



Investigation Into The Deaths Of

**Firefighter Jeffrey Wornham
Firefighter Michael Miller
and
Ms Natalie Close**

at

85 Harrow Court
Silam Road
Stevenage
Hertfordshire

on

Wednesday 2nd February 2005

CALL NUMBER 1693

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1 Introduction

This report concerns the tragic incident at Harrow Court, Stevenage which resulted in the deaths of two firefighters and one of the residents.

The report published is a shorter version of the main report, which was the product of a year long investigation carried out by Hertfordshire Fire and Rescue Service to assist the Coroner.

This report provides a summary of the investigation and its conclusions, as well as a very detailed sequence of events, showing the actual timing of the incident and the actions of the crews attending as the incident progressed.

Following the fire a separate Fire Investigation was carried out into the cause and development of the fire and an Executive Summary of the Fire Investigation is also included.

The final section of this report details the recommendations made by the Service following the in depth investigations. Those recommendations were subjected to risk analysis and much strategic debate to identify the outcomes desired to address each one of those recommendations.

The Service has made good progress with the recommendations to date but many can only be implemented over the longer term. To ensure that the progress is accurately reflected the following web address is provided which will show the very latest position with each of those recommendations. Please visit www.hertsdirect.org/fire.

Hertfordshire Fire & Rescue Service trust that this shortened report will provide you with an understanding of the actual incident and how the Service is addressing the issues that arose from the investigations carried out.

2 Summary

On 2nd February 2005 Hertfordshire Fire & Rescue Service received the first of several calls to a fire on the 15th floor of Harrow Court, Silam Road, Stevenage.

Harrow Court is an 18 storey residential tower block. It is situated in Silam Road, Stevenage which is close to the town centre. It is one of five high rise tower blocks within Stevenage, all of which are owned by Stevenage Borough Council.

The building was constructed between 1965 and 1967 and has 103 flats arranged with six flats on each floor except the ground which has only one flat. Twenty nine of the 103 flats are private leasehold.

Two fire appliances were despatched from Stevenage Fire Station, which is approximately half a mile from the incident at 03.00 hrs. On arrival at the building at 03.03 hrs, it was seen that there was a fire on the 14th or 15th floor.

T/LFf Helen Antrobus, Ff Michael Miller and Ff Jeffrey Wornham went aloft to locate and fight the fire. On arrival, having established that there was a fire on the 14th floor, the two Firefighters made entry to flat 85 and rescued one of the occupants. They left him outside the flat and re-entered to search for the second occupant they had been informed was still inside.

T/LFf Antrobus had by then laid out a hose line to the flat and was attempting to open the riser outlet to charge the hose, but without success. The two Firefighters re-entered the flat, but were without water to carry out any firefighting or to protect themselves from any fire development.

Following the second entry there was a major fire development within the flat. Ff Wornham managed to escape from the serious fire situation but became entangled in cables that had fallen down across the open front door of the flat when the plastic trunking holding the cables melted from the heat of the fire.

When reinforcing crews managed to enter the fire area they found Ff Wornham in the lobby just outside the flat, still tangled in the cables

and Ff Miller in the bedroom where the fire had started. Close to Ff Miller was the second occupant, Ms Natalie Close.

Ff Wornham was cut free from the cables, recovered from the lobby and conveyed to hospital where his time of death was recorded.

After establishing the situation with Ff Miller and Ms Close they were both left in situ for forensic examination, which is in line with Service procedures.

The Report concludes that:

- 1 Initially the fire was contained in the bedroom of the flat but soon after the second entry a major fire escalation occurred resulting from either a flashover or backdraught situation, which produced unsustainable conditions for anybody within or in close proximity to the room.
- 2 The two Firefighters had entered the flat to save lives, but they did so without the protective hose lines.
- 3 The supporting control measures required were not established when the first crew went aloft so early into the incident. The rest of the crew and the Officer in Charge were continuing to formulate the overall plan and collecting the equipment that would be required to deal with an incident of this nature.
- 4 The Service had operating procedures in place to deal with this type of incident.

The Report recommends that:

- 1 The recommendations contained within the main body of the report are considered, planned and acted upon by Hertfordshire Fire and Rescue Service. The Service should pay particular attention to reviewing their procedures for preparing, attending and dealing with incidents to ensure that a safe system of work is always introduced and maintained throughout the incident.
- 2 The report including its conclusions and recommendations is circulated widely to ensure that all Fire Authorities and other interested parties have the opportunity to review their own policies and procedures against the events that occurred at the Harrow Court incident.

3 Sequential Timed Event Plotting Information

Time	Event	Evidence
02.58.59	<p>First call received from Mr Brown who lives at No. 95 on the 16th floor who woke to smell smoke, which he believes, is coming from a lower flat. After making the 999 call and stating he believes the fire to be in Flat 89 on 15th floor, he leaves his flat to check on the location of the fire.</p> <p>On his way down the rear stairs to 15th floor Mr Brown meets Ms Cuffe & Ms Holt leaving flat 91 on this floor. They had become aware of the smell of smoke, heard noises and Ms Cuffe claims she saw flames issuing from the back bedroom window of a flat below theirs.</p> <p>Mr Brown checks flat 89 and sees a drunken man lying on the floor outside this flat. Mr Brown looks through the letterbox and realising it wasn't this flat on fire, they all descend the rear stairs and on 14th floor they realise the flat on fire is No 85. Mr Brown tries the door handle and the door is locked.</p>	<p>Control Log 9491</p> <p>Ms Cuffe, Ms Holt & Mr Brown's Police statements</p>
03.00.42	Fire Control assigns 2 appliances from Stevenage Fire Station 23 as a 'persons reported' call.	Control Log
03.00.48	Ms Cuffe activates the fire alarm call point outside Flat 90.	Stevenage Boro' Council/Chubb Fire records
03.01.00	Mr Savage says he is in the lounge of flat 85 when he heard the fire alarm.	Mr Savage Police Statement
03.01.11	DO Drakes informed	Control Log 26233
03.01.37	After confirming the exact location of fire Mr Brown entered the right-hand lift to go down & meet the Fire Service as he has given the incorrect address. He left the lift on the ground floor @ 03.02.10.	CCTV – Camera (C) 6
03.02.17	Stevenage fire engines call signs 230 and 231 book 'Mobile to Incident' with crews of 5 and 4.	Control Log 2799723

Time	Event	Evidence
03.03.05	Automatic Fire Alarm call from Harrow Court received at Fire Service Control from the Fire Alarm Call Centre. [Set off by Ms Cuffe at 03.00.42].	Control Log 26234
03.03.16	231 and 230 arrive at entrance to Harrow Court incident. Crews observe smoke issuing from an upper floor. Ff Dudley sees 'dirty dark grey smoke pumping out of the window'.	CCTV – C7, C8 HFRS Interviews Ff Dudley Police Statement
03.03.28	Mr Savage states he sees the fire brigade from his 14th floor lounge window.	Mr Savage Police Statement
03.03.30	Ms Cuffe & Ms Holt have continued to descend the rear stairs to the ground floor where they now meet Mr Brown who has already arrived in the lobby.	CCTV C4, 3, 2
03.03.35	T/LFf Antrobus enters building and is met at the entrance door by Mr Brown and Ms Cuffe who both inform her of the correction of address as flat number 85 on the 14th Floor and that there are 2 persons inside. CCTV shows T/LFf Antrobus appearing to speak to LFf Scotchford who is just outside the entrance door.	CCTV – C1, 2 Mr Brown, Ms Cuffe & Ms Holt Police Statements
03.03.41	LFf Scotchford then enters the building and goes to lift lobby where Mr Brown waits by the lift. T/LFf Antrobus holds the entrance door open for Ff Wornham to enter. He is holding the breaking in tool and stands by the stairs as T/LFf Antrobus then enters followed by Ff Miller who is carrying hose.	CCTV – C2 & C3
03.03.49	Call to Control from 230 – 'Both pumps in attendance'.	Control Log 2799797
03.03.50	LFf Scotchford goes to right lift with Mr Brown (who calls the lift).	CCTV – C3
03.03.56	LFf Scotchford passes T/LFf Antrobus, Ff Wornham and Ff Miller and exits the building.	CCTV – C3 & C2
03.04.02	1st crew from 231 (T/LFf Antrobus, Ff Wornham and Ff Miller) enter the right-hand lift with 1 line of hose, 1 branch, 1 Haligan tool and go to 14th Floor. LFf Scotchford shouts up to the first crew to 'hang on & not to go up' and states he radios to T/LFf Antrobus saying, "you are on your way now when you get there tell me what's happening". Ff Dudley has stated that he is unhappy with their departure.	CCTV – C3 LFf Scotchford Interview, Police Statements Ff Dudley Mr Brown

