LONDON FIRE BRIGADE

Report title

Review of the Specification for Fireground and Breathing Apparatus Radios

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Summary
This paper discusses the issues involved in determining if intrinsically safe (IS) radios are required during 'general use' (fireground and breathing apparatus) operations and whether a different standard of IS can be justified through an assessment of the risks involved. It provides a summary of the advantages and disadvantages in the specification and use of IS radios and if the current standard of IS is not required for general use operations how this may impact more broadly on radio procurement.

Recommendations
That the London Fire Commissioner agrees to

1. Provide a more appropriate level of IS for all general use fireground radios for both breathing apparatus and fireground operations;
2. Introduce a single specification 4W/IS ATEX radio for all radios;
3. Amalgamate the BA radio and Fireground Radio projects;
4. Provide radios via riding position with personal issue retained for senior officers; and
5. Retain a stock of higher rated IS radios for specialist operational use

Background

1. Both the fireground and breathing apparatus (BA) radios, currently provided by Entel, require replacement and are in varying stages of specification and procurement. The specifications for the current BA radio (Entel HT981 Ex) and fireground radio (Entel HX480/1) are different because of variations (actual and perceived) in their operational use. BA radios are specified as intrinsically safe (IS) because they are occasionally required to be used in hazardous areas (including, albeit rarely, exposure to potentially explosive atmospheres).

2. The fireground radio procurement is being managed through Information and Communication Technology (ICT) and the BA radio is being managed through the Respiratory Protective Equipment (RPE) project, led by Operational Policy and Assurance (OPA).

3. Regulations require that special precautions need to be taken in areas where there is potential for a flammable or explosive atmosphere to prevent equipment from being a source of ignition. In situations

where an explosive atmosphere has a high likelihood of occurring, reliance is placed on using equipment with a low probability of creating a source of ignition, which is often referred to as 'intrinsically safe' equipment. Where the likelihood of an explosive atmosphere occurring is reduced, equipment constructed to a less rigorous standard may be used.

4. The Brigade currently uses intrinsically safe (IS) radios for BA operations. The current level of IS for these radios is equivalent to the standard identified in national operational guidance, which is a medium to high standard of IS.

5. Unfortunately, a disadvantage of this added protection is that radios with a medium to high standard of IS will generally only have a maximum of 1 Watt transmitting power versus a standard 4 Watt transmitting power for some lower standard IS and non-IS radios. The low transmitting power of the higher standard IS radios increases the potential for ineffective or limited radio communications between BA teams and the fireground, particularly where BA operations occur in the built environment.

6. This issue has been highlighted by a number of Fire and Rescue Services, and in a number of investigations undertaken by the Brigade, where poor communications at incidents, including poor radio performance, has been identified as a hazard and/or factor that has contributed to injury to operational staff. Furthermore, interviews with brigade firefighters suggest that due to experience with the poor signal propagation of BA radios, confidence in the equipment is low and therefore it is common practice for BA teams to enter smoke-filled environments (fires) with their non-IS 4W fireground radios on their tunics to improve communications.

7. Whilst the use of a medium to high standard of IS radio for BA operations has been the historical norm in the UK, in recent years many Fire and Rescue Services have moved away from the use of IS radios entirely and/or reduced the standards of IS protection associated with their BA radio equipment. This has been predominantly justified through a requirement to increase the effectiveness of BA radio communications (i.e. increasing available transmitting power) and through the general observation that firefighters may carry with them a range of other equipment that is not rated for 'intrinsic safety'. There is an additional benefit in that non-IS radios can be significantly less expensive to purchase and maintain than their IS counterparts. However, National Operational Guidance (NOG) states that FRSs should consider that an explosive atmosphere is likely to occur in normal operation and so a level of IS should be retained.

8. Current Brigade policy position on use of radios require the following:

    - All staff should have access to a non-IS radio (at this time this is on a personal issue basis)
    - All BA teams (minimum 2 wearers) must have an IS radio 'per team' to be worn by team leader
    - IC undertakes a risk assessment to determine if an explosive atmosphere is present; where an explosive atmosphere may be present non-IS radios must not be used by BA crews
    - Policy requires the use of non-IS radios when IS radios are not available, subject to risk assessment of whether an explosive atmosphere is present

9. The guidance in Brigade policy for making an assessment of the risk from an explosive atmosphere states that non-IS radios may only be used where a naked flame is already present and/or where a survey (using detection equipment) shows it is safe (subject to ongoing review). In practice, because of the nature of the incident, building structure or availability of appropriate detection equipment it will not always be possible for the IC to confirm this.

Assessment, selection and use of IS radios

10. ATEX is the name commonly given to two European directives that provide the requirements for controlling potentially explosive atmospheres in workplaces. These directives cover the protection of staff potentially at risk from explosive atmospheres and generate standards for equipment and protective systems that should be used in workplaces where an explosive atmosphere could occur.

