COMHAIRLE NA SEIRBHÍSÍ DÓITEÁIN

FIRE SERVICES COUNCIL

FIRE-FIGHTER HANDBOOK

Fire Fighters Handbook

Amendments

From time to time amendments will be issued to this handbook.

To maintain a correct and up to date copy of the handbook it is important that instructions given in amendment notices are carried out.

The person carrying out the amending should complete the table below.

Amendment No.	Date Amended	By Whom amended
1		
2		
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Contents

INTRODUCTION TO HANDBOOK

In Ireland three thousand fire-fighters provide fire, rescue and other emergency services for their communities. They operate from 220 fire stations nation-wide, responding to 30,000 emergency calls (excluding ambulance) each year.

The range and complexity of tasks which fire-fighters undertake continues to expand. In the last decade, response to hazardous substances incidents, road traffic accidents, environmental incidents and rescues from a variety of situations have been added to the fire services area of operations. The range of equipment and procedures which the fire service operates continues to expand accordingly. There is also a growing demand for quality in public service provision.

This handbook was prepared to assist in meeting these challenges.

This handbook is intended as one of a series of Irish Fire Services Handbooks. Others in the series include :

Junior Officer Handbook

Senior Officer Handbook

Rescue Handbook

Road Traffic Accident Handbook

Hazardous Materials Handbook

The handbook provides general information on fire services, as well as specific sections covering equipment and procedures necessary for efficient and safe operations, as one reference text. It is based to a large extent on existing training material. Some new material has been added where appropriate. The handbook format is intended to facilitate updating and expansion of sections.

The contents of the handbook are intended to assist the recruit and ongoing training programmes of fire authorities. Much of the material will already be

familiar to serving fire-fighters. The handbook is also intended to help towards safe and effective work practices, in accordance with the principles of Safety, Health and Welfare legislation.

Preparation of the material is being overseen by a sub-committee of the Fire Services Council. The Council wishes to express its gratitude to the members of the sub-committee :

Mr. Karl Cashen, Chief Fire Officer, Tipperary (NR) County Council

Mr. Donal Guerin, Asst. Chief Fire Officer, Kerry County Council

Mr. M. P. Hanly, Chief Fire Officer, Westmeath County Council

Mr. John Ryan, Asst. Chief Fire Officer, Cork Corporation

Mr. John Barry, Asst. Fire Adviser, Department of the Environment and Local Government

Mr. Sean Hogan, Fire Adviser, Department of the Environment and Local Government

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Section 1.   General Information

1.1   Fire Services in Ireland

1.1.1   Introduction

Fire services have existed in various forms in Ireland for centuries. One of the earliest known references to fire-fighters is in a manuscript relating to the monastic town of Clonmacnoise in the tenth century. Fire services as we know them today started to develop with fire brigades run by insurance companies in the nineteenth century. These developed into municipal brigades, provided by Corporations and Borough Councils towards the end of the last century.

It was the Fire Brigades Act, 1940 which underpinned the development of fire brigades as we know them today. The function of establishing and running fire brigades was assigned to the local authorities.

This early legislation was replaced by the Fire Services Act, 1981 which set out the current framework within which fire services are provided by local authorities. The services have evolved over the years to the current position.

Thirty seven fire authorities were established by the 1981 Act, or subsequent amendments. These fire authorities, who are the statutory bodies charged with providing fire services, are listed in Table 1.1.1.A below.

TABLE 1.1.1.A **LIST OF FIRE AUTHORITIES**
Athlone UDC Carlow County Council Cavan County Council Clare County Council Cork Corporation Cork County Council Donegal County Council Drogheda Corporation Dublin Corporation Dun Laoghaire / Rathdown County Council Dundalk UDC

| TABLE 1.1.1.A |
| LIST OF FIRE AUTHORITIES |

Fingal County Council
Galway Corporation
Galway County Council
Kerry County Council
Kildare County Council
Kilkenny County Council
Laois County Council
Leitrim County Council
Limerick Corporation
Limerick County Council
Longford County Council
Louth County Council
Mayo County Council
Meath County Council
Monaghan County Council
Offaly County Council
Roscommon County Council
Sligo County Council
South Dublin County Council
Tipperary (NR) County Council
Tipperary (SR) County Council
Waterford Corporation
Waterford County Council
Westmeath County Council
Wexford County Council
Wicklow County Council

These fire authorities maintain 220 fire brigades. A brigade consists of the fire station, the appliance(s) and equipment, and most importantly the crew, comprising officers and fire-fighters. These fire brigades provide a well-distributed infrastructure, from which over 30,000 emergency calls are responded to every year. A list of fire stations in Ireland is detailed in Table 1.1.1.B below.

TABLE 1.1.1.B
LIST OF FIRE STATIONS

Abbeyfeale	Cobh	Maynooth
Abbeyleix	Cootehill	Midleton
Achill Sound	Cork County Council Headquarters	Milford
Anglesea St.	Crosshaven	Millstreet
Ardee	Crossmolina	Mitchelstown
Ardmore	Daingean	Moate
Arklow	Dingle	Mohill
Arranmore	Dolphins Barn	Monaghan
Athenry	Donegal	Monasterevin
Athlone	Donnybrook	Mountbellew
Athy	Drogheda	Mountmellick
Bailieboro	Drumshanbo	Mountrath
Balbriggan	Dundalk	Moville
Ballaghaderreen	Dungarvan	Muinebheag
Ballina	Dungloe	Mulgrave St
Ballinakill	Dunlavin	Mullingar
Ballinamore	Dunleer	Naas
Ballinasloe	Dunmanway	Navan
Ballincollig	Dunmore East	Nenagh
Ballinrobe	Dunshaughlin	New Ross
Ballybay	Durrow	Newbridge
Ballybunion	Edenderry	Newcastlewest
Ballyhaunis	Edgeworthstown	Newport
Ballyjamesduff	Elphin	Nobber
Ballymahon	Ennis	North Strand
Ballymote	Enniscorthy	Oldcastle
Ballyshannon	Enniscrone	Phibsboro
Baltinglass	Ennistymon	Portarlington
Banagher	Falcarragh	Portlaoise
Bandon	Ferbane	Portlaw
Bantry	Fermoy	Portumna
Belmullet	Finglas	Rathdowney
Birr	Foynes	Rathdrum
Blanchardstown	Freshford	Rathfarnham
Blessington	Galway City	Rathkeale
Borrisokane	Georges Pl	Roscommon
Boyle	Glencolmcille	Roscrea
Bray	Glenties	Scarriff
Bunclody	Gorey	Schull

TABLE 1.1.1.B
LIST OF FIRE STATIONS (CONTD.)

Buncrana	Gort	Shannon
Bundoran	Graiguenamanagh	Skerries
Caherciveen	Granard	Skibbereen
Cahir	Greystones	Sligo
Callan	Gweedore	Sneem
Cappamore	Hacketstown	Stradbally
Cappoquin	Kanturk	Stranorlar
Carlingford	Kells	Strokestown
Carlow	Kenmare	Swinford
Carndonagh	Kilbarrack	Swords
Carnew	Kilbeggan	Tallaght
Carrick-On-Shannon	Kilcormac	Tallow
Carrick-On-Suir	Kilkee	Tara St.
Carrickmacross	Kilkenny	Templemore
Carrigaline	Killaloe	Thomastown
Cashel	Killarney	Thurles
Castlebar	Killorglin	Tinahely
Castleblayney	Killybegs	Tipperary
Castlecomer	Kilmacthomas	Training Centre
Castlegregory	Kilmallock	Tralee
Castleisland	Kilrush	Tramore
Castlepollard	Kiltimagh	Trim
Castlerea	Kingscourt	Tuam
Castletownbere	Kinsale	Tubbercurry
Catherine St.	Lanesboro	Tullamore
Cavan	Leixlip	Tullow
Charlestown	Letterkenny	Urlingford
Charleville	Lismore	Virginia
Clara	Listowel	Watercourse Road
Claremorris	Longford	Westport
Clifden	Loughrea	Wexford
Clonakilty	Macroom	Wicklow
Clones	Malahide	Youghal
Clonmel	Mallow	
Cloughjordan	Manorhamilton	

Summary information on fire services, extracted from the 1999 Fire Statistics are provided in Appendix 1. These statistics are compiled from the reports produced after each incident attended by fire brigades.

Over three thousand fire-fighters are involved in delivering the community emergency service. Twelve hundred are full-time fire-fighters, employed by the larger city / urban areas, and eighteen hundred are part-time (retained) staff, who respond to incidents when called by alerter.

Fire Services are part of the broader range of services provided by local authorities. The service is delivered through a structure as illustrated in Figure 1.1.1 below. The day to day running costs of the fire service are met by the local authority.

Figure 1.1.1
Typical Fire Authority Structure

```
              Local Authority Management
                        |
                 Chief Fire Officer
                        |
             Assistant Chief Fire Officer
                        |
               Assistant Fire Officer
           ┌────────┬────────┬────────┐
   Station Officer  Station Officer  Station Officer  Station Officer
   Sub-Officer      Sub-Officer      Sub-Officer      Sub-Officer
   Crew             Crew             Crew             Crew
```
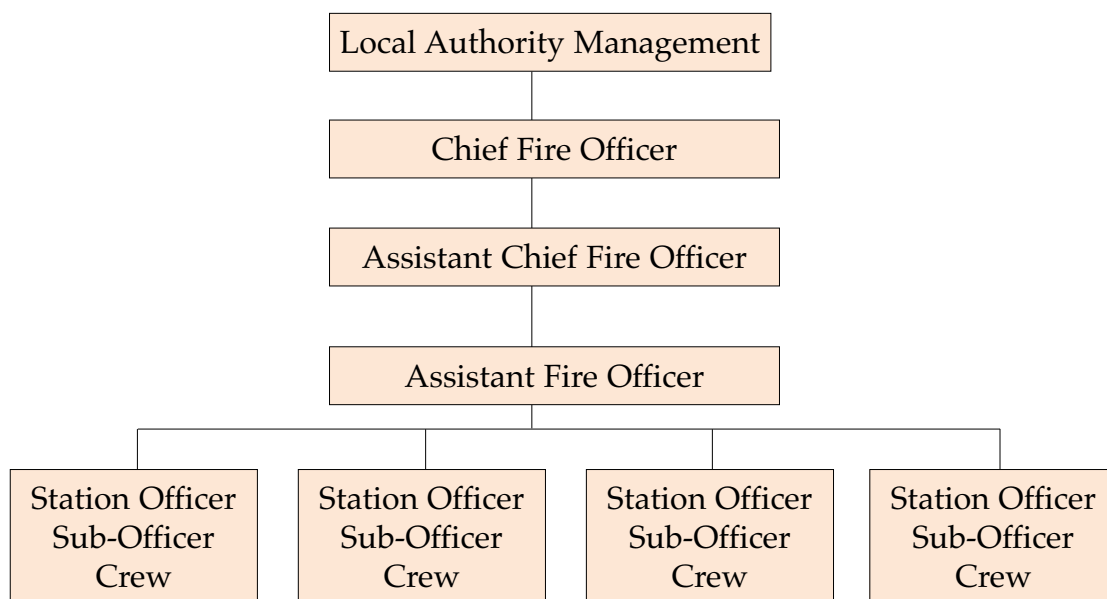
In addition to emergency functions, fire authorities are involved in protection of the community by a range of strategies, including regulatory roles and community awareness initiatives.

1.1.2   Fire Services Council

The Fire Services Act, 1981 made provision for a Fire Services Council to be appointed by the Minister for the Environment and Local

Government. Fire Services Councils have been active since 1983, especially in the area of supplementing local authority fire service training. The Council run an annual programme of training courses, in co-operation with local authority staff and using existing fire station training facilities, primarily aimed at officer development.

1.1.3 Department of the Environment and Local Government

In addition to providing the statutory framework governing fire services, the Department of Environment and Local Government is involved in certain statutory functions in relation to staffing. It is also involved in overseeing the development of fire services country-wide through a capital development programme. The Department has assisted local authorities with fire station construction and renovation, appliance and equipment purchase as well as specific projects such as the regional-based mobilisation schemes to achieve cost-effective solutions to emergency call mobilisation. The Department also has a programme of publishing guidance, which is developed in partnership with the local authorities. Recent examples include Guidance on the Use of Breathing Apparatus in the Fire Services, as well as Guides to Fire Safety in Flats, Nursing Homes etc. The underlying philosophy is a partnership between central and local government to ensure that persons, infrastructure and property are protected from fire and other emergencies.

1.2 Dress Codes for Fire Brigade Personnel

1.2.1 Introduction

A draft dress code for fire service personnel was circulated in a letter, DCOL 2/90, issued from the Department of Environment and Local Government to all Chief Fire Officers in April 1990. While primarily relevant to full-time brigades, this Dress Code has gained widespread acceptance among fire authorities. This section repeats guidance on the type of dress that should be worn by fire service personnel on different occasions. Circular Letter Fire 7/97 from the Department of Environment and Local Government to fire authorities enclosed a report with recommendations for uniforms for fire service personnel

prepared by the Fire Services Council. The letter requested authorities to give consideration to these recommendations when they are making decisions on the purchase and replacement of uniforms for fire service personnel. Circular Letter Fire 6/99 from the Department of Environment and Local Government to fire authorities amended some aspects of the original report. It is desirable that a consistent uniform is worn throughout the country, particularly on occasions when personnel from different brigades gather together.

This section is aimed at covering most of the occasions on which fire brigade uniforms are worn. It endeavours to cater for the multiplicity of tasks undertaken by the fire service.

1.2.2   Dress Types

This paragraph describes the dress types in use in the fire services.

No. 1 Dress - Fire Kit
Fire helmet - fire tunic - trousers - fire boots - socks - overtrousers - protective gloves and other protective equipment as detailed by the Fire Authority. Spectacles, (unless in accordance with permission) jewellery, earrings, etc., should not be worn.

No. 2 Dress - Uniform
Cap - tunic and trousers - rank markings (as appropriate) - black shoes - navy socks - shirt - navy tie - overcoat - reversible anorak, as authorised by the Officer-in-Charge. See Note M in paragraph 1.2.4 below.

No. 3 Dress - Shirt Sleeve
Cap - black shoes - navy socks - trousers - shirt - navy tie - rank markings. Sleeves as appropriate. See note K in paragraph 1.2.4 below.

No. 4 Dress - Hydrant Inspection
Cap - fire tunic - trousers - fire boots - overtrousers   See Note L in paragraph 1.2.4 below.

No. 5 Dress - Fire Service Pullover
Cap - black shoes - navy socks - trousers - fire service pullover - shirt - navy tie - rank markings.

No. 6 Dress - General Duty
Black shoes or fire boots - navy socks - sweat shirt - overalls or trousers - t-shirt, as authorised by the Officer-in-Charge.

No. 7 Dress - Fitness Training
Trousers - socks - t-shirt - sweatshirt - shoes.

1.2.3   Dress Applicable to Various Duties

This paragraph relates the dress types to the most common duties.

Change of Watch (dress for morning and evening parades)
On-coming crews should wear Dress No. 1. Off-going crews should wear Dress No. 2, 3 or 5, as authorised by the Officer-in-Charge or Mobilisation Officer. Ambulance crews should wear Dress No. 2 for both on-coming and off-going parades. See Note J in paragraph 1.2.4 below. Officers taking Parades shall wear Dress No. 2, 3 or 5 as authorised by the Officer-in-Charge or Mobilisation Officer.

Fires and Other Incidents
Dress No. 1. See Notes B, D and N in paragraph 1.2.4 below.

Practical Drill
Dress No. 1. See Notes D, E and N on paragraph 1.2.4 below.

Ambulance and Service Vehicles
Dress No. 2, 3 or 5. Dress No. 1 should be carried on ambulances and service vehicles and should only be worn if directed by the Officer-in-Charge at an incident.

Control Room Duties
Dress No. 2, 3 or 5 (without cap, overcoat or reversible anorak) as authorised by the Officer-in-Charge.

Lectures on Station
Dress No. 3, 5 or 6 (without cap) as authorised by the Officer-in-Charge.

General Station Duties
Dress No. 3, 5 or 6 (without cap) as appropriate and authorised by the Officer-in-Charge.

Hose Repair and Testing
Dress No. 1 when testing hose. Dress No. 3, 5 or 6 when repairing hose.

Hydrant Inspections
Dress No. 4. See Note L in paragraph 1.2.4 below.

Fitness Training
Dress No. 7.

Pre-Fire Planning, Risk and Premises Inspections and Familiarisation Visits
Dress No. 1, 2, 3 or 5 as appropriate and authorised by the Officer in Charge.

Pre-Arranged Meetings with Outside Personnel
Dress No. 2, 3 or 5, as appropriate and authorised by the Officer-in-Charge.

Meetings at Fire Brigade Headquarters
Dress No. 2, 3 or 5.

Ceremonial Parades
Dress No. 2.

