Expert witness on Grenfell Fire: Cladding on Grenfell Tower was “a major hazard”

Trevor Johnson
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The testimony of Dr. Barbara Lane, a fire safety specialist and expert witness to the inquiry on Grenfell Tower, presented a report on the tower’s construction in relation to the relevant fire safety requirements. Officially, 72 people died as a result of the inferno at the West London tower block on June 14, 2017, which was able to spread rapidly due to numerous safety failings.

Lane used photographs and videos from the night of the fire to show how quickly the fire spread around the outside of the building due to the combustible cladding that had been fitted to improve its appearance in a “refurbishment to prettify its outside appearance.” Lane also used photos her team had taken since the fire to show many examples of noncompliant materials and construction.

Lane identified a “culture of noncompliance” that resulted in the blaze and listed many failures to meet building regulations at Grenfell Tower, the majority of which were the result of changes made since it was originally designed and built between 1967 and 1974.

She began her presentation to the inquiry by describing Grenfell Tower as it was first built. While many of its features were not compliant with building regulations now in use, it was largely composed of materials that were non-combustible, such as concrete.

Building regulations required the use of materials and safety features in a way that ensured a fire in one flat would not spread to others, she said. This “compartmentation” is the basis of the “stay put” and “defend in place” policies employed by the London Fire Brigade during the fire. These regulatory measures have been in place since the 1960s, she explained, and are “not matters of fire brigade policy.”

Lane explained that compartmentation was one of numerous safety systems that should work together to ensure that fires do not result in loss of life. These are a mixture of “passive” systems, which are always present, and active safety systems, which involve some form of response to a change in conditions (such as the presence of smoke that triggers a smoke detector and activates a smoke ventilation unit).

When building regulations are followed, the combination of these ensures an acceptable level of safety. However, at Grenfell Tower, noncompliance with the regulations meant that many of these safety systems were either compromised or completely absent.

Of the companies involved in Grenfell’s refurbishment in 2016, Lane said, “I have found no evidence yet that any member of the design team or the construction ascertained the fire performance of the rainscreen cladding system materials, nor understood how the assembly performed in fire.” The tenant management organisation Kensington and Chelsea Tenants Management Organisation (KCTMO) and London Fire Brigade (LFB) failed to include an appraisal of the cladding’s ability to withstand fire in their risk assessments.

Lane stated that the building’s window fittings had allowed the fire to spread to the combustible cladding. She included numerous photographs of the construction of the window fittings, which were largely composed of combustible materials with cavities and lacked some of the required fire-resistant cavity barriers. Some components that should have been fitted horizontally had been fitted vertically and had also been turned (on their longest axis) to face the wrong way.

These defects played a critical role in the spread of the fire. In the space of less than 15 minutes, it spread from inside flat 16 on the fourth floor right up to the 11th floor. The cladding was so combustible that the fire spread upwards seven floors within seven minutes,

and it covered 19 floors within 12 minutes.

Only 106 of the 120 original fire doors in Grenfell Tower had been replaced, and Lane's report assumes the rest were those installed in 1974. The replacements were not compliant with current regulations and had not been properly tested. Fire doors are essential both for achieving compartmentation and for restricting the flow of smoke.

In Grenfell Tower, the presence of toxic smoke was a factor in making it harder for residents to escape and for firefighters to rescue them. Fire doors should resist the spread of fire for 60 minutes, but the doors used in Grenfell could do this for as little as 20 minutes. The fire doors to the stairwell had not been replaced during the whole lifespan of the tower and were far below the standard required by building regulations.

The original lifts in use at Grenfell Tower had been refurbished in 2005, but the replacements were not compliant with the regulations in force at the time and not suitable for use by firefighters as they were unfit for evacuating the building and aiding the emergency response.

Residents had to escape through a single narrow stairwell filled with smoke that obscured their vision. With the absence of a working firefighter's lift, the sole stairwell was also being used by firefighters. A second staircase had been included in the original proposal for the refurbishment of Grenfell Tower, but this had later been dropped.

Although Lane did not refer to it in her testimony, the active ventilation system that should have removed smoke from common areas, such as the stairwell, was not working at the time of the fire. A fault had been reported but no maintenance contract for it was in place and the company that manufactured it had not been engaged to fix it.

A similar disregard for safety is evident in the treatment of the gas supply to Grenfell Tower, as recorded in Dr. Lane's report. When a minor gas leak was detected in a riser, the riser was decommissioned and replaced with one that went up through the stairwell. Work on this had been in progress at the time of the fire. This meant that both the compartmentation and ventilation of the gas riser were incomplete at the time of fire.

This gas pipe rising through the stairwell may have contributed to it to becoming extremely hot between floors 13 and 16, adding to the difficulty facing residents trying to evacuate from the 13th floor upwards. All but two of the deaths were of residents on floors 14 to 23. The difficulties faced by firefighters were such that they did not get to the residents above the 20th floor to rescue them.

Lane stated that tower blocks more than 50 metres in height were required to have a wet fire main, which reduces the time needed for the fire service to use it because water is already present. However, even though Grenfell Tower was over 60 metres in height, only a dry riser was provided, with no water present. This may have meant that it took longer for the fire service to extinguish the fire in flat 16.

Also, unlike a dry riser, a wet riser does not reduce in usefulness at higher floors. A dry riser cannot be used at all above a certain height because the amount of pressure needed to pump water up to that height is greater than the maximum pressure that the riser can withstand. This is why tower blocks over 50 metres should have a wet riser.

On several occasions, Lane raised that she had not been able to obtain evidence that she required. While she had been able to access the plans made by the companies involved in the 2016 refurbishment, a number of issues on the construction of Grenfell Tower remain to be resolved, as do some issues on the events of June 14, 2017, when the fire occurred. Lane stated that these issues would be addressed in her next report.

Ministers want to ban the cladding but are minded to continue to allow materials that are classed as having limited combustibility. Less combustible materials are more expensive than those used on Grenfell Tower and a ban would cost building owners up to £11 million a year, the government estimates.