11. The assessment of the relevant ATEX rating and protection principles required for equipment that may be used in potentially explosive atmospheres depends on a number of factors, including:

    - The classification of the hazardous location, which generally relies on the probability of a potentially explosive atmosphere occurring
    - The classification of the explosion group of gases/vapours/mists that are likely to be encountered (and usually can be identified in advance because of known storage and industrial processes, and
      (following the above)
    - Identification of the relevant protection principles and standard of protection

12. In the UK the requirement of the ATEX directives are put into effect by the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR). DSEAR is targeted at employers and places of work that manufacture, store, process or use dangerous substances and the requirements are for employers to assess and eliminate or reduce the risks from those dangerous substances/explosive atmospheres. The principles in DSEAR cannot easily be applied to firefighting operations because the fire service has limited or no control over the working environment, substances and/or processes in use at the sites we may have to attend.

13. When the principles of DSEAR and ATEX guidelines are however applied to firefighting operations the following can be concluded. National Operational Guidance (NOG) states that FRSs should consider that an explosive atmosphere is likely to occur in normal operation (classed as Zone 1). This guidance appears to be set against the context of the hazardous locations for which ATEX and DSEAR were designed to control. The environments that firefighters generally respond to differ in a number of key ways:

    - The buildings firefighters respond to will not normally be hazardous locations and as such will include multiple items of commercial, industrial and/or domestic equipment and installations that are not rated to any standard of IS, and
    - The frequency and duration with which a firefighter will be exposed to a potentially explosive atmosphere is very low. Firefighters will spend most of their time in relatively benign environments with very brief excursions into extremely hostile environments where combustion is already taking place. As such there are very few occasions or circumstances where a product rated for IS will be of any value.

14. There is no evidence that a portable radio carried by a firefighter has been the cause of ignition of an explosive atmosphere and it is worth noting that a number of fire and rescue services in both the US and the UK are not using IS radio solutions.

15. In light of the general presence of non-IS rated equipment in environments that firefghters attend, the fact that combustion will generally already be taking place, the low frequency of attendance at any incident where a potentially explosive atmosphere may be present, the minimal periods of time that firefighters may then be directly exposed to that environment and the fact that there is no evidence of a portable radio igniting an explosive atmoshphere it would be more appropriate to allocate a classification of 'zone 2' to the general principles of firefighting operations.

16. In the United States (US) the National Fire Protection Association (NFPA) have recognised that the standards in use for both IS and non-IS radios do not take into account the extreme conditions in which they may be used by firefighters. As a result they have worked to produce a new standard that is specific to this, but this will not be published until 2020. Whilst this standard has still not been fully published the NFPA have indicated that, following assessment, they do not intend to remove IS from the specification of BA radios but they have reduced the minimum standard required.The standard of IS they have set (Division 2) is broadly equivalent to the standard of IS idenitified through our risk assessment (Zone 2).

17. Consideration has also been given to the 'explosion group' classification for the IS standard. Firefighters will generally attend fire situations where combustion is already taking place. This will result in the generation of fire gases but as combustion is required to produce these gases there will also generally be an ignition source already present. In these circumstances IS rated equipment will not be required.

18. Additional risk from a potentially explosive atmosphere may be present for firefighters where there are the conditions for backdraught and/or fire gas ignition. The key control measures for firefighters for these conditions are to recognise the signs of these phenomena and adopt defensive firefighting tactics (fighting the fire externally) and/or using tactical ventilation to remove gases. It is important to reiterate that there is no known occasion where a firefighters radio has been identified as the cause of ignition at an operational incident, under any circumstances. It is much more likely that gases will track back to the original fire and/or for disturbed embers to be a source of ignition.

19. However, the Brigade may be called to hazardous sites and/or hazardous incidents, and in particular known chemical release or hazardous materials incidents with no active fire, that do resemble the circumstances the standards were designed for. In these circumstances higher rated IS radios (with 1 watt transmitting power) would be a requirement and these include entering confined spaces or premises where there is specific and additional risk potential for an explosive atmosphere such as:
    - Sewers
    - Silos
    - Ships and vessels
    - Flour mills
    - Paint spray shops
    - Premises that have conducted an assessment under DSEAR and identified they have hazardous locations (DSEAR requires hazardous locations to be displayed with warning signs that will provide information on risk to responders)
    - COMAH sites (although it will generally be normal practice for the site to provide the required standard of equipment to firefighters if required)

20. This supports the case for retaining a stock of higher-rated IS radios for incidents that have specific characteristics that increase the risk of inadvertent ignition of an explosive atmosphere (e.g. confined spaces where there is known increased risk of a potential explosive atmosphere).

Cost of radios and level of issue

21. In broad terms, radios with a level of IS tend to cost more than those without and therefore to keep to the same strategy of personal issue for all could be prohibitively expensive.

22. With the current shift system and personal issue, most of the radios are only in use for a quarter of their working life and therefore to ensure a more efficient use of resources as well as keeping within the current budget envelope, it is recommended that we move to a riding position level of issue. This would effectively mean that minimum purchase quantities without taking into account spares, could be

reduced from 4500 units to 900. Allocation to senior officers would still have to be on a personal issue basis.