Mess Room, Recreation Room or Rest Room on Stations
Dress No. 2, 3, 5 or 6 as authorised by the Officer-in-Charge. See Note E in paragraph 1.2.4 below.

Stand Down Periods
Dress No. 3 or 5 (without cap) or Dress 6 (with black shoes). Dress 7 may also be acceptable if authorised by the Officer-in-Charge.

Promotional Assessments or Interviews
Dress No. 2. See Note H in paragraph 1.2.4 below.

Disciplinary Hearings
Dress No. 2 only. See Note H in paragraph 1.2.4 below.

Conducting Visiting Parties
Dress No. 2, 3 or 5.

Walk-Out Dress (including coming-on and going off duty)
Dress No. 2, 3 or 5 as authorised by the Officer-in-Charge of the station.
(Civilian clothes may be worn for coming or going off duty).
Permission to wear uniform or fire kit off-duty may only be granted by
Chief Fire Officer or the senior officer on duty.

Training Courses
The Course Director will determine the various modes of dress to be
worn by staff and students on training courses. This will generally be
in accordance with this section.

Officers' Dress
All officers and personnel acting in officer ranks shall wear Dress No. 2,
3 or 5 when carrying out station duties and supervision. During stand
down periods, e.g. recreation, games, rest periods, etc. this requirement
may be relaxed. Personnel acting in officer positions should wear the
appropriate rank markings. Rank markings for this purpose should be
obtained from the Officer-in-Charge.

Reversible Anoraks
Reversible anoraks should be worn as authorised by the Officer-in-
Charge by personnel on ambulance duties in conjunction with Dress
No. 2, 3 or 5 and by drivers of service vehicles. When attending at
incidents the jacket shall be worn with the reflective side visible.
Alternatively, the Officer-in-Charge may direct the wearing of Dress
No. 1.

Fluorescent Jerkins
Fluorescent jerkins and identity surcoats provided on appliances

should be worn at incidents as directed by the Officer-in-Charge or as outlined in Brigade Orders.

1.2.4   General Notes on Uniform

This paragraph provides some general notes on wearing of fire service dress.

A   All personnel should be aware of the importance of conveying a good image to the public and should therefore be smart and well turned-out at all times.

B   Fire tunics, uniform tunics, jackets, anoraks and overcoats should be fully fastened or buttoned when worn.

C   Fire service pullovers worn underneath uniform jackets should be adjusted, so far as is possible, to ensure that they do not show when the jacket is being worn.

D   Dress No. 1 should be worn at fires, special service incidents, drills and other appropriate occasions, such as hose and yard washing, changing of appliances and all occasions where it is required for safety reasons. The wearing of this kit at fires or other incidents may be relaxed at the discretion of the Officer-in-Charge of the incident only in circumstances where such a relaxation is conducive to the efficiency of the actual task to be carried out. The prime consideration is to maintain adequate personal safety and protection and presenting a satisfactory public image.

E   Only the standard issue uniform or clothing should be worn and it should be maintained in a clean and neat condition at all times. Officers should wear the appropriate rank markings at all times. Lanyards, logos, etc. may only be worn if authorised by the Chief Fire Officer.

F   Drivers of fire service appliances, staff cars, or vans should not wear fire boots while driving. On arrival at incidents, the appropriate footwear should be worn.

G Cap, overalls and fire kit should not be worn in Mess Rooms, Recreation Rooms or Rest Rooms.

H Caps should be worn when appearing before a promotion assessment or interview board, or at disciplinary hearings.

I Braces are not permitted when dressed in Dress No. 3 except as specified in Note L below.

J Dress No. 1 should be placed in front of personnel on parade and carried on ambulances and service vehicles by the crews.

K The sleeves of the shirt should be rolled/folded neatly up to 25mm above the elbow when wearing Dress No. 3.

L The Officer-in-Charge may at his discretion relax Dress No. 4, provided all crew members are dressed alike, in very hot weather, Dress No. 3 may be worn. In addition, fire boots and overtrousers should also be worn.

M Ties should be worn on ambulance duty at all times. Dress No. 1 should not be worn on ambulance duty.

N For safety reasons and to present a satisfactory public image, long hair, side burns or beards should not be worn by personnel.

P Cap badges, should only be fitted in the holes provided in the cap for this purpose. In the case where a cap is issued which does not have holes provided, holes should be made taking care that they are positioned so that the lowest point of the badge, when fitted, is 3mm above the chin strap when it is in the closed position above the cap peak.

1.3 Rank Markings for Uniforms, Caps and Helmets

The different ranks in the fire service are identified by rank markings worn on the shoulders of uniforms, caps and helmets.

In October 1990, the Department of Environment and Local Government issued "Fire Services Standards for Rank Markings for Uniforms, Caps and Helmets". These are widely used by fire authority staff and a copy should be included in this handbook.

1.4   Fire Safety

1.4.1   Introduction

One of the roles of the fire authority is to provide advice on fire safety. This is done in many settings and many fire authorities have full-time officers dedicated to fire prevention / safety work. This includes dealing with applications for fire safety certificates for new buildings, or new work in existing buildings, and inspecting a range of buildings to which the public have access. This work also includes providing public information, which may includes lectures to interested groups, using local radio, and visits by children to fire stations.

In your role as a fire-fighter the public may also look to you on occasion for advice on fire safety. With your experience of dealing with fire, people will respect any message of fire safety which you give. This section contains information which will assist you in giving a consistent message on fire safety.

1.4.2   Smoke Alarms

Smoke alarms are the most effective way of protecting people from the danger of fire. This is recognised in the Building Regulations, which require that mains-powered alarms are provided in all new or renovated dwellings. Existing houses are not included within the scope of the Building Regulations, but mains or battery powered smoke alarms are the most effective and economical protection from fire you can have in your own home. Smoke alarms, especially battery powered are readily available in supermarkets, hardware shops, filling stations etc. and are not difficult to install. Battery alarms should be installed where they are accessible for replacing batteries and testing, but not so as to cause nuisance alarms. The simple message is therefore :-

<div align="center">

**MAKE SURE YOUR FAMILY IS PROTECTED
WITH SMOKE ALARMS**

</div>

1.4.3   National Safety Council Leaflets

The National Safety Council produces a range of leaflets dealing with fire safety in a range of settings. These are usually available within brigades.

1.5   Fire Station Turnout Area

1.5.1   Introduction

There are several aspects of the fire service and the environment in which it operates, with which the fire-fighter must be familiar. These include :

(i)   fire station and brigade procedures;

(ii)   appliances and equipment;

(iii)   drills and operations; and

(iv)   station turnout area.

This section considers the station turnout area i.e. the area in which the brigade operates, which is unique to each fire station, but which may be considered in general terms as detailed below.

1.5.2   Station Turnout Area

To carry out its duties and function efficiently, the fire service requires a thorough and comprehensive knowledge of the local area. This local area for practical purposes may be termed the Station Turnout Area i.e. the station ground and the grounds of adjoining stations and the fire authorities to which an appliance may be ordered on first attendance. Familiarity with the area and information about it will be developed over time with attendances at fires. This information is necessary for the following three functions :

(i)   mobilisation of appropriate brigades, whether by a local, county or regional based system;

(ii)   locating the incident; and

(iii)   effective operations at the scene.

1.5.3   Changing Society

With a fast pace of development in Irish society, local knowledge among fire brigade personnel alone cannot provide for the three functions detailed in paragraph 1.5.2 above. The factors which contribute to this include :

-   major redevelopments in our town centres encompassing urban renewal schemes, complex multi-occupancy shopping centres, etc.;

-   development of many housing estates;

-   construction of motorways and ring roads around our cities and towns; and

-   introduction of one-way streets and changes in traffic flows.

1.5.4   Recording, Storing and Retrieving Information

It is generally necessary therefore that as much information as possible is recorded and stored in a retrievable system for use by fire brigades responding to incidents. While very considerable efforts are required for initial documentation of information, the benefits in terms of correct mobilisation of nearest resources, the ease of location of incidents and the improved impact of speedy response make these vital to the fire-fighters' work.

Information can be held and retrieved in a number of formats. Computer databases are now used in regional control centres to store and retrieve address data and pre-determined attendances for those addresses. Information is also stored on plastic laminated cards which are held on the front-line appliance, and used for navigation purposes, to provide general information about an area (e.g. hydrant location) or specific information on a building such as entry points, key-holders etc.

This standardised type of information is of benefit to :

(i)   enable non-local 999 or 112 call-takers to confirm address information given by callers, and to identify the best available fire brigade response (pre-determined attendances for specific addresses);

(ii)   supplement the information of fire-fighters responding to an incident, by providing clear address information, by using maps to locate the incident address and take the most direct routes, and by providing information on individual areas or buildings (pre-fire plans);

(iii)   provide information to appliances from outside stations unfamiliar with the area; and

(iv)   record and co-ordinate the knowledge and experience of individual fire-fighters.

1.5.5   Types of Information

In addition to the above uses, information on the following aspects are also very relevant to the fire-fighters' work :

(i)   location of hydrants and the capacity of water mains, if supplies or pressure can be increased in certain locations, and the location of supplementary water supplies, including temporary changes such as the effects of dry weather in the summer;

(ii)   places of particular interest because of the scale or function of the area, including ports, airports, rail lines, sports grounds etc.;

(iii)   buildings in the area, including places of public resort such as theatres, cinemas, hospitals and other institutions etc., details of fixed installations such as sprinklers, gas shut-off valves, key-holders, contact names etc. may also be held;

(iv)   special risks such as electrical substations, manufacturing / processing industries which fire-fighters may have to deal with; and

(v)   road network within the area.

The information required by fire-fighters of the station turnout area may be broken down into the following components :

(i)   topography;

(ii)   navigation;

(iii)   street index;

(iv)   water supply;

(v)   pre-fire plans; and

(vi)   temporary information.

Fire-fighters need to familiarise themselves with the information available on their station area, and how to utilise it.

1.5.5.1   Topography

Knowledge of the station turnout area, local geography, characteristics, landmarks, particular features of the area, type of building, use of buildings, built-up areas, rural areas, residential, industrial, agricultural, densely populated / sparsely populated.

Topography will cover Roads, Water Supplies, Life Risks and Special Industrial Risks.

Topography of an area is usually best shown on a map with a scale of one inch to one mile which will give a general overview of the area. The use of colour on this map will aid assimilation and recognition of information especially when unfamiliar locations are involved.

A knowledge of the station turnout area should also include a knowledge of the underground services within that area, such as the location of gas and underground service tunnels where people are likely to be working.

1.5.5.2   Navigation

For navigation purposes, the one inch to one mile map is usually sufficient for rural areas, however, for urban areas a larger scale is required, the minimum usually being six inches to one mile or one 1 : 10,000. It is necessary to have enough information on the appliance to allow it to get to an incident from any point within the station turnout area.

It should be noted that the shortest route may not always be the quickest, depending on the time of day and traffic congestion and the location of road works. Traffic flow is also a consideration. It may be quicker for an appliance from a neighbouring station to reach an incident depending on traffic conditions e.g. in the morning the flow is into a city from the suburbs, in the evening the flow is generally reversed. Route information from the station should consist of simple concise instructions and may be given conveniently by reference to street names and the use of abbreviations.

1.5.5.3   Street Index

In cities, to respond to an incident fire brigades require the address and the quickest route to the incident from the nearest station. A critical component in locating the incident is a street index used in conjunction with a map of the area. An alphabetical list of streets (and other location names), together with grid references and map sheet/page numbers, complements the map of the turnout area and ensure that a particular street may be quickly and easily located. This index usually contains all the streets, drives, avenues, crescents, important features and termination points of the street.

Grid references and map sheet numbers are included with mobilising messages from regional control centres, so that there is an easy cross reference with the map of the station turnout area. For rural areas a scale of 1 : 10,000 is usually adequate while for urban areas the maps may be more detailed, up to a scale of 1 : 2,500. The map is usually stored in A4 format so a number of sheets are required to cover a station turnout area.

1.5.5.4   Water Supply

On attending an incident, the brigade requires information on the water resources in the locality, particularly the following :

(i)   location;

(ii)   type (hydrant, water tank, open water);

(iii)   flow or yield (for open water supplies); and

(iv)   hose lengths required.

This information may also be displayed on a map, depending on the scale, with unique hydrant identifier which allows the other information for that hydrant to be read off a matching chart or table.

1.5.5.5   Pre-Fire Plans

Pre-fire plans are usually prepared for complex sites in the stations turnout area. They are most useful to the responding brigades, and can avoid loss of valuable time at the start of an incident. For instance, there may be a number of different access points from different streets / roads to a site. The site access map also shows the various entrances into the building. There may be a number of different buildings on site and an incident may occur in any one of the buildings. It is important to be able to locate the relevant building quickly. Site access information for complex sites is usually in the form of a large scale map of the site area with the access points and routes indicated

1.5.5.6 Temporary Information

This information concerns items of a temporary nature but which may significantly effect the brigade activities. There are two types :

(i)   temporary risks   fairs;
exhibitions;
hazardous materials in transit through an area or parked overnight;
planned road works and diversions; and

(ii)   immediate or short notice information which has to be disseminated quickly to those affected; (road congestions, unforeseen road closures, and diversions).

1.5.6 Collection and Up-dating of Information

A considerable effort is required to gather and document the information described above. This information may be developed progressively over a period of time as visits are carried out, e.g. water supply information could be added for individual locations during hydrant inspections of the relevant area. Actual fire incidents provide another source of information, and incorrect material should be amended as necessary.

The information on the station turnout area needs to be regularly updated to take into account new estates, new traffic arrangements, new water supplies etc.

1.6 Glossary of Fire Service Terms and Abbreviations

1.6.1 Introduction

There are a number of common terms and abbreviations which are used in the fire service. This section sets out the most common of these under three categories :

(i)   appliances and equipment;

(ii)   telecommunication terms; and

(iii)   standard abbreviations.

The terms and abbreviations are listed in alphabetical order and are adapted from the UK Fire Service Training Manual (Appendix A).

1.6.2   Appliances and Equipment

Adaptors
Delivery hose adaptor
A fitting used for connecting together two lengths of hose with different types of couplings.

Suction hose adaptor
A fitting used to connect suction hose to delivery hose or to suction hose of a different diameter.

Aerial Ladder Platform
An aerial appliance consisting of hydraulically operated booms, the first boom having telescopic sections with an operator cage at the upper end. Appliances range in size, can be operated from the cage or console, elevated and rotated through 360o. Full size ladders attached to the booms offer a continuous rescue capability.

Air lifting units (Air-bags)
Reinforced inflatable cushions used for lifting when the use of conventional jacks is impracticable. Operated by compressed air via control valves.

Aqueous film forming foam (AFFF)
See 'Light water foam'

Axes
Large axe
Sometimes known as a 'felling' axe, used for breaking in or cutting away heavy timber, etc.

Fire-fighter's axe
A small axe used for cutting away.

Blank cap
A cover fitted to a delivery, inlet and suction connections when they are not in use. Also used to protect threads on other equipment e.g. on BA cylinders.

Branches
Branch
A tapering fitting employed at the end of a line of hose between the delivery coupling and the nozzle, in order to increase the velocity of the water and so to assist the nozzle to provide a solid jet.

Diffuser branch
A branch which can give a spray or a jet of variable size and which can be shut off at will.

Foam making branchpipe
A branch used for the generation and discharge of mechanical foam in which the foam solution is aerated, expanded and discharged as a jet or spray.

Hand-controlled branch
A branch with the capability to stop or reduce the flow of water. It may be capable of delivering a jet, or spray, or both, simultaneously.

Breathing apparatus
Apparatus which is provided with its own supply of oxygen or compressed air, designed to enable the wearer to breathe in irrespirable atmospheres.

Breechings
Collecting breeching
A fitting used to join two lines of hose to form one.

Dividing breeching
A fitting used to divide one line of hose into two.

Note : A breeching fitted with a valve to control the flow of water is known as a 'controlled dividing breeching' or a 'controlled collecting breeching'.

Ceiling hook
A long wooden pole having, at one end, a steel point with a spur at right angles.

Chemical incident unit
An appliance designed and equipped to attend chemical incidents.

Chemical protection suit
A one piece garment which, when worn with self-contained or airline breathing apparatus, gives protection against harmful solids or liquids.

Chimney rods
Jointed rods to which the tubing of a stirrup pump or hosereel can be connected for dealing with chimney fires.

Collecting head
Or 'suction collecting head'. Used to connect one or more lines of hose to the suction inlet of a pump.

Collector pumping
A method of increasing water supplies by stationing pumps at a number of sources and delivering water to the collecting head of a single pump for which it is pumped onto the fire.

Control Unit
A vehicle equipped as a mobile control room for use by the Officer-in-Charge at large incidents. Usually equipped with radio and, sometimes, field telephones.

