

# OPUS2

Grenfell Tower Inquiry

Day 169

July 29, 2021

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Phone: +44 (0)20 3008 5900

Email: [transcripts@opus2.com](mailto:transcripts@opus2.com)

Website: <https://www.opus2.com>

1 Thursday, 29 July 2021  
 2 (10.00 am)  
 3 SIR MARTIN MOORE—BICK: Good morning, everyone. Welcome to  
 4 today's hearing. Today we're going to continue hearing  
 5 evidence from Ms Beryl Menzies, one of the experts  
 6 instructed to help the Inquiry.  
 7 Would you ask Ms Menzies to come back in, please.  
 8 Thank you.  
 9 MS BERYL MENZIES (continued)  
 10 SIR MARTIN MOORE—BICK: Good morning, Ms Menzies.  
 11 THE WITNESS: Good morning.  
 12 SIR MARTIN MOORE—BICK: All ready to carry on?  
 13 THE WITNESS: Yes, I am.  
 14 SIR MARTIN MOORE—BICK: Thank you very much.  
 15 Yes, Ms Grogan.  
 16 Questions from COUNSEL TO THE INQUIRY (continued)  
 17 MS GROGAN: Thank you.  
 18 Good morning, Ms Menzies.  
 19 A. Good morning.  
 20 Q. We left off yesterday where we'd started to look at the  
 21 specifics of the design of the system, and I'm just  
 22 going to continue with that topic for a little longer.  
 23 In your supplementary report, you explain your view  
 24 that the PSB technical submission for the smoke control  
 25 system, as conditionally accepted by building control in

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1 revision 3, was acceptable in principle.  
 2 A. Yes.  
 3 Q. And in paragraph 304 -- we don't have to go to it, but  
 4 the reference for the transcript is {BMER0000007/69} --  
 5 you say that by this you mean a performance-based  
 6 strategy was acceptable in the circumstances of  
 7 an existing building with retained smoke extract shafts.  
 8 Can you confirm what you mean when you say  
 9 performance-based?  
 10 A. The system had to achieve a criteria of the air flow  
 11 through the door, and the system would have to be  
 12 designed to achieve that and to demonstrate that.  
 13 Yesterday I made reference to the air flow through  
 14 the grilles. That would have a bearing on achieving  
 15 that performance standard, but it would be variable and  
 16 possibly depend from floor to floor to achieve it,  
 17 because that would have to be, as all part of the  
 18 commissioning, which I'm sure we'll touch on,  
 19 demonstrated at each floor level.  
 20 Q. When you say a performance-based strategy was  
 21 acceptable, are you saying that this approach was  
 22 acceptable or is it your view that the specific design  
 23 as presented to the BCB was acceptable?  
 24 A. The approach was acceptable, it's outlined in the  
 25 guidance in various documents, and the choice of the

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1 air flow through the door at 2 metres per second was in  
 2 a recognised, substantiated code, and, in my view, that  
 3 was an acceptable rate of flow for a performance.  
 4 Q. In terms of the proposed system, is it right that,  
 5 whilst it may not have been intended as a full  
 6 depressurisation system that complied with  
 7 BS EN 12101-6, it was a system that created a pressure  
 8 differential in the lobby?  
 9 A. Yes, it did, it created a reduction of pressure in the  
 10 lobby.  
 11 Q. And at paragraph 120 of your report, which is page 19  
 12 {BMER0000007/19}, for the transcript, you say you do not  
 13 believe that the intent of the design proposal was full  
 14 compliance with BS EN 12101-6.  
 15 A. Correct.  
 16 Q. If we could look at paragraph 123 of your report, which  
 17 is on the same page, {BMER0000007/19}, you say there:  
 18 "No guidance existed to address the Grenfell Tower  
 19 proposal: a partially retained system that was to be  
 20 modified. The adoption of any particular guidance is  
 21 not mandatory to achieve compliance with the  
 22 Building Regulations. As outlined in my main report ...  
 23 an applicant is at liberty to choose how to achieve  
 24 compliance. The Building Regulation requirements B1  
 25 through to B5 are substantive and not prescriptive. The

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1 guidance must be appropriate for the situation. No one  
 2 document is subjugated by another but one guidance  
 3 document may be predominantly relevant and form the  
 4 basis of a proposal with benefit from others. However,  
 5 it should be remembered that guidance is based on the  
 6 assumption that its inter-related measures are adopted  
 7 and 'cherry picking' from numerous documents is  
 8 unacceptable without justification and can be  
 9 inappropriate."  
 10 It could be said that taking just one aspect of  
 11 BS EN 12101-6 was cherry-picking. What's your view on  
 12 that?  
 13 A. In the context I viewed cherry-picking, it was not. It  
 14 was a performance that was considered by the BSI as  
 15 achieving an appropriate level for means of escape and  
 16 for firefighting, which was required in this instance.  
 17 The means of achieving that was via equipment and design  
 18 that was achieving a depressurisation, but not in the  
 19 context of the BS EN 12101-6, inasmuch as I had never  
 20 seen a depressurisation system in accordance with that  
 21 guidance ever proposed in a residential situation. It  
 22 would not have been appropriate to do so. It would have  
 23 taken substantial alterations.  
 24 Similarly, a pressurisation system, again  
 25 a differential system, would not have been appropriate

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1 at Grenfell Tower or, in my opinion, any other  
 2 residential situation .  
 3 Q. And why is that?  
 4 A. Depressurisation generally requires extract of the smoke  
 5 from the fire cell , the room of origin, if you like , of  
 6 the fire , which would not have been appropriate in  
 7 a flat .  
 8 Pressurisation is an excellent form of smoke  
 9 control, but it requires a very high standard of  
 10 maintenance. If the doors that are forming the barriers  
 11 that maintain the pressurisation and the differentials ,  
 12 et cetera, are under frequent use, they become worn,  
 13 then requiring more maintenance. The testing of it can  
 14 become quite annoying to residents because of the fans  
 15 starting up, et cetera, and it's a high level of capital  
 16 outlay and a high level of ongoing maintenance.  
 17 Q. In terms of the actual design of the system, Dr Lane has  
 18 set out her view regarding the system in detail in her  
 19 Phase 2 report. She concludes that the Grenfell Tower  
 20 smoke control system did not comply with the  
 21 requirements of schedule 1 of the Building Regulations,  
 22 B1, B3 and B5, when handed over to the TMO. We'll go to  
 23 the detail of her conclusions in a moment.  
 24 Have you had the opportunity to acquaint yourself  
 25 with Dr Lane's conclusions in her report?

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1 A. I've looked at all 500-odd pages, yes.  
 2 Q. If we could go to a summary of her conclusions, which is  
 3 at {BLARP2000036/25}. So this is in chapter 10 of her  
 4 smoke control report.  
 5 She concludes there, at 10.13.2, that she has found  
 6 no evidence that either set of performance standards --  
 7 and she is referring there to both CP3 1971 and ADB --  
 8 were considered as a means to derive design objectives,  
 9 nor were criteria set on that basis.  
 10 Do you agree with her conclusion there?  
 11 A. I don't really understand the reference to CP3. There  
 12 were aspects of Grenfell Tower that complied with CP3.  
 13 The smoke control in the lobby did not comply with CP3,  
 14 but had been accepted as a reasonable provision under  
 15 the legislation at the time by the authorities having  
 16 jurisdiction .  
 17 Q. What about her criticism that they didn't use ADB to  
 18 derive any type of design objective?  
 19 A. ADB did not really address mechanical systems. It spoke  
 20 about alternative to natural systems, but didn't give  
 21 any technical data for the system, other than by  
 22 reference to other documents.  
 23 Q. She goes on to say at 10.13.4 that:  
 24 "Mechanical extract only systems are agreed to be  
 25 inappropriate for the protective purpose of means of

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1 escape ... No consideration was given to this during the  
 2 Grenfell Tower primary refurbishment."  
 3 Do you agree with that?  
 4 A. I think Dr Lane's referring to depressurisation . This  
 5 was not a full depressurisation system; it was  
 6 a mechanical extract system that afforded a level of  
 7 depressurisation in the lobby.  
 8 Q. At 10.13.5, she says that:  
 9 "RBKC Building Control correctly requested  
 10 a performance-based design as a route to compliance, by  
 11 means of the SCA Guide. However, I have not found  
 12 evidence that PSB's lobby smoke control system was  
 13 designed on that basis."  
 14 A. I do not recollect any disclosure that building control  
 15 requested a performance-based design. It requested  
 16 details of the existing system to show that it was  
 17 a no-worsening situation, or, as an alternative , it  
 18 requested details of a new system.  
 19 The observations provided by Mr Hanson, the RBKC  
 20 expert in the field of the smoke control, stated that he  
 21 based his actual observations, B1 being wider than the  
 22 smoke control alone, on ADB and BS 9991 as appropriate.  
 23 He did recommend that the components of the system  
 24 accorded with the SCA guide, and the SCA guide in turn  
 25 referred to other documents for standards to be

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1 attained, et cetera.  
 2 Q. She also concludes at 10.13.6 that the commissioning  
 3 process fell below the standard to be expected. She  
 4 says there that it did not demonstrate compliance with  
 5 regulation 7 of the Building Regulations.  
 6 Do you agree with that?  
 7 A. The commissioning process, as I understand the  
 8 commissioning process, is merely to demonstrate that the  
 9 system works as intended. The reason building control  
 10 bodies generally do not attend commissioning processes  
 11 is that they take so long, they can be very  
 12 time-consuming, very intense, lots of people involved,  
 13 particularly when there are a number of floors that need  
 14 to be addressed at the same time, and the actual  
 15 standards of the equipment, et cetera, should have been  
 16 dealt with as they were installed and checked by the  
 17 installation engineers as being adequate.  
 18 The compliance with regulation 7 is basically they  
 19 are being fit for purpose and are installed in  
 20 a workmanlike manner, and that should have been  
 21 addressed all the way through the construction. At the  
 22 commissioning, it's too late, and as I understand it,  
 23 commissioning engineers, who may have never seen the  
 24 site before, are not looking at the standards of the  
 25 equipment, but making sure that they are literally wired

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1 up correctly and running in the correct order,  
 2 et cetera.  
 3 Q. She also concludes at 10.13.7 that:  
 4 " ... the fire performance standard for the dampers  
 5 (most importantly) as well as the newly installed  
 6 portions of the ductwork did not comply with either the  
 7 performance standards for a smoke control system, nor  
 8 the requirements for a protected shaft."  
 9 A. I would agree with that, and from all the disclosures  
 10 I have seen, there is no evidence that building control  
 11 sought clarification and sought test certificates or  
 12 anything associated with establishing the performance of  
 13 those dampers.  
 14 Q. So does that lead you then to also conclude that there  
 15 were non-compliances with B1 and B5?  
 16 A. Yes, because there was no conclusion that indicated that  
 17 there was full compliance.  
 18 Q. In those circumstances, should building control have  
 19 rejected the proposal, or at least not issued a final  
 20 certificate ?  
 21 A. Not issued a final certificate , which I have stated in  
 22 my supplementary report.  
 23 Q. In the event that the panel accepts Dr Lane's  
 24 conclusions there that the system did not comply in  
 25 other ways with B1 and B5, is that something that you