Time	Event	Evidence
03.04.04	The 2nd crew of Ff Dudley, Ff Dredge & Ff Boswell collect equipment from the appliance and place it in the lift lobby ready to go aloft.	CCTV C2/C3
03.04.14	Ff Wornham and Ff Miller don Breathing Apparatus in the lift assisted by T/LFf Antrobus. Ff Wornham wears his fire hood but does not have his helmet. (T/LFf Antrobus states that she provides her helmet for Ff Wornham).	CCTV-C6 T/LFf Antrobus Police statement
03.04.14	230 and 231 'In attendance' message is confirmed and logged by Fire Control.	Control Log 2799797
03.04.17	Ff Dudley is seen pointing to the right-hand lift, he is talking to Mr Brown, who states Ff Dudley said "they are supposed to wait here and he appeared annoyed".	Mr Brown Police Statement CCTV – C3
03.04.43	1st crew exit the right-hand lift on the 14th floor, Ff Miller & Ff Wornham rigged in Breathing Apparatus (BA) with 1 line of hose, 1 branch and 1 Haligan tool. As they walk along the corridor towards flat 85 T/LFf Antrobus has stated that she sees a man appearing to come out of one of the middle flats to her left. She tells him to 'get out'. It is not known who this man is.	CCTV – C6 T/LFf Antrobus Police statement
03.05.00	T/LFf Antrobus, Ff's Wornham & Miller arrive at flat 85 on the 14th floor, and saw a small layer of dark grey wispy smoke coming from the top of the door which T/LFf Antrobus recognised as associated with a fire starved of oxygen. She could not hear any activity from inside flat 85 at this time. However, to verify the information given by Mr Brown they all run up the rear stairs to the 15th floor to check flat 89 before returning by the same stairs to the 14th floor.	Timed reconstruction. T/LFf Antrobus Police Statement
	The second crew of Ff Dudley and Ff Dredge in BA and Ff Boswell who is the Breathing Apparatus Entry Control Officer are sent to join the first crew on the 14th floor. Ff Reynolds is instructed to charge the dry riser, (to cut the external padlock he took the bolt croppers from Ff Boswell in the lobby).	Ff Boswell and Ff Reynolds HFRS Interviews
03.05.08	Lf Scotchford exits and enters the building four times appearing to use his handheld radio.	CCTV – C2

Time	Event	Evidence
Approx 03.05.10	<p>Mr Wright from flat 84 states he is standing outside his flat in the lobby kicking the door of Flat 85. He then sees Ffs Wornham and Miller in the rear stairwell (to his left) running up the stairs to floor 15. He believes they have come up the stairs from floor 13. He then sees T/LFf Antrobus following and he knocks on the glass of the fire door to the stairwell and calls to tell her that they have gone to the wrong floor, the fire is in the flat opposite him, Number 85.</p> <p>He states T/LFf Antrobus uses her radio to call Ffs Wornham & Miller down from the stairs. T/LFf Antrobus stands next to Mr W. in the doorway to the stairwell and the two Firefighters go past her towards the front door of flat 85. T/LFf Antrobus pulls the fire door shut and Mr Wright then leaves them in lobby outside flats 84 and 85 to exit the building via the corridor past flats 82 and 83 towards the front stairs. Whilst he is walking down the corridor he states he hears a 'bang' and assumes one of the Firefighters is attempting to break in to the flat. He does not witness this or look back. He does not recall seeing any hoses.</p>	<p>Paul Wright's interview with Fire Investigation Team. Police interview with Paul Wright</p>
03.05.12	<p>The 2nd crew of Ff Dudley, Ff Dredge & Ff Boswell as instructed enter the left-hand lift with 1 BA board, 2 lengths of 45mm hose, 1 branch, 1 Haligan bar, 1 line bag, Mars equipment, Thermal Image Camera and the First Aid Kit.</p>	<p>CCTV – C3</p>
03.05.19	<p>T/LFf Antrobus leaves Ff Wornham and Ff Miller at No 85 instructing them to prepare for entry, whilst she went to the riser outlet with the hose to sort out water.</p> <p>When arriving at the riser outlet she discovers it is chained & padlocked but decides to lay the hose out whilst waiting for the 2nd crew to arrive with the bolt croppers.</p>	<p>T/LFf Antrobus Police Statement Timed reconstruction</p>
03.05.44	<p>Dry riser charged at ground floor by Ff Reynolds as instructed.</p>	<p>CCTV – C10</p>
03.05.46	<p>Ff Dudley and Ff Dredge start up their BA sets in the lift whilst travelling to the 15th floor. They pass their tallies to Ff Boswell who inserts them into the Initial Deployment Slots of the BA board he is carrying.</p>	<p>CCTV – C5</p>

Time	Event	Evidence
Approx. 03.06.00	Mr Savage states he heard a bang on the door of his flat (No. 85) and someone shouting to him to "open up". Mr Savage says he shouted that he could not get to the door; the flat door then burst open and a Firefighter entered the flat and then went into the lounge.	Mr Savage Police Statement
03.06.20	Ff Wornham and Ff Miller have made an entry to flat 85 sometime between 03.05.20 when they first arrive at the flat and 03.06.31 when T/LFf Antrobus returns to the lobby outside the flat from the riser.	
03.06.30	DO Drakes books 'Mobile to Incident'.	Control Log 2799800
Approx. 03.06.31	T/LFf Antrobus ran out the hose back along the corridor from the riser towards flat 85. She is seen by Ms Deborah Quinlan of flat 82 who has stated "she looked out of her front door on hearing the fire alarm and was hit by the smoke. She saw a fire lady headed towards No 85 ... holding a hosepipe..... These were also on the floor. She could also hear a male screaming." Ms Quinlan immediately closes the door to stop the smoke coming in, puts on her shoes and leaves, locking her flat she turns right and descends by the front stairs. She does not pass or see anyone else. On reaching the lobby just outside flat 85 T/LFf Antrobus finds this is smoke logged. Ffs Wornham & Miller are not there and the door to the flat is open. She leaves the branch outside the flat.	T/LFf Antrobus reconstruction for Fire Investigation Team Ms Quinlan Police Statement T/LFf Antrobus Police Statement
Approx. 03.06.50	T/LFf Antrobus is unsure how she gets back to the riser outlet – either by crawling beneath the smoke layer in a clear space of approximately 1 foot all the way back through the corridor, or by exiting the lobby just outside flat 85 into the rear stairwell and going down to floor 13, back along that corridor and up a flight of stairs to the riser on the 14th floor.	T/LFf Antrobus Police Statement
03.06.55	Large smoke plumes are seen externally on CCTV but this camera only shows up to the 4th floor height.	CCTV – C8
Approx. 03.07.00	A firefighter guides Mr Savage out of the flat and he informs the Ff that there is another person in the flat. (Between approximately 03.06.31 when T/LFf Antrobus leaves hose & approximately 03.08.00 when Ff Dredge & Ff Dudley arrive at the riser).	Mr Savage Police Statement

Time	Event	Evidence
03.07.09	Mr Wright (occupant of flat 84) is seen to leave the building via the front staircase.	CCTV – C2
03.07.21	The 2nd crew of Ff Dudley and Ff Dredge exit the lift on the 15th floor, leaving 1 length of hose in the lift. During unloading the lift there is deliberation over what floor the fire is actually on. Ff Boswell radios to try to find out. Ff Dudley notices the floor number and Ff Boswell looks down the stairs to see smoke on 14th floor. He calls Ffs Dudley & Dredge to go down to 14th floor.	CCTV – C5. Ff Dudley & Ff Dredge Police Statements FF Boswell - HFRS Interview
Approx. 03.07.30	A major fire development occurred inside flat number 85. DO Drakes notes en route to the incident that he could “see fire from a distance and knew it was well advanced”. He stated that flames & smoke were issuing from the building at a high level.	DO Drakes HFRS Interview
Approx. 03.07.45	T/LFf Antrobus sent a message to LFf Scotchford on her handheld radio declaring “it’s a job” which spurred LFf Scotchford to send a ‘Make Pumps 4’ message.	T/LFf Antrobus Police Statement LFf Scotchford HFRS Interview
Approx. 03.08.00	The 2nd crew arrived down at the 14th floor dry riser after leaving the 15th floor lift at 03.07.21. They meet T/LFf Antrobus at the riser on the 14th floor and Ff Boswell sees her struggling with the chain on the riser. Ff Boswell assists, using the Haligan bar as a lever with no success. T/LFf Antrobus advised Ff Dudley & Ff Dredge that “they are in there”. T/LFf Antrobus radioed LFf Scotchford for bolt croppers. LFf Scotchford appears to receive a radio message and reacts immediately to get bolt croppers.	CCTV – C5 T/LFF Antrobus Police Statement Ff Boswell HFRS Interview Ff Dudley Police Statement CCTV – C3
03.08.04	DO Drakes booked ‘In attendance’ to Fire Control.	Control Log 2799803
03.08.04	231 (Ff Reynolds) sent the “Make Pumps 4” radio message to Fire Control on instruction from LFf Scotchford.	Control Log 2799803 Ff Reynolds HFRS Interview

