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Tuesday, 5 March 2013.

(10.00 am)

(Proceedings delayed)

(10.47 am)

Housekeeping

THE CORONER: Yes, good morning everybody.

MR MAXWELL-SCOTT: Apologies for the delay this morning,

madam, we are now ready to proceed with the evidence of

David Crowder. The plan is that I should ask him some

questions about the issues touched upon in his

supplementary report, and then show him one additional

photograph that he may not have seen before to do with

the suspended ceiling, and if we could then have a break

so that others can digest what he's said and be better

placed to formulate their questions more efficiently,

that would be helpful, I think.

THE CORONER: All right. Well, that's helpful. If

everybody could indicate to me roughly what sort of

length of break would be helpful, that would help me,

thank you. Yes, thank you very much.

Mr Crowder, would you like to come forward?

Yes, could we have the jury in please, thank you.

Do help yourself to a glass of water. Mr Crowder,

when you came before you swore an oath to tell the

truth, and you're still bound by that oath, thank you.

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(In the presence of the Jury)

THE CORONER: Members of the jury, good morning. My apologies for having kept you waiting so long. We've been trying to make sure that the evidence which we're going to be dealing with this morning is in such a state, as it were, that we can present it to you in a uncomplicated and as smooth a way as possible, and we've needed to sort out one or two IT issues as part of that.

You probably remember that at the very beginning I explained to you that we would be having evidence from some witnesses of fact, that is people who can tell us about events, what has actually happened, and of course we've had a great deal of that evidence, and also that we would be having opinion evidence. For the rest of this week we're going to be having largely expert -- that is opinion -- evidence.

We're going to begin this morning with the evidence of Mr Crowder. You remember that Mr Crowder came before. Mr Crowder is from the Building Research Establishment and you'll remember that he gave evidence about the spread of fire and smoke from flat 65 into flat 79 and the spread into flat 81. Of course, it was Mr Crowder who took us through the reconstruction of the fire which had been undertaken at BRE.

1           So Mr Crowder's going to be dealing with some  
2           related matters this morning. We're going to have one  
3           or two breaks during the course of the morning, but  
4           I hope that on each occasion I'll be able to give you  
5           a rough idea of how long it is that we'll be having  
6           a break for so that you know where you are.

7           It's good to see the sun shining. If anyone in the  
8           room is finding that the sun is giving them  
9           difficulties, then I hope that you'll say. Members of  
10          the jury, for example, if it's a problem with not being  
11          able to see monitors or anything of that sort, then  
12          please do say and we can close the curtains.

13                 All right? Thank you very much.

14                 Yes, Mr Maxwell-Scott, thank you.

15                         DAVID CROWDER (recalled)

16                                 Questions by MR MAXWELL-SCOTT

17   MR MAXWELL-SCOTT: Good morning, Mr Crowder.

18   A. Good morning.

19   Q. Thank you for coming back to help us. When you gave  
20          evidence a few weeks ago, we asked you about a very wide  
21          range of matters, and today I'm going to ask you about  
22          two particular issues, one of which is very short, and  
23          I'll deal with it at the end and it relates to  
24          a photograph and the inferences that may be drawn from  
25          it.

1           The larger issue is one that you touched on in your  
2           earlier evidence but which we would seek you to provide  
3           some further explanation and clarification on. It  
4           relates to the composite panels underneath the bedroom  
5           windows. The coroner asked you to answer in writing  
6           some questions in relation to this issue. Is it right  
7           that you did that by way of a letter dated 1 March 2013?

8   A. Yes, that's correct.

9   Q. In essence, is it right that what you were asked to do  
10       was to look on the one hand at the composite panels as  
11       they were at the time of the fire and on the other hand  
12       at a hypothetical set of panels which had different  
13       characteristics and then to comment on a range of ways  
14       in which the spread of fire and smoke might have been  
15       different if the hypothetical panels had been installed  
16       rather than the actual panels?

17   A. Yes, that's correct.

18   Q. The questions that you were asked assumed that the  
19       hypothetical panels had the following qualities:  
20       firstly, that they were fire-resisting to 30 minutes;  
21       secondly, that they had a surface spread of flame  
22       performance of class 0; and thirdly, that the internal  
23       surface had a spread of flame class 3. Is that right?

24   A. Yes, that's correct.

25   Q. I think that for the purpose --

1 THE CORONER: Sorry, can I just stop you there, when you  
2 talk about the internal surface, can you just clarify  
3 which surface you're talking about?

4 A. Yes, the class 0 surface refers to the surface that is  
5 exposed to the external face of the building, so exposed  
6 to weather conditions and so on, and the internal  
7 surface is the surface that would have been exposed to  
8 the bedrooms or indeed other accommodation areas within  
9 the flats.

10 THE CORONER: Thank you.

11 MR MAXWELL-SCOTT: Is it right that your tests showed that  
12 the actual panels did in fact have an internal spread of  
13 flame performance of class 3?

14 A. Well, the test showed that the panels had a surface  
15 spread of flame performance of class 3, which  
16 corresponds with the -- with the requirement I've been  
17 asked to consider of class 3.

18 Q. So for today's purposes, when we are seeking to compare  
19 the actual panels in place on the day of the fire with  
20 hypothetical panels, we'll focus on two features: (1)  
21 fire resistance to 30 minutes; and (2) surface spread of  
22 flame performance of class 0?

23 A. Yes.

24 Q. Before asking you your views on that, I think it would  
25 be helpful to refresh our memory on what these different

1 terms mean. If you look at the glossary at tab 22 of  
2 the jury bundle, please. (Handed)

3 On the first page of tab 22 at the bottom we see  
4 a definition of class 0.

5 A. Yes.

6 Q. Does this relate to surface spread of flame performance?

7 A. Yes, it does.

8 Q. In which case, before going to it in more detail, let's  
9 go to page 3 for a definition or explanation of surface  
10 spread of flame. The definition that we see there is:

11 "The propensity for a material or product to allow  
12 the spread of flame or fire across its surface."

13 A. Yes.

14 Q. So bearing that in mind, we then go back to class 0 on  
15 page 1. We see that it is a product performance  
16 classification for, amongst other things, wall linings,  
17 it's the highest national product performance  
18 classification for lining materials, and it relates to  
19 a concept of limited combustibility; is that right?

20 A. Yes.

21 Q. Then if one looks at what is meant by "limited  
22 combustibility", I'll take you to page 2, where at the  
23 top we see a definition of "combustible" --

24 A. Yeah.

25 Q. -- which, in short, means capable of burning?

1 A. Yes.

2 Q. Note that "flammable" and "limited combustibility" are  
3 both subsets of combustible.

4 A. Yes.

5 Q. At its most basic, something is either capable of  
6 burning and combustible, or not capable of burning and  
7 non-combustible?

8 A. Yes, that's correct.

9 Q. On page 3 of this glossary, we have a definition of  
10 "non-combustible":  
11 "Will not burn. This is the highest level of  
12 reaction to fire performance."  
13 Then above that, "Limited combustibility":  
14 "Capable of burning but not liable to burn unless  
15 under an imposed heat source."

16 A. Yes, that's correct.

17 Q. So when we are thinking about something with  
18 characteristics of class 0, we are talking about  
19 something which is capable of burning, but is not liable  
20 to burn unless under an imposed heat source, and we are  
21 looking at its ability to allow or prevent the spread of  
22 flame or fire across its surface, is that right?

23 A. Yes, that's correct. Can I just elaborate briefly?

24 Q. Please do.

25 A. In the context of a composite product, it's possible

1 that you might have a combustible component to that  
2 product somewhere within a number of layers. The tests  
3 for class 0 relate specifically to the surface. So the  
4 surface should be of limited combustibility, and there  
5 are test criteria that they use to determine that. But  
6 it is possible that you might have a combustible layer  
7 somewhere within that product, but that it is protected  
8 to a sufficient extent by that layer that's of limited  
9 combustibility, or that surface that's of limited  
10 combustibility.

11 Q. Then the other definition I wanted to draw to your  
12 attention and that of the members of the jury is on  
13 page 2, "fire resistance". We're told that it needs to  
14 be distinguished from surface spread of flame, which is  
15 what we've been talking about up until now, and the  
16 explanation given here is:

17 "The ability of the material or product to resist  
18 the passage of fire from one side to another, ie acting  
19 as barrier to fire spread."

20 A. Yes.

21 Q. Having got those explanations out of the way, what I'm  
22 going to ask you is firstly about the differences, if  
23 any, in your opinion, between the actual panels used on  
24 the bedrooms and hypothetical panels that were both  
25 fire-resisting to 30 minutes and class 0. That is what



1           you addressed in your letter of 1 March, isn't it?

2    A.   Yes, that's correct.

3    Q.   The first question that you were asked was:

4           "Did the presence of the composite panels in flat 65

5           have any impact on the fire development within flat 65

6           beyond the fact that they formed part of the material

7           that burned within flat 65?"

8    A.   Yes.

9    Q.   As a general principle, is it right that a panel or

10           anything else that is effectively acting as a wall, once

11           it has burnt away, then the space that is created

12           provides a source of ventilation?

13   A.   Yes, that's correct.

14   Q.   You comment on that in more detail in your letter, but

15           is the short answer to the question that the rate of

16           fire growth within flat 65 would not have changed

17           significantly, even if there were increased ventilation?

18   A.   Yes, that's correct.

19   Q.   So in other words, in respect of this question, the

20           development of fire within flat 65, there is no relevant

21           difference between the panels that were actually used

22           and the hypothetical panels that we asked you about?

23   A.   Not in terms of fire development, no.

24   Q.   Then the second question that you were asked to consider

25           was whether the presence of the composite panels in

1 flat 65 had any impact on the speed of fire spread to  
2 flat 79 and/or the growth of the fire within flat 79.

3 A. Yes, that's correct.

4 Q. Was the short answer to that question that the presence  
5 of the composite panels in flat 65 would not have  
6 affected the growth or maximum burning rate of the fire  
7 within flat 79?

8 A. That's correct.

9 Q. The third question that you were asked was:

10 "Did the presence of the composite panels in flat 79  
11 have any impact on the speed that fire spread to flat 79  
12 and/or the growth of the fire within flat 79, beyond the  
13 fact that they formed part of the material that burned  
14 within flat 79?"

15 A. Yes, that was the question.

16 Q. You were asked to consider that question by assuming  
17 hypothetical panels with fire-resisting qualities to  
18 30 minutes and surface spread of flame properties of  
19 class 0. Can you explain the differences, if any, that  
20 would arise firstly just if the panels that we are  
21 comparing with were class 0?

22 A. Okay. So the -- compared with a panel that had  
23 a surface spread of flame class of class 0, the  
24 composite panels that were present provided a surface  
25 which was liable to ignite under the effects of the

1 flaming that was emerging from flat 65 below, and --  
2 well, it's slightly interrelated with fire resistance,  
3 but those panels were ignited and whether therefore  
4 liable to burn through.

5 Q. So if the composite panels in place had been class 0,  
6 what effect, in your opinion, would that have had on  
7 whether, and if so when, they would have ignited?

8 A. If the panels had been class 0, then I would -- I would  
9 have expected them maybe to char or blister to a limited  
10 extent under the effect of the flames from flat 65.  
11 I would not have expected them to ignite and burn in  
12 their own right. So if flaming ceased or was even  
13 intermittent from flat 65, I would not have expected  
14 sustained flaming at those panels.

15 Q. That was your answer in relation to if the panels had  
16 been class 0, just looking solely at class 0. If one  
17 assumes also that they were fire-resisting to  
18 30 minutes, what difference would that have made to what  
19 happened on the day of the fire?

20 A. So if the panels were both class 0 and fire-resisting,  
21 then -- in the first instance the surface would not have  
22 ignited, but even under the sustained imposed heat that  
23 they were being subjected to as a result of the flames  
24 that were emitting from flat 65, then those panels  
25 should have been remained in place for potentially up to

1 30 minutes. I've no reason to believe that the flaming  
2 from flat 65 was any more severe than the conditions to  
3 which these panels might be exposed in a standard test.

4 Therefore, at least 30 minutes would be reasonable  
5 to expect, and just to elaborate, the 30-minute  
6 requirement that relates to the fire resistance means  
7 that there are -- there are requirements relating to  
8 insulation and integrity and so on, but in basic terms  
9 I would not expect the panel to distort or pull away  
10 from the frame within that 30-minute period and provide  
11 a gap for any flames that were up the outside of the  
12 building to get in through the frames to the interior.

13 Q. When you gave evidence on the previous occasion, you  
14 showed us extracts from the reconstruction video and you  
15 told us about the fact that the actual panels were  
16 alight within about a minute and a half of ignition and  
17 had burnt through within about four and a half minutes  
18 of ignition --

19 A. Yes.

20 Q. -- whereas, if they had been fire-resisting to  
21 30 minutes, does it follow that they would not have been  
22 expected to burn through for 30 minutes?

23 A. Yes, that's correct. There is a caveat to that which  
24 relates to the aluminium frames, but I don't know  
25 whether you want to deal with that now or later.

1 Q. That is what I was coming to next. Is it right that  
2 during the course of the fire the fact that the panels  
3 burnt through enabled flames to enter the bedroom of  
4 flat 79 and to start fires there and there was also the  
5 additional source of ventilation provided by the fact  
6 the panels had burnt through?

7 A. Yes.

8 Q. As you said, if a panel is fire-resisting to 30 minutes,  
9 you wouldn't expect it to burn through before the  
10 30 minutes is up, but these panels were held in  
11 aluminium frames, weren't they?

12 A. Yes, they were.

13 Q. That creates, does it, the possibility that the  
14 aluminium frames become the weaker part of that  
15 arrangement?

16 A. Yes, the aluminium frames, or indeed the glazing, either  
17 of these, I think, actually did fail within 30 minutes  
18 of the start of the reconstruction, and therefore they  
19 were the weak point in that entire system and would have  
20 provided a route for the fire spread.

21 Q. So if the system, as you're describing it, is comprised,  
22 is it, in this instance, of firstly the composite  
23 panels, secondly the aluminium frames and thirdly the  
24 glazing --

25 A. Yes.

1 Q. -- and you told us on the previous occasion some points  
2 about the glazing.

3 Firstly you told us the results of the  
4 reconstruction, where we saw that one glass pane failed  
5 within just over four minutes of ignition, the first  
6 window failed -- that's a double-glazed window -- after  
7 about five and a half minutes, and the final window  
8 failed after just over nine minutes from ignition.

9 So you told us those results, and you also told us  
10 about the unpredictability of glazing when exposed to  
11 fire.

12 A. Yes.

13 Q. But we didn't get into the same detail in relation to  
14 the aluminium frames which, as we are now discussing, is  
15 the third part of this system.

16 A. Yes.

17 Q. Can you give us your opinion on what might happen to the  
18 aluminium frames if they were exposed to fire and heat  
19 and had within them composite panels that were  
20 fire-resisting to 30 minutes?

21 A. Okay. So in the case where you have aluminium frames  
22 with the composite panels that were fire-resisting to  
23 30 minutes, I would expect that -- the aluminium  
24 subjected to the heat -- aluminium starts to soften,  
25 I think, around the 500, 600 degree mark from memory,

1 possibly 650. Those frames would soften, they would  
2 start to distort, depending on the temperatures they  
3 might actually start to melt, and they would provide  
4 a gap in that system, and assuming the glazing hadn't  
5 already failed, and it's possible that the glazing would  
6 also fail, but between the aluminium and the glazing,  
7 there would be gaps in the system through which heat  
8 could pass from the flames on the outside of the  
9 building to the interior.

10           However, neither aluminium nor glazing would be  
11 expected to actually introduce a flame into the room in  
12 their own right. So as we had the discussion last time  
13 about the unpredictability of glazing, there's  
14 an expectation that glazing will fail when significant  
15 quantities of flame are emitting from a floor below on  
16 the building, but even though that glazing might fail,  
17 it is not expected to actually introduce a flame into  
18 the room on the relevant floor. It provides a gap, but  
19 it doesn't actually introduce a route by which fire can  
20 gradually take hold of materials and introduce burning  
21 into the contents of the room.

22 Q. I'll come back to that point in a moment, but is it  
23 right that even if the composite panels had been  
24 fire-resisting to 30 minutes and had been class 0, they  
25 would have potentially slowed down the rate at which

1 fire entered flat 79 and started the fire within

2 flat 79, but they would not have prevented it?

3 A. Yes, that's correct, there would have been a delay, but  
4 it wouldn't have prevented the process from occurring,  
5 so at some stage fire spread could have occurred but  
6 there would have been some time delay associated with  
7 not having a -- a route of fuel going from one point to  
8 the other.

9 Q. We'll come back to a question of how that delay might  
10 work, but at a broader level, at best, they would have  
11 provided a delay, because eventually the fire would have  
12 started in flat 79 unless the London Fire Brigade had  
13 succeeded in putting out the source of the fire before  
14 then --

15 A. Yes.

16 Q. -- which is a matter outside your evidence.

17 A. Yes, that's correct.

18 Q. Once the fire started within flat 79, unless checked, is  
19 it right that it would ultimately have created  
20 conditions in flat 79 that were not survivable?

