TENOS

FIRE SAFETY ENGINEERING CONSULTANTS

FIRE INVESTIGATION

WHARFEDALE GENERAL HOSPITAL, OTLEY, WEST YORKSHIRE

Report for

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1 INTRODUCTION

1.1 A fire occurred at a construction site at Wharfedale General Hospital, Newall Carr Road, Otley on 5th July 2003. In November 2003, Kingspan Ltd instructed Tenos Ltd to examine the structure to determine the behaviour of any Kingspan products in the structure.

1.2 Assistant Divisional Officer Duncan Stainthorpe was interviewed at Bradford Fire Station and Sub Officer Graham Newhall was interviewed at Otley Fire Station both on 17th November 2003. A copy of the fire report, together with photographs and a short video recording were obtained from West Yorkshire Fire Service on 30th November 2003.

2 CONSTRUCTION AND USE OF THE PREMISES

2.1 The premises were still under construction when the fire occurred.

2.2 The building consisted of three storeys constructed around a quadrangle. A two storey section bisected the quadrangle to form a triangular piece of land at ground floor level. The building had a steel frame and all floors were concrete, the upper two concrete floors being on steel decking. The first and second floors were clad with sandwich panels which we understand from Kingspan Limited were:

- DW900/A/70/LPC Flat Stucco (Equivalent to Kingspan KS900FL-S/ LPC), and
- DW600/A/70/LPC Flat Stucco (Equivalent to Kingspan KS600FL-S/LPC).

2.3 These panels are approved by LPCB to LPS 1181 Part 1 2003 as Grade B.

2.4 At the date of the fire, the ground floor had a steel framework in place for cladding but no cladding had been fixed.

2.5 All steel beams had been coated with an intumescent paint (MGN Fire Protection - sample 0.9mm thick) to give a standard of fire resistance of one hour.

2.6 At the date of the fire, the interior of the upper floors was unfinished. The ground floor was in use as a storage area for building materials. It is understood (from the fire brigade) that these building materials included “slabs of insulating material approximately two feet square and four inches thick, tied in packs two feet square and eight feet long”. The type of material is not known. In addition there were tins of what was assumed to be adhesives.

3 THE FIRE

3.1 West Yorkshire Fire Service has determined that this fire was started deliberately by people unknown. It is thought that the adhesive had been poured over the slabs of insulating material and then ignited.

3.2 West Yorkshire Fire Service received an emergency call at 1831 hours and the first fire pump arrived at the incident at 1839 hours. The alarm was raised by on-site security. Fire officers have estimated that fire was discovered within 5 – 30 minutes of ignition and the call to the fire brigade was within five minutes of discovery.

3.3 Fire pumps in West Yorkshire are fitted with “silent witness” video cameras. These are fixed cameras that show the scene directly to the front of fire pumps. They are for purposes other than recording fires, however, the recording from the first attending fire pump shows the extent of smoke from the fire as the pump arrived at the incident.

3.4 On arrival Sub Officer Graham Newhall (who attended as officer in charge of the first fire pump) noticed a “deep red glow” in the smoke. He ordered two jets to be deployed to attack the fire. The first jet was positioned to strike the fire from the outside of the building. The second jet was positioned to the left of the first and was able to attack the fire from near the quadrangle. A third jet was deployed when an additional fire pump arrived.

3.5 Sub Officer Graham Newhall checked for fire spread in other parts of the building. He reported that he found light smoke but no fire spread on the upper floors. However, he noted that the concrete floor at first floor level had dipped above the fire. He also reported heat damage to the external skin of the cladding to the upper floors but no spread in the insulation of the wall cladding and no fire spread to the eaves.

3.6 Assistant Divisional Officer Duncan Stainthorpe attended after the first attendance.

3.7 The fire report shows that a “stop” message was sent at 1911 hours (40 minutes from the time of call). This is an indication that the fire is under control. In addition both Sub Officer Graham Newhall and Assistant Divisional Officer Duncan Stainthorpe have stated that in their opinion the fire burned in total for no more than 45 minutes.

3.8 Assistant Divisional Officer Duncan Stainthorpe’s assessment of the fire spread concurred with that of Sub Officer Graham Newhall. In addition, ADO Stainthorpe noticed that the fire had removed the intumescent coating to the beams supporting the first floor. He reported that the beams had distorted and the expansion of the beams had pushed out the supporting columns. The concrete floor above had cracked due to the movement of the beams. He further reported that the joint of the floor and walls had not been fire stopped.

4 DETAILS OF THE FIRE DAMAGE

4.1 The fire occurred in storage in the open ground floor of one section of the building. Damage was caused to the steel beams that supported the first floor, the profiled steel sheets that rested on the beams and the concrete floor that had been laid on the profiled steel sheets.

