

Surrey Fire & Rescue Service
Report of Fire

Incident No.:
007905/2015

Address:
Clandon Park The Street
West Clandon, GU4 7RQ

Owner: National Trust

Date and time:
Friday 29th April 2015 at 16:08 hours



Prepared by
Group Manager Bryn Strudwick
Fire Investigation Officer

Not suitable for Civil or Criminal Proceedings
Not Restricted

CONTENTS

Section	Contents	Page No.
1.	Summary Details	1
2.	Incident Narrative	2
3.	Fire Investigation Report	4
	1. Fire Investigation Officer	
	2. Fire Investigation	
	3. External Inspection	
	4. Internal Inspection	
	5. Excavation	
	6. Examination of Causes	
	7. Fire Development	
	8. Conclusion	
4.	Appendices:	
	A Photographs	

SECTION 1

SUMMARY DETAILS

Details of Call

Address	Clandon Park, The Street, West Clandon
Street Atlas Ref	Page 115 J1
Occupier	National Trust
Details Of Building	A mansion house built in the 1720s and is a building of 3 floors and a basement, it is brick built with stone dressings, the roof was lead covered and obscured by parapets
Day, Date and Time of Call	Friday, 29 th April 2015 at 16:08 hours
Incident Number	007905/2015
Origin of Call	999 call from National Trust Staff Mobile Phone
Appliances Attending	A total of 16 appliances attended
Fire Investigation Officer	Group Commander B Strudwick Assistant Group Commander A Grant

SECTION 2

INCIDENT NARRATIVE

1 Action Before Arrival of the Fire and Rescue Service

- 1.1 Prior to the time of call to the fire service, a member of the Surrey Infantry Museum staff was working in the museum basement office when his computer lost power. He went to the fuse board to investigate the loss of power and on opening the cupboard discovered that there is a fire inside.
- 1.2 He has contacted National Trust Staff, who responded to the basement area, isolated the power at the main electrical intake in the plant room and then at 16:08 hours dialled 999 on her mobile phone and requested the fire service.
- 1.3 The house is open to the public and the National Trust staff and volunteers then evacuated the building.

2 Action by the Fire and Rescue Service

- 2.1 At 16:08 hours, Surrey Fire and Rescue Service's Joint Emergency Communication Centre (JECC) received the first emergency call to a fire in the basement electrical fuse board at Clandon Park House.
- 2.2 JECC mobilised two fire appliances from Guildford Fire Station and an Aerial Ladder Platform (ALP) and an ALP support fire appliance from Chertsey Fire Station.
- 2.3 At 16:17 hours, the first appliance arrived at the incident and the Crew Commander ordered a crew in breathing apparatus into the basement to tackle the fire with a hose reel jet.
- 2.4 At 16:20 hours, the Crew Commander sent the following message: "Make pumps 3, fire in basement - 2 breathing apparatus 1 hose reel jet".
- 2.5 At 16:26 hours, the Crew Commander sent the following message: "Make pumps 4, Fire on ground floor spreading to first floor - 2 breathing apparatus 1 hose reel jet".
- 2.6 At 16:37 hours, with 4 appliances in attendance, the Watch Commander sent the following message: "Make pumps 6"
- 2.7 At 16:42 hours, the Group Commander took over the incident and sent the following message: "Make pumps 8 for salvage"
- 2.8 At 16:44 hours, the Group Commander sent the following message: "Make water carriers 2" and at 17:09 hours, "Make pumps 12 for firefighting and salvage"

- 2.9 At 17:07 hours, a second Group Commander arrived at the incident and took over the Salvage operations, this involved working with the on-site National Trust team, leading fire crews in the internal salvage operations and four fire crews in breathing apparatus with jets to mount an internal fire fighting attack inside the building on the ground, first and second floors of the house. This internal fire fighting allowed for additional time for the salvage operation to be carried out.
- 2.10 At 17:34 hours, the Area Commander now in charge, sent the following message: "Make pumps 16" and at 17:39 hours, "Make ALPs 2"
- 2.11 At 17:47 hours, the Area Commander sent the following message: "A building of 4 floors approx 30m x 30m, used as a stately home of historic interest - fire in basement, ground floor, first floor, second floor and roof - all floors affected with heavy smoke logging - ALP in use - 4 jets 4 hoses 10 breathing apparatus - all breathing apparatus crews have been withdrawn offensive firefighting mode".
- 2.12 Surrey Fire and Rescue Service remained in attendance extinguishing small areas of fire and assisting in salvaging operations for a number of days and closed the incident at 15:12 hours on 08 May 2015.