21 A. Yes, that's correct.

22 Q. So the potential relevance of the difference between the  
23 actual panels used and hypothetical panels which are  
24 class 0 and fire-resisting to 30 minutes relates to the  
25 potential for some form of delay in that process within



1 flat 79 starting; is that right?

2 A. Yes, that's correct.

3 Q. Can I then ask you to try to distinguish between on the  
4 one hand the delay if any that would arise if the panels  
5 that had been chosen to be used were both class 0 and  
6 fire-resistant to 30 minutes, and on the other hand if  
7 the panels chosen to be used were class 0 but were not  
8 fire-resistant.

9 A. Okay. This is going to be a slightly involved answer,  
10 because it relates to the way in which products are  
11 tested according to British Standard 476: Part 7.

12 If I just first start by explaining the actual test  
13 that's carried out, and it might be useful to have  
14 a figure from one of the reports, just so that it can be  
15 seen by the jury, in the last appendix of the computer  
16 modelling reconstruction report.

17 Q. Do you have a page number?

18 A. 249, maybe. That's where the appendices start, if you  
19 just carry on from that. Yes, one of these tests.  
20 Figure 3 you can see the apparatus for the British  
21 Standard 476: Part 7 test, and what that involves is  
22 a test sample which measures approximately, I think,  
23 88 centimetres by about 27 centimetres, which is exposed  
24 to a radiant heat source. So to the right of that  
25 image, it's a sintered concrete surface, so it's

1 effectively aerated concrete through which gasses can  
2 pass, and we pump in propane, I think, and air through  
3 the back which is mixed, and the combustion process  
4 occurs within that surface so it only exposes the test  
5 sample, which is to the left of that image, to radiant  
6 heat.

7 The performance of that sample, and the measurement  
8 of the performance of that sample s necessarily limited  
9 to the size of that sample. There are criteria relating  
10 to the speed at which the flames which you can see  
11 spread across the surface from one side to the other.  
12 There are also criteria relating to the delamination of  
13 the sample.

14 So in order to provide a valid test result, it's  
15 required that, in effect, some level of the sample  
16 remains and that's given in more detail in the standard.  
17 But regardless of what standard you achieve, that is  
18 necessarily limited to the size of that sample.

19 Now, if we assume that the panel had to be  
20 fire-resisting in addition to passing this test, then  
21 there are requirements relating to that product  
22 remaining in place across, in the fire resistance test,  
23 a span of three metres. The tests, for a fire  
24 resistance test, are carried out in a test assembly,  
25 where you have a three metre by three metre wall, and

1 the system that is installed into that wall has to  
2 provide integrity and insulation for 30, 60, 90,  
3 whatever number of minutes we're looking at.

4         However, if you take away that requirement then it's  
5 entirely possible that a product would pass the surface  
6 spread of flame test and retain the required amount of  
7 rigidity, for want of a better word, within that sample,  
8 but once you look at a larger area, then it's possible  
9 that you might have a surface that is class 0 and is not  
10 sustaining flaming in the way that we have already  
11 discussed, but that actually you'll get deformation of  
12 that product within the larger assembly and I think the  
13 panels in Lakanal were something of three and a half  
14 metres by a metre, so closer to the sort of fire  
15 resistance in its longest span.

16         What that means is, had you had a panel that had  
17 a class 0 performance for its surface, but was not  
18 fire-resisting, I would not have expected the surface to  
19 ignite, but it's entirely possible that the panel as  
20 a whole would have deformed within the aluminium frame,  
21 and there's also the possibility of the aluminium frame  
22 itself deforming, but the panel itself could have  
23 deformed and could have fallen away as a result of that  
24 deformation and coming loose from the frame. Therefore  
25 again, the barrier to fire spread, so that fire

1 resistance aspect, would have gone, because it wasn't  
2 designed in.

3 However, I wouldn't expect the surface to have  
4 ignited and sustained flaming in the absence of flame  
5 from flat 65, and so there would still have been some  
6 element of a time delay associated with a product not  
7 igniting, albeit falling away and no longer providing  
8 an actual barrier to fire spread.

9 Does that answer the question? I know it's a lot to  
10 take in.

11 THE CORONER: It is a lot to take in. I wonder if you could  
12 perhaps in a just a couple of sentences give us  
13 a summary answer. You've helpfully given us the  
14 background to it, and I appreciate it's a more  
15 complicated answer than you would perhaps want to  
16 summarise, but I think it would be helpful if you could  
17 just summarise it in a couple of sentences.

18 A. Okay. At its simplest, a composite panel that was  
19 class 0 but was not fire-resisting, I would not expect  
20 it to have ignited and sustained flaming in the way that  
21 the composite panels did, but it would be entirely  
22 reasonable for that panel not to be expected to provide  
23 a barrier to fire spread from one side to its other, and  
24 that relates back quite nicely to the glossary,  
25 actually, in that it shouldn't have burnt if it was

1 class 0, but it wouldn't necessarily maintain that  
2 barrier across the window facade.

3 MR MAXWELL-SCOTT: It can't burn through until it ignites;  
4 is that right?

5 A. Strictly speaking, yes. Depending on the design of the  
6 panel, it's possible that once it starts to undergo  
7 deformation, you might expose an edge that is  
8 combustible, but that's going into an awful lot of  
9 uncertainties and -- because, as I mentioned earlier,  
10 you might have been able to produce a window panel that  
11 was class 0 by virtue of the two -- or specifically the  
12 outer surface being manufactured from some sort of  
13 product or material that was class 0, but you might  
14 within that panel still have had a combustible  
15 insulation core, and so that combustible insulation  
16 core, over the vast majority of the surface, would still  
17 have been protected by the class 0 surface, but if  
18 an edge becomes exposed to flaming that edge might start  
19 to ignite, although I suppose for that edge to ignite  
20 I would have expected it to have been deforming  
21 outwards, if that makes sense.

22 So for the edge to become directly exposed to the  
23 flames from flat 65 below, I would expect the panel to  
24 have fallen outwards and the flame that would start on  
25 the edge of that panel would probably still remain on

1 the outside of the envelope of the building and the  
2 perimeter of the room.

3 Q. In the answer that you gave in writing when you were  
4 asked to assume that hypothetical panels were both  
5 class 0 and fire-resisting to 30 minutes, you said that  
6 the composite panels, by contrast, used at the time of  
7 the fire, because of their surface spread of flame  
8 properties, were liable to ignite when subjected to  
9 flames -- is that right --

10 A. Yes.

11 Q. -- and because of their lack of fire-resisting  
12 properties, once fire was established on the surface of  
13 the composite panel on the outside, it was liable to  
14 burn through?

15 A. Yes.

16 Q. In terms of what happened in the fire on 3 July itself,  
17 that provided a source of flames within flat 79; is that  
18 right?

19 A. Yes, that's correct.

20 Q. The fact that the panels burnt through contributed to  
21 the ventilation within flat 79?

22 A. Yes, also correct.

23 Q. If one thinks about the arrangement as a whole of the  
24 three parts of composite panels, aluminium frames and  
25 glazing, what if anything is added to the fire safety of

1 the arrangement as a whole by the composite panels being  
2 fire-resistant to 30 minutes in addition to being  
3 class 0? Do you understand that?

4 A. Yes, I understand the question. So had they been  
5 30-minute fire-resisting, in addition to being class 0,  
6 then the panel itself would have been expected to remain  
7 in place and not introduce any significant -- well, even  
8 a hot surface or a flame within the flat, within that  
9 30-minute period, as it was being exposed to flaming  
10 from flat 65, although that's not to say that there  
11 wouldn't have been deformation of the aluminium and the  
12 glazing, and so on, during that time, but the panel  
13 itself should not, and I would think it would not, have  
14 introduced flaming into the inside of flat 79.

15 Q. Is it right that that would not rule out the possibility  
16 of the aluminium frame deforming in under 30 minutes,  
17 such as to allow flames to enter the flat?

18 A. Well, the aluminium frame would deform and no longer  
19 provide a barrier to the flames entering, but again, the  
20 flames -- aluminium itself won't sustain flaming, it's  
21 effectively a non-combustible material, so the barrier  
22 would be removed, but it wouldn't introduce a source of  
23 flaming within the room.

24 Q. Is it right that the position with the glazing is the  
25 same?

1 A. Yes.

2 Q. It could fail and remove that barrier to flames entering  
3 but it wouldn't be a source of flames itself?

4 A. Yes, that's correct.

5 Q. I'm then going to move on to ask you about the next  
6 question you were asked on this topic, which relates to  
7 the fact that we have heard evidence and seen  
8 photographs indicating that fires started in flats 37  
9 and 53 at around 1648 hours on 3 July --

10 A. Yes.

11 Q. -- and that they appear to have been started because  
12 debris fell from higher up the building and entered  
13 those flats through the windows.

14 A. Yes.

15 Q. You were asked whether it was possible to express a view  
16 on whether or not the debris that ignited those fires in  
17 flats 37 and 53 was or included the composite panels  
18 from flats 65 and 79.

19 A. Yes, that's the question that was asked.

20 Q. Your answer, is it right, is this: first point, that  
21 there's no forensic evidence which helps us to establish  
22 what fell into those flats or what started those fires?

23 A. That's correct.

24 Q. So working then on inferences about your knowledge of  
25 the fires in flats 65 and 79, is it your view that the



1 falling burning debris was likely to have included both  
2 material from the composite panels and other combustible  
3 materials from flat 65 or 79?

4 A. Yes.

5 Q. Then narrowing it down, because of the time when the  
6 fires started in flats 37 and 53, is it more likely that  
7 the falling burning material at around that time would  
8 have come from flat 79 --

9 A. Yes, that's correct.

10 Q. -- than from flat 65?

11 A. Yes.

12 Q. So to summarise, shortly before 16.48, there would have  
13 been falling burning material from flat 79 --

14 A. Yes.

15 Q. -- comprising both material from the composite panels  
16 and some contents of flat 79 --

17 A. Yes.

18 Q. -- but precisely what fell into flats 37 or 53, or what  
19 started the fires in those flats, one cannot establish  
20 from the scientific evidence available to us?

21 A. That's correct, that cannot be established.

22 Q. Then, finally on this issue, you were asked whether it  
23 was possible to express a view on whether the ability of  
24 debris within flat 65 and 79 to be blown out of those  
25 flats and fall into the flats below would have been

1 reduced if the composite panels had been different to  
2 those that were actually in place at the time of the  
3 fire. You were asked to focus on the possibility of  
4 hypothetical panels that were both fire-resistant to  
5 30 minutes and class 0.

6 A. Yes.

7 Q. Is it right that, in your view, if the composite panels  
8 had been both fire-resisting to 30 minutes, and class 0,  
9 they would have acted as a physical barrier to burning  
10 debris within flat 79 and would have significantly  
11 reduced the amount of debris that would have blown out  
12 of that flat?

13 A. Yes, that's correct.

14 Q. What if the composite panels had been class 0 but not  
15 fire-resisting to 30 minutes? Can you help us with your  
16 opinion as to what extent such panels would have acted  
17 as a physical barrier to prevent burning materials  
18 blowing out of flat 79?

19 A. Yes. So if the panels had been class 0 but not  
20 fire-resisting, then -- well, it's subject to what panel  
21 might actually have been installed that can fulfil the  
22 class 0 requirement whilst not being fire-resisting, but  
23 it wouldn't necessarily have provided any additional  
24 barrier, because again, although the surface wouldn't  
25 have ignited, and wouldn't have provided a source of

1 flaming in its own right, it's entirely possible that  
2 the panel would have deformed and distorted at a very  
3 early stage, possibly falling away, I can't say, but it  
4 wouldn't have provided a significant barrier to that  
5 debris being blown around and possibly out of the  
6 building.

7 Q. Then you were asked whether there were any other  
8 respects, other than those which we've already  
9 discussed, in which composite panels that were  
10 30 minutes fire-resisting and class 0 might have had  
11 an impact on fire development, the spread of smoke, and  
12 the task faced by the London Fire Brigade on the day of  
13 the fire, as compared to the panels that were in fact in  
14 place. Am I right in thinking that the discussion we've  
15 had so far captures all of the possible differences?

16 A. Yes.

17 Q. Then finally, the second, short topic relates to  
18 a photograph which you may not have seen before which is  
19 on the screen now, which we understand was taken on the  
20 south corridor of the 11th floor, looking towards the  
21 lift lobby area, and indeed very close to it, because we  
22 have the door in the photograph leading from the  
23 corridor to the lift lobby. What I'd like to ask you is  
24 whether, looking at that photograph, there appears to be  
25 in place any actual or attempted fire break in the

1           suspended ceiling area?

2    A.   Okay.  I'll start by saying the first time I've seen  
3           this photo that I can recall is this morning.  The  
4           condition of the panels -- they look like some sort of  
5           ceramic panels.  It's difficult to say whether the  
6           damage that's clearly visible is purely as a result of  
7           fire or whether there's some physical damage that might  
8           be associated with workmanship or whatever else, it's  
9           difficult to assess.  But it does -- that could be  
10          construed as being an attempt at fire stopping -- not  
11          fire stopping, sorry, a cavity barrier within the  
12          suspended ceiling space.

13                 As I said, I haven't seen this photograph before  
14                 today.  I also hadn't seen anything like this within the  
15                 building during our investigations, so the remaining  
16                 extent of the cavity in the rest of the suspended  
17                 ceiling along the corridor certainly appears to have  
18                 unstopped throughout the corridor.  Therefore, in the  
19                 north corridor that's somewhere, I think, in the region  
20                 of 21 metres and in the south corridor 28 metres of  
21                 continuous cavity above each of those corridors.

22                 It would be useful, although probably not possible,  
23                 to see an undamaged example of this, if it were  
24                 available from another floor, just to get a sense of  
25                 what kind of condition this was in before the fire,

1           because, as I say, it's entirely possible that this --  
2           it might have been an attempt at a cavity barrier, but  
3           it might have been an attempt made during the works,  
4           during the 1980s, I don't know, and then might have been  
5           disturbed during subsequent works and not fully  
6           reinstated.

7                     Given the fire spread that occurred, I would -- it's  
8           my expectation that, even when these panels in place,  
9           they did not provide a complete barrier to fire spread  
10          within that suspended ceiling.

11       Q.   Looking at the photograph, does it appear that the panel  
12           that you are referring to, which I'm marking with my  
13           cursor now -- is that right --

14       A.   Yes, that's correct.

15       Q.   -- would appear to be directly above the door?

16       A.   Yes, it would, which is interesting in -- I mean, if  
17           these panels were installed around the time of the  
18           suspended ceiling, my understanding -- and this may have  
19           been clarified since I last gave evidence -- but there  
20           was some uncertainty about when the doors were installed  
21           and when the suspended ceiling was exactly installed and  
22           which came first.  If the security doors were installed  
23           some time after the suspended ceiling, but these panels  
24           went in at the time of the suspended ceiling, then there  
25           wouldn't be a reference point, if you like, to why

1 someone would have chosen to install this cavity barrier  
2 at this location.

3 It's one of a number of issues that it would be good  
4 to resolve, but I don't think there's going to be  
5 an opportunity to do that.

6 Q. Is it right and does it follow from what you've said  
7 a few moments ago, that along the ceilings in both the  
8 south and north corridors on the 11th floor you didn't  
9 find anything like this?

10 A. That's correct, we didn't find anything like this along  
11 the length of the corridors.

12 Q. Thank you very much, those are the questions that I have  
13 for you.

14 THE CORONER: Thank you. Is it going to be helpful to have  
15 a break now at this stage? I think it probably would.  
16 What shall we say, about 15 minutes, is that going to be  
17 sufficient for everybody? I don't see any shaking of  
18 heads.

19 All right, members of the jury, we'll have a break  
20 now, so please could you be back at 11.55, please.

21 Thank you very much. Mr Crowder, because you're  
22 part way through giving your evidence, you must not talk  
23 to anyone at all during the break. Could you be back at  
24 11.55, please?

25 (11.39 am)

1 (A short break)

2 (11.56 am)

3 THE CORONER: Thank you.

4 (In the presence of the Jury)

5 THE CORONER: Thank you, yes. Is the sun upsetting anybody?

6 Well, say if it does.

7 Mr Maxwell-Scott, you'd finished your questions, had

8 you?

9 MR MAXWELL-SCOTT: Yes, I have.

10 THE CORONER: Thank you very much. Mr Hendy?

11 Questions by MR HENDY

12 MR HENDY: Thank you, madam. Mr Crowder, Hendy,

13 representing some of the bereaved.

14 Could I ask for that photo just to be put up again,

15 just the last photo? Thank you very much.

16 Mr Crowder, as I understand it, you've never seen

17 that photograph before --

18 A. That's correct.

19 Q. -- and you never saw that site on your inspection.

20 A. That's also correct.

21 Q. From that photograph, it's difficult to tell whether the

22 apparent barrier is in line with the fire door or

23 slightly in front of it or behind it -- one can never

24 tell with a flat photograph -- is that right?

25 A. That's correct.

1 Q. One can't tell obviously, because of the condition after  
2 the fire, whether that barrier, if that's what it is,  
3 was sealed around the perimeter originally.