Time	Event	Evidence
Approx. 03.08.05	<p>Ff Dudley moved along the 14th. Floor towards flat 85, following the uncharged hose line, he passes Mr Savage as he emerged from the corridor into the lift lobby.</p> <p>T/LFf Antrobus then pulls Mr. Savage through the last lobby door into the staircase. Ff Dredge then follows Ff Dudley along the corridor.</p> <p>Mr Savage states he “saw a fireman hitting the hydrant” which is believed to be Ff Boswell trying to break the chain on the riser with the Haligan tool.</p> <p>Ff Boswell took Mr Savage to the 15th floor where he’d left the Mars resuscitation equipment to administer first aid.</p>	<p>T/LFf Antrobus Ff Dudley & Ff Dredge Police Statements.</p> <p>Mr Savage Police Statement.</p> <p>Ff Boswell HFRS Interview</p>
03.08.08	Right lift starts to fill with white smoke after the lift door opened.	CCTV – C6
03.08.15	Lf Scotchford appears to collect the bolt croppers from just outside the main entrance door and returns back into the building with Ff Reynolds	CCTV – C2
03.08.17	Burning debris is seen falling on the east face of building beneath the kitchen and lounge windows.	CCTV – C11
03.08.20	Ms Quinlan arrives on the ground floor via the front stairs and talks to Ms Cuffe and Ms Holt in the entrance lobby.	CCTV – C2
03.08.28	Right-hand lift is now smoke logged with grey smoke.	CCTV – C6
03.08.28	Lf Scotchford goes up in left-hand lift with the bolt croppers and a bag of keys. He is accompanied by Mr Brown.	CCTV – C5
03.08.50	Pumps 310 & 320 assigned to incident by Fire Control	Control log 2799814
03.08.59	A 999 call is received from a member of the public who states “the whole place has gone up” and they could see flames coming out of the bedroom window and debris falling.	Control Log. 9493 Mr Saville at Stoneycroft, Fire Investigation Interview.
03.09.02	<p>Lf Scotchford, holding the bolt croppers, and Mr Brown leave the left-hand lift on the 13th floor.</p> <p>This lift then appears to travel to the 14th floor because when the doors open it immediately fills with smoke.</p>	<p>CCTV – C5 Mr Brown Police Statement Lf Scotchford HFRS Interview</p>

Time	Event	Evidence
03.09.06 to 03.13.18	At the rear exit on the ground floor of the building (under the bedroom window of flat 85), burning and falling debris is seen through the doors with a large object alight on the ground.	CCTV – C12 & C4
03.09.08	The right-hand lift arrives and opens on the ground floor and smoke has dispersed.	CCTV – C6
Approx. 03.09.12	T/LFf Antrobus states that she first declares 'BA Emergency' on her handheld radio, possibly just prior to LFf Scotchford arriving from the lift. She says she went on to call BA Emergency several more times, but no evidence can be found that this message was received or acknowledged at this time.	T/LFf Antrobus Police Statement Ff Dudley Police statement
03.09.15	<p>LFf Scotchford arrives on the 14th floor with the bolt croppers and sees T/LFf Antrobus and Ff Boswell who has returned from the 15th, trying to lever off the chain on the riser with the Haligan bar.</p> <p>LFf Scotchford said, "get out of the way" and cut the chain, T/LFf Antrobus observes this is after several attempts.</p> <p>Mr Brown sees "two or three firemen and also Mr Savage who is all black" on his way back to his flat on 16th floor using the front stairwell.</p> <p>Ff Boswell returns to Mr Savage on the 15th floor.</p>	<p>LFf Scotchford HFRS Interview</p> <p>T/LFf Antrobus Police Statement</p> <p>Mr Brown Police Statement</p> <p>Ff Boswell HFRS Interview</p>
03.09.37	Left-hand lift opens on the 14th floor and becomes smoke logged with white smoke. (The camera in this lift becomes obscured for the rest of the incident although the smoke later clears and the lift is still useable.)	CCTV – C5
03.09.39	999 Caller states "It's alight".	Control Log 23238
Approx. 03.09.45	The jet is charged from the 14th floor at the radio request of Ff Dudley. Ff Dudley and Ff Dredge advance the jet and pulse the fire in or near flat 85.	Ff Dudley's Police Statement
03.10.44	A hose reel is got to work on the falling debris outside.	CCTV – C11
03.10.49	Fast Response Car Paramedic arrives in car park.	CCTV – C8
03.10.58	DO Drakes is seen walking towards the building.	CCTV – C8
03.11.22	A series of pictures taken by a member of the public on camera phone shows a fire 'well advanced' and flames issuing from the kitchen and bathroom windows.	Videophone

Time	Event	Evidence
03.11.35	Lff Scotchford enters the right-hand lift at the 13th floor to descend. Lff Scotchford appears to be transmitting a radio message as he descends.	CCTV – C6
03.11.43	Message to Control from 310 (Baldock) "Mobile to Incident". Control inform them it is a 'Make Pumps 4'.	Control Log 2799807
03.11.43	Informative message from Lff Scotchford sent via 231 to Control 'Confirmed Persons Reported Ambulance required'. (This is believed to be the message from him whilst he was in the lift).	Control log 2799807
03.11.46	Ff Boswell returned to the landing, between the 14th & 15th floors to the BA board and entered the 'Time of Whistle' for Ffs. Dudley & Dredge. He used the Initial Deployment Clock, which gave him a precise time for the 'Time of Whistle'.	Ff Boswell HFRS Interview BA Board detail
03.12.09	Lff Scotchford leaves the right-hand lift at ground floor level.	CCTV – C3
03.12.14	Lff Scotchford leaves building.	CCTV – C2
03.12.14	Lff Scotchford briefed DO Drakes outside the building and states he told him that it was a "flat fire, believed on 15th floor - 2 BA teams and jet established, riser charged".	CCTV – C8 Lff Scotchford HFRS Interview
Approx. 03.12.30	Ff Dredge & Ff Dudley are forced to drop the jet and withdraw from the fire due to Ff Dudley losing his helmet. (The jet was later found in the lobby outside flat No 85 and Ff Dudley's helmet was found in the central corridor just outside the lobby).	Ff Dudley & Ff Dredge Police Statements
Approx. 03.13.00	Ff Dredge & Ff Dudley return to the 14th Floor dry riser where T/Lff Antrobus is waiting. (This time is approximate but T/Lff Antrobus is seen to leave the building at ground floor level at 03.15.12 after travelling down the 14 floors via the rear stairs).	Ff Dredge's Police Statement CCTV C4
03.13.00	From 320 (Hitchin) 'Mobile to incident'.	Control Log 2799814
03.13.01	Ff Hanmer goes to locate the hydrant.	CCTV – C8 & C7
03.13.16	Control confirmed informative radio message of 03.11.43 'Persons Reported, Ambulance required'.	Control log 2799807

Time	Event	Evidence
	Ff Wornham leaves the flat and becomes entangled in the cables, which have fallen from the lobby wall outside and above the front door of flat 85. (This must have occurred sometime between approximately 03.06.31 when T/LFf Antrobus laid out and left the jet outside flat 85 and approximately 03.17.15 when Ff Dudley & Ff Dredge arrive at the 14th floor rear staircase and first see Ff Wornham.)	HFRS Interviews
03.13.43	DO Drakes takes the Incident Commanders (IC) Surcoat from LFf Scotchford who re-enters the building and goes to the lift lobby.	CCTV – C8, C2
Approx. 03.13.50	Ff Dredge runs down the front staircase from 14th to 13th floor followed by Ff Dudley. T/LFf Antrobus remains at the riser outlet on 14th floor until driven out by smoke in staircase. T/LFf Antrobus then runs down from the 14th floor staircase along the 13th floor to descend the rear stairs.	Ff Dredge & Ff Dudley Police Statements T/LFf Antrobus Police Statement
03.14.00	LFf Scotchford leaves the building and follows DO Drakes to the car park.	CCTV – C2 & C8
	Ff Dudley & Ff Dredge reach the 14th floor via 13th floor corridor and at the top of the rear staircase they discover Ff Wornham lying on the floor in the lobby just outside flat 85.	Ff Dredge & Ff Dudley Police Statements
03.14.13	LFf Scotchford meets DO Drakes again outside the building.	CCTV – C7 & C8
03.15.04	T/LFf Antrobus leaves the building via rear staircase and exit door (at a run).	CCTV – C4
03.15.12	T/LFf Antrobus runs around the back of the flats (beneath the fire flat No 85) towards appliance & meets LFf Scotchford outside the main entrance.	CCTV – C11 & C8
03.15.30	T/LFf Antrobus & LFf Scotchford re-enter the building.	CCTV – C2 & C3
03.15.45	DO Drakes enters building carrying Incident Commanders Surcoat.	CCTV – C2
03.15.50	DO Drakes meets with T/LFf Antrobus in lift lobby. DO Drakes states it was after this meeting he first heard T/LFf Antrobus declare a “BA Emergency” on her handheld radio. Ff Reynolds also heard this message on his radio shortly after hearing the “make pumps four message” which had been sent and logged at 03.08.04.	CCTV – C2 & C3 DO Drakes - HFRS Interview Ff Reynolds HFRS Interview

