

Sootunderway

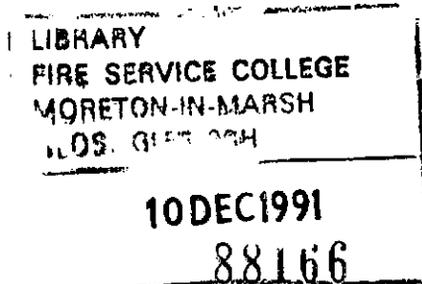


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Our reference: FIR/84 82/118/1
Your reference: FEP/89 20/321/1
FEP/87 47/94/2

FEP/91 52/351/1
FEP/91 45/240/1



3 October 1991

To: All Chief Officers

Dear Chief Officer

DEAR CHIEF OFFICER LETTER 7/1991

Items

1. CFBAC Research Report Number 40. A survey of firefighting foams associated equipment and tactics relevant to the United Kingdom fire service: Parts 1 - 3.
2. A survey of tools and methods for forcing entry through security doors - CFBAC Report No. 41.
3. Fire precautions in National Health Service premises - Firecode.
4. Fire standards in prison establishments - Principles of Design and Standards of Construction (The Design Guide).

Fire Precautions Manual for Prisons.

5. IEE Wiring Regulations - 16th edition.

Yours faithfully

SIR REGINALD DOYLE
Her Majesty's Chief
Inspector of Fire Services

**The Fire Service
College**



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CFBAC RESEARCH REPORT NUMBER 40

A SURVEY OF FIRE FIGHTING FOAMS ASSOCIATED EQUIPMENT AND TACTICS
RELEVANT TO THE UNITED KINGDOM FIRE SERVICE: PARTS 1 - 31. Background to the Survey

1.1 The enclosed three part report records the results of a survey undertaken in 1987 by a contractor, Ewbank Preece Limited, as the first phase of a wider, on-going project which examines foams, tactics and equipment for the fire service. The fourth part of the report summarises the conclusions in parts one to three and it is therefore considered unnecessary to publish it. The project, which is being carried out as part of the Home Office Fire Research Programme, represents a considerable long-term commitment in manpower and financial resources, and before deciding on the specific areas for examination, a preliminary state-of-the-art review was necessary to establish those aspects which would benefit from scientific research.

1.2 As a first step, the contractor examined the published reference material, together with specific areas of expertise within individual foam manufacturing companies, testing and research bodies, fire brigades and mutual aid organisations. The information obtained was then analysed and has now been summarised in the attached report together with recommendations for possible future research. Although it is not Home Office practice to publish the results of background research studies in full, it was considered that the information contained in this report would be of particular interest to those concerned with fire brigade operations, and should therefore be made available as a CFBAC research report.

2. Part 1 - Fire Fighting Foams

2.1 The first part of the report deals with fire fighting foams, and describes how over the past forty years the two main groups of foam

(protein and synthetic) have developed. The introduction of additives to counteract specific deficiencies in the product is also documented, and it is explained that both protein and synthetic based foams have been directed toward a common goal; a foam which can be used against Class B fires in all circumstances. The main properties and minimum application rates of fire fighting foams are discussed, and deficiencies in existing knowledge are identified together with the requirement to up-date information. Reference is made to the advantages and disadvantages of using 'un-aspirated' AFFF (see also CFBAC Research Report number 31, 'Additives for Hosereels Systems: Trials of Foam on 40 M Petrol Fires'). However, the authors indicate that the effectiveness of un-aspirated AFFF is unproven and that certain conditions can arise which could decrease its chances of extinguishing a tank fire.

2.2 Specifications and standards for foams are matters of considerable importance to the fire service and the fact that these are not directly comparable is a cause for concern. Existing test methods are frequently criticised as inadequate and the authors emphasise that an agreed purchasing standard is required against which foams can be tested. The Home Office recognises that this is a matter of fundamental importance and is currently working, in conjunction with the relevant ISO Committee, to establish a standard, reproducible test which can be used by the fire service. The authors of the report also suggest that a review and revision of foam application rates, as outlined in the Manual of Firemanship, should be pursued as a matter of urgency.