4 A. That's correct.

5 Q. One can't tell where the holes in it, where pipes and  
6 wires went through, were properly fire stopped.

7 A. That's also correct.

8 THE CORONER: Sorry, could we just have the photograph back,  
9 please?

10 MR HENDY: One can't tell whether there were other gaps in  
11 it.

12 A. That's also correct.

13 Q. All those things would require an inspection of that  
14 site and a comparison with the situation in other  
15 corridors where the fire hadn't been.

16 A. Yes, that's correct.

17 Q. Let's move away from that. I wanted to ask you a couple  
18 of very short questions about matters, which have arisen  
19 in the evidence but since you last gave evidence, and  
20 get your opinions on them.

21 Could I ask please for advocates' bundle page 1089  
22 to be put up? This is a photograph from the fire in  
23 1997. It's the lower photograph, please, on that page.  
24 Mr Clark has the hard copy if that's easier for you,  
25 Mr Crowder, it's the advocates' bundle, the ones that we



1 had a couple of weeks ago.

2 A. I can see well enough on the screen, if it comes to the  
3 point that I need the hard copy I will --

4 Q. Yes, I just wanted to locate you, really, and the jury.  
5 I want to ask you about the panel next to the door of  
6 the kitchen in that flat which was 81, and I asked you  
7 about it on previous occasions. But since then we've  
8 heard a little something about the panel.

9 Before I just say what it is, can I remind you that  
10 you gave evidence that you thought on the basis of these  
11 photos alone, without further analysis, that that panel  
12 between the door and the wall was probably 30-minute  
13 fire-resistant?

14 A. Yes.

15 Q. It's in your report, and my learned friend Ms Al Tai  
16 asked you about that. Since then, we've heard from  
17 Ms Annabel Sidney, who gave evidence -- and this is only  
18 for the benefit of the advocates -- it was 1 March of  
19 this year at page 28, lines 12 and 3, where she said  
20 that although she couldn't remember the composition of  
21 the panel, she believed that it was ply on the internal  
22 and external face with something sandwiched in the  
23 middle which wasn't asbestos.

24 Now, I appreciate you may not be able to help us at  
25 all, but does that give you any assistance in assessing

1 its fire resistance qualities?

2 A. Not in fire resistance per se, although it's  
3 an interesting piece of information. From what we can  
4 see on the photograph, it's my opinion that what you can  
5 see is most probably what was sandwiched between the two  
6 layers of plasterboard, and I suppose it's actually  
7 quite a good illustration of the difference between  
8 surface spread of flame and fire resistance, in that the  
9 plywood wood, is a readily combustible material,  
10 I forget what it's spread of flame classification is:  
11 something around class 3 or class 4.

12 But sandwiched between those two layers of  
13 combustible material that may even have ignited and  
14 burned quite readily, there appears to be something  
15 which was probably non-combustible, but I can't say for  
16 certain, and appears to have provided a level of fire  
17 resistance.

18 So it's possible that the overall composition of  
19 that product, that composite product that was present at  
20 that point included at least three layers, two of  
21 plywood on either of the faces, and some other layer  
22 that provided a fire-resisting element.

23 Q. Thank you. Just while we have that photograph up, we  
24 see that the plaster on the side wall there has come  
25 away from the concrete. Does that give any indication

1 of the likely temperature at that place or can't one  
2 draw any conclusions?

3 A. It's difficult to draw conclusions. Plaster will be  
4 more likely to come away from masonry at high  
5 temperatures, but it can also be dislodged by  
6 firefighting jets and various other activities, so  
7 I wouldn't be particularly confident in using that  
8 particular marker to assess the temperature. More  
9 useful might be the discolouration at the top of the  
10 appliance, which is in the middle of the image where you  
11 can see that it's started to oxidise. I forget the  
12 exact temperatures, there's references to them, but  
13 you're talking 500 to 700s of degrees to get that sort  
14 of discolouration.

15 Q. Right. I also wanted to ask you about the asbestos  
16 panels below the bedroom, and while we have that volume  
17 open, I wonder if I can take you, please, to the  
18 photograph at 1092. Just to remind the jury, this was  
19 the fire that started in the kitchen -- a stew pan had  
20 been left on -- and descended into the lower floor.  
21 There at the bottom of the -- the bottom picture on  
22 1092, we can see two firefighters in the right hand  
23 bedroom as we look at them, and we can see the panels  
24 below the windows of that particular bedroom.

25 Again, is there -- before I ask you about the

1 composition of those panels -- is there anything in that  
2 photograph, such as the plaster coming off the ceiling,  
3 or any other clue as to the sort of likely temperatures  
4 that the panel has withstood?

5 A. I would have to say no. The only material there that is  
6 sometimes used as indicator is the charring of the wood  
7 but, I mean, that's a combination of temperatures to  
8 which it's exposed and also the time for which it's  
9 exposed, so without knowing the duration of the fire, it  
10 would be difficult to make an assessment as to what the  
11 temperatures were.

12 Q. That's helpful, thank you. Can we look, please, in the  
13 bundles we now have in front of us, at page 1170. 1170  
14 in the chronological bundles. Sorry, that's volume 3.

15 (Handed)

16 This is evidence that we had --

17 THE CORONER: Sorry, can we just wait for Mr Crowder to get  
18 the page?

19 MR HENDY: Of course.

20 This is evidence that we had last week, and it's  
21 an analysis of those asbestos panels in the bedroom that  
22 we were looking at a few minutes ago. This in fact is  
23 the analysis for flat 65, but at 1172 there's the  
24 analysis for flat 79 and they are the same.

25 So if we look at the second entry down, the second

1 set of boxes down, we see that the composition is  
2 "Asbestos insulation board type infill panels below  
3 windows" consisting of amosite.

4 We understand from the regulations which were in  
5 place when these flats were built at Lakanal House at  
6 the end of 1959 and the beginning of 1960, that it was  
7 necessary for the flat to conform with what is called  
8 class 2B, which meant that it had to resist the action  
9 of fire for a period not less than one hour.

10 I wondered whether you were able to tell us what the  
11 likely time of fire resistance would be in your expert  
12 opinion for such an asbestos insulation board?

13 A. Not without knowing more detail about it, its  
14 composition and indeed its thickness, I'm afraid not,  
15 sorry.

16 Q. Right. Again, the photographs that we looked at  
17 a minute ago don't really help on that, because we don't  
18 know how long that fire had been burning.

19 A. Not to an extent that you could accurately quantify. As  
20 I said when I previously gave evidence, the fire that's  
21 occurred to produce the level of damage in those rooms  
22 was a serious fire, and those panels have withstood that  
23 fire, and are still -- you know, withstood that fire to  
24 the point they were still in place after firefighting  
25 action, so I think it's reasonable to think that they

1           were able to withstand the force of a jet impacting on  
2           them after having been exposed to the fire, and they  
3           were in a fairly good state to remain in place in the  
4           way that they have done. I wouldn't want to, as I say,  
5           quantify that, but remaining in place after such  
6           a significant fire does give a level of confidence about  
7           their performance.

8    Q.    But I can't draw you out into saying that they're  
9           30 minutes or 60 minutes or anything like that?

10   A.    I'm afraid not, not without further information.

11   Q.    Understood. Can we look at one other composition  
12           question which I have for you, and for this we need  
13           page 1411, which is in file 4. (Handed)

14                 This is in a tender report which was provided for  
15           the design services of the London Borough of Southwark.  
16           At paragraph 6.51, it says that:

17                 "Southwark Council's commitment to energy  
18           considerations is demonstrated in this contract through  
19           the following:

20                 "New block-work under windows to be constructed of  
21           Thermalite Shield blocks increasing the insulation value  
22           of this element of the elevation."

23                 Now, we haven't been able to ascertain through  
24           evidence where those Thermalite Shield blocks were  
25           proposed to go, but the suggestion from our side of the

1 room is that it is likely that they were to go under the  
2 bedroom windows. If that be the case, are you able to  
3 give the jury any view on what their likely  
4 fire-resistant time period might be or not?

5 A. It's -- as with the asbestos, it's subject to the  
6 thickness of the wall that would be constructed. What  
7 I can say is that I believe we used Thermalite blocks to  
8 construct rigs for carrying out fire experiments, so we  
9 have a fair degree of -- we, BRE, have a fair degree of  
10 confidence in their performance of withstanding fires.  
11 I think -- well, it would be possible to find out,  
12 because I'm fairly confident there would be  
13 a certificate to the effect -- it would be possible to  
14 find out for a given thickness -- what the fire  
15 resistance period of those blocks would be, because  
16 again I'm confident that they will have been tested  
17 accordingly and that's something that could be  
18 ascertained.

19 Q. Well, I'm grateful for that and no doubt advocates will  
20 discuss that afterwards, thank you.

21 Can I come to your letter, which is the reason that  
22 you're really here today. You've explained the  
23 difference in performance between compliant panels and  
24 the panels that were there at the time, but I just  
25 wanted to ask you about this, and perhaps we could

1 discuss it via a couple of photographs. Could we put up  
2 jury bundle tab 14 at page 1?

3 THE CORONER: Well, we could just ask Mr Crowder to have  
4 a look at the photograph?

5 MR HENDY: Thank you.

6 It's very difficult to see on the screen but you and  
7 the jury have hard copies of this photograph. Just to  
8 locate ourselves, this is taken at a time when there was  
9 a jet coming up from the ground, aiming at the fire on  
10 the 5th floor. Above that, we have the fire on the  
11 7th floor, and then above that, we have the flats 65 and  
12 above that directly is flat 79.

13 Now, the flames that went into flat 79 could have  
14 come from the bedrooms of flat 65, or they could have  
15 come from the balcony level of flat 65. What's your  
16 opinion as to where they came from or was it  
17 a combination of the two?

18 A. I think that was covered in the reconstruction modelling  
19 report, I don't know whether we covered it actually  
20 here, but my opinion would be that it's most likely  
21 a combination of the two --

22 Q. Right.

23 A. -- because when you have two plumes from independent  
24 fires running together you'll get a lengthening effect  
25 from that, so that would be the time when the flames



1           would be longest and most liable to cause that spread.

2   Q.   Had the panels all been 30-minute fire-resistant and  
3        class 0 on their surfaces, the aperture through which  
4        the flames came from the bedroom and from the balcony  
5        level would have been narrowed as they came out of  
6        flat 65, they couldn't come out the whole window because  
7        the lower panels would still be there; am I right?

8   A.   Yes, that's correct.

9   Q.   Would that fact have had any impact on the spread of  
10        fire to flat 79?

11   A.   No, just in terms of the amount of flame emitting from  
12        flat 65, and the performance of the panels, whether the  
13        panels that were actually in place during the incident  
14        or panels that were fire-resisting to 30 minutes and  
15        class 0, that would not have had a significant impact on  
16        the amount of flaming outside of the building from  
17        flat 65.

18   Q.   Right.  But then let's look at it from the other point  
19        of view, namely the penetration of the fire into  
20        flat 79.  If the panels had been 30-minute fire  
21        resistant and class 0 on their surface at the bedroom  
22        level of flat 79, the flames, in order to get past that,  
23        prior to -- sorry.

24           The flames, in order to get to the glass, would have  
25        had to have been long enough to reach over the height of

1           those panels; am I right?

2    A.   Yes, that's correct.

3    Q.   Would that fact, or the difference between the panels  
4           that were there and panels that were 30-minute  
5           fire-resistant and class 0 on their surface, have meant  
6           it less likely that fire would in fact have entered  
7           flat 79?

8    A.   Okay, if I just start with the flame length issue.  
9           I think the -- I can check -- the flame lengths that  
10           were emitting from flat 65 were long enough that they  
11           would have impinged both on the panels of flat 79 and  
12           indeed on the glass.

13   Q.   Yes.

14   A.   So that would occurred, regardless of whether the panels  
15           were the composite panels that were there or the  
16           30-minute class 0 panels.

17   Q.   But would it make a difference that there would be less  
18           of the flame impinging on the glass if the panels of the  
19           bedroom of 79 had been fire-resistant and class 0 on  
20           their surface? I mean you'd only get the tops of the  
21           flames hitting the glass.

22   A.   Yes, you would, but you would still only have the tops  
23           of the flames hitting the glass with the composite  
24           panels, although -- sorry, that was the second point  
25           I should have already come to -- you wouldn't have had

1 the panel itself burning and having flames that were  
2 actually established at the panel directly beneath the  
3 glazing.

4 Q. Indeed, I think that the point you made to the jury on  
5 the last occasion was that the heat on the glass was  
6 contributed to by the fact that it wasn't just flames  
7 coming from the outside being blown onto the glass, the  
8 flames were -- because the panels themselves were  
9 burning, they were applying heat from directly  
10 underneath the glass.

11 A. Yes, that's correct.

12 Q. On the balance of probabilities, in your view, did the  
13 fact that the panels in place at the time were neither  
14 fire-resistant to 30 minutes nor class 0 on their  
15 surface cause or contribute to the fire spreading from  
16 65 to 79?

17 A. On the balance of probabilities, it contributed to the  
18 time it took for fire to spread from flat 65 to flat 79.  
19 It would not have prevented fire spread from flat 65 to  
20 flat 79, and that's not -- well, that's not the  
21 intention of fire separation between floor to floor.

22 It's well accepted that glazing on the outside of  
23 buildings tends not to be fire-resisting. At some point  
24 you could have a fire on one floor which is fully  
25 involved and emitting considerable flame to the outside

1 and the glazing on the floor above will at some point  
2 fail as a result of that and fire will eventually get  
3 into the floor above, but there is a time element to  
4 that.

5 Q. Absolutely, one understands that. Even if the panels  
6 had been one-hour fire-resistant, if the fire had  
7 continued for an hour, then they would have passed  
8 through the panels and into the bedroom, so it's  
9 a question of --

10 A. Absolutely, and in all probability it would have got  
11 through the glazing before that hour would have passed.

12 Q. Yes. But if we put the question the other way, on the  
13 balance of probabilities, had the panels been  
14 fire-resistant for 30 minutes and class 0 on their outer  
15 surface, the spread of fire from 65 to 79 would have  
16 been less quick --

17 A. Yes.

18 Q. -- but it's not really possible to tell how much slower  
19 that would have been, there's too many factors in play.

20 A. Yes, too many variables.

21 Q. Would that proposition hold true even if the panels had  
22 not been fire-resistant to 30 minutes but class 0 on  
23 their outer surface?

24 A. Yes, that would still apply, potentially to a lesser  
25 extent, as in the delay would not be so much, but there

1           would still be a delay that would be additional to that  
2           which was afforded by the composite panels which were  
3           there during the incident.

4    Q.   I wanted to ask you about the question that you  
5           answered, the fifth question that you answered, which  
6           was whether the debris falling from flats 65 or 79 -- or  
7           the ability of debris would have been reduced to fall  
8           from flats 65 or 79 and enter flats 37 and 53, and you  
9           say that, had the panels been 30-minute fire-resistant  
10          and class 0 on their outer surface, this would have  
11          significantly reduced the amount of debris from within  
12          the flats which could have been blown out of those  
13          flats.

14   A.   Yes.

15   Q.   Does it follow from that that, had the panels on  
16          flats 65 and 79 been 30-minute fire-resistant and  
17          class 0 on their outer surface, that would have  
18          significantly reduced the possibility of fires in flats  
19          37 and 53?

20   A.   Yes, I suppose that would follow.  Again, there's a lot  
21          of uncertainty and variables in that, wind on the day  
22          and where things happened to land, but yes, if  
23          there's --

24   Q.   It goes with the territory of being an expert,  
25          Mr Crowder.

1 A. Yes, if there's less debris being blown out then there  
2 is less opportunity and therefore the possibility of  
3 that occurring reduces.

4 Q. Absolutely, the possibility is always there, but if we  
5 are looking on the balance of probabilities and  
6 likelihood, then the likelihood would be diminished?

7 A. Yes.

8 Q. The final matter I wanted to ask you about was this: we  
9 recall that Catherine Hickman first detected smoke  
10 coming through the cracks in her floorboards in the  
11 bedrooms, and I wanted to ask you whether that was --  
12 and you may not be able to answer this -- whether that  
13 was likely because there were gaps between the panels  
14 and the floor plates, through which smoke came from  
15 below, or whether that was likely to be the product of  
16 the panels themselves burning?

17 A. Thinking back to the way that the frames and the panels  
18 interacted with the suspended floor -- not suspended,  
19 the floating floor -- I think it's most likely that that  
20 smoke was the result of gaps. I don't think -- and it  
21 might be useful to have a photograph of the inside of  
22 one of the flats -- but I don't think that the panels  
23 communicated in any way with the void that was beneath  
24 the floating floor, so the -- I mean, it's possible, but  
25 the most likely route would have been gaps, either

1           between components of the frame or between the frame and  
2           the concrete, through which smoke from the outside of  
3           the building entered into that void beneath the floor  
4           and it permeated up through the cracks in the  
5           floorboards.