1 think building control ought to have picked up?  
 2 A. I would have to know what those particular aspects were.  
 3 From the regulatory side, the system as installed was  
 4 not shown to be compliant because it was altered after  
 5 building control last saw it demonstrated. And I am  
 6 still confused as to what these additional vents that  
 7 were requested by building control were, and at what  
 8 stage they were requested, and whether they had ever  
 9 been mentioned before, because there is a disclosure  
 10 that says, "Building control agreed that we didn't need  
 11 a vent". Then we get the request after the  
 12 demonstration for the additional vent, and the S2,  
 13 I believe from memory, annotation by building control on  
 14 the drawings includes inlet vents to lobby at the lower  
 15 level.  
 16 So I'm very confused as to what was actually thought  
 17 to be required and what was actually installed at the  
 18 final completion.  
 19 Q. We will come on to that topic and look at Mr Hanson's  
 20 evidence on that slightly later this morning.  
 21 Moving on to a new topic now, which is the Smoke  
 22 Control Association guidance.  
 23 At paragraphs 121 and 122 of your report, which are  
 24 on page 19 {BMER000007/19}, you explain that:  
 25 "121. The recommendations of the various BS EN 12101

1 Specifications relating to the installation , components,  
 2 testing and maintenance were relevant and were similarly  
 3 referenced in the Smoke Control Association guidance.  
 4 "122. In my experience the SCA guidance was  
 5 generally recognised as authoritative and relevant and  
 6 was applied to smoke control schemes at the time of the  
 7 full plans submission. There was no other performance  
 8 based guidance available. BS 12101-6 provided  
 9 a performance criteria."  
 10 Moving on in your report to page 55  
 11 {BMER000007/55}, paragraph 219, you also say there:  
 12 "I consider the SCA guidance was an appropriate  
 13 reference in the circumstances: there was no other  
 14 performance related guidance; no guidance that  
 15 specifically related to existing buildings."  
 16 Can you explain to what extent you would have  
 17 expected building control to consider the proposal  
 18 against the SCA guidance? So it's acceptable in  
 19 principle as a starting-off point, but how would you  
 20 expect them to follow it through?  
 21 A. Well, the SCA guidance addressed mechanical extract,  
 22 natural inlet as a system of smoke control. It was also  
 23 guidance that was more recent in its version , 12101-6 is  
 24 getting quite old now, and it was guidance that was  
 25 compiled by persons and organisations who were literally

1 at the coalface dealing with these installations on  
 2 a day-to-day basis, and was contributed to by  
 3 building control bodies and the fire service , who would  
 4 be one of the end users.  
 5 Q. It's right, though, that the SCA guidance also sets out  
 6 a process for arriving at your final design.  
 7 A. It does.  
 8 Q. Would you expect the BCB to insist upon that process  
 9 being followed, so selecting a performance criteria and  
 10 justifying them?  
 11 A. Not insisting , because they can't insist . It would be  
 12 a case of: if you followed this guidance, that would be  
 13 something we would be supportive of in our overview and  
 14 it would make sense for you to do it, particularly in  
 15 this case where Mr Hanson was actually sitting on the  
 16 committee. But irrespective of that, it was something  
 17 that gave a constructive process by which people could  
 18 relate to a process as submitted to building control .  
 19 Q. Mr Hanson's confirmed his view in his witness  
 20 statement -- for the transcript the reference is  
 21 {RBK00033894/9}, paragraph 52 -- that the new smoke  
 22 control system was designed in accordance with the  
 23 principles of the 2012 revision of the SCA guide.  
 24 Mr Mahoney, however, said that the system was not  
 25 designed in accordance with the SCA guide process, and

1 the reference for that is {Day155/135:20}. When he was  
 2 asked whether the system was meant to be designed in  
 3 accordance with the process set out in the SCA guide, he  
 4 said, "No, because we couldn't follow it".  
 5 A. But —  
 6 Q. Given the conflict of evidence there, how do you  
 7 reconcile the fact that Mr Hanson, on the one hand,  
 8 thought that that was what was being followed, but  
 9 Mr Mahoney says it wasn't?  
 10 A. The SCA guide puts great emphasis on CFD, which was  
 11 decided not to be done at Grenfell Tower. Mr Mahoney's  
 12 statement, I believe, related to the fact that he  
 13 designed it from the basic principle of achieving a flow  
 14 rate, which the SCA guide then directs you back to  
 15 12101–6 for pressure differential systems, but the  
 16 SCA guidance was more akin to what was being proposed.  
 17 Mr Mahoney's proposal didn't set out on what it was  
 18 based, but then neither did the building control  
 19 documents that have been made available, and the records  
 20 cannot be found, there is no record of what the  
 21 discussions were held, what was said between the  
 22 parties, and why the conclusion was drawn. But looking  
 23 at it, if you like, as a separate review, it seemed  
 24 appropriate to me for the purposes of the  
 25 Building Regulations.

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1 Q. If we could just look at the SCA guide 2012 and one  
 2 particular aspect of it, it's clause 5.3.1, which is at  
 3 {LFB00059241/10}.  
 4 It says there, right at the bottom:  
 5 "Design conditions and performance criteria should  
 6 be agreed with the approving authority as part of the  
 7 approval process, preferably in advance of detailed  
 8 calculation or modelling."  
 9 Is it clear to you, having looked at the  
 10 documentation, what design conditions and performance  
 11 criteria were agreed in advance for Grenfell Tower?  
 12 A. Not what was agreed in advance of the submission of  
 13 revision 03. I do know that a clause was removed from  
 14 revision 02, where I think there was a typing error  
 15 anyway because it said it extracted into the staircase,  
 16 which was obviously totally unacceptable, but the  
 17 reference saying it wasn't designed to 12101, et cetera,  
 18 was removed as well. So a correction would have been  
 19 better, but the whole paragraph was removed.  
 20 But the justification for the removal was only  
 21 a comment by Wrights saying that they had spoken to  
 22 building control and Mr Hanson said, "This is not what  
 23 we agreed", but I can't make out from the disclosures  
 24 whether the extraction into the staircase, which was the  
 25 question that Mr Hanson was raising, or the whole

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1 paragraph in its entirety, because there is no  
 2 explanation from either as to why.  
 3 Q. Just focusing on the idea that design conditions and  
 4 performance criteria should be agreed with the approving  
 5 authority, do you see any evidence that that was  
 6 positively done?  
 7 A. Not recorded as such, no. Whether it was discussed and  
 8 not recorded, I don't know.  
 9 Q. Are you critical of that failure to record that that  
 10 process had been carried out?  
 11 A. Yes, because it's a record leading up to the decision.  
 12 But then, as we never had a decision on the overall  
 13 project, this standalone aspect is probably the most  
 14 detailed recording, but it has gaps leading up to why  
 15 that particular process was adopted.  
 16 Q. And why would it be important to record what had been  
 17 agreed?  
 18 A. Because it's a record that shows what and why it was  
 19 installed; it's a record that shows that  
 20 building control had done its due diligence and its job,  
 21 if you like; and it's also a record for those that come  
 22 after the installation has been installed and been  
 23 running for some time.  
 24 If, for instance, a component is no longer  
 25 available, you can look at what's gone before, what was

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1 discussed, why it was achieved, and if the variation  
 2 that you're now compelled to incorporate in the system  
 3 will have a detrimental effect on it.  
 4 MS GROGAN: If we could look now at clause 5.4 —  
 5 SIR MARTIN MOORE–BICK: I'm sorry, can I just interrupt you  
 6 for a second to ask this: I can understand that the  
 7 questions about the design of the system may be  
 8 interesting, may be important, as may be questions of  
 9 record-keeping, but from the point of view of compliance  
 10 with the Building Regulations, does it matter, so long  
 11 as the air flow was achieved in practice?  
 12 A. In practice, no.  
 13 SIR MARTIN MOORE–BICK: Right.  
 14 A. But it is always good practice, whether you're on the  
 15 building control side or on the design side, to record  
 16 the route that you went to achieve what you did.  
 17 SIR MARTIN MOORE–BICK: I don't dispute that for a moment,  
 18 I just want to be clear, though, because sometimes one  
 19 gets confusion between it's not recorded and whether it  
 20 happened.  
 21 A. Yes.  
 22 SIR MARTIN MOORE–BICK: And of course we do have the data  
 23 from the commissioning exercise, which presumably would  
 24 be available subsequently if anyone wanted to know how  
 25 it had performed.

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1 A. Yes. Yes.  
 2 SIR MARTIN MOORE—BICK: So to some extent there is a record  
 3 of actual performance, even if not a record of how you  
 4 got to that point.  
 5 A. The record of the actual performance is indication that  
 6 the system achieved the design, which is what you want  
 7 to know.  
 8 SIR MARTIN MOORE—BICK: Well, it's a record, is it not, of  
 9 the fact that the system achieved a performance level  
 10 which satisfied the Building Regulations?  
 11 A. Yes. Correct.  
 12 SIR MARTIN MOORE—BICK: Now, it may also have achieved the  
 13 design, if you know what the design was, but that  
 14 doesn't detract from the fact that it achieved what was  
 15 required to satisfy the Building Regulations.  
 16 A. Exactly that, because that design criteria was accepted  
 17 as satisfying the Building Regulations, yes.  
 18 SIR MARTIN MOORE—BICK: All right. Thank you very much.  
 19 Yes, I'm sorry, Ms Grogan.  
 20 MS GROGAN: Thank you.  
 21 So we were just about to look at clause 5.4 of the  
 22 SCA guide, which is on page 14 of this same document  
 23 {LFB00059241/14}.  
 24 It's the bottom half of the page there, and we can  
 25 see that the documentation required by the SCA guide to

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1 allow relevant parties to assess the analysis undertaken  
 2 in relation to checking and meeting the required  
 3 performance criteria should include at least, and then  
 4 there is a list:  
 5 "▪ A description of the residential area and the  
 6 proposed ventilation system.  
 7 "▪ The design criteria and performance objectives of  
 8 the analysis.  
 9 "▪ The scenarios investigated.  
 10 "▪ Details of the techniques used and related  
 11 information.  
 12 "▪ The results of the analysis.  
 13 "▪ A statement as to whether the design criteria and  
 14 objectives have been met."  
 15 Mr Hanson, in his evidence, suggested that this list  
 16 was in relation to modelling a scenario, rather than  
 17 considering a performance-based criteria. The  
 18 reference, for the transcript, is {Day154/190:2-8}.  
 19 Can you help us: if one was following the SCA guide  
 20 in establishing performance criteria, as we've just  
 21 discussed and as you've just had an exchange with  
 22 the Chairman about, would you expect that information to  
 23 have been provided for Grenfell?  
 24 A. I think to a level it was provided.  
 25 If we can go back a page, "A description of the

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1 residential area and the proposed ventilation system",  
 2 there was a description of that at high level, and  
 3 I think it would be acceptable to assume that, this  
 4 coming after the main submission of the full plans and  
 5 plans of the proposed works having been submitted,  
 6 people involved, including building control, had  
 7 an awareness of the residential area and the proposed  
 8 ventilation system.  
 9 The design criteria was the performance criteria, as  
 10 was the objective. The analysis leading up to that may  
 11 be a little vague in the paperwork.  
 12 "The scenarios investigated", there was only one  
 13 scenario, and that was a fire in a flat and persons  
 14 leaving, and the whole concept of stay in place had been  
 15 described previously.  
 16 "Details of the techniques used and related  
 17 information", I'm not quite sure what that would be.  
 18 That's probably where the reference to modelling,  
 19 et cetera, by Mr Hanson is.  
 20 If we can go down the page, the results of the  
 21 analysis was the calculation that was done by  
 22 Mr Mahoney, and the aspirational flow that was achieved  
 23 by the commissioning certificate at the time, although  
 24 it must be noted that that was not the final system that  
 25 was installed.