Control, forward
Where the main control is sited at a distance, a forward control may be established in a conspicuous position close to the incident.

Contamination meter
An instrument used to detect contamination by radioactive particles, usually measured in counts per second.

Couplings
Delivery hose
An instantaneous coupling. There is one standard size (62.5mm) for all sizes of delivery hose.

Suction hose
A round thread screwed coupling, the standard sizes being for 75 mm, 100 mm and 140 mm bore hose.

Crowbar
Usually has a chisel edge at one end and a claw at the other.

Dam
A container usually portable, to hold water from which pumps can be got to work.

Distress signal unit (DSU)
A device, either automatic or hand-operated, fitted to the harness of a breathing apparatus to enable a distress warning signal to be sounded when necessary.

Demountable unit (POD)
Any specialist appliance requiring a prime mover to transport it.

Door breaker
A device for breaking in a door or forcing it off its hinges in order to effect an entry.

Dosimeter
An instrument that records the total amount of gamma radiation received.

Ejector Pump
A portable jet pump designed for removing water from depths beyond the maximum practical lift of pumps and/or in confined spaces. It is operated by water delivered from a pump through standard delivery hose.

Emergency Tender
An appliance carrying specialised equipment for use at special services.

Film forming fluoroprotein foam (FFFP)
See 'Light water foam'.

Fire beater
A wooden shaft at one end of which is usually fitted a piece of reinforced canvas. Used for beating out grass and heath fires.

Fire Extinguisher

CO$_2$
An extinguisher containing liquid carbon dioxide (CO2), which is released as a gas on the actuation of the extinguisher.

Powder (gas cartridge)
An extinguisher containing powder which is expelled by pressure stored within the body of the extinguisher as a whole.

Powder (stored pressure)
An extinguisher containing powder which is expelled by pressure stored within the body of the extinguisher as a whole.

Foam (mechanical, gas cartridge)
An extinguisher from which mechanical foam is expelled by pressure from a cartridge of compressed gas attached to or fitted into the extinguisher.

Foam (mechanical-stored pressure)
An extinguisher from which mechanical foam is expelled by pressure stored within the body of the extinguisher as a whole.

Vaporising liquid (gas cartridge)
An extinguisher containing a vaporising liquid which is expelled by pressure from a cartridge of compressed gas, attached to, or fitted into the extinguisher.

Vaporising liquid (stored pressure)
An extinguisher containing a vaporising liquid which is expelled by pressure stored in the body of the extinguisher as a whole.

Water (gas cartridge)
An extinguisher in which water is expelled by pressure from a cartridge of compressed gas, attached to, or fitted into the extinguisher.

Water (stored pressure)
An extinguisher from which water is expelled by pressure stored within the body of the extinguisher as a whole.

Fire alarm call point, manual
A device for the manual operation of an electrical fire alarm system.

Fire alarm system, automatic
A fire alarm system comprising components for automatically detecting fire, initiating an alarm of fire and taking other action as arranged. The system may also include manual call points.

Fireground
The area in which firefighting operations are in progress.

Fire hydrant
A fitting attached to a water main below street or pavement level. The hydrant incorporates a control valve and an outlet connection to which a standpipe can be attached (double hydrants have two control valves and two outlets).

Fire hydrant cover key
A tool used to lift the cover of certain types of hydrant.

Fire hydrant key and bar
A tool used to open up a hydrant and turn on the valve.

Fire hydrant pit
The recess below the road or pavement level in which a hydrant is located.

First-aid box
The medical first-aid box carried on appliances.

Foam
The product of a mixture of foam concentrate,
water and air.

Foam concentrate
A liquid used in the production of mechanical foam.

Foam container
A container to carry foam concentrate.

Foam dam
A portable reservoir to provide a continuous supply of foam concentrate for pick-up tubes.

Foam generator (high expansion)
See High expansion foam generator.

Foam generator
A device introduced into a line of hose for creating mechanical foam which is discharged through a branch.

Foam inlet adaptor
An adaptor fitted on fixed foam inlets to enable foam branches to feed into a fixed installation.

Foam inductor
A piece of equipment whereby the correct amount of foam concentrate is induced into the water stream.
Foam solution
A solution of foam concentrate in water at an appropriate concentration.

Foam Tender
An appliance wholly or mainly used for carrying foam-producing equipment.

Gantry

A fitting at the rear of an appliance to carry a ladder.

Gas tight chemical protection suit

A one piece garment which, when worn with self-contained or airline breathing apparatus, gives a high degree of protection against harmful liquids, particles and gaseous or vapour contaminants.

Gloves (electrical protection)

Gloves for use where live electrical wires or apparatus are involved.

Headrest

Fitting located at the front of an appliance to take the weight of the head of a ladder.

Hearth kit

A kit of tools required for dealing with hearth fires and cutting away.

High Expansion foam generator

A piece of equipment for generating high expansion foam. It consists of a fan which drives a spray of water and foam solution through a net gauze. The resulting foam is delivered through a short trunking of large cross-sectional area as it can only operate against a relatively small back pressure.

Hose
Delivery hose

Hose used on the delivery side of the pump. The standard sizes are 45 mm, 70 mm and 90 mm.

Suction hose

Hose specially constructed to withstand external pressure. For use on the suction side of the pump. Normally referred to simply as 'suction'. The standard sizes are 75 mm, 100 mm and 140 mm bore.

Hose becket/sling

A rope or webbing sling used for securing hose on a ladder. The type used on turn-table ladders are sometimes made of leather.

Hose ramp

A device to enable vehicles to pass over delivery hose without damaging the hose.

Hose reel equipment

Fitted to appliances and used to deal with small fires. Water carried in a tank on an appliance is pumped through 20 mm bore rubber hose at high or low pressure. The hose is wound on a revolving reel and has small diameter nozzles or fog/spray nozzles attached to the end.

Hose strap

A strap used for securing a length of hose when it is rolled.

Hydraulic platform

An appliance carrying two hydraulically operated booms with a cage attached at the upper end. Larger sizes have an additional short boom from the upper main boom. The booms can be operated either from the turntable or from the cage and can be rotated through 360 degrees. The cage is fitted with a monitor and can also be used for rescue purposes.

Incident ground

The area in which fire service operations are taking place. This may, or may not involve a fire.

Ladders
Extension ladder (7,9 or 10.5m)

A two-section ladder extended by means of a line.

Exension ladder (13.5 m with props)

A three-section ladder with jacks, plumbing gear and supporting props. Extended by means of a line.

Short extension ladder

A light ladder in two sections extending to approximately 4 metres.

Triple extension ladder

A light ladder of three extensions of a push-up type extending between 5.6 and 6 m.

Light water foam

An extinguishing medium having the ability to assist water to float on the surface of flammable liquids and provide a seal to prevent re-ignition.

Lines

Grass line

A line made up of coir or synthetic fibre which will float on water.

Ground control line

A line used to control a turntable ladder monitor from ground level.

Guide line

A line 60 m long used in certain circumstances to guide fire-fighters in and out of a building when breathing apparatus is being worn.

Guy line

(i)   A line (usually 40 m long) attached to a turntable ladder to assist in maintaining stability in a high wind.

(ii)   A line bent on to an object e.g., rescue sling, stretcher or ladder, to keep it clear of obstructions whilst being lowered.

Long line

A 16 mm diameter general purpose line, 30 m long.

Lowering line

A 16 mm diameter synthetic line, 40 m long, may have two legs one of which is spliced in 1.5m from one end of the line. Each leg is fitted with a running eye.

Personal line

A line up to 6 m long, secured at one end to a BA set and fitted at the other end with a snap hook for attaching to a guide line when BA is worn. This line can be used at its full extent (6 m) for searching off a guide line or it may be used 'short' (1.25 m) for traversing a guide line.

Rescue line

A special 16 mm diameter synthetic line (usually 70 m long) used for rescue work with turntable ladders.

Short line

A 16 mm diameter general purpose line, 15 m long.

Tail line

A line not more than 6 m long permanently attached to a turntable rescue sling. Used to prevent undue swinging of a person being rescued when the turntable ladder is trained away from the building.

Line / round protector

A device, preferably of a suitable aluminium alloy, designed to fit over the rounds of all types of ladders. It is attached to whichever round is necessary to protect the lowering line, and round, from damage when carrying out lowering drills.

Monitor

A special type of branch with lateral and vertical travel, mounted on an appliance, or designed to operate unattended at ground level when it is known as a 'ground monitor'.

Nozzles

Plain nozzle

A tapered fitting screwed onto the end of a branch which determines the size of the jet.

Spray nozzle

A nozzle designed to discharge water in the form of a spray.

Persuader

A cigar-shaped cold chisel mounted in a holder and used, in conjunction with a sledge-hammer, to force the hasp of a padlock.

Pick-up tube

A tube through which foam concentrate is drawn into foam making equipment.

Portable pump
A self-contained portable pumping unit.

Pump (appliance)
A self-propelled appliance having a built in pump, usually with a minimum capacity of 2270l/min. Carries either a 7, 9 or 10.5 m extension ladder and hose-reel equipment with a minimum tank capacity of 1370 litres.

Pump ladder
A self-propelled appliance having a built-in pump, usually with a minimum capacity of 2270 l/min. Carries a 13.5 m ladder and will probably have a tank capacity of 1370 litres.

Rescue sling
A special sling used for lowering people. It has two loops connected to a steel ring by which it is attached to a turntable rescue line. Sometimes used as an alternative to spliced legs on a lowering line.

Resuscitation apparatus
Apparatus for supply oxygen or a mixture of oxygen and air to a person needing artificial respiration.

Safety belt (turntable ladder)
A special belt with a swivel type hook for use with turntable ladders.

Safety device
A mechanical device incorporating a line and a belt. The device must be attached to the head of a TL or HP or to the anchorage of a drill tower.

Safety device belt
The belt attached to the line of a safety device which must be worn by the fire-fighter being carried down.

Salvage Tender (also known as Damage Control Unit)
An appliance wholly or mainly used for carrying specialised equipment to prevent or minimise water or smoke damage, etc.

Standpipe

Used on a hydrant to bring the outlet above ground level. The term normally includes the bend at the top which, when used separately, is known as the standpipe head. Standpipes may have single or double outlets.

Steel-shod lever

A large wooden lever, steel shod at one end, for lifting heavy objects and forcing doors, etc.

Stirrup pump

A small, hand-operated pump used in conjunction with a bucket of water. The pump is fitted with 12.5 mm rubber tubing with a 3 mm nozzle and delivers up to 5.5 1/min. In operation it is held steady with a foot stirrup.

Strainers
Basket

Used over the suction strainer to prevent the entry of dirt and leaves etc. The canvas part is knows as the 'skirt'.

Conical

A removable wire strainer fitted in the suction inlet of a pump.

Slipper

A low-level suction strainer facilitating pumping from shallow water. Water can only enter via the bottom of the strainer which stands on four short legs.

Suction

A metal strainer connected to the end of a suction hose to prevent entry into the suction of objects liable to choke or damage the pump.

Suction
Hard

Suction hose designed to withstand both internal and external pressure. It is used between open water supplies and the pump.

Soft

Delivery type hose used to connect the pump to a pressure fed source of water.

Suction wrench

Used to tighten suction hose couplings.

Survey meter

An instrument used to detect and measure gamma radiation. Also known as a 'dose-rate meter'.

Turntable ladder

A sectional ladder mounted on a self-propelled chassis which is extended by steel cables. It is operated hydraulically and can be rotated through a complete circle. It is usually fitted with a monitor at the head of the ladder.

Water tender ladder

See 'Pump ladder'.

1.6.3 Telecommunication Terms

1.6.3.1 General

Acceptance point

A place where fire calls are received. Normally the Mobilising/ Control Centre.

Central Alarm Station

A point where automatic fire alarms, fire telephones, intruder alarms, etc. from protected buildings may terminate. The centre accepts the responsibility for passing on calls to the appropriate emergency service control. This definition is synonymous with Central Commercial Alarm Centre.

Computer-Aided Mobilisation Project (CAMP)

A project initiated to update fire brigade mobilisation and communication facilities in Ireland.

Fallback control

A mobilising/ control centre which is only used in an emergency when the normal Mobilising/ Control Centre is not available, e.g. where it has been evacuated because of an alarm of fire.

Fire telephone

A telephone provided exclusively for calling the fire brigade. It is often connected to a private circuit from a fire risk to a fire station, mobilising control or Central Alarm Station.

Incident Control

A site, possibly a mobile Control Unit, which acts as a focus for communications and command at an operational incident.

Mobilising / Control Centre

A permanently staffed and fully equipped room on fire service premises in which emergency calls are received and subsequent action taken to mobilise personnel, appliances and equipment.

Private wire circuit

A dedicated telephone circuit permanently connected between two or more points for transmission and reception of speech and/or data.

Public switched telephone network (PSTN)

A switching system which allows public access to anyone connected to the national or international telephone network.

PSTN stand-by line

Secondary means of operating a call-out system by dialled-up connections on PSTN.

Remote control centre (RMC)
See 'Central alarm station'.

1.6.3.2   Call-out Systems

Acknowledgement signal
A signal transmitted back solely as a result of the reception of another signal e.g. a signal received at a call-out point of a remote control system indicating that remote equipment had operated. It may not, however, indicate that other alerting systems linked to the remote equipment are in fact operating.

Call-out installation
A line installation or radio alerter system, with associated control equipment, used to call fire-fighters to the fire station from their homes and/or places of employment.

Call-out point
The place from which a call-out installation is remotely controlled.

Identification signal
A signal received at the call-out point of a remote control system indicating that connection has been made with remote equipment. It does not indicate that the remote equipment is operating.

Mobilising System
The manual or computer-aided system by which appliances are assigned to an emergency call and mobilised.

Paging system
A selective call, personal paging system which may utilise the outgoing transmit frequency of a fire brigade main radio scheme, an independent paging facility using its own unique frequency, or the telecommunications paging network.

Paging encoder

The control equipment of a paging system usually located in the control room.

Public address system

A loudspeaker system which may be operated by remote control from a central control room or locally for both operational and administrative purposes.

1.6.3.3   Radio

Breathing apparatus interface

An interface designed to permit a handheld radio set to be used in conjunction with breathing apparatus.

Call sign

An identifier, normally comprising a name, numbers or letters, by which an appliance or officer is identified when being called by radio.

Control station

The place where main control operators and equipment are situated and from where the radio traffic of a scheme is controlled. Normally located in the mobilising control.

Duplex working

A communications technique in which it is possible to transmit and receive simultaneously e.g. as in an ordinary telephone conversation.

Explosion protected

Equipment designed to be operated safely in an environment consisting of flammable or explosive dusts, gases or vapours.

Field telephone

A temporary telephone system using lines deployed for the purpose and used mainly at operational incidents.

General clearance

A radio operating procedure term used by main control operators to denote that a period of traffic is completed and that out-stations may call in as necessary e.g. 'NNA1 out'.

Hand portable radio

A hand-held or body worn radio transmitter/receiver.

Leaky feeder

A linear aerial which radiates radio signals throughout its length. Such an aerial is particularly suited to facilitating radio communications in sub-surface premises (tunnels etc.) in conjunction with a UHF base station.

Main station

The place where the main transmitting and receiving equipment of a scheme is located. Sometimes it also includes the main control equipment and operators.

Main scheme radio

A radio system giving wide-area radio coverage throughout the area covered by the mobilising control. It is usually operated on low-band VHF channels, broadcasting from a high-site(s).

Multi-station scheme

A scheme served by several main stations e.g. a large county scheme.

Out-stations

All radio stations in a scheme, including two-way fixed and mobile sets and fixed receivers by excluding main stations, main and sub-controls.

Paging receiver

A device capable of receiving tone, numeric or text messages.

Retained alerter system

A call-out system utilising pocket-alerters, carried by fire-fighters, which are triggered by a radio signal transmitted by a remotely controlled alerter transmitter usually located at a fire station.

Retained alerter

A small alerter receiver carried by fire-fighters when on call and which sounds either an 'alert' or 'test' signal when actuated by a radio signal from an alerter transmitter.

Retained alerter transmitter

A transmitter, usually located at a fire station and remotely controlled from a central control room. It transmits either an 'alert' or a 'test' signal to pocket alerters.

Radio UHF base station

A radio installation which allows boosted signals of double frequency operation with UHF equipment. This equipment is usually provided as a mobile version but, exceptionally, e.g. at major airports, there are authorised fixed installations.

Simplex working

A communication technique in which it is not possible to transmit and receive simultaneously.

Single frequency scheme

A scheme using one common frequency for transmitting and receiving by all stations.

Transportable Radio

A portable transmitter/receiver of roughly the same power as a mobile set. Normally used on the loss of main station facilities or to enhance the power of hand-held sets to cover a wider area.

Talk-through

A facility on two-frequency radio schemes which interconnects incoming and outgoing channels. Used to enable out-stations on a scheme to hear and talk to each other.