6    Q.   There's an email from Symphony Windows which you might  
7           think supported that thesis, or on the other hand you  
8           might think it completely irrelevant, but I'll just show  
9           it to you and ask.  It's in 2332, which is in volume 6  
10          of the chronological documents.  (Handed)

11                 This is from Symphony Windows on 11 July.  I'll read  
12                 the whole of it.  It says:

13                 "We have gone through all the top floor maisonettes  
14                 along with the floor that the pilot [pilot flat] is  
15                 installed in.  We have compared all the sizes that we  
16                 are trying to standardise.  To give you an idea of the  
17                 outcome, we have openings that vary from  
18                 3,511 millimetres down to 3,470 millimetres.  The  
19                 existing frame widths for the whole of the building is  
20                 a constant 3,450 millimetres.  We have decided on lounge  
21                 screens to have an overall width of 3,473 millimetres.  
22                 The kitchen units will be 3,478 ... and in both cases of  
23                 the bedrooms we have opted for 3,480 millimetres.

24                 "Obviously on the smaller openings these are going  
25                 to be very tight but on a number of openings these will

1           be quite gappy. What we propose to do will be to take  
2           up the tolerance with a treated timber packer cut to  
3           suit on site and we will commit to production on this  
4           basis."

5                    Is that of any assistance or not?

6   A. Yes, I think that would support the view that there  
7       probably were some gaps around the interface between the  
8       frame and the concrete and that would provide  
9       an opportunity for smoke to spread through those gaps  
10      into the space beneath the floor or around the sides  
11      with the walls or against the ceiling.

12   Q. Thank you very much. I'm sorry, there's just one matter  
13       that I should have asked you earlier when I was asking  
14       you about flame lengths and whether it would go over the  
15       barrier of the panel, had that been fire-resistant, and  
16       so on.

17                    There's a photograph I wanted to ask you to look at.  
18       It's in the jury bundle at divider 12, the computer  
19       presentation sequence of events, and I have it at  
20       page 9, but I have been tweaking my pagination so it may  
21       not be page 9. The timing is 16.38.06. I think it may  
22       be page 5, I'm grateful.

23   A. Yes, I have that as photo 4.

24   Q. Yes, photo 4, thank you very much. I want to ask you  
25       about this as a pure illustration, because this is on



1 the east side of the building, so it wasn't -- the  
2 flames we see there were not involved in the passage of  
3 the fire from 65 to 79. But nevertheless, it seemed to  
4 me that it might be a good demonstration of how the  
5 flames came out of the balcony level of 65 and impinged  
6 on flat 79 above.

7 The point that I wanted to put to you is that  
8 clearly the intensity of the flame, although as you've  
9 already said it was long enough to reach the glass above  
10 the panels, the intensity must have been less, as it got  
11 to the glass, than it would have been -- than it was, in  
12 fact -- because the panels themselves were not  
13 fire-resistant. Does that have any --

14 A. Sorry, could you just repeat that question?

15 Q. Yes. This is really an idiot's point, from my point of  
16 view, but just looking at it, it looks to me as if the  
17 intensity of the flame is greater the lower it is.

18 I could be wrong about that, it may be the hottest part  
19 of the flame is the very top of it, but it looks more  
20 intense lower down than it does towards the top. I'm  
21 just wondering that if you have a 30-minute barrier for  
22 the flame to jump over, then the intensity of the heat  
23 being applied to that exterior face, both panel and  
24 glass, is going to be less if the flame has to jump over  
25 the barrier to hit the glass than if it can just go

1 through the barrier and into the flat?

2 A. Right. In interpreting this photograph, there's  
3 a couple of things to note, I suppose. One is the  
4 prevailing wind on the day of the incident is from the  
5 west, so the flames that are public generated here are,  
6 at least to some extent as a result of fresh air  
7 entering flat 65 on the west, passing through a flat  
8 fully involved in fire, and then passing out and being  
9 pushed out on the east side by that same flow.

10 The reason why you have more luminous flames lower  
11 down than higher up may well be simply related to the  
12 position of the smoke layer within the flat, in that you  
13 have a smoke layer at a high level and you have quite  
14 fresh air lower down, which is also being promoted by  
15 the prevailing wind, and therefore you have a cleaner  
16 burn going on lower down and that is why you have more  
17 luminous flames in this image than you have --

18 Q. It sounds to me as if I was attempting a very bad point,  
19 so I'll leave it there. Thank you very much indeed,  
20 Mr Crowder?

21 A. Okay.

22 THE CORONER: Thank you. Mr Dowden? Ms Al Tai?

23 Mr Walsh?

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Questions by MR WALSH

MR WALSH: Mr Crowder, I just want to clarify one or two matters, and I'm afraid I want to go back to something you said last time which is pertinent to the questions you've been asked today.

On the last occasion you were here, you said this: eventually it's widely accepted that a fire in any given storey on a building will be in a position where it can spread to a storey above, but there is, in the design of buildings, a time lag that is built in to allow for the activities of fire and rescue personnel to do their job.

A. Yes, that's correct.

Q. In relation to the surface spread of flame over the exterior of the building, that is what class 0 addresses?

A. Yes.

Q. In fact, when you did your assessments and the various reports that you did and the tests that you did, you were looking pretty well exclusively at class 0 during the course of those tests and reports.

A. In terms of what?

Q. In terms of the -- in relation to the panels, at least, and in relation to the statutory requirements, you were concentrating on class 0.

A. Yes, that's correct.

1 Q. Now, the question I want to ask you, really as  
2 a consequence of that, is this: BRE, of course, are now,  
3 and have for many years been involved in investigating,  
4 carrying out investigations of fires around the country.

5 A. Yes.

6 Q. How rare is it as an occurrence that fire will spread  
7 upwards, across the external fabric of a block of flats,  
8 bearing in mind the requirements of class 0?

9 A. It's rarer than it used to be. During the 1990s, there  
10 were a spate of incidents, I think one's already been  
11 mentioned in court, which was in Irving where, I believe  
12 it was another 14 storey block of flats actually, where  
13 a fire started relatively low down on that block and it  
14 involved an external cladding system.

15 Q. Yes.

16 A. It's similar but different to the issues at Lakanal,  
17 because this is a system that's applied onto the masonry  
18 of the block.

19 Q. Yes, can I just stop you there, sorry, because it's  
20 a very interesting subject, that, but the result of that  
21 was that people looked very closely at it and the result  
22 is that things are now very much better?

23 A. Yes, standards were developed and recommendations in the  
24 approved documents were refined accordingly.

25 Q. All right, thank you very much. Then just trying to

1       simplify matters, relatively briefly, I'm only concerned  
2       with class 0 now, I'm not going to ask you about fire  
3       resistance to 30 minutes or otherwise. Considering  
4       class 0 issues, in short, the composite panels in this  
5       case should not have provided a combustible source to  
6       allow the flame to spread across them in the time that  
7       they did, they shouldn't have ignited.

8   A. Yes, I would agree with that, yes.

9   Q. They shouldn't have ignited and they shouldn't have  
10       burned through in the time that they did.

11   A. Well, by virtue of them not igniting, they shouldn't  
12       have burnt through. They might well have deformed --  
13       and this is going back to the issue of whether the  
14       panels were class 0 and fire-resisting or simply  
15       class 0 --

16   Q. Yes.

17   A. -- but they shouldn't have provided a combustible  
18       surface.

19   Q. Yes, all right. Thank you. The consequence of that, of  
20       course, is that they shouldn't, in the time that they  
21       did, have provided a burning residue to fall below, with  
22       the potential, at least, that it would cause fires  
23       below; that must be right?

24   A. Yes and no. There aren't any specific requirements in  
25       the British Standard 476: Part 7 test in relation to

1 falling burning debris, but the expectation would be  
2 that, if a product does not burn to that extent, then  
3 any falling burning debris will at most be minimal, if  
4 any at all.

5 Q. If any at all, all right.

6 What you've been asked about this morning is that,  
7 even if the panels had complied with class 0, and they'd  
8 not ignited in the time that they did, that there is  
9 a possibility that they may have become distorted and  
10 fall away as a result. Would not the requirements of  
11 class 0, that panels should not ignite, provide in any  
12 event, a limitation in time during which any potential  
13 deformity in the panel would result in it falling away?  
14 Do you see what I mean by that question?

15 A. Yes, I think I do, so the class 0 panel would be less  
16 prone to deforming than a panel which was not class 0?

17 Q. Yes.

18 A. Again, that's not something that's dealt with directly  
19 by the standards which are used to produce these  
20 classifications, but yes, that's a reasonable  
21 expectation that, if the surface -- let's say you had  
22 two panels, both of which were composed 90 per cent of  
23 the same materials, but on one you had something that  
24 provided a class 0 surface and on the other you had  
25 a surface that provided a class 3, as in this case, then

1 I would expect that the class 0 surface, albeit with the  
2 same composition throughout the rest of the panel, would  
3 have a beneficial effect on the overall performance of  
4 that panel.

5 Q. All right, thank you. But even if such a panel did  
6 distort to such an extent that it fell away, first of  
7 all, obviously, it wouldn't be falling away burning, but  
8 you appeared to indicate earlier that if you had a panel  
9 falling away because of distortion, that you might  
10 expect the fire to remain outside of the envelope of the  
11 building; did I hear you rightly when you said that?

12 A. Yes, so I think that was in relation to the panel that  
13 was not fire-resisting but was class 0.

14 Q. Yes.

15 A. So the panel would deform -- or could deform, I mean it  
16 might not but there's no reason to prevent it from  
17 deforming just because it's class 0 -- and a layer  
18 within that panel would ignite, but on the balance of  
19 probabilities, then for that combustible element to  
20 become exposed to flaming, it would have to become  
21 exposed towards the flaming rather than away from the  
22 flaming.

23 If it distorted so that it fell into the room, then  
24 there would still be a -- there would be a gap, and the  
25 flames would be able to radiate heat and whatever onto

1           that component that had fallen within the room, but  
2           there wouldn't be actual ignition of the product in  
3           terms of a route of fuel by which the fire could  
4           directly spread; does that answer the question?

5   Q.   Yes, I think it does, thank you very much.

6           The last question I want to ask you is this: I'm now  
7           talking about the debris which was allowed to fall from  
8           flats 79 or 65, burning, from the composite panels and  
9           perhaps other debris that fell out, starting fires in  
10          flats below. You were asked last time to confirm  
11          whether flats catching fire below an existing fire in  
12          a block of flats was unusual.

13   A.   Yes.

14   Q.   You said it was unusual, but I think it important to ask  
15          how unusual. BRE have been involved in investigating  
16          fires for many a long time; how unusual is that?

17   A.   Okay. I suppose the simplest answer is to make  
18          reference to my colleague Martin Shipp, who has  
19          investigated fires under the employment of BRE on behalf  
20          of the government since 1974; he'd never seen it before.

21   Q.   Thank you very much.

22   A.   Thank you.

23   THE CORONER: Thank you. Mr Matthews?

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Questions by MR MATTHEWS

MR MATTHEWS: Can you just help us --

THE CORONER: Can we have the microphone on, please?

MR MATTHEWS: I'm sorry.

Can you help us with the questions you were answering to my learned friend Mr Walsh on behalf of the London Fire Brigade?

My name's Matthews, I ask questions on behalf of the London Borough of Southwark. Just a moment ago, you were discussing the scenario of the class 0, but not fire-resistant panel, that had fallen into the flat, having distorted -- not fallen out, but fallen into the flat.

A. Yes.

Q. You were saying that it of itself wouldn't introduce an element that was on fire.

A. That would be my expectation, and that's -- again, that's on the basis that you have a class 0 surface and the edges that were previously --

Q. I haven't got to the question yet.

A. Okay.

Q. What about in the scenario we're dealing with, the flames that were coming from flat 65 --

A. Yes.

Q. -- if that's the panel in flat 79 that's fallen into the

1 flat, the flames coming from flat 65, they're the same  
2 length?

3 A. Yes, they are, and the barrier, as I said -- so if you  
4 take away the fire-resistant element, you just have  
5 a class 0 panel, then you don't have that barrier to  
6 fire spread.

7 Q. Right, but once the panel's fallen either in or out,  
8 there's nothing stopping the flames coming into flat 79?

9 A. Correct.

10 Q. In all these scenarios, you're dealing with something  
11 that's encased in a aluminium frame.

12 A. Well, no, I was simply referring to something that was  
13 a class 0 that had --

14 Q. No, in all the scenarios about these composite windows.

15 A. Oh, right, sorry.

16 Q. Yes?

17 A. Absolutely, yes.

18 Q. Again, it may be my lack of understanding, please  
19 clarify, is there uncertainty about how long  
20 an aluminium frame would hold each of these different  
21 types of panel? So class 0 and resistant, just class 0,  
22 or neither class 0 nor fire-resistant?

23 A. As in, would that change the performance of the  
24 aluminium frame?

25 Q. Yes, would that change the performance of the aluminium

1 frame?

2 A. It might -- I mean there might be an effect in that  
3 a fire-resistant panel, because it would retain its  
4 rigidity, the whole system working together, the  
5 aluminium might derive some benefit, but ultimately the  
6 aluminium in all cases will itself soften and provide  
7 less of a structure into which those panels are held,  
8 but there is a system interaction which I'm not going to  
9 attempt to quantify because it would be a futile  
10 exercise.

11 Q. Right, well, it's probably better than the way I asked  
12 the question, that's what I meant by uncertainty.

13 A. Yes, there is uncertainty.

14 Q. But what isn't uncertain is that the aluminium frame has  
15 the potential to distort and to stop holding, stop  
16 retaining, any one of those three different types of  
17 panel at less than 30 minutes.

18 A. Yes. There is something to add to that, which -- I'm  
19 not sure it's appropriate, stop me if it's something  
20 that you want to discuss later, because it kind of  
21 relates to regulations and so on, but it's this  
22 separation of class 0 and materials that are of limited  
23 combustibility and fire resistance and, on the one hand,  
24 you could have had the -- okay, the entire facade of the  
25 bedrooms could have been a fire-resisting facade, so the

1 frames, the panels, and so on --

2 Q. I am going to stop you, because I don't think that's the  
3 territory from you and, with respect, I think this may  
4 be quite important, to understand what you're saying.  
5 But back to where we were then, on aluminium frames, the  
6 uncertainty, but on each of the three different types of  
7 panel, of potential different types, there is the  
8 potential for those to fail to retain the panel --

9 A. Yes.

10 Q. -- in less than 30 minutes.

11 A. Yes.

12 Q. Is this right: in your reconstruction, the aluminium  
13 frame failed to retain the panel in something like six  
14 and a half minutes? Let me take you to a page, that's  
15 probably unfair of me.

16 A. I mean, there were certainly elements of the frame  
17 failing within that time. I had a look at the footage  
18 this morning. The frame was largely still in situ until  
19 around ten minutes in, but it certainly would have  
20 failed well before 30 minutes.

21 Q. Well before 30 minutes?

22 A. Yes.

23 Q. I think that's all I need to ask, thank you.

24

25

1 Questions from THE CORONER

2 THE CORONER: Can you help us quantify the uncertainty?

3 I appreciate that's a rather daft for the way of putting  
4 it. We have the possible distortion of the frames with  
5 the composite panels which were in place, we have  
6 distortion of the aluminium frames with panels which  
7 were class 0 but not 30-minute fire-resistant, and then  
8 thirdly, we have the distortion of the frames with  
9 panels of both 30-minute fire resistance and class 0,  
10 and you've taken us to the time which in the  
11 reconstruction the frames with the actual composite  
12 panels started to distort.

13 Can you give the jury any indication of whether  
14 aluminium frames in the other two hypothetical scenarios  
15 were likely to have lasted longer before distortion or  
16 are you unable to say?

17 A. I will say they're likely to have lasted longer, and  
18 that's result of system interaction I think is the term  
19 we use. So where you have a number of products that  
20 come together as an overall structure or system, and the  
21 performance of one product has an effect on the  
22 performance of the product it's connected to. So on  
23 that basis, as you improve the performance of the  
24 panels, I would expect a limited improvement in the  
25 performance of the frame, but I don't think that

1 a 30-minute panel -- I don't think the frame would have  
2 survived 30 minutes, even if a 30-minute panel had been  
3 put in there.

4 THE CORONER: Thank you. Mr Compton?

5 Questions by MR COMPTON

6 MR COMPTON: Mr Crowder, I think you know who I am from the  
7 last time that you gave evidence.

8 Just two matters really arising out of that. You  
9 were very clear and frank about the limitations on the  
10 particular fire tests, and I'm not going to go back  
11 through all of that now. You were asked a question  
12 about whether the class 0 panels would be less prone to  
13 buckle, and you hesitated and you thought, quite fairly,  
14 about that.

15 Are you aware whether any tests have been carried  
16 out to do with the issue of buckling as opposed to fire  
17 and surface spread?

18 A. You mean in relation to panels, I assume?

19 Q. Yes.

20 A. I must say I'm not.

21 Q. Is that something that would be right on the edge of  
22 your scientific knowledge and would be entering  
23 speculation or --

24 A. It's based on the experience of witnessing a fair number  
25 of specifically Part 7 tests and the performance of

1 various products that are inserted. Those have been  
2 commissioned on the basis of other investigations. So  
3 there's a certain amount of experience I can draw on,  
4 direct experience, but there hasn't been a formal  
5 programme of work to look at this issue.

