelia and Bruce Sounes,

and I don't think it came to you, but it says:
"Dear All,
"Please find our structural specifications attached."
I suspect one of the reasons it didn't come to you is you weren't involved in the Grenfell project at that time.
Now, I'm assuming, Mr Crawford, unless you tell me otherwise, that you didn't see this email at the time.
A. No, this is a year and a half before --
Q. Exactly, but let's look and see what the structural specifications were. It's one of the attachments to the email, and it's at TMO10002249. In the email, it's the one that's entitled LO1212-SPEC-001, it's the last attachment referred to.
There it is. It's Curtins' spec of 1 March 2013 for the design, supply and application of overcladding systems to Grenfell Tower.
If you look at this, do you remember ever reading this document once you had taken over from Bruce Sounes?
A. I don't recall seeing this document.
Q. You don't recall ever seeing it; is that right?
A. I don't recall seeing it, no.
Q. Okay.
Did you know -- and I'll ask the question in

a general way -- that this specification had at least recommended that the cladding system should comply fully with the recommendations of the BRE document, "Fire performance of external thermal insulation for walls of multistorey buildings" dated 2003?
A. I don't recall seeing the document, so I wouldn't --
Q. You wouldn't know.
Did you ever have a discussion with Mr Sounes about whether the system as specified in the NBS specification was compliant with BR 135?
A. Specifically with 135, no.
Q. Yes.
A. No.
Q. Would you agree with me -- and this may be a hypothesis because you didn't read the document, so putting it in that context, Mr Crawford -- that if, under this structural specification that Harley were working to, if they were required to work to it, that's the case and the cladding system was to comply fully with the recommendations of BR 135 of 2003, then the recommendations were part of the performance criteria for the system?
A. This I can't answer. It's a hypothetical question.
Q. Okay, you won't answer. All right. Or can't answer.
Just generally, then, before I leave that, did you

take any steps yourself to ensure at any time that Harley's drawings were compliant with the recommendations under BR 135, 2003 or indeed 2013, which was the third edition?
A. Not that I recall, no.
MR MILLETT: Okay.
I'm now going to turn to a different topic.
Mr Chairman, we're a bit early for the next break, but the next topic is quite long, so I'm entirely in your hands. I'm very happy to start it.
SIR MARTIN MOORE-BICK: When you say quite long, what are you talking?
MR MILLETT: It's likely to take us up until the lunch break and possibly beyond.
SIR MARTIN MOORE-BICK: Perhaps you would rather have a break while you have the chance, Mr Crawford.
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: I think that would be sensible.
All right, we will rise for ten minutes. If you go with the usher, please, we will come back at 12.05, thank you.
(Pause)
12.05, please.
(11.55 am)
(A short break)

(12.05 pm)
SIR MARTIN MOORE-BICK: All right, Mr Crawford?
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: Good.
Thank you, Mr Millett.
MR MILLETT: Mr Chairman.
Mr Crawford, I'm going to ask you some questions now about the exchange of emails on 17 and 18 September 2014 following the request for information from Harley to Rydon.
If we can start, please, with {SEA00011730/4}. There you have an email from Daniel Anketell-Jones to Simon Lawrence and Simon O'Connor of Rydon, copied to you and Mr Sounes -- well, actually to both of you, and copied to Kevin Lamb. The subject is "Grenfell Tower Cavity Fire barriers":
"Simon,
"Please find attached RFI001 which relates to tbe requirement of firebreaks. This may be something that has already been decided, or may need confirmation from the local fire officer, as the opinion tends to vary."
Do you see that?
A. Yes.
Q. Then the request itself, which is attached, is at {HAR00003616}, please.

You can see it there, request for information form. The date on the right-hand side, 17 September 2014. It's from Daniel Anketell-Jones at Harley to Simon Lawrence at Rydon. Date answer required: 26 September 2014. Query:
"Please may you confirm the required extent of the horizontal firebreaks within the cladding areas?"
Then the suggested solution:
"We believe that they will be required at every floor level on the vertical columns, but not in the area of cladding between windows. This is because there is no 'chimney' effect here, and therefore the cladding will not add to the spread of fire."
First, because we have seen that you received this document, my question is: why did you think at the time that Harley was sending you this request as well as Rydon, given your post-novation role as you saw it?
A. Well, if you look at the original email -- if you bring that back up on the screen.
Q. Yes, it's {SEA00011730/4}.
A. Where they mention "may need confirmation from the local fire officer, as the opinion tends to vary", meaning building control. So I saw this as assisting in co-ordinating building control.
Q. Why did that occur to you as something for Studio E as

opposed to Rydon alone?
A. Well, we obviously had a cavity barrier strategy at stage E within the employer's requirements, and what he is suggesting is contradictory to that.
Q. So the question then is -- and I want your recollection of how you saw this at the time, Mr Crawford -- was the RFI, that was the question, a question which fell within the scope of what you saw as commenting on design intent?
(Pause)
A. Or rather manifests issues, yes.
Q. "Or rather manifests issues", I'm not sure I'm understanding that qualification.
A. Okay, the way I saw this is we had a fire strategy -- a cavity barrier strategy at stage E in employer's requirements. They were proposing a different strategy, so it was perfectly logical for them to quantify that against our strategy, particularly when it related to co-ordination of building control submission, for which it's part of our responsibility, which is what's inferred by confirmation from a local fire officer.
Q. So just to be clear about this, this question, am I right in saying, fell outside the scope of what you saw as commentary on design intent?
A. I know where you're coming from and --

Q. Never mind about where I'm coming from. Did you or did you not see it as falling within the scope --
A. It's not architectural intent. Is it architectural intent? Borderline.
Q. Borderline?
A. Yeah.
Q. And given --
A. The fact they've -- well, look, I think I've said it already, they came to us for specific information in an RFI in relation to the clarification against our original scheme. It would be unreasonable not to answer it -- at least attempt to answer it.
Q. Well, Harley were already on board at this point, weren't they --
A. Yes.
Q. -- as the specialist subcontracting designer for the cladding?
A. Yes.
Q. So why didn't you go back, as a recipient of this email, to Daniel Anketell-Jones and say, "This is a matter for you to work out with Rydon and not a matter for us because it does not fall within the scope of architectural intent or design intent"?
A. Yeah, but there's an issue of co-ordinating building control and ultimately seeking to get building control

sign-off, so -- and -- well, yeah, that's what I would say, I guess.
Q. Okay. Well, we see your response, or rather your next move. If you go up the page, page 4, we can see that under cover of an email on 18 September at 11.08, you send the email that you have received on to Terry Ashton at Exova with the RFI; yes?
A. Yes.
Q. And you copy in Simon Lawrence and Simon O'Connor, and you say:
"I am working on the Grenfell Tower regeneration project from the Studio E end. The following RFI bas come in relating to horizontal fire breaks within the cladding areas.
"Can you comment on the RFI attached and whether you believe this interpretation in relation to stack effect is correct?"
Now, the first point is that's not, is it, the co-ordination of answers with building control; you're essentially passing him on the question you have been asked by Daniel Anketell-Jones.
A. Yes, but ultimately his original question related to -- I mean, he raised the point that different building controls have different -- or he didn't use the word "building control", I can't remember what he used, but

that's what he's referring to. Building control fire officers have different interpretations of the requirements of cavity barriers. Therefore, it was related to building control ultimately.
Q. You then move up the page, if we can, please, to page 3 {SEA00011730/3} of that email chain -- I'm sorry to do this in reverse order, but that's how these things are -- and Mr Ashton replies at 11.30 that morning, 18 September 2013, and he says:
"Neil
"I've never seen details of what you're doing to the external walls. Do you have any cross-sections/elevations?"
Now, let's just take this slowly.
At this stage, Mr Crawford, you had read issue 3 of Exova's outline fire safety strategy, as you have told us before.
A. Yes.
Q. And you had read in that document in relation to B4 that there were no adverse effects but that would be confirmed in a future analysis.
A. Yes.
Q. Mr Ashton's response that he had never seen details of what Studio E had designed --
A. No, no, that's not what he said. He says, "I have not

seen details ". It doesn't mean that he didn't know what was happening in the external walls.

Q. You cut across my question.

A. Sorry.

Q. Let me try it again.

Mr Ashton responds and he says:

"I've never seen details of what you're doing to the external walls."

Did that come as something of a surprise to you at the time?

A. Well, my understanding from discussions with Bruce is that Exova were fully aware of how the scheme had developed, including the external wall build-ups.

Q. Well, let's just go back a little bit to the evidence that you gave us this morning, Mr Crawford, about that paragraph which deals with requirement B4 in the Building Regulations within the Exova fire safety strategy.

You told us that you thought that Mr Sounes had believed that he had been told by Exova that the strategy was compliant, that the design was compliant.

Now, when Mr Ashton tells you in September 2014 that he has never seen details of what you're doing to the external walls, did you not stop and think and ask yourself how it could be that Mr Sounes had previously

thought -- if that is correct -- that he had been told by Exova that the external wall construction was compliant?

A. No, because he says, "I've never seen details". Harley were doing the details, they were doing the 1:5 details. We hadn't done 1:5 details in, for example, the employer's requirements set. So they understood the concept, they understood it in a broad-brush stroke, let's say, sense of what was being installed. But what he is saying is, "I've never seen details". I understand "details" means specific details, as in the specialist subcontractor's details.

Q. Yes, so did Mr Ashton's response not undermine entirely what you had read in the outline fire safety strategy from 2013?

A. No, because that's an outline fire strategy; it's not a detailed fire strategy.

Q. Did it not undermine the belief that you had that Mr Sounes had been told by Exova that the designs at that stage were compliant?

A. No.

Q. Did it give you cause to consider that Exova had not in fact at that stage considered at all the impact of the overcladding scheme and its compliance with requirement B4?

A. Sorry, can you rephrase that or repeat it, sorry?

Q. Yes.

Did Mr Ashton's response to your question not give you cause to consider that Exova had not in fact considered at all the impact of the overcladding scheme and its compliance with requirement B4 of the Building Regulations?

A. I don't think it necessarily did, no.

Q. If Mr Ashton had not seen the details of what you were doing to the external walls, how could he possibly give any reliable advice about whether the overcladding scheme did or didn't comply with requirement B4 of the Building Regulations?

A. But I've just explained that. He was taken through the scheme. As the scheme developed, my understanding was the scheme was developed up to tender stage, he did understand the concept of what was going to the wall. What he is saying here is, "I've never seen details". The key word is "details".

Q. Did you take up Mr Ashton's response with Mr Sounes?

A. I don't recall. Possibly.

Q. Would you not have expected Studio E and yourself, as project architect -- and I know you don't like the term -- but as lead consultant and lead designer, to have sent the details that we see there referred to by

Mr Ashton to Exova at an earlier stage so that they could advise on whether the various elements of the cladding design and the system did comply with Approved Document B?

A. Well, I think I've already explained to you what my understanding was, and the information that was, for example, worked up to and in the stage E report wouldn't have included and didn't include that level of detail. It didn't include 1:5 details, for example.

Q. Did it not occur to you at the time to go back to Mr Ashton and ask him a question such as, "Well, hold on a moment, I need to understand what details you have seen and what details you haven't seen in relation to the external walls"? Did that occur to you?

A. Well, with all due respect, I don't know exactly what he had or hadn't seen or had or hadn't discussed with Bruce, but my understanding was that Exova, whether Terry individually or as a totality, had an understanding of where the project was at that point in time. Now, when he made this comment, I then send him the details, which had quite recently just become available from Harley.

Q. Well, all right, let's look at that. If you go on to page 3 {SEA00011730/3}, up the page, you can see your answer, Neil Crawford to Terry Ashton, 18 September at

12.18:

"Hi Terry

"Please see attached our sections and the initial drawings set we have bad from Harleys. The initial drawings from Harleys are fairly limited but they attempt to establish the basic approach.

"Regards

"Neil."

Now, let's just look at the drawings that you sent to Mr Ashton. I think you attach the Harley initial drawing set, don't you?

A. Yes.

Q. You refer to it in your statement, but let's look at it. It's {SEA00011714}, please.

Now, we can scroll through these quickly, just to -- or not quickly, but gradually perhaps, just to identify what it is you sent. I'll just let you do that.

If, Mr Operator, you could please scroll down through the drawings so that the witness can see what it is he sent.

(Pause)

So that's page 3 {SEA00011714/3}, window head, upper levels.

On page 4 {SEA00011714/4} we've got window jamb. That's upside-down, but it probably doesn't matter.

Then page 5 {SEA00011714/5}, the vents.

Page 6 {SEA00011714/6} we have got column front.

Page 7 {SEA00011714/7} is jamb joint, upper levels.

Page 8 {SEA00011714/8} is column joint.

Page 9 {SEA00011714/9} is window cill, lower levels.

Page 10 {SEA00011714/10} is window head, lower levels.

Page 11 {SEA00011714/11} is jamb joint, lower levels.

Just to remind you of what it is you sent.

Those were -- I'm summarising them -- window head, cill and jam sections, plus typical bay, west elevation.

Now, we can look at any one of these if you would like to, but am I right in thinking that no materials are identified, either in terms of panel or insulation type?

A. Not within this set, no.

Q. And there are no details of the proposed cavity barrier locations either, are there?

A. No.

Q. And, indeed, parts of the window assembly are unlabelled, aren't they?

A. That's correct.

Q. So if you go back to your email to Mr Ashton, just have a look at it, {SEA00011730/3}, yours at 12.18, you the

second line, you describe these as:

"... fairly limited but they attempt to establish the basic approach."

And that's right, isn't it? That's all they were.

A. Yes.

Q. You then sent, just following the facts through, some Studio E section drawings, and the first one I want to show you is {SEA00011711}, for the offline version, please. We want that for the offline version. We may just have to blow it up a little bit.

This is entitled "Detail section sheet 1". I can't see it on the screen. If you go to the bottom. You will have to read it, I am afraid, in portrait, although it's a landscape document. You can see at the bottom left-hand corner -- if you turn your head, you can see it says in the third box from the left, "Detail section sheet 1". Do you see that?

A. Mm-hm.

Q. It's dated 26 September 2013; yes?

A. Yes.

Q. On the left-hand side of the drawing, the first and the third labels down from the top under the big "01", next to the "H92 123", you can see that it says:

"Zinc composite rainscreen panel and framing system to cills."

Do you see that?

A. Yes.

Q. In fact, it's right that by this time -- this is mid-September 2014 -- aluminium composite panels had been selected, hadn't they?

A. I believe that had been proposed, yes.

Q. Can you explain why you are sending Mr Ashton drawings which show zinc composite cladding when in fact aluminium composite panels had by now been selected?

A. Well, that's not actually quite true. If you look down at the bottom of that, you can see it says "Aluminium composite TBC". So it's true the drawing shows both zinc and aluminium composite, although they're both national class 0.

Q. I wasn't asking you about national class 0, Mr Crawford, I just want to understand why it is that at H92, where I have identified, it says zinc composite rainscreen panel. Can you explain why it still said that, given that ACM had been selected?