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1 Q. When this list of matters that should be addressed was  
 2 put to Mr Hanson, he acknowledged that it should have  
 3 been documented better, how the considerations were  
 4 arrived at, and the reference for that is  
 5 {Day154/191:3-6}.  
 6 In light of his acceptance that things could have  
 7 been done better, was it right for building control to  
 8 proceed to approve the system in the absence of proper  
 9 recording?  
 10 A. For the purpose of the Building Regulations, I think  
 11 yes, inasmuch as the Building Regulations were looking  
 12 for a result to be achieved, and that result was  
 13 achieved at the time, but not the final system because  
 14 that was never recorded.  
 15 Q. So, as you've said in your evidence before, the focus is  
 16 on what happened at commissioning and was it  
 17 demonstrated that this flow rate was achieved, rather  
 18 than, when looking at it on paper in advance, whether  
 19 all of the information was there to permit  
 20 building control to carry out an assessment?  
 21 A. Yes. The looking at it in advance gives an indication  
 22 that it's viable and will fulfil the function of the  
 23 Building Regulations. If it showed a total  
 24 non-compliance or something that didn't fulfil or aim to  
 25 fulfil the function of the Building Regulations, it

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1 could have been rejected at that point.  
 2 Although this proposal would have been rejected on  
 3 the basis that it 's unacceptable, your full plans  
 4 application is rejected. In this particular case, the  
 5 full plans application was never passed or approved, it  
 6 went outside the time limit. No overall view of  
 7 building control on the proposed project was ever given.  
 8 So it would have been, "This is unacceptable", and  
 9 if they said, "Oh, well, we're going to proceed with it  
 10 anyway", then it would have been a case of, "Well, we'll  
 11 see on site what is produced and whether that is  
 12 adequate".  
 13 Q. In circumstances where a design criteria or  
 14 a performance criteria is put forward but, as we've  
 15 discussed, not explained or justified, and  
 16 building control looks at it, and then you get to site  
 17 and something goes wrong, is it not too late by the time  
 18 you've got to site and the commissioning process?  
 19 A. It is too late. In the case of Grenfell, I would have  
 20 said, although there was not the detailed analysis and  
 21 the whole matrix, if you like, of how I arrived at this  
 22 decision, there was nothing to say, "This will not  
 23 perform on site". There was nothing to say, "This is  
 24 totally wrong". I think, as Mr Mahoney said, a lot of  
 25 it was based on his experience and he didn't put it down

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1 on paper, and perhaps Mr Hanson, in his experience, knew  
 2 that the intent would work, although he suddenly decided  
 3 towards the end, although the commissioning demonstrated  
 4 the flow was achieved, that he thought there should be  
 5 and recommended additional ventilation at ground level.  
 6 Q. At paragraph 183 of your report, which is on page 52  
 7 {BMER0000007/52}, you say that the PSB technical  
 8 submission rev 3 does not state that it 's based on,  
 9 reliant on or has adopted the SCA guidance and the  
 10 guidance is not quoted anywhere in the document. Should  
 11 it have done so?  
 12 A. Mr Mahoney said it wasn't based on the SCA guidance. On  
 13 that basis, no, it wouldn't have been.  
 14 The conditional approval, if you like of revision 03  
 15 stated that it should comply with the components aspect  
 16 as recommended in SCA guidance. So then, if you like,  
 17 that almost became conditional of it. But if it was  
 18 proven that it hadn't followed it, but was adequate in  
 19 any event, then the system finally would have been  
 20 accepted.  
 21 Q. Moving on in your report to page 54 {BMER0000007/54},  
 22 paragraphs 211 and 212, thinking about the proposal as  
 23 it came across Mr Hanson's desk, you said there are  
 24 several aspects that you would have expected to be  
 25 queried by an experienced BCB surveyor, and they are:

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1 "(a) did the proposals follow any aspect of the SCA  
 2 guidance (Mr Hanson having stated that the proposed  
 3 system was designed in accordance with the guidance); if  
 4 so why was it not referenced in the Technical  
 5 Submission;  
 6 "(b) what was the temperature rating of the smoke  
 7 extract fans;  
 8 "(c) what was the fire resistance of the proposed  
 9 dampers to the smoke extract shafts;  
 10 "(d) were the dampers to the smoke extract shafts,  
 11 the fire and smoke dampers required to maintain  
 12 compartmentation and deter smoke spread."  
 13 Then you go on to say you have seen no disclosure  
 14 that indicates that these issues were queried at the  
 15 time of the BCB review.  
 16 In light of your view that those matters were not  
 17 queried, should building control have accepted the  
 18 proposal in principle?  
 19 A. Accepted it in principle, but should have queried those  
 20 aspects, and that could have been part of the  
 21 conditional approval.  
 22 The aspect I highlighted in my main report was the  
 23 division of Mr Hanson and Mr Hoban, Mr Hanson being  
 24 a consultant to Mr Hoban. The smoke extract shaft  
 25 dampers, et cetera, were relevant under requirement B3

23

1 as well, so one of the two should have been looking at  
 2 them. Mr Hanson said he never carried out any site  
 3 inspections, so implying, in my view, that Mr Hoban  
 4 should have been looking at the fire rating of the  
 5 dampers.  
 6 So this is where this confusion arises on several  
 7 aspects of the Building Regulations review of the whole  
 8 project, but those are matters which should, in my view,  
 9 have been queried, and would have been beneficial to  
 10 both parties to have known at the time prior to  
 11 installation.  
 12 But all the building control body can do is ask for  
 13 that information. If the scheme proceeds, and that  
 14 information is not forthcoming, they can't stop it. All  
 15 they can say at the end is, "Well, basically, we warned  
 16 you. Now, because we don't know if these dampers are  
 17 adequate, we need you to prove it or you replace them  
 18 with something that we both agree is acceptable".  
 19 Q. I think it 's right that there is no evidence that that  
 20 happened.  
 21 A. Correct.  
 22 Q. So there was no querying later on --  
 23 A. Not that I've seen.  
 24 Q. -- of the dampers and no request to install something  
 25 different.

24

1 In those circumstances, should building control at  
 2 the end of the process have issued its certificate, so  
 3 in the absence of information that you have listed  
 4 there?  
 5 A. No, they should not. I think I said in my main report  
 6 that the completion certificate should not have been  
 7 issued. The aspect of the smoke control was only one  
 8 part of that recommendation that they should not have  
 9 issued it, or conclusion rather.  
 10 Q. Moving on to a new topic, which is extended travel  
 11 distances.  
 12 Can we go to first to ADB, which is  
 13 {CLG00000224/31}. This is the 2006 edition,  
 14 incorporating the 2007, 2010 and 2013 amendments.  
 15 If we zoom in on 2.25, which is at the top of the  
 16 page, it says:  
 17 "There should therefore be some means of ventilating  
 18 the common corridors/lobbies to control smoke and so  
 19 protect the common stairs. This offers additional  
 20 protection to that provided by the fire doors to the  
 21 stair. (The ventilation also affords some protection to  
 22 the corridors/lobbies.)  
 23 "This can be achieved by either natural means ...  
 24 or ... mechanical ..."  
 25 Is it correct that this is drawing attention to the

25

1 need to ventilate the common lobbies, first of all so as  
 2 to protect the stairs, but second of all also to provide  
 3 some protection to the lobbies themselves?  
 4 A. Yes.  
 5 Q. Is it right that what the guidance is saying there is  
 6 that you need to think about the escape route in its  
 7 entirety, so a single-minded focus on the stairs would  
 8 not be appropriate?  
 9 A. You would consider the escape from the room within the  
 10 flat, through the flat hall, through the common  
 11 horizontal areas, down the stair, right out to somebody  
 12 standing outside in the fresh air.  
 13 Q. And that would apply whether or not travel distances are  
 14 extended?  
 15 A. Correct.  
 16 Q. If we go now to the 2015 version of the SCA guide, which  
 17 is {RBK00002932/6}.  
 18 Now, we've heard the evidence, and you've said in  
 19 your report, that it's the 2012 guide that would have  
 20 applied to the assessment of the smoke control system,  
 21 but the 2015 guide expresses the principle as well,  
 22 which is why I've taken you to it.  
 23 It says at the beginning of the section entitled  
 24 "Primary Objectives":  
 25 "Where the travel distances are no more than 7.5m in

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1 distance from the door to the staircase (or sterile  
 2 lobby) to the most remote apartment entrance door, the  
 3 primary objective of smoke control in residential  
 4 buildings is to protect the staircase enclosure by  
 5 ensuring that the stairway(s) remain relatively free  
 6 from smoke and heat in the event of a fire within  
 7 a dwelling."  
 8 It goes on to say:  
 9 "However, where corridors are extended, the primary  
 10 objective of the smoke control system is to protect both  
 11 the common corridor and the staircase enclosure. There  
 12 are considered to be two forms of extended corridors."  
 13 Then it goes on to define extended travel distances  
 14 of typically no more than 15 metres, and then  
 15 significantly extended travel distances, which have more  
 16 than 15 metres travel distance.  
 17 So if you keep that in mind, we'll now look at one  
 18 further standard, which is clause 0.2.3 of BS 9991:2011,  
 19 and that is {BSI00000621/11}.  
 20 At 0.2.3, it says in the second paragraph:  
 21 "Smoke can be controlled in the common areas through  
 22 fitted ventilation systems which are either natural or  
 23 mechanical. These ventilation systems have two main  
 24 purposes: the first of which is to provide some  
 25 protection to the stair core and the second of which is

27

1 to aid fire-fighters when tackling a fire. Ventilation  
 2 systems can also be used to compensate for extended  
 3 travel distances within the common corridor leading to  
 4 the stairs and thereby help occupants to escape safely.  
 5 Where smoke control is used to provide compensation for  
 6 extended travel distances, it is the responsibility of  
 7 the designers to demonstrate that the ventilation system  
 8 can provide tenable conditions (see Annex E) for the  
 9 occupants using the route with extended travel  
 10 distances."  
 11 Do you agree that, therefore, ADB, the SCA guide  
 12 2015 and BS 9991 all anticipate the use of a smoke  
 13 control system to protect not just the stair but also  
 14 the common corridor?  
 15 A. In the context of an extended travel distance, yes.  
 16 Q. Yes.  
 17 A. The smoke ventilation system will also afford some  
 18 protection to the common lobby, and I say lobby in the  
 19 context of Grenfell, because it was not a corridor as  
 20 such, and there is a big debate as to what's a lobby and  
 21 what's a corridor. In my view, a corridor is longer and  
 22 bigger than a lobby. You will, by virtue of the smoke  
 23 control system running, have some degree of protection  
 24 in that protected lobby, whether the travel distance is  
 25 7.5 or longer.

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1 The whole aspect has to be considered recognising  
2 the concept of how these recommendations are compiled on  
3 the basis of the stay-in-place protocol and the  
4 compartmentation, the fact that the flat on fire will be  
5 the initial flat and perhaps, hopefully, the only flat  
6 necessary to evacuate. Therefore, when they evacuate,  
7 they open the door to the flat, which should be  
8 a fire resistant, self-closing, smoke-sealed door. They  
9 will come into the common area.