Time	Event	Evidence
03.15.59	230 sent (by Ff Reynolds) a radio message to Fire Control stating 'BA Emergency'.	Control log 2799820 Ff Reynolds HFRS Interview
03.16.08	Ambulance arrives.	CCTV – C7
03.16.13	DO Drakes & T/LFf Antrobus leave the building.	CCTV – C2
03.16.29	LFf Scotchford re-enters, goes to lifts, calls left-hand lift but the right lift arrives & opens.	CCTV – C2
03.16.37	LFf Scotchford goes up in right-hand lift.	CCTV – C3
03.16.43	999 caller (elderly man) in the flat below flat 85 on floor 13 is concerned about sparks falling and there is an 'explosion' heard during the conversation.	Control Log 9497
03.16.53	T/LFf Antrobus re-enters building and waits around near lifts.	CCTV – C2, C3
Approx. 03.17.00	Ff Dudley and Ff Dredge make several attempts to rescue Ff Wornham without success because he was entangled in cabling. They were beaten back by fire and heat as they had no water at this time and had to withdraw from the 14th floor rear staircase. They run back along the 13th floor corridor and up towards the 14th floor dry riser outlet to establish a new water supply.	Police Statements FF Dredge FF Dudley
03.17.15	LFf Scotchford leaves right-hand lift on the 13th floor.	CCTV – C6 LFf Scotchford HFRS Interview
Approx. 03.17.30	Ff Dudley & Ff Dredge arrive at the 14th floor riser outlet, but decide they could not disconnect that hose as it provided a "life line" to Ff Miller & Ff Wornham.	Police Statement Ff Dudley.
03.17.51	T/LFf Antrobus & paramedic enter right-hand lift.	CCTV – C3
03.17.53	DO Drakes enters building following a paramedic.	CCTV – C2
03.17.58	DO Drakes exits building.	CCTV – C2
Approx. 03.18.00	LFf Laycock from Hitchin (320), heard on his handheld radio (whilst passing Sainsbury's at Corey's Mill) en route to the incident a radio message "..... We've got no water, where's the water". Ff House from Hitchin also heard this message. (Hitchin appliance booked mobile at 03.13.00 and were "in attendance" at 03.20.33). (It is likely that this was Ff Dudley or Ff Dredge calling for water).	LFf Laycock & Ff House HFRS Interviews

Time	Event	Evidence
Approx. 03.18.00	Ff Dudley and Ff Dredge return back down to the 13th floor dry riser outlet and meet LFf Scotchford.	Police Statement Ff Dudley
03.18.00	T/LFf Antrobus & paramedic go up in right-hand lift.	CCTV – C3
Approx. 03.18.20	Ff Dudley returns back up to the 14th floor to get the bolt croppers, on return LFf Scotchford takes them from Ff Dudley and cuts the chain on the riser outlet of the 13th floor.	Ff Dudley Police statement. LFf Scotchford HFRS Interview
03.18.36	T/LFf Antrobus & paramedic leave right-hand lift on 13th floor.	CCTV – C6
03.19.04	Hydrant charged.	CCTV – C8
Approx. 03.19.30	Ff Dredge ran one length of hose along the 13th floor corridor and inserted the branch. As he ran the hose out along the 13th floor his radio started to work and he thought he heard a radio transmission. He believes it may have been a muffled Distress Signal Unit (DSU) which sounded for approx. 20-30 seconds to which he responded by shouting, but received no reply.	Timed reconstruction Ff Dredge Police Statement
03.19.42	Right-hand lift doors open and the legs of 1 Ff and 1 other person are visible. The floor is not known but it is likely that it is T/LFf Antrobus and the paramedic on the 13th floor.	CCTV – C6
Approx. 03.20.00	Ff Boswell decides to take Mr Savage out of the building. He leaves the BA board with the tallies of Ff Dudley and Ff Dredge on the half-landing between 15th & 14th floors (front staircase) before descending the front stairs with Mr Savage.	Ff Boswell HFRS Interview
Approx. 03.20.00	Crew from 310 (Baldock) observe flames issuing from building as they approach and just before they arrive at the incident.	HFRS Interviews
03.20.10	Ff Hanmer tackles a car fire at the side of the flats.	Ff Hanmer HFRS Interview CCTV – C11

Time	Event	Evidence
03.20.13	<p>DO Drakes made a mobile phone call to Fire control, which was recorded as 'make pumps 8, make officers 4'. An Informative message at the same time was "Confirm fire on 14th floor block of flats, possible persons reported, 4 BA, 1 jet in use and Tactical Mode Oscar".</p> <p>In the middle of this call DO Drakes is interrupted by a message on his handheld radio with someone shouting, "Water on" which was also heard in Fire Control. This message is believed to be Ff Dredge and he is calling "priority water on" from the 13th floor staircase. A response is heard, believed to be LFF Scotchford replying "it's alright Simon hold fire".</p> <p>Ff Dudley turns the water on at the 13th floor riser and returns to Ff Dredge at the 13th floor rear staircase.</p>	Control Log 26245
Approx. 03.20.20	<p>The hose, run out from the 13th floor riser, is not long enough to reach up the rear staircase and into the 14th floor lobby.</p> <p>Ff Dudley states "it came short of the top landing on the 14th floor"</p> <p>Ff Dudley and Ff Dredge "kept opening the fire door spraying water and pulling at Ff Wornham" in an effort to rescue him.</p> <p>Ff Dudley's air supply warning whistle sounds and he is forced to withdraw. He meets LFF Scotchford in the 13th floor corridor and takes him back to the 13th floor rear staircase to show him Ff Wornham lying in the doorway of the lobby above. Ff Dredge states that at some point LFF Scotchford joins him on the rear stairs and instructed him to withdraw.</p> <p>LFF Scotchford did not recognise this casualty as a Firefighter at this time.</p>	<p>Police Statements Ff Dudley Ff Dredge</p> <p>Lff Scotchford HFRS Interview</p>
03.20.22	Two paramedics enter building.	CCTV – C2
03.20.33	From 320 (Hitchin) and 310 (Baldock) a radio messages was sent to Fire Control that both were "In attendance".	CCTV- C8 Control log 2799828
03.20.35	T/LFf Antrobus comes down the front stairs and exits.	CCTV – C2. T/LFf Antrobus Police Statement
03.20.42	Right-hand lift flooded on an unknown upper floor.	CCTV – C6
03.21.31	DO Drakes is seen on CCTV surrounded by fire fighters from 320 and T/LFf Antrobus. He instructs LFF Laycock to take over BA Entry control.	CCTV – C9 Sub 0 Bloxham HFRS Interview

Time	Event	Evidence
03.21.49	T/LFf Antrobus, Sub O Bloxham & 4 BA wearers talk at the entrance at bottom of the stairs; T/LFf Antrobus advises both Sub O Bloxham and LFf Laycock that they had lost a crew and need BA & hose.	CCTV – C2 Sub O Bloxham LFf Laycock HFRS Interviews
03.22.08	1 paramedic enters and walks up stairs.	CCTV – C2
03.22.24	Control is informed by the Police that they have received a phone call from the occupants of Flat 81 who are trapped. Control advises DO Drakes.	Control Log 26247
03.22.16	Fire Control confirms the message sent by DO Drakes as “make pumps 8 plus 4 Officers required. 4 BA and 1 jet in use”.	Control Log 26245
03.22.25	Sub O Bloxham and 4 BA wearers (Ff House, Cropley, Bootle and Waddingham) enter the left-hand lift with 1 length of hose and 1 hand lamp to go to 13th floor.	CCTV – C3 HFRS Interviews: Ff Bootle Ff Waddingham Ff Cropley Ff House
03.22.46	LFf Laycock meets Ff Boswell and Mr Savage at the foot of the front stairs. LFf Laycock then goes up these stairs.	CCTV – C2. LFf Laycock. HFRS Interview
03.22.48	Ff Boswell leaves the building with Mr Savage and LFf Laycock goes up the stairs.	CCTV – C2
Approx. 03.22.50	Sub O Bloxham and the 4 BA wearers arrive at 13th floor by lift.	Timed Reconstruction
03.23.03	DO Drakes sent a radio message to Fire Control “All persons not yet accounted for, lost contact with one BA team”. LFf Scotchford can be heard over DO Drakes radio during this call asking T/LFf Antrobus for more BA up here and she advises they are on their way.	Control Log Call 26248
Approx. 03.23.05	Sub O Bloxham and his crew meet LFf Scotchford on the 13th floor. LFf Scotchford informs him that there are 2 Firefighters ‘missing’. Sub O Bloxham assigns his BA crews to the 14th floor rear stairs.	HFRS Interviews: Sub O Bloxham. LFf Scotchford
Approx. 03.23.20	Ff Waddingham and Ff Bootle meet Ff Dudley on the rear stairs of 13th floor who advises them there is a casualty “still in there”.	HFRS Interviews: Ff Bootle Ff Waddingham
03.23.25	LFf Broom and Ff McGrinder use the front stairs to go up to the 13th floor with a large axe and a line.	CCTV – C2
Approx. 03.23.30	LFf Laycock passes Ff Dredge then Ff Dudley coming down the stairs whilst he was on his way up.	HFRS Interview - LFf Laycock