A. I think there was a -- Bruce was hoping that the zinc would perhaps stay and certainly there were issues relating to discharge of the final planning, or final planning decisions were still being made in the background.

Q. Right. Okay. Well, let's --

A. So, in essence, what I'm saying is that drawing does show two different types of cladding. What I'm saying to you is materially my understanding is there is effectively no difference in terms of performance.
Q. Right.
We know that there was some element of aluminium on the first four floors, Mr Crawford, just to be clear about that.
A. Yeah.
Q. But at H92, at 123, which is that part of the NBS spec which refers to the rainscreen higher up the building, it still says zinc, and I would just like to try and understand why you were sending Mr Ashton at this stage drawings which said zinc when it was ACM.
A. Yes, but it also says "H92 125", halfway up, "PPC aluminium (composite ...)".
Q. Yes, Mr Crawford, we have been round this before, and that may be the lower levels, but higher up it wasn't going to be --
A. No, no, it's not the lower levels, it's still within the main body of the upper -- when you say lower levels, do you mean the top 20 levels or do you mean a level within that level?
Q. H92 125, which is what you're focussing on where it says aluminium, do you remember that the NBS spec refers

to "rainscreen cladding first four floors elevation and internal envelope of main entrance canopy and canopies in general"? That's 125. 123 is not.
A. Can you scroll this section up?
Q. Certainly.
(Pause)
A. Okay, so, yeah, if you scroll back up to the top again.
(Pause)
Yes, so this is with -- yeah, it's walkway +1. Sorry, I see what you're saying, yes.
Q. So can you explain, just to ask the question one more time, why it was that under H92, which referred to part 123 or paragraph 123 of the NBS spec, which is the rainscreen cladding higher up in the tower to the spandrel panels, it still referred to zinc composite when ACM had by now been selected?
A. Well, for the reasons I think I mentioned slightly earlier, but I know Bruce was keen to try and keep the zinc, and obviously there were ongoing planning issues. Zinc CM, ACM, interchangeable in terms of performance. But, yes, it --
Q. It was out of date, wasn't it?
A. Well, not if you consider it is part -- say, taken from the employer's requirements set of drawings, which would have been done.

Q. By the time you sent this document to Mr Ashton, Mr Crawford, this drawing, in that respect, was out of date.
A. But there was no onus to update that because, from that point on, Harley were doing the detailed drawings.
Q. Harley, right.
Let's look at something else.
If you could please be shown the far left-hand side of the drawing, just above the title "Mezzanine Level +9.000". Do you see that?
A. Yes.
Q. Then three arrows or circles above that, you can see H92 776, "Thermal insulation"; do you see that?
A. Yes.
Q. We can see that this drawing does not record the fact that Celotex FR5000, let alone RS5000, had been specified. Why was that?
A. With all due respect, this drawing was from the employer's requirements. Sorry, you're saying -- I didn't quite catch that -- the H92 776 reference?
Q. Yes, thermal insulation?
A. But does that not reference back to the FR5000?
Q. Well, it does. If you go back, of course, to the NBS spec, it would say FR5000. My question is: why doesn't thermal insulation either refer to FR5000 or RS5000,

which by this time had now been specified?
A. But we didn't -- we didn't know that RS5000 had been specified at that point.
Q. I thought that at this point you had the data sheet --
A. No, the data sheet --
Q. -- for RS5000 --
A. Sorry.
Q. -- and you told us this morning that you had had a conversation with Mr Bailey, Ray Bailey of Harley, who told you that RS5000 had now been specified?
A. Yes, but you're talking about the emails from 17/18 September.
Q. 18th, yes.
A. Yes, but that's when we received the data sheet.
Q. Do you know why it was that no product had been specified at all in relation to that arrow with thermal insulation?
A. But it has been, because it's referenced back to 776, H92.
Q. Okay.
A. I'm sorry, I don't really get your point, because --
Q. Never mind, I'm just seeking to understand -- really what I'm seeking to get from you, Mr Crawford, is how complete these documents were when you sent them to Mr Ashton so that he could understand the detail -- do

you see? -- that he was after --
A. Yes.
Q. -- in the external wall construction.
A. Can I just clarify, though?
These drawings -- we worked the drawings up to employer's requirements, the stage E, to the tender set. After that point, Harley take over, so Harley do the drawings after that. So what I've sent him is where the -- we had taken the drawings up to, plus Harley's drawings. That's the state of the design, that's where the design is at. And that includes their proposition for the insulation, which is the same day.
I mean, even if you had gone back and retrospectively updated it, you wouldn't have been able to do it the same day. But we weren't under any obligation to update it, because at this point, this was Harley's proposals moving forward. Do you see where I'm coming from?
Q. Let's have a look at another part of this. If you go to the right-hand side of the drawing, you can see that there is a label under P10 235. Do you see it says, "Thermal insulation to prevent cold bridging"?
A. Yes.
Q. And then there's an arrow to a piece of insulation there.

In fact -- did you know this? -- that thermal insulation was Rockwool, but the drawing doesn't specify that Rockwool had been chosen, does it?
A. P10 is in sundry items, and --
Q. Indeed.
A. -- sundry items covers precisely that: sundry items.
Q. Indeed.
A. This detail is of a roller shutter along the ground floor, so it's specific -- very specific, limited bit of detail. It's not the overall insulation; it's a specific bit of insulation behind a very specific detail.
Q. Let's see if we can get this this way: anybody looking at these drawings, Mr Ashton receiving them from you, would not know when he looked at them what the rainscreen was comprised of or what the insulation behind the rainscreen was, or indeed what the insulation to prevent thermal bridging or cold bridging was?
A. No, I disagree.
Q. Why do you disagree?
A. Well, first of all, we sent him the data sheet with the insulation on it, so that was Harley's proposal, had their insulation on it, and then clarified the ACM.
Q. Did you send Mr Ashton the NBS spec?
A. I don't recall.

Q. Why not? Sorry, not why don't you recall. Would it not have been sensible to send him not only the drawings but the NBS spec so he could see exactly what the details he was after were?
A. Well, to be clear, my understanding was he did understand what was being built. So what I sent him was the Harley details, then Harley's proposal in relation to the insulation, and then clarified the cladding type.
Q. Why didn't you say to Mr Ashton, "Here are the drawings and here is the NBS spec so you can make sense of the materials in the external wall construction"? You didn't do that, and my question is: why not?
A. Well, NBS spec contains a number of alternatives. What I was trying to do is communicate what I believed we were building.
Q. Why didn't you say to Mr Ashton, "I should just tell you that the bits where it says zinc aren't right anymore, it's aluminium composite"?
A. But I think I did. There was a follow-up -- I ... zinc CM and ACM in performance terms, as I understood it, were the same, and then -- so he worked on the assumption, I think, of the zinc CM, performance of which I think had been the same as the ACM. Then at the end of the conversation I think I did confirm with him that it was -- my understanding was that we were running

with ACM.
Q. When was that conversation, please?
A. At the same time.
Q. At the same time as?
A. 17th/18th conversation.
Q. That you referred to on Thursday where you told us that he had said that the Celotex was compliant, the same conversation as that; is that what you are saying?
A. I think it was, yes, I think it was.
Q. Really?
A. I mean, maybe I've got conversations mixed up.
Q. Do you agree with this proposition: Exova could not have produced any reliable analysis of the compliance of the proposed overcladding scheme with requirement B4 of the Building Regulations without knowing what cladding or rainscreen and insulation materials were going to be used in the structure?
A. But they did know.
Q. No, sorry, can I have the answer to my question?
A. Sorry.
Q. Do you agree that Exova couldn't have produced any reliable analysis of the compliance of the proposed overcladding scheme with B4 unless they did know what was being used as the --
A. Yes, if they didn't know, they wouldn't ...

Q. You do, thank you.
You say they did know because you told Mr Ashton -- is this right? -- on the telephone? Is that right?
A. Yeah, I'm pretty sure it was within the conversation, yes.
Q. Right. On 17 or 18 September; yes? Is that what you're saying?
A. Yeah, I think -- without going back and checking all the -- there's so many emails and there's so much data, I can't recall precisely what was explained when, but my understanding is that I clarified it with the insulation.
Q. Now, it's right, isn't it, that Exova never did produce a further issue of its outline fire safety strategy, did it?
A. Not that I'm aware of. I remember having the conversation with Terry about the suitability of the insulation and the suitability of the cavity barrier strategy. I remember having these distinct telephone conversations. And then I remember asking him to put into an email confirmation that he believed that they were appropriate.
He did send a response, which I think on reflection was more of a tacit approval. But my understanding is that his belief was that it was compliant.

Q. Well, we're going to look at the rest of the email chain shortly, but just so I understand your answer, you're saying, are you, that you had a telephone conversation with Mr Ashton on 17 or 18 September in which he told you that Celotex RS5000 and Reynobond PE 55 aluminium composite material rainscreen --
A. ACM.
Q. -- ACM --
A. Yeah.
Q. -- were compliant; is that your evidence? I don't want to put words in your mouth, I'm trying to summarise what I think you've been telling me, and if I'm wrong, please say.
(Pause)
A. My understanding is that in discussing the fire strategy -- the cavity barrier strategy in relation to the wall build-up, he understood what the build-up was, we had sent him the insulation detail -- the insulation data sheet, and he understood what the cavity barrier strategy was and he understood what the cladding panel build-up was, and I asked him to confirm that in writing.
Q. And you say that he did confirm it in writing, but only tacitly?
A. He confirmed in writing that he thought that it was

appropriate, but on reflection it's more of a tacit approval than an explicit one.
Q. Right.
A. When I re-read it.
Q. We will come to see what we do see in writing shortly.
Just to be clear, it's right, certainly from the documents that the Inquiry has seen, that Exova's proposition in its issue 3 of its outline fire safety strategy of 7 November 2013 that the proposed changes would have no adverse effect on the building in relation to external fire spread was never confirmed by any analysis by Exova?
A. That's correct.
Q. And it was never confirmed by any other specialist fire consultant in any report during the period you were project architect on Grenfell?
A. Not that I'm aware of.
Q. You never sought to chase one up, and is that because -- and, again, I don't want to put words in your mouth -- of what you say are the assurances that Mr Ashton gave you over the telephone on 17 or 18 September?
A. Yeah. Well, I remember having conversations with Mr Ashton on a number of occasions across the project, on a number of issues, separate issues. But I remember on the -- on this particular issue in relation to the

cavity barriers and when the data sheet for the insulation was sent, I remember him alluding to the fact that he would have to complete the report or something of that nature, and I never thought any more of it, firstly because I basically had the conversation with Bruce about what I understood we had and whether it was compliant, and then had the conversation with Exova, and to me, Exova just confirmed that, yes, what we understood was compliant was compliant, and that was it, and ...
Q. Right.
Let's go back to the email chain. Going back to it at {SEA00011719}, you can see at the second email down on the first page -- this is in response to you, where you sent him the fairly limited drawings -- he, Terry Ashton, comes back to you, and we're now at 18 September at 15.32; do you see that?
A. Yes.
Q. "Neil
"If the insulation in the cavities behind the rainscreen cladding is combustible [note the 'if'] you will need to provide cavity barrier as shown on your drawing (number 1279 (06) 120) in order to prevent fire from spreading from one flat to the one above even if there isn't a continuous cavity from the top to the

bottom of the building.
"Kind regards
"Terry."
Do you see that?
A. Yes.
Q. Now, clearly by this point in the day, 18 September, 3.30, you hadn't yet had this telephone conversation with Mr Ashton where he confirmed that Celotex was compliant and that ACM was compliant, as you now say, had you?
(Pause)
The reason I say that, to be clear, is he is saying "If the insulation in the cavities behind the rainscreen is combustible". If you had the discussion with him about Celotex being non-combustible, as you tell us, then that conversation must have happened after 15.32 on 18 September, mustn't it?
A. Not necessarily. I mean, he's saying "If the insulation in the cavities behind the rainscreen is combustible" -- he may have understood the information I had given that that was the case.
Q. Well, if he had understood that the information you had given him showed that the rainscreen was combustible, and the insulation in the cavities was combustible -- we can ask him -- then that would not reflect the

conversation that you're telling us you had with him.
A. Can you just pull up the email when the data sheet was forwarded? Because I'm losing track -- there's so many emails, I'm losing track of what was sent when.
Q. Indeed. Yes, we can do that.
A. It's eight years, six years ago.
Q. Yes, we can do that. If you go to the email at {SEA00011730/2}. I think the one you're after is at 16.03, which is where Daniel Anketell-Jones says to you, "The insulation is class 0."
A. Yes, but --
Q. That's after -- to be fair to you -- the conversation, or rather after the email I've just shown you at just before 3.30 on the same day.
A. What I'm trying to establish is: do you have the email with the attachment on it that was sent?
Q. Yes, and we looked at that earlier. If you stay on this page -- it's {SEA00011730/2} -- we can see, and we will go back to this again, go back to this at page 2, second email down, that's where Daniel Anketell-Jones tells you the insulation is class 0 and then you email Terry Ashton saying, "Is this interpretation correct ...?"
A. What I'm trying to establish is the email that had the data sheet on it, because that's -- the data sheet was

forwarded to Terry, so that would give you the time.
Q. Yes, and according to your statement at 192, you say you sent that comment to Exova together with the data sheet.
A. Okay, so which --
Q. That's what you said in your statement.
A. I'm really confused.
Q. I agree with you, you can't see it from the email, because the email doesn't refer to an attachment, but you say in your statement that it does.
A. Yeah. The problem with the way these emails are presented, when you see the actual email in Outlook, you can see the attachment. With this, I can't, and that's why I can't determine which one the attachment was on.
Q. Yes. I'm just trying to establish the time on the day at which you had the conversation you're referring to. I think we have established that it wasn't before the email when you go back to him sending him the detailed drawings, so it must have been after that.
Do you think it was after the exchange of emails where you say you get the data sheet from Daniel Anketell-Jones and then send it on to Terry Ashton?
A. I think it would have been after, yes, that's logical.
Q. Right.
So going to the email chain, then, and still on this

page, it's not inconvenient to stick with this reference, if we can scroll down a little bit, please, this email chain at page 2, just to see the top of it. I am afraid it goes over two screens. If you could scroll up to the top of page 2, I think that's the email we want.
Daniel Anketell-Jones says to you the insulation is class 0, and that's at 16.03. You say to Terry Ashton -- if we could scroll down, please, because we have only got half the email -- this is at 15.32, and then you go back to him -- this isn't right -- at 15.50.
Okay, what's gone wrong here, I am afraid, is I don't think my instructions to the operator are getting through.
Could I please be shown the top half of page 2 of this document and the bottom of page 1. So we can see the email to you from Daniel Anketell-Jones at 16.03, and then you're sending that to Terry Ashton at -- bottom of page 1, please -- 16.07, if you look at page 1. We have managed to get both parts of the email string up on the screen.
So you send this on to Terry Ashton at 16.07; yes? Then he responds to you at 16.21.
A. 16.03 and 16.21 are the times I'm seeing.
Q. Right. So let's take it even more slowly.