3 Description of Building

- 3.1. Clandon House is a mansion house built in the 1720s and is a building of 3 floors and a basement. It is brick built with stone dressings, the roof was lead covered and obscured by parapets.

4 Description of Damage

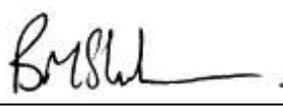
- 4.1 Clandon Park was 95 % damaged by fire leading to the collapse of the roof and 95% of the internal floors.

5 Details of Injuries

- 5.1. No injuries

6 Supposed Cause

- 6.1 Accidental fire caused by a resistance heating fault on a neutral bar in the electrical distribution board.

Signed: 
Group Commander Bryn Strudwick

Date: 18th November 2015

SECTION 3

FIRE INVESTIGATION REPORT

1. Fire Investigation Officer

1.1 **Group Commander Bryn Strudwick** - I am a fire officer in Surrey Fire and Rescue Service with 23 years of service, I am currently serving as a Group Manager in the role of Community Safety Manager. Since October 2004 I have been a flexi duty officer working as a Fire Investigation Officer.

1.2 In September 2005 I attended Institution of Fire Engineers Accredited Foundation and Practical Fire and Explosion Investigation Courses. I am a Certified Fire Investigator, this is a voluntary certification program administered by the International Association of Arson Investigators. Since this training and as part of my continuing professional development, I have successfully completed the following qualifications or training programmes:

- BTEC Level 7 - Advanced Professional Certificate in Investigative Practice
- The Academy of Experts – The Experts Report Course
- Vytenis Babrauskas - Principles of Electrical Fires Course
- Forensic Pathways - Specialist Vehicle Fire Investigation
- Surrey Police - Tier 1 - Interviewing Training.

International Association of Arson Investigators - Certified Fire Investigator (CFI) Courses:

- CFI - Fire Investigator Scene Safety
- CFI - An Analysis of the Station Nightclub Fire
- CFI - The Scientific Method for Fire and Explosion Investigation
- CFI - Digital Photography and the Fire Investigator
- CFI - Ethics and the Fire Investigator
- CFI - MagneTek: A Case Study In The Daubert Challenge
- CFI - Introduction to Fire Dynamics and Modelling
- CFI - Investigating Motor Vehicle Fires
- CFI - Insurance and the Fire Investigation
- CFI - Fire Dynamics Calculations
- CFI - Introduction to Evidence
- CFI - Critical Thinking Solves Cases
- CFI - Physical Evidence at the Fire scene
- CFI - Documenting the Event
- CFI - Investigating Fatal Fires
- CFI - Understanding fire through the candle experiments
- CFI - Managing Complex Fire Scene Investigations
- CFI - Vacant & abandoned buildings; hazards & solutions
- CFI - A ventilation-focused approach to the impact of building structures and systems on fire development
- CFI – Post flashover fires
- CFI - Fire & explosion Investigation: Utilizing NFPA 1033 & 921
- CFI - Motive, Means and Opportunity: Determining responsibility in an arson case

- CFI - Arc Mapping Basics
- CFI – Effective Investigation and Testimony
- CFI – Preparation for the Marine Fire Scene
- CFI – The HAZWOPER Standards
- CFI – Evidence Examination: What happens at the lab
- CFI – Fundamentals of Residential Building Construction
- CFI – Wildland Fires Investigation
- CFI – Electrical Safety
- CFI – Fundamentals of Interviewing
- CFI – Explosion Dynamics
- CFI – DNA
- CFI - Fire Protection Systems
- CFI – The potential value of electronic evidence in fire investigation
- CFI – Ethics and Social Media
- CFI – Basic Electricity
- CFI – Residential Electrical Systems
- CFI – Process of Elimination
- IFE Fire Safety National Occupational Standards 2 – Risk assessment of simple Premises
- IFE Fire Safety National Occupational Standards 3 – Approved B Document
- IFE Fire Safety National Occupational Standards 5 – Risk Assessment for high risk Buildings
- IFE Fire Safety National Occupational Standards 7 – Building Construction & Materials
- NEBOSH – National General Certificate in Health and Safety
- NCFE Level 2 certificate in Mental Health Awareness