Time	Event	Evidence
Approx. 03.23.40	<p>Ff Bootle and Ff Waddingham approach the door to the lobby of the 14th floor from the rear stairs. They discover a casualty (Ff Wornham) lying in the lobby with one foot out through the doorway. No DSU is sounding and they note that the original hose line from the 14th floor riser has burst and is producing almost a curtain spray within the lobby. The crews describe extreme heat, smoke and flames in the lobby and staircase area.</p> <p>The hose line laid out on the staircase is not long enough to advance into the 14th floor lobby from the rear staircase so Ff Bootle places himself between Ff Wornham and the heat and flames in an effort to shield him from the heat.</p> <p>Ff Cropley and Ff House join Ff Bootle and Ff Waddingham and the four of them manage to drag Ff Wornham from the lobby onto the staircase landing. He was entangled in cables (armoured) which would only allow them to move him just through the door. They describe that the wires are all over him, and melted onto his BA set and shoulders.</p>	<p>HFRS Interviews: Ff Bootle Ff Waddingham Ff Cropley Ff House</p>
Approx. 03.24.45	<p>Lff Laycock meets Lff Scotchford on the 13th Floor and he establishes a BA Control Point on the 13th floor as instructed, (central corridor adjacent to the rear lobby)</p>	<p>HFRS Interview Lff Laycock</p>
Approx. 03.25.00	<p>Ffs Bootle, House, Cropley, and Waddingham free Ff Wornham from the cables using personal knives and a large axe, then pass him down the 14th rear stairs to Sub O Bloxham, Lff Broom and Ff McGrinder who carry him through the 13th floor corridor to the lift lobby and waiting paramedics. Ff McGrinder remains and assists the paramedics to cut the fire kit from Ff Wornham.</p> <p>The jet on the rear staircase, which is supplied, from 13th Floor riser outlet is extended by one length, enabling the BA crews to enter the flat as a team of 4.</p> <p>Ff Waddingham described the whole flat as alight with flames like a jet engine issuing from the door as he and Ff Bootle advanced the jet into the flat to knock back the fire. Ff House and Ff Cropley search behind them as the fire is brought under control.</p>	<p>HFRS Interviews: Ff Bootle Ff Cropley Ff Waddingham Ff House</p> <p>Contemporaneous notes of LFF Broom & FF McGrinder</p>
03.25.43	<p>DO Bordoni books 'Mobile to Incident'.</p>	<p>Control Log 2799830</p>
03.26.06	<p>Ff Dredge & Ff Dudley leave the building by the front stairs.</p>	<p>CCTV – C2</p>

Time	Event	Evidence
03.26.09	A radio message was sent by DO Drakes to fire control "requesting make ambulances 4".	Control Log Call 26250
03.28.02	Ffs Bennett and Smith enter the left-hand lift to go aloft.	CCTV – C3
03.28.15	321 (Hitchin 2nd appliance) send a radio message to Fire Control 'In attendance'.	Control Log 2799828
03.29.59	DO Bordoni books "In attendance" with Fire Control.	Control Log 2799838
Approx. 03.30.00	Ff House and Ff Cropley discover a firefighter together with the female occupant in the 1st room on the left in the flat and made the decision to leave the casualties in situ as it was clear they were both deceased	HFRS Interview Ff Cropley Ff House
03.30.48	A further informative message sent by DO Drakes "8 BA, 2 jets in use, 1 BA team and 1 person unaccounted for, Tactical Mode Oscar".	Control Log Call 26256
03.32.52	Sub O Gollogly and Sub O Huthwaite go up the stairs with Ff Harvey and LFf Theakstone.	CCTV – C2
03.35.12	LFf Scotchford leaves the building after descending stairs.	CCTV – C2
03.35.16	DO Bordoni and Sub O Cheshire go upstairs to take over Forward Control. When reaching the 13th floor they witness paramedics working on Ff Wornham (CPR).	CCTV – C2 HFRS Interview DO Bordoni
03.37.02	201 (Welwyn) book 'In Attendance' with Fire Control.	Control Log 2799865
03.37.19	A further informative was sent from DO Drakes on his mobile phone "Fire spread to 15th floor, Tactical Mode Oscar".	Control Log 26263
03.38.55	190 (Welwyn Garden City) books 'In attendance'. DO Harold books 'In attendance'.	Control Log for both 2799868
03.40.00	Ff Bootle and Ff Waddingham are forced to withdraw due to Ff Bootle's low-pressure warning whistle starting. Ff Cropley and Ff House also withdraw at the same time.	HFRS Interviews BAEC Board
03.40.02	Paramedics enter the building with a stretcher, followed by Ff Dudley, T/LFf Antrobus and Ff Dredge.	CCTV – C2
03.40.05	Ff Dredge seen to examine his right forearm. (Possible burns – reported later).	CCTV – C2
03.40.31	DO Drakes talks to T/LFf Antrobus, Ff Dudley, and Ff Dredge. The paramedics go to the left-hand lift.	CCTV – C2

Time	Event	Evidence
03.41.57	Ff Dudley calls the lift, it arrives and Ff Dredge removes a yellow key bag from the lift together with a length of 45mm hose and drops them in the lift lobby.	CCTV – C3
03.41.05	Ff Dudley & Ff Dredge assist paramedics into left-hand lift.	CCTV – C3
03.41.17	311 (Baldock 2nd appliance) books 'In attendance'.	Control Log 2799874
03.41.25 to 03.42.40	Ff Dudley & Ff Dredge spend some time in lift lobby area and are joined by T/LFf Antrobus. They attempt to switch the right-hand lift over to 'Fire' status using the lift key from the yellow bag recovered from the lift earlier.	CCTV – C3
03.41.35	DO Stevenson books 'In attendance'.	Control Log 2799876
03.42.40	4 firefighters and 1 Sub O. enter the building and go to the lifts where T/LFf Antrobus passes them and exits followed shortly by one firefighter.	CCTV – C3 & C2
03.42.41	Environment Agency informed.	Control Log 9507
03.43.38	T/LFf Antrobus re-enters carrying a BAEC board which she takes to the lift area and gives to the Sub O.	CCTV – C3
03.43.44	4 BA crew exit building with T/LFf Antrobus.	CCTV – C2
03.44.04	A Sub O and 3 firefighters use the front stairs whilst Ff Dredge & Ff Dudley continue to try and turn the right-hand lift to Fire operation.	CCTV – C2 & C3
03.44.53	A Firefighter enters the building and talks with Ff Dudley & Ff Dredge next to the stairs.	CCTV - C2
03.45.35	A further message is sent to fire control, "one Ff injured, Tactical Mode Oscar".	Control Log 26268
03.45.50	2 Ffs come down the stairs and join Ff Dudley & Ff Dredge in the lift area. The left lift arrives and Ff Wornham is brought out of the lift on a stretcher.	CCTV – C3
03.46.19	Ff Wornham is taken by stretcher from the building while the LFf and Sub O are talking with Ff Dudley.	CCTV – C2 & C3
03.47.40	Ff Dredge leaves the building with Ff Dudley but Ff Dudley then returns to the lift area with a LFf.	CCTV – C2
03.49.47	191 (WGC 2nd appliance) and 189 (Control Unit) book 'In Attendance'.	Control Log 2799895
03.50.08	A further informative was sent by DO Drakes: "Details as previous, 1 Ff found believed Code 1 and left in flat. Make Pumps 10 and Officers 6".	Control Log 26270

Time	Event	Evidence
04.00.00	Sub O Gollogly and Sub O Huthwaite proceed to search the rest of the 14th floor flats for occupants. They find flat 81 occupied by a male, youth and a dog. They take them to safety on the 13th floor and a firefighter takes them to the ground floor via the front stairs.	Sub O Gollogly and Huthwaite contemporaneous notes.
04.01.58	A further informative was sent from 189 "As previous, 2 civilians Code 1 and left in situ. 6 BA, 2 jets in use, Tactical Mode Oscar".	Control Log
04.04.56	Lff Scotchford re-enters building with breaking in gear.	CCTV – C2 & C3
04.05.42	Occupants of flat 81– 1 male adult and 1 male youth and a dog arrive on the ground floor via front stairs.	CCTV – C2
04.05.29	ACO Hazeldine books "In attendance".	Control Log 2799924
04.07.35	Lff Scotchford takes 'breaking in gear' up front staircase.	CCTV – C2
04.07.46	A further informative was sent from 189 "B189 now Control Point."	Control Log 2799928
04.17.19	A further message was sent from 189 "Make pumps 15, all appliances to rendezvous at Station 23 (Stevenage).	Control Log 2799937
04.21.57	A further message was sent from 189 "4 Officers required attending Station 23. 10 BA, 2 jets in use, Tactical Mode Oscar".	Control Log 26297
04.28.17	A further message was sent from 189 "Counsellor required to attend Stevenage fire station".	Control Log 26304
04.59.38	A further Informative Message was sent via 189 Control Unit from ACO Hazeldine, "1 Ff believed Code 1, 2 civilians believed also Code 1, all casualties left in situ. 1 Ff taken to hospital. 14th floor been searched. Fire is all out, damping down in progress. Search being carried out on 15th floor. 10 BA in use. Tactical Mode Oscar. BA Main Control is being set up."	Control Log 26334
05.35.00	Ff Miller removed from the building.	Police

Time	Event	Evidence
06.00.02	<p>A further message was sent via 189 Control Unit from ACO Hazeldine, "Fire is all out, damping down in progress. 4 BA in use, BA Main Control no longer required. 2 Ffs and 1 civilian confirmed as Code 1.</p> <p>1 Ff receiving treatment for burns in hospital, approx. 70 persons led to safety to local community centre. Approximately 10 other casualties referred to hospital by self-referral. All persons accounted for Tactical Mode Oscar".</p>	Control Log 26381
06.15.33	HSE Duty Officer Informed.	Control Log 26393
07.08.07	STOP – PAPA 03 86 95 – Three Persons Code 1 – Seven Persons Code 2 – Seventy Persons Code 4	Control Log 26423

4 Fire Investigation

Executive Summary

4.1 Sequence of Events

On Tuesday 1st February 2005 at approximately 21:00hrs the electricity supply ran out in flat 85 Harrow Court. Mr Savage and Ms Close, the occupants, did not have any meter cards or credit left, therefore Mr Savage approached a neighbour, Ms Quinlan, who gave him some tea light style candles. Mr Savage and Ms Close had a number of alcoholic drinks with a friend in their flat until around 23:00hrs, when the friend left and they went to bed.