On the right-hand side you have Daniel Anketell-Jones telling you insulation is class 0, 16.03.
A. Yeah.
Q. The email, which is I am afraid split over two pages which you send to Terry Ashton is at 16.07, if you look on the screen in the bottom left-hand --
A. Sorry, I see what you're saying.
Q. Above that, Terry Ashton comes back to you at 16.21.
A. Okay.
Q. Where he says, "A material which has a Class 0 ..." Do you see that?
A. Yes.
Q. So just to be clear about timing, which is what I'm trying to look at with you, you say, I think, that Daniel Anketell-Jones sends you the data sheet at 16.03, you send that on to Terry Ashton at 16.07, four minutes later -- yes?
A. Yeah.
Q. And then Terry Ashton responds to you, 13 minutes after that or so, when he says:
"Neil
"A material which has a class 0 rating is not necessarily non-combustible ..."
Do you see that?

A. Yes.
Q. Right.
Now, just to finish off the answer, perhaps we can look at the very top of page 1 {SEA00011730/1}, just for the timing.
You then go back to Terry at 17.12 and say:
"Hi Terry
"Thank you.
"Daniel,
"Can you confirm your position in relation to Terry's comment below regarding combustibility and continuous cavity paths."
I don't need the rest, unless -- well, you can certainly look at the rest, but I don't want to ask you about the rest.
So that's the email chain on that day. Do you see that?
A. Yes.
Q. Now, when do you think, looking at that email chain, you had your conversation with Mr Ashton about Celotex RS5000 being a material of limited combustibility or not combustible?
A. Well, it would have been after I sent him the data sheet.
Q. After you sent him the data sheet but before he

responds?
A. I couldn't tell you precisely, but it would have been after I sent the data sheet because the data sheet would have been to inform him.
Q. Right.
Now, let's just look even more closely at your statement.
At paragraph 192, if you go back to it, it's page 62 {SEA00014275/62}, you say:
"In response to the comment Daniel Anketell-Jones ... stated 'The insulation is class 0."
You set out the rest of the quotation and then you say:
"Again, I forwarded the comment to Exova, together with the datasheet for Celotex RS5000 dated August 2014 that Daniel had attached to his email."
You see that?
A. Yes.
Q. That's what you say. But do you accept that, looking at the emails -- if we can just go back to them, please -- that we had a minute ago on the screen, {SEA00011730/2}, which is what you're referring to, which is the one from Anketell-Jones to you at 16.03, do you accept that looking at that, neither Mr Anketell-Jones' email to

you, nor yours to Mr Ashton, referred to an attachment?
A. This comes back to what I said earlier. I was trying to establish which email had the attachment on it, and I can't see it from the way these are presented here. If you -- you know, when you're in Outlook, you see your email and it's got an attachment, so you know. Because of the way this is presented, I can't tell.
Q. Perhaps, to be fair to you, we could show you a different email, or rather the same email in a different guise. If you look at {SEA00011724}, which is the one you refer to in your statement, that's what you refer to in your statement and it's on the screen there. But, again, we don't, I think, see Mr Anketell-Jones sending you the data sheet, do we? I don't think Mr Anketell-Jones sends you the data sheet, because his email doesn't have an attachment to it and he doesn't refer to an attachment, does he?
A. Well, that's how it would appear there.
Q. Right.
SIR MARTIN MOORE-BICK: Just a minute, Mr Millett. The top half of this page does seem to refer to an attachment, doesn't it?
MR MILLETT: It does. I was just going to come to that, Mr Chairman.
SIR MARTIN MOORE-BICK: Right.

MR MILLETT: I just want to work out where the attachment originates.
A. Sorry, can I just interject? The data sheet was sent from Harley to me; correct?
Q. Well, you tell me.
A. Well ... it says here, "Attachments: rainscreen cladding product datasheet".
Q. Yes. Well, let's try a different way of going about it.
SIR MARTIN MOORE-BICK: I think the point Mr Millett is putting to you is you can see from the top half of this page that where there is an attachment, it's referred to.
A. Yes.
SIR MARTIN MOORE-BICK: And this is you sending that data sheet to Mr Ashton.
A. Yes.
SIR MARTIN MOORE-BICK: What we don't see, either in the bottom half of the page or, I think, in any other email we have looked at so far, is an attachment to an email from Mr Anketell-Jones to you.
Is that your point, Mr Millett?
MR MILLETT: Yes. That's right.
So just looking at these two emails, Anketell-Jones to you and you to Mr Ashton, Anketell-Jones doesn't attach the data sheet or refer to it; correct?

A. It would seem that way.
Q. Yes. So we move to the next question.
You then go to Mr Ashton and clearly you do attach the data sheet.
A. Yes.
Q. My question is: was it you who decided to attach the data sheet to the email you were sending Mr Ashton, or were you, as is possible, just forwarding it on?
(Pause)
A. I can't recall without seeing all the emails. This is the problem. I'm used to looking at the historic emails and then you can see and you can piece the things together. I'm getting excerpts here.
What I think happened is I was forwarding -- what I understood was, from my recollection, that it was forwarded to me from Harley and then I forwarded it to Exova. That's what I recollect. But because I don't have that --
Q. Over the lunch break we will see if we can find that, because that may well be true. What happens sometimes is you don't always see the attachments on the versions of the emails that come up.
But let's just focus on the message in the email. It's certainly right, looking at these emails, that Mr Anketell-Jones doesn't tell you to look at the

attachment, look at the data sheet, and you don't mention the data sheet to Mr Ashton, do you, when you send it on?
A. Within the email you're showing me here, no, but --
Q. No. And your witness statement doesn't refer to any discussion with Mr Ashton in which you say that he told you that Celotex FR5000 was compliant with Approved Document B as a material of limited combustibility.
A. You are talking about RS5000 at this point.
Q. All right.
A. The data sheet was from RS5000.
Q. You are quite right.
A. That's the whole point. The RS5000 was sent to me. It was sent to me from Harley and then I forwarded it from Harley to Exova. That's the whole point. I wouldn't have forwarded it otherwise.
Q. You are absolutely right, Mr Crawford. I mis-asked the question. Let me ask it again.
Your witness statement doesn't refer to any discussion with Mr Ashton in which he told you that Celotex RS5000 was compliant with Approved Document B?
A. Correct, it may not refer to any discussion, but there were discussions going on.
Q. Nor does it refer to any discussion in which he told you that RS5000 was a material of limited combustibility,

does it?
A. But I never said that he did.
Q. And there is no email record where you actually asked him the question: "Terry, is RS5000 compliant with the Building Regulations?"
A. Categorically, no, but I sent -- I had sent him that as a package of details of the build-up.
Q. And all you asked him when you sent him the data sheet is, "Is this interpretation correct?" You don't ask him, "Is RS5000 compliant with the Building Regulations?", do you?
A. No, but he's asked for details of the build-up. I've sent him details of the build-up and have clarified what the proposed insulation type is. There's a series of conversations that took place around that. For sure there was more than one telephone conversation. What I do not have is a record of all those conversations, I just have a sense of what was sent and what I agreed.
Q. Given the absence of any reference in your witness statement to a telephone conversation with Mr Ashton on the subject of whether Celotex RS5000 complied, are you quite sure in your recollection, as you told us on Thursday and again this morning, that you actually did have a conversation over the telephone with him?
A. There were definitely conversations going on in parallel

with the emails, for sure.
Q. Can you explain why it is that your witness statement, which is lengthy and detailed, made absolutely no reference to such a telephone conversation?
A. Well, there was a lot of telephone conversations that took place, so I wouldn't have recorded them all, and also you can't say precisely what you said in telephone conversations, you only know what you discussed in general terms, let's say.
Q. Given that you knew by this stage that Exova had promised a further analysis as to whether the proposed cladding would comply with Approved Document B so far as external fire spread was concerned, and given what you now tell us, namely that you had a conversation over the telephone that Celotex RS5000 complied, was that not something that you would have put in your witness statement --
A. No, you --
Q. Mr Crawford, I'm going to ask the question and you can answer it.
Is that not something that you would have put in your witness statement, had it actually happened?
A. To be clear, the conversation that I had was in relation to the cavity barrier proposal in relation to the build-up. That was the conversation I was having.

Q. Indeed. But given -- it is a "but" -- the importance of, as Exova had said, getting a future analysis of whether or not the proposed overcladding complied with ADB, and given what Mr Ashton, you say, was telling you over the telephone in the middle of this email string on the afternoon of 17 September, I'm suggesting to you, I'm putting it to you, that you would have recorded that in writing at the time and you would have put it in your witness statement.
A. No.
Q. My question to you is: you didn't; why not?
A. I'm trying to explain to you how -- what I understood happened, first of all, that's what I'm trying to say, is that the conversation was in relation to the cavity barrier strategy. Harley sent me additional information in relation to the RS5000, and Exova were looking for clarification of what the details and the build-up was, and that was what -- that's what was going on in those conversations, and that email conversation backwards and forwards. That was what was being tried to -- that was what was being established.
I mean, it was primarily around the cavity barrier strategy, but it sucked in other stuff. It wasn't -- the conversation wasn't about them doing this follow-up report. That wasn't what the conversation was about.

The conversation was about the cavity barrier strategy, but it inevitably brought the other elements into the conversation.
MR MILLETT: Right.
Mr Chairman, is that a convenient moment? I'm afraid I'm mid-stream, but ...
SIR MARTIN MOORE-BICK: Well, I don't think we can do much about that.
MR MILLETT: No.
SIR MARTIN MOORE-BICK: We are going to have a break now, Mr Crawford. Again, please don't talk to anyone about your evidence or things related to it --
A. Can I just say, I don't want you to feel I'm being obstructive, I'm just trying to recollect relative to what I know I had in emails and in notional conversations that I know I had round about the same time. It's very difficult because there are definitive email trails, but there are a lot of telephone conversations and I'm trying to link them in logically to what I was talking about at the time. That's why I'm emphasising, this was a conversation about cavity barriers but it expanded from that, and you could see that because it brought the insulation into that conversation. But it wasn't a categoric conversation about dealing with the follow-up report.

MR MILLETT: I understand.
A. Do you see what I'm saying?
MR MILLETT: I do.
A. I don't want you to feel that I'm somehow dodging or not ... you know, I'm trying my best to relay what I understood happened.
SIR MARTIN MOORE-BICK: We understand that.
A. Yes.
SIR MARTIN MOORE-BICK: Thank you for clarifying.
All right, would you like to go with the usher, then, please.
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: We will resume at 2.05, please.
(Pause)
2.05, please. Thank you.
(1.05 pm)
(The short adjournment)
(2.05 pm)
SIR MARTIN MOORE-BICK: Right, Mr Crawford, happy to carry on?
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: Yes, Mr Millett.
MR MILLETT: Mr Crawford, before lunch we were looking at some emails between Harley and you and you and Mr Ashton at Exova, and one of the questions that arose was

whether or not you had got the data sheet for RS5000 from Harley. Let me just be clear about that, to be fair to you.

Can I show you, please, a document {BSD00001420}. This actually has come from Kevin Lamb's disclosure. What it shows is that on 18 September, looking at the top email on page 1, Daniel Anketell-Jones sends you the data sheet at 16.03, and then in the email says, "The insulation is class 0". Then you send that on, although we can't see it on this version of the email string, to Terry Ashton a few minutes later saying, "Terry, is this interpretation correct?"

So does that help you orientate yourself in where you got the data sheet from? It's clear from this that you did get it from Mr Anketell-Jones of Harley.

A. Well, I knew. With all due respect, that's what I understood.

Q. No, exactly.

A. Yeah.

Q. One of the problems that we have, so you know, is some of the email strings don't always show the attachments because of the way they've been archived. So that was the position.

Now, can we go back to the email where you do forward the message to Mr Ashton, "Is this

interpretation correct?" That's {SEA00011730/2}.

Again, I'm afraid we have the slight difficulty about the time, but it doesn't perhaps matter. You say:

"Is this interpretation correct (see below)?"

Is it the case that you yourself were not sufficiently familiar with the regulations and Approved Document B in particular to know if Mr Anketell-Jones' interpretation was correct?

A. I think in relation to something like -- part B is a very technical document, and some aspects of it are quite apparent and some aren't, and particularly where I would consider this to some extent specialist, then I think it's right to verify it with a specialist, and that's what I was looking to do, to check that the interpretation was the same as Daniel's.

Q. So you didn't go back to Approved Document B yourself and check the requirements for limited combustibility?

A. Not that I recall.

Q. Okay. Is there a reason why, as we can see, you didn't volunteer any commentary in your message to Mr Ashton?

A. Not that I recall. I mean, I know I've mentioned before the break there were telephone conversations as well, but I don't ... I don't recall anything specific in relation to this particular question.

Q. We can see from this email that you didn't ask Mr Ashton

any particular queries regarding the technical detail. Is there a reason why you didn't?

(Pause)

A. No, I mean, as I said, there were telephone conversations going on as well, and I just can't recall precisely -- because I know that's what you're looking for: precise -- precisely what those were and precisely what was discussed.

Q. Yes, I mean, I don't think you're saying there was a telephone conversation between 16.03 and 16.07.

A. No, but you're asking about what's being said in terms of technically.

Q. Yes. So my question again: why didn't you ask Mr Ashton any specific questions regarding the technical detail that you were being given by Mr Anketell-Jones?

A. Well, I've asked him if the interpretation is correct.

Q. If we go up to the first page of that email chain {SEA00011730/1}, we can see Mr Ashton's response on 18 September 2014 at 16.21. We looked at this a little bit before, but he says:

"Neil

"A material which has a Class 0 rating is not necessarily non-combustible although the reverse is invariably true. Some Class 0 products will burn when exposed to a fully developed fire."

Just looking at the first sentence I've shown you, did you understand what Mr Ashton meant when he said that a class 0 rating is not necessarily non-combustible, although the reverse is invariably true?

A. I think so, yes.

Q. What? What did you understand by that?

A. That ...

(Pause)

A non-combustible material will be, by default, class 0.

Q. Right. What about the other way round?

A. What do you mean the other way round?

Q. Well, the obverse, the reverse. What did you understand him to mean by that? He says "The reverse is invariably true". What did you understand by that?

A. Just what I said, which is a non-combustible will be by default class 0.

Q. And that class 0 by contrast, what? You say "Non-combustible will always be class 0 by default"?

A. Well, class 0, as he stated, the rating is not necessarily non-combustible.

Q. Exactly.

A. Yes.

Q. That leads to the next question: in what circumstances

would a class 0 rating not be non-combustible, did you think?

(Pause)

A. Well, the test method for class 0, the 476 test, the BS 476 test, is effectively a surface test. You -- well, it's a small square and you hold a flame under it. Whereas the BS EN 13501 test is a through material test.

Q. What you have just given to me by way of an explanation, was that something you knew at the time? Was that something you were alive to?

A. No, no.

Q. I see, okay.

Let me ask a question in a slightly different way. What was your takeaway, your basic understanding, from Mr Ashton's message that class 0 rated material was not necessarily non-combustible?