1.3 I am an International and UK member of the International Association of Arson Investigators

1.4 I have completed many fire investigations.

1.5 As a Fire Investigation Officer my duties involve the collection of data and the examination of fire scenes to determine the area of origin, probable cause, behaviour of the fire, the effect on and of the building structure and human behaviour.

2. Fire Investigation

2.1 The fire investigation was carried out in conjunction with a number of fire investigators assigned by the insurance companies.

2.2 Due to the dangers posed by the structure, it was not possible to carry out an internal investigation into the cause of the fire until 19th October 2015.

3. External Inspection

- 3.1. Clandon House is a mansion house built in the 1720s and is a building of 3 floors and a basement. It is brick built with stone dressings, the roof was lead covered and obscured by parapets.
- 3.2. The main access to the house is via the main front door, with additional side access to the basement area.

4. Internal Inspection

- 4.1. From the evidence gained from staff and first attending fire crews the fire started in the basement area and in the electrical fuse cupboard.
- 4.2. The basement contains the public toilets, restaurant, the Surrey Infantry museum, museum office, plant room containing the electrical intake, kitchens and shop. Also in the basement was the basement level access to the lift that allowed lift access to all floors.
- 4.3. As part of the investigation the building's fire alarm panel information was accessed and the timing and location of activated smoke detectors show that prior to the arrival of the fire service smoke had travelled to the roof space.

5. Excavation

- 5.1. Due to the problems caused by the dangers posed by the structure it was decided to gain access to the electrical fuse cupboard and excavate the area of the cupboard and approximately 2 to 3 feet around the location of the cupboard.
- 5.2. The electrical distribution (fuse) board was located, recovered and removed from the site for forensic examination at Hawkins, the forensic fire investigation company assigned by the National Trust's insurance company.
- 5.3. The remaining area when excavated located the distribution board allocation paperwork at the bottom of the cupboard.
- 5.4. No other evidence as to the cause of fire was found.
- 5.5. The forensic examination of the distribution board shows evidence that there had been a connection fault on the lower left hand side neutral bar.
- 5.6. The distribution board was manufactured by the company MEM and is estimated to be about 20 to 25 years old.

6. Examination of Causes

- 6.1. The electrical intake located in the plant room in the basement has been discounted as a cause of the fire due to the fact that a National Trust member of staff has accessed this room to isolate the building main power switch and reports no sign of fire in this room.
- 6.2. Based on the evidence gained from witness statements, the fire started in the electrical fuse cupboard at the entrance to the museum.
- 6.3. The forensic examination of the distribution board shows evidence that there has been resistive heating on the connection between the two lower left hand side neutral bars that serve fuses numbered one to thirty six.
- 6.4. The affected connection was found to be considerably tighter than others on the same component and in comparison with those on the right hand neutral bar which serve fuses thirty seven to seventy two. This over tightening has caused a deformation of the wiring and over time caused the connection to loosen hence increasing the resistance of the wiring and subsequently the generation of considerable heat. This heating process has degraded the connection, including its insulation, continuously until full combustion (in the form of open flame) has occurred.
- 6.5. It is possible, if not probable that this distribution board would have been supplied with the internal wiring complete. It could be assumed that this distribution board was delivered from the manufacturer with this fault.
- 6.6. A deliberate fire is always considered and has been discounted as there is no evidence to suggest that this fire was deliberately set.
- 6.7. Other causes were looked at by the fire investigation team and were discounted for the following reasons:

POSSIBLE CAUSE(S) FOR FIRE INVESTIGATION		
CAUSE(S)	✓	COMMENTS – WHY / DISCOUNTED
Animals / Rodents		No evidence
Candles		Not allowed in building
Chimney		No open fires
Electric heater		No evidence of use
Other electric appliance (state)		No evidence of use in area where the fire started
Explosion		No evidence of explosion
Hot Process / Friction		No evidence of hot process or items causing friction
Open fire		No open fires
Radiant Heat Source		Not in area where the fire started
Smoking & Drug material		No smoking building – no evidence
Spread from secondary fire		No secondary fires
Sun - refracted light		No access to sun light in basement
Workmen's actions		No workmen working

7. Fire Development

7.1 In all probability the fire would have developed through a number of distinct stages.

a) Ignition

Resistance heating of an electrical connection causes degrading of wiring insulation and combustible material in the area around the connection. This heating continues over a period of time until combustible material ignites.

b) Smouldering

In this type of fire there is little or no smouldering as the elevating temperature continues until open flame and the spread of fire to other nearby combustible material.

c) Heat Build Up and Flashover

As the flames spread to further combustible materials, more and more heat is generated and released that subsequently heats an ever increasing area until a flashover occurs in the vicinity of the fire. This will occur throughout the building as the fire spreads from room to room or area to area.

d) Rapid Fire Spread

It is believed that the rapid fire spread observed at this incident occurred when the fire quickly reached the lift shaft allowing the smoke and fire to rapidly spread to each floor of the building and into the roof space.

It is believed the fire was able to spread in to the room above the distribution board cupboard due to a lack of fire compartmentation above the board.

An electrical contractor's report in 2010 noted a lack of fire stop/barrier to the ceiling recesses of the distribution board cupboard.

This report did not recommend any remedial work regarding this issue

Additional evidence of this comes from the fire alarm panel information.

In addition to the lift shaft this building had horizontal ceiling voids in between each floor and many other hidden voids that accommodated unseen, rapid fire spread.

8. Conclusion

- 8.1 By analysing the evidence gained from the investigation it is possible to highlight the approximate time of the fire starting, the most probable cause for the fire and for the fire spread.
- 8.2 The approximate time of the fire starting was 16:00 hours
- 8.3 The most probable cause for this fire was an accidental fire caused by a resistance heating fault on a neutral bar in the electrical distribution board.
- 8.4 This electrical connection would have repeatedly overheated, when subject to sufficient electrical load, ever since the distribution board was fitted. On the day of the fire this connection and the surrounding area has degraded to the point where it has caught fire.
- 8.5 Over its life, buildings of this construction and age (some 290 years old), together would have been adapted and/or changed for different uses and to add more modern amenities, for example: heating, water supplies, electricity etc, many hidden voids in the building construction are produced.
- 8.6 Some of these voids maybe known and others may, due to loss of buildings plans and records, not be known. It is the hidden voids in this type of building that allow unpredictable and uncontrollable fire spread and cause problems when trying to effectively protect the building from fire.
- 8.7 In conclusion, the probable cause was a resistance heating fault on a neutral bar in the electrical distribution board in the basement catching fire which was not contained through adequate fire compartmentation, spreading quickly throughout the entire building.

SECTION 4 - APPENDIX A

LEGEND OF PHOTOGRAPHS

1. Ref: From Internet – Copyright to Jason Hawkes
Description: Clandon Park before the fire showing the lead covered roof
2. Ref: DSC_0006
Description: Firefighting operations
3. Ref: From National Trust
Description: Aerial view following fire
4. Ref: DSC_00000019
Description: View of distribution board location
5. Ref: DSC_0004
Description: View of distribution board prior to removal
6. Ref: From National Trust
Description: View of distribution board prior to fire
7. Ref: DSC_0022
Description: View of neutral bars in distribution board
8. Ref: DSC_0042
Description: View of neutral bars after removal from distribution board
9. Ref: DSC_0047
Description: View of neutral bars after removal from distribution board