Two tea lights were lit with a cigarette lighter by Mr Savage and placed directly¹ on to a portable television that was on a dining chair, adjacent to a free standing wardrobe in their bedroom. The couple went to sleep at approximately 23:40 hrs without extinguishing the tea lights.

4.2 Discovery

At approximately 02:58hrs on the 2nd February 2005, Ms Cuffe, one of the occupants of flat 91, directly above flat 85, reports seeing flames issuing from the main bedroom window of flat 85.

Around the same time Mr Brown of flat 95, on the 16th floor, heard a male voice shouting "Get out. Get out". He subsequently looked out of his lounge window and noticed smoke 'billowing' from an adjacent bathroom window, which we now know was flat 85.

Mr Brown made the first call to the Fire Service, which was received at 02:58hrs.

4.3 Action of Occupants

Mr Savage stated in his interview that when he awoke he saw a flame approximately a foot in height from one of the tea lights on top of the television. He believed that the flame was from the tea light placed closest to the wardrobe side. He didn't wake Ms Close but decided to get a dampened tea towel and he went to the lounge, situated at the far end of the flat, to try to find one.

1. Best practice states that tea lights should be placed on a non-flammable surface or in a suitable container. This practice was not followed on this occasion.

Mr Savage stated that after a short period of time he attempted to return to the bedroom but found he was unable to, due to heat and smoke discharging from the bedroom. At this time he shouted to Ms Close but got no response. He then made his way back to the lounge where he remained until he heard banging on the front door of the flat. In response he shouted "I can't get to the door - you will have to kick it in". Mr Savage then remembered seeing a Firefighter in the lounge.

Mr Savage was rescued by HFRS personnel who led him out of the flat.

Although Mr Savage has stated he shouted repeatedly to Ms Close, we have no record of any response from her, being heard by him or any other witness.

4.4 Summary of Fire Service Action - On Arrival of Fire Service

Entry to flat 85 was made by Ff Miller and Ff Wornham, who effected the rescue of Mr Savage.

He was led out of the flat after which the two Firefighters continued to search the flat in order to attempt to rescue Ms Close. In doing so, Ff Miller and Ff Wornham fell victim to the fire. Ms Close also perished.

4.5 Casualty Details

Fatalities: Firefighter Michael Miller

Firefighter Jeffrey Wornham

Ms Natalie Close

Injury Details: Mr Nicholas Savage

Smoke inhalation and minor burns to left arm and shoulder.

Firefighter Jim Dudley

Burns to right cheek

Firefighter Simon Dredge

Blister burns to right forearm

4.6 Potential Sources of Ignition

The HFRS Fire Investigation Team investigated the following feasible sources of ignition and came to the following conclusions:

- Tea light use – double wicking PROBABLE
- Tea light use – flaring tea light POSSIBLE
- Tea light use – direct burning POSSIBLE
- Deliberate ignition POSSIBLE
- Careless disposal of matches POSSIBLE
- Carelessly discarded smoking materials (cigarettes) POSSIBLE
- Other Candle use ELIMINATED
- Electrical fault ELIMINATED
- Gas installation/appliance malfunction ELIMINATED
- Heating appliance malfunction ELIMINATED
- Natural occurrences ELIMINATED

We therefore conclude that the most likely ignition source was a tea light candle (one of two), which was lit and placed directly on the surface of a plastic cased portable television.

One of the tea light candles appears to have burnt abnormally. This condition, although rare, can be attributed to the introduction of a foreign body acting as a second wick.

When a second wick is involved, the heat from both wicks can melt and subsequently ignite all of the wax within the tea light casing. The heat from full wax involvement would be transferred to the aluminium tea light casing conducting temperatures in the region of 250°C. This would be sufficient to start decomposition of the plastic casing of a television set.

4.7 Most Likely Origin and Cause

Based on the information available and statements given to date, we conclude that the following sequence of events is the most probable cause of this fire:

Two tea light candles were lit and placed directly on top of the portable television in the main bedroom, by Mr Savage, at approximately 23:10hrs on the 1st February 2005. These candles were not extinguished prior to the occupants of the flat, Mr Savage and Ms Close, falling asleep in that room.

One of the candles appears to have burnt abnormally and began to heat up the plastic casing of the television set.

This abnormal burning will have generated sufficient heat to soften and then melt the plastic television casing.

As the tea light dropped through, the flame ignited the casing and the flaming tea light wax, together with burning droplets of plastic casing, then ignited the internal combustible components of the television set.

A reconstruction under controlled conditions by the Building Research Establishment (BRE) and various tests by the HFRS were carried out to reproduce this scenario. All followed a remarkably similar pattern to that described above.

4.8 BRE and HFRS Fire Testing

On the 14th February 2005 a meeting was held at the Building Research Establishment at Garston between HFRS and BRE. At this meeting it was discussed how the BRE could assist in the fire investigation.

In early May 2005 a proposal was produced by BRE which detailed a number of possible options.

HFRS contracted the BRE to conduct the following tests:-

- Bedroom and hallway reconstruction for a measured test burn
- Investigation of air flows through Harrow Court, including the influence of automatic opening vents in the two staircases
- Fire modelling using Computational Fluid Dynamics (CFDs)

Concerns were voiced that with the bedroom and hallway reconstruction, it would be problematical if, on the day of tests, the proposed sequence of events did not produce the expected results. It was, therefore, decided that the HFRS Fire Investigation (FI) Team would conduct a series of tests to determine if the proposed sequence of events was one which could have led to complete involvement of the bedroom.

These tests were conducted at Gardiner Associates Practical Fire Investigation Training Facility at Ministry of Defence (M.O.D), Wethersfield, Essex on the 30th August 2005. The tests determined that the proposed events could lead to full involvement of the bedroom.

The bedroom and hallway reconstruction was carried out by BRE at their testing facilities in Middlesbrough on the 13th October 2005.

In addition, air movement tests were conducted at Harrow Court on the 20th December 2005. At this time, the temperature and weather conditions were similar to those at the time of the fire. The tests provided some key information to populate the computer modelling data.

4.9 Fire Development

In test fire reconstructions carried out by HFRS and BRE, when the bedroom door was opened, approximately 22 minutes after the television had caught alight, it was observed that the fire size and temperature within the bedroom had diminished, presenting a relatively small fire to extinguish.

During the tests, a sudden escalation of the fire was observed three minutes after the bedroom door was opened. The opening of this door was included to simulate the entry into this room during rescue operations.

In the BRE test, a dramatic escalation from small fire to full room involvement (flashover) occurred. Temperatures in the bedroom rose from 180°C to over 800°C at head height. This development took 60 seconds.

In considering the time-line of fire development in the test compared with the timings of the actual incident, the following factors are likely to have led to differences.

- Ambient temperature
- Wind effect
- Stack effect
- Ventilation factors (including size and timing of bedroom window failure)

4.10 Recommendations

The recommendations made in this section, relate only to the cause, origin and development of the fire.

4.11 Careless Use of Tea Lights

The use of candles and tea lights has increased in the last decade.

However, as discussed in the main Fire Investigation Report the dangers of using tea lights inappropriately appears to be virtually unknown by the public and media.

Therefore, it is recommended that the Community Safety Department is tasked with investigating the issues surrounding the use of tea lights and candles in general. In conjunction with the National Community Fire Safety Centre (NCFSC), a campaign is instigated to educate the public and influence the media to ensure a more responsible approach to their use is made.

4.12 Fire Safety Advice for Residents of High Rise Flats

Fire Safety advice for residents of high rise flats is contained in an Office of Deputy Prime Minister (ODPM) leaflet 'Escaping from a High Rise'. Locally, home fire safety checks are available from the HFRS.

However, it is recommended that in order to learn the lessons from this tragedy, the Community Safety Department lead a working group consisting of members from the NCFSC, Fire Investigation Team, Accident Investigation Team and Community Fire Safety. This group should review the findings of the full Fire Investigation Report, Accident Report and other relevant documentation to see if national guidance for residents in high rise properties can be improved and how this should be delivered.

4.13 Major Fire Investigations

The Fire Investigation Team should be fully debriefed to identify the learning points of running a major fire investigation. This will ensure that any future major fire investigations run as efficiently and effectively as possible. This information and any identified learning points can be shared both regionally and nationally.

4.14 Tea Light Packaging/Safety Warnings

Most candles now carry warnings associated with their use. These are generally on a label attached to the candle itself, so that the user has sight of appropriate safety measures.

Tea light candles are frequently sold in bags. Although the bags containing the tea lights often display the relevant safety warnings the tea lights individually do not. If the tea lights are then separated from the original packaging, safety warnings are not evident. We suggest all tea lights should display safety warnings as with other candles.

We also suggest a modification in their construction, whereby a non conducting material is placed on the bottom of the tea light container to prevent heat conducting to combustible materials.

4.15 Firefighter safety when dealing with fires in high rise buildings

We recommend that further research is conducted by a national group of subject area experts to produce clear guidance, best practice policy and procedures, on tackling fires in high rise buildings both safely and effectively. This research should be implemented by means of a nationally agreed training package and update of the Fire Service Manuals.

4.16 Additional Information

Simultaneous Fire on 3rd Floor, Harrow Court,
2nd February 2005

During firefighting operations to extinguish the fire in flat 85, at approximately 03.45hrs, smoke was observed in the 3rd floor lift lobby. A small fire was discovered in the electrical cupboard adjacent to flat no. 15.