A. Well, it could be class 0 and be of limited combustibility, for example.

Q. In what circumstances would something which was class 0 be of limited combustibility, did you think at the time?

A. I don't know if I did think at the time.

Q. Right.

I mean, did you ask yourself the question: well, what does it depend on? When would it be necessarily non-combustible and when wouldn't it be?

A. I don't think I thought that far.

Q. Right.

So did you ever learn in the end whether RS5000 was in fact combustible, non-combustible or of limited combustibility?

A. I think I suspected it was limited combustibility, but my method of verification was -- for its suitability in the proposed build-up was with Exova.

Q. Just following that up, you say "I think I suspected it was limited combustibility"; did you ever actually learn whether it was?

A. Categorically, no.

Q. Does that mean that from September 2014, Mr Crawford, you were at least alive to the fact that you couldn't rely on a class 0 fire rated classification for insulation as demonstrating, without any further questions being asked, that the insulation was of limited combustibility?

A. I don't think I thought that far. I mean, I think I just ... I took the product and I read the -- my interpretation was as per my witness statement in terms of how I read the statements that were made in the front of the product, and then I sent it to -- had the conversation, sent it to Exova to verify that my understanding was that it was effectively compliant

within the build-up.

Q. Now, you then go to the top of the email chain, please, which is {SEA00011730/1}, at the very top. This is your response back to Terry Ashton, same day, 18 September 2014, at 17.12, so just about 55 minutes after you received his email at 16.21. You say:

"Hi Terry

"Thank you."

You cc this to Daniel Anketell-Jones at Harley and Simon Lawrence at Rydon and Simon O'Connor as well, and Kevin Lamb indeed. You say:

"Daniel,

"Can you confirm your position in relation to Terry's comment below regarding combustibility and continuous cavity paths."

Then you talk about the Kensington Aldridge Academy.

What did you mean, do you remember, by confirm his position, "Can you confirm your position", when you asked Daniel Anketell-Jones that question?

(Pause)

A. I suppose that he agreed with Terry's interpretation.

Q. Right.

It's fair to say, because we can see it here, that you didn't offer any commentary on Mr Ashton's email or ask any questions back to Mr Anketell-Jones, did you?

A. Well, I can only go by what's in the emails.

Q. Looking at it in the round -- and tell me if this is unfair, Mr Crawford -- isn't it fair to say that in respect of this design issue, cavity barriers interlaced with combustibility of the insulation, you were attempting really to act as a go-between as between Harley on the one hand and Exova on the other, without really engaging with the substance of the problem?

A. No, I think that's a little unfair. I mean, I think ... I think on one hand you had Harley, who were proposing something that was albeit a slight deviation from what was in the employer's requirements, and you have the specialist fire consultant on the other, and I was trying to, if you like, arbitrate between the interpretations, and make sure that what was being proposed would ultimately be compliant.

Q. You say you were "if you like, arbitrating between the interpretations" --

A. That's probably not the best use of --

Q. No, I'm not going to pick you up on the word "arbitrate", I understand that might be a lawyer's phrase misused, but is it right to say that you were essentially acting as a middleman, receiving the question from Harley, punting it off to Exova to answer, getting the answer back from Exova, and then punting it

back to Harley?
A. Well, what I would say is the proposal by Harley was not mine, and so it wouldn't necessarily be one I would make, and then I wouldn't attempt to interpret something as specialist as that without going to the specialist. So I was co-ordinating between the two.
Q. That was how you saw your role, was it?
A. Yeah.
Q. One of co-ordination, rather than inputting any professional advice yourself?
A. Yeah. Well, I wouldn't see it as checking for compliance.
Q. You wouldn't see it as checking for compliance?
A. No.
Q. One way or the other?
A. No, I was seeking to ensure that it was compliant, but not specifically checking myself that it was compliant.
Q. Okay.
Can I ask you to stay on this page and look back at the second email from Mr Ashton. This is the one at 16.21 to you. We have looked at the first two sentences. He then goes on to say:
"In any case, you need to prevent fire spread from on flat to the flat above as I stated in my earlier email. What isn't clear from the information to hand is

whether or not there is a continuous cavity from top to bottom in any part of the cladding (apart from around the column casings) irrespective of the type of insulation?"
Just a few questions about what he says there, because I want your understanding. Obviously Mr Ashton will come and explain what he meant.
Did you understand that there were actually two separate issues here: there was the type and the fire performance of the insulation on the one hand, and also, on the other, the design scheme for cavity barriers? Did you see that as two separate issues?
A. He's highlighted that as two separate issues, yes.
Q. Yes. Did you appreciate that the question of whether there should be cavity barriers along compartment floor lines was not determined by the combustibility rating of the insulation used?
A. Sorry, I'm just going to re-read it.
Q. Yes, of course.
(Pause)
A. Yes, I think that's what he's saying.
Q. Did you appreciate that the question of whether there should be -- this is my question to you --
A. I had always assumed there should be cavity barriers around the compartments. I've never thought anything

other than that. I mean, it's interesting, I think on the original RFI, the proposal that I see Harley suggesting is to address with -- is mainly to address the chimney effect, and this is something that Terry's picked up in this where he talks about the continuous cavities from top to bottom. You can see that's his primary concern. And I think that concern probably is illustrative of how people in the industry, with that type of cladding, would think.
But I don't think it -- I think, being prudent, you would always be looking to maintain the compartment and protect the compartment.
Q. Right.
Just to come back to my question about the distinction again. Let me ask it slightly differently.
Did you think, or did it occur to you, that Harley had misunderstood the distinction here between, on the one hand, the question of the type and fire performance of the insulation, and, on the other hand, the design scheme for cavity barriers?
(Pause)
A. Can you ask that again, sorry?
Q. Yes.
You and I have agreed that there are two separate issues here: there is the type and fire performance of

the insulation and there is the design scheme for cavity barriers. My question is whether you thought at the time that Harley had lacked an understanding of that distinction.
A. I think that's a question for Harley.
Q. I'm asking you whether you thought they might have done.
(Pause)
A. I don't know.
Q. Okay. All right.
A. It's possible.
Q. Do you accept that the specification of insulation that doesn't comply with the Building Regulations and the guidance in Approved Document B is something that should have been, in your words, manifest to the reasonable architect or any architect or any person performing the role of an architect on a project to overclad a building in excess of 18 metres in height?
A. I think it's your duty to seek to check that it complies -- seek to ... to make sure that it -- seek to ensure that it does comply, yes.
Q. Would you accept, as a general proposition, Mr Crawford, that a subcontractor omitting cavity barriers from locations where they are required by Approved Document B to the Building Regulations and the guidance in it should have been manifest to any architect engaged on

a project to overclad a building in excess of 18 metres in height?
A. Not necessarily. They may have -- I mean, they may have their reasons. You say omit in relation to ADB2, but ADB2 is only guidance on where to place cavity barriers. It's not -- it doesn't guarantee that you are -- that you would be compliant, even if you did place them there, nor is it the only means by which you could determine to place them there, nor is it, in my opinion, specifically diagram 33 in section 9, fit for purpose as a method for determining where to place cavity barriers. I would always seek -- again, I would always seek specialist input in order to determine that, particularly where this narrow[sic] fell outside that described in section 9, diagram 33, which in this case it did, in my view.
Q. Do you accept or, perhaps better put, is it your experience that an architect on a project such as this, prior to novation, should have taken the lead in sorting out compliance issues before the full plans application was submitted to RBKC building control?
A. I believe that the team, the people involved in that, did believe that what they had proposed was compliant.
Q. You believe that now or you believed that at the time?
A. I believed that at the time and I believe that they

believed that at the time now.
Q. Did it surprise you when the question of whether RS5000 was a material of limited combustibility arose, as we've seen in this email chain, in the March of 2015, that that hadn't been sorted out and that question answered prior to the full plans application being submitted to RBKC building control in the distant past?
A. But I think that the issue of using RS5000 or the -- then the equivalent of FR5000, I believe that they did believe that was compliant.
Q. And the basis of your belief is what?
A. The conversations that I had at handover, and the conversations I had when I checked the RS5000 with Bruce. I mean, he, to my mind, was of the opinion that the scheme and what had been proposed was compliant. I don't think NS(?) had any view to doubt that. But then I checked with Exova, with the new product or variant of the same product, whatever you want to call it, that it was compliant, and now it's my understanding that it was.
Q. You see, given that you say you had had these conversations with Bruce Sounes at handover about the compliance of the insulation at that stage, my question is really whether it came as a surprise to you to discover in March 2015, some nine or eight months later,

that the question of whether or not the Celotex RS5000 was of limited combustibility had arisen. Did that not come as a surprise to you, given you thought it was something that had been resolved already?
A. Sorry, I'm not sure I really understand the question.
Q. You told us, I think -- and correct me if this is wrong -- that during your handover discussions with Bruce, he had led you to believe that the specification of what was then FR5000 Celotex as the insulation product for the use on Grenfell Tower had been compliant.
A. Yes.
Q. That's what you told us. My question then is: did it not come as a surprise to you to learn in March 2015, some eight or so months after the handover from Bruce Sounes, that there were questions around whether the Celotex material was compliant or not?
A. By -- I never saw them -- that there were questions; I was simply seeking to verify that what Harley were proposing was compliant.
Q. Why?
A. Because it was a different title product.
Q. You say you had discovered that it was a different kind of product --
A. No, different title to the product. It was RS5000.

Q. And you discovered that it was RS5000 I thought you had said in September, which is now.
A. Yes.
Q. 2014.
A. When it was forwarded to me by Daniel is when I forwarded it to Exova.
Q. Yes.
A. Yes.
Q. So did it not come as a surprise to you to discover that when Bruce Sounes had told you that it was a compliant material, that matter had not been actually got to the bottom of?
A. But I don't think that's what happened or what I'm saying.
Q. Right.
A. I mean, at the tender stage, at the stage E of the employer's requirements, there was a product in there, the FR5000. I understood Bruce understood that that product was compliant. When the specialist subcontractor is putting together his package of information, he brought forward the data sheet for this product, RS5000, which for all intents and purposes seemed to be reasonably similar, but then this was forwarded to Exova to check for compliance.
Q. Right.

A. This is what happened. This is how I see it.
Q. I see. So as far as you were concerned, this was quite a new issue and had to be resolved?
A. It was only a new issue inasmuch as the product name was different.
Q. Right.
Now, can I ask you to go to your witness statement and look at paragraph 102, please, at page 38 {SEA00014275/38}. You say there that:
"100. On 23 January 2015 at 15:36, Kevin Lamb (Harley) copied me into an email to Simon Lawrence (Rydon) and said 'Please find attached revised typical windows showing reduced qty of trickle vents ...'"
Do you see that?
A. Yeah.
Q. Then at 102 -- I'm so sorry, I actually read the wrong paragraph, it's a different email -- he says:
"Please find attached specification on the upper 20 floors for clarity/approval. We shall add to this as we reissue the lower elements."
You see that?
A. Yes.
Q. You say there:
"He attached the first version of a Harley Drawing C1059-100, titled 'Specifications' (the Harley

Specification)."
Okay?
A. Yeah.
Q. Then in paragraph 103 you say:
"Harley prepared the Harley Specification to identify the materials it specified for the detailed design of the cladding system."
Now, let's just have a look at the specification, if we can, please. This is {SEA00003059}, just to look at the version that was sent to you on 23 January 2015. If you can see the date at the bottom, it's dated 15 January 2015, "Issued for approval", and if you look to the left, there is a box or set of boxes with revisions in it. There is no revision number in there, if you just move across to that. Then if you look at the top of the page, it says "Specification notes".
Is that the document that he attached to the email of 23 January I referred to in your statement?
A. It looks to be, yes.
Q. Right.
Now, if you go to paragraph 106 of your statement, which is on page 39 {SEA00014275/39}, you say:
"On 26 January ... I emailed Harley regarding the three drawings they sent on 23 January, stating 'Please see attached comments'. I attached marked up drawings."

Do you see that?
A. Yes.
Q. Can we take it from what you say there that you had read the specification that Mr Lamb had sent you on 23 January and had commented on it? Do you remember that? We can look at a document in a moment but I just want to get your recollection first.
A. I commented on it from the purposes of -- for the purposes of architectural intent, yes.
Q. Okay, let's look at that. It is {SEA00003060}. On the first page of that, we can see the specification notes, very similar to what I've just shown you, but this time it's got a Studio E Architects red stamp on it and some red handwriting. I'm assuming that red handwriting is yours.
A. Yes.
Q. You can see that you have marked it B, so it conforms to design intent subject to comments. Do you see that?
A. Mm-hm.
Q. Now, have a look at it, up the page, please. Have a quick look at that -- or a slow look at it, doesn't matter. You can't see anywhere in there where the insulation for use within the overcladding system is specified, can we? We can't see that?
A. No.

Q. Did you notice that at the time?
A. But the insulation had already been specified back in the 17th/18th correspondence.
Q. Indeed, and that was my next question. Having spent two days engaged in discussions, 17 and 18 September 2014, that we spent quite a lot of time on this morning and this afternoon, Mr Crawford, did it not surprise you to see that Harley's specification, when it came in January 2015, did not refer to the insulation for use within the overcladding system?
A. Well, not necessarily, because it had been covered out in that previous correspondence. I mean, they might have added it into this sheet.
Q. Yes, and they didn't, as we can see. My question is: did you notice that they hadn't?
A. Well, I know I keep saying this, but I was commenting on this for the purposes of architectural intent.
Q. I'll ask you one more time: when you received this document and you commented on it, did you notice the fact that the insulation type was not specified?
A. I don't recall.
Q. Right.
Now, you made a comment in respect of the possible need for window restrictors. You can see that, "TBC by client"?

A. Yeah.
Q. You stamped the specification status B, "Conforms to design intent subject to incorporation of comments".
On what basis were you satisfied that the specification conformed with design intent when there was no reference at all to the insulation for use in the cladding envelope?
(Pause)
A. Well, I suppose, as I said before, they had been covered separately, but I don't know if I did necessarily think about it in those terms on this sheet.
Q. Was the omission of any material for insulation not a manifest error which any architect in your position should have picked up?
A. Not necessarily, I mean, this specification sheet is not complete in any sense, it's not complete for the whole building. I mean, this was revised several times and it's extended to cover all the cladding across the building.
Q. It was, and we'll look at some later editions of it. But at this point, having had two days of discussions on the insulation material, was it not manifest, and manifest to you and manifest to any architect on this type of project, that the insulation was missing?
A. But it wasn't missing; it had been covered separately.