Two-frequency operation

A means of operation whereby radios receive on one frequency and transmit on a different frequency (also known as double-frequency operation).

UHF base station

A combined radio receiver and transmitter which receives on one UHF frequency or a two-frequency channel and transmits on the second frequency thus permitting the use of two-frequency UHF assignments.

VHF/UHF mobile repeater unit

A composite radio installation comprising a VHF transmitter / receiver (on main scheme channels) interfaced with a UHF transmitter / receiver (on hand-held set channels). Can operate either :

(a)   On main scheme channel;

(b)   On hand-held set channel (with talkthrough) to enhance range of hand-held sets; or

(c)   Hand-held set through to main scheme stations direct.

1.6.3.4   Computer Systems

Bit

An abbreviation for binary digit which is the unit of information presented as either a '0' or a '1'.

Byte
A sequence of binary digits contained as a unit.

Central processing unit (CPU)
The unit of a computer in which processing data takes place.

Chemdata
Microcomputer based chemical information retrieval system.

Computer
A machine controlled by a stored programme, which automatically inputs and processes data and outputs the results of processing.

Database
A computerised store of information e.g. list of townlands, street gazetteer.

Data processing (DP)
Storing, retrieving, sorting or selecting data, changing data from one form to another, doing calculations or making decisions based on data.

Data transmission
The movement of information in a coded form over a transmission system by breaking down letters and figures into codes in order to send messages by electronic means.

Hard copy
A permanent record obtained on paper through a computer.

Hardware
The physical units of equipment which make up a computer.

Integrated System Digital Network (ISDN)

A digital switching system capable of supporting speech and/or data and facilitating the interconnection of radio and line connections.

Line printer

An output device which prints out one complete line of information at a time.

Modem

A device for converting digital information into voice frequency signals for transmission over a speech network or for converting signals back again into digital form at the receiving end of the circuit.

Network

An interconnection of two or more terminals to allow the transmission of data.

Peripheral

A piece of equipment linked to a computer.

Program

A set of instructions to a computer.

Software

An alternative term to Program.

Terminal

A device providing a direct link between a computer and the person using it.

Visual Display Unit (VDU)

A terminal where data is displayed on a screen rather like a television screen.

1.6.4   Standard Abbreviations

<u>Note</u> :   These abbreviations should not be used over the telephone or radio.

1.6.4.1   Appliances

ALP	Aerial ladder platform
BAT	Breathing apparatus tender
BACV	Breathing apparatus control van
BL	Break down lorry
CIU	Chemical Incident Unit
CU	Control Unit
DCU	Damage Control Unit
Decon. U.	Decontamination Unit
EST	Emergency/Salvage tender
ET	Emergency tender
FoT	Foam tender
HL	Hose-layer
HP	Hydraulic platform
P	Pump with 9 m or 10.5 m ladder
PL	Pump with 13.5 m ladder
TL	Turntable ladder
WrL	Water tender with 13.5 m ladder
WrT	Water tender with 9 m or 10.5 m ladder

1.6.4.2   Ancillary Appliances

CaV	Canteen van
FTr	Foam trailer
L4	Light 4-wheel drive vehicle
LU	Lighting unit
LUTr	Lighting unit trailer
WrC	Water carrier

1.6.4.3   Equipment

ALU	Air lifting unit
BA	Breathing apparatus

ELG	Emergency lifting gear
FBP	Foam branch pipe
FG	Foam generator
HX	High expansion foam
LX	Low expansion foam
LPP	Light portable pump (below 1600 Ilpm)
MX	Medium expansion foam

1.6.4.4 Personnel

CFO	Chief Fire Officer
ACFO	Assistant Chief Fire Officer
AFO	Assistant Fire Officer
DO	District Officer
Stn. O.	Station Officer
Sub. O.	Sub. Officer
LFf	Leading Fire-fighter
Ff	Fire-fighter
BAECO	Breathing Apparatus Entry Control Officer
BTO	Brigade Training Officer
SEFPO	Senior Executive Fire Prevention Officer
EFPO	Executive Fire Prevention Officer
OiC	Officer-in-charge
FCOp	Fire Control Operator
Comm. O.	Communications Officer
Mob. O.	Mobilising Officer
TO	Transport Officer
WO	Water Officer

1.6.4.5 Premises

Bde	Brigade
CCC	County Control Centre
RCC	Regional Control Centre
Cmd	Command
Con.	Control
Div.	Division / Divisonal
Div.HQ	Divisonal Headquarters

FBHQ	Fire Brigade Headquarters
Stn.	Station
TC	Training Centre
WS	Workshops

1.6.4.6 Miscellaneous

Actg	Acting
AFA	Automatic Fire alarm
AFD	Automatic fire detection
Ex. Tele.	Exchange telephone
FP	Fire prevention
FS	Fire Safety
FSC	Fire Services Council
PSTN	Public Switched Telephone Network
Ret.	Retained
RT	Radio Telephone
Temp.	Temporary
Vol.	Volunteer
WFB	Works fire brigade
WT	Whole-time

Appendix 1

FIRE SERVICES STATISTICS 1976 TO 1999

Year	Total Cost of Fire Service £ millions	Personnel		Total No. of Fires Attended	Total No. of Fires in Domestic Buildings	Fatalities resulting from Fire
		Full-Time	Part-Time			
1976	8.12	870	1,980	24,806	12,511	55
1977	9.52	902	1,993	27,044	14,748	44
1978	11.18	917	2,004	24,561 *	15,509 *	38 *
1979	13.26	923	2,041	29,716	18,124	116
1980	18.81	954	2,083	30,969	18,721	69
1981	25.30	1,046	2,061	30,589	18,434	109
1982	31.38	1,022	2,037	31,736	18,182	47
1983	32.27	1,099	2,029	27,674 *	16,960 *	69
1984	37.47	1,124	1,988	33,134 *	16,877 *	69
1985	41.04	1,161	1,991	28,505 *	18,115 *	64
1986	44.47	1,206	1,931	31,367 *	19,788 *	52
1987	47.86	1,207	1,917	26,138 *	15,786 *	52
1988	46.26	1,195	1,890	24,401 *	14,288 *	51
1989	49.02	1,202	1,880	28,965	14,153	57
1990	52.03	1,212	1,907	25,960	13,510	39
1991	57.46	1,224	1,945	30,202 *	15,939 *	52
1992	61.88	1,250	1,940	31,099 *	16,104 *	48
1993	64.13	1,222	1,966	31,613	16,028	51
1994	64.37	1,227	1,964	28,533	14,121	42
1995	68.62	1,241	1,953	36,024	12,517	38
1996	71.46	1,218	1,970	33,352	13,801	52
1997	74.62	1,256	1,969	29,381	11,909	51
1998	81.61	1,222	1,968	26,230	11,361	45
1999	94.00	1,219	1,970	30,210	11,540	51

*   Figures included are not available for the full year for some fire authorities.

**   Fires om Domestic buildings includes fires in apartments, flats and bedsitters

PARTICULARS OF STATIONS AND TURNOUTS IN 1999

Fire Authority	No. of Fire Stations	No. of Fire Posts	No. of turnouts to Fires	No. of turnouts to special Incidents	No. of turnouts to False Alarms	No. of turnouts to Ambulance Calls	Total No. turnouts
Athlone U.D.C.	1	0	240	23	95	0	358
Carlow Co. Co.	4	0	279	55	52	0	386
Cavan Co. Co.	10	2	190	174	32	0	396
Clare Co. Co.	7	0	661	156	166	0	983
Cork Corporation	2	0	1,810	471	1,005	0	3,286
Cork Co. Co.	20	0	1,133	365	346	0	1,844
Donegal Co. Co.	15	2	667	290	168	0	1,125
Drogheda Corporation	1	0	281	83	102	0	466
Dublin Corporation	15	0	25,141	See note 1	See note 1	90,236	115,377
Dundalk U.D.C.	1	0	362	86	105	0	553
Galway Co. Co.	10	0	1,296	188	280	0	1,764
Kerry Co. Co.	11	0	706	84	121	0	911
Kildare Co. Co.	6	0	1,062	174	58	0	1,294
Kilkenny Co. Co.	7	0	487	266	280	0	1,033
Laois Co. Co.	9	0	492	84	135	0	711
Leitrim Co. Co.	5	0	155	70	21	0	246
Limerick Corporation	1	0	936	194	466	0	1,596
Limerick Co. Co.	6	0	378	152	83	0	613
Longford Co. Co.	5	0	310	117	50	0	477
Louth Co. Co.	3	0	107	47	25	0	179
Mayo Co. Co.	12	8	991	335	119	0	1,445
Meath Co. Co.	7	0	462	190	217	0	869
Monaghan Co. Co.	5	0	299	85	35	0	419
Offaly Co. Co.	8	0	535	54	48	0	637
Roscommon Co. Co.	6	0	368	94	66	0	528
Sligo Co. Co.	4	1	505	224	113	0	842
Tipperary (NR) Co. Co.	7	0	552	90	104	0	746
Tipperary (SR) Co. Co.	5	0	454	112	216	0	782
Waterford Corporation	1	0	647	176	189	0	1,012
Waterford Co. Co.	9	0	418	174	154	0	746
Westmeath Co. Co.	3	0	359	42	61	0	462
Wexford Co. Co.	5	0	861	232	156	0	1,249
Wicklow Co. Co.	10	0	718	124	79	0	921
Totals	221	13	43,862	5,011	5,147	90,236	144,256

Note 1:   Number of turnouts includes special service incidents and false alarms as breakdown was
not available

1.50

Particulars of Fire Brigade Activities in 1999

Fire Authority	Number of Fires Attended: Own Area	Number of Fires Attended: other Area	Road Traffic Accidents	Water Pumping/ Flooding	Rescue/ Removal from Water	Other non-fire rescues	Hazardous Substances (No. Fire)	Miscell- aneous	Amublance Calls	False Alarms: Malicious	False Alarms: Good Intent	Total No. incidents attended by Fire Authority
Athlone U.D.C.	128	112	14	2	3	4	0	0	0	54	41	358
Carlow County Council	249	26	37	4	3	6	0	5	0	20	32	382
Cavan County Council	173	6	64	14	2	0	0	90	0	8	20	377
Clare County Council	651	10	39	45	1	18	14	39	0	138	28	983
Cork Corporation	1,472	338	91	20	55	28	34	243	0	383	622	3,286
Cork County Council	1,092	41	162	56	8	21	2	116	0	124	222	1,844
Donegal County Council	662	5	158	79	8	6	0	39	0	30	138	1,125
Drogheda Corporation	178	103	53	5	2	0	0	23	0	55	47	466
Dublin Corporation	11,563	0	2,007	335	85	3,187	209	529	74,815	2,609	4,617	99,956
Dundalk U.D.C.	282	80	53	3	4	4	17	5	0	42	63	553
Galway County Council	1,274	22	81	47	18	15	2	25	0	82	198	1,764
Kerry County Council	706	0	39	45	0	0	0	0	0	96	25	911
Kildare County Council	1,052	10	121	7	8	21	2	15	0	18	40	1,294
Kilkenny County Council	408	57	69	34	0	0	83	82	0	198	79	1,010
Laois County Council	457	28	39	12	0	0	10	19	0	71	64	700
Leitrim County Council	130	25	37	13	0	0	5	15	0	4	17	246
Limerick Corporation	774	162	54	0	13	45	3	79	0	325	141	1,596
Limerick County Council	358	20	80	20	0	4	30	18	0	53	30	613
Longford County Council	281	29	46	26	0	2	21	22	0	23	27	477
Louth County Council	105	2	34	5	1	1	0	6	0	8	17	179
Mayo County Council	977	14	163	67	14	5	78	7	0	24	96	1,445
Meath County Council	458	4	117	15	1	0	1	56	0	32	185	869
Monaghan County Council	292	7	63	6	1	2	5	8	0	11	24	419
Offaly County Council	491	44	39	6	2	7	0	0	0	9	39	637
Roscommon County Council	355	13	45	23	0	0	18	8	0	20	46	528
Sligo County Council	498	7	86	57	10	6	21	44	0	38	75	842
Tipperary (NR) County Council	496	56	73	1	3	1	7	5	0	46	58	746
Tipperary (SR) County Council	409	33	43	5	4	1	1	54	0	145	71	766
Waterford Corporation	561	86	48	13	11	0	6	98	0	81	108	1,012
Waterford County Council	418	12	92	23	1	6	27	35	0	54	100	768
Westmeath County Council	354	5	29	3	2	5	1	2	0	8	53	462
Wexford County Council	847	14	110	20	0	3	46	53	0	122	34	1,249
Wicklow County Council	686	2	73	9	0	17	1	12	0	49	30	879
Totals	28,837	1,373	4,259	1,020	260	3,415	644	1,752	74,815	4,980	7,387	128,742

1.51

FIRE SERVICE PERSONNEL AS AT 31ST DECEMBER 1999

Grade	Full-time		Retained		Total		Overall
	Male	Female	Male	Female	Male	Female	Total
Chief Fire Officer	28	0	0	0	28	0	28
Assistant Chief Fire Officer (Operational)	37	0	0	0	37	0	37
Assistant Chief Fire Officer (Prevention)	24	4	0	0	24	4	28
Senior Executive Fire Prevention Officer	6	0	0	0	6	0	6
Executive Fire Prevention Officer	11	1	0	0	11	1	12
Assistant Fire Officer Prevention	15	1	0	0	15	1	16
Second Officer	1	0	0	0	1	0	1
Third Officer	6	0	0	0	6	0	6
District Officer	27	0	0	0	27	0	27
Station Officer *	102	0	171	0	273	0	273
Sub Officer *	102	0	198	0	300	0	300
Fire-Fighter/ Leading Fire-Fighter/Driver/ Mechanic*	847	7	1583	18	2430	25	2455
Total	**1,206**	**13**	**1,952**	**18**	**3,158**	**31**	**3,189**

* Station/Post Personnel

1.52

Location of Fires Attended by Fire Brigades in 1999

Fire Authority	Domestic Chimney Fires	Domestic Other Fires	Apartments flats and bedsitters	Caravans/ Mobile Homes	Hospitals	School	Other Institutions	Factories	Chemical Plants	Storage Buildings/ Warehouses
Athlone U.D.C.	132	36	0	1	0	2	0	0	0	8
Carlow County Council	122	23	5	5	0	0	0	6	0	3
Cavan County Council	78	25	1	4	0	0	0	3	0	0
Clare County Council	299	97	0	12	0	0	0	0	1	0
Cork Corporation	194	213	60	14	15	11	5	22	3	26
Cork County Council	491	139	0	5	1	0	1	0	0	1
Donegal County Council	255	119	5	15	3	3	0	15	0	7
Drogheda Corporation	20	49	2	6	2	1	2	8	0	0
Dublin Corporation	547	932	596	88	35	52	23	79	0	52
Dundalk U.D.C.	27	45	3	5	0	0	1	5	0	7
Galway County Council	453	162	18	11	8	8	7	10	0	14
Kerry County Council	319	84	2	4	1	0	0	0	0	8
Kildare County Council	466	135	4	6	2	5	1	16	0	9
Kilkenny County Council	220	28	1	4	2	0	0	3	0	4
Laois County Council	311	33	2	4	1	2	8	7	0	4
Leitrim County Council	79	25	0	0	0	0	0	6	0	1
Limerick Corporation	190	0	27	4	2	8	0	0	0	7
Limerick County Council	217	40	1	4	0	0	0	4	0	0
Longford County Council	156	34	2	4	0	0	0	1	0	0
Louth County Council	14	24	1	6	0	0	1	0	0	0
Mayo County Council	541	128	2	9	2	2	1	20	0	0
Meath County Council	127	69	6	10	1	1	0	17	0	1
Monaghan County Council	92	51	4	4	2	0	6	34	0	4
Offaly County Council	367	32	3	9	0	1	0	5	0	0
Roscommon County Council	219	36	1	0	1	0	0	8	0	0
Sligo County Council	236	71	6	6	5	1	4	0	0	7
Tipperary (NR) County Council	343	57	1	6	0	1	2	0	0	2
Tipperary (SR) County Council	161	38	5	4	1	0	1	10	0	6
Waterford Corporation	88	71	7	6	4	1	2	7	0	3
Waterford County Council	153	65	0	10	0	2	1	9	0	1
Westmeath County Council	245	33	1	3	0	0	0	1	0	4
Wexford County Council	370	60	2	13	1	0	5	15	0	2
Wicklow County Council	194	88	4	10	1	1	1	7	0	3
Total this page	**7,726**	**3,042**	**772**	**292**	**90**	**102**	**72**	**318**	**4**	**184**