10 They have left their flat because they have either  
11 seen the fire, noticed smoke or have been warned of fire  
12 by virtue of the smoke detection in their flat  
13 activating, and that should activate in the early stages  
14 of the fire so that they should be leaving the flat in  
15 the early stages of the fire. That flat entrance door  
16 closes behind them — should close behind them. If  
17 sufficient smoke has escaped from the flat to activate  
18 the smoke detector in the common area, that ventilation  
19 system, that smoke control system, will activate. They  
20 then move into the stair and go down and evacuate the  
21 building.

22 Should anybody else on the floor become aware of  
23 a fire and feel the need to evacuate, when they come out  
24 into that lobby, that smoke control system may or may  
25 not be running. If it's running, it will be pulling air

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1 from the stair, from gaps under the door, et cetera.  
2 When the door is opened into the stair, it will boost up  
3 and further dilute the smoke in the lobby. But it would  
4 be a limited amount of smoke in the common lobby  
5 provided the front door to the fire flat had closed.

6 So there is a level of protection, but it is  
7 recognised in guidance and commentary and I think  
8 generally known throughout the industry that during  
9 firefighting, the only practical way of holding the  
10 smoke back from entering the stair to a degree is if the  
11 stair is part of a pressurisation system that will hold  
12 the smoke back. Otherwise, it is inevitable that smoke  
13 will pass into the common stair.

14 Now, should the Fire Brigade determine that further  
15 persons need to evacuate, their decision as to whether  
16 to close the door to the stair, close the door to the  
17 flat, stop firefighting at that particular time while  
18 persons evacuate, is entirely up to them and it's  
19 a dynamic decision. Only they can decide.

20 Q. But in circumstances where there are extended travel  
21 distances, it is right that the guidance points to the  
22 fact that the smoke control system should protect the  
23 lobby as well as the stair?

24 A. Yes, and it should achieve certain levels of tenability,  
25 temperature, visibility, which is not specified for

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1 a code-compliant distance. So not all new projects  
2 adhere strictly to the 7.5 metres travel distance,  
3 because 7.5 metres, as probably has been said, will be  
4 adequate for Joe Public, but perhaps not somebody who  
5 has breathing difficulties, has just come back from  
6 skiing and has broken their leg, et cetera, or is of  
7 a certain age or has some form of impairment. So  
8 a metre/half a metre each way is probably not going to  
9 make much difference.

10 I'm sure the Inquiry has been informed that at one  
11 point we had mandatory rules for means of escape, way  
12 back from the 1985 regulations. That was done away  
13 with. One reason, I believe, was because it was very  
14 rigid and did not allow circumstances where a slight  
15 extension would be adequate.

16 But definitely if it goes up towards 15 metres, or  
17 perhaps even sort of 10 or so metres, you would then  
18 start looking, in an extended travel distance situation,  
19 for those tenability criteria to be demonstrated, and  
20 that is usually done by a CFD.

21 In the case of Grenfell, in my view, the travel  
22 distances were not extended because they complied with  
23 the criteria when it was built. So whilst in the  
24 context of modern standards it was extended and it  
25 approached the magic 15-metre distance, depending on how

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1 you — or you were permitted under CP3 to go up to 15.  
2 I know that the BRE measured that travel distance,  
3 I know Dr Lane measured it, I have measured it on the  
4 plans from scale, and we've come up with three different  
5 versions of how far that distance is. It's not unusual  
6 in scaling to get an incorrect distance, but it gives  
7 you an indication. And that's what you do, when you do  
8 the plans under building regs, you're doing the review,  
9 you're scaling it or you're taking dimensions that are  
10 put on the plan by the architect.

11 So in particular in Grenfell Tower, the distance,  
12 which was not 15 metres, it was less, would have been  
13 permitted under CP3 at the time.

14 Q. So just going back to BS 9991, where it says it's the  
15 responsibility of designers to demonstrate that the  
16 ventilation system can provide tenable conditions for  
17 the occupants using the route with extended travel  
18 distances, is it your view that, for Grenfell Tower,  
19 that piece of guidance didn't apply, so there was no  
20 requirement for the designer to demonstrate that tenable  
21 conditions in the common lobbies could be achieved?

22 A. Had I been looking at it, I wouldn't have raised the  
23 matter of extended travel distances being a criteria  
24 which they would now have to address under the new  
25 proposals, the refurbishment proposals. I readily

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1 acknowledge another building control officer may have in  
2 fact raised it as an issue.

3 If they were looking at distances of 15 metres, if  
4 a building control officer had raised it, they would, if  
5 following the guidance at that time, have been looking  
6 at putting sprinklers in all the flats, which would not  
7 have been viable from the proposals, the building  
8 owner's point of view, perhaps. But I personally would  
9 not have considered it being an extended travel distance  
10 in the context of Grenfell Tower.

11 Q. You refer to what you personally would have done; is  
12 that a matter that there is a range of reasonable views?  
13 So bearing in mind the standard of a reasonably  
14 competent BCB, would it be within the range of  
15 reasonable responses for a BCB to query the travel  
16 distances and ask for a demonstration that, at  
17 Grenfell Tower, those extended travel distances could  
18 still provide tenable conditions with the smoke control  
19 system?

20 A. In all honesty, I can't give you a view on that,  
21 inasmuch as these systems, exactly as per  
22 Grenfell Tower, I've never seen another one in  
23 existence, so I couldn't say, in all honesty. It's down  
24 to personal judgement and interpretation by the  
25 building control body.

33

1 Q. Mr Hanson's evidence was that, in the context of  
2 protecting the common corridor, where there were these  
3 extended travel distances but less than 15 metres, he  
4 described that as a qualitative decision, not based on  
5 any kind of modelling or anything of that nature, and  
6 that's at {Day154/168:2–25}.

7 Does that reflect what you have just said, that it's  
8 a matter of professional judgement as to how you  
9 approach it as a BCB?

10 A. Yes.

11 Q. I'm going to ask you now about the shape of the lobbies,  
12 the I shape of the lobby.

13 We've heard evidence in relation to that, and in his  
14 evidence Mr Mahoney on {Day155/88:4–7}, which we don't  
15 need to go to, said:

16 "The system I'm putting forward isn't designed to  
17 [deal with the I-shaped lobby], and no system will  
18 remove those dead spots, whether it be natural or  
19 mechanical, because it's a dead spot."

20 Is that an issue you would have expected to see  
21 considered in the design documentation?

22 A. Again, ideally it would have been part of a discussion  
23 recorded or set out in the document. However, in the  
24 case of the layout of Grenfell Tower, unlike most modern  
25 layouts that comply with the travel distance or not, you

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1 were actually extracting in two points, so you were  
2 drawing away from two points, some of which were quite  
3 near these dead ends.

4 I'm not convinced that the dead-end situation would  
5 have been significant. It would add to my view that, as  
6 was usual in these circumstances, you would have  
7 requested demonstration of a cold smoke test to show  
8 what the situation was with the flow of smoke away from  
9 the stair, et cetera.

10 The layout of the opposing extract and the proximity  
11 to the dead ends would, in my view, have likely resulted  
12 in some movement, but as to whether it would have been  
13 at a level that would have been demonstrated as giving  
14 the visibility that one would expect or the guidance  
15 gives you, I don't know.

16 Mr Mahoney's experience as an engineer, a mechanical  
17 engineer, dealing with air movement, smoke control  
18 systems, far exceeds mine, so I can't say whether or not  
19 it would have. If that was his stance, then I would  
20 have expected that to have been recorded in the  
21 discussions and addressed. But I don't think it played  
22 a significant role in the system that he designed.  
23 There's nothing to direct me towards saying this was  
24 a system that would deal with — well, as he said, it  
25 wouldn't deal with the aspects of the dead-end

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1 situations.

2 Q. In those circumstances, should the BCB have thought  
3 about whether or not that affected compliance with B1  
4 and B5?

5 A. You would always consider dead-end situations in the  
6 context of smoke movement, but as the prime concern was  
7 to protect the stair, and in my view there were not  
8 extensive dead ends, I can understand why it was not  
9 apparently considered under the proposals at Grenfell to  
10 any high degree, but it would have been a general aspect  
11 that you would consider as a building control officer in  
12 any project with smoke control. The same would arise  
13 for a natural system as well as a mechanical system.

14 SIR MARTIN MOORE—BICK: Well, I was going to ask you about  
15 that, because the dead ends, if we're going to call them  
16 that, were built into the structure, weren't they?

17 A. Yes.

18 SIR MARTIN MOORE—BICK: And because the new system was  
19 drawing or designed to draw smoke from two locations in  
20 the lobby rather than just one, presumably it was no  
21 more unsatisfactory than the original arrangement?

22 A. In my view, it would have been better.

23 SIR MARTIN MOORE—BICK: Well, yes.

24 A. Yes.

25 SIR MARTIN MOORE—BICK: In which case there wasn't much that

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1 building control could say about it, was there?  
 2 A. Not really, no.  
 3 SIR MARTIN MOORE—BICK: No, all right. Thank you.  
 4 MS GROGAN: Is that right even in circumstances where they  
 5 were applying modern standards, so they were seeking  
 6 achievement of B1 and B5?  
 7 A. I think the applying modern standards was aspirational,  
 8 but in an existing building, it would be rare that you  
 9 could apply all modern standards.  
 10 In this particular case, the size of the vent shafts  
 11 didn't comply with any guidance at all, and although  
 12 I hesitate to raise the Colt system, which has been  
 13 discussed at length in Dr Lane's — well, not at length,  
 14 but has been addressed in Dr Lane's report, the reason  
 15 people often go for the Colt system is that the vent  
 16 duct is smaller than the recommendation, but it's been  
 17 shown to work on a certain layout. All the CFD analysis  
 18 has been done, which is expensive and can run for weeks,  
 19 to get an answer. So people sometimes opt for that for  
 20 the smaller size vent shaft.  
 21 In this case, I don't think they even added up to  
 22 the Colt size shaft.  
 23 Q. In circumstances where you have the dead end and there  
 24 is a potential for smoke not to be cleared from that  
 25 dead end, how can the BCB satisfy itself that there

1 would be an adequate means of escape from the lobby and  
 2 out to the stair?  
 3 A. If the BCB was concerned that there was a dead-end  
 4 situation where there would be a lack of dilution in  
 5 that area, in order to request substantiation that it  
 6 was not a problem, they'd have to establish that there  
 7 was a problem in the first case.  
 8 In the situation of a layout with dead ends, you  
 9 would consider the escape from the individual flats on  
 10 the basis of a stay in place, and then I think you would  
 11 surmise that, had the dead-end situation been an issue,  
 12 it would have been because it wasn't the fire flat that  
 13 was escaping — the fire and the smoke should be behind  
 14 you and you're running ahead of it — it would have been  
 15 a situation if the fire flat fire had caused an issue  
 16 within the common lobby and the residents on the same  
 17 floor were trying to escape through that lobby.  
 18 But in the case of an existing situation, it would  
 19 have been an issue as originally approved at the same  
 20 time as being the proposed scheme. There was no  
 21 worsening, if you like, of the situation. And because  
 22 you were now going from natural to mechanical, you were  
 23 probably improving the situation in the lobby for that  
 24 other flat occupants to escape.  
 25 Q. Moving on to foreseeable scenarios and door-opening