Q. In an email, but not in a formal specification document such as this, which you had stamped.
A. Yes, but is this a formal specification? It's not really; it's a sheet that relates to drawings.
Q. Well, let's move on in time.
If you go to the next edition of this, this is the one of 25 March 2015, it's {SEA00003180/1}.
A. I mean, just to mention that even the title itself says "Specification notes".
Q. What did you take from that at the time?
A. Well, it's not the full specification, is it?
Q. Did you think that at the time?
A. Probably. I don't know. Possibly.
Q. I'm wondering why you make the point, then. You say it's just notes.
A. I'm making --
Q. At the time -- let me just ask you. At the time, Mr Crawford, you saw the word "notes", did you think that there would be something else which would come from Harley which would more formally and completely set out what it was they had to do?
A. I would read this, because of the title, saying "Specification notes", that it was specifically that: notes referring -- notes that were used against the drawing. So, for example, "Cladding - R2", so you take

R2 and you relate it to what's in the drawing.
Q. I see.
A. So I suppose what I'm saying is it's not a complete specification in the sense that I think you're referring to.
Q. Right. You say it's not complete. Again, we see there is no reference to the insulation for use within the overcladding system. But this time you have marked it with an A, "Conforms to design intent", and that's on 27 March 2015, as we can see in the stamp.
So question again: did you notice at the time that the specification for the insulation was missing from this document?
A. I can't comment on that, but I would stand by my other comments, which is this sheet -- I wouldn't consider this sheet as a specification or a complete specification. I would consider this sheet as precisely what it says: specification notes, notes on specification to be read in conjunction with the drawings, as it was issued with and in conjunction with the drawings.
Q. We will come to one or two drawings in a moment. Let's just complete the run.
If you go to the final specification we have -- and there are one or two others in the intervening period,

Mr Crawford, so forgive me if you want to go back to any of those, but this is {SEA00003387}, dated 28 January 2016. We can see the date on that by looking at the box at the bottom. You can see the box at the bottom with the revisions going from A at the bottom to I at the top. You can see this is revision I, 28 January 2016. Do you see that?
A. Yes.
Q. Then if we can just pan out a bit, we don't see a stamp from you on that, but I think you say in your statement that it was provided to you; can you confirm that?
A. If that's what I said, then yeah, that would be the case.
Q. Yes. Just for your note, you do, it's paragraph 136 {SEA00014275/46}. We don't need to turn up it. Just to be clear, for your recollection, you say you didn't mark the status. You say you stamped it but didn't mark the status, but you intended to mark it status A "because I had no further comments to make".
Now, can I just show you some drawings. In fact, actually it's easier to do this from your witness statement. If you go to paragraph 136, this is probably a quicker way of doing this. On page 46 of your statement, you can see there you refer to the Harley spec updated 28 January 2016, which is what we were just

looking at, Mr Crawford, and you say:

"On 28 January 2016, Kevin Lamb (Harley) copied me into an email to Stephen Blake (Rydon) and attached drawings for the internal atrium screen 'for final approvals'."

Et cetera, et cetera.

Then four lines up from the bottom of that paragraph you say:

"I replied later that day, attaching marked up drawings, including revision I of the Harley Specification [which we have just seen], which I had stamped but did not mark Status, although believe I had intended to mark it Status A because I had no further comments to make."

Now, if we look at {SEA00003387}, which is the document revision I to which you refer in paragraph 136, there is no stamp on that.

Again, it's the same question. There is no reference in that document to the insulation for use in the building envelope. Take it from me that there isn't, even though the document has come on a long way since its version originally in January 2015.

My question is: did you notice in January 2016 that the insulation for use in the building envelope was not specified?

137

A. Comment is just the same as before.
Q. Right. So is the answer: no, you didn't?
A. As I said before, the insulation had been established within our spec and then the proposal for, if you like, the equivalent had been raised, which was the RS5000 product.
Q. Yes.
A. Which they may or may not have believed to be essentially the same as the FR5000 product. And this sheet is not full specification, it's specification notes, nor is it clear to me whether Harley were ever required to produce a full specification or what the terms of that full specification were, for example, was it outline spec, spec notes.
Q. Is there a reason why you never went back to Rydon or to Harley and said to them, "Look, I have had a whole load of these specification notes from you for about a year now, none of them refers to RS5000, can you please put that in"?
A. No, it didn't occur to me to go back and ask them.
Q. Given the importance of the insulation product and the questions that had arisen about it in the September of 2014, my question is: why didn't it occur to you?
A. Because it had already been established at 2014 what it was.

138

Q. I see. So you were content at the time, were you, to leave this question of the identity of the insulation product as something contained in email traffic as opposed to going into a document which had been built up by a series of revisions, such as we see here?
A. You say email traffic, but I think it was pretty explicit what it was, and also the checking was pretty explicit, so to me ...
Q. If someone was coming into this project at this point from the outside, and had no idea about discussions or anything that had occurred, where would that person look to find out what specification or what product was to be used for the insulation at Grenfell Tower? What would they look at?
A. Well, the data sheet that was provided by the specialist contractor.
Q. What would tell them to look for that?
A. All that information would be held together by Rydon.
Q. I see.
A. And ourselves for that matter.
Q. Let me change tack slightly, a different product. I'm going to ask you one or two questions about Kingspan Kooltherm K15 because we mentioned it before.

Were you familiar with that product, Kingspan Kooltherm K15, in July/August 2014?

139

A. I knew of the product.
Q. Did you know that it was a phenolic product?
A. I possibly might have. I mean, I couldn't say definitively at this point.
Q. Were you aware that Kingspan Kooltherm K15 had been used as an insulation product on Grenfell Tower?
A. No.
Q. Okay. Can you remember when you first became aware of that?
A. After the fire.
Q. After the fire.

I'm going to turn to ACM in a moment. Before I do, I have just one or two questions left on insulation on the KALC project.

Now, Studio E, as you have told us, were the architect on the KALC project, and specifically the Kensington Aldridge Academy; yes?
A. Yes.
Q. Were you involved in the design of the façade for the Kensington Aldridge Academy?
A. At a -- there was a senior architect working on that who did the bulk of the work on that.
Q. Senior architect at Studio E?
A. Yes.
Q. Who was that?

140

A. Markus Kiefer.
Q. Markus Kiefer, I see.
A. And also ... I forget the name of the individual who did the GA drawings for the façades.
Lucas, Lucas Brandes.
Q. Were you involved in the selection of the materials that formed the cladding system on the building?
A. Was I aware of ... I didn't do the specification, no.
Q. You didn't do the specification?
A. No.
Q. Can you assist us -- and maybe you can't -- with what the façade on the Kensington Aldridge Academy is comprised of?
A. A large chunk of it is a stick system, curtain walling system, Schüco-type curtain walling system that was -- the main contractor was MTW for that. There were portions of brickwork at the lower levels, and with windows inset into those, and a small amount of curtain walling around the sports hall -- small amount of rainscreen walling around the sports hall.
Q. I see, okay. Was there any insulation used in the cladding system?
A. In the main cladding system, in the curtain walling, was Rockwool.
Q. Okay, and Rockwool is, for those who perhaps don't know,

non-combustible, isn't it? It's a mineral.
A. Yes.
Q. To all intents and purposes, non-combustible.
A. Yes, all intents and purposes --
Q. Do you know why a non-combustible mineral insulation came to be used on the Kensington Aldridge Academy, not least given that it was not a building in excess of 18 metres in height?
A. Well, there wasn't just Rockwool used in the Kensington Academy.
Q. What else was there?
A. I believe there is phenolic and PIR within the brick construction.
Q. Right.
One of the questions is whether the choice of the use of non-combustible mineral insulation was related to the choice to use ACM panels on that building.
A. Sorry, what? Say that again?
Q. Yes. Was the choice of mineral wool as the insulation material related in any way to the choice to use ACM panels on that building?
A. ACM panels weren't used on that building.
Q. Well, they had a combustible styrofoam insulation. Does that not ring a bell with you?
A. Which building are you talking about here, KALC?

Q. Yes. KAA.
A. I wasn't aware of that.
Q. Okay. Well, I could take this shortly: were you aware of what the composite elements of the cladding system were at KAA?
A. I wouldn't be without checking, no.
Q. Perhaps I can show you a document. I didn't mean to take time up on this. {RBK00029935/4}.
This is the executive summary, and I'll just tell you what this document is. This is a fire safety review done by FDS Consult in June 2018 for the Kensington Aldridge Academy.
If you go to page 4 under the executive summary, you can see that under the first bullet point it says:
"The external walls of the KAA building are covered with aluminium composite material (ACM) panels which have a core of combustible Styrofoam insulation. The type of ACM panel used on KAA is different to that used on Grenfell Tower and, except for a few small isolated areas, is backed up with non-combustible mineral insulation."
Now, that's what it says there.
First of all, did you know that? Is that something you're familiar with?
A. I wouldn't have been without checking, no.

Q. Without checking, what, some underlying --
A. Spec.
Q. I see, okay.
Can you help me, then, just with one question: was the choice to use a non-combustible mineral insulation related to the choice to use ACM panels with a combustible core?
A. I couldn't say.
MR MILLETT: All right.
Mr Chairman, we're going to come next to a different topic. We have been going 55 minutes. It may be appropriate now to take a break.
SIR MARTIN MOORE-BICK: Yes. How long is the next topic likely to take?
MR MILLETT: The next topic is likely to take about three-quarters of an hour.
SIR MARTIN MOORE-BICK: In that case, perhaps we should take a break.
MR MILLETT: Maybe half an hour.
SIR MARTIN MOORE-BICK: We will stop now for ten minutes and come back at 3.05, please. Would you like to go with the usher.
(Pause)
Right, 3.05, please.
MR MILLETT: Thank you.

(2.55 pm)
(A short break)
(3.05 pm)
SIR MARTIN MOORE-BICK: All right?
THE WITNESS: Yeah.
SIR MARTIN MOORE-BICK: Good, thank you.
Yes, Mr Millett.
MR MILLETT: Mr Crawford, we are now going to turn to a different topic, namely ACM. All right? So we have put insulation aside now.
At the time of working on the Grenfell project, indeed at any time you were involved in it, were you aware of previous fires involving external cladding façades on high-rise residential buildings?
A. No.
Q. So you weren't aware of a fire in 1991 at Knowsley Heights, or 1999, Garnock Court in Scotland?
A. No.
Q. Were you aware of the Lakanal House fire in Southwark in 2009?
A. Lakanal House fire?
Q. Yes.
A. I had heard the name but I wasn't aware that it was connected to a fire -- specific fire.
Q. Right. So what about fires in the UAE or Dubai in 2012

to 2013 and 2015?
A. No.
Q. No? Right.
Can I ask you to go to your witness statement, please, paragraph 53, which is at page 23 {SEA00014275/23}. You say there:
"I was not involved in the development of the cladding design prior to Rydon's appointment, however, I understand that Bruce Sounes (Studio E) addresses this aspect of the design in detail in his witness statement."
Now, that's what you say there.
By July 2014, so when you started to work on the Grenfell Tower project, or perhaps August, do you remember that Bruce Sounes had just submitted an application to the RBKC planning department for their approval of face-fixed ACM panels?
Just to be clear, when I say Bruce Sounes, I actually mean through IBI Taylor Young, the planning consultants. Did you know that at the time?
A. I was aware that a mock-up had been done as part of discharging that issue, I think.
Q. Right, okay. Let's look at a document. If you can go to {RYD00010789}, please.
This is a document from IBI Taylor Young to

Sarah Scanell at planning at RBKC, dated 29 June 2014. It's entitled, "Grenfell Tower, planning application reference ... discharge of conditions 3 and 4", and there are some details there. This is just the first page of it.
Do you remember looking at this document or seeing it as part of your handover or preparation for coming into the project?
A. I don't specifically recall, but it doesn't mean that I didn't.
Q. All right.
Can you turn, please, to page 2 {RYD00010789/2} of this document. You can see under paragraph 3:
"Rainscreen: Aluminium Composite Material (ACM).
"Brushed Aluminium ..."
Then there is an email address Alcoa, otherwise known as Arconic, and then, "Stainless Steel Rivets". Under 5, "Aluminium rainscreen cassette". That's a different part of the building.
Do you remember seeing a document like this which contained that specification in it?
A. No.
Q. Did you have any discussion with Bruce Sounes -- leave aside this document -- when you came into the project about what the rainscreen should consist of?

A. I think it's inevitable that there would have been some sort of discussion, but I can't remember specifics.
Q. Do we take it from that that therefore you did not have any involvement in the decision to change from a zinc rainscreen to an aluminium composite?
A. I didn't have any involvement, no.
Q. Right.
Did you yourself ever take any steps to consider for yourself whether ACM was a suitable material for the purposes of compliance with part B4 of the Building Regulations?
A. My knowledge of ACM is that, I suppose, it had been around for a while, widely used. I didn't view it as any different from a standard aluminium panel.
Q. So is the answer to my question no, but that's because it was widely used and no different from a standard aluminium panel? Well, we will come to that.
A. I had no concept that it was any different from a standard aluminium panel.
Q. What do you mean by a standard aluminium panel?
A. Normally rainscreen -- let's say, for example, the rainscreen put up on KAA, round the sports hall -- is usually a sort of 1.2/2-mil thick aluminium pressed panel.
Q. With or without a core?

A. Without a core.
Q. Without a core?
A. Yes.
Q. I see. Just so I understand your evidence, you didn't think that an ACM, an aluminium composite material, was different from an aluminium panel without a core?
A. Correct. I just thought it was a thin laminated panel, basically.
Q. I see. So do we take it from that that you never took any steps to investigate whether ACM -- which of course, by definition, has a composite core or is a composite material with a core -- was different from what you call a standard panel?
A. Not that I recall.
Q. Right.
Did you investigate what fire classification the ACM proposed for Grenfell had?
A. I don't specifically remember doing so, but I know we had the BBA certificate on file, and if I had done and looked at it, I would have understood it as compliant on the basis of being national class 0.
Q. Right, that takes me to the next question.
You say you had the BBA certificate on file. Do you remember when you first saw the BBA certificate?
A. Well, it was obviously pulled out after the event, but

whether I looked at it before then, I couldn't definitively say.
Q. Did you look at the BBA certificate when you came into the project or at any time thereafter? Just to be clear, this is the BBA certificate for the Reynobond PE 55.
A. Yeah, I couldn't recall definitively.
Q. You couldn't recall definitively. Let's --
A. Or I can't -- I just say I can't recall. The reason I say that is obviously Bruce introduced the project and showed me things. He may or may not have shown me that as part of showing the information, but I just don't recall.
Q. Okay.
At the point of coming into the project, am I right in thinking that you had never yourself used ACM on any of your projects?
A. As far as I'm aware, I have never personally specified or used them.
Q. So doing the best you can with your recollection, would you have, do you think, been interested to look at the BBA certificate, given that this was a product which was new to you?
A. Possibly, except my understanding -- possibly if my understanding was that it was something different than

just a normal aluminium panel.
Q. Let's look at the certificate itself. This is at {SEA00000516}. We will see if it jogs a recollection.
I should just say, Mr Crawford, what I don't want to do is to show you this document and ask you questions about it if you don't have any recollection of seeing it at the time. So I'm not using this exercise as an opportunity for you to make points about the document, I just want to get your recollection of your thoughts at the time. If you didn't read it or didn't think about it then we will move on.
If you go, please, to the first page of this, you can see this is the BBA certificate, and it has a sort of red, white and blue triangle at the top and a picture of a building.
Does that look familiar to you?
A. It's familiar to me, but only because of -- it's been looked at post-event.
Q. I see. So you don't recall seeing something like that at the time --
A. I don't, no.
Q. -- when you had a handover with Bruce Sounes? Right, okay. In which case, if that doesn't jog your recollection of seeing it at the time, I won't ask you about it.