Location of Fires Attended by Fire Brigades in 1999

Fire Authority	Shops/ Supermarket	Offices	Hotels Guesthouses, Boarding Houses etc.	Dance Halls Discos, Cinemas, Theatres etc.	Public Houses	Restaurants	Motor Vehicles	Unoccupied Buildings	Agricultural Buildings
Athlone U.D.C.	2	0	0	0	0	1	27	0	1
Carlow County Council	1	0	0	0	0	1	36	1	7
Cavan County Council	2	0	1	1	0	1	15	1	2
Clare County Council	0	0	0	0	0	0	68	0	8
Cork Corporation	14	9	6	7	4	12	284	23	7
Cork County Council	0	0	3	0	0	0	83	0	21
Donegal County Council	1	2	6	5	5	3	87	11	15
Drogheda Corporation	1	0	1	0	4	1	62	0	1
Dublin Corporation	97	76	37	34	34	34	3,516	72	25
Dundalk U.D.C.	1	0	0	0	2	1	116	16	3
Galway County Council	10	3	14	4	5	8	268	30	13
Kerry County Council	5	0	5	0	2	2	62	6	25
Kildare County Council	10	1	2	2	2	1	180	11	34
Kilkenny County Council	0	1	0	0	0	0	29	2	11
Laois County Council	1	2	0	0	4	3	15	1	10
Leitrim County Council	2	1	2	0	1	0	16	5	3
Limerick Corporation	9	6	4	3	15	0	265	78	0
Limerick County Council	2	0	2	0	1	3	36	2	12
Longford County Council	2	0	1	0	0	1	33	5	0
Louth County Council	0	1	1	1	1	1	25	2	3
Mayo County Council	15	1	4	1	5	1	77	0	10
Meath County Council	5	4	9	6	6	3	87	14	24
Monaghan County Council	9	0	1	2	1	3	34	4	14
Offaly County Council	5	4	0	3	1	0	26	0	4
Roscommon County Council	3	0	0	0	3	0	20	0	5
Sligo County Council	1	0	2	3	3	0	71	2	6
Tipperary (NR) County Council	1	0	1	0	3	3	46	16	20
Tipperary (SR) County Council	6	0	1	2	0	1	33	3	7
Waterford Corporation	5	2	3	2	1	1	108	13	2
Waterford County Council	4	0	0	0	2	0	50	7	8
Westmeath County Council	1	1	1	0	2	1	35	6	5
Wexford County Council	10	3	0	1	4	0	66	7	17
Wicklow County Council	10	1	1	0	1	1	122	5	9
Total this page	**235**	**118**	**108**	**77**	**112**	**87**	**5,998**	**343**	**332**

Location of Fires Attended by Fire Brigades in 1999

Fire Authority	Forest/Bog/Grass	Outdoor Storage	Outdoor Rubbish	Petrol Stations/Garages	Hazardous Substances in transit where fire involved	Ships/Aircraft	Miscellaneous	Overall Total
Athlone U.D.C.	3	0	14	0	0	0	13	240
Carlow County Council	30	4	13	0	0	0	18	275
Cavan County Council	5	0	15	0	0	0	25	179
Clare County Council	109	10	46	0	0	11	0	661
Cork Corporation	332	42	418	7	0	0	82	1,810
Cork County Council	109	0	55	0	0	0	224	1,133
Donegal County Council	59	2	16	4	0	1	28	667
Drogheda Corporation	54	0	0	0	0	0	67	281
Dublin Corporation	1,017	208	3,686	21	23	12	267	11,563
Dundalk U.D.C.	43	13	63	0	0	0	11	362
Galway County Council	67	12	143	11	0	3	14	1,296
Kerry County Council	50	25	17	1	0	0	88	706
Kildare County Council	44	25	74	1	0	1	30	1,062
Kilkenny County Council	17	0	26	5	0	0	112	465
Laois County Council	7	3	10	0	0	0	57	485
Leitrim County Council	8	2	3	0	0	0	1	155
Limerick Corporation	27	0	253	1	0	0	37	936
Limerick County Council	11	13	23	1	0	0	6	378
Longford County Council	30	2	23	0	0	0	16	310
Louth County Council	19	1	3	0	0	0	3	107
Mayo County Council	118	0	24	10	0	0	20	991
Meath County Council	20	8	20	1	0	0	23	462
Monaghan County Council	6	7	11	2	0	0	8	299
Offaly County Council	7	15	32	2	0	1	18	535
Roscommon County Council	34	0	10	0	0	0	28	368
Sligo County Council	17	6	43	0	0	0	15	505
Tipperary (NR) County Council	26	1	14	0	2	0	7	552
Tipperary (SR) County Council	68	2	49	1	23	0	20	442
Waterford Corporation	148	11	143	0	0	1	18	647
Waterford County Council	64	0	24	0	0	3	27	430
Westmeath County Council	10	1	9	0	0	0	0	359
Wexford County Council	118	0	23	1	0	0	143	861
Wicklow County Council	103	13	80	1	0	1	31	688
Total this page	2,780	426	5,383	70	48	34	1,457	30,210

Causes of Fires Attended by Fire Brigades in 1999

Fire Authority	Chimney/ Flues/Soot/ Hot Ashes	Matches/ Cigarette Lighters	Rubbish Burning	Cooking and Heating	Electrical and other Equipment	Electrical Wiring Installation	Malicious	Unknown Causes	Smoking Materials	Using Fuels to Kindle Fires	Explosions	Other Suspected Causes	Total
Athlone U.D.C.	132	0	14	15	0	17	5	46	11	0	0	0	240
Carlow Co. Co.	122	3	13	8	18	9	43	42	1	2	1	13	275
Cavan Co. Co.	78	4	15	5	15	15	3	16	10	10	4	4	179
Clare Co. Co.	299	0	19	1	1	0	0	339	0	0	0	2	661
Cork Corp.	220	17	65	157	25	60	942	236	21	0	1	66	1,810
Cork Co. Co.	433	12	22	41	57	0	36	506	1	0	0	25	1,133
Donegal Co. Co.	259	8	14	62	37	10	47	177	22	2	0	29	667
Drogheda Corp.	20	41	22	17	5	23	98	34	5	2	0	14	281
Dublin Corp.	577	65	717	424	390	32	3,880	5,204	104	5	21	144	11,563
Dundalk U.D.C.	28	15	20	11	14	14	135	115	4	0	0	6	362
Galway Co. Co.	422	7	21	55	34	12	148	550	7	0	0	40	1,296
Kerry Co. Co.	319	4	25	29	25	24	3	277	0	0	0	0	706
Kildare Co. Co.	352	15	15	38	17	4	63	522	2	1	1	32	1,062
Kilkenny Co. Co.	220	0	26	6	2	0	0	210	0	0	1	0	465
Laois Co. Co.	320	10	25	17	8	15	14	51	2	0	0	23	485
Leitrim Co. Co.	79	3	2	14	6	12	7	28	4	0	0	0	155
Limerick Corp.	92	13	55	44	11	18	444	193	0	0	0	66	936
Limerick Co. Co.	220	11	0	33	6	22	7	77	0	0	0	2	378
Longford Co. Co.	156	1	23	4	0	4	0	122	0	0	0	0	310
Louth Co. Co.	16	1	4	7	6	5	24	33	0	0	0	11	107
Mayo Co. Co.	542	1	27	50	44	3	0	318	0	2	1	3	991
Meath Co. Co.	136	6	17	11	31	1	41	212	2	0	0	5	462
Monaghan Co. Co.	95	11	19	22	33	14	30	63	2	1	0	9	299
Offaly Co. Co.	367	1	32	14	14	1	15	84	2	4	0	1	535
Roscommon Co. Co.	219	0	10	1	0	0	10	128	0	0	0	0	368
Sligo Co. Co.	236	0	43	8	0	0	0	218	0	0	0	0	505
Tipperary (NR) Co. Co.	343	0	15	30	0	46	0	118	0	0	0	0	552
Tipperary (SR) Co. Co.	163	10	22	19	11	23	84	70	2	2	1	35	442
Waterford Corp.	89	45	79	41	22	9	291	57	7	0	1	6	647
Waterford Co. Co.	153	28	7	4	7	8	37	182	4	0	0	0	430
Westmeath Co. Co.	245	1	11	12	8	0	4	76	2	0	0	0	359
Wexford Co. Co.	370	10	143	25	23	13	92	174	8	3	0	0	861
Wicklow Co. Co.	205	2	3	30	12	23	214	172	7	1	0	19	688
Totals	7,527	345	1,545	1,255	882	437	6,717	10,650	230	35	32	555	30,210

2000 Fatalities

There were 43 fatalities from fire attended by Fire Brigades in 2000. The details are set out below

Fire Authority	Date of Fire	No. of Fatalities	Under 12	Between 12 and 18	Between 18 and 65	Over 65	Sex M/F	Time of Fire	Type of Premises or Place	Location of Premises or Place	Suspected Cause of Fire	Seat of Origin of Fire	Smoke Alarm
Cavan Co. Co.	14-Mar-00	2	0	0	1	1	F	1:20	House	Rural	Chimney	Ceiling/floor joists	N/A
Cork Corp.	7-Apr-00	1	0	0	1	0	F	8:46	House	Urban	Cigarette	Bedroom	N/A
Cork Corp.	15-Oct-00	1	1	0	0	0	M	8:48	House	Urban	Matches	Bedroom	N/A
Cork Corp.	1-Dec-00	1	0	0	1	0	M	20:34	House	Urban	Oil Appliance	Living Room	N/A
Cork Co. Co.	5-Dec-00	1	0	0	1	0	M	2:20	House	Urban	Cooker area	Kitchen	N/A
Donegal Co. Co.	4-Jun-00	1	0	0	0	1	M	4:35	House	Urban	Smoking Material	Bedroom	N/A
Dublin Corp.	21-Feb-00	1	0	0	0	1	M	17:04	House	Urban	Unknown	Kitchen	Unknown
Dublin Corp.	20-Apr-00	1	1	0	0	0	M	14:08	House	Urban	Possible Misadventure	Unknown	N/A
Dublin Corp.	28-May-00	1	0	0	1	0	M	3:57	House	Urban	Chip Pan	Kitchen	Unknown
Dublin Corp.	11-Jun-00	1	0	0	0	1	F	5:01	House	Rural	Electrical Appliance	Bedroom	N/A
Dublin Corp.	18-Jun-00	1	0	0	1	0	M	1:00	House	Urban	Unknown	Unknown	Unknown
Dublin Corp.	23-Jul-00	1	1	0	0	0	M	4:04	House	Urban	Unknown	Kitchen	Unknown
Dublin Corp.	16-Sep-00	1	0	0	1	0	M	7:24	House	Urban	Chip Pan	Kitchen	Unknown
Dublin Corp.	20-Oct-00	1	0	0	0	1	F	12:40	House	Urban	Cigarette	Living Room	N/A
Dublin Corp.	1-Nov-00	1	0	0	0	1	F	0:41	Flat Complex	Urban	Unknown	Unknown	N/A
Dublin Corp.	8-Dec-00	1	0	0	1	0	M	7:10	House	Urban	Unknown	Unknown	Yes
Dublin Corp.	23-Dec-00	1	0	0	1	0	M	12:15	House	Urban	Oil Appliance	Livingroom	N/A
Dundalk UDC	24-Jul-00	1	0	0	1	0	M	16:32	Outdoors	Urban	Ignited fuel vapours	Boiler House	N/A
Dundalk UDC	13-Sep-00	1	1	0	0	0	F	10:20	House	Urban	Unknown	Outdoors	N/A
Galway Co. Co.	10-Mar-00	1	0	0	0	1	F	4:38	Apartment	Urban	Cigarette	Living Room	Yes
Galway Co. Co.	16-Dec-00	1	0	0	0	1	F	17:34	House	Rural	Unknown	Bedroom	Yes
Galway Co. Co.	30-Dec-00	1	0	0	0	1	M	7:19	House	Rural	Cigarette	Bedroom	N/A
Kerry Co. Co.	14-Jan-00	1	0	0	0	1	M	9:20	House	Urban	Electrical Appliance	Bedroom	Yes
Kerry Co. Co.	14-Jan-00	1	0	0	0	1	M	11:33	House	Village	Unknown	Kitchen	N/A
Kerry Co. Co.	17-Jan-00	1	0	0	1	0	M	23:34	House	Urban	Possible candles	Bedroom	N/A
Kerry Co. Co.	29-May-00	1	0	0	0	1	M	8:29	House	Rural	Unknown	Bedroom	N/A
Kildare Co. Co.	29-Sep-00	1	0	1	0	0	M	22:31	Garden Shed	Urban	Matches/Lighters	Shed	N/A
Kilkenny Co. Co.	20-Oct-00	1	0	0	0	1	F	12:45	House	Rural	Unknown	Kitchen	Unknown
Laois Co. Co.	1-May-00	1	0	0	1	0	M	3:43	Hayshed	Rural	Unknown	Hayshed	N/A
Laois Co. Co.	9-Jul-00	1	0	0	0	1	M	14:18	House	Rural	Unknown	Kitchen	N/A
Leitrim Co. Co.	26-May-00	1	0	0	1	0	M	20:08	Storage Shed	Urban	Unknown	Shed	N/A
Limerick Co. Co.	20-Apr-00	1	0	0	0	1	F	11:46	House	Rural	Solid Fuel Appliance	Living Room	N/A
Louth Co. Co.	29-Oct-00	1	0	0	1	0	M	13:42	House	Rural	Unknown	Unknown	N/A
Louth Co. Co.	9-Nov-00	1	0	0	1	0	M	10:12	House	Urban	Unknown	Livingroom	N/A
Roscommon Co. Co.	22-Jan-00	1	0	0	0	1	M	5:00	House	Rural	Cigarette	Kitchen	N/A
Roscommon Co. Co.	2-Sep-00	3	0	0	1	2	2M/1F	5:30	House	Rural	Unknown	Kitchen	n/a
Sligo Co. Co.	7-Feb-00	1	0	0	0	1	F	9:15	Convent/ school	Urban	Electric Heater	Bedroom	N/A
Tipperary NR Co. Co.	3-Oct-00	1	0	0	0	1	F	6:50	House	Rural	Unknown	Bedroom	N/A
Waterford Co. Cl.	12-Dec-00	1	0	0	0	1	M	18:00	House	Rural	Spark - Open Fire	Livingroom	N/A
Westmeath Co. Co.	5-Aug-00	1	0	0	0	1	M	23:35	House	Urban	Unknown	Bedroom	N/A

Fatalities from Fires Attended by Brigades in 1995

Fire Authority	Date	Number	Age	Time of Fire	Type of Premises
Cork Corporation	13.11.95	1	60	7.19	Boatyard
Dublin Corporation	24.2.95	1	Adult	21.24	Local Authority Flat Complex
	13.3.95	1	Adult	8.47	Local Authority four storey flat complex
	29.3.95	1	Adult	8.32	Private two storey house
	11.4.95	1	Adult	10.05	Private flats complex
	16.4.95	1	Adult	14.15	Caravan
	16.9.95	1	Adult	4.40	Local Authority house
	22.11.95	1	Adult	3.35	Private two storey over basement terraced house in flats
	4.12.95	1	Adult	19.35	Private three storey over basement
	18.12.95	1	Adult	4.43	Local Authority five storey flats
Limerick Corporation	12.1.95	1	Adult	2.36	Local Authority House
	27.9.95	1	Adult	20.14	Public house
	19.3.95	1	5	NA	House
Clare Co. Co.	1.7.95	1	65	4.03	Private cottage
Cork Co. Co.	17.7.95	1	NA	3.15	Private two storey house
Galway Co. Co.	11.1.95	1	83	18.29	Private House
	26.3.95	1	65	4.26	Local Authority Prefabricated House
	28.12.95	2	24, 24	3.59	Private Flat
Kerry Co. Co.	15.2.95	1	3	4.19	Mobile Home
Kildare Co. Co.	1.4.95	1	NA	7.23	Local Authority two storey dwelling
	27.4.95	2	NA	9.20	Local Authority two storey dwelling
	7.10.95	1	NA	11.33	Private two storey dwelling
Laois Co. Co.	8.12.95	1	30	4.54	Private House
Limerick Co. Co.	10.2.95	1	70	13.35	Private Bungalow
Mayo Co. Co.	5.11.95	1	65	3.45	Private House
	8.11.95	1	83	20.39	Private House
	13.12.95	1	70	13.55	Private House
Meath Co. Co.	1.5.95	1	81	NA	Caravan
Tipperary(NR)Co. Co.	24.12.95	1	22	8.03	Private House
Tipperary S.R. Co. Co.	6.7.95	1	74	22.18	Private House
	25.11.95	1	21	10.02	Private House
Waterford Corporation	21.3.95	1	78	17.11	Local Authority House
	29.10.95	1	49	3.38	Private House
Waterford Co. Co.	25.11.95	1	82	3.55	House
	16.2.95	1	Adult	NA	Private house
Westmeath Co. Co.	19.8.95	1	45	14.20	Tractor and trailer load of hay
TOTAL		**38**			

Contents

Section 2.   Communications

2.1   Radio

2.1.1   Background

Radio and other communication facilities are vital tools for the fire service. Fire service mobilisations / communications systems are in the process of evolving from county-based to regional systems. It has consequently been necessary to review the use of radio by the fire service, this section contains relevant guidance stemming from this review and the consultation process, which has taken place.