1 conditions now.  
 2 At paragraph 116 of your report on page 18  
 3 {BMER0000007/18}, you say there:  
 4 "SCA guidance makes no specific recommendations  
 5 relating to firefighting operations."  
 6 You have said this in oral evidence today:  
 7 "These will be dynamic at each incident but an  
 8 experienced competent BCB should be aware it is likely  
 9 fire fighters will approach a fire from a floor or  
 10 floors below where they have connected hoses to the  
 11 rising water main and that the hoses will retain open  
 12 the doors between lobbies and the stair."  
 13 Then going forwards in your report to page 65  
 14 {BMER0000007/65}, at paragraph 271 it says:  
 15 "Whilst neither version of the SCA Guidance  
 16 specifically stated the stair doors on the lower floors  
 17 should be considered as being open in addition to those  
 18 at the level of the fire, a competent building control  
 19 surveyor familiar with smoke control systems supporting  
 20 firefighting operations and the particular scenarios  
 21 associated with a Class B installation would have been  
 22 aware of the need to consider additional doors being  
 23 open."  
 24 Then at paragraph 275, which is on the same page at  
 25 the bottom, you say:

1 "I have seen no disclosure that suggests the BCB  
 2 required open doors other than on the fire floor as part  
 3 of the commissioning of the system or the witnessing of  
 4 the system. There is no indication that the BCB took  
 5 these additional doors into consideration when reviewing  
 6 the smoke control proposal."  
 7 Is it right, then, that you would have expected  
 8 a reasonably competent BCB to have required the  
 9 commissioning or testing process to address different  
 10 door-opening scenarios?  
 11 A. Yes, and in witnessing the demonstration, I would have  
 12 expected them to have asked for certain doors to be held  
 13 open on the lower floors to demonstrate the effect. It  
 14 was not a commissioning matter, inasmuch as it was not  
 15 part of the design, as I understand it.  
 16 SIR MARTIN MOORE—BICK: Can you help me with this, because  
 17 I'm sure it's a lack of understanding on my part, but as  
 18 I understand it, the system is designed to draw air from  
 19 the stairway into the lobby and thereafter up the shaft;  
 20 why does it matter where the air has come from when it  
 21 emerges from the stair shaft into the lobby?  
 22 A. I'm not a mechanical engineer, but my understanding is  
 23 that this whole system works on balancing, and therefore  
 24 it would be just to demonstrate that there was not  
 25 an imbalance of the air flows through from the stair

1 through the doors. But also it would be an indication  
 2 of where the likely direction of flow would be. Would  
 3 this influx of air cause any additional drawing from the  
 4 fire flat?  
 5 SIR MARTIN MOORE—BICK: At the moment, I can't see how it  
 6 could, because effectively you're just drawing air from  
 7 the whole of the stairwell, and the stairwell is open to  
 8 the atmosphere at the top. So in one sense you're  
 9 drawing air, on the face of it —  
 10 A. From practical —  
 11 SIR MARTIN MOORE—BICK: — from everywhere, and I can't see  
 12 why having a door open on the floor above or the floor  
 13 below should affect the rate of flow through the door  
 14 you're concerned about. I thought Mr Mahoney said it  
 15 wouldn't, but I may have misunderstood, which is why  
 16 I was asking the question.  
 17 A. From my understanding of the way these systems work,  
 18 I doubt whether it would have affected it, but it would  
 19 be a demonstration of what would be happening on the  
 20 night of the fire with the Fire Brigade holding doors  
 21 open.  
 22 It's a bit different in Grenfell, inasmuch as under  
 23 current guidance, the Brigade prefer and the guidance is  
 24 that the dry riser or the wet riser is in the stair.  
 25 SIR MARTIN MOORE—BICK: Yes.

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1 A. Under previous guidance, it asked for it to be in  
 2 a ventilated protected space, and in this case it was  
 3 the lobby, as opposed to the stair.  
 4 So the actual performance — that's the wrong word.  
 5 The operations of the Fire Brigade on the night or at  
 6 the fire incident would have been different to what  
 7 would have been set out in the actual guidance.  
 8 The guidance changed and the acknowledgement of the  
 9 two crews was different to the original concept for  
 10 Grenfell Tower. The two crews followed the 9/11  
 11 incident, my understanding is, having spoken to firemen  
 12 for many, many years, and read the reports post-9/11, in  
 13 that the temperatures that were reached, the crew that  
 14 fights the fire is effectively protected by the second  
 15 crew — and I'm sure this has been explained to the  
 16 panel — by spraying above their heads so the hot gases  
 17 don't affect them, because as good as their suits are,  
 18 temperature-wise, they were, in London anyway, at one  
 19 time known as boil in the bag suits, because they don't  
 20 wick the temperature from the body and the perspiration.  
 21 So post-9/11 it was established that probably the  
 22 maximum a firefighter at the face of a fire could  
 23 withstand from a durability point of view, not only from  
 24 heat but exhaustion as well, was about 17 minutes. So  
 25 obviously the crews need to be given additional

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1 protection, et cetera.  
 2 Sorry, I've gone off on a tangent.  
 3 SIR MARTIN MOORE—BICK: It's all right, I invited you to.  
 4 A. But, yes —  
 5 SIR MARTIN MOORE—BICK: I think I understand. I think what  
 6 you're telling me is that it would have been good  
 7 practice for building control to have asked for  
 8 a demonstration with other doors open, even though you  
 9 don't think it was likely to have made any difference?  
 10 A. I thought, but I wouldn't categorically say no.  
 11 The other aspect that is in my mind, when you're  
 12 adopting a flow criteria taken from that particular BS,  
 13 is that that recommends that you do consider other doors  
 14 being opened.  
 15 So whether or not it would have a practical effect,  
 16 others more qualified should give the definitive answer.  
 17 But I did note, when looking at the draft document which  
 18 is in the BS EN 12101-6 series, which I think is 13,  
 19 which reflects this type of system, there was, in my  
 20 reading of it — and it was only a draft — no  
 21 recommendation for additional doors on other levels  
 22 being open to be considered.  
 23 SIR MARTIN MOORE—BICK: Thank you very much.  
 24 Yes, Ms Grogan.  
 25 MS GROGAN: Yes. For the transcript, I'll just give you the

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1 reference: it's clause 12.2.3.3 of BS EN 12101-6, which  
 2 is {RBK00045054/73}. There is a list there of the  
 3 different door-opening scenarios that should be open  
 4 during the test.  
 5 A. For a pressurisation system, yes.  
 6 Q. For a pressurisation system.  
 7 I just want to ask you about one particular  
 8 scenario.  
 9 So where a door to the fire flat is open, and  
 10 a window in that flat is broken or is otherwise open,  
 11 can you help us on whether the exposure of the system to  
 12 outside air through the window would negatively affect  
 13 the 2 metres per second flow rate at the stair door?  
 14 A. No, I can't help you. I'm not qualified to make that  
 15 judgement.  
 16 Q. Would you expect a reasonably competent BCB to have  
 17 required the commissioning process to have demonstrated  
 18 that, in that scenario, the 2 metres per second was  
 19 still achieved?  
 20 A. A competent BCB with a basic knowledge of fire would,  
 21 I think, be expected to know that a window to a flat  
 22 could be open, or that the fire may — and it doesn't  
 23 happen in every case — cause a window to fail.  
 24 In the context of the door being open, the safety of  
 25 the residents, that would have been a transient risk

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1 because that door should have closed after them, and  
2 therefore protected everybody else using that same  
3 level. It may have marginally, if the window was open  
4 or failed, been another leakage path, but it would have  
5 been directing the fire and the heat out of the window.  
6 So it would have been a balance, I would imagine.

7 I'm not qualified to give you the full scientific  
8 facts on that.

9 Q. Mr Hanson said in his oral evidence that he expected  
10 that door testing would be done to the British Standard,  
11 which is the standard we've just discussed, which refers  
12 to the different door-opening scenarios. For the  
13 transcript, that was {Day154/197:12-15}.

14 Was it reasonable for Mr Hanson to make that  
15 assumption without seeing positive evidence that it had  
16 in fact been done?

17 A. No. A wise man once said to me it's unsafe to assume  
18 anything.

19 SIR MARTIN MOORE-BICK: When you say that guidance to which  
20 we've just been referred refers to a pressurisation  
21 system, are we to think of pressurising the staircase in  
22 this context?

23 A. A pressurisation system is different to what was  
24 proposed.

25 SIR MARTIN MOORE-BICK: Quite.

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1 A. You would pressurise the stair, you would pressurise the  
2 lobby and you would pressurise the lift.

3 SIR MARTIN MOORE-BICK: Right.

4 A. And, as I hope I've illustrated, it's a very delicately  
5 balanced system. Therefore, if you open doors on other  
6 levels, then it's going to affect it.

7 SIR MARTIN MOORE-BICK: Well, that's what I was wondering,  
8 you see, because if BS EN 12101 is concerned with  
9 pressurisation systems and you're applying it to  
10 a staircase and pressurising the staircase, then it  
11 would not strike me as surprising that if you open doors  
12 in several places on the staircase, you're likely to  
13 affect the pressurisation, because you're offering --

14 A. Yes.

15 SIR MARTIN MOORE-BICK: -- exit paths for the pressure, so  
16 to speak.

17 A. Yes.

18 SIR MARTIN MOORE-BICK: I put that rather crudely, but  
19 I think you'll understand. But that wouldn't apply to  
20 the system that we are considering, would it?

21 A. In my understanding of the system, no, it wouldn't.

22 To be quite honest, it's something, because we know  
23 that the doors will be propped open by the Brigade's  
24 hoses, that we generally look to demonstrate. I can't  
25 honestly say I've ever seen a system fail because of it.

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1 I know anecdotally of a pressurisation system that  
2 failed when somebody cut a socket for the cleaner's  
3 Hoover in the actual wall of a protected shaft. It's  
4 that finely balanced.

5 SIR MARTIN MOORE-BICK: All right. Thank you very much.

6 MS GROGAN: So we know that 2 metres per second was the  
7 performance criteria for this system, so focusing on  
8 that rather than pressurisation/depressurisation for  
9 a moment, and that was proposed on the basis that it  
10 would have ensured an adequate means of escape.

11 How is it that the BCB would know that that adequate  
12 means of escape in the form of that flow rate would  
13 always be achieved depending on all these different  
14 scenarios unless it was tested?

15 A. They wouldn't. The design engineer would have carried  
16 out his calculations on the basis of the information  
17 given to him and what he observed on site, et cetera.

18 That design is then given to others to build, to  
19 formulate. Tolerances, et cetera, may not have been  
20 maintained. Until that system is up and running, whilst  
21 everybody's fingers are crossed it will follow the  
22 design intent, until it's actually tested and it's shown  
23 at the commissioning that everything is literally joined  
24 up and doing what it's supposed to do in the various  
25 scenarios it's required to address, then nobody knows

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1 that it's actually working and achieving that particular  
2 flow rate.

3 Q. So it would then be important to check whether the  
4 2 metres per second was maintained with other doors on  
5 the floor below, for example, open to the stair? Even  
6 if in principle you are sceptical that it would make  
7 a difference, it's important to test it to make sure?

8 A. Yes. It's best practice, shall we say.

9 Q. On the issue of the force of the door, you note at  
10 paragraph 257 of your supplementary report  
11 {BMER000007/64} that there is no record of Mr Hanson  
12 measuring the door-opening force.

13 A. Correct.

14 Q. In his evidence he said that the commissioning report  
15 didn't include the readings of door-opening forces and  
16 said that building control were relying on the  
17 professionalism of the installer and designer.