Let's go to {SEA00013049}. This is an email exchange between you and Mr Ashton of Exova in March 2015, and this is on 31 March, and it's part of a longer chain of emails that we're going to come back to later in your evidence, but I just want to ask you to look at page 1 and the second email down on that page. Do you see that? It's an email where Mr Ashton writes to you at 13.32 on that day, and the context of this, so that I can just explain it to you, is the fire resistance of the cavity barriers and/or firestops, and the title to the email, as you can see, is "Grenfell Tower Fire Stopping".
I don't want to ask you about that precise topic at the moment, because we will come back to it, but if you look at Mr Ashton's email to you at 13.32, he says:
"Neil
"This isn't something that would necessarily form part of a fire safety strategy for a building. Therefore, it would not have been dealt with in the fire safety strategy for this buildings. I agree with Ben Kay."
That's a reference to someone called Ricky Kay at Siderise, we will come back to him later:
"I believe that a cavity barrier is all that is required in this application. Even if we were to agree

with RBKC, it is difficult to see how a fire-stop would stay in place in the event of a fire where external flaming occurred as this would cause the zinc cladding to fail.

"Kind regards

"Terry."

I have read that to you because I want to show you your response, and that's what I want to ask you about.

At the top of this chain you reply to Mr Ashton at 14.12 on that day and you say in the first line:

"... metal cladding always burns and falls off, hence fire stopping is usually just to the back of the cladding line. Thanks for this confirmation anyway."

Now, I just want to focus on the words "metal cladding always burns and falls off".

Were you saying there that there was no point in installing cavity barriers behind the ACM rainscreen because in the event of an external fire, there would be nothing to hold them in place to seal the cavity?

A. Firestopping, you mean?

Q. Well --

A. That's specifically what that's referring to, holding firestopping in place if it fell off. A cavity barrier would be kept in place.

Q. Right. Then your words, "metal cladding always burns

and falls off", looking at that, was that your experience?

A. I think I've detailed that within my witness statement.

Q. You have, and I will come to that. Just before we get to that --

A. It's a poor choice of words, it should have been "melts and fails and falls off", but that was my experience, and the reference specifically was to previous projects where I had been working within -- the best way to explain it is within a building you have compartments and you have the façade, which can be anything from curtain walling or brick, whatever it is, but the compartment which, you know, in this case would be an apartment, you have compartment walls that are lines of fire resistance, and the external wall, it generally isn't a line of fire resistance unless you have a boundary issue.

So what happens in -- if you have a developed fire scenario, then the compartment itself is protected but the façade will fail or buckle, melt, fall off, and the specific reference I made in my witness statement was where I had been working on a project and it was made clear to me that that's what happens.

I think sometimes it's misconstrued. People think there is a requirement for some level of fire resistance

on the external wall, and there isn't. Basically, in a fire scenario, they fail, except where you have the relative boundary issue.

So, yeah, that's --

Q. That's your understanding.

You have said in your statement that your comment here was based on advice that was given to you by a fire engineer on a project in Manchester in 2004.

A. Yeah.

Q. That's right, is it?

A. Yes. I mean, I remembered that specifically because I remember sitting in the upstairs in the pavilion and he had got a bit exasperated with me because it was an office building and he was trying to -- we had a boundary issue, a very close boundary issue. It just failed. And if you think of a typical office block where you have aluminium curtain walling and glass, the glass will pop, the aluminium will melt, the brackets holding it will melt, they'll fail, and so it basically just collapses in a fire scenario.

Q. Right.

A. I mean, there's ways to deal with that. You see in some of the office buildings around the city, if you do have a proximity issue, you can use local dousing systems and so on. But basically it's this notion that there is no

fire resistance within the external wall generally.

Q. I see. Does it follow from that that, although you made this remark in March 2015, the fact that metal cladding burns or, as you would say, perhaps melts and falls off was something that you had known since the start of your involvement on the Grenfell project?

A. Metal cladding melts and fails in a developed fire scenario, yes.

Q. So you had always known that, is my question?

A. Yes.

Q. Yes, I see.

Was it ever drawn to your attention by anybody that composite rainscreen material like ACM, which has a polyethylene core, can contribute to external flame spread?

A. No.

Q. Do you agree that if rainscreen products burn or melt, then they don't adequately resist spread of fire over the external walls?

A. I can see what you're referencing, but I don't think you can say that, because then you would have to say effectively every glass and aluminium tower in the city was non-compliant.

Q. Well, you might or might not say that, that is as it may be, but do you agree that if a rainscreen product burns

or melts in the way that you are referring to here in this email, then it does not adequately resist the spread of fire over the external wall?
A. No, it does adequately resist the spread of fire across the external wall as defined in B4.
Q. Now, you say that now; is that something that you actually turned your mind to at the time? When I say at the time, to be specific --
A. Yes.
Q. -- in and from July/August 2014.
A. Well, yes. Let's say the product is -- to be compliant would have to have national class 0. If it had national class 0 then it was meeting that requirement.
Q. Even though it always burns and falls off?
A. In a developed fire ...
Q. Well, you --
A. It will eventually melt and fail. It will fail and melt.
Q. I'm just struggling to see, if it will eventually fail and melt, then how could it adequately resist the spread of fire over the external wall?
A. Because it meets the requirement within -- I mean, the kind of question you're asking is a bit like saying, to meet that requirement, every external wall would have to have a fire resistance, and they don't. They're only

required to meet the standard set out in B4, which it does.
Q. Did you ever raise with anybody, whether Harley or Rydon or within Studio E, your experience, as identified in this email, that metal cladding always burns and falls off, or as you would say melts and falls off?
A. Yes.
Q. Who and when?
A. Fails and melts, yes.
Q. Who did you raise that with?
A. Sorry, did I raise it --
Q. Yes, my question was: did you ever raise with anybody, whether Harley or Rydon or within Studio E, your experience, as identified in this email, that metal cladding always burns or melts and falls off?
A. I think it's self-evident. I think most people in the industry would realise that an aluminium panel at some point would fail. Aluminium I think melts at about 650 degrees. It isn't instantaneous, but it will fail, the same way glass will fail. Well, glass will fail long before the aluminium, but ultimately it fails and ultimately it melts.
SIR MARTIN MOORE-BICK: I am a little concerned that we may be slightly at cross-purposes here.
If you envisage a fire in a compartment in any

building, let's say a tall building, your understanding is that a metal cladding will fail in way of the fire; is that what you are saying? Or that the fire will propagate across the cladding to other storeys and other parts of the building? Because it seems to me there is a distinction there which we need to understand.
A. I see what you're saying. No, it will fail where -- it will ultimately melt and fail where it's exposed. It wouldn't actively propagate it, no. I mean, that propagation would be tested by the -- being compliant to the national class, for example, being --
SIR MARTIN MOORE-BICK: So the failure of the cladding, as you understood it, will depend on the temperature reached by the fire behind it?
A. Yes.
SIR MARTIN MOORE-BICK: But the sort of cladding you have in mind, I think, you would not expect to support combustion itself?
A. Correct.
SIR MARTIN MOORE-BICK: Right.
Thank you.
MR MILLETT: Now, looking back at this email, as we can see from the second email down from the top of this page, which is from Terry Ashton to you, Mr Crawford, 31 March, you can see in the last sentence that

Mr Ashton refers to zinc cladding; do you see?
A. Yes.
Q. Did you spot, when you received this email from Mr Ashton, that he was referring to zinc cladding?
A. I think I actually sent him an email afterwards and corrected him and said it was ACM.
Q. We may need to look at that, but were you surprised that Mr Ashton still thought that the cladding was zinc at this stage?
A. I don't know. I mean, the VMZinc that was shown in the drawings that I sent to him was effectively the same as ACM.
Q. We had seen some of the drawings earlier on. Did it occur to you that Mr Ashton had got the notion that the cladding was zinc from the section drawings that Harley had sent you and you had sent to Mr Ashton in September 2014 that we looked at earlier today?
A. It's possible he was referencing something historic, yes.
Q. Now, we are at the end of March 2015 here. Did you realise that construction had started at this point and in fact was reasonably well advanced?
A. Construction generally or in the cladding?
Q. Construction -- well, on the cladding system, in fact, yes.

A. I think the mast climbers were up.
Q. Yes.
A. I couldn't say definitively --
Q. At this stage, did you think to yourself that you should check where Exova had got to with the promised analysis of external fire spread as a result of the proposed overcladding?
A. No. I think as I stated earlier, my understanding was that they understood what was proposed and they formed the opinion that it was compliant, and I saw no reason to go beyond that.
Q. You now at this point had, on any view, clarity about what precise product was being used in the rainscreen, namely Reynobond PE 55 ACM.
A. Yeah.
Q. Did it occur to you at this stage at the latest to go back to Exova and say, "Now you know what the insulation is, now you know what the rainscreen material is going to be, can we please have your analysis of the effect of these materials on external fire spread"?
A. I don't recall. I don't recall.
Q. You don't recall? We know that you didn't, and I suppose my question is: why didn't you?
A. Well, I think I corrected him on the zinc and said that it was ACM, and my understanding was that he was happy

that what we had proposed was compliant, from before.
Q. We don't --
A. With regard to the specifics of the question and the report, no, I didn't think about the report.
Q. We know from the previous report that Exova had said in issue 3 of the OFSS, the outline fire safety strategy, that there would be no adverse effect on external fire spread but that would be subject to a confirmation by an analysis in a future report.
Was this not the moment to ask Mr Ashton to update Exova's analysis based on the use of ACM, given at least the change in the material to ACM and the fact that you knew that it would burn in a fire, or melt?
A. I thought he knew about the ACM from before.
(Pause)
Q. Yes, but you had not had the promised report from him, so I'll just ask my question perhaps one more time and in a slightly different way.
Was now not the time at last to go back to Exova and say, "Look, you promised a confirmation in a future report, now you know what materials we're using, can we please have it?"
A. It could have been, yes.
Q. So why didn't you?
A. Because I understood that he understood that what we

were doing was compliant.
Q. But you hadn't had that in a formal written report signed by Exova, had you?
A. No.
Q. So was that not something that you, as a conscientious architect, would have wanted to have had from them with a signature for the file, not least because they had promised it?
A. Well, I suppose I may have still been expecting it.
Q. Well, if you were expecting it, why didn't you pursue it?
A. Well, I can't recall whether I did or not.
Q. Well, we can't see any documents which show that you did.
A. No, what you're saying is you can't see the final report. That doesn't mean that I didn't ask for it or ask for it repeatedly, or they didn't intend to produce it and not produce it. All that means is they didn't ultimately produce it.
Q. Yes, and my question is --
A. I understand your question. Your question is: did I ask them categorically at that time? And I've told you I don't recall.
MR MILLETT: Right.
Cavity barriers. I'm going to ask you some

questions about the design of cavity barriers in the façade. We have looked at this a little bit before in some of the questions on the email strings that we've seen.
Mr Chairman, this is a short topic, but if we're going to get a second break this afternoon, perhaps now is the time to have it, or I can cover it off and then we can move on to the next topic.
SIR MARTIN MOORE-BICK: You have quite a few more questions?
MR MILLETT: Oh, yes, many more, but not on this specific topic. It's probably more sensible if we break now.
SIR MARTIN MOORE-BICK: Do you feel you need another break now, Mr Crawford?
A. It's probably a logical point, isn't it?
SIR MARTIN MOORE-BICK: It's a matter for you whether you feel you need a break or not.
A. Yeah, I will take a break.
SIR MARTIN MOORE-BICK: Yes.
Before you do, can I just ask you a question arising out of Mr Millett's questions on ACM panels.
You have described to us what you knew about aluminium panels and their behaviour in fire. Did you have the same or a different view about ACM, which had a polyethylene core?
A. No, I mean, I just viewed it as a laminated aluminium

panel. I didn't --
SIR MARTIN MOORE-BICK: So the fact that the core was polyethylene didn't cause you to consider how it might behave?
(Pause)
A. I mean, as I understand it, Reynobond only had -- they only marketed the one product. I mean, my knowledge of polyethylene ... did I even know it was polyethylene, or is it ... I didn't -- I didn't -- I just viewed it as a laminated aluminium panel. I didn't have any perception that it was ... well, the sort of monster that it's become, I mean ...
SIR MARTIN MOORE-BICK: That's all right.
A. Yeah.
SIR MARTIN MOORE-BICK: Good, thank you very much. We will have ten minutes now. Back at 3.45, then, please.
THE WITNESS: Yes.
SIR MARTIN MOORE-BICK: Thank you very much.
(Pause)
3.45, please. Thank you.
(3.35 pm)
(A short break)
(3.45 pm)
SIR MARTIN MOORE-BICK: All right, Mr Crawford?
THE WITNESS: Yes.

SIR MARTIN MOORE-BICK: Good, thank you.
MR MILLETT: Mr Crawford, I'm going to ask you some questions about the design of the cavity barriers in the façade.
Can I ask you to go back to the Building Regulations, please, {CLG00000224/69}.
This is schedule 1, part B3, "Internal fire spread (structure)".
If you look at subsection (4), please, at the bottom, it says:
"The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited."
Do you see that?
A. Yes.
Q. Were you aware of that requirement when you were working on the Grenfell Tower project?
A. I was aware of B3, yes.
Q. Yes, including subsection (4)?
A. Categorically, verbatim --
Q. Not necessarily verbatim, but --
A. The concept generally, yes.
Q. Yes. If we look at the guidance for that in ADB, {CLG00000224/82}. This is paragraph 9.1,

"Introduction", and it says:
"Concealed spaces or cavities in the construction of a building provide a ready route for smoke and flame spread. This is particularly so in the case of voids in, above and below the construction of a building, eg walls, floors, ceilings and roofs. As any spread is concealed, it presents a greater danger than would a more obvious weakness in the fabric of the building."
Were you aware of the guidance in ADB, Mr Crawford, on cavities at the time when you became involved in the Grenfell Tower project?
A. Yes, I was aware of diagram 33 in section 9, yes.
Q. Did you appreciate that the construction of the new façade on Grenfell Tower would create cavities?
A. Yes.
Q. Did you appreciate that there was a risk of fire spread within those cavities?
A. Yes.
Q. Looking at paragraph 9.2, "Provision of cavity barriers", it says there that cavity barriers should be provided, and there is quite a lot of text below that, but can I summarise it: to subdivide the cavity where there would otherwise be a pathway around a fire separating element, ie compartment walls and floors; yes?