This section does not cover the use of hand portable radio equipment, but is concerned with network traffic. The main traffic will be between control centres and appliances attending incidents. The control centre receives the fire calls via the '999' / '112' system, and passes relevant mobilising information to the appropriate fire station. The Officer-in-Charge (OiC) of the incident or appliance must keep the control centre fully informed of the situation, using the standard messages detailed in this section.

The control centre will record all radio traffic on a tape system, and will also enter relevant information onto their computer aided mobilising system. The format and content of call signs and standard messages set out in this section are designed to facilitate use with the computerised system of mobilisation.

Although the proposed regional mobilising systems may not be completed for a number of years, it is considered advisable that the recommended procedures be adopted as soon as is practicable by all fire authorities.

2.1.2   Use of Radio

The radio network operates on frequencies allocated to the fire service by the Department of Public Enterprises. It is essential that traffic is minimised to ensure fullest availability for emergency use.

Messages should be carefully composed, preferably written down if circumstances allow, before transmission to ensure that no time is wasted in delivering the message, or by the inclusion of unnecessary words or phrases. Only information which is relevant to the operational needs of the control centre, senior officers or OiC should be transmitted over the radio.

Messages will normally originate from the OiC at an incident. If the OiC does not transmit the message himself, it is preferable that it is written down, when being allocated to a staff member to transmit. When transmission is complete the person who has transmitted the message should report the result to the OiC.

To make contact over radio, the party required to be contacted should be named first in the transmission, followed by 'from' the transmitting person. For example when an appliance wants to call the control centre the message should be framed as follows :

"CONTROL FROM LH11A1, OVER"

to which the control centre will reply

"LH11A1 FROM CONTROL, GO AHEAD, OVER"

Transmissions on a radio network are not secure, and messages should therefore be confined to fire service matters only. Information of a confidential nature, including names of casualties should not be transmitted by radio.

2.1.3   Clarity of Speech on Radio

The microphone should be held at a distance of 50 mm (2 inches) from the mouth when transmitting by radio. Delivery of speech should be deliberate, at a pace that is slightly slower than normal.

Messages should be delivered literally and should not be spelled out unless requested by the receiving party. Messages should then be pre-fixed 'I SPELL ......'   The phonetic alphabet should be used when

spelling out messages. Appendix 2.1 gives the phonetic equivalent and correct pronunciation of the alphabet and numbers for use on radio.

2.1.4   Chemical Incident Reports

The standard chemical incident report form, issued by the Department of Environment and Local Government in Circular Letter EP 4/90, should be utilised when assessing incidents involving chemical substances. This will facilitate requests for further information from the control centre. Copies of this form, suitably laminated and with an appropriate marker, should be kept in all fire stations and carried on appliances.

2.2   Call Signs for the Fire Service

2.2.1   Introduction

Call signs are designed to enable the control centre to identify the caller, and to rapidly enter this identity and the message given onto the computer system. Call signs are arranged in four groups :

(i)   county identification signs;

(ii)   senior officer identifications signs;

(iii)   station identification signs; and

(iv)   appliance identification signs.

All radio messages should be preceded by an identification sign. In all cases of communication with the control centre the County Identification Sign must be included. The use of Senior Officer Identification Sign does not require the inclusion of a Station or Appliance Identification Sign.

2.2.2 Call Signs and Hand Portable Radios

Hand portable radios are used for fireground communications, permitting the OiC of an incident to control operations such as breathing apparatus or pump operator remotely. Call signs are not allocated to sets, and personnel should identify themselves by the task allocated to them, e.g. Breathing Apparatus Entry Control Officer (BAECO), or by rank and name, as directed by the OiC.

2.2.3 County Identification Signs

As it is intended to operate the new mobilisation systems on a regional basis, incorporating up to fourteen fire authorities in one region, the County Identification Signs enable the control centre to identify the county from which the message originates. The county identification system is based on the existing car registration system, with a slight variation, making the single character counties into two character ones. Table 2.2.3 below shows the County Identification Signs.

TABLE 2.2.3

COUNTY IDENTIFICATION SIGNS (C.I.S.)		
County	**Call Sign**	**Phonetic Equivalent**
Carlow	CW	Charlie Whiskey
Cavan	CN	Charlie November
Clare	CE	Charlie Echo
Cork City	CO	Charlie Oscar
Cork County	CK	Charlie Kilo
Donegal	DL	Delta Lima
Dublin	DN	Delta November
Galway	GY	Golf Yankee
Kerry	KY	Kilo Yankee
Kildare	KE	Kilo Echo
Kilkenny	KK	Kilo Kilo
Laois	LS	Lima Sierra
Leitrim	LM	Lima Mike
Limerick City	LI	Lima India
Limerick County	LK	Lima Kilo
Longford	LD	Lima Delta
Louth	LH	Lima Hotel
Mayo	MO	Mike Oscar
Meath	MH	Mike Hotel
Monaghan	MN	Mike November
Roscommon	RN	Romeo November
Offaly	OY	Oscar Yankee
Tipperary (Nr)	TN	Tango November
Tipperary (Sr)	TS	Tango Sierra
Sligo	SO	Sierra Oscar
Waterford City	WA	Whiskey Alpha
Waterford County	WD	Whiskey Delta
Westmeath	WH	Whiskey Hotel
Wexford	WX	Whiskey X-Ray
Wicklow	WW	Whiskey Whiskey

2.2.4   Senior Officer Identification Signs

Table 2.2.4 below shows the one-character / one-digit identification signs for groups of senior officers. When used with the County Identification Signs this system, a four figure call sign, uniquely identifies all senior officers.

TABLE 2.2.4

Call Signs For Senior Officers		
Officer Rank	**Call Sign**	**Phonetic Equivalent**
Chief Fire Officer	V1	Victor One
Asst. C.F.O.	Y1-Y9	Yankee One - Yankee Niner
Senior Executive	Q1-Q9	Quebec One - Quebec Niner
Second Officer	S1-S9	Sierra One - Sierra Niner
Executive	W1-W9	Whiskey One - Whiskey Niner
Third Officer	T1-T9	Tango One - Tango Niner
District Officer	R1-R9	Romeo One - Romeo Niner
Asst. & Graduate	Z1-Z9	Zulu One - Zulu Niner

Examples :

"KYV1"	Kilo Yankee Victor One	CFO, Kerry
"GYZ1"	Golf Yankee Zulu One	AFO, Galway
"MNY2"	Mike November Yankee Two	ACFO Monaghan

2.2.5   Station Identification Signs

All fire stations have an associated Station Identification Sign which includes the County Identification Signs. Station Identification Signs will generally be followed by an Appliance Identification Sign. Tables 2.2.5.A, 2.2.5.B and 2.2.5.C below show the Station Identification Signs for all stations, by region and fire authority.

TABLE 2.2.5.A

Station Identification Signs Munster Region		
Fire Authority	**Station**	**Call Sign**
Clare Co Co	Ennis	CE11
	Shannon	CE12
	Ennistymon	CE13
	Scarriff	CE14
	Killaloe	CE15
	Kilrush	CE16
	Kilkee	CE17
Cork Corporation	Anglesea St.	CO11
	Watercourse Road	CO12
Cork Co Co	Headquarters	CK11
Cork Co Co (North)	Mallow	CK21
	Millstreet	CK22
	Kanturk	CK23
	Charleville	CK24
	Fermoy	CK25
	Mitchelstown	CK26
Cork Co Co (South)	Bandon	CK31
	Macroom	CK32
	Ballincollig	CK33
	Kinsale	CK34
	Carrigaline	CK35
	Crosshaven	CK36
Cork Co Co (East)	Midleton	CK41
	Cobh	CK42
	Youghal	CK43
Cork Co Co (West)	Bantry	CK51
	Castletownbere	CK52
	Schull	CK53
	Skibbereen	CK54
	Dunmanway	CK55
	Clonakilty	CK56
Kerry Co Co	Tralee	KY11
	Killarney	KY12
	Listowel	KY13
	Castleisland	KY14
	Caherciveen	KY15
	Dingle	KY16
	Ballybunion	KY17
	Kenmare	KY18
	Killorglin	KY19
	Sneem	KY21
	Castlegregory	KY22

TABLE 2.2.5.A (Contd.)

Station Identification Signs Munster Region		
Fire Authority	**Station**	**Call Sign**
Limerick Co Co	Newcastlewest	LK11
	Rathkeale	LK12
	Kilmallock	LK13
	Abbeyfeale	LK14
	Foynes	LK15
	Cappamore	LK16
Limerick Corp.	Mulgrave St	LI11
Tipperary (NR) Co Co	Nenagh	TN11
	Thurles	TN12
Tipperary (NR) Co Co	Roscrea	TN13
	Templemore	TN14
	Borrisokane	TN15
	Newport	TN16
	Cloughjordan	TN17
Tipperary (SR) Co Co	Cahir	TS13
	Cashel	TS14
	Tipperary	TS15
	Carrick-On-Suir	TS16
	Clonmel	TS17
Waterford Co Co	Dungarvan	WD11
	Tramore	WD12
	Kilmacthomas	WD13
	Portlaw	WD14
	Cappoquin	WD15
	Lismore	WD16
	Dunmore East	WD17
	Ardmore	WD18
	Tallow	WD19
Waterford Corp.	Catherine St.	WA11

TABLE 2.2.5.B

Station Identification Signs West Region		
Fire Authority	**Station**	**Call Sign**
Donegal Co Co	Letterkenny	DL11
	Buncrana	DL12
	Carndonagh	DL13
	Moville	DL14
	Stranorlar	DL15
	Donegal	DL16
	Ballyshannon	DL17
	Bundoran	DL18
	Killybegs	DL19
	Glenties	DL21
	Dungloe	DL22
	Gweedore	DL23
	Falcarragh	DL24
	Milford	DL25
	Glencolmcille	DL26
	Arranmore	DL27
Galway Co Co	Galway City	GY11
	Athenry	GY12
	Ballinasloe	GY13
	Clifden	GY14
	Gort	GY15
	Loughrea	GY16
	Mountbellew	GY17
	Portumna	GY18
	Tuam	GY19
Leitrim Co Co	Carrick-On-Shannon	LM11
	Mohill	LM12
	Drumshanbo	LM13
	Ballinamore	LM14
	Manorhamilton	LM15
Mayo Co Co	Castlebar	MO11
	Ballina	MO12
	Westport	MO13
	Claremorris	MO14
	Ballinrobe	MO15
	Ballyhaunis	MO16
	Swinford	MO17
	Kiltimagh	MO18
	Achill Sound	MO19
	Belmullet	MO21
	Crossmolina	MO22
	Charlestown	MO23

TABLE 2.2.5.B (Contd.)

Station Identification Signs West Region		
Fire Authority	**Station**	**Call Sign**
Roscommon Co Co	Roscommon	RN11
	Castlerea	RN12
	Ballaghaderreen	RN13
	Boyle	RN14
	Elphin	RN15
	Strokestown	RN16
Sligo Co Co	Sligo	SO11
	Ballymote	SO12
	Tubbercurry	SO13
	Enniscrone	SO14

TABLE 2.2.5.C

Station Identification Signs East Region		
Fire Authority	**Station**	**Call Sign**
Carlow Co Co	Carlow	CW11
	Muinebheag	CW12
	Tullow	CW13
	Hacketstown	CW14
Cavan Co Co	Cavan	CN11
	Cootehill	CN12
	Kingscourt	CN13
	Bailieboro	CN14
	Virginia	CN15
	Ballyjamesduff	CN16
	Killeshandra	CN17
	Ballyconnell	CN18
	Belturbet	CN19
	Dowra	CN20
Dublin Corp.	Donnybrook	DN11
	Dolphins Barn	DN12
	Phibsboro	DN13
	North Strand	DN14
	Finglas	DN15
	Kilbarrack	DN16
	Tallaght	DN17
	Rathfarnham	DN18

TABLE 2.2.5.C (Contd.)

Station Identification Signs West Region		
Fire Authority	**Station**	**Call Sign**
Dublin Corp.	Blanchardstown	DN19
	Tara St.	DN21
	Swords	DN22
	Skerries	DN23
	Balbriggan	DN24
	Malahide	DN25
	Training Centre	DN26
	Dun Laoghaire	DN27
Kildare Co Co	Newbridge	KE11
	Naas	KE12
	Athy	KE13
	Maynooth	KE14
	Monasterevin	KE15
	Leixlip	KE16
Kilkenny Co Co	Kilkenny	KK11
	Castlecomer	KK12
	Freshford	KK13
	Urlingford	KK14
Kilkenny Co Co	Thomastown	KK15
	Callan	KK16
	Graiguenamanagh	KK17
Laois Co Co	Portlaoise	LS11
	Portarlington	LS12
	Rathdowney	LS13
	Durrow	LS14
	Mountmellick	LS15
	Mountrath	LS16
	Abbeyleix	LS17
	Stradbally	LS18
	Ballinakill	LS19
Longford Co Co	Longford	LD11
	Granard	LD12
	Ballymahon	LD13
	Edgeworthstown	LD14
	Lanesboro	LD15
Louth Co Co	Ardee	LH11
	Carlingford	LH12
	Dunleer	LH13
	Drogheda	LH14
	Dundalk	LH15

TABLE 2.2.5.C (Contd.)

Station Identification Signs West Region		
Fire Authority	**Station**	**Call Sign**
Meath Co Co	Navan	MH11
	Trim	MH12
	Dunshaughlin	MH13
	Kells	MH14
	Oldcastle	MH15
	Nobber	MH16
Monaghan Co Co	Ballybay	MN11
	Carrickmacross	MN12
	Castleblayney	MN13
	Clones	MN14
	Monaghan	MN15
Offaly Co Co	Tullamore	OY11
	Edenderry	OY12
	Clara	OY13
	Daingean	OY14
	Birr	OY15
	Ferbane	OY16
	Kilcormac	OY15
	Banagher	OY18
Westmeath Co Co	Mullingar	WH11
	Kilbeggan	WH12
	Castlepollard	WH13
	Moate	WH14
	Athlone	WH15
Wexford Co Co	Wexford	WX11
	Gorey	WX12
	Enniscorthy	WX13
	New Ross	WX14
	Bunclody	WX15
Wicklow Co Co	Bray	WW11
	Greystones	WW12
	Wicklow	WW13
	Rathdrum	WW14
	Arklow	WW15
	Blessington	WW16
	Dunlavin	WW17
	Baltinglass	WW18
	Carnew	WW19
	Tinahely	WW21

2.2.6   Appliance Identification Signs

Appliance Identification Signs have been designated as a one letter / one number call sign. The first component of the call sign, the letter, designates the appliance type and is given in Table 2.2.6 below. The second component, the number, differentiates individual appliances of the same type. Appliance Identification Signs are used in conjunction with County and Station Identification Signs and are always six characters in length.

TABLE 2.2.6

Appliance Call Signs		
Appliance Type	**Letter**	**Call Sign**
Water Tender*	A	A1, A2.....
Emergency Tender	B	B1,.....
Control Unit	C	C1,...
Ambulance	D	D1,D2...
Hydraulic Platform	E	E1,E2....
Turntable Ladder	F	F1,F2...
Chemical Incident Unit	G	G1,...
Foam Tender	H	H1,..
Landrover, 4wd	J	J1, J2, ...
Water Tanker	K	K1,K2...
Personnel Carrier	L	L1,..
Mobile Workshop	M	M1,..
Pod Mover	N	N1, ...

* Only water tenders, which carry crash rescue equipment should be assigned the call signs A1.

Example :

"CE11A1"   CLARE, ENNIS FIRE STATION, WATER TENDER NO 1

2.3 Standard Terminology for Use on Radio

2.3.1 Standard Terms

The following are standard terms, which should be used consistently in all radio transmissions.

"OVER"	Used at the end of any transmission, where an answer is required or expected.
"OUT"	Used at the end of any transmission, where no answer is required or expected, and to indicate that the exchange is finished.
"RECEIVED"	Used to acknowledge receipt of a transmission and signifies that the transmission or message has been received, is understood and will be complied with.
"REPEAT"	Used when a recipient of a message has not received or understood all or part of a message, and requests the transmitter to repeat. In addition, the following message types should be repeated back to the transmitter as a standard procedure :
	(i) mobilising instructions passed by radio;
	(ii) assistance required messages; and
	(iii) stop messages.
"VERIFY"	Used when requesting verification of accuracy of previous transmission of message (such as address of an incident).

"I SPELL"	Used prior to spelling out a word or message. The phonetic equivalent should always be used when spelling over radio.
"PRIORITY"	Used at the beginning of a transmission to indicate to the recipient that the message is of an urgent and serious nature, such as a request for assistance.