6 Q. So there's no test or paper or thesis that you can say  
7 deals with that particular point?

8 A. No.

9 Q. Thank you. I just want to ask you two further short  
10 matters, please. Can we go to page 2 in respect of the  
11 letter that you wrote to the learned coroner dated  
12 1 March? It's at the bottom of the page. Forgive me if  
13 I've been a bit slow, if this has been given in evidence  
14 already. But you say this -- with we just put that up:

15 "With respect to both questions (a) and (c) ..."

16 We know question (a):

17 "Did the presence of the composite panels in flat 65  
18 have any impact on the fire development within flat 65  
19 beyond that they formed part of the material that  
20 burned ..."

21 (c):

22 "Did the presence of the composite panels in flat 79  
23 have any impact on the speed that fire spread to flat 79  
24 and/or the growth of the fire within flat 79 beyond the  
25 fact that they formed part of the material that burned

1           within flat 79?"

2           Is this right, that you say, with respect to both  
3           those questions:

4           "... it should be stressed that the presence of  
5           compliant panels would not have improved conditions in  
6           either flat 65 or flat 79 (assuming fire did spread to  
7           flat 79) to the extent that they would have been  
8           survivable."

9   A.   Yes, that's correct.

10 Q.   Then you give some temperatures there.

11           The other matter, the final matter I wanted to ask  
12           you, is this, and it's really in relation to debris.  
13           I don't want to go over the old ground of panels  
14           falling, but can we just go to your original report,  
15           please, and it's your report 259449. It's really the  
16           reconstruction that starts on page 51.

17           I'm going to ask you in particular to go to  
18           figure 41, which is actually a photograph on page 56 of  
19           that report. That is a photograph of bedroom 1 of  
20           flat 79 in Lakanal House, understood to have been taken  
21           by a flat occupant on 13 April 2009. What you've  
22           attempted to do, would this be correct, is as accurately  
23           at possible reproduce -- I'm sorry, reproduce is the  
24           wrong word -- put the contents back in your fire testing  
25           just the way they would have been at the time of the



1 fire in that particular bedroom?

2 A. Yes, although we did have specific discussions about the  
3 tidiness of bedroom 1 in this photograph, and I forget  
4 what the -- there was some mention of either a witness  
5 statement or an interview with one of the occupants of  
6 flat 79, and my memory fails me, but I remember the  
7 outcome of that was that there was some discussion  
8 around the fact that the flat was more untidy than it  
9 would otherwise have been in this photograph, because  
10 the photograph was taken to raise a point about someone  
11 making a mess, or something like that.

12 Q. Very well.

13 A. As such, what we produce in the reconstruction was  
14 actually a much more tidy representation to try and  
15 again, as I think I gave in previous evidence, we were  
16 trying to be as conservative as possible, so not having  
17 lots of materials out and about that were available to  
18 ignite and spread the fire more quickly.

19 Q. Very well. That photograph gives the jury an idea in  
20 April 2009. I think you had to be a little careful.  
21 For example, there were a number of aerosol cans and a  
22 lighter tube --

23 A. Yes.

24 Q. -- and they would have exploded at some stage, fairly  
25 early on presumably?

1 A. Depending on where they were, and again I remember a lot  
2 of the aerosols were believed to have been contained  
3 under the stairs.

4 Q. Very well.

5 A. Being used as storage, and they would have exploded, and  
6 we didn't want to have the risk of someone becoming  
7 injured during the course of our work, so we replaced  
8 them with an alternative.

9 Q. Please, if you're unable to answer this question, say  
10 so, but when we have, and you've explained about the  
11 glazing breaking and so forth, and then the west wind  
12 coming in, the contents there, in a fairly crowded sort  
13 of area, you're going to get spillage as those items  
14 ignite and burn through curtain materials and so on,  
15 that those are going to go out of the building, aren't  
16 they, as part of the debris?

17 A. Oh yes, picked up by the wind, and with the -- well,  
18 again, we've gone through the various options as to  
19 whether the composite panels were there or whatever, but  
20 ultimately, if the facade is missing or there's gaps,  
21 certainly at low level, then there's an opportunity for  
22 the wind to pick up those burning materials and for them  
23 to fall out of the building.

24 Q. Yes, and, as you've said, there's no forensic evidence.

25 A. Yes.

1 Q. Thank you. No further questions.

2 THE CORONER: Thank you. Mr Leonard?

3 MR LEONARD: No, thank you.

4 THE CORONER: Ms Canby.

5 Questions by MS CANBY

6 MS CANBY: Mr Crowder, I'm Ms Canby and I just have three  
7 short questions to ask you on behalf of SAPA. The first  
8 point relates back to burning debris. I think you  
9 agree, don't you, that burning debris is not  
10 specifically precluded for products to achieve a class 0  
11 rating?

12 A. That's correct.

13 Q. Secondly, also in relation to burning debris, are you  
14 able to say whether the falling burning debris from the  
15 composite panels is more likely to have been the  
16 sheeting or the insulation between the sheeting?

17 A. Not with any certainty. I mean from memory, from the  
18 Part 7 tests that were carried out, the debris that fell  
19 from the test specimen ranged from very small to quite  
20 sizable chunks, and the sizable chunks you'd expect to  
21 contain possibly the whole cross section of the panel  
22 but I couldn't say with any certainty whether that was  
23 the sheeting or the insulation or both.

24 Q. So that's unquantifiable?

25 A. That's not a quantifiable (inaudible), no.

1 Q. Finally, Mr Crowder, it's in your May 2012 report,  
2 although I'm not sure we need it on the screen unless  
3 you want it, you say in that report that your opinion is  
4 that the fire-retardant grade Trespa could have been  
5 used in composition with a suitably formulated foam to  
6 achieve the finished composite panel that was class 0;  
7 is that still your opinion?

8 A. Yes. I mean, I caveatted it that I am not a plastic  
9 specialist, but I know from experience that a lot of  
10 work has been put into improving the fire performance of  
11 foams and various other things, and they can be  
12 extremely successful in terms of providing a level of  
13 fire protection.

14 Q. Thank you very much, Mr Crowder.

15 THE CORONER: Thank you. Ms Petherbridge?

16 Questions by MS PETHERBRIDGE

17 MS PETHERBRIDGE: Just a little help if I can ask you,  
18 Mr Crowder, with the composition of sandwich panels,  
19 composite panels, as we might call them.

20 Is it right, and I'm going to use a general term,  
21 "fire performance", and not distinguish too much at the  
22 moment, but do I gather from your evidence that  
23 a manufacturer of such panels might take the approach of  
24 producing a panel that had a class 0 surface spread of  
25 flame and expect that to provide some protection for the

1 inner, for the middle, which might then be combustible  
2 or semi-combustible, but that would be one approach, to  
3 have a class 0 surface and a slightly --

4 A. And a combustible core? Yes.

5 Q. (Inaudible) core, yes.

6 A. Yes.

7 Q. We know that's not what happened here, because we've  
8 heard from Mr Laing that whoever manufactured the panels  
9 actually ordered the standard grade material.

10 A. Yes.

11 Q. So no doubt that was combustible, and it burned; is that  
12 right? Is it also right, though -- I think you said  
13 class 0 means limited combustibility, it doesn't  
14 actually mean that the surface will not burn at all,  
15 does it?

16 A. That's correct. You would expect -- well, there's no  
17 reason why a class 0 material can't be a non-combustible  
18 material, but just because a material is class 0 doesn't  
19 mean that it won't burn, it's entirely possible that it  
20 will sustain flaming under an imposed radiant heat flux  
21 or flame impingement, or whatever, but it could still  
22 achieve class 0.

23 Q. If which case if it did have a combustible core, that  
24 could catch fire?

25 A. Well, the -- and this relates back to the way that the

1 Part 7 test actually works, so you -- in the case of the  
2 panels that were present, you might have a class 0  
3 surface and a combustible core, and that passes the  
4 test, you might equally have a class 0 surface that  
5 because of some other property of the combustible core  
6 the class 0 surface delaminates or exposes the  
7 combustible core and that might then give rise to  
8 a failure of a Part 7 test, but this -- it's a case by  
9 case answer, but it's entirely possible to come up with  
10 a product that is, in simplistic terms, made of plastic  
11 but would pass that test.

12 Q. I think probably the simple way of putting it that you  
13 might be able to agree with is just because you have  
14 a class 0 surface does not mean you can ignore what goes  
15 in the middle of the panel in terms of performance, does  
16 it?

17 A. Oh, absolutely, and there are specific passages in terms  
18 of the guidance that's given on the construction of  
19 buildings with respect to what's considered to be  
20 acceptable in terms of those multiple layers that might  
21 be there or the presence of various products. That's  
22 all dealt with in those documents.

23 Q. Indeed, another approach that might be taken by  
24 a theoretical manufacturer of these panels, and perhaps  
25 was taken in respect of the panels that Mr Hendy asked

1           you about, in respect of the 1997 fire, is to have  
2           a combustible facing, like the plywood we saw, but  
3           a non-combustible inner. That would produce the effect  
4           that we saw, if indeed those were plywood faced panels  
5           in 1997, whereby they still stayed in place but retained  
6           their integrity?

7    A. Yes, fire resistance doesn't mean you have to have  
8           a class 0 surface.

9    Q. You could have a class 0 surface which burns away and  
10           leaves the core in place and that may well be what  
11           happened in 1997.

12   A. Yes. Just to add to that, in the case of solid timber  
13           fire doors, that can be timber call the way through its  
14           cross-section, and ultimately the timber will burn  
15           away -- well, the surface will certainly burn and the  
16           timber will gradually burn away and the fire resistance  
17           period that is afforded by that door is relative to the  
18           thickness of the door and the time that it takes for the  
19           fire to burn through.

20   Q. What we do know is that whoever made the panels that  
21           were in place in this instance, that were involved in  
22           the fire that we're looking at, what was put in the  
23           middle was combustible, wasn't it?

24           I wonder if perhaps we could look at the photograph  
25           that we looked at before with the standard tests in

1 appendix H of your first report. I think it was the  
2 second of the standard tests in that report, and it was  
3 page 9 of 9. It's beyond the main pagination of the  
4 report.

5 I think it's the page that Mr Crowder looked at with  
6 Mr Hendy, I think, page 9 of 9 of the second report.

7 Yes, I think that's the one you looked at earlier,  
8 is it not, Mr Crowder?

9 A. Yes.

10 Q. Indeed, we can see with our own eyes I think, certainly  
11 from the second picture, that the core, the foam, is  
12 combustible. It's burning in that picture, isn't it?

13 A. Yes, I mean I don't think the picture does it particular  
14 justice, but I can confirm from having witnessed the  
15 test that yes, the foam core was burning.

16 Q. Just as a matter of observation, the test, this is  
17 BS 476:7 that you were running here, was it not?

18 A. Yes. Well, sorry, I was observing, but one of my  
19 colleagues in the UKAS accredited department was running  
20 it.

21 Q. "You" as in BRE, not you personally. The test runs for  
22 ten minutes, does it not?

23 A. The overall duration of the test is up to, from  
24 memory --

25 Q. If we have a look at page 4 --



1 A. Well, we have reference times up to 710 seconds. Sorry,  
2 that's not --

3 Q. If you look at page 4 of 9 I think it gives the spread  
4 distance at ten minutes.

5 A. Well, it goes on for at least ten minutes. I mean, I'm  
6 struggling to think of the overall duration. It goes on  
7 for some time more than ten minutes.

8 Q. Could you tell us, that last picture that we see on the  
9 page we were looking at, page 9 --

10 A. Yes.

11 Q. -- can you help us with when that photograph was taken?  
12 It says:

13 "Visible after test run completion."

14 A. Oh, not from the top of my head. It's something I could  
15 find out, but I don't have that information to hand and  
16 I'm not going to attempt to --

17 Q. If you don't have it, that's all right.

18 THE CORONER: Thank you. Members of the jury, do you have  
19 any questions? Thank you very much.

20 Mr Crowder, thank you very much for coming again and  
21 for the help that you've been able to give us. You're  
22 free to stay if you would like, but you're welcome to go  
23 if you would prefer. Thank you very much.

24 (The witness withdrew)

25 THE CORONER: I suggest we have a slightly longer break for

1 lunch today, so shall we begin at 2.30? 2.30 then,  
2 please. Thank you very much.

3 (1.06 pm)

4 (The short adjournment)

5 (2.36 pm)

6 THE CORONER: Thank you, do sit down. Could we ask the jury  
7 to come in please? Thank you.

8 (In the presence of the Jury)

9 THE CORONER: Members of the jury, thank you. We're going  
10 to continue this afternoon with more expert evidence.

11 Last week we heard from Annabel Sidney and  
12 John Menlove on, amongst other things, Building  
13 Regulations and Building Control and we heard from  
14 Ms Keogh about fire risk assessments and we are now  
15 going to have some expert evidence from Mr David Walker  
16 on those topics and some others as well.

17 Would you like to come forward, Mr Walker?

18 DAVID WALKER (sworn)

19 THE CORONER: Thank you, Mr Walker, do sit down. Do help  
20 yourself to a glass of water if you would like. I think  
21 you've been sitting at the back, so you'll realise that  
22 the sound in the room isn't always very easy, so please  
23 if you could keep your voice up that would help, and if  
24 you could direct your answers across the room towards  
25 the members of the jury that will help them to hear your

1 evidence and to keep you close to the microphone.

2 Mr Maxwell-Scott, I think you know, he's going to  
3 begin asking questions on my behalf and then there will  
4 be some questions from others. Thank you.

5 Questions by MR MAXWELL-SCOTT

6 MR MAXWELL-SCOTT: Good afternoon, Mr Walker, can you give  
7 the court your full name please?

8 A. David John Walker.

9 Q. As the coroner has already explained, you're here to  
10 give expert evidence to the court. Can you tell us  
11 firstly your professional qualifications?

12 A. I'm a chartered building surveyor.

13 Q. Is it right that you took a BSc in building surveying in  
14 the 1980s --

15 A. Yes, correct.

16 Q. -- and you are a member of the Royal Institute of  
17 Chartered Surveyors and have been since 1985 --

18 A. Correct.

19 Q. -- and you have over 29 years' experience as a building  
20 surveyor?

21 A. Yes, indeed.

22 Q. Projects that you have been involved in include the  
23 management of fire risk assessments for landlords of  
24 multi-occupied residential premises?

25 A. Yes.

1 Q. You were instructed by the coroner to prepare an expert  
2 report on her behalf and you prepared a report dated  
3 14 February 2013.

4 A. That's correct.

5 Q. If I might, by way of introduction, identify in general  
6 terms the issues that you were asked to address in that  
7 report. As I think you're aware, the coroner and the  
8 advocates have your report, the members of the jury  
9 don't, but there is the opportunity for specific  
10 passages to be put up on screen if anybody wishes.

11 A. Okay.

12 Q. What I will be doing with you is trying to introduce  
13 your evidence and bring out the key parts, as I see it,  
14 and I'll try, as far as possible, to do that without  
15 putting the report itself on the screen.

16 A. Okay.

17 Q. But if you turn to page 5 of the report, and I'll  
18 identify with you some of the specific issues you were  
19 asked to address. Firstly, is it right that they fell  
20 broadly into two completely separate categories, one  
21 relating to Building Regulations and Building Control --

22 A. Yes, that's correct.

23 Q. -- and then the second one relating to what we have been  
24 calling the Fire Safety Order and fire risk assessments?

25 A. Correct.

1 Q. Then breaking down those two issues in a little more  
2 detail, you were asked at the bottom of page 5 whether  
3 there was a requirement in 2006/2007 that Building  
4 Control approval be obtained for works carried out at  
5 Lakanal House.

6 A. Yes, correct.

7 Q. Going over the page to page 6, firstly can you confirm  
8 that you have had access to and considered the expert  
9 evidence prepared by David Crowder of BRE?

10 A. I have, yes.

11 Q. You were asked to look at certain features of  
12 Lakanal House which he had identified in his reports,  
13 and you were asked which, if any, of those features you  
14 would have expected to be identified if the 2006/2007  
15 refurbishment had gone through the process for obtaining  
16 building control approval.

17 A. Correct.

18 Q. Then in relation to the Fire Safety Order, you were  
19 asked which parts of the building it required the  
20 London Borough of Southwark to risk assess.

21 A. Yes, correct.

22 Q. Then -- I'm now at the top of page 7 -- you were asked  
23 in general terms how would a fire risk assessment be  
24 carried out in your expert opinion for a building such  
25 as Lakanal House.

1 A. Yes.

2 Q. Then, thinking back to the features of the building that  
3 BRE had drawn attention to, you were asked which, if  
4 any, of them, or any combination of them, ought to have  
5 been identified in a fire risk assessment, had one been  
6 carried out.

7 A. Correct.

8 Q. Is it right that you conducted a site visit of Lakanal  
9 House on 8 January this year?

10 A. Yes, that's right.

11 Q. With those introductions out of the way, in terms of the  
12 sort of topics you've been asked to consider and that  
13 you're going to help us with, I'd like to look with you  
14 at the Building Regulations and the approved document,  
15 not for the purposes of a law lecture, far from it, but  
16 simply so that the members of the jury can understand  
17 the different sources that one might turn to as  
18 an expert to try to understand the answers, and work out  
19 the answers, to some of the questions that we've asked  
20 you to consider.