A. Yes.
Q. Closing the edges of cavities; yes?
A. Yes.
Q. Subdividing extensive cavities.
A. Yes.
Q. And protecting openings within extensive cavities, for example around window.
A. Yes.
Q. You can see diagram 33 where that's illustrated. Can you please be shown diagram 33 at the bottom. This is called "Provisions for cavity barriers". It's still page 82. You can see, just working from the top of the building in the diagram downwards, one can see that one is supposed to put cavity barriers at the top of the cavity; do you see that?
A. Yes.
Q. And within the cavity at the compartment floor line; do you see that?
A. Yes.
Q. Second one down. Then third one down, around openings. You can see the two little arrows. Do you see that?
A. Yes.
Q. That's a window, isn't it?
A. Yes.
Q. So the little green box also shows you where you have to

put a firestop.
A. Yes.
Q. And that's got to be the same fire resistance as the compartment.
A. Yes.
Q. We will come back to that later when we look at the design of the cavity barriers, but before we do, can we go to 9.3, which is on page 83 {CLG00000224/83}, the next page in the guidance. That says that -- and it's again quite a long bit of text:
"Cavity barriers should be provided to close the edges of cavities, including around openings."
A. Yes.
Q. You see that in the first part of 9.3.
Do you agree that the guidance is clear that you need cavity barriers around openings?
A. I would make several observations -- you have to bear with me a bit while I do this -- on section 9 and diagram 33.
The basis of the Building Regulations, as I understand it, the original conception with the DCLG is they were based largely or created largely for designing sort of generic, if you like, Wimpey type houses in housing estates, and section 33, in my experience over time -- sorry, diagram 33 in section 9,

in my experience over time, is that it's not fit for purpose. There's reasons I have to believe that, and they've informed how I apply cavity barriers over time.
There are a number of observations I would make. First of all, architects are visual. 90% of our time is spent drawing and working 3D sketching and so on. Diagram 33 itself looks like a two-up, two-down house. If you look at the silhouette of it, it looks like two brick skin walls together. Actually, the revised version, the 2019 version, is even worse, because they slap a basement on it, so it doesn't give any sense because it's for any building of any height. And my experience when you actually read through section 9 is that it's very limited. It doesn't make any reference, for example, to double-skinned façades, to overcladding or to rainscreen façades, and I have had the personal experience before in other projects, specifically double-skinned façades, where they typically don't use cavity barriers at all or very limited.
So you have to assess based on the specifics of your building type, which in my view are not covered by the guidance -- and bearing in mind that it is just guidance -- and no amount of -- well, you could spend dozens of hours reading the text and trying to interpret the language in that section, but it doesn't make up for

lack of experience in terms of practical application, and I'm mentioning that specifically to experience I have had doing double-skinned façades, which don't allow you to put in cavity barriers in the way that is shown, for example, in diagram 33.
Q. Well, go, please, to this same document, actually, page 96 {CLG00000224/96}, which is the guidance under B4, external wall construction, Mr Crawford, and I would like you, please, to look at paragraph 12.8.
A. Yeah.
Q. Now, we have seen 12.7. We spent a lot of time on that. I'm now looking at 12.8 under "Cavity barriers", which we looked at briefly on Thursday --
A. Which references 9, yeah.
Q. Correct, it does.
So had you looked at that at the time, you would have understood, surely, that cavity barriers should be provided in accordance with section 9 in respect of Grenfell Tower; no?
A. No. I mean, if you read the actual text, you can't even -- you can't satisfy section 9. I mean, you can't, for example, close around all openings in a rainscreen façade. The way a rainscreen façade works is it's effectively open, so it's ventilated, so you have -- it's pressure equalised. The theory behind that is that

the pressure behind the rainscreen is the same on the front or it equalises. In order to do that, every panel is open round the edge. If you were to take verbatim section 9, you would have to seal round every edge. So you can't satisfy ADB2 by following section 9.
Q. I'm just trying to understand your recollection at the time. Was it your recollection at the time --
A. That's my recollection at the time.
Q. Wait a minute. Was it your recollection at the time that Approved Document B, even though it refers to cavity barriers at 12.8, in accordance with section 9, didn't require cavity barriers round the windows at Grenfell Tower?
A. Sorry, can you say that again?
Q. Yes. Was it your understanding of Approved Document B at the time that, notwithstanding the language of 12.8 of Approved Document B, which refers in terms to section 9, cavity barriers were not required around the windows in the external wall construction at Grenfell Tower?
A. If you were to follow section 9 in part you might assume that they were required.
Q. Did anything about the project lead you to think that cavity barriers were not required around the windows?
A. I think there's practical issues with rainscreen façades

where you can't satisfy section 9 by placing cavity barriers to close the edges around windows. Most proprietary rainscreen systems, all the bracketry is right up at the edge, so you can't -- if you look at product literature on most rainscreen systems, you can't get a cavity barrier closing the edge.

Q. It --

A. So my understanding in terms of the strategy, cavity barrier strategy on Grenfell, was that there was a scheme that had been agreed and agreed, like I say, compliant for the employer's requirements. I then took that and tried to verify it with Exova, with my understanding of what would be a compliant scheme, and, well, they agreed.

Q. We will come to the email correspondence in due course. I'm just trying to understand at the moment your evidence about your thinking at the time of how the rainscreen system proposed for Grenfell would comply with the requirements of Approved Document B, paragraph 12.8 and section 9.

Again, I'm just trying to summarise your evidence: are you telling us that in fact it wasn't possible, in your opinion at the time, to construct the rainscreen cladding in such a way that it did comply?

A. Not to ADB2, but that's only a guidance.

Q. Did you raise that concern or question with anybody at the time?

A. Yes, with the conversation with Exova.

Q. Just to be clear, is this the one in March 2015?

A. March, end of March, start of April.

Q. Right, we will look at those emails.

I don't think you have put in your statement anywhere your opinion at the time that it was not possible to comply with paragraph 12.8 and section 9 of Approved Document B?

A. Why would I? That's only one route to compliance.

Q. All right.

Now, let's look at paragraph 9.13 at page 86 {CLG00000224/86}, please. This says:

"Every cavity barrier should be constructed to provide at least 30 minutes fire resistance. It may be formed by any construction provided for another purpose if it meets the provisions for cavity barriers (see Appendix A, Table A 1, item 15)."

Were you familiar with that provision as at July 2015?

A. I was familiar with that provision and what we had in the spec, although in the spec I think we actually had 30/30.

Q. Right. Looking down the page at 9.14,:

"A cavity barrier should, wherever possible, be tightly fitted to a rigid construction and mechanically fixed in position."

Do you see that?

A. Yes.

Q. Were you familiar with that as at July/August 2014?

A. It's self-evident to me.

Q. Then if you go to appendix A, table A1, which is referred to at the beginning of 9.13, Mr Crawford, that's at page 124 {CLG00000224/124} of this document, this says that cavity barriers should have a minimum of 30 minutes' integrity and 15 minutes' insulation, doesn't it?

A. Yes.

Q. Were you familiar with that --

A. Yes.

Q. -- at the time?

Just to go back to an answer to some of my questions earlier on, if you were of the view at the time that it was not possible to comply with all of the guidance in Approved Document B in relation to cavity barriers for the proposed rainscreen cladding at Grenfell Tower, how were you expecting to comply with functional requirement B3 of the Building Regulations?

A. To install as far as practical a cavity barrier

strategy.

Q. Around the windows?

A. Not round the windows for the reasons I've given.

Q. If you didn't provide cavity barriers around the windows, which are openings in accordance with diagram 33, then, Mr Crawford, how were you going to comply with functional requirement B3?

A. The cavity barriers were around the compartments, and you would probably have seen from the correspondence and the fact that rainscreen cladding wouldn't stay in place in a developed fire, therefore the cavity barriers wouldn't perform a meaningful function in those locations anyway, not that you could get them into those locations precisely in the terms set out in B3. Additionally, we had cavity barriers in close proximity anyway at the head and sides.

Q. The head and the sides -- we will come to precisely where the cavity barriers were in due course.

Can I just ask you this, given your answers just now: did you ever raise with Harley or Rydon or Exova your view that it was not going to be possible to put cavity barriers around the window openings, given the design of the rainscreen cladding?

A. I had a conversation with Exova in relation to practical application of cavity barriers in the rainscreen façade.

Q. Is that the discussion we see in the emails at the end of March?
A. That's correct.
Q. Anything else?
A. Harley had their own ideas about a cavity barrier strategy that was quite different, again, as you will see.
Q. Okay. Perhaps we will come back and revisit this question again when we have looked at the emails.
I want to turn, in the context of cavity barriers, to look at the NBS specification. Now, I know this was prepared before your involvement, Mr Crawford, but let's look at it. It's {SEA00000169/246}.
If you look there, under paragraph 435, "Ventilated cavity barriers" -- do you see that?
A. Yes.
Q. "Manufacturer: Downer Cladding Systems ..."
Then:
"Product reference: Lamatherm, CW-RSH60 (horizontal), Lamatherm CW-RSV60 (vertical)."
Do you see that?
A. Yes.
Q. Then we can see underneath that, fifth bullet down:
"Fire resistance rating: 30/30 to BS 476, Part 20: 1987 and BS EN 1366-4:2006."

Do you see that?
A. Yes.
Q. Does that fifth bullet point down mean 30 minutes' insulation and 30 minutes' integrity?
A. Yes.
Q. I see.
Now, the minimum performance stated in ADB, as we've seen, is 30 minutes' insulation and 15 minutes' integrity, isn't it?
A. Yes.
Q. Is it right, then, that the fire resistance required by the NBS spec here would meet and in fact exceed the minimum performance standard required by ADB?
A. Yes.
Q. If we then go up to the last sentence of the first dashed bullet point, we looked at that, the product reference, "Lamatherm CW-RSH60 (horizontal) ... CW-RSV60 (vertical)", did that suggest that the fire resistance for the cavity barriers actually specified was 60 minutes?
A. I'm not sure. I don't think Lamatherm were even the manufacturer.
Q. Lamatherm is a product. The manufacturer is people called Downer.
I should just be clear, Lamatherm became Siderise.

A. Siderise, yes, that's right.
So, sorry, your question was ...?
Q. My question is whether the reference to 60 in the product reference of RSH60, RSV60, was actually a fire resistance period of 60 minutes?
A. It may well have been.
Q. Right. Can you explain the difference?
A. No, except the requirement was only for 30/15.
Q. I understand that, and you have said that, but did you notice the difference when you did read this spec?
A. No, I think I would have just read the fire resistance rating.
Q. Okay.
When you started working on the project, did you independently check the cavity barrier products that had been specified?
A. I remember having conversations about the cavity barrier strategy with Bruce. I don't recall whether I individually checked the products specified.
Q. Okay. You remember a conversation about the strategy with Bruce; was that on the handover?
A. It may have been later, I'm not sure.
Q. Okay.
Do you remember ever looking for any test certification that supported the use of these products

in a rainscreen system?
A. Erm ... I don't recall.
Q. Can we look at the Harley design, then.
In August 2014, I think it's right that Harley began sending you drawings of their detailed design of the cladding; do you remember that?
A. Mm.
Q. If we turn to {SEA00011490}, we can see that this is an email from Kevin Lamb to Simon Lawrence on 22 August 2014, which is copied to Daniel Anketell-Jones and to you at Studio E as well as to Bruce Sounes. Do you see that?
A. Yes.
Q. The attachments -- there are two of them -- are GA models for the tower. He says:
"Simon,
"Please find attached some preliminary drawings to prove the basics of design & set out, prior to us producing a full design package.
"It would be useful for us to discuss these principles at our meeting on Tuesday morning."
You see that?
A. Yes.
Q. The attachments there are {SEA00002851}. Just have those up, thank you. As you can see from the date at

the bottom -- don't need to blow it up -- it's 20 August 2014. Do you see that?
A. Mm-hm.
Q. And "Drawn by", in the box to the left, "bd", and there is a little quadruped.
A. Lamb.
Q. Lamb, and KVL, which is Mr Lamb, and that's how we know it's his, and then you can see the drawings there; do you see that?
A. Yes.
Q. Now, correct me if I'm wrong, but there are no cavity barriers indicated on that drawing, are there?
A. That's correct.
Q. No. If we look through each of the next few drawings, scrolling down slowly, I think it's right, isn't it, that there are no cavity barriers on each of those either, or any of those?
A. That's correct.
Q. Right.
Did you think it was strange, given that the employer's requirement drawings had included some cavity barriers?
A. No, because they issued the RFI at virtually the same time.
Q. You say at virtually the same time; the RFI we saw

before was September, wasn't it?
A. Yes.
Q. So when you say same time, perhaps it's my fault, same time as what?
A. These drawings.
Q. I see. So these drawings pre-date the RFI?
A. They do. I mean, these drawings were preliminary, and I think I commented at the time were very basic. They were intended to show the basic layout, let's say, of panels, and then the RFI followed shortly afterwards.
Q. When you received these drawings, you didn't know that the RFI was coming a few days later, did you?
A. That's correct.
Q. So when you received these, why didn't you go to Kevin Lamb or anyone else at Harley and say, "Wait a minute, why are there no cavity barriers around the windows as shown in the employer's requirement drawings?"
A. We may have done. I possibly did, I don't recall. These were, as I stated, preliminary drawings to show the proportions in setting out.
Q. Mr Crawford, you say, "We may have done". We have no record of that and it's not in your statement that you did, and we have to proceed on that basis, so that's why I was asking you why you didn't.

A. But I'm not sure that that's the case. I suppose what I'm saying is these were preliminary drawings and they were showing proportions and it was his first pass, let's say, at setting out, and things like the detail follows on from that. I mean, if you had, for example, produced this drawing and six months later there were no cavity barriers, then yeah, sure, it would send alarm bells ringing.
Q. Right. Okay.
Let's just see what you did do. If you go, please, to {SEA00002853}, these are your -- well, you help me. The red handwriting is yours. I think we're used to that now.
A. Yeah. As I recall, when we did these comments, Kevin sent them out for initial comments about the proportions and the setting out. There were also a number of workshops that we had as well where we met them on site and the drawings were discussed. So, you know, the cavity barriers may have been discussed in those.
Q. Well, all right, but just looking at your comments on these drawings, Mr Crawford, we can see, just taking it in stages, first of all there is a box on the first drawing in the bottom left, "Neil Crawford 27/08/14", and you have put "Studio E, status B"; yes?
A. Yes.

Q. That's, as it were, a handwritten form of the stamp that normally goes on these?
A. Yes.
Q. And status B means conforms to design intent subject to comments?
A. Yes.
Q. Here are your comments. This is on the first one:
"Intention was to keep this joint wide joint ..."
Have I misread that?
A. Yeah. There's actually several sets of comments done on these drawings.
Q. There are.
A. Bruce did a set, I did a set. They were literally an initial appraisal of an initial attempt to reconcile our architectural intent with the practical -- a practical initial set of short drawings.
Q. We can see on these drawings -- and take your time and have them scrolled down for you, if you like. If we go to the next one down, please, Mr Operator, we can see a set of comments on the second page, "Indicate which is trickle vent", "Omit fixing and extend cill to create drip detail" -- is that right?
A. Yes.
Q. "... and critically eliminating line of fixings", et cetera.

One could look at these and look at all of them. It's really about what's not there. We can't see you saying anywhere here, "Why is there no cavity barrier around the windows?"