3. Part 2 - Tactics and Equipment

3.1 This part of the report describes some of the common types of fires encountered, illustrating various fire scenarios, and highlighting some areas where the use of foams, tactics and equipment could be improved. For example, it is suggested by some users that in the case of road traffic accidents, first response appliances should be equipped for the use of AFFF foam through hoselines. However, it is noted that alternatives to AFFF in this application have not yet been fully researched. Of all the equipment reviewed, the clip-on aspirating

device for existing fire service branch pipes has the advantages of simple, robust technology, and is seen to give substantial benefits for a relatively small financial outlay.

3.2 The survey also dealt with major incidents at oil and petrochemical installations, revealing that pre-planning is often hampered by unreliable and out-of-date information relating to site arrangements and tank contents. Such incidents are very costly in terms of manpower deployment and foam concentrates, and the authors consider that in order to deal effectively with a fire in a large flammable liquid storage tank, foam should not be deployed until there is a sufficient quantity available to mount a full-scale attack. It is also recommended that cooling water should be used more sparingly against this type of fire, and in many cases, directed at specific targets. This is seen as being of particular importance in areas where water supplies are inadequate.

3.3 Many of the conclusions drawn in this section of the report interrelate to the recommendations in part 1, whilst others are concerned with operational and training matters. Particular emphasis is laid on the training of fire officers in charge of major incidents, and the report recommends that they should be specifically prepared for the organisational complexities of the task. Further areas of research are also discussed, such as elevated platforms for foam delivery, automatic foam proportioning and surveillance equipment for monitoring progress at major incidents.

4. Part 3 - Large Tank Fires

4.1 The third part of the report deals with the problems associated with large petroleum storage tank fires. It is suggested that existing fire brigade equipment is less suitable than the larger, specialist equipment which is specifically designed for tackling such fires. Quantitative comparisons are made between the specialist and existing fire service equipment that would be required to combat a large tank fire based on a standardised test fire scenario of 90, 75, 60 and 45 metres in diameter. It is considered that if tank wall heights are

greater than 27 metres, conventional monitors and pumps would be unable to project foam over the tank rim. However, the report concludes that the use of 'standard' fire service equipment against this type of fire requires excessive quantities of 70mm hoseline, and that in the event of a boil-over, or change of wind direction, serious logistical difficulties can arise in equipment and manpower re-deployment.

4.2 In contrast, these problems could be greatly reduced by the use of specialist equipment which, because it uses 125mm hoseline, requires only 25% of that needed if standard 70mm hoseline equipment is used. Similar improvements could be made by the use of large monitors, large pumps and specialist foam proportioning equipment without the need to increase water or foam supplies. Specialist equipment is also considered to be more effective, and it is generally agreed that large monitors (which have a greater range than smaller monitors of the same design that operate at the same working pressure), throw foam jets which are more likely to survive the heat emitted from the tank fire plume.

4.3 The report contains proposals for the introduction, within the United Kingdom fire service, of fire fighting teams trained in the use of specialist foam equipment, and also explores the possibility of making greater use of existing commercial teams, and mutual aid organisations. The researchers concluded that there is insufficient data to define the largest size of tank fire that can be tackled with foam monitors alone, and for this reason it is recommended that all petroleum liquid storage tanks above 45 metres in diameter, should be fitted with fixed-base injection foam systems. These recommendations have been closely studied by the Home Office, and it is considered that responsibility for a significant number of them fall within the provinces of the Health and Safety Executive and the petro-chemical industry. Matters are therefore being pursued in respect of these conclusions.

4.4 The Fire Research and Development Group is now planning to conduct large-scale fire tests involving leaded and unleaded petroleum formulations. These tests will take place at the Fire Experimental Unit, Moreton-in-Marsh during 1991, and the possibility of computer

modelling large oil tank fires is also being explored.

4.5 It is possible that some financial and manpower implications relating to equipment and training may arise from this part of the letter.

Contact for technical queries: Home Office
 Fire Experimental Unit
 Moreton-in-Marsh

 Telephone: 0608 50004

File Reference Number: FIR/84 82/118/1

A SURVEY OF TOOLS AND METHODS FOR FORCING ENTRY THROUGH SECURITY DOORS - CFBAC REPORT NO 41

1. Following concern expressed by the Fire Service over the increased use of security doors in residential premises, particularly blocks of flats, and the difficulties experienced generally when they have been used as front entrance doors to individual flats, the Home Office decided to undertake a survey which would identify suitable tools and methods of attack which brigades might adopt to combat the problem. The traditional methods of forcing entry, as outlined in the Manual of Firemanship, proved to be generally ineffective when fire crews were confronted by a locked security door and brigades have been faced with this problem of what equipment to carry in order to deal effectively with such doors in the shortest time practicable. The work was undertaken as part of the Home Office Fire Research Programme and was carried out by the Fire Experimental Unit (FEU) at Moreton-in-Marsh.

