LONDON FIRE BRIGADE

London Fire Brigade Headquarters
169 Union Street London SE1 0LL
T 020 8555 1200 **F** 020 7960 3602
Textphone 020 7960 3629
london-fire.gov.uk

Freedom of Information request reference number: 6949.1

Date of response: 31/10/2022

Request:

1.Name of your Fire Brigade in full
2.Email Address this FOI went to (to avoid any email reminders being sent)
3.Does your fire brigade have a standard method of dealing with overheating Commercial & Industrial lithium-ion based batteries
- *YES*
- *NO*

4.Does your fire brigade have a standard method of dealing with leaking Commercial & Industrial lithium-ion based batteries
- *YES*
- *NO*

5.Does your fire brigade have a standard method of dealing with fires involving Commercial & Industrial lithium-ion based batteries
- *YES*
- *NO*

6.If yes to any of the above, please could you expand on your standard process/methodology below, including any links/URL's/documentation (please send as attachments)

Response:

Please see our response to your queries in turn below:

1.Name of your Fire Brigade in full

London Fire Brigade

2.Email Address this FOI went to (to avoid any email reminders being sent)

informationaccess@london-fire.gov.uk

3.Does your fire brigade have a standard method of dealing with overheating Commercial & Industrial lithium-ion based batteries
- *YES*
- *NO*

4.Does your fire brigade have a standard method of dealing with leaking Commercial & Industrial lithium-ion based batteries
- *YES*
- *NO*

5.Does your fire brigade have a standard method of dealing with fires involving Commercial & Industrial lithium-ion based batteries
- *YES*
- *NO*

6.If yes to any of the above, please could you expand on your standard process/methodology below, including any links/URL's/documentation (please send as attachments)

Under the FOI Act we are not required to answer a question if we do not already have the relevant information in recorded form. We do not hold the specific answers to your questions numbered 3-6 in recorded form.

However, we do hold information in relation to our response method to incidents that occur in adverse and dangerous environments, with significant hazards, which you may find useful.

Risk Assessment

The LFB holds policy number: *'PN985: Operational safety management: knowledge skills and competence'*. Personnel may attend incidents in adverse and dangerous environments, with significant hazards. The priority for an incident commander is the safety of the public, people under their control and anyone affected by their actions. There is a balance that needs to be achieved between maintaining the safety of personnel and carrying out the emergency role of the fire and rescue service. The operational safety framework has been designed to help incident commanders to manage risk in such a way as to comply with both sets of duties.

I have attached a copy of the *'Standard Operating Procedure: PN985c'* in relation to risk assessments at an incident.

Incidents involving li-ion (lithium-ion) batteries.

The LFB newsletter (for all London Fire Brigade operational and Control staff) published an article in April 2022 in relation to lithium-ion batteries. This includes some information in relation to extinguishing a li-ion batterie fire. I have attached this article to this response.

We have dealt with your request under the Freedom of Information Act 2000. For more information about this process please see the guidance we publish about making a request on our website.

LONDON FIRE BRIGADE

Standard Operating Procedure: **PN985c**

Incident type code:

Risk assessments at an incident

Official

Introduction

This procedure provides incident commanders with guidance in the application of risk assessments at an incident. It should be read in conjunction with Safety management at incidents – knowledge, skills and competence and in particular Risk assessments at an incident.

Appendix 1 contains a graphical key point summary of the operational procedures for the application of risk assessments at an incident.

Background

1 The fire and rescue service not only have a duty of care for their personnel but to others who may be affected by their activities. The objectives of the incident commander must take these duties of care into account when deciding on a course of action. They must minimise the danger and protect life, property and the environment. To do this they must select and apply safe systems of work at the earliest opportunity and ensure they are maintained and reviewed throughout the incident. In selecting the most appropriate safe systems of work the incident commander will also need to assess the risk against benefit, effective control measure and any relevant time constraints.

Operational Procedure

2 Incident commanders **must:**

- Carry out a dynamic risk assessment, identify hazards, evaluate risk and implement safe systems of work.
- Communicate the result of the dynamic risk assessment to those on the incident ground and Brigade Control which is achieved by the declaration of the tactical mode.
- Identify and communicate the hazard area and establish a safe working area as soon as is practicable.
- Continually review the risk assessment using situational awareness gathered as the incident progresses.
- Reflect their risk assessment in all subsequent messages to Brigade control.

3 Incident commanders **should:**

- Carry out and formally record analytical risk assessments when appointing a suitably trained safety sector commander who may be delegated this task.
- Communicate the findings of analytical risk assessment to all personnel and other agencies.
- Ensure that all personnel are briefed on the current hazards, risks, control measures and tactical mode.
- Review the analytical risk assessment at suitable intervals or when risks to personnel change.

Appendix 1 – Key point summary – Risk assessments at an incident – operational safety management SOP

Information on task or event

- What are the hazards?
- What are the associated risks?
- Who is at risk?
- What are the existing control measures?

Information about resources

- What are the skills and qualities of personnel?
- What equipment and resources are available and/or required?

Information about risk and benefit

- What are the significant risks?
- What are the potential benefits?
- Is saveable human life involved?

Gathering and thinking

What is the expected outcome from the planned actions?

Do the benefits gained justify the risk to personnel, equipment or the environment?

Objectives

- Resolve the incident safely with minimal impact to the community
- Minimise the danger and protect life, property and the environment.