21 If I could turn firstly to the Building Regulations.  
22 I'll put those up on the screen. These are the  
23 Building Regulations 2000. If we turn to page two, I do  
24 so simply to draw attention to the fact that some  
25 phrases that are commonly used in the English language,

1           such as "Building work" at the top, in fact have  
2           a special definition within these Building Regulations;  
3           is that right?

4    A.   Yes.

5    Q.   Then on page 3, we can see that the phrase "Material  
6           alteration" also has its own special definition within  
7           these regulations.

8    A.   Yes.

9    Q.   If we go to page 4, there's part 2, "Control of building  
10          works," and at 3(1) we then see a definition of  
11          "Building work;" is that right?

12   A.   Yes, yes.

13   Q.   At (c), the definition of building work can mean the  
14          material alteration of a building?

15   A.   That's correct.

16   Q.   Then just to make matters more complicated, in  
17          paragraph 3(2), we get a definition of "Material  
18          alteration"; is that right?

19   A.   Yes, correct.

20   Q.   To make matters further more complicated, that  
21          definition carries within it the phrase "Relevant  
22          requirement"; do you see that?

23   A.   Yes.

24   Q.   Then at subparagraph (3), the phrase "Relevant  
25          requirement" itself has its own definition.

1 A. Yes.

2 Q. We see that over the page on page 5.

3 Page 5 refers to B1, something we've heard about  
4 before in the context of the approved document, we'll  
5 see it again --

6 A. Yes.

7 Q. -- "Means of warning and escape", and B4, "External fire  
8 spread".

9 Then we have a heading "Requirements relating to  
10 building work", Regulation 4, which I think we've heard  
11 mentioned before, which carries within it the concept of  
12 complying with requirements contained in Schedule 1?

13 A. Yes.

14 Q. Just pausing there, before we go to Schedule 1, and  
15 thinking now about pages 12 and 13 of your report, is it  
16 right that the duties under these Building Regulations  
17 are placed on whoever is carrying out the work?

18 A. That's correct.

19 Q. Is it right that that can be more than one person at  
20 a time?

21 A. Yes, correct.

22 Q. Thinking about the London Borough of Southwark and the  
23 fact that it was a local authority, as such itself part  
24 of the process of issuing Building Control approval, did  
25 the Building Regulations apply to it in the same way as



1 to private companies, or did it have any special status?

2 A. No, it's exactly the same process, and it had no special  
3 status.

4 Q. If we go back then to the Building Regulations and have  
5 a look at Schedule 1 at page 17. These refer back to  
6 Regulation 4, and then they set out requirements. The  
7 first one is structural, part A, that doesn't concern  
8 us. We're interested in part B, "Fire safety".

9 Part B1, which we will be interested in, is about  
10 "Means of warning and escape", and we're going to be  
11 focussing on escape, and it says:

12 "The building shall be designed and constructed so  
13 that there are appropriate provisions for the early  
14 warning of fire, and appropriate means of escape in case  
15 of fire from the building to a place of safety outside  
16 the building capable of being safely and effectively  
17 used at all material times."

18 So to the extent that there is an obligation to  
19 comply with the Schedule 1 requirement, that is how  
20 Schedule 1 phrases it; is that right?

21 A. Yes, correct.

22 Q. Without being disrespectful to the law, how would you  
23 characterise that the language in that is expressed as  
24 compared to the approved documents that we're going to  
25 turn to in due course?

1 A. It's a very general phraseology that just gives  
2 a blanket cover to what is coming out of the approved  
3 document.

4 Q. Before we go then to the approved document, which  
5 provides guidance on how to comply with this  
6 requirement, and has a status which we'll talk about in  
7 due course, may I ask you about some general points of  
8 principle that I have asked factual witnesses about  
9 before you've come to give evidence.

10 Firstly, this proposition: that it is a general  
11 principle of the Building Regulations that work should  
12 not make the performance of the building any worse than  
13 it was before the works were carried out. Firstly, and  
14 putting aside the possibility of any exceptions at this  
15 stage, is that a general principle of the regulations?

16 A. Yes, it is.

17 Q. Secondly, I turn to ask you about whether there are any  
18 exceptions to that principle that we ought to be aware  
19 of.

20 A. The exceptions are around what the actual  
21 Building Regulations say, so if the requirements of the  
22 Building Regulations are lesser than the actual  
23 construction that's in place, then you can go back to  
24 using the regulations as the guide, so if there was  
25 a 60-minute fire door, for example, that was in place,

1 and the regulations say it only needs to be a 30-minute  
2 fire door, you could actually replace the existing door  
3 with a 30-minute fire door.

4 Q. So if you comply with the Schedule 1 requirements, that  
5 is sufficient, even if coincidentally you are taking the  
6 building from a higher level of performance to a lower  
7 one, provided the lower one complies with current  
8 standards; is that right?

9 A. Yes, that's right, but you have to be careful that there  
10 is no knock on effect on any other areas of the  
11 regulations, or other requirements. So if, for example,  
12 the -- by reducing some former specification, be it the  
13 fire door, in a wall that reduces the overall impact of  
14 the wall, the fire resistance required by that wall,  
15 then you have to be careful that you're not reducing it  
16 just for that one item, you have to look at what impact  
17 it has, knock on effect, with the other areas of the  
18 building, and their requirements to comply with the  
19 regulations.

20 Q. Because the building is just that, a building, as it  
21 were, a system, and you can't look at one specific  
22 feature of it in isolation from the building as a whole;  
23 is that the point you're making?

24 A. Yes, correct.

25 Q. Then this second general proposition: in some

1           circumstances, and depending on the nature and extent of  
2           the works, doing work on a building will trigger  
3           a requirement to bring the building up to current  
4           standards?

5   A.   Yes, I think the extent -- it depends on the extent of  
6           the work, but if somebody's maintaining the building and  
7           they're going in there carrying out a small patch  
8           repair, as long as that doesn't make the situation any  
9           worse, they don't need to upgrade the -- take the  
10          ceiling, for example.

11   Q.   If you could give an explanation firstly of what you  
12          mean by a "small patch repair" I think that would help,  
13          and then perhaps an example.

14   A.   Okay.  "Patch repair" is if a maintenance man on site  
15          that -- has to carry out some redecorations or carry out  
16          some replacement of a broken ceiling tile, that sort of  
17          work would be a patch repair.  If you're looking at  
18          replacing large elements of a fire partition -- or  
19          fire-rated partition, then you have to comply with  
20          current regulations for that work, in my view.

21   Q.   I wanted to get your assistance on how this works in  
22          practice, because it seemed to me that there could in  
23          practice be some tension, if one imagines the owner of  
24          a building with a limited budget, rather than  
25          an unlimited budget, between the desire to prevent the

1 fabric of the building deteriorating, and therefore to  
2 repair it, to keep things as they were on the one hand,  
3 and on the other hand not wanting as a result of  
4 carrying out a repair to trigger a requirement to alter  
5 the entire building and bring it up to current  
6 standards.

7 A. Yes. It depends what element of the work is involved,  
8 but yes, there is a tension. Obviously for the landlord  
9 doing the work, he's got to budget and provide for the  
10 costs of that element of work being undertaken, and the  
11 regulations take the point that you have not got to make  
12 the situation any worse, and that really allows for  
13 patch repair and the running of that building without  
14 having to replace all of the elements as you go along to  
15 current standards.

16 Q. What I'd like to do next is to look at the approved  
17 document as a source of material that assists in working  
18 out whether or not works comply with the schedule 1  
19 requirement. I'll put the approved document B on the  
20 screen.

21 This is, as we understand it, the version that was  
22 applicable at the time that we are concerned with, the  
23 works in 2006/2007?

24 A. Correct.

25 Q. It's issued by the then office of the Deputy Prime

1 Minister. It applies to the Building Regulations 2000,  
2 and it deals specifically with fire safety. Then it  
3 breaks it down B1 to B5 in the way that we've seen  
4 earlier in the Schedule 1 requirement.

5 If I then turn in that to part of the introductory  
6 comments at page 7, this is headed "Use of guidance."  
7 about four lines in, it says:

8 "This document is one of a series that has been  
9 approved and issued by the Secretary of State for the  
10 purpose of providing practical guidance with respect to  
11 the requirements of Schedule 1 to and Regulation 7 of  
12 the Building Regulations 2000."

13 Then about three paragraphs further down, underneath  
14 the first paragraph in bold, it says:

15 "The approved documents are intended to provide  
16 guidance for some of the more common building  
17 situations. However, there may well be alternative ways  
18 of achieving compliance with the requirements.

19 "Thus there is no obligation to adopt any particular  
20 solution contained in an approved document if you prefer  
21 to meet the relevant requirement in some other way."

22 Does that explain the status of the approved  
23 document?

24 A. Yes, it does, yes. The approved document is guidance  
25 only, and if you look at the British Standards behind

1           that, you have then to provide an engineering solution  
2           to actually achieve the requirements of the British  
3           Standard, if you go away from these approved documents.

4    Q.   That's the first mention that you've made of British  
5           Standards. We've looked at the Building Regulations,  
6           and we've looked here at the status of the approved  
7           document and, as I've explained at the outset, we're  
8           looking at this not for the purposes of a law lecture,  
9           but just to explain the different materials that people  
10          in your profession might turn to for information and  
11          guidance. Can you explain to the jury in a little more  
12          detail what British Standards are and how they fit into  
13          that picture?

14   A.   Okay. British Standards are developed for different  
15          parts of buildings, materials, et cetera, and give  
16          detailed guidance on very specific areas, and the  
17          Building Regulations at this time referred to British  
18          Standard 5588, which explains in detail the requirements  
19          for some of the areas of the -- fire precautions and  
20          design work, for example, you have other British  
21          Standards that define electrical requirements, British  
22          Standards that will define in lots of detail the  
23          materials that should be used and the testing of  
24          materials.

25                 So the guidance generally is followed from the

1 approved documents by surveyors and architects, because  
2 that's an easier form of going down that route rather  
3 than actually having to dig into and then try and  
4 provide an engineering solution to the British Standard,  
5 which can be quite complex. But in some respects, it's  
6 needed on complicated buildings, and with that I mean,  
7 if you were, for example, to look at shopping centres  
8 and the fire precautions involved in that, you would  
9 want a fire engineered solution rather than trying to  
10 work something out through the approved documents.

11 Q. Then going back to the approved document, they've looked  
12 at the status of it on the page that's currently on  
13 screen. Is it right that within the approved document  
14 itself, which runs to some 160 pages, one has a mixture  
15 of general propositions of principle and then more  
16 detailed guidance?

17 A. Yes, what we've tried to do in the approved documents is  
18 pick on the common threads of what people come across in  
19 construction, so they will cover it generally and then  
20 try and pick on some smaller topics that keep getting  
21 repeated throughout the industry.

22 Q. We'll come to that when we look at the reasons for some  
23 of the views you've expressed in your report, but at  
24 this stage if I could just ask you to turn to page 10,  
25 which is the general introduction. We see here the



1 general introduction to fire safety, "Arrangement of  
2 sections":

3 "The functional requirements B1 to B5 of Schedule 1  
4 of the Building Regulations are dealt with separately in  
5 one or more sections. The requirement is reproduced at  
6 the start of the relevant sections, followed by  
7 an introduction to the subject.

8 "The provisions set out in this document deal with  
9 different aspects of fire safety, with the following  
10 aims."

11 Then one sees the general aims of B1 to B5. Then at  
12 0.3:

13 "Whilst guidance appropriate to each of these  
14 aspects is set out separately in this document, many of  
15 the provisions are closely interlinked."

16 Would you agree with that?

17 A. Yes, indeed.

18 Q. Then at the bottom of 0.3, we see it says:

19 "Interaction between these different requirements  
20 should be recognised where variations in the standard of  
21 provision are being considered. A higher standard under  
22 one of the requirements may be of benefit in respect of  
23 one or more of the other requirements. The guidance in  
24 the document as a whole should be considered as  
25 a package aimed at achieving an acceptable standard of

1 fire safety."

2 Do you agree with that?

3 A. Yes, I would, yes.

4 Q. Can you explain, and add to that if you wish, in  
5 relation to how those general principles fit with the  
6 language used in Schedule 1 of the Building Regulations?

7 A. Because of the Schedule 1 being so general, the  
8 explanation to fit into those from the approved  
9 documents may come from any one or more of the sections  
10 of the fire safety side, so it could come from B1, B4,  
11 and even B2 and B3 together, so to look at any situation  
12 is never as clear as perhaps you would hope, in that  
13 it's either clearly identified in one area, quite often  
14 you have to look in several areas of the approved  
15 document to try and satisfy the items in Schedule 1.

16 Q. I'm going to turn away, now, for the moment from the  
17 approved document and ask you a few questions about the  
18 Building Control approval process. I'm looking at  
19 page 17 of your report. Can you help us in general  
20 terms with an explanation of when it is that Building  
21 Control approval is required for works, and indeed what  
22 it means to seek Building Control approval?

23 A. Building Control approval should be obtained prior to  
24 undertaking the work on site. Sorry, the second part of  
25 the question: what does it mean?

1 Q. What is Building Control approval?

2 A. What is Building Control approval. It's basically, you  
3 have got to submit drawings, specification, details that  
4 will enable the Building Control officer to review the  
5 work that you're proposing to undertake so that he can  
6 check that it complies with the Building Regulations.

7 Q. So a local authority will have a Building Control  
8 department; is that right?

9 A. Correct, yes.

10 Q. In certain circumstances, one needs to send them either  
11 full plans or a building notice; is that right?

12 A. Yes.

13 Q. Is the trigger for the need to send the Building Control  
14 department either full plans or a building notice the  
15 fact that you're carrying out building work, building  
16 work having that special definition in the regulations?

17 A. Yes, correct.

18 Q. What is your opinion on whether the 2006/2007  
19 refurbishment of Lakanal House required the local  
20 authority Building Control department to be notified?  
21 I ask this firstly with either full plans being  
22 deposited, or a building notice. Should one of those  
23 have been done?

24 A. The work in my view, because it involved work -- fire  
25 precaution work, it should have been subject to full

1 plans submission rather than a building notice  
2 submission.

3 Q. You've answered my second question as well. So firstly  
4 the formal process should have been engaged, by which  
5 I mean using either full plans or a building notice, and  
6 secondly, in this case it should have been full plans;  
7 is that right?

8 A. Should have been, yes.

9 Q. Now, of course we've heard that did not happen, so my  
10 next series of questions is simply hypothetical. Based  
11 on your experience, can you help us with what, at around  
12 that time in 2006, would have been the next stages in  
13 the process, had full plans been lodged with a local  
14 authority's Building Control department?

15 A. Okay. When one submits details to the Building Control  
16 department, they have a period in which they can review  
17 those documents, and during that review process, they  
18 may ask questions and raise issues with it, or they may  
19 just approve the documents. If they have issues, they  
20 will generally write to you and ask you to resolve those  
21 issues, or indeed they can get through the process which  
22 they have up to two months to cover that process, that  
23 includes an extension of time that they can acquire as  
24 well, to -- they can actually issue an approval to the  
25 Building Control process, or they can issue an approval

1 with some conditions that you have to meet, but  
2 generally most will require clarification during the  
3 actual process.

4 Q. I'm not, for obvious reasons, going to ask you to  
5 comment on how the Building Control department in the  
6 London Borough of Southwark worked at the time, so if  
7 I ask you more generally about Building Control  
8 departments in local authorities at the time, based on  
9 your experience, to what extent did they employ people  
10 with particular expertise in, or knowledge about, fire  
11 safety issues?

12 A. Generally, there would be a Building Control officer who  
13 would be assigned to the project, and he would either  
14 have that expertise himself, that specialism, or he  
15 would have a colleague that he would refer to, to  
16 provide that advice. Most Building Control teams have  
17 specialists that they refer to.

18 Q. So perhaps there are people in this court who, when they  
19 think of Building Control, automatically think about  
20 structural issues and matters to do with inspection and  
21 foundations and the like, but is it your expert opinion  
22 that, at the time we're concerned with, there would have  
23 been specialist knowledge more broadly than that within  
24 the Building Control department, which would have had  
25 a particular focus on fire safety issues as well?

1 A. Generally, I can't obviously comment on Southwark,  
2 because I don't know the Building Control team at  
3 Southwark, but generally in local authorities, the  
4 Building Control team would have a specialist who they  
5 would be able to refer to internally to get advice on  
6 fire precautions, yes.

7 Q. The next question on the same issue of the role of  
8 Building Control departments, once they're formally  
9 engaged by the depositing of full plans, what happens,  
10 or what happened in around 2006/2007, if plans were  
11 changed, if the project changed, after plans were  
12 deposited at Building Control?

13 A. Then you would have to go back for approval of the  
14 changes, if indeed those changes affected anything that  
15 was a material change under the Building Regulations.

16 Q. So if a specification were changed in a material way  
17 after plans had been deposited at the Building Control  
18 department, the Building Control department ought to be  
19 updated; is that right?