2. The majority of doors which are installed for security purposes in domestic premises are of timber construction, but some are fabricated from sheet steel. A number of agencies active in the physical security field were contacted together with twenty manufacturers and suppliers of security doors in order to ascertain which types are most commonly installed. Using the information obtained from these enquiries a selection

of three different door types was made for testing during the trials:-

- (i) Single point locking wooden door with reinforced frame,
- (ii) Three point locking (from a single lock) wooden door, and
- (iii) Four point locking (from a single lock) steel door.

The choice of doors was made because:

- (a) By selecting a small number of different doors for use in the trials a larger range of possible entry tools and methods could be appraised,
- (b) Fair comparisons of the relative performances of the various tools and methods could be obtained,
- (c) The use of standard, commercially available assemblies meant that doors were unlikely to vary from one specimen to another, and
- (d) The doors chosen were considered to represent some of the toughest currently installed in domestic premises.

The trials were separated into two distinct parts; penetration and wrecking. The aim of the penetration trials was to make a

hole adjacent to the lock large enough for a firefighter to insert a hand and unlock the door from the inside. In the wrecking trials the intention was to create a hole big enough for a firefighter to enter, or to take out the door completely. The penetration trials were undertaken first, as in this way something of the relative toughness of the doors could be determined prior to the wrecking trials, and as the penetration trials were concerned with making relatively small holes, it was possible to undertake a number of tests on each door blank by re-positioning them so that an unspoilt area was at the most common lock height.

3. The best times achieved to penetrate the wooden doors (minimum hole size 127 mm in diameter), were in the order of 0.5 minutes, with five methods succeeding in under one minute. The best times achieved to wreck identical doors were broadly similar, and again five different tools succeeded in under one minute against the multi-locking point door. Only two tools were successful in under one minute at both types of attack; the Homelite multi-purpose saw and the chainsaw. In the case of the steel doors only a very small number of tools were successful in making a hand-sized hole. The best times achieved were in the order of two minutes and only four tools achieved times of under three minutes. Of these tools not one was common to both types of attack, although the Homelite multi-purpose saw achieved the best times, making a hand-sized hole in one minute forty seconds and a hole large enough for a firefighter to enter in three minutes eighteen seconds. The only other type of tool to succeed in both types of attack, although taking longer, were the thermic

lances. However, the Home office does not consider this equipment, or the chainsaw discussed in paragraphs 6.3.3.2 and 7.5.3 of the report, suitable for fire service operational use because of safety considerations.

4. As well as the thermic lances and chainsaw, mentioned in paragraph 3, the Home Office also considers that the equipment listed below should be operated with particular caution:-

- 6.3.3.1 - Homelite DM40 multi-purpose saw
- 6.3.3.13 - Sachs Dolmar disc cutter

However, the following items are not recommended for use in fire service operations for safety reasons :-

- 6.3.3.2 - Stihl "Farm Boss" chainsaw
- 6.3.3.3 - Battery powered drill and 110v jigsaw
- 6.3.3.4 - 110v circular saw
- 6.3.3.12 - Clucas thermic lance
- 6.3.3.14 - Arcair "slice-pak" thermic lance
- 7.5.3 - Chainsaw
- 7.5.11 - Circular saw
- 7.5.12 - Clucas thermic lance
- 7.5.13 - Arcair "slice-pak" thermic lance

It is emphasised, however, that the operation of all cutting and power tools carries certain risks and that care should be exercised by all concerned with their use operationally. If thermic lances are to be used the Home Office guidance on the use

of thermal cutting equipment issued under cover of Dear Chief Officer letter 4/1991 in May 1990 should be strictly adhered to.

5. Although the majority of the tools described in the report are bulky and noisy and therefore unlikely to be attractive to most would-be criminals, only limited publicity has been given to the report and Chief Fire Officers are asked to ensure, that so far as practicable, access is confined to fire service personnel only.