18 Was that a reasonable approach for the  
19 building control to take?

20 A. If he hadn't seen any records that the force on the  
21 doors had been tested, no, it wouldn't.

22 Did not somebody from JS Wright say that they, with  
23 Mr Hanson -- no, they tested them and recorded them, and  
24 it was no more than 85 newtons, and that Mr Hanson  
25 relied on his being able to open the door without any

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1 undue force, I think was the way it was phrased.  
 2 I think that was in Mr Whyte's oral evidence.  
 3 Q. Yes. So where that had happened, was that sufficient  
 4 for building control's assessment of whether the system  
 5 was adequate and compliant?  
 6 A. I'll be quite blunt, it was fine until you get found  
 7 out. That's just a fact. That is why you should record  
 8 these things, or get somebody to record them and submit  
 9 that detail to you, or get them to perform the test and  
 10 you witness it and get them to record it and copy it to  
 11 you.  
 12 Q. Moving on to the topic of dampers, in his evidence,  
 13 Mr Hanson said that he just considered B1 and B5, and  
 14 did not consider how the system would in any way affect  
 15 internal fire spread or building compartmentation.  
 16 Was that, in your view, a reasonable approach for  
 17 him to take?  
 18 A. No, it was not. B1 and B5 rely on all other aspects,  
 19 all other requirements of the Building Regulations under  
 20 part B.  
 21 Q. And does that feed into your overall conclusion that the  
 22 final certificate should not have been issued?  
 23 A. Correct.  
 24 Q. Mr Hanson said that he considered the basic  
 25 specification for the dampers to make sure that they

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1 were appropriate, and he told the Inquiry that the type  
 2 of damper being used was a smoke control damper because  
 3 it was being used to control smoke and it did, he said  
 4 he believed, and the references for the transcript are  
 5 {Day154/204:2} to {Day154/205:7}.  
 6 Was that level of scrutiny of the dampers by  
 7 building control appropriate, in your view?  
 8 A. No, the damper required fire resistance to perform the  
 9 function of the protected shaft, a firefighting shaft.  
 10 It was critical, particularly in the context of B5, as  
 11 I've said in my report. It's the last way a firefighter  
 12 at risk can evacuate the building. It's the point of  
 13 retreat for them, they fall back to it, and they  
 14 evacuate people via the shaft if they need to by  
 15 rescuing them.  
 16 Q. The Inquiry heard evidence from Mr Jones of the damper  
 17 supplier, Gilberts, to the effect that the Series 54  
 18 dampers were not intended to be nor were described as  
 19 being smoke control dampers. The Inquiry also has seen  
 20 product documentation that references test standards  
 21 applicable to fire and fire/smoke dampers, not smoke  
 22 control dampers. Mr Jones also acknowledged that the  
 23 Series 54 damper had no formal certification at all.  
 24 Would you have expected a reasonably competent BCB,  
 25 without the benefit of a mechanical and electrical

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1 engineer, to recognise that the dampers were not a smoke  
 2 control damper?  
 3 A. Yes, because they should have asked for full details of  
 4 the damper and should have asked for the test results  
 5 for the damper.  
 6 Q. So was it reasonable, then, for Mr Hanson to conclude  
 7 that the damper being used was a "smoke control damper",  
 8 just because it was being used to control smoke?  
 9 A. No, because it had two functions: fire resistance and  
 10 smoke.  
 11 MS GROGAN: Can we just look now at a change in the design  
 12 after --  
 13 SIR MARTIN MOORE-BICK: Can I just intervene to ask you how  
 14 you're getting on?  
 15 MS GROGAN: I was going to ask this question and then  
 16 propose a break, because I'm not going to reach the end  
 17 of my questions before --  
 18 SIR MARTIN MOORE-BICK: No, no. Yes, you take your course.  
 19 MS GROGAN: -- the transcriber needs a break.  
 20 So I'm just asking you about this change to the  
 21 design which we can see described in Mr Mahoney's first  
 22 witness statement, which is {PSB00001329/11}. It's  
 23 subparagraph 3 there.  
 24 In this part of his statement, Mr Mahoney is  
 25 explaining some of the key changes in the design that

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1 occurred as the technical submission progressed through  
 2 the project, and as we know, there were six revisions to  
 3 that technical submission.  
 4 He says there that:  
 5 "As well as the configuration of the extended smoke  
 6 shafts, another detail which was finalised after the  
 7 initial design work recorded in revision 1 of the  
 8 Technical Submission was the specification and location  
 9 of the fan sets used in the System."  
 10 Just to summarise what he says there, it's that  
 11 initially it was envisaged that the north and south  
 12 smoke shafts would be connected at roof level. That  
 13 design then changed, and a new arrangement was reflected  
 14 in revision 5 of the technical submission onwards, which  
 15 he also confirmed with JS Wright.  
 16 Was that change in design something that should have  
 17 been considered by building control, given that it  
 18 postdated the rev 3 technical submission?  
 19 A. Yes, I would have expected building control to have been  
 20 advised of a change in the design, even if it was simply  
 21 to allow them to check it out on site when they were  
 22 conducting their inspections. You could turn up, look  
 23 at something and say, "Well, that was what we approved  
 24 and that's what you've got on site, what happened in  
 25 between?"

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1 MS GROGAN: Thank you, Mr Chairman, that would be  
 2 an appropriate moment for a break.  
 3 SIR MARTIN MOORE—BICK: That's a good point? All right,  
 4 thank you very much.  
 5 Well, Ms Menzies, time for a break for the morning.  
 6 We'll stop now, we'll resume at 11.35, please, and as  
 7 with everyone else, please don't talk to anyone about  
 8 your evidence while you're away. All right?  
 9 THE WITNESS: Okay, thank you.  
 10 SIR MARTIN MOORE—BICK: Thank you very much.  
 11 (Pause)  
 12 Thank you. 11.35, thank you.  
 13 (11.21 am)  
 14 (A short break)  
 15 (11.35 am)  
 16 SIR MARTIN MOORE—BICK: All right, Ms Menzies, ready to  
 17 carry on?  
 18 THE WITNESS: Thank you.  
 19 SIR MARTIN MOORE—BICK: Good, thank you.  
 20 Yes, Ms Grogan.  
 21 MS GROGAN: Thank you.  
 22 We're moving on to commissioning now.  
 23 In his evidence, Mr Hanson explained that he looked  
 24 at the system's commissioning certificate as best he  
 25 could, but that not being a mechanical and electrical

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1 engineer, the commissioning certificate is not something  
 2 that he could interrogate as well as a mechanical and  
 3 electrical engineer could do.  
 4 He also explained that "with the loss of the  
 5 [mechanical] engineer, we weren't expected to go down  
 6 a witness commissioning or any kind of inspection", and  
 7 the references for the transcript for that are  
 8 {Day154/49:25} and {Day154/147:11–13}.  
 9 How common was it for building control bodies to  
 10 employ an M&E engineer at that time, so the 2012 to 2016  
 11 period?  
 12 A. Probably not common. I think, as Mr Hanson alluded to,  
 13 when the GLC was disbanded, the BREG, the Building  
 14 Regulations Electrical Engineers Group, were dispersed,  
 15 as were we surveyors, and various ones went to all the  
 16 London boroughs, and as time went by, they either moved  
 17 on or they retired, and due to mostly cost-cutting,  
 18 their positions were not replaced.  
 19 Also, sorry, if I may add, with the loss of the  
 20 section 20, a role disappeared. Now, that went into the  
 21 Building Regulations to an extent, but whereas under the  
 22 protocol that was adopted by the GLC for section 20,  
 23 when BREG went out and periodically witnessed the  
 24 testing, et cetera, of fireman's lifts, firefighting  
 25 lifts, whatever you want to call them, and safety

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1 lighting, smoke control systems and the like, that was  
 2 no longer done.  
 3 The Government was at great pains to lift the  
 4 burden, deregulate the legislation, and put the onus on  
 5 the person carrying out the work to achieve and display  
 6 compliance.  
 7 Q. So against that background, would you expect  
 8 a reasonable BCB to be able to consider a commissioning  
 9 report without the assistance of an M&E engineer?  
 10 A. Yes, a reasonably experienced one, inasmuch as what you  
 11 don't gather from the commissioning that you expect to  
 12 see, you ask. That's the role of building control, is  
 13 to question and to check things are as they would expect  
 14 to demonstrate compliance.  
 15 Q. Could you just expand on that? So in the absence of  
 16 an M&E engineer, what would you expect a BCB such as  
 17 Mr Hanson to do when it came to inspection and  
 18 commissioning of the system?  
 19 A. If he wasn't — the reason building control generally do  
 20 not accept invites to go to commissioning is because  
 21 it's a very lengthy process, as I said before, and all  
 22 they're really interested in is the results, not how if  
 23 you balance damper 55 and then tweak damper 62, you'll  
 24 end up with what you want. They're not interested in  
 25 that, they're just interested in the end results.

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1 But looking at the commissioning certificate, you  
 2 would expect all the smoke detectors to have been  
 3 tested, inasmuch as they were activated by artificial  
 4 smoke to run to make sure that, when they activated,  
 5 they opened the vents that they were required to open,  
 6 to close vents that they were required to open,  
 7 et cetera. You wouldn't be looking for anything as  
 8 regards the wiring other than to the commissioning  
 9 certificate to say it was installed as required.  
 10 Q. So would it follow, then, that you would expect the  
 11 commissioning documentation to lay out in a fair bit of  
 12 detail that all of the relevant things had been carried  
 13 out?  
 14 A. Yes. What I would have expected is what was given to  
 15 building control in the form of, I think, four separate  
 16 documents, ie it was the partial commissioning  
 17 certificate, as they termed it, which was for floors 4  
 18 and above, because the lower floors weren't completed at  
 19 the time; there was then a commissioning certificate  
 20 that related to the building as a whole, but it didn't  
 21 say whether it tested all the floors at the same time;  
 22 and then there was the separate sheet without heading  
 23 that established the flow rate readings; and another  
 24 sheet that was the environmental flow rate readings.  
 25 So I would have expected a proper commissioning

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1 certificate to have incorporated all that information  
 2 and not be a few A4 sheets stapled together, shall we  
 3 say.  
 4 Q. And on receipt of the A4 sheets stapled together, as you  
 5 describe it, is there anything you would have expected  
 6 Mr Hanson to do?  
 7 A. Either say, "Thank you very much, I note the content  
 8 and am satisfied", or, "This is inadequate, I expect to  
 9 see X, Y and Z", neither of which I understand was the  
 10 response.  
 11 MS GROGAN: At paragraph 291 of your report, which is on  
 12 page 68 {BMER0000007/68}, you say that in your  
 13 experience, systems are generally demonstrated on site  
 14 using --  
 15 SIR MARTIN MOORE--BICK: Do you want this up on the screen?  
 16 MS GROGAN: No, it doesn't need to come up on the screen.  
 17 They're generally demonstrated on site using a cold  
 18 smoke test, and that's something you mentioned earlier  
 19 in your evidence, and that while that wouldn't fully  
 20 replicate a fire situation, it would be indicative, and  
 21 you say that this doesn't appear to have been suggested  
 22 or undertaken.  
 23 Can you explain to us exactly how it would work in  
 24 practice in a building such as Grenfell which was  
 25 occupied?