20 A. Yes, correct.

21 Q. What, if any, sort of inspection would you expect  
22 a Building Control department to carry out in relation  
23 to works such as the works at Lakanal House, which  
24 I think I'm right in saying do not particularly have  
25 a structural element to them?

1 A. The inspection regime changes dependent on the type of  
2 work being undertaken and what work might be covered  
3 over during the process of doing that work, but at  
4 something like Lakanal House, I believe that they would  
5 carry out an inspection at completion of the work on the  
6 fire precaution works. If there were electrical works  
7 going on, or air conditioning works, or something that  
8 affected the ventilation through mechanical means, they  
9 may carry out an inspection to witness testing.

10 For example, if someone was digging foundations,  
11 a notice has to go in to the Building Control team to  
12 notify them of when the trench has been dug so the  
13 Building Control officer can come out and inspect the  
14 bottom of the trench, to make sure it's suitable for  
15 them to form the foundations.

16 Q. What is the formal process that takes place once the  
17 works have been completed, if they are works where  
18 Building Control departments have been engaged by the  
19 depositing of full plans?

20 A. There is a notice that -- basically of cards, they give  
21 you some postcards to fill in that the contractor has,  
22 or the person undertaking the work has, and he will  
23 complete them and send them off to notify the Building  
24 Control department of completion of the work.

25 Q. You explained to us that the Building Regulations

1 applied to the London Borough of Southwark in the same  
2 way that they applied to others. What was your  
3 experience in around 2006/2007 of the extent to which  
4 local authorities did in fact put their own building  
5 projects through their formal building control  
6 processes?

7 A. My experience is that the majority, if not all, for  
8 projects, perhaps other than schools, all went through  
9 the internal Building Control team.

10 Q. Can I ask you then about self-certification schemes?  
11 I think it's right that FENSA, which we've heard  
12 something about, is an example of a self-certification  
13 scheme.

14 A. Sorry, say that again.

15 Q. FENSA is an example of a self-certification scheme; is  
16 that right?

17 A. Yes it is, yes.

18 Q. Could you just explain generally what  
19 a self-certification scheme is?

20 A. Okay, it is a scheme that was put forward to try and  
21 simplify where you have a competent person undertaking  
22 the work, that they could self-certify the scheme that,  
23 it complied with Building Regulations. So it covered  
24 various aspects, building FENSA, so we had electricians,  
25 gas installation, et cetera.



1           So it was a competent person scheme so that they  
2           took on the responsibility of making sure that the  
3           element of work that they were undertaking complied with  
4           the regulations.

5   Q.   I think you are aware that a Mr Giles Wilson has given  
6           evidence to the court about the FENSA scheme in more  
7           detail --

8   A.   Yes.

9   Q.   -- and about the way in which the works carried out at  
10          Lakanal House may or may not have complied with it, and  
11          should or should not have been certified under it.

12  A.   Yes.

13  Q.   Do you want to add anything to the evidence that he's  
14          given to this court about what parts of the windows,  
15          doors and panels properly fell within the FENSA scheme?

16  A.   Okay.  I agree with what he had to say.  This is the  
17          windows, and the glazing only of the doors, that  
18          actually fall within the FENSA scheme.  The panels  
19          beneath do not fall within the FENSA scheme.

20  Q.   What I'd like to do now is to turn and ask you which  
21          parts of the 2006/2007 works were potentially  
22          controllable under the Building Regulations.  I'm  
23          thinking about page 20 of your report.  If you could  
24          explain firstly what is meant by the phrase "Potentially  
25          controllable under the Building Regulations".

1 A. For works to be controllable under the  
2 Building Regulations, it has to -- the work that you're  
3 undertaking has to fall within the Building Regulations,  
4 and we come back to this phrase of not making it any  
5 worse than it currently is on site. The controllable  
6 works are works that should actually then be submitted  
7 in a building notice -- sorry, a building notice or full  
8 plans notice to the Building Control team.

9 Q. The members of the jury will have had a flavour of the  
10 fact that the works in 2006/2007 covered a wide range of  
11 aspects of the building, and not all of those are  
12 relevant to the issues in these inquests. Narrowing it  
13 down, you have identified in your report in your expert  
14 opinion five features of the works that were potentially  
15 controllable under the regulations, is that right?

16 A. Yes, correct.

17 Q. If I just list those, you've identified: the balcony  
18 doors; the corridor walls, specifically their reaction  
19 to fire; the composite panels; the balcony panels; and  
20 the cross-ventilation scheme.

21 A. Correct.

22 Q. Then if I narrow matters down further with you and turn  
23 firstly to the corridor walls' reaction to fire, is it  
24 the case that if the paint that was applied was as  
25 specified, namely fire-retardant paint, or coating

1 class 0, that would have complied with the

2 Building Regulations?

3 A. Yes, that is my opinion.

4 Q. Then if I narrow matters down further by asking about  
5 the cross-ventilation scheme, is it the case that  
6 because you and we haven't been able to establish the  
7 precise specification of what was replaced in 2006/2007,  
8 one can't say whether what was installed made matters  
9 worse, and therefore one can't take any further the  
10 question of whether the Building Regulations made those  
11 works controllable.

12 A. Yes, that's correct, the air flow, basically we don't  
13 know what the existing vents did in allowing the volume  
14 of air to travel through there, and therefore we can't  
15 say whether the new ones were better or worse.

16 THE CORONER: It's a while since the members of the jury  
17 have heard about the cross-ventilation scheme. It has  
18 been touched on earlier, but I think it might be helpful  
19 to them if you could just explain in a little more  
20 detail which element of the work you're talking about  
21 there.

22 A. Okay. At the ends of the corridors, at either end of  
23 the corridor, there are some large louvred vents, most  
24 of the size of the actual end of the corridor. These  
25 are smoke vents, basically, so they're allowing the

1 smoke to escape from the corridor. The vents have been  
2 replaced, they're louvre vents and they've been  
3 replaced, and they've got a fly mesh on the back of them  
4 which actually inhibits air flow through those. But  
5 what we don't know is what was there before, and whether  
6 the actual vents that were there before actually were  
7 fully in the opening, or whether it was only part of the  
8 opening that now exists. So I can't say whether it's  
9 a better or worse situation.

10 THE CORONER: Thank you.

11 MR MAXWELL-SCOTT: Narrowing the issues further, if I could  
12 then ask you to take up the jury bundle at tab 18.

13 Mr Clark will provide you with a copy. (Handed)

14 What we have here are three diagrams that show the  
15 three features that you identify as potentially  
16 controllable, but we haven't turned to yet. They are  
17 the balcony panels that we see identified with the  
18 number five on pages 2 and 3; is that right?

19 A. Yes.

20 Q. Then the balcony doors that we see also on pages 2 and 3  
21 with a glazed top half and a composite panel with  
22 insulation core bottom half.

23 A. Yes.

24 Q. Then the composite panels, and we see those in various  
25 places, we see them in the bottom half of those balcony

1 doors. On page 2, we can see a full height composite  
2 panel with insulation core next to the kitchen door.

3 A. Yes.

4 Q. Then on page 1 we can see what we know to be the same  
5 specification composite panels with insulation core  
6 under the bedroom windows; is that right?

7 A. Yes, correct.

8 Q. Now, is it right that in your expert opinion each of  
9 those features, the balcony doors, the balcony panels,  
10 and all the composite panels, were features that ought  
11 to have been put through the process of obtaining  
12 Building Regulations approval?

13 A. Yes, that's correct.

14 Q. Others may ask you in more detail about the balcony  
15 doors and the balcony panels, but I'm going to ask you  
16 to focus on the composite panels, and specifically the  
17 composite panels underneath the bedroom windows.

18 A. Okay.

19 Q. You're aware, I think, having followed some of the  
20 evidence in this case and having heard the evidence of  
21 Mr Crowder this morning, of their potential importance  
22 in the events that we're considering in these inquests?

23 A. Yes.

24 Q. What we would like you to do is give us your expert  
25 opinion on what characteristics the composite panels

1           underneath the bedroom windows that we can see on page 1  
2           of tab 18 should have had in order for them to comply  
3           with the regulations at the time.

4    A.   Okay.  My view is that the panels should have had  
5           a 30-minute fire resistance, and that they should have  
6           had a class 0 spread of flame.

7    Q.   Those are the two key points; is that right?

8    A.   Yes.

9    Q.   That is the view that you expressed in your expert  
10          report?

11   A.   It is, yes.

12   Q.   It may be that people will want to ask you about those  
13          points in more detail, and it's right to say, is it not,  
14          firstly that you don't give detailed reasons in your  
15          report for forming that view?

16   A.   I don't, no.

17   Q.   Is it also right to say that there is no one specific  
18          paragraph in approved document B that is precisely on  
19          point in relation to the fire resistance 30-minute  
20          requirement?

21   A.   Correct, it's -- every building is different, and  
22          unfortunately Lakanal House doesn't fall within the  
23          examples set out in the approved documents, so as  
24          a result of that, you have to read through the documents  
25          in quite a tortuous way to come to the answer, I'm

1           afraid.

2    Q.   That's not a very encouraging introduction to what we're

3           about to do.

4    A.   Sorry.

5    Q.   But there we have it.  What I would like to do first,

6           because it is shorter and simpler, is to ask you to

7           explain your reasons behind your expert opinion that

8           they should have been class 0.  I think if you take up

9           the approved document, approved document B, am I right

10          in thinking that you want to start at page 88?

11   A.   Yes.

12   Q.   Do I have the right page up on the screen?

13   A.   Yes, it is, yes.

14   Q.   If you could -- I'll make it full screen, and then if

15          you could tell us where you want us to focus and then

16          take us through the other parts of this document that

17          you rely on to reach your expert opinion.

18   A.   Okay, at the bottom of that page, B4.ii --

19   Q.   Just give me a moment to enlarge it?

20   A.   B4.ii:

21                "Provisions are made in section 13 for the fire

22                resistance of external walls and to limit the

23                susceptibility of the external surface of walls to

24                ignition and to fire spread."

25                So we're dealing with the spread of flame on the

1 external walls, and from B4.ii you then move on to  
2 section 13. So if you then move on to page 90.  
3 Actually, if we move to page 89 and 13.2. 13.2, this  
4 general paragraph is about having buildings too close  
5 together. It's fire spreading from one building to  
6 another, however hidden in here is an additional  
7 sentence, four lines down:

8 "... irrespective of the boundary distance, the  
9 external walls of high buildings [Lakanal House is  
10 clearly a high building] and those of the assembly and  
11 recreation purpose group. This is in order to reduce  
12 the surface's susceptibility to ignition from  
13 an external source, and to reduce the danger from fire  
14 spread up to the external face of the building."

15 So it's again very general guidance, but then we  
16 move across the page to 13.5 on page 90. 13.5, at the  
17 very top there:

18 "The external surfaces of walls should meet the  
19 provisions of diagram 40."

20 Before we move across to diagram 40, if we then move  
21 across to paragraph 13.7, "External wall construction":

22 "The external envelope of a building should not  
23 provide a medium for fire spread if it is likely to be  
24 a risk to health of safety. The use of combustible  
25 materials for cladding framework, or of combustible



1 thermal insulation as an overcladding or in ventilated  
2 cavities, may present such a risk in tall buildings,  
3 even though the provisions for external surfaces in  
4 diagram 40 may have been satisfied.

5 "In a building with a storey 18 metres or more above  
6 ground level, insulation material used in ventilation  
7 cavities in the external wall construction should be of  
8 limited combustibility (see appendix A)."

9 Then if we move across to page 91, in the bottom  
10 centre of that page, we have the diagram e, so "Any  
11 building". This conflicts a little bit, which is the  
12 nature of approved documents, I'm afraid, until you get  
13 to the bottom of it. At the top "Any commendation over  
14 18 metres" is a dark shaded area, and to the right it  
15 says class 0, so class A for any elevation above  
16 18 metres. It does have a lighter greyed out colour of  
17 the area of up to 18 metres, which is a class 3.

18 Q. Is it right that flat 65 on the 9th floor and above were  
19 above 18 metres, and therefore a class 0 requirement?

20 A. Correct.

21 Q. Is that where you reach your opinion that the class 0  
22 requirement was applicable to the facts that we're  
23 interested in?

24 A. That is correct. There is another area which we'll come  
25 on to when we go to the composite structures, which also

1           impinges on the panels in the bedrooms as well.

2    Q.   Let me ask you then to turn to the material you rely  
3           upon to form your view that the composite panels under  
4           the bedroom windows should have been fire-resisting to  
5           30 minutes.  I think you want to start this at  
6           page 29 -- is that right -- page 30 on the electronic  
7           version?

8    A.   Yes, that's right.

9    Q.   If you take us through your reasoning, where do you want  
10           us to start?

11   A.   Okay, "Balconies and flats", 3.9, the bottom right-hand  
12           corner.  This is where you have to start, because this  
13           is the only hint, if you like, in the approved  
14           documents, of where we should be going to find  
15           an answer.  3.9:

16                 "The guidance in section 2, paragraphs 2.5 and 2.6  
17           on balconies and flat roofs of dwelling houses, applies  
18           equally to flats and maisonettes.  In addition any  
19           balcony outside an alternative exit to a dwelling more  
20           than 4.5 metres above ground level should be a common  
21           balcony and meet the conditions in paragraph 3.15."

22                 So actually it didn't give us many clues, but it  
23           then referred us on to 3.15.  So if we move on to 2.15,  
24           which is on page 32 on my document.

25                 Paragraph 3.15 on the right-hand side there:

1           To be effective, an alternative exit from a flat or  
2           maisonette should satisfy the following conditions."

3           The conditions below actually don't give us any  
4           further guidance, but at the bottom of that we have  
5           a note:

6           "Any such access to a final exit or common stair  
7           should meet the appropriate provisions dealing with the  
8           means of escape in the common parts of the building."

9           Then it refers to another paragraph. So we've  
10          brought in stairs now, so we've dropped the balconies,  
11          we've lost balconies for some reason, but we've gone to  
12          stairs and lobbies. So if we then move on to 3.17,  
13          which is on page 33, "Means of escape in the common  
14          parts of flats and maisonettes":

15          "The following paragraphs deal with means of escape  
16          from the entrance doors of dwellings to a final exit.  
17          They should be read in conjunction with the general  
18          provisions in section 6."

19          So again, there's no answers there, but they're now  
20          referring us to section 6, which generally is where  
21          we're going to find the answers. If we then move to,  
22          just to cover one other area, because there is element  
23          which is also on page 37, 3.45, "External escape stairs"  
24          at the bottom left-hand side:

25          "If the building (or part of the building) is served

1 by a single access stair, that stair may be external if  
2 it ..."

3 Then if we drop down to -- sorry, it doesn't then  
4 help us apart from:

5 "... meets the provisions in paragraph 6.25."

6 As you notice there in b.

7 3.46:

8 "Where more than one escape route is available from  
9 a storey ... some of the escape routes from that storey  
10 of part of the building may be by way of an external  
11 escape stair provided that there is at least one  
12 internal escape stair from every part of each storey."

13 Then in 3.46.a:

14 "... serves a floor not more than six metres above  
15 either the ground level or a roof or podium which is  
16 itself served by an independent protected stairway; and

17 "b. meets the provisions in paragraphs 6.25."

18 So this is where it guides us towards 6.25.

19 Q. Just give me a moment to show the members of the jury  
20 the reference to paragraph 6.25, which is at the top of  
21 the right-hand column; is that right?

22 A. Yes, it is, yeah.

23 Q. Thank you.

24 A. So if we then -- before we get to 6.25, it's worth just  
25 touching -- there are on page 44, paragraph 4.26, this

1           is "Design for horizontal escape" --

2   THE CORONER:  Sorry, just let's get it on the screen first.

3   MR MAXWELL-SCOTT:  This is 4.26?

4   A.  Yes, 4.26, page 44.

5   Q.  I have it up now.

6   A.  This is for buildings other than dwellings, but again we

7       have to cover these different -- the different guidance

8       just to make sure you don't miss anything, but again

9       here on 4.26:

10           "Guidance on the use of external escape stairs from

11       buildings other than dwellings is given in

12       paragraph 5.33."

13           Then if we go over to page 50, item 5.33 --

14  Q.  Just give me a moment.

15  A.  Okay.

16  Q.  So now on paragraph 5.33.

17  A.  Okay.  5.33 unfortunately is no help for us, but 5.34:

18           "Where external stairs are acceptable as forming

19       part after escape route, they should meet the provisions

20       in paragraph 6.25."

21           So everybody's pointing us towards section 6, but

22       we've changed from what said earlier, we've lost the

23       balcony unfortunately, and we've now moved into stairs.

24       So if we then go to section 6, page 51, item 6.2.

25  Q.  Yes, I have it up.

1 A. Thank you. "Fire resistance of closures":

2 "Details of fire resistance test criteria and  
3 standards of performance, are set out in appendix A.  
4 Generally a 30-minute standard is sufficient for the  
5 protection of means of escape."

6 Then in 6.3:

7 "All walls, partitions and other enclosures that  
8 need to be fire-resisting to meet the provisions of this  
9 approved document ..."