6. It is possible that cost and manpower implications will arise from this item.

Telephone number of contact: 071 273 2411

File reference number: FEP/89 20/321/1

FIRE PRECAUTIONS IN NATIONAL HEALTH SERVICE PREMISES - FIRECODE

The Chief Executive of NHS Estates, the new Executive Agency of the Department of Health, has recently written to Health Authority General Managers and NHS Trust Chief Executives enclosing unbound, advance copies of one more of the fire precautions publications in the FIRECODE series: Commercial Enterprises on Hospital Premises (Fire Practice Note 5). It is important that this document be brought to the attention of all who have responsibilities for fire precautions on hospital premises and a copy is therefore enclosed for the information of Chief Fire Officers and for use by fire prevention officers when responding to requests for advice.

2. Fire Practice Note 5 (FPN 5) replaces, with immediate effect, the guidance issued in Item 10 of DCOL 7/1990 dated 9 May 1990. Item 10, which set out interim measures to be taken in relation to fire precautions for shops and other commercial enterprises situated on NHS land pending the publication of FPN 5, is now cancelled.

3. FPN 5 provides technical and managerial guidance to ensure that when commercial enterprises or complexes formed by the conversion, extension, adaptation, modernisation or refurbishment of existing hospital premises are planned or designed, they will not subvert the fire safety precautions for adjacent health care areas or hospital buildings.

4. The FPN also recommends that Health Authorities/NHS Trusts adopt an holistic approach to setting fire safety strategies for hospital premises. In this respect it draws attention to Sections 3 to 6 of Health Technical Memorandum 81 (Fire Precautions in New Hospitals) which deals with statutory requirements such as those of the Fire Precautions Act 1971 and

the Building Regulations; fire separation requirements between commercial fire risk areas and hospital life risk areas and consultation procedures are also covered.

5. Further copies of this FIRECODE document may be purchased direct from HMSO in due course. An ISBN reference for the publication is not yet available.

6. There are no cost implications, apart from the purchase of copies of the bound publication, and no additional manpower implications arising from the issue of this guidance to fire brigades.

Telephone number of contact: 071-273 3406

File reference: FEP/87 47/94/2

DCOL 6/1991

FIRE STANDARDS IN PRISON ESTABLISHMENTS - PRINCIPLES OF DESIGN AND STANDARDS OF CONSTRUCTION (THE DESIGN GUIDE)

FIRE PRECAUTIONS MANUAL FOR PRISONS

I am writing to draw your attention to two publications, a design guide and a manual, which have been issued by the Home Office Prison Department. Copies of these documents are enclosed for the information of Chief Fire Officers and for use by fire prevention officers when called upon to visit Prison Service establishments to advise on fire safety matters, including the drawing up of operational plans to save lives in case of fire.

2. The design guide has been prepared in close consultation with the Home Office Fire Service Inspectorate and the PSA Projects Fire Adviser (Prison Build) for use in the design of prison building projects and for the refurbishment and alteration of or extension to existing buildings. Although the guidance aims for compatibility with national codes or guides wherever possible, it should be noted that the prison environment can present unique problems involving security requirements which can only be resolved by the adoption of a range of balanced fire precautions.

3. The opportunity is being taken now to give wider circulation to the most recent edition of the Fire Precautions Manual for prisons. This edition, which was issued by the Home Office Prison Department in May 1989, amended and replaced the 1987 issue. The amendments principally concerned the replacement of Appendices 1 and 2 by two new appendices, which update the technical information on fire fighting equipment and its maintenance; and the amplification of the material on contingency planning.

4. I enclose 2 copies of the design guide. Further copies of this unpriced document are available from:-

Mr M Penny
Fire and Emergency Planning Department
Room 927
Home Office
Queen Anne's Gate
LONDON SW1H 9AT

Telephone: 071 273 3406

5. One copy of the manual is enclosed. Additional copies of it may be produced locally as required.

6. Any periodic amendments or alterations to the guides will be forwarded to you for distribution.

7. There are no additional costs or manpower implications arising from the issue of this guidance to fire brigades.

Telephone number of contact: 071-273 3406

File reference: FEP/91 52/351/1

DCOL 6/1991

IEE WIRING REGULATIONS - 16TH EDITION

The Institution of Electrical Engineers (IEE) has published the 16th Edition of the Wiring Regulations.