A. That's correct.

Q. No. Would this not have been the time to raise that in your comments?

A. As I said, we had several -- we had meetings on site and workshops, and it's highly probable that they were and that's why Harley raised the RFI.

Q. Do you have a specific recollection of raising the absence of cavity barriers round the windows with Harley at around this time?

A. I can't recall.

Q. No.

Let's look at the Harley RFI, which we looked at earlier this morning. It's {HAR00003616}.

A. Can I just say that with that initial set of drawings that went out, they were sent out under the auspices of being preliminary and for initial comments. I mean, they weren't set out in the sense that there was any finality to them. So you would normally expect, for example, more detail to be added over time, as the drawings were developed up.

Q. I understand, and I think what we have so far is at this

stage in time, when it comes to you for comment on 24 August 2014, you don't comment on it that there are no cavity barriers. We have seen that.

A. Yes.

Q. Let's move on, then, to the RFI. Here it is. We saw it earlier this morning. 17 September. The query, just to repeat it now that we are talking about cavity barriers:

"Please may you confirm the required extent of the horizontal firebreaks within the cladding areas?"

Then the suggested solution -- and, again, I'm repeating this to you, I am afraid:

"We believe that they will be required at every floor level on the vertical columns, but not in the area of cladding between windows. This is because there is no 'chimney' effect here, and therefore the cladding will not add to the spread of fire."

You see that?

A. Yes.

Q. So there is no question that's raised, "Do we need firebreaks", as they call them, "or cavity barriers around the windows?", is there? That's not part of the question.

A. No.

Q. The use of the word "firebreaks" is interesting. Do you agree with me that the word "firebreak" is not a term

used in Approved Document B?

A. Erm ... not in Document B, but I notice it was used in BR 135.

Q. Yes. I mean, is it a word you have come across in your experience as an architect up to that point?

A. I think firebreaks, firestops, cavity barriers, are -- can be intermittently used, perhaps wrongly, but they are. They're used -- what's the word? --

Q. Interchangeably?

A. Yeah, interchangeably.

Q. I didn't want to put that word in your mouth, but I suspect that's what you meant.

A. Yes.

Q. Yes. Now, that's potentially quite confusing, isn't it, because there's a difference between a firestop and a cavity barrier?

A. There is, yes.

Q. Did you ever go back to Harley and say "Look, don't use 'firebreaks', can I please be clear what you're asking. Are you saying cavity barriers or are you saying firestops?"

A. I think firebreaks to me clearly meant cavity barriers.

Q. You thought it clearly meant cavity barriers?

A. Yes.

Q. Right, and why did you think that?

A. Because I couldn't see what else it would mean.

Q. I see, okay. So you thought it meant cavity barriers.

Now, Harley suggested in the suggested solution that we've just seen that the installation of firebreaks -- to you, cavity barriers -- was to avoid a so-called chimney effect. Does that mean fire spreading up the columns uninhibited?

A. Yeah. What I understood, and I think I may have explained this the first phase -- it's really difficult without a whiteboard -- imagine these windows, this is the window and it is repeating and you have got the columns in between. They understood the most important thing to do is break that verticality all the way up the building. And although the description is slightly confusing, I understood it as they wanted to put the cavity barrier between the windows, so like this (indicated), because the window is actually projected, so you wouldn't have the chimney effect going up the front and you would stop it at the columns.

So, if you like, this was their strategy for addressing the chimney effect.

Q. Right. I see that.

So at this stage, is it right that, so far as you could see, Harley weren't sure where the horizontal cavity barriers should be placed?

A. I think if they were left to it, that's where they would have placed them.
Q. Would that have been any good?
A. Well, you might find that's how it exists in quite a lot of rainscreen cladding or variants of that, but my view was that wasn't sufficient.
Q. Right.
If we can now go, please, to the emails, {SEA00011730/4}. I'm sorry to have to drag you back to this email run again. This is September 2014. We looked at this probably ad nauseam this morning, I am afraid, Mr Crawford, but there it is. There is the question asked by Mr Anketell-Jones which you referred on to Exova on 18 September and asked Mr Ashton for his view.
Do you know why Studio E was not able to answer that question, or why were you not able to answer that question yourself?
A. Well, I think there's two points I would make. First of all, we did have a cavity barrier strategy. I'm aware personally of the shortcomings of section 9, particularly in its sort of -- of ADB2, its sort of restricted remit in terms of what it seems to refer to, and in my view it doesn't cover or adequately cover dealing with a rainscreen façade or a double-skinned

façade or an overclad façade, for that matter. So it made sense to me to initiate the conversation with Exova to understand their understanding of what was reasonable in that context.
Q. Yes. You don't in the message that you sent to Mr Ashton say to him or impart to him the sense of what you're telling us, which is that you think there are shortcomings in section 9 in ADB2, which means that it doesn't easily apply to the cavity barrier strategy that you were adopting. You don't say that, do you?
A. Well, not in the email.
Q. No, so Mr --
A. What I referenced in the email specifically is Harley's interpretation of the stack effect. I suppose that's because I thought I might have missed something. Harley have produced -- well, many more overclads than myself, so maybe they know something I don't, so --
Q. Right.
Did you seek the advice of anybody else at Studio E first before going to Mr Ashton with the question?
A. Well, I would certainly have had the conversation with Bruce probably about what our strategy was and what he believed.
Q. What did he tell you?
A. I think he was pretty adamant that our strategy was

correct.
Q. Right.
You talk about the cavity barrier strategy. Can you just summarise that for me, so that I'm clear about what you mean in the context of these messages?
A. As in our --
Q. Yes.
A. -- one that we had --
Q. Yes, your cavity barrier strategy.
A. It was cavity barriers that related to the compartment lines. So, for example, the illustration I used earlier, if this is the plan of the apartment and you have got the façade here (indicated), you have compartment walls round here, compartment walls typically 60 minutes, except where they're onto escapes, they're 120, and so if you imagine that's the floor plan of the whole apartment, you wouldn't have a cavity barrier at the rooms where they hit the external wall, but you would have them where the compartment lines are, which you could see in the fire strategy plans.
So, for example, imagine this is the apartment, you would have a 60-minute -- sorry, you would have the compartment -- you would follow the compartment line, so you would be protecting one compartment from the next.
Q. Yes, I see, thank you.

Just so we're clear, the cavity barrier strategy that you have just explained to us doesn't involve any strategy requiring the installation of cavity barriers round the windows?
A. No.
Q. Were you not surprised that a specialist cladding contractor like Harley would have a query of this nature?
A. Perhaps, but then when you read the actual email where they say -- in fact, it's here, isn't it? -- "local fire officer, as opinions tend to vary", and that is definitely the case, and one of the reasons I think that is the case is because Approved Document B is really not fit for purpose in that respect.
Q. We have looked at this series of emails and drawings you sent to Exova already. If we go up to page 3 {SEA00011730/3} of this email chain, you can see that the second email down from you to Mr Ashton at 12.18 on 18 September, you say:
"Hi Terry
"Please see attached our sections and the initial drawings set we have bad from Harleys. The initial drawings from Harleys are fairly limited but they attempt to establish the basic approach."
We looked at that this morning.

If you go, please, to {SEA00011710}, go back to the drawings which we had looked at again this morning, we can see those are the attachments. I think I have given you a wrong reference, but if you go to {SEA00011714}, that's the pack of Harley drawings we have already looked at. Those are the same ones dated 20 August 2014, without your notes on it. So it's the same pack of what I think you are calling preliminary drawings which don't show any cavity barriers.

My question is: did you not think it necessary to clarify with Mr Ashton exactly where he was advising that the cavity barriers needed to be placed by reference to these drawings?

A. When you say "he", do you mean Harley?

Q. No, Mr Ashton. Did you not think it necessary to clarify with Mr Ashton exactly where Mr Ashton was advising the cavity barriers needed to be placed by reference to these drawings?

A. But I think I did. Sorry, can I see the original email again?

Q. The original email is back at {SEA00011710}.

A. "Please see attached our sections and the initial drawings ... from Harleys."

So he had our sections, which showed where we thought the cavity barriers should be, and they had

Harley's drawings without the cavity barriers drawn on, so he could see basically our cavity barrier strategy and he could see, let's say, where Harleys had got to in their design. So he had, if you like, the information for him to make an input.

Q. Yes. I think I'm agreeing with you, but I'm just pressing you a bit more.

Did you not think it necessary to get him to clarify where exactly the cavity barriers needed to go?

A. I think that's what I was doing.

Q. I see. All right.

A. I mean, again, I know you don't like me saying this, but the reality is there's telephone conversations going on at the same time as emails. I'm not saying specifically now or between this email or that email, but that is the case.

Q. At all events, he never comes back to you -- at least we don't ever see him coming back to you -- saying, "Well, you need to have cavity barriers around the windows"?

A. No.

Q. Indeed, at this stage, all you had to send to Exova, which was available to you, other than the preliminary drawings from Harley, were the employer's requirements drawings from ten months before that?

A. Yes, which had our cavity barrier strategy on them.

Q. Indeed.

Now, moving forwards in time to January 2015, on 13 and 14 January 2015, I think you got another pack of drawings from Kevin Lamb, and that is, just to be clear with you, {SEA00012489}. It's also referred to in your statement, for the transcript, at paragraph 97 {SEA00014275/36}. We can see the email there. Kevin Lamb sends you that as a copy. The email itself goes to Simon Lawrence. Do you see that? And you see the attachment?

A. I can see the attachment.

Q. Yes. Then it says:

"Please find attached finalized all 160 off North & South windows all as agreed in our last meeting just before Christmas.

"The sample window will be one of these.

"If you have any concerns, please advise immediately as manufacture is now starting."

Do you see that?

A. Yes.

Q. Then if you go to {SEA00003040} -- and these are the drawings that you refer to at paragraph 99 of your statement on page 37 {SEA00014275/37}, that's just for the transcript -- here they are, here are the drawings, and if you look at page 1 you can see they were

originally created on 20 August 2014 that we were looking at before, and now they have progressed from August through to January 2015, construction, do you see? This is now revision E --

A. Yes.

Q. -- in the box on the left-hand side at the bottom.

You have marked that, looking at the first one, B, "Conforms to design intent subject to comments". You did that on 16 January 2015, and we can see your comments; yes?

A. Yes.

Q. Right.

Again, in this drawing, even revision E, January 2015, Harley did not indicate where on those drawings any cavity barriers should be located, did they?

A. No.

Q. And you didn't pull them up on it, did you?

A. That's not entirely true.

Q. Isn't it?

A. No.

Q. Well, in this drawing, you didn't, did you?

A. In this specific drawing, no.

Q. No, and indeed none of the other drawings in this pack comprising what you're sent on 15 January; that's right,

isn't it?
A. Correct. What I would point out is that these windows were -- sorry, these drawings were to reflect late client decision and window -- late client decision that related to the change in the window sizes.
Q. Yes.
A. So there were separate conversations going on in relation to the cavity barrier strategy that stretched back to 17 September, and continued on in various workshops in relation to determining the final strategy. So these drawings were an attempt to pin down the revised window format that had come about due to a number of late changes in the actual design and size of the windows.
Q. Indeed, if you look at page 3 {SEA00003040/3}, here is a drawing, "Typical bay levels 1 to 20 south elevation", this is revision B, 13 January 2015, which you have stamped A, "Conforms to design intent"; yes?
A. Yes.
Q. But that doesn't have any cavity barriers anywhere on that, does it?
A. No.
Q. It's right, therefore, isn't it, that it therefore did not even reflect Studio E's employer's requirement drawings, which did have cavity barriers?

A. Correct, but I've explained the situation in relation to the cavity barriers to you, and it's not that -- it's not that these -- that there wasn't the understanding that cavity barriers were going in, it's just that the strategy was being developed separately. I mean, for example, these drawings don't show the cladding rail positions, but you wouldn't say, well, therefore it's not an applicable drawing. I mean, there is a lot of things these drawings don't show.
Q. No, my question -- perhaps you misunderstood it. Given that the Studio E employer's requirement drawings did contain some cavity barriers, how could Harley's drawings, which didn't contain cavity barriers, be stamped status A, "Conforms to design intent"?
A. No, because it's talking about architectural intent. The cavity barriers weren't part of the architectural intent, the same way that the cladding rails weren't part of the architectural intent, the same way that the cladding brackets weren't part of the architectural intent. All of those things could have been shown on this drawing.
Q. Was the absence of any cavity barriers on this not a manifest error which any architect should have identified?
A. No, absolutely not, for the reasons I have given. It

was absolutely clear that we had a cavity barrier strategy, that the cavity barrier strategy was being developed. There had been numerous discussions about it, there had been meetings on site, and it was understood that we had a cavity barrier strategy and it was to be added to the drawings, which it was. I think it took them until March to actually add the final agreed scheme on. But nonetheless, the idea that somehow, because it wasn't shown on this drawing, it wasn't being discussed or absolutely assumed that it had to be there is a bit like saying, well, the cladding rails aren't there, so surely --
Q. I'm going to finish off this line of questions now, Mr Crawford, because of the hour. But you are right that Harley did not produce drawings showing what they called firebreaks until 3 March, and we will come to that now tomorrow morning, but just focusing on this document at this point of period, given that Harley had been producing revisions of the August 2014 drawings now for some months, and had not shown any cavity barriers at all, what were you waiting for?
A. There's a lot -- I feel like a broken record here, but basically the -- as I said, and you know because there is a plethora of emails on it, there had been a lot of discussion on the cavity barrier strategy and getting it

to an agreed position that involved, amongst other things, building control, site workshops, et cetera, et cetera.
What these drawings are showing were Harley were having to respond very quickly to late changes by the client on the window arrangements. They had come about for a number of reasons, planning reasons, client reasons. These changes were being done very late on and there was a lot of pressure for Harley to get in some form of production. In order for them to do that, they had to agree the basic, basic architectural intent.
MR MILLETT: Mr Chairman, it's been a long day and it's now gone 4.30. I am afraid I'm in the middle of a line, but --
SIR MARTIN MOORE-BICK: I think Mr Crawford has had a long day anyway.
MR MILLETT: He has.
SIR MARTIN MOORE-BICK: So it would be a good idea to stop now.
Can we give Mr Crawford some reasonable assurance that he will finish tomorrow?
MR MILLETT: We can, not least because of the quality of the evidence and the witness himself, but also because Ms Grange, who sits to my right, will have something to say about it if I don't. So yes.

SIR MARTIN MOORE-BICK: Well, Mr Crawford, I'm sorry I've got to ask you to come back for more questions tomorrow, but, as you have heard from Mr Millett, he will finish questioning you tomorrow and that will be it.

So we will break now and resume at 10 o'clock tomorrow, please. Again, I have to ask you not to discuss your evidence or any aspect of it over the break. Is that all right?

THE WITNESS: Yes.

SIR MARTIN MOORE-BICK: You go with the usher and we will see you tomorrow morning.

(Pause)

All right, thank you very much. 10 o'clock tomorrow, please.

(4.35 pm)

(The hearing adjourned until 10 am on Tuesday, 10 March 2020)

INDEX