Photograph 1. Ref: From Internet – Copyright to Jason Hawkes

Description: Clandon Park before the fire showing the lead covered roof



Photograph 2. Ref: DSC_0006

Description: Firefighting operations



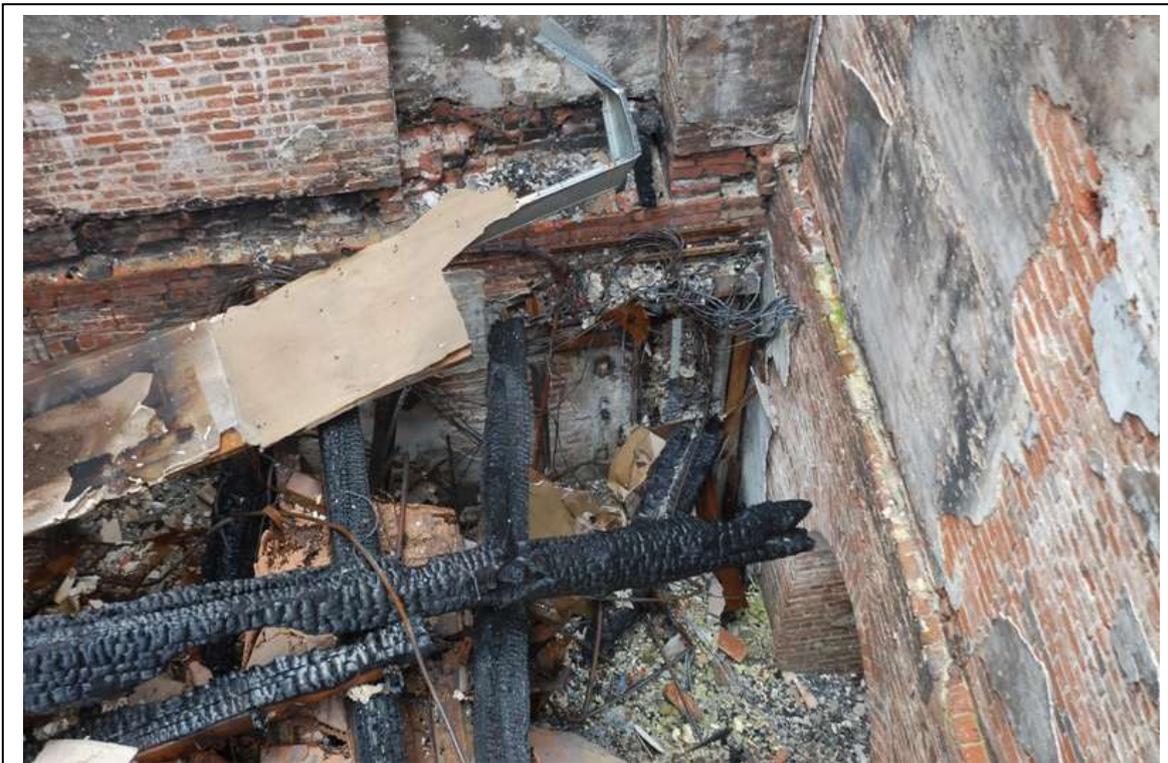
Photograph 3. Ref: From National Trust

Description: Aerial view following fire