2. The Institution's News Release which accompanied the publication explained in some detail how it differed from the 15th Edition which was first published in 1981 and has since been amended. A copy of the News Release is attached for information.

3. Attention is drawn particularly to the 'Note by The Health and Safety Executive' in the Preface to the Regulations. The Note welcomes the publication and states that the HSE continues to regard compliance with the Wiring Regulations as likely to achieve compliance with the relevant aspects of the Electricity at Work Regulations. The Home Office takes a similar view with regard to those premises where it has a departmental interest (e.g. premises subject to the Fire Precautions Act 1971, cinemas, other places of entertainment, pleasure fairs, etc).

4. Specific points in the new edition which will be of interest to the fire service include:

(i) Changes in the numbering of Regulations which are largely due to alignment with international electrical standards. This means that some care will be necessary to avoid confusion which might arise where a changed number relates to similar technical provisions of the 15th and 16th Editions.

(ii) Requirements for the provision of a fireman's switch are extended in the new Regulation 476-03-05. Whereas earlier editions of the Wiring Regulations required the

provision of a fireman's switch to isolate only high voltage discharge lighting installations, this requirement now applies to:

(a) all exterior high voltage installations, (i.e. this is no longer restricted to discharge lighting), and

(b) in the case of interior high voltage discharge lighting installations, all such installations, not only those operating unattended as previously.

(iii) Much of Chapter 52 'Selection and erection of wiring systems', which is now in line with the IEC standard is particularly relevant to fire safety.

(iv) Part 6 'Special installations and locations' includes additional requirements specific to installations which present special risk. For example, in circumstances in buildings where users may be in contact with water, outdoor locations, construction sites, caravans and caravan parks.

(v) There are now more detailed requirements for inspection and testing and these are further extended to cover periodic testing on installations.

(vi) The suggested 'Completion Certificate' is now changed and extended to allow for separate certification by each of those responsible for the design, construction, inspection and testing of an installation.

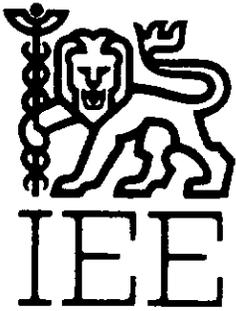
5. The series of new Guidance Notes (which are intended to support the practical application of the Regulations) are in an advanced state of preparation.

6. There are no manpower implications arising from this item and any cost will be limited to that necessary for the purchase of the new Edition of the Regulations.

Enc: IEE News Release

Telephone number of contact: 071 273 3514

File reference: FEP/91 45/240/1



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NEWS RELEASE

Annex A
Item 5
DCOL 6/1991

Fax 071-836 0190

10 May 1991

IEE PUBLISHES 16TH EDITION OF THE REGULATIONS FOR ELECTRICAL INSTALLATIONS

The 16th Edition of the IEE Wiring Regulations is published today and will supersede the 15th Edition from 1 January 1993. Until that date the 15th Edition will retain its validity. The 16th Edition should, however, be used immediately for the design of installations scheduled for completion after 1 January 1993 and for certain installations for which Regulations were not included in the 15th Edition.

The new edition is a development and simplification of the 15th Edition. A new part on 'Special Installations or Locations' is included to provide information for installations where special or additional considerations apply.

The 16th Edition also contains a list of internationally agreed documents which have been taken into account for the 16th Edition, as well as a Note by the Health and Safety Executive covering the relationship of the Wiring Regulations to the Electricity at Work Regulations 1989.

The Appendices for the 16th Edition have been reduced in number. Those previously included in the 15th Edition dealing with installation detail, such as maximum demand and diversity, and methods of supporting cables, have been transferred to a series of Guidance Notes. These will be published shortly after the 16th Edition. In particular, a detailed Guidance Note on Inspection and Testing, both initial and periodic, is already in preparation.

An On-Site Guide in handy pocket form will also be published by the IEE. This will cover the smaller installation - domestic, commercial and industrial - explaining how to achieve compliance with the Regulations without the need for detailed calculation.

Copies of the 16th Edition are now available from:

*The Institution of Electrical Engineers
Publication Sales Department
Michael Faraday House
PO Box 96
Stevenage
Herts
SG1 2SD*

Price, Soft cover £32, cash with order.

A ring-binder version will be available in June 1991, price £42, cash with order.

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*Ref: 55/91/TA
16thEd*