4.2 The external skin of the cladding to the first and second floors was damaged by heat and smoke.

4.3 The following photographs describe what are considered to be important aspects of this fire.

Photograph No 1



4.4 Photograph 1 shows the cladding on an unaffected part of the building.

Photograph No 2



4.5 Photograph 2 shows the beams and profiled steel sheets on an unaffected part of the building.

Photograph No 3



4.6 Photograph 3 shows the fire area on the ground floor.

Photographs No 4 & 5





4.7 Photographs 4 & 5 show the beams immediately above the fire area on the ground floor.

Photograph No 6



4.8 Photograph 6 shows the outer skin of the cladding on the elevation that faced the quadrangle.

Photograph No 7



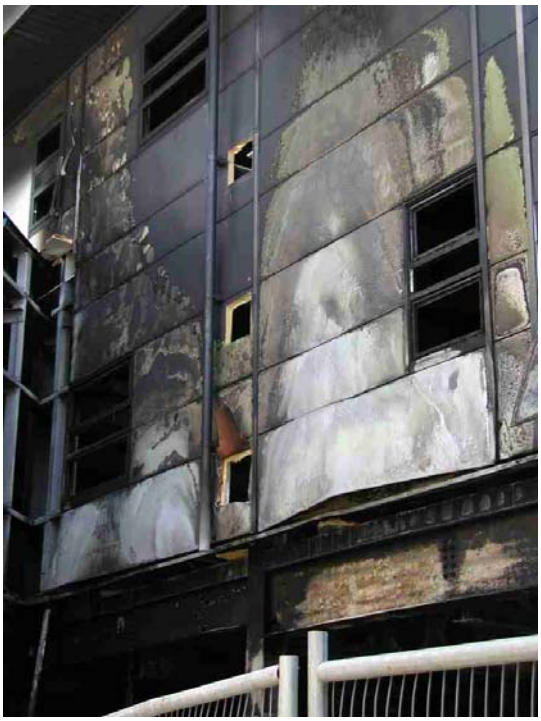
4.9 Photograph 7 shows the corner to the left of the cladding in Photograph 6.

Photograph No 8



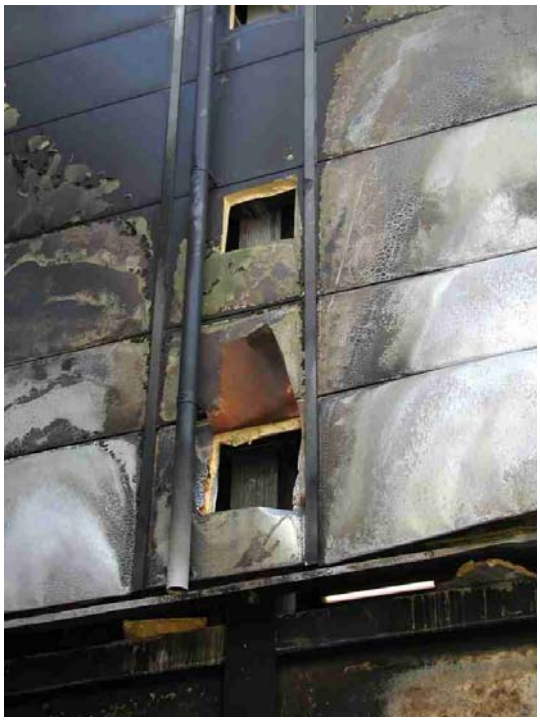
4.10 Photograph 8 shows the cladding on the elevation on the external face of the building.

Photograph No 9



4.11 Photograph 9 shows sections cut from near the corner shown in Photographs 6 & 7.

Photograph No 10



4.12 Photograph 10 is a close-up of part of Photograph 9.

Photograph No 11



4.13 Photograph 11 shows the removal of the outer skin of the bottom panel to the right of the panel shown in Photographs 9 &10.

5 INTERPRETATION OF THE FIRE DAMAGE

5.1 The “silent witness” video shows that a serious fire was in progress when the first fire pump arrived at the incident.

5.2 From the estimates of the fire officers and the recorded times on the fire report it is probable that this fire was burning for at least 20 minutes before the first jet was deployed. When that jet came into operation it would only cool a part of the fire, therefore the remainder of the fire would continue to burn unchecked and would continue to transfer heat to the building structure.

5.3 It would be necessary to obtain supplementary water supplies from a hydrant before a second jet could be deployed and before the supply in the tank of the first fire pump was exhausted by the first jet. When the second jet came into operation it would enable an attack to be made on the other side of the fire. It is probable that the fire had been burning for 25 to 30 minutes before the second jet was deployed.

5.4 The first two jets would have prevented the fire from growing further and would have started to extinguish the fire before the third jet was deployed. The three jets combined would have completed the extinction of the fire.

5.5 Once the first two jets were in operation, the fire would have started to cool. It follows that the heat damage to the structure must have occurred before the two jets were deployed i.e. within 30 minutes of the start of the fire.

5.6 It is evident from the damage to the intumescent coating to the steel beams and the subsequent distortion and expansion of the steel beams, as reported by ADO Stainthorpe, that the heat generated by this fire was significant (the intumescent coating was rated to provide a one hour standard of fire resistance when tested in accordance with BS 476 yet resisted the fire for less than half an hour in this fire).

5.7 It is also evident, from the damage visible in Photographs 6, 7, 8, 9, 10 and 11 above, that flames attacked the external cladding to the first and second floors. The external skin of the panels has discoloured and distorted.

5.8 The inverted “V” pattern of heat damage to the cladding panels is typical of what would be expected from a serious fire burning at a lower level.

6 CONCLUSION

6.1 This report describes an investigation into the behaviour of the Kinspan panels in a fire at Wharfedale General Hospital, Newall Carr Road, Otley on 5th July 2003. We understand from Kingspan Limited that the panels used in the construction were:

- DW900/A/70/LPC Flat Stucco (Equivalent to Kingspan KS900FL-S/ LPC), and
- DW600/A/70/LPC Flat Stucco (Equivalent to Kingspan KS600FL-S/LPC).

6.2 These panels are approved by LPCB to LPS 1181 Part 1 2003 as Grade B.

6.3 In spite of the significant heat generated by this fire (sufficient to damage the intumescent coating and distort the steel beams); the orientation of the cladding panels (directly above the fire); and the fact that fire stopping was not in place; the cores of the panels, as evidenced in Photographs 9, 10 and 11, did not ignite, did not promote fire spread within the core or to the eaves and did not significantly contribute to the products of combustion.