This scene was examined by the Fire Investigation Team, Forensic Science Service and Police Scenes of Crime. It was concluded that the fire had been caused by water entering the electrical trunking within a shaft that travels vertically throughout the building. Water from firefighting operations on the upper floors had entered the trunking and caused two major short circuits at 3rd floor level. These short circuits burnt two holes in the metal trunking and droplets of molten metal fell onto some combustible rubbish at this level, igniting it.

The joint Fire Investigation Team were satisfied that the fire on the third floor was caused as a consequence of the firefighting operations on the upper floors.

5 Recommendations Arising From The Investigations

5.1 Local Recommendations

Fire Safety

1. The Service should review their policy of inspections for high rise buildings to assess the need to have relevant information available to crews.
2. Stevenage Borough Council (SBC) should explore the feasibility of extending the riser outlets through the fire resisting partition and into the lift lobby at all floor levels in line with modern day standards.
3. Taking into account recommendation 2 above and the dangers to members of the public or fire crews whilst travelling in the lift, together with the Strathclyde Incident and added complications of controlling the fire resisting qualities of both internal and flat entrance doors (particularly those which are privately owned), SBC should explore the options available to them to secure the integrity of both staircases.
4. A fire resisting lobby at ground floor level should be formed between all risk rooms and the main staircase to protect its integrity in the event of fire.
5. The Automatic Opening Vents (AOVs) manual override facility sited in the lobby should be indicated and/or numbered in consultation with HFRS Fire Safety dept.
6. All Flat main entrance doors, and internal doors whether privately owned or Local Authority, should be maintained fire resisting and self closing as stipulated in both CP 3 and our letters of 1964, 1976, 1979, 2004 and the current regulations.

7. A regular inspection programme should be set up by SBC to ensure all fire precautions in common parts of the building are maintained as operating efficiently and effectively. Close partnership, cooperation and communication between LA, EHO's and HFRS is needed.
8. HFRS strongly recommend that the fire alarm system, together with the evacuation procedures is looked at in consultation with our fire safety dept, to establish a system which is more appropriate for the building and occupancy. Consideration should be given to the removal of sounders and break glass points in common areas.
9. SBC should ensure that all fire protection measures are regularly and correctly inspected, tested and maintained with the results recorded in a log book.
10. The Fire and Rescue Service should consider the need to carry out a specialist risk based inspection of all high rise buildings to highlight any shortfalls in fire safety measures and provide advice to owners & fire crews.
11. All personnel need to be fully conversant with the procedures to be used when attending high rise incidents. The Service should ensure that crew familiarisation is provided at all levels to ensure that competency and knowledge is maintained.

Operational Procedures

12. The crew familiarisation inspection programme should be widened to ensure that all high rise properties over eight floors (Generic Risk Assessment 3.2) are included and neighbouring stations also participate in those familiarisation inspections.
13. Consideration should be given to a system of guidance plates, attached to high rise properties, which would give personnel information about the affected premises. The information should note such things as the chaining shut of the valves, the number of hose lengths to get to the furthest point of the floor and equipment required. Additional points such as the ventilation systems in use and how to manually operate them should be included.
14. A section within the Hertfordshire High Rise Procedure should be included as Strathclyde have done for "worst case scenarios", such as actions to be taken resulting from the failure of communications, lifts or risers.

15. The HFRS “Inner cordon procedure” which basically controls the number of personnel operating inside of it is too complex for this type of incident. The police could control an alternative safety zone and consideration should be given to the delegation of this task within agreed protocols between the two services.

16. An auditing process should be introduced in order to confirm that personnel have received, read and understood any procedural documents issued. The process should be clearly linked into the service training programme and its prioritisation and delivery of training.

17. The Service already provide extensive leadership training but existing provision should be reviewed to ensure that officers and particularly those that are exposed to command of risk critical situations are equipped with the skills and knowledge to ensure that they can take effective command of operational incidents. The training should emphasise the need for clear communications and effective delegation with clear briefings.

18. The Service should reinforce training to all Officers to enhance the levels and understanding relating to dynamic risk assessment procedures. The training should emphasise the need for effective control measures to be in place as crews operate in risk areas.

19. A programme should be commenced that ensures that crews are complying with the operational procedures that they are required to implement which will ensure that a safe system of work is in place. Particular emphasis should be placed on the use of Bridgeheads, Sectorisation and Safety Zones in general.

20. A review of how our operational procedures are reviewed should be carried out to ensure that the Service has included the necessary safe systems of work guidance. This should include the necessary training on the guidance provided.

21. A system of monitoring must be implemented at station level to ensure that the essential task of checking BA sets and its ancillary equipment is carried out and recorded at each change of watch.

22. A review of the communications used in the risk areas for all types of incidents should be undertaken and re-familiarisation provided so that all personnel are aware of the different radio channels, their specific use and the importance of effective communications whilst wearing BA.

23. The importance of correct radio procedures, particularly when used in conjunction with breathing apparatus cannot be over-stressed. The service must ensure that all operational crews are aware that the radio procedure detailed in OPS 2/068 must be adhered to.
24. A training strategy for improving radio communications should be provided across the Service to enhance the level of knowledge regarding effective radio communications.
25. At each change of watch the Officer in Charge nominates a specific duty to each crew member. This process should be extended to ensure that teams are formed using their skills and experience in a balanced and operationally effective manner.
26. The Service should carry out a review of breathing apparatus training, both at its central training establishment and at station level with particular emphasis on the supporting functions of testing, donning the set, BA Control Procedures and the wearing of Personal Protective Equipment whilst working in a risk area. Emphasis must be placed on ensuring that crews are fully aware of the correct technical procedures to be followed whenever BA is deployed.
27. The Service already provides fire behaviour and ventilation training but the course content should be reviewed to ensure that all operational personnel are aware of the conditions relating to flashover, backdraught and fire gas ignition.
28. The CD Rom relating to fire behaviour is five years old and should be reviewed for accuracy and consistency with the Service Information System procedure.
29. The Safe Egress from Buildings Procedure was issued in 1982 and should be reviewed in line with the SIS review process.
30. OPS 1/023 should be reviewed in order to reflect the new 2004 legislation and clarify what is meant by High Rise in relation to office or residential property.
31. The use of mobile phones to Fire Control should be reviewed to verify its effectiveness.
32. The document "Crewing and Mobilising of Appliances" makes reference to "acting up". There is different terminology used in other procedures, such as the "Approved to Ride Assessment" and

“Temporary Promotion”. All three documents should be reviewed to ensure consistent terminology is used to avoid confusion.

33. The discrepancy in timings between the Vision and Dictaphone systems must be corrected to ensure a clear record of all calls and actions taken is available.

34. All Officers should be reminded that they must inform Command & Control when they take over command of an incident.

Equipment and PPE

35. The PPE ‘no rigging en route’ policy should be constantly reiterated and enforced by Officers in Charge of appliances with action taken against those personnel who are not adhering to the correct procedure.

36. The risks associated with incorrect rigging need to be promoted and BA wearers should be reminded that it is good practice to check their BA partner is correctly rigged before entry to the risk area.

37. Icom radios should be reviewed to ensure that they are fit for purpose as the ingress of water and deterioration of the circuit board is a fault known to the manufacturers.

38. An Asset Management System should be introduced in order to establish a ‘whole life’ audit trail of all equipment used by the Service. The system should include facilities to enable equipment to be marked, tracked and logged. At the present time this is not carried out.

39. At change-of-Watch, nominated BA wearers are required to undertake general checks on their BA sets and ancillary equipment which includes testing the operation of the ADSU. This testing twice a day is recorded in the BA log book. This practice should be rigorously enforced.

40. The procedure for BA Control with one appliance in attendance and no BAECO available is known as ‘Initial Deployment’. The wording on the ECB states ‘Rapid Deployment’. Replacement boards purchased in future should have the correct wording to avoid confusion and reinforce the message that Initial Deployment is only the first stage of BA Control.

41. All new equipment should be made the subject of a full and thorough risk assessment before being used on front line appliances. The 'field trial' process should be tightened up to ensure that equipment issued on a short term basis is subject to all the control measures in place for equipment that has been through the complete procurement process.

42. Tech 1/019 (Bolt Croppers) should be reviewed. It contains a lot of highly technical information, which is of no consequence to the operational Firefighter. It would be more helpful if it contained instructions for use, such as the correct chain link cutting technique.

43. Service personnel should be reminded of the benefits and when to use Thermal Image Cameras at incidents. Incident Commanders must consider the size of BA teams when deciding if a TIC is to be deployed.

44. Managers on station should ensure that only equipment provided by the Service is carried on appliances. This ensures that the equipment has been through the appropriate selection and assessment process carried out by the Technical Services Department.

45. Pump Operators should be made aware that when a dry rising main is utilised to fight a serious fire, the water supply should be supplemented from a hydrant as a matter of urgency. The supply from a hydrant to a riser, via a pump should be fed through twin lines of hose.

46. TECH 2/058 states that the audio output for the Automatic Distress Signal Unit 'OK' and pre-alarm is tested at 3 metres, whereas the distance for full alarm is 2 metres. JCDD 38 states that the distance is 2 metres for all three. TECH 2/058 should be reviewed and the correct figures inserted.

Supervision and Command

47. The ICS Dynamic Risk Assessment (DRA) approach should be part of the Service overall system for managing risk. The DRA approach should therefore be linked into the Service Health and Safety Policy.