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1 A. A cold smoke test?  
 2 Q. Yes.  
 3 A. You would gain permission from one of the residents to  
 4 access their flat, and then you would set off a cold  
 5 smoke machine. It's a theatrical smoke machine,  
 6 generally smells of baby talcum powder, really, and it's  
 7 just thick white smoke which is discharged from a small  
 8 electrical canister, electrical device. Then you would  
 9 open the front door, that would activate the smoke  
 10 detection, and then you would observe what happened to  
 11 the smoke as the system did what it's supposed to do,  
 12 and it would give you an idea of the direction of flow  
 13 towards the grilles, into the shaft, away from the  
 14 staircase. It would in that particular case, if you  
 15 left it running long enough to fill the lobby, or you  
 16 could purposely fill the lobby with smoke, see what was  
 17 the situation in the dead ends that have been mentioned,  
 18 and just to give an overall impression of what the  
 19 system would do.  
 20 It doesn't reflect fully, obviously, the energised  
 21 smoke from a fire, but it will give you in fact, because  
 22 it's cooler smoke and not as buoyant, not as active, it  
 23 will give you a better indication of the way that the  
 24 system is pulling the smoke.  
 25 SIR MARTIN MOORE--BICK: Do you know what is the nature of

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1 the smoke that is generated?  
 2 A. Off the top of my head, no, it's just what they use in  
 3 theatres.  
 4 SIR MARTIN MOORE--BICK: I ask the question because I wonder  
 5 whether it contains very fine particulate matter, which  
 6 is sometimes the way in which smoke detectors operate,  
 7 I believe, and if so, where does all the particulate  
 8 matter end up?  
 9 A. You can breathe it, it's safe to be in and breathe,  
 10 because it's used in theatres, and then the smoke  
 11 detection would generally work on obscuration.  
 12 Ionisation smoke detectors are frowned upon because they  
 13 have a radioactive element in them.  
 14 SIR MARTIN MOORE--BICK: Right.  
 15 A. So as soon as that beam in the head is obscured by the  
 16 smoke, the white smoke in this case, then it will  
 17 activate.  
 18 SIR MARTIN MOORE--BICK: All right. Thank you.  
 19 A. As far as I'm aware, the particulates can't be large  
 20 because you don't walk away covered in white --  
 21 SIR MARTIN MOORE--BICK: That's rather what I was wondering,  
 22 particularly if you were going to fill the whole lobby  
 23 with smoke.  
 24 A. No, it gets extracted away. What is the best thing you  
 25 can do is do a hot smoke test, but obviously nobody

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1 wants to do one of those and set fire to it. You could  
 2 demonstrate a proposal in a derelict building by doing  
 3 a hot smoke test, and there are descriptions of doing  
 4 hot smoke tests, but I'd say they're never done these  
 5 days.  
 6 SIR MARTIN MOORE--BICK: Thank you.  
 7 MS GROGAN: If a cold smoke test had been carried out, would  
 8 one have been able to look at the different door-opening  
 9 scenarios that we discussed before the break to see what  
 10 the effect on the flow direction or the flow rate might  
 11 be?  
 12 A. Yes, I don't see why not. It would demonstrate what  
 13 would be happening with smoke, yes.  
 14 Q. And could it help to identify whether there were  
 15 breaches in compartmentation up through the dampers in  
 16 the shaft?  
 17 A. It would have been a good way to observe it. What has  
 18 been done in the past, if you suspect there is a failure  
 19 in compartmentation, you would put coloured smoke in  
 20 an area and see if you could see it on the other side of  
 21 the compartmentation. That's been done. That's to  
 22 demonstrate whether it's good or bad compartmentation.  
 23 Q. Mr Hanson said that he was not aware that carrying out  
 24 a cold smoke test is important in any system where there  
 25 are extended travel distances, although he accepted it

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1 could be a useful guide. Mr Partlow said that he would  
 2 have considered a cold smoke test to be dangerous in  
 3 an occupied building.  
 4 In light of that evidence, are you still of the view  
 5 that a cold smoke test should have been considered and  
 6 undertaken?  
 7 A. I think it would have been reasonable to consider it.  
 8 I have never heard of it being an issue in an occupied  
 9 building.  
 10 SIR MARTIN MOORE—BICK: I think the question is not whether  
 11 it would have been reasonable to do it, but whether it  
 12 was unreasonable not to have done it.  
 13 A. I think in this particular case it would have been  
 14 reasonable, because you had an existing situation,  
 15 existing layout and construction of which you did not  
 16 know all the intricacies and the voids, et cetera.  
 17 MS GROGAN: Did the failure to carry it out fall below the  
 18 standard that you would expect of a reasonable BCB? The  
 19 failure to request that it was carried out.  
 20 A. I think I'm going to say yes, in this particular case,  
 21 yes, particularly with an experienced BCB.  
 22 Q. One of Dr Lane's concerns about the system is that it  
 23 may have drawn smoke from the fire flat into the lobby.  
 24 Should that issue have been considered by the BCB?  
 25 A. Yes. However, I would say that in my view it's

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1 inevitable, if you extract from the lobby, you will at  
 2 some point draw smoke from the fire flat. The cold  
 3 smoke test would have indicated whether that was  
 4 excessive or not.  
 5 Q. Moving on to a topic that you have already mentioned,  
 6 which is the makeup air and the additional vent proposed  
 7 by Mr Hanson.  
 8 If we go to your report at page 68 {BMER0000007/68},  
 9 paragraphs 296 and 297, you say there that:  
 10 "296. I am not satisfied that the issue of the  
 11 makeup/input air in the ground floor entrance was  
 12 resolved.  
 13 "297. I have concluded that the commissioning report  
 14 did not relate to the system as installed. As such the  
 15 commissioning report should not have been accepted as  
 16 part of the evidence of compliance that resulted in the  
 17 BCB issuing a Building Regulations Completion  
 18 Certificate dated 7 July 2016."  
 19 This relates to, as you've identified, the  
 20 suggestion by Mr Hanson that an additional vent be added  
 21 after the commissioning had been undertaken.  
 22 A. Yes.  
 23 Q. And then no additional commissioning process was carried  
 24 out.  
 25 In those circumstances, where the BCB suggests

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1 a change to the system, what further commissioning would  
 2 you expect to have been undertaken after that?  
 3 A. The whole system, to see that everything had — any  
 4 additional connections to other parts that already had  
 5 been commissioned had been dealt with. It may not have  
 6 been to the depth of the original, but as the lower  
 7 floors had not had an in-depth commissioning undertaken,  
 8 because the available commissioning report only related  
 9 to the floors above the lower levels, there was no  
 10 overall commissioning report that related to the  
 11 building as completed.  
 12 Q. Can we go to Mr Hanson's evidence on this in the  
 13 transcript, which is {Day154/160:15}.  
 14 He is asked:  
 15 "Question: But do you want to just clarify exactly  
 16 what was being requested by building control?  
 17 "Answer: Yeah, yeah. Okay, so after our witnessing  
 18 of what I call the sequence testing [and he explains  
 19 what that is] ... there was a lobby there that, as  
 20 existing, didn't have any ventilation at all.  
 21 "So just a little bit of background to this.  
 22 Generally speaking, if I see something that could have  
 23 been improved in the building, I mention it to the  
 24 design team."  
 25 Then we see that again — sorry, I think the

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1 reference I've got for this is wrong, but what  
 2 Mr Hanson's evidence was, if I can summarise, is that  
 3 this wasn't something that he could legitimately ask for  
 4 as a matter of relevant to compliance, it was  
 5 an improvement that he was suggesting, {Day154/163:5–25}  
 6 and {Day154/164:1–19}.  
 7 In light of that evidence, is it still your view  
 8 that an additional commissioning process should have  
 9 been carried out?  
 10 A. Yes, because although it may have been a suggestion on  
 11 his part, it was adopted and therefore affected the  
 12 system as finalised.  
 13 Q. We have just two topics left.  
 14 The first one is the involvement of the London  
 15 Fire Brigade, again on the commissioning.  
 16 We've covered the consultation with the London  
 17 Fire Brigade in Module 1. These questions relate  
 18 specifically to the commissioning and testing.  
 19 If we could first go to the 2015 SCA guide at  
 20 page 56, which is {RBK00002932/56}.  
 21 Under 9.1, "Introduction", the text says:  
 22 "As smoke control systems are primarily life safety  
 23 systems and/or for assistance to the fire and rescue  
 24 service it is imperative that the smoke control system  
 25 is tested by the installer and then offered for witness

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1 testing to the authority having jurisdiction ... to  
 2 prove its compliance with the project specification and  
 3 the approved design criteria."

4 Authority having jurisdiction is defined on page 9  
 5 of that guidance {RBK00002932/9}, so if we go there, you  
 6 will see it's the first one:

7 "Organisation, office or individual responsible for  
 8 enforcing the requirements of legislation or standards,  
 9 or for approving equipment, materials, an installation,  
 10 or a procedure."

11 I just want to understand what your understanding of  
 12 that guidance is.

13 Is the authority having jurisdiction the LFB, the  
 14 BCB, both, neither?

15 A. Both, the BCB under the Building Regulations, and the  
 16 fire authority, ie the fire service, the London  
 17 Fire Brigade in this case, under the Fire Safety Order.  
 18 But you would do that -- you would invite the local  
 19 fire service as well, because it's familiarisation .  
 20 They're the ones that are going to turn up and fight the  
 21 fire . It's in your interests for them to know how that  
 22 particular system works.

23 Q. Does the fact that the LFB witnessed the commissioning  
 24 of the smoke system on 28 April 2016 have any bearing on  
 25 your views about RBKC's approach to the commissioning

1 process?

2 A. No.

3 Q. So would it have been reasonable for the BCB to rely on  
 4 the fact that the LFB had been there and hadn't raised  
 5 any objections?

6 A. I wouldn't have expected the LFB to make any comment on  
 7 their witnessing the commissioning unless it was their  
 8 opinion that there was something wrong with the system  
 9 from their operational point of view, or otherwise.

10 Q. The final topic that we have to cover is the gas works  
 11 in 2017, so we're moving on now from the refurbishment  
 12 to the gas works.

13 You covered these in your first report, and for the  
 14 transcript that reference is {BMER000004/156} onwards.

15 I want to look at the advice given by Mr Allen to  
 16 Janice Wray of the TMO about whether the gas works were  
 17 controllable under the Building Regulations.

18 So if we could go to {TMO10016546/3}, which is the  
 19 beginning of an email chain on the matter.

20 You see at the bottom there, Ms Wray tells Mr Allen  
 21 that National Grid is fitting a new riser to Grenfell,  
 22 and they've told her that Building Regulations approval  
 23 is not required. She asks him to confirm that this is  
 24 correct, and if we go further up the page we see that,  
 25 on the basis of the information she gives him, he agrees

1 that the work is a repair, providing that no changes to  
 2 fire safety implications are there, and so no  
 3 application would be required.

4 So he says:  
 5 "... I am content that this work would be regarded  
 6 as a repair ..."

7 With that caveat.

8 It's right that you agree with the initial advice he  
 9 gave, based on the information he received from  
 10 Janice Wray?

11 A. On the basis it was a repair of an existing  
 12 installation, yes.

13 Q. Going up to page 2 of the same document {TMO10016546/2},  
 14 we see another email. You can't see the date on that  
 15 page, because it's on page 1, but the date of the email  
 16 is 24 March 2020, so we've moved forward in time  
 17 a little. Ms Wray tells Mr Allen that the new riser has  
 18 been installed in a new location.