2.3.2 Standard Messages

The type of information to be relayed from the scene of an incident to the control centre will not vary to a great extent. A series of abbreviations are employed for standard messages, so that in conjunction with a call sign, the operators can readily keep a log of messages relating to incidents in the computer system. It is important therefore that messages are composed in accordance with the standard terminology. Messages sent from the fire ground to the control centre will generally be in the following sequence :-

1	Mobile (The appliance is mobile to incident at ...)
2	In Attendance (The appliance is in attendance at ...)
3	Assistance (The OiC requires assistance at ...)
4	Informative (Information on situation at ...)
5	Stop (Appliance(s) at this incident sufficient ...)
6	Mobile and Available (Heading for home station)
7	At Home Station (Appliances(s) are at the home station)
8	Closing Down

The application of these standard messages is further explained with examples in the following paragraphs.

2.3.3 Mobile

Immediately on setting out from a station, or on receipt of a mobilisation message, while returning to the home station, a call should be transmitted from the appliance to the control centre indicating that the appliance is mobile to the incident, e.g.

"CONTROL FROM LK12A1, MOBILE FOR ....(address)..., OVER"

the control centre will acknowledge the call, e.g.

"LK12A1 FROM CONTROL, MESSAGE RECEIVED, CONTROL OUT".

2.3.4 In Attendance

On arrival at the scene of the incident, an in attendance message should be transmitted, e.g.

"CONTROL FROM DL17A1, IN ATTENDANCE AT ....(address).., OVER"

to which control should respond,

"DL17A1 FROM CONTROL, MESSAGE RECEIVED, CONTROL OUT".

2.3.5 Assistance

When dealing with an incident, if the Officer-in-Charge considers that extra assistance is required, an assistance message should be transmitted to the control centre. Assistance may be required in the form of :

(i)   additional appliances;

(ii)   equipment;

(iii)   attendance of senior officer(s)

(iv)   specialist assistance;

When initiating an assistance message, the Officer-in-Charge should contact the control centre using the appliance call sign e.g.

"CONTROL FROM WX11A1, OVER"

Thereafter the assistance message should contain four parts :

(i)   appliance identification sign;

(ii)   name of the originating officer;

(iii)   address of the incident; and

(iv)   required assistance.

All assistance messages should be repeated by the control centre.

Priority Message

Priority of attention should only be requested for extremely urgent messages. The method of obtaining priority is to use the words 'Priority Message' in the preliminary call. When the need arises to transmit a very urgent message from an incident e.g. an assistance message, the person sending the priority message may break into the transmission at an appropriate point as follows :

"CONTROL FROM KY11A1, PRIORITY MESSAGE, OVER".

The control centre will then request all mobiles to wait while dealing with the priority message. The sender should then transmit the priority message.

Persons Reported

Where it is known that persons are trapped or unaccounted for at an incident, the words 'Persons Reported' should be added to the first message back, e.g.

"CONTROL FROM GY11A2, STATION OFFICER .. (name) .. AT .. (address).. MAKE PUMPS 5, PERSONS REPORTED, OVER"

On receipt of a 'Persons Reported' message, an ambulance will be ordered by the control centre. If assistance is not considered necessary this information should be sent as an informative message, (see paragraph 2.3.6).

2.3.5.1   Additional Appliances

Requests for additional appliances should include those already in attendance. An incident with two pumps in attendance with three more required should transmit the message :-

"CONTROL FROM LD13A1, STATION OFFICER .. (name) .. AT .. (address).. MAKE PUMPS 5, OVER"

to which the control centre should respond,

"LD13A1 FROM CONTROL, MAKE PUMPS 5, MESSAGE RECEIVED, OVER"

"CONTROL FROM LD13A1, MESSAGE CORRECT, OVER"

"LD13A1 FROM CONTROL, OUT".

All requests for special appliances should include the number of each type of appliance required, e.g.

"CONTROL FROM MO12A1 STATION OFFICER .. (name) .. AT .. (address), 1 EMERGENCY TENDER, 1 AMBULANCE REQUIRED, OVER"

Requests for additional special appliances should include those already in attendance, e.g., if two ambulances are required and one is already in attendance the following message should be sent :-

"CONTROL FROM MO12A1 STATION OFFICER .. (name).. AT.. (address).. MAKE AMBULANCES 2, OVER".

2.3.5.2   Equipment

Requests for additional equipment, including specialised equipment, should be included with the assistance message. For example, if a portable pump is required the correct message to be sent would be :-

"CONTROL FROM MO12A1 STATION OFFICER .. (name) .. AT .. (Address) .. MAKE PUMPS 3, PORTABLE PUMP REQUIRED, OVER".

2.3.5.3   Attendance of Senior Officer(s)

Requests for Senior Officer attendance should be included with the assistance message, e.g.

"CONTROL FROM LD13A1, STATION OFFICER .. (name) .. AT .. (address) .. MAKE PUMPS 3, SENIOR OFFICER REQUIRED, OVER".

These procedures are not intended to preclude initiative on the part of the Officer-in-Charge. Requests for the attendance of a Senior Officer, may be transmitted at any stage during an incident.

2.3.5.4   Specialist Assistance

Requests for the presence of personnel from any of the following services, Garda Síochána, Gas Company, Water Department, Dangerous Buildings Department, Electricity

Supply Board or other specialists, should include the reason why they are required, e.g.

"CONTROL FROM DN16A1, STATION OFFICER .. (name) .. AT .. (address) .. SPECIALIST ASSISTANCE REQUIRED, BROKEN WATER MAIN, OVER".

When assistance messages are transmitted from an incident, the control centre will repeat and acknowledge the message, e.g.

"DN16A1 FROM CONTROL, MAKE PUMPS 3, SPECIALIST ASSISTANCE REQUIRED, BROKEN WATER MAIN, MESSAGE RECEIVED, OVER"

"CONTROL FROM DN16A1, MESSAGE CORRECT, OVER"

"DN16A1 FROM CONTROL, OUT".

2.3.6   Informative

Informative messages serve to keep the control centre informed and give an overall picture of the incident. Where a message stating 'Persons Reported' has previously been transmitted, the message should be sent, as soon as possible confirming the situation, e.g. if the persons are all accounted for the following message should be sent :-

"CONTROL FROM LS11A1, STATION OFFICER.. (name) .. AT .. (address) .. ALL PERSONS ACCOUNTED FOR, OVER"

Informative messages should be brief and contain only information which, is essential to the immediate operational needs. Informative messages from incidents involving hazardous materials should include detailed information on the nature and properties of the hazardous material. Information can then be transmitted as an informative message using the standard format outlined in Department of Environment and Local Government Circular Letter EP 4/90, e.g.

"CONTROL FROM DN21A2, STATION OFFICER.. (name) .. AT .. (address) .. CHEMICAL INCIDENT, SPILLAGE OF SULPHURIC ACID FROM OVERTURNED TANKER. PREPARE TO RECEIVE FURTHER INFORMATION, OVER."

At this stage the relevant information as detailed in Circular Letter EP 4/90 should be transmitted to the control centre.

The message 'Fire under Control' should be sent by the Officer-in-Charge of an incident, when the fire has been brought under control, e.g.

"CONTROL FROM LK13A1, STATION OFFICER .. (name) .. AT .. (Address) .. FIRE UNDER CONTROL, OVER"

the control centre response should be :

"LK13A1 FROM CONTROL, MESSAGE RECEIVED, CONTROL OUT".

Examples of informative messages are as follows :

-	"CONTROL FROM DN14B1, STATION OFFICER .. (name) .. AT.. (address).. PERSONS REPORTED TRAPPED ON TOP FLOOR, OVER";

-	"CONTROL FROM CE12A1, STATION OFFICER .. (name) .. AT.. (address) .. FIRE NOT YET LOCATED, BREATHING APPARATUS IN USE, OVER"; and

-	"CONTROL FROM CKY2, ASSISTANT CHIEF FIRE OFFICER.. (name) .. AT.. (address) .. VESSEL OF 7000 TONNES, LADEN, GENERAL CARGO, NUMBER ONE HOLD ALIGHT, 2 JETS, 8 BREATHING APPARATUS IN USE, OVER".

2.3.7   Stop

A stop message indicates that no more help is required and that the personnel and appliances already in attendance or mobilised are sufficient, except for any necessary relief. A stop message should be sent from every incident as soon as it is certain that no further assistance is needed, e.g.

"CONTROL FROM CO11A1, STATION OFFICER .. (name).. STOP FOR.. (address) .. OVER"

Stop messages include other brief information, as follows. A stop message may be combined with an informative message to reduce the pre-determined attendance (P.D.A.) to an incident when the Officer-in-Charge is satisfied that the reduced attendance will be sufficient to deal with the incident, e.g.

"CONTROL FROM MN12A1, STATION OFFICER .. (name). STOP FOR.. (address).., THIS IS A ONE PUMP FIRE, OVER".

Requests for additional appliances should always be transmitted as an assistance message. When persons have been reported trapped or unaccounted for it is not always possible to send the message 'All persons accounted for' before the stop message. Where appropriate, the words should be added at the end of the stop message, e.g.

"CONTROL FROM TS13A1, STATION OFFICER .. (name). STOP FOR .. (address)., ALL PERSONS ACCOUNTED FOR, OVER".

If in doubt that persons may still be unaccounted for when the stop message is sent back the words 'All persons not yet accounted for' may be used, followed subsequently by a further informative message when they have been accounted for.

2.3.8   Mobile and Available

Appliances, as they depart from an incident, are mobile and available. Appliances attending a multi-appliance incident will not always leave

the incident en masse, so it is imperative that each appliance transmits an available message to allow the control centre to alter the appliance status. Immediately on leaving the incident, each appliance should transmit the message :-

"CONTROL FROM TN12A1, MOBILE AND AVAILABLE, OVER"

the control centre response should be :-

"TN12A1 FROM CONTROL, MESSAGE RECEIVED, CONTROL OUT".

2.3.9   At Home Station

When appliances arrive back at the station they should transmit an "At Home Station" message :-

"CONTROL FROM DN11A1, AT HOME STATION, OVER"

the control centre response should be :-

"DN11A1 FROM CONTROL, MESSAGE RECEIVED, CONTROL OUT".

2.3.10 Closing Down

When appliances are back at the station and all operations pertaining to that incident are complete they should transmit a closing down message :-

"CONTROL FROM DN11A1, CLOSING DOWN, OVER"

the control centre response should be :-

"DN11A1 FROM CONTROL, MESSAGE RECEIVED, CONTROL OUT".

2.4   Fireground Communications

2.4.1   Introduction

The scale of incidents that fire brigades have to deal with varies from run of the mill incidents, such as chimney fires, to very large and complex incidents. Operations at significant incidents can involve mobilisation and deployment of considerable resources in terms of personnel and equipment, and can at times also involve complex and hazardous operations. Proper control over the activities of fire service personnel is central to effective, efficient and safe operations. An important aspect of control at incidents is the flow of information, the communications in the form of briefings, instructions, situation and progress reports.

Communications systems are used by officers in charge of operations at incidents to initiate, evaluate, and monitor operations. The choice of which mode of communication to use in individual situations is affected by the strengths and weaknesses of the four main modes :

(i)   direct verbal communication

         strengths :

         -       allows immediate two-way conversation and natural
                 interaction between individuals or groups;

         -       allows more complex messages to be passed;

         -       preferred means of communication for most command
                 and control purposes; and

         -       privacy can be readily assured.

         weaknesses :

         -       distance between personnel must be limited, especially
                 where there is a lot of noise.

(ii)   messenger communication

strengths :

-       good for transfer of simple instructions; and

-       can provide useful record if written messages used.

weaknesses :

-       does not facilitate two-way exchange and interaction;

-       can give rise to inaccuracies if verbal messages not
        repeated faithfully; and

-       can take considerable time.

(iii)   hand signals communication

strengths :

-       quick, unequivocal transmission of standard messages;

-       allows messages to be passed over distance; and

-       receipt of signal can be confirmed rapidly.

weaknesses :

-       constrained by darkness or obstacles;

-       limited number of established signals;

-       danger of misinterpretation if non-standard signals used;
        and

-       does not facilitate two-way exchange.

(iv)   radio communication

strengths :

-        allows verbal communication over distance;

-        allows some interaction and two-way exchange;

-        allows quick confirmation of messages; and

-        not constrained by darkness or obstacles.

weaknesses :

-        communications are by voice only;

-        simplex nature of message and response;

-        messages must be kept simple if frequencies to be available for multiple users;

-        requires discipline where multiple users involved; and

-        messages can be heard by unauthorised personnel.

Radio Communication is not subject to many of the weaknesses of the other modes which allow communication over distance. The availability of affordable, reliable, and easily portable radio telephones has brought the possibility of quick, reliable communications over distance and around or through obstacles at the fireground. Radios allow rapid and ongoing communications with personnel, including those who may be operating in hazardous situations in buildings and/or out of sight of the officer in charge of an incident, making a valuable contribution to the effective control of operations. Radios can also contribute greatly to the safety of personnel in emergency operations. Hand portable radios have been in use by fire services for a number of years and have proved a valuable addition to their equipment, where used effectively.

It is however, important to appreciate that Direct Verbal Communication is still preferable in many situations to Radio Communication. The simplex nature of the information exchange introduces difficulties which, of necessity, limit the amount and complexity of information which may be exchanged. The eye contact and body language which are used in normal face-to-face conversation and give an indication that the speaker is understood are missing.

2.4.2   Hand Portable Radio Channels

The Department of Public Enterprise has allocated ten UHF channels to the fire service for use with hand portable radios. The channel frequencies, channel number and purpose are used to mimic the standard and major incident command system in use in the fire services.

The first five channels detailed in Table 2.4.2 below are in accordance with the frequencies indicated for fire service use in Circular Letters 15/84 of 30 November 1984 and 4/88 of 26 May 1988, issued by the Department of the Environment and Local Government. Where authorities are equipped with hand portable radios whose channel allocation is in accordance with Circular Letter 15/84, or Circular Letters 15/84 and 4/88, they may be used in conjunction with the ten channel scheme detailed, while not having the capability to operate on all ten channels.

TABLE 2.4.2

UHF Channels - Fire Service			
Channel	**Tx. (MHz)**	**Rx. (MHz)**	**Purpose**
1	462.25		OIC-PMCO-BAMCO/BACO-FF
2	462.45		BAMCO-BACO
3	462.475		BACO-BATS
4	462.15	456.65	Re-Broadcast Channel
5	460.475		OIC-LA Services
6	466.575		PMCO-PTs
7	466.5		BAECO-BATs
8	466.525		BAECO-BATs
9	452.525		OIA
10	466.550		AS-GS-LA

Explanation of acronyms :

OIC	Officer-in-Charge
BAMCO	Breathing Apparatus Main Control Officer
BAECO	Breathing Apparatus Entry Control Officer
BAT	Breathing Apparatus Team
PMCO	Pump Main Control Officer / Water Officer
PT	Pump Team
LA	Local Authority
OIA	Other Incidents in the Area
AS	Ambulance Service
GS	Garda Síochána
Tx	Transmission frequency
Rx	Reception frequency
MHz	Megahertz

2.4.3   Use of Radio with Breathing Apparatus

A number of systems exist for dedicated radio communications between personnel wearing breathing apparatus and officers

supervising their operations from outside. Such systems typically incorporate specialised microphone and speaker fittings designed specially for use with breathing apparatus facemasks, with transmit switches and connections to hand portable radios worn or carried by the user or line connections to a dedicated receiver located with the supervising officer. They enable the fire-fighters within a building to receive evacuation messages.

2.4.4   Explosion Protection

Some hand portable radios have been specified to be "intrinsically safe", (with the specific designation EEx ib 11C T6). This is intended to avoid situations where the radios could cause explosions when operated in flammable or explosive atmospheres.

Personnel operating outside an area where a flammable or explosive atmosphere exists need not be equipped with the intrinsically safe radio equipment suitable for use in such atmospheres. Personnel in this category include those operating in support or in control of fire-fighters operating in an area where a flammable or explosive atmosphere is believed to exist, such as breathing apparatus entry control officers, the officer-in-charge of operations and fire-fighters performing duties in an area removed from such atmospheres.

Hand portable radios which are suitable for use in flammable or explosive atmospheres are usually conspicuously marked so as to enable them to be distinguished from radios which are not suitable for such use. A bright colour (both yellow and blue are in use) applied either in the manufacture of radio casings or subsequently securely fixed to the radio, is the general arrangement to denote an intrinsically safe hand portable radio.

Where fire service personnel using breathing apparatus are equipped with hand portable radios, the breathing apparatus entry control officer verifies that the radios are suitable for use in flammable or explosive atmospheres. The colour-coded marking arrangement facilitates this.