48. TC 2/035, which is used to form the syllabus for delivering ICS to the service, should be deleted and the revised Op's Procedure 1/020 should be used in its place. Alternatively, TC 2/035 must be fully updated in line with the above and must include reference to Risk Assessment.

49. The Service should develop a robust system of performance management and review to fully comply with Reg. 5 (1) of the 'Management of Health and Safety at Work Regulations 1999 which states, 'every employer shall make effective arrangements for planning, organisational control, monitoring and review of the preventative & protective measures'. In particular there should be an audit to ensure that safe systems of work that are included in the operational procedures are implemented.

50. The use of Integrated Personal Development System (IPDS) and the current National Occupational Standards (NOS) should be integrated into officer ICS training programmes to ensure the training provided is fully matched to the role.

51. As part of the IPDS process individual operational performance should be tested, measured and recorded to ensure personnel are fully prepared and remain competent for their respective role. The standards required should be developed and introduced across the service as soon as possible.

52. Officers with operational responsibility should be subjected to and tested on ICS to ensure that they have the correct knowledge and skills to implement the safe system of work required.

53. A comprehensive Command Support Pack which includes documentation for recording and updating risk assessments and the closing and handing over of operations should be developed and sited to be readily available for use both in the early stages of an incident, or on occasions when the Command Support Unit may be unavailable. This is as recommended in the Fire Service Manual Volume 2.

54. SIS document OPS 1/020 should be reviewed to summarise and specify the generic ICS actions to be taken during the early stages of an incident including:

- On arrival at incident, crews must not 'self deploy' but must be kept together until fully briefed
- Effective briefing of crews following Dynamic Risk Assessment which may start on route to the incident, should include individual and team goals, the allocation of responsibilities and the safety measures and procedures to be implemented

- Correct and effective delegation and use of radio communications, including allocation of channels.
- Where there is any doubt as to the control measures to be put in place the need to default to 'Defensive' mode.
- Senior Officers must make it clear when they are assuming command and relay this message to Control.

55. Initial training and development should be carried out using operational scenarios with a variety of training aids and methods including:

- Knowledge & understanding (including operational procedures)
- Realistic training scenarios
- Exposure to incidents and debriefs commanded by others
- Table top exercise
- Role play
- Case study
- Vector training

56. In view of the use of the Incident Command Board at this incident, research should be instigated to determine the appropriateness of the current design and associated procedure.

Training

57. An effective method of document control should be introduced within HFRS to ensure that any changes at a national level in legislation or procedures are introduced to Service policy including training as soon as possible.

58. An auditing system should be introduced to ensure that employees have received the appropriate information, instruction and training whenever a change is made to national legislation. The auditing system should ensure that all personnel understand the information received and act upon it.

59. The responsibility for effective training provision should be emphasised to all managers and overall responsibility placed in one central and identifiable position.
60. The present system of nominations only being made by watch or station managers for all courses should be changed to a system where all training nominations are made centrally. The central recording system should include station level input to ensure that Station Managers are engaged in the nomination process.
61. The recording of all training carried out should be incorporated into a central electronic system, which will enable strategic monitoring and the effective provision of training.
62. The course nomination procedures should be incorporated into a highly visible SIS procedure.
63. The Service should consider sending Officers or potential Officers to the Fire Service College or similar on core progression courses where they will receive theoretical and practical training in live fire situations and management of crews at operational incidents.
64. The Service should influence the Fire Service College to introduce new practical command courses for newly promoted officers at all ranks. (A new course for Crew and Watch Managers has been introduced during 2005).
65. The Service should introduce a robust BA course nomination process to ensure that all operational personnel receive regular training and updates on current BA fire behaviour procedures. They should wear BA in heat and smoke on a regular basis as recommended in Fire Service Circular 17/1970.
66. Operational activity regarding compartment fire behaviour should be monitored by HFRS and additional training should, if required be provided as a result of the feedback received.
67. The breathing apparatus guidance (OPS 2/057) should be reviewed to ensure that just one document comprehensively covers flashover, backdraught and the risks associated at BA incidents. The document should include the specific points raised in the generic risk assessments and national guidance.

68. The obvious discrepancies between the high rise buildings CD ROM and the HFRS operational procedure note should be corrected or withdrawn from the station training package and the presentation deleted from Fire Web.
69. The BA training provided at the central training department should be reviewed to ensure that it includes all areas of operational activity.
70. The assessment of trainers should be formalised in accordance with the national guidance, which states, "To remain in certification and provide evidence of proficiency, instructors should be assessed at regular intervals in knowledge, skills and understanding. The assessment process and recording must be managed, preferably by the Brigade Training Officer."
71. The use of an alternative firefighting branch during training should cease. The operational branch must be used during CFBT.
72. OPS 2/058 regarding flashover training should be deleted from the SIS.
73. Recruit Student Note 2/033 should be reviewed and updated to reflect the information provided in Operational Procedure 3/088.
74. The Recruit PowerPoint High Rise Presentation should be reviewed and updated to reflect the information provided in Operational Procedure 3/088.
75. The "principles of air conditioning and building construction" should be incorporated within the basic recruit training.
76. Pressurised atmospheres and refrigerator plants should be formally incorporated into the recruit BA training syllabus.
77. The station "role model" system of recording training should be reviewed to check reliability and that it is functioning correctly. Particular emphasis should be placed on the reasons for training gaps at the stations researched.
78. Watch Officers must ensure that all training is correctly and efficiently delivered and recorded.
79. A robust auditing system should be introduced to ensure that all station training carried out is accurately recorded and monitored.

80. Any new recording system introduced should maintain the facility to record specific elements of training in those risk critical subjects such as BA training and its component parts such as heat and smoke and entry procedures.

81. Training targets within the station system should be reviewed, specified and monitored.

82. Watch Officers should ensure that all practical experience or NVQ training is correctly recorded in the station training records.

83. Station Managers should ensure that tasks have been completed through sampling.

5.2 National Recommendations

Fire Safety

1. Provision should be made to inform all relevant stakeholders including Local Authorities, Housing Associations and other Fire Authorities of the potential dangers associated with the lack of adequate securing of cables in trunking, particularly any which were installed to the 1988 British Standard.

2. The method and effectiveness of smoke ventilation in the stairways and corridors should be re-assessed in light of the fire and any BRE findings. Consideration should be given to the provision of inlet air at ground floor level.

3. Consideration should be given to fitting Intumescent strips and smoke seals to all fire resisting doors, including entrance doors to flats, common areas and staircases.

4. Due to the heightened risk of fire affecting many occupants if naked lights or unsafe appliances are used to supplement any electric heating or lighting in this type of building, SBC should seek alternatives to the 'Top Up' system of electricity supply. An example could be to include within the rent.

5. If Recommendation 4 is not feasible then the domestic smoke detectors should be re-wired into the communal electricity supply to ensure the only need for the battery back up will be when there is a total mains electricity failure.

6. Any new or replacement smoke detectors installed within the flats in these type of premises should be fitted with a back up power supply such as a capacitor or 10 year battery.

7. The UK Fire service should explore options for high rise buildings which consider the following:

- Provision of sprinklers in high rise buildings
- Removal of Break Glass Points to prevent vandalism and reduce false alarm calls
- Installation, removal or Zoning of fire alarm in common areas linked to a clear evacuation policy
- Whether the AFD should be sited in the staircase only and linked to activate AOV's
- To consider if fire alarms are to be installed in this type of building, whether it is appropriate and necessary for them to be linked to auto-diallers.

8. The proposed amendments to Approved Document B (ODPM fire safety guidance to the Building Regulations) which is due to be finalised by the ODPM this year will continue to allow a new building to be constructed without a dedicated fire fighting lobby, albeit with ventilation to lobbies and corridors.

We recommend that this situation is reviewed by the ODPM in light of the fire situation at Harrow Court.

9. The following areas are significant and may warrant further investigation and research as they have national implications concerning past legislative requirements.

- The effect of a non-ventilated protected corridor
- The effect of a non-ventilated lobby
- The effect of single door protection to the staircase enclosure
- The effect of numerous fire doors being open due to hose and fire fighting operations

- The chimney effect in the main stairs
- The effect of the AOV's within the staircase enclosures and their effect on the fire behaviour
- Whether the specification of the AOV's was appropriate regarding the outlet and inlet areas
- The possibility that the AOV's allowed air into the staircase, due to atmospherics around the building in the early stages

Equipment and PPE

10. JCDD 38 states that an ADSU should function correctly following a test where it is subjected to a temperature of 75°C for one hour. Given that the battery recommended for this unit cannot be relied upon at temperatures above 55°C, and the PPE provides protection up to 1000°C this area of incompatibility should be explored.


Training

11. With the current national assessment and promotion procedure there is no test of an individual's command potential or ability using simulated fireground scenarios, as there used to be in the old Leading Firefighter and Sub Officer Examinations. The Service should consider the impact not testing in command, which is a risk critical skill, has had on the operational competency testing prior to promotion, and to raise this issue with the national policy makers.

Progress continues with all of the recommendations and in particular the follow up actions which include regular auditing, monitoring of standards and improvements in process and systems as new information is returned from the relevant bodies acting on the Information provided to them.

The specific status of each recommendation can be found by visiting www.hertsdirect.org/fire.

Hertfordshire Fire and Rescue Service welcome a full appraisal by the Health and Safety Executive of the evidence provided to them and the changes it has made since the incident occurred.



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