19 If we go up page 1 {TMO10016546/1}, we see an email  
 20 at the top on 3 April 2017 from Mr Allen, where he  
 21 advises that they do not usually take a Building  
 22 Regulation application for this type of work and he  
 23 would still regard it as a repair.

24 In your report, your view is that the installation  
 25 of a gas riser in a new location was controllable under

1 the Building Regulations.

2 A. Yes.

3 Q. And that's because the venting of the gas pipe duct into  
 4 the stair was detrimental to escape and affected the  
 5 integrity of the stair as a firefighting stair.

6 A. Yes, the riser had been moved in its position, it had  
 7 been installed within the stair. By virtue of it being  
 8 a gas riser, it would be in a position whereby it would  
 9 ventilate any leak that emanated from the steel conduit  
 10 that it was made of. The purpose, I understand, from  
 11 speaking to gas engineers prior to this Inquiry and  
 12 subsequently, is that they want people to be able to  
 13 smell the gas.

14 Positioning it in the only escape stair from a tall  
 15 building, by any stretch of the imagination, I don't  
 16 think would be acceptable. The fact that it is the  
 17 intention that it is for people to sniff the gas  
 18 basically underwrites the fact that it's expected that  
 19 it will at some stage leak, and to have a combustible  
 20 gas in the only escape route and the firefighting shaft  
 21 is very bad practice.

22 It is also governed, in my view, under the  
 23 Building Regulations in that this is an adverse effect  
 24 on the existing arrangements and is therefore a material  
 25 alteration.

1 Q. And potentially falls foul of the non-worsening  
2 principle?

3 A. It does, yes.

4 SIR MARTIN MOORE-BICK: So what you're saying is the  
5 Building Regulations, which impose legal requirements,  
6 would be inconsistent with putting the riser where it  
7 was relocated?

8 A. The building --

9 SIR MARTIN MOORE-BICK: Ultimately that's a question of law,  
10 I suppose, but ...

11 A. Well, in my view, the works as undertaken made the  
12 situation worse in respect of fire safety. That invoked  
13 the Building Regulations by a worsening of the  
14 situation. That meant that the building control body  
15 would require an application with proposals that would  
16 justify it where it was, if you like, this is after the  
17 event, because it was put in, and then you would look at  
18 the guidance in relation to gas installations in  
19 buildings, having regard to the fact this was an escape  
20 stair and that it was a firefighting shaft.

21 Now, ADB is not the most straightforward as regards  
22 the installation of gas in a stair, and it effectively  
23 says you can install it if you have it in a conduit,  
24 a gas pipe, that complies with the gas safety regs, X, Y  
25 and Z. It then says if you enclose it for aesthetic or

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1 other reasons, you have to vent it top and bottom.

2 Positioned in the stair, it was not ventilated top  
3 and bottom, and it was enclosed. It was only ventilated  
4 at the top, as I understand it, unless it was ventilated  
5 into another escape route, ie the escape route from the  
6 stair at the bottom.

7 But also, all the guidance in relation to  
8 a firefighting shaft says: you shall not have any  
9 service within that shaft that is not related to the  
10 functioning of the firefighting shaft.

11 If you enclose the gas riser, you effectively, in  
12 practice or otherwise, take it out of the firefighting  
13 shaft, but you would have to take it out by construction  
14 that was imperforate and attained two hours  
15 fire resistance.

16 Now, the TMO was informed by the gas undertaker that  
17 they were going to enclose it. When I went down to  
18 site, it was partially enclosed, because I think the  
19 fire occurred in the interim, but the protection was  
20 actually on the firefighting shaft side, on the stair  
21 side, where you would not expect the attack of fire to  
22 come from. It should have been, in my view, on the  
23 inside of the stud that was separating the gas riser  
24 from the stair.

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

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1 MS GROGAN: So, in effect, to summarise your view, what  
2 Mr Allen ought to have done was say, "This is  
3 controllable under the Building Regulations and  
4 therefore I need to see justification as to why these  
5 proposals are compliant or no worse"?

6 A. Yes. I mean, I think one of the first things he should  
7 have said to her, "Yes, it is controllable and I can  
8 tell you now it won't be acceptable if you're siting it  
9 in a firefighting shaft, or it has been sited in  
10 a firefighting shaft".

11 Then I would imagine -- and this is just to  
12 illustrate it -- she would have said, "But it's already  
13 in there", and then I think Mr Allen should have been  
14 saying words to the effect, "Well, in that basis, if  
15 you're not going to move it, then we expect it to be  
16 separated to the required two-hour standard from the  
17 stair".

18 Q. The Inquiry's gas expert, Mr Hancox, gave evidence that  
19 Mr Allen's advice as contained in that email was  
20 a common position taken by BCBs, and the reference for  
21 that is {Day161/21:18}.

22 Is this an issue, then, on which there might be  
23 a range of reasonable expert opinion from the  
24 building control side of things?

25 A. I don't know if Mr Hancox is actually referring to

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1 buildings of this height that contain firefighting  
2 shafts, but a reasonably competent building control  
3 surveyor should have known that a firefighting shaft, by  
4 virtue of the recommended standard, shouldn't have  
5 anything in it that did not support the functioning of  
6 the firefighting shaft.

7 Q. If we perhaps just go to his evidence so you can see  
8 what he was asked and what his response was. It's, as  
9 I said, {Day161/21:18}:

10 "Question: In 2016, would a gas engineer have  
11 expected their work on a replacement riser to be  
12 controllable work under the Building Regulations and  
13 subject to building control approval?

14 "Answer: No."

15 A. Does he mean by replacement like-for-like, ie same  
16 service, in the same position?

17 Q. We can check that to see the basis on which the question  
18 was put to him.

19 Are you aware that this issue -- so the works that  
20 we're actually looking at, so the installation in  
21 a stair in a tall building -- would have prompted  
22 a different range of responses from different BCBs?

23 A. I know it should have prompted: it is controllable.  
24 I suspect there are some that would not have had that  
25 reaction on the basis that it is permitted, if you like,

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1 under the guidance within ADB, subject to certain  
2 conditions. But where you have a firefighting shaft,  
3 you have that additional consideration.

4 It is an issue, this aspect of venting gas supplies.  
5 Just by way of illustration, I was carrying out a fire  
6 risk assessment in a conversion from the 1980s of  
7 a rather large, in its day very grand house that had  
8 been converted into small flats in the 1970s, and the  
9 time had come to replace the gas supply. One staircase,  
10 the gas engineer, when I got the place, was in fact  
11 venting the gas supply into the main entrance hall in  
12 the ground floor, taking the pipes then into a riser and  
13 up to the top, venting at the top, and venting into the  
14 hall below, which was obviously, in my view — well, in  
15 my view, was unacceptable and so the arrangement was  
16 changed.

17 But I think there is a belief that if an accredited  
18 gas contractor undertakes the work, everything will be  
19 fine. People are, quite rightly, somewhat scared of  
20 gas, because it goes bang on occasion, but in the  
21 context of fire safety under the Building Regulations,  
22 it is a recognised phenomena, we know it occurs, we know  
23 it goes into stairs, we have standards that go with  
24 that. If you deviate from those standards or you want  
25 to enclose it aesthetically, there are further

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1 standards, but there are additional standards that  
2 relate to a firefighting shaft.  
3 Q. So would it have been reasonable for the BCB to take any  
4 comfort from the fact that the gas transporter, in this  
5 case Cadent, was ultimately responsible for those works?  
6 A. Not on the basis that they were not compliant with the  
7 standard required at the time. The actual installation  
8 of the gas may have been perfectly okay. Its location  
9 within the firefighting shaft was unacceptable. Did  
10 Cadent know it was a firefighting shaft? I don't know.  
11 Q. You say you considered that a building notice would have  
12 been reasonable but that some authorities would have  
13 required a full plans application.  
14 A. Yes, the reason for that is that the Building  
15 Regulations and the RRO legislation require that where  
16 a building is or will be subject on completion to the  
17 RRO, then a full plans application is the only route  
18 under the Building Regulations, and that is to ensure  
19 that the necessary consultation takes place in quite  
20 a formal manner. However, that requires quite  
21 a process.  
22 A building notice with a simple description would  
23 have achieved the same function, because in my opinion  
24 the answer would have been, "No, you can't put it  
25 there". So effectively there was no need to consult the

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1 fire service, because the answer from the building regs  
2 aspect, the BCB enforces the building regs, was, "No, it  
3 shouldn't be there".

4 But I can quite understand any other building  
5 control body saying, "No, we require a full plans  
6 application".

7 Q. And strictly as a matter of the regulations, because  
8 this was a building that would be subject to the RRO, it  
9 should have been a full plans application?

10 A. Yes, in the context it was adversely affecting the  
11 existing fire safety arrangements, yes, and it was  
12 a material alteration, yes.

13 MS GROGAN: Thank you, Ms Menzies, that's the end of my  
14 prepared questions for you, so now would be the time for  
15 a break to see if anything else has come in.

16 SIR MARTIN MOORE—BICK: Right. Well, as you already know,  
17 I'm sure, Ms Menzies, we have to have a break now to  
18 enable counsel to check that nothing has been left out,  
19 and to enable others who are not present in the room to  
20 suggest questions that perhaps we should put to you.

21 So we'll break now. We'll come back at 12.25, and  
22 we'll see if there are any further questions. All  
23 right?

24 THE WITNESS: All right, thank you.

25 SIR MARTIN MOORE—BICK: Thank you very much. Would you like

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1 to go with the usher.

2 (Pause)

3 All right, 12.25, please.

4 MS GROGAN: Thank you.

5 (12.12 pm)

6 (A short break)

7 (12.25 pm)

8 SIR MARTIN MOORE—BICK: Right. Well, let's see if there are  
9 any more questions, shall we?

10 Yes, Ms Grogan.

11 MS GROGAN: Thank you. We do not think there are any  
12 further questions that we need to ask at this stage.

13 SIR MARTIN MOORE—BICK: Right. Good. All right, thank you  
14 very much.

15 Well, Ms Menzies, it really just remains for me to  
16 thank you very much yet again on behalf of the panel and  
17 the Inquiry as a whole for all the work you have put in  
18 to your expert reports, and of course coming here today  
19 and yesterday to give us your oral evidence. I need  
20 hardly say we're very grateful to you.

21 THE WITNESS: It's been a pleasure.

22 SIR MARTIN MOORE—BICK: It's been very helpful and very  
23 interesting, and we're going to profit greatly from what  
24 you have told us.

25 THE WITNESS: I hope so.

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1 SIR MARTIN MOORE–BICK: Thank you very much indeed.  
 2 THE WITNESS: Thank you. Bye bye.  
 3 SIR MARTIN MOORE–BICK: You're free to go, of course.  
 4 Thank you.  
 5 (The witness withdrew)  
 6 SIR MARTIN MOORE–BICK: Thank you very much, Ms Grogan.  
 7 That was our last witness for the day, so we're going to  
 8 call a halt at that stage.  
 9 That will complete the Inquiry's hearings for this  
 10 month. We shall not be sitting during August, but we  
 11 shall resume at 10 o'clock on 6 September.  
 12 MS GRANGE: Thank you.  
 13 SIR MARTIN MOORE–BICK: Thank you very much.  
 14 (12.30 pm)  
 15 (The hearing adjourned until 10 am  
 16 on Monday, 6 September 2021)

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