Communicating

- Ensure all personnel are briefed on the current hazards, risks and control measures
- Ensure a tactical mode is declared following dynamic risk assessment
- Share findings of analytical risk assessment with all personnel and other agencies

Controlling

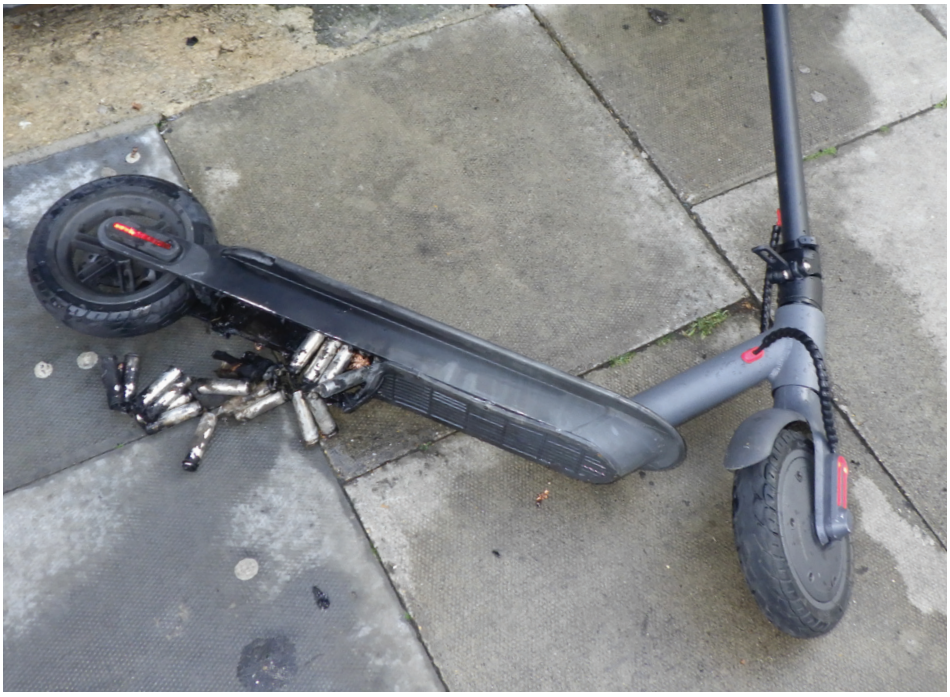
- Use all available control measures to reduce risk to as low as reasonably practicable.
- Maintain control of personnel, the public or responders to ensure effective and safe operations

Plan

- Conduct dynamic assessment of risk
- Establish a safe working area as soon as is practicable
- Identify any hazards and risks
- Select the most appropriate control measures
- Consider the benefits of proceeding with actions, taking account of the risk
- Appoint and brief safety officers
- Appoint a suitably trained sector commander safety when enhanced supervision of safety is required
- Conduct an analytical assessment and record significant findings on operational risk assessment form
- Review risk assessments at suitable intervals or when risks change throughout the incident
- Retain completed operational risk assessment forms for review and audit

This Standard Operating Procedure should be read with:
PN985 - Operational safety management – knowledge skills and competence: Dated 1 March 2022

LITHIUM-ION BATTERIES



Fires involving lithium-ion (Li-ion) batteries are on the increase. The batteries are particularly dangerous because they contain a large amount of energy in a very small space. They are used in many different locations, from mobile phones and cars to large energy storage sites, known as a BESS (Battery Energy Storage System). They are often also used alongside other alternative energy systems, such as in hydrogen vehicles and in photovoltaic panels on buildings.

The battery packs often consist of a number of 'cells' which again can vary from cylindrical types (often described as 'AA' battery style cells) to pouch cells that appear as a number of mobile phone batteries contained within the pack, and can be as large as many sheaves of A4 paper.

BATTERY PACK FAILURE

There are a number of reasons a battery pack may fail and ignite. These include:

- Age of the battery pack
- Overcharging
- Damage
- Heat and/or fire

We have seen recently a significant increase in the number of battery-powered devices/vehicles igniting in homes during the charging phase, probably as a result of a failure of the charging circuit that causes the battery to overcharge. The incident at Parsons Green (https://www.youtube.com/watch?v=m24ZQ0SjriQ) and another at Stanmore could be examples of damage sustained by the battery during use.

EXTINGUISHING A LI-ION BATTERY FIRE

There is still a lot of work being carried out worldwide on the most effective method of extinguishing a Li-ion battery fire. New equipment is being considered, such as fire blankets, extinguishers and intervention kits. In the meantime, it is still recognised that copious amounts of water is effective.

If the burning battery pack is of a size that can be safely placed into a large container of water (such as a paladin, skip or other container) then this is currently the best method. The battery should not be handled directly if possible, but should be moved and/or lifted with a non-conductive implement to guard against the potential electrical risks and potential harmful materials leaking from the battery. Likewise, BA and full structural firefighting PPE is essential.

The Lithium metal is also water reactive; placing the battery in water may not extinguish the fire, but only control it until the lithium components have burnt out.

If a battery cannot be placed into a container of water, such as when the battery pack is attached to a vehicle, then fires should be tackled with a 45mm jet as a minimum. Once the fire is believed to be extinguished, regular checks should be carried out with a thermal imaging camera (TIC) to ensure thermal runaway has not started.

THERMAL RUNAWAY

Thermal runaway is the name given to the breakdown of cells within a battery pack that allows fire to spread from one cell to the next. This may start in a relatively small way, but as more and more cells become involved, the energy release will increase and potentially lead to jet flames emitting from the battery and/or the explosive release of gases as the battery containment pack fails.

HANDOVER

When handing over a Li-ion battery pack which has been involved in fire it must be given to a responsible person who recognises the risk that Li-ion batteries can re-ignite, sometimes several hours, days or even weeks after the initial fire.

The National Resilience training package supporting this article gives further information about Li-ion battery packs; how they are constructed, used and the associated risks.