23. In terms of 'on-costs', this could potentially mean a higher level of wear and tear due to their continuous use and maintenance may need to be carried out by the manufacturers rather than our own radio workshops to comply with the IS arrangements.

24. As a guide, there are two radios currently on the market that would provide both 4 W transmitting power and a level of IS. The Tait TP9361 and the Entel DT885.

25. The Tait TP9361 and the Entel DT885 are four watt IS radios with a price point of approximately £500 which if allocation was on a riding position basis would equate to approximately £750,000. This is based on a calculation of needing to provide 1500 radios (including senior officer provision and spares for servicing).

26. Benefits of this solution could be realised by the addition of an accessory (fist mic) permanently attached to the radio incorporating a speaker enabling improved communication between firefighters and between firefighters and members of the public. These would go some way to addressing recommendations from the Grenfell inquiry. If this was implemented, the proposed interim communications solution would not be required which would realise significant cost savings.

27. Taking into account the background into this subject outlined above it is considered that there are the following 3 options for the replacement of the LFB's general use fireground radios.

Options

28. **(Option 1)** Maintain the status quo with two separate radio projects to procure separate radio specifications, i.e.Non-IS FGR and IS BA radio

29. **(Option 2)** Dispense with IS standards for normal operations, adopt a single non-IS specification for FGR and BA radio, but keep stock of NOG-standard IS radios for specialist incidents

30. **(Option 3)** Introduce a new single specification for all general use fireground radios to;

    - Provide a more appropriate level of IS for all general use fireground radios for both breathing apparatus and fireground operations
    - Introduce a single specification 4W/IS ATEX radio for general use fireground radios
    - Amalgamate the BA radio and Fireground Radio projects
    - Provide radios via riding position with personal issue retained for senior officers
    - Retain a stock of higher rated IS radios for specialist applications

Recommendation

31. It is recommended that Option 3 is adopted for the reasons detailed earlier within this report.

Finance comments

32. This report sets out three options for the replacement of fireground and breathing apparatus radios. The capital programme currently includes £2.3m in 2019/20 for the Respiratory Protective Equipment project (BARRIE) and £1.8m forecast expenditure in 2020/21 for fireground radios. If option three is approved and the projects are amalgamated, then the amounts and timing of these payments should be reviewed and updated as required.

Workforce comments

33. Informal consultation has taken place with the representative bodies who have indicated that they will support this recommendation at the formal consultation stage.

Legal comments

34. Under section 9 of the Policing and Crime Act 2017, the London Fire Commissioner (the "Commissioner") is established as a corporation sole with the Mayor appointing the occupant of that office. Under section 327D of the GLA Act 1999, as amended by the Policing and Crime Act 2017, the Mayor may issue to the Commissioner specific or general directions as to the manner in which the holder of that office is to exercise his or her functions.

35. By direction dated 1 April 2018, the Mayor set out those matters, for which the Commissioner would require the prior approval of either the Mayor or the Deputy Mayor for Fire and Resilience (the "Deputy Mayor").

36. Paragraph (b) of Part 2 of the said direction requires the Commissioner to seek the prior approval of the Deputy Mayor before "[a] commitment to expenditure (capital or revenue) of £150,000 or above as identified in accordance with normal accounting practices…".

37. The Deputy Mayor's approval will be required for the Commissioner when it comes to any new procurement of FGR and BA radios.

38. The statutory basis for the actions proposed in this report is provided by section 7 (2)(a) of the Fire and Rescue Services Act 2004, under which the Commissioner must secure the provision of personnel, services and equipment necessary to efficiently meet all normal requirements for firefighting.

39. Under section 2(1) of the Policing and Crime Act 2017, the Commissioner has a duty to keep under consideration whether entering into a collaboration agreement with one or more other relevant emergency services in England could be in the interests of the efficiency or effectiveness of that service and those other services.

40. The proposed procurement of FGR and BA radios must be in compliance with the Public Contracts Regulations 2015 and ATEX Directive 2014/34/EU which requires products manufactured for use in potentially explosive atmospheres and intend for sale in Europe, to provide assurance that the equipment will not cause an explosion during routine operation. The ATEX directive was implemented into law in Great Britain by The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016.

Sustainability implications

41. No sustainability issues have been identified.

Equalities implications

42. The Public Sector Equality Duty applies to the London Fire Commissioner when they make decisions. The duty requires them to have regard to the need to:

    - Eliminate unlawful discrimination, harassment and victimisation and other behaviour prohibited by the Act. In summary, the Act makes discrimination etc. on the grounds of a protected characteristic unlawful.
    - Advance equality of opportunity between people who share a protected characteristic and those who do not.
    - Foster good relations between people who share a protected characteristic and those who do not including tackling prejudice and promoting understanding.

43. The protected characteristics are age, disability, gender reassignment, pregnancy and maternity, marriage and civil partnership, race, religion or belief, sex, and sexual orientation. The Act states that 'marriage and civil partnership' is not a relevant protected characteristic for (b) or (c) although it is relevant for (a).
44. Prior to implementation of the recommended option, a screening equality impact assessment will be undertaken. There are neutral impacts on individuals sharing a protected characteristic arising from this decision.