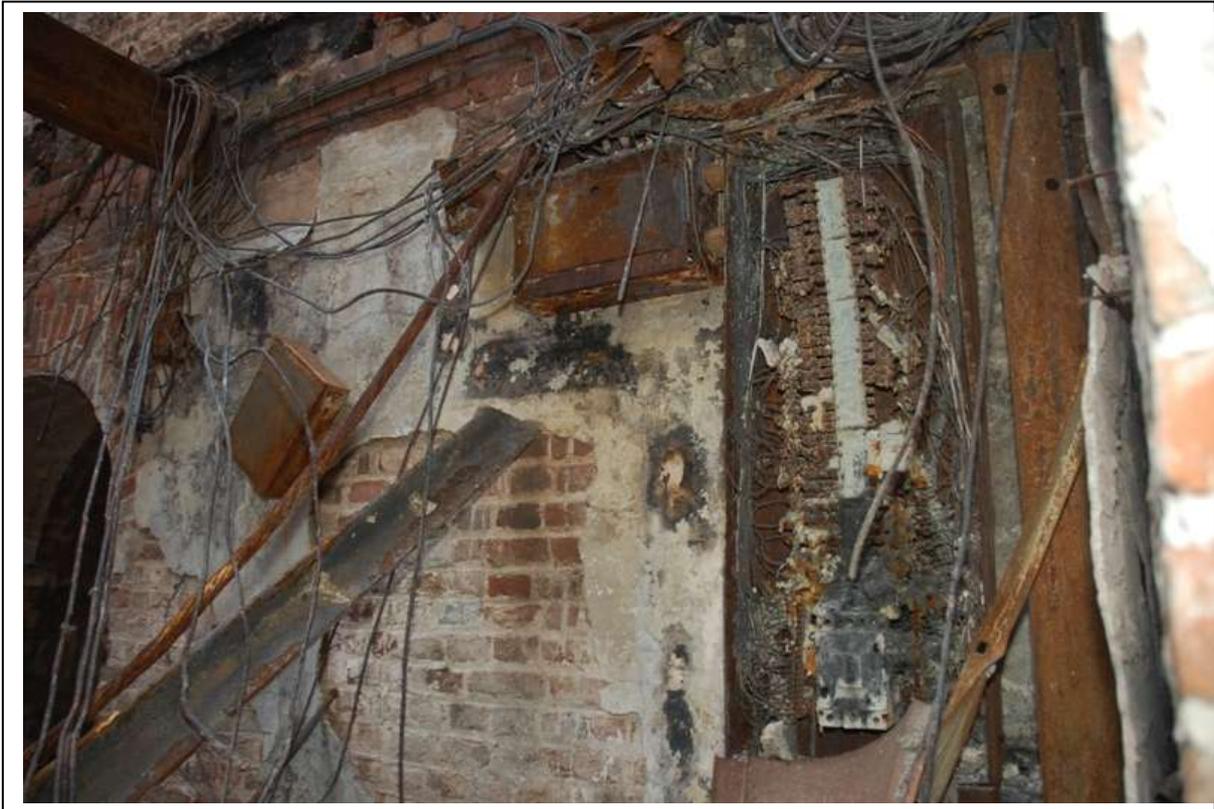
Photograph 4. Ref: DSC_0019

Description: View of distribution board location



Photograph 5. Ref: DSC_0004

Description: View of distribution board prior to removal



Photograph 6. Ref: From National Trust

Description: View of distribution board prior to fire



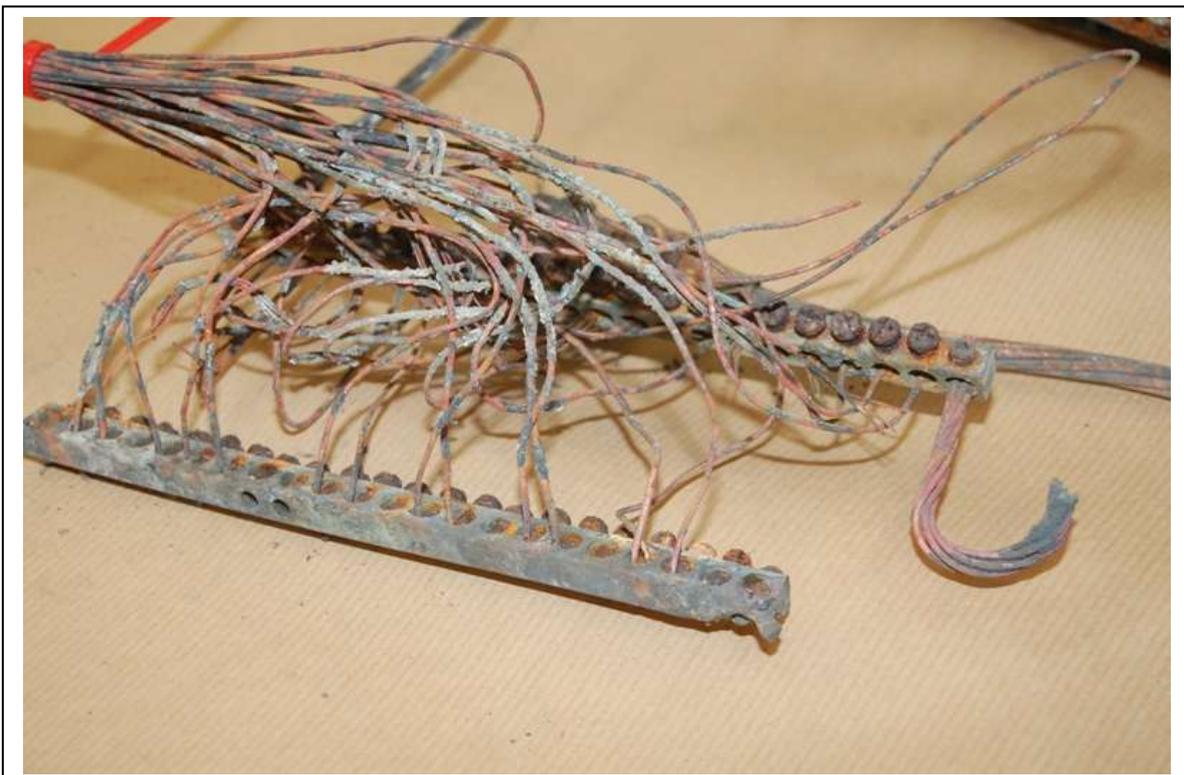
Photograph 7. Ref: DSC_0022