10 Including roofs, et cetera.

11 So we have general guidance in section 6.2 and 6.3.  
12 6.8 below refers to glass, but it's the panels that  
13 we're looking at, not the glass. So if we then move  
14 over the page to 53, and 6.23.b. "External walls of  
15 protected stairways":

16 "The distance between any unprotected area in the  
17 external enclosures to the building and any unprotected  
18 area in the enclosure to the stairway should be at least  
19 1,800 millimetres."

20 Just park that for a minute, and if we drop down to  
21 "External escape stairs", 6.25.a, which is the section  
22 that previously we were referred to, and it repeats  
23 6.24.b, effectively:

24 "All doors giving access to the stair should be  
25 fire-resisting and self-closing."

1           That's the first point, and then in b:

2           "Any part of the external envelope of the building  
3           within 1,800 millimetres of (and nine metres vertically  
4           below), the flights and landings of an external escape  
5           stair should be of fire-resisting construction, except  
6           that the 1,800-millimetre dimension may be reduced to  
7           1.1 metres above the top level of the stair if it is not  
8           a stair up from a basement to the ground level."

9           So what that's saying is basically everything below  
10          the balconies has to be fire-resisting, other than the  
11          very top floor, where it's only limited to 1.1 metres in  
12          height from the floor level of the top floor.

13          On the right-hand side, there's a diagram that tries  
14          to explain this, diagram 22 on page 54. Go to the  
15          diagram at the top first, but it's probably better  
16          explained by the one below. Remember that we've been  
17          directed from balconies to stairs, so it doesn't  
18          actually show balconies, it shows stairs and landings  
19          and lobbies, but on the top diagram, there's the words  
20          that you can just see on the right-hand side middle,  
21          which says:

22                 "1,800-millimetre zone of fire-resisting  
23                 construction at side of stair."

24          So the dark greyed out area on that diagram has to  
25          be fire-resisting, okay? Then if we drop down to the

1           one below.

2    Q.   This is example B?

3    A.   Sorry, section B-B, yeah.

4    Q.   Section B-B on the right-hand side?

5    A.   So you can see from this, this is showing an external

6           staircase, okay, with a door coming out from one of the

7           floors, just by example, but what it's saying is that

8           everything beneath the escape route has to be

9           fire-resisting for a nine-metre zone below the stair, or

10          in our case a balcony, and that applies to the height

11          of -- because of the balconies being every other floor,

12          in my view it catches the bedroom panels as well.

13   Q.   So just pausing there, we're looking in section B-B at

14          a diagram that is generally showing stairs with short

15          horizontal sections.  Are you inviting us to imagine

16          that diagram with a horizontal balcony, as at Lakanal,

17          leading to a fire escape door and then to an internal

18          staircase?

19   A.   Yes I am, yes.

20   Q.   You're inviting us to take the view that the same

21          principles would apply to the horizontal balcony as to

22          the staggered stairs with horizontal sections in this

23          diagram?

24   A.   Yes.

25   Q.   Thank you.



1 A. Okay, so we've got to that stage, so then we jump a few  
2 pages, you'll be glad to hear, then look at page 116,  
3 table A1. We're now in appendix A, which he we referred  
4 to earlier, and if you go down to item 5c.

5 Q. Just pausing there, so we can see what this is, it's  
6 appendix A, page 116, "Performance of materials and  
7 structures", table A1, "Specific provisions of test for  
8 fire resistance of elements of structure" and then on  
9 the left-hand column, "Part of building", and at 5,  
10 you're drawing your attention to?

11 A. 5c.

12 Q. 5c, "External walls":  
13 "Any part adjacent to a external escape route."  
14 Then we see a reference to the diagram we've just  
15 been looking at.

16 A. Correct, it's a reference to section 6 and diagram 22,  
17 yeah.

18 Q. I'll just make it smaller for a second so we can see  
19 what these columns are headed. The middle column in the  
20 first three is "Integrity;" is that right?

21 A. Yes.

22 Q. Which particular box should we be looking at then?

23 A. Well, the integrity, we've got 30 minutes for the:  
24 "... minimum provision when tested to the relevant  
25 European Standard."

1           So the penultimate column.

2   THE CORONER:   That is the shaded column, is it?

3   A.   RE30.

4   MR MAXWELL-SCOTT:   Thank you.   So that's the 30 minutes that  
5           you --

6   A.   So that gives us the 30 minutes.   If we actually turn  
7           over the page to page 117, which is still table A1  
8           continued.

9   Q.   Just pausing there, was the second column the British  
10          Standard, also 30 minutes?

11   A.   Yes.

12   Q.   Thank you.   Then over the page to 117, still in table  
13          A1.

14   A.   Then item 11b, so:

15            "An enclosure (which is not a compartment wall or  
16            described in item 8) to a protected corridor."

17            Or protected lobby, it doesn't matter which.   So  
18            again we have the fire resistance of 30 minutes.

19            Below there at 14:

20            "Enclosure in a flat or maisonette to a protected  
21            entrance hall, or to a protected landing."

22            That also gives 30 minutes.   So the reason of just  
23            highlighting those three areas is to indicate that no  
24            matter which bits you look at, we've got 30 minutes in  
25            there, and because it's not defined exactly what we've

1 got, because we've gone from balcony to staircase and  
2 now we've got lobbies, they've all got the same  
3 protection, so I've just highlighted the bits that  
4 I relied on and they all give the same answer.

5 So then if we move to page 119, table A2 "Minimum  
6 periods of fire resistance". Item 1a, so you actually  
7 have "Residential (domestic) flats and maisonettes" and  
8 again for a building not more than 18 metres high, in  
9 a column, you have 60 minutes.

10 So the next page, on --

11 THE CORONER: Sorry, that figure is relating to what  
12 elements of work?

13 A. That's the performance of the material that you should  
14 be using in -- A2, I think it refers to, I'm just trying  
15 to find the reference that we moved to A2. Standards in  
16 A2, if we go to the next page.

17 THE CORONER: Yes.

18 A. If we go to page 120, item d. The application of the  
19 fire resistance standards in the table A2 we've just  
20 look at, it's-- can you go to d:

21 "... most elements of structure in a single storey  
22 building may not need fire resistance (see the  
23 guidance ...), fire resistance will be needed if the  
24 element:"

25 Then you go to d.i:

1           "is part of (or supports) an external wall and there  
2           is provision in the guidance on requirement B4 to limit  
3           the extent of openings and other unprotected areas in  
4           the wall."

5           So it's the external wall which may be structural.

6           Okay, sorry, this is probably really complicated,  
7           but what I'm trying to show is that, you know, to get to  
8           the decision that I've made, there are a lot of elements  
9           that you have to consider, and on the next page, 121,  
10          item 3, which covers the glazing elements again on  
11          escape routes. So I'm dealing with the panels beneath  
12          rather than the glazing, but 3 and 6 cover the glazing  
13          elements.

14 Q. Let's not focus on the glazing, if we stick to the  
15          panels for the moment.

16 A. Okay.

17 Q. Were there other passages in the approved document that  
18          you wanted to refer us to, or did you want to take us to  
19          the British Standard?

20 A. The British Standard is next. So having looked at all  
21          that, and sort of come to a conclusion of what the right  
22          answer is, but maybe you're suspicious that there might  
23          be another alternative, you then have to look at the  
24          British Standard, and the British Standard behind the  
25          approved document that it is referring to is British

1 Standard 5588 part 1, which is 1990. It's:

2 "Fire precautions in the design, construction and  
3 use of buildings -- code of practice for residential  
4 buildings."

5 First of all, if we go to page 11, 4.6.

6 Q. These have internal pagination, don't they,  
7 paragraph 4.6, is it?

8 A. 4.6, yes:

9 "Recommendation for escape by way of an external  
10 balcony or flat roof."

11 So here we have it repeated in that they're using  
12 the same phrase that that they did in the approved  
13 documents, and it's:

14 "Any alternative escape route by way of a balcony or  
15 flat roof should be defined and guarded with protective  
16 barriers in accordance with BS6180."

17 Now, I don't intend to take you through BS6180, but  
18 just to give you a summary, at 11.6 it talks about  
19 flammability of the barrier, and it basically says it  
20 has to be class 1 or class 0 or class 3, dependent on  
21 what the Building Regulations say, so it actually  
22 doesn't help us, again it rebounds us back to the  
23 Building Regulations.

24 So then if you move on to page 27, section 13.  
25 Section 13 is dealing with:

1           "Escape routes from dwellings with balcony or deck  
2           approach."

3           On the third line down, which begins from "from  
4           a fire main," further along that line, it reads:

5           "... and, in the case of single stair buildings,  
6           that adequate safeguards are provided for persons  
7           wishing to escape past the dwelling on fire."

8           So it's the relevant wording out of there. If you  
9           drop down to 13.2, the recommendation, 13.2.a, which is  
10          towards the bottom there:

11          "Provision of escape routes should be in accordance  
12          with the principles indicated in figure 15."

13          So the next step is then to look at figure 15, which  
14          is on page 31. Ignore the top diagram, so if you go to  
15          b, single staircase building, which is not quite what we  
16          have. If you picture that as the balcony, you still  
17          have an alternative escape. So if you drop down to the  
18          bottom one, which is more realistic from Lakanal, if you  
19          thought that the bottom bit was perhaps the balcony and  
20          the other side was the internal escape corridor to the  
21          single staircase.

22          If you can perhaps just enlarge it a little bit,  
23          because the notes are the important bit in the hatching  
24          here. If you go down to the key under note 1, where it  
25          says "Key: OV" and the solid black line is

1 fire-resisting construction, which is the actual  
2 stairwell closure, and then you have the dotted line,  
3 which is the fire-resisting construction up to a height  
4 of 1.1 metres above the deck level, which covers the  
5 panels. Then it's saying that all the doors onto the  
6 balcony should be self-closing fire doors, 30 minutes.  
7 Note 2 below that actually says:

8 "All doors breaching the 1.1 metre high  
9 fire-resisting separation should be self-closing fire  
10 doors [with 20 minutes rating]."

11 Figure 15, I think, is important then to, although  
12 there's slight conflicts with the 1.1 and what I was  
13 talking about with the nine-metre drop from below the  
14 balconies, it gives us a good picture of where we should  
15 be looking at.

16 We then move on to page 34, 14.7, which because the  
17 balconies' side of it is not comprehensive, it's -- and  
18 we've been referred to external staircases, the stairs  
19 in the approved document, we then have to refer to the  
20 same element in buildings for the British Standard. So  
21 14.7, the last paragraph:

22 "It is necessary to ensure that their use at the  
23 time of a fire cannot be prejudiced by smoke and flames  
24 from nearby doors and windows."

25 Over the page, page 35, 14.7.2.b:

1           "Any wall or portion (other than 1.1 above the top  
2 floor level of a stair not being a basement stair)  
3 within 1.8 metres, or within nine metres vertically  
4 below."

5           So it must be of fire resisting construction, that  
6 may be fixed by a resistant glazed area, et cetera, so  
7 it refers back to the same diagram below that we looked  
8 at in the Building Control document.

9           Then finally, on page 41, we've item 8 -- sorry,  
10 item 8 covers the glazing again, so it's not relevant.

11 Q. I won't ask you about that because that may complicate  
12 matters.

13 A. Okay.

14 Q. Does that bring to an end then the different sources of  
15 guidance that you rely on to reach your expert opinion  
16 of what was required to comply with Schedule 1 of the  
17 Building Regulations?

18 A. Yes, it does, yes.

19 Q. It's been quite a paper trail there, perhaps because  
20 there's no one paragraph that precisely deals with this  
21 issue, but can you assist the jury perhaps by just  
22 summarising your thinking? You started out by telling  
23 us that the language in Schedule 1 is very general, and  
24 you've then taken us to a range of different specific  
25 provisions. Can you sum it up and piece it together for



1 us?

2 A. Yes, sure. So what we've got is -- the documents don't  
3 refer to balconies other than to mention them at the  
4 very beginning and then immediately refer you on to  
5 stairs and lobbies and landings, so then we follow the  
6 trail through to try to get an answer as to what the  
7 standards are that are required for the fire resistance.

8 So we've got external balconies that are a one  
9 direction fire escape, and that one direction fire  
10 escape goes past other dwellings, and in a tall  
11 building. All of these -- we've gone through the  
12 various tables that apply to that, and it's my view that  
13 the balcony fire escape, as we saw on the diagram in 22,  
14 actually gives fire resistance to the building below for  
15 nine metres and above for 1.1 metres on the top floor.

16 So effectively, in my view, that covers the whole of  
17 the building elevation where the balcony extends, which  
18 is the whole building, basically, on the front and rear  
19 elevation of Lakanal House.

20 Q. Is part of the thinking that you're referring to there  
21 the fact that the integrity of the balcony fire escape  
22 route depends on the integrity of what lies on the floor  
23 beneath it?

24 A. Yes, yes, because of what's in the diagram at 22, if  
25 there was a fire below that, it would affect the escape

1 on the balcony which is the fire route.

2 Q. Madam, I notice the time. There is one additional short  
3 topic on the Building Regulations Building Control half  
4 of Mr Walker's evidence, if I might deal with that.

5 THE CORONER: Members of the jury, is that acceptable to  
6 you? We had a slightly later start this afternoon?

7 Okay. Yes, thank you.

8 MR MAXWELL-SCOTT: It's going to relate to page 23 of your  
9 report. It's to do with the suspended ceiling in the  
10 communal corridors. Can I ask you, in dealing with  
11 this, to look at a document at page 73 in the  
12 chronological bundles, in file 1? (Handed)

13 I think you've looked at this document in preparing  
14 your report.

15 A. I have, yes.

16 Q. This is a letter from Donald James Chartered Surveyors,  
17 dated 2 December 1986 to Southwark District Surveyors.

18 It says:

19 "We have been commissioned by the London Borough of  
20 Southwark to carry out improvement works to the communal  
21 corridor areas of the above two blocks."

22 Then it identifies what the works comprise:

23 "... reinstatement of 'Panoflam' fire-resistant  
24 boarding ..."

25 Do you understand that to be the panels of the

1 suspended ceiling?

2 A. Yes, I do.

3 Q. "... to provide half hour fire resistance and to  
4 restrict the spread of flame."

5 Then there's reference at point (iii) to "Fire  
6 stopping within servicing ducts".

7 Point (iv):

8 "Removal of defective and provision of half hour  
9 fire doors between communal corridor and staircase area  
10 ...

11 "Please note that we are not altering the  
12 arrangement of the Means of Escape but upgrading the  
13 existing layout."

14 Then at the bottom of the page:

15 "Your attention and comments in respect of this  
16 matter are requested. We have had a meeting with the  
17 fire officer on site and items (i) to (v) [all of the  
18 items above] are all in accordance with his advice."

19 That's the end of the letter from a Mr Holloway of  
20 Donald James.

21 You were asked to consider whether the suspended  
22 ceiling would have complied with the relevant  
23 Building Regulations in force at the time that it was  
24 installed. Am I right in saying that firstly your  
25 analysis of that issue was understandably hampered or

1           limited by the fact that few documents survive from the  
2           period almost 30 years ago --

3    A.   Yes.

4    Q.   -- and that the relevant regulations changed in  
5           January 1986, and the question of whether or not the  
6           suspended ceiling complied turned at least in part on  
7           whether the works were done before or after  
8           January 1986 --

9    A.   Correct.

10   Q.   -- and the surviving documents don't provide an answer  
11          to that question?

12   A.   No.

13   Q.   Madam, that brings to an end the topics in relation to  
14          Building Regulations and Building Control matters, so  
15          I suggest that we call it a day at that point.

16   THE CORONER: All right. Yes, thank you very much. Members  
17          of the jury, yes, don't lose heart over the complexity  
18          of what we've just looked at, we shall all endeavour to  
19          help it to look a little clearer to you than maybe it  
20          does at the moment.

21                 Thank you very much, please could you be back for  
22                 a 10 o'clock start tomorrow morning? Thank you.

23                                 (In the absence of the Jury)

24   THE CORONER: Mr Walker because you're part way through  
25          giving your evidence, you must not talk to anyone about

1 your evidence or about this matter. Would you be back  
2 for 10 o'clock tomorrow morning? Thank you.

3 (The witness left the court)

4 Housekeeping

5 THE CORONER: Yes, could I just perhaps make this plea to  
6 everybody, to all properly interested persons I should  
7 say, to consider two things: first, the extent to which  
8 you're wanting to challenge Mr Walker's evidence as to  
9 30-minute fire resistance, and if you are wishing to do  
10 so, to give very careful thought as to how you deal with  
11 that, so that the jury are not left in a state of  
12 complete fug, because obviously from Mr Walker's  
13 explanation as to how he's arrived at his opinion,  
14 there's a lot of complexity there, and I really would  
15 not want the jurors to lose heart completely over this  
16 point, and I can see that it would be quite easy for  
17 them to do so. All right? So 10 o'clock tomorrow,  
18 thank you.

19 (4.13 pm)

20 (The Court adjourned until 10 o'clock the following day)

21 Housekeeping .....1  
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Day 34 OF Transcription of the  
Lakana1 House Fire  
Inquest - 05/03/13  
Corrected