Description: View of neutral bars in distribution board



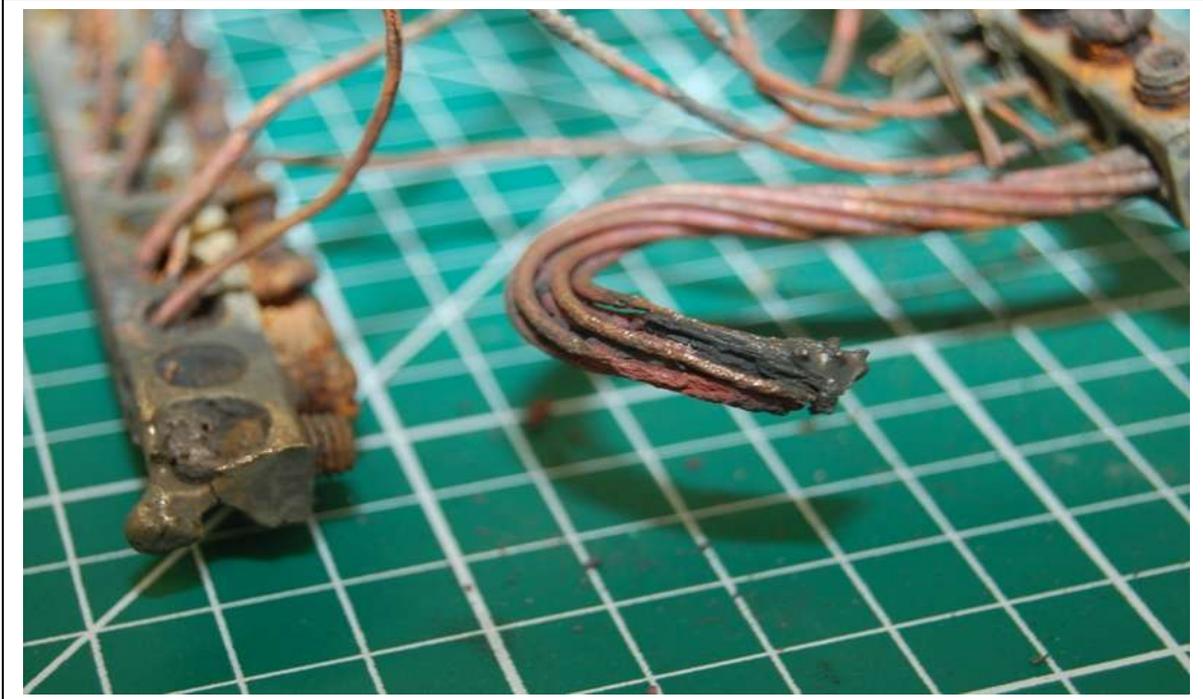
Photograph 8. Ref: DSC_0042

Description: View of neutral bars after removal from distribution board



Photograph 9. Ref: DSC_0047

Description: View of neutral bars after removal from distribution board





Surrey Fire & Rescue Service