2.4.5   Radio Procedures and Training

As with the VHF main radio communication system, radio procedures are required for fireground communications as hand portable radios operate in the simplex mode, i.e. unlike the telephone, a radio can only transmit or receive at one time. When using radio, if one wishes to send a message it is necessary to depress the Press To Transmit (PTT) button on the radio set / microphone; also, it should be noted that even the best radio communications may suffer from interference which can result in misunderstood messages. If two people transmit simultaneously, the result is complete disruption of the network. Good radio procedure include :

-        correct use of voice procedure;

-        closing down and opening up of stations;

-        use of the correct channel; and

-        constant radio watch by all stations.

Only one station can speak at a time. To prevent confusion, therefore, the following rules apply to fireground communications :

(i)   listen before speaking to ensure that the channel is clear, and don't cut in on transmissions; allowances must be made for transmissions where only one of the participants in a conversation can be heard by you;

(ii)   leave a short pause at the end of a conversation;

(iii)   ensure that the radio returns to receive after each transmission (a faulty / sticking PTT switch will reduce a good network to a state of chaos); and

(iv)   use the phonetic alphabet to spell words that are not understood.

Training in radio procedures is necessary for successful operation of a network. Such training can be included in recruit, breathing apparatus, and ongoing training, as well as officer training.

Appendix 2.1

PHONETIC EQUIVALENT AND PRONUNCIATION OF THE ALPHABET AND NUMBERS FOR USE ON RADIO

Sending Names, Words or Figures

The vowel sounds should be given their ordinary value and the sound of consonants emphasised.

The phonetic equivalents given below should be used by fire service personnel, when passing messages by telephone and radio whenever it is necessary to emphasise the identity of letters and numerals.

When using the phonetic alphabet, particular attention should be given to the phonetic pronunciations, emphasis being laid upon the syllables which are underlined.

Letter	Phonetic Equivalent	Pronunciation
A	ALPHA	<u>ALFAH</u>
B	BRAVO	<u>BRAH-VOH</u>
C	CHARLIE	<u>CHAR</u> LEE
D	DELTA	<u>DELL</u> TAH
E	ECHO	<u>ECK</u> OH
F	FOXTROT	<u>FOKS</u> TROT
G	GOLF	GOLF
H	HOTEL	HOH<u>TELL</u>
I	INDIA	<u>IN</u> DEE AH
J	JULIET	<u>JEW</u> LEE<u>ETT</u>
K	KILO	<u>KEY</u> LOH
L	LIMA	<u>LEE</u> MAH
M	MIKE	MIKE
N	NOVEMBER	NO<u>VEM</u> BER
O	OSCAR	<u>OSS</u> CAR
P	PAPA	PAP<u>PAH</u>
Q	QUEBEC	<u>KEY</u> BECK
R	ROMEO	<u>ROH</u> ME OH

Letter	Phonetic Equivalent	Pronunciation
S	SIERRA	SEEAIR RAH
T	TANGO	TANG GO
U	UNIFORM	YOU NEE FORM
V	VICTOR	VICTAR
W	WHISKEY	WISSKEY
X	X-RAY	ECKSRAY
Y	YANKEE	YANKKEY
Z	ZULU	ZOOLOO

Number	Pronunciation
0	ZERO
1	WUN
2	TOO
3	THUH-REE
4	FO-WER
5	FI-YIV
6	SIX
7	SEVEN
8	ATE
9	NINE

Contents

Section 3.   Safety, Health and Welfare

3.1   Safety in the Fire Service

3.1.1   Legislation

The Safety, Health and Welfare at Work Act, 1989 is the principal legislation governing safety at work in Ireland. This Act sets out the duties and responsibilities of employers and employees with respect to safety, health and welfare.

Section 6(1) of the Act states :

"It shall be the duty of every employer to ensure as far as reasonably practicable the safety, health and welfare at work of all his employees."

Section 9(1)(a) of the Act states :

"It shall be the duty of every employee while at work to take reasonable care for his own safety, health and welfare and that of any other person who may be affected by his acts or omissions while at work."

Section 12 of the Act requires the preparation of Safety Statements. Safety Statements for the fire service are usually included as part of the general local authority safety statement.

3.1.2   Safe Places of Work - Safe Methods of Work

The principal requirements of the Safety, Health and Welfare at Work Act, 1989 are in respect of the provision of safe places of work and safe methods of working, in so far as is reasonably practicable. The emergency services may have to operate in practically any location in its functional area, ranging from buildings on fire to road-sides, forests etc. There are a number of ways in which fire services meet the requirements to provide safe places of work and safe methods of working and these are :

- recruitment standards;

- personal protective clothing and equipment;

- training and standard drills;

- specialist work equipment;

- health and safety equipment;

- medical protection;

- appointing responsible persons;

- hazard analysis / risk assessment;

- pre-fire planning;

- safe work practice sheets;

- plant and equipment planned maintenance; and

- records, check lists and notices.

3.1.2.1   Recruitment Standards

Standards for recruitment to the fire service are set down by fire authorities to ensure that personnel have appropriate qualities and capabilities for the job. This usually includes a range of aptitude tests. Recruits are also usually required to undergo a probationary period before final appointment to ensure their suitability for the job.

3.1.2.2   Personal Protective Clothing and Equipment

Suitable personal protective clothing and equipment is issued to all fire-fighters to protect them while they are in training or doing the fire-fighters' job and may be divided into the following two areas:

- personal issue of protective clothing and equipment includes :

    (i) helmet;
    (ii) tunic;
    (iii) leggings;
    (iv) fire boots;
    (v) gloves;
    (vi) lamp;

- specialised protective clothing and equipment includes :

    (i) breathing apparatus;
    (ii) splash suits;
    (iii) gas suits;
    (iv) safety glasses;
    (v) helmet and suit for chainsaw operation;
    (vi) goggles for cutting and welding / visor;
    (vii) ear defenders;
    (viii) life jackets, if working on or over water; and
    (ix) intrinsically safe radios, etc.

Such gear and equipment is purchased to a recognised standard, where these are available. Fire-fighters should ensure that both personal and specialised equipment are kept in proper condition and in satisfactory working order.

3.1.2.3 Training and Standard Drills

The fire service has a long tradition of incorporating safety procedures in training. Fire service personnel are given both recruit and ongoing training as part of the job. It is important that fire-fighters avail of opportunities given by their authorities for training.

The current training reflects the work, equipment and procedures which have developed over the years. Such equipment and procedures continue to change and develop and

fire service training does likewise. Systems for evaluating training needs and recording completed training have also been important since the introduction of the 1989 Safety, Health and Welfare at Work Act.

3.1.2.4   Specialised Work Equipment

Fire brigades employ a range of specialised appliances and equipment to do their work. It is important that fire-fighters are familiar and capable of safely using such appliances and equipment.

3.1.2.5   Health and Safety Equipment

First-aid kits are generally available on every fire appliance and in every fire station. Equipment carried in the first-aid kit is usually listed, with a minimum and maximum quantity of each item. As well as bandages, plasters, scissors, eye wash bottles, etc. the kit usually includes surgical gloves for use where contact with body fluids are likely, and strong disinfectants for use by fire personnel who may inadvertently come in contact with body fluids. Appliances usually carry a respirator suitable for adults and children. Explosimeters and gas monitoring or gas sampling equipment is carried where relevant.

3.1.2.6   Medical Protection

See paragraph 3.3 below for a detailed description of Occupational Health Systems in the fire services.

3.1.2.7   Appointing Responsible Persons

The fire service operates as a disciplined service with a definite rank structure and the Officer-in-Charge (OiC) is the person in charge and has responsibility for ensuring that health, safety and welfare requirements are looked after.

3.1.2.8 Hazard Analysis / Risk Assessment

The Safety Statement referred to in paragraph 3.1.1 is based on an identification of the hazards and assessment of the risks to safety and health at the place of work to which the Statement relates.

A hazard is something which could cause injury or harm and a risk is the injury that could result from exposure to that hazard.

Hazard identification is done in a number of ways, and is an ongoing process:

(i)   observation - looking around for hazards, such as trip hazards, slip hazards, heat and fire hazards, falling material hazards, noise hazards, lack of light hazards, lack of height hazards, etc.; and

(ii)   experience - the hazards that caused injury in the past and the steps taken to eliminate or ameliorate them.

Hazard analysis is usually applied in the context of buildings such as offices, appliance rooms, wash areas, training buildings, but also extends to appliances; equipment should be properly stowed, with sharp or jagged equipment properly sheathed, etc.

3.1.2.9 Pre-Fire Planning

Pre-fire planning is an integral part of the operations of the fire service, but it is also an integral part of the fire service from a safety point of view, because it is effectively a hazard analysis / risk assessment of potential places of work for the fire service. The identification of hazards such as chemicals, fuels, explosion risks, access points, control points, water supplies, key holders, location of personnel, etc. is extremely important from the point of view of the safety of fire personnel as well as the general public.

3.1.2.10 Safe Work Practice Sheets

Safe work practice sheets are standard to set out the correct way of undertaking a task safely. The standard drills used and practised in the fire service provide the equivalent of safe work practice sheets for the various operations and activities.

3.1.2.11 Plant and Equipment Maintenance

Planned maintenance is a key element to ensuring safety in the fire services for a number of reasons :

(i)   the specialised nature of equipment such as breathing apparatus, gas suits, splash suits etc. requires a strictly observed schedule of planned maintenance as their failure at an incident could be fatal; and

(ii)   specialist equipment such as winches, jacks, spreading and cutting gear etc. have to be ready to work at a moments notice to be crucial in saving life; it is essential that they are always in a proper working order.

3.1.2.12 Records, Check Lists and Notices

Records are kept of how the requirements of the Safety Statement are being implemented at all times. It is only by keeping records and having them regularly inspected that the various actions required for compliance with the Safety Statement can be carried out.

Check lists are an extremely important tool in ensuring that the Safety Statement is complied with, such as, that the correct equipment is stored, that correct procedures are followed and that maintenance is carried out. Examples of where check lists are useful are :

- vehicle maintenance;

- locker storage; each locker should have its own list of equipment which should be checked after each incident as there may not be time to check it before the next incident;

- first-aid kits and other consumable stores; maximum and minimum quantities of stock should be listed on the check list;

- equipment such as fire extinguishers, breathing apparatus sets, water tanks etc.; these should be checked, topped up or replaced in accordance with a set routine to avoid overlooking anything;

- ensuring that proper safety precautions are used at drills or training; and

- ensuring that pre-entry tests and equipment checks are carried out before committing crews to heat or smoke.

Notices are necessary where hazards exist and where such hazards cannot be removed. Notices can be temporary such as

BEWARE SLIPPERY FLOOR - WASHING IN PROGRESS

or permanent, such as

MIND THE STEP   or   MIND YOUR HEAD

The Safety, Health and Welfare at Work (Signs) Regulations, 1995 (S.I. No. 132 of 1995) set out requirements for the provision of safety and/or health signs at work.

3.2   Manual Handling of Loads

3.2.1   Introduction

The application of correct techniques for the safe lifting and handling of loads so as to minimise the risk of personal accident and injury is important for all workers. Notwithstanding the special circumstances under which fire-fighters' work, and the need to improvise in many situations, fire-fighters should follow the principles and techniques set out in this section. Training in manual handling is usually widely available and courses provided should be availed of. This section is based on the UK Fire Service Training Manual (Part 5).

In order to understand the concept on which correct lifting techniques are based it is necessary to learn something about the construction of the spine.

The spine is a hollow column made up of a series of separate interlocking bones known as vertebrae. The vertebrae are separated from each other by a small cushion of resilient tissue. This not only provides a cushion against the shock of landing heavily on one's foot or buttocks but also allows each vertebrae, at least in younger people, to move slightly independently of its neighbour.

In certain forward and backward movements the cushions will have a tendency to act as a hinge between the vertebrae. If, therefore, too much strain is applied with the body bent in the forward (or backward) position, the hinge can be damaged and this may result in a very painful injury. Some of these injuries are referred to as 'slipped discs'. To ensure that such injuries are avoided, safe lifting techniques should be practised until they become second nature.

3.2.2   Correct Lifting Techniques

Where lifting heavy objects the correct practice is to place the load near the feet, bending the knees and maintaining the spine a straight posture. When the load is to be raised, the straightening of the legs and maintenance of a straight back places the strain on the powerful

leg muscles and not on the back muscles and the lifting then requires less effort.
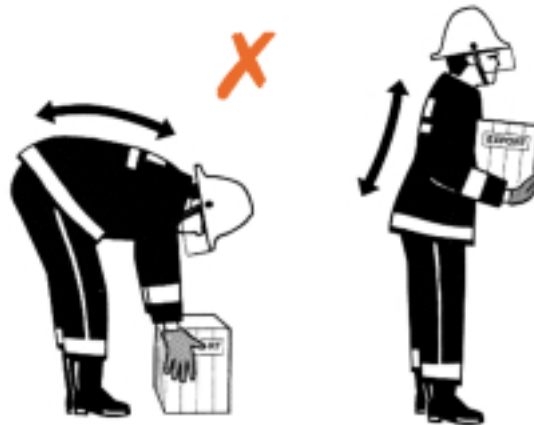
This illustration shows the 'WRONG' method of lifting showing the position of the spine lift a heavy weight and indicates the area of possible damage and injury.
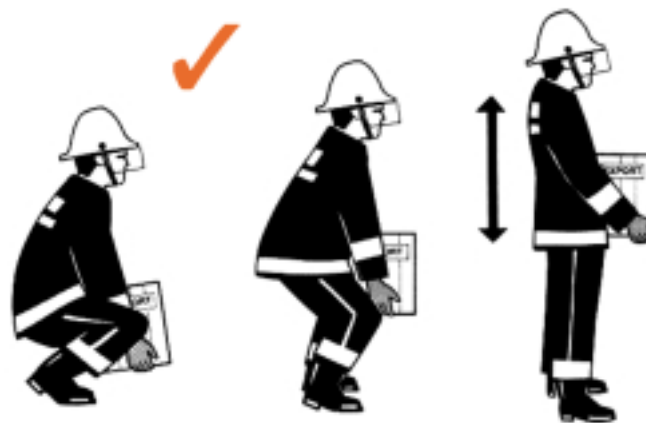
This illustration shows the 'RIGHT' method of lifting.

3.2.3   Two Person Lifting Technique

When lifting a heavy or sizeable load requiring two fire-fighters, both should lift together with the knees bent, back straight and facing squarely to the load. One fire-fighter should take charge and give the cautionary command 'PREPARE TO LIFT' followed by 'LIFT'

Illustrates the 'WRONG' method with legs straight and backs bent.

The 'RIGHT' method with knees bent, straight backs and facing the load squarely.

It is important when two fire-fighters are lifting a heavy load together that the load is evenly balanced between both. The ideal is for both to be of similar height and physique to avoid undue strain on the smaller fire-fighter.

The 'WRONG' method showing the excess strain on the smaller fire-fighter.

The 'RIGHT' method showing the load equally balanced.

3.2.4   When Lifting a Load down from a Height

It is important to seek assistance when lifting a load from a height or needing to move a load into position for lifting or lowering. Any attempt to move a load single-handed by jerking can give rise to the danger of causing a serious strain. Additionally, there is the possibility of the load falling and a more serious injury occurring.
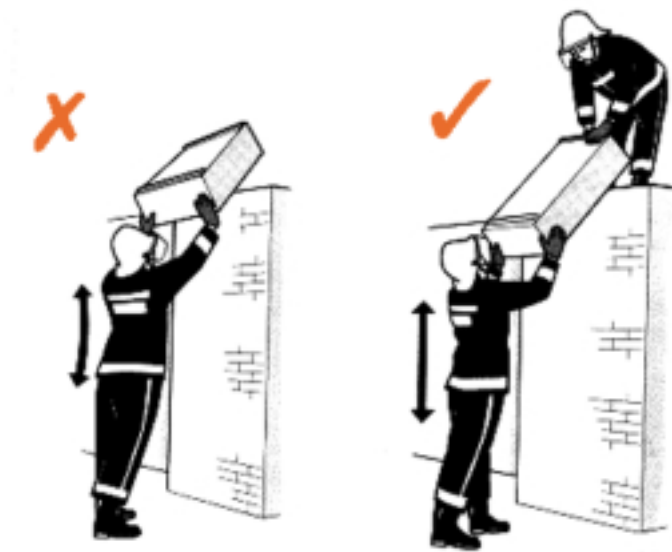
The 'WRONG' method showing the danger of damage to spine by sudden jerking movements.

The 'RIGHT' method showing the gradual application of load with assistance.

3.2.5   When Needing to Push a Load

The full weight of the body should be placed squarely behind a load whenever it is necessary to push it along. The hands should be placed firmly on the load so that the weight of the body will be transmitted, via the arms, to the load to be moved.

3.2.6 Good Vision when Carrying a Load

A load should never be carried blindly. The person carrying should be able to see the way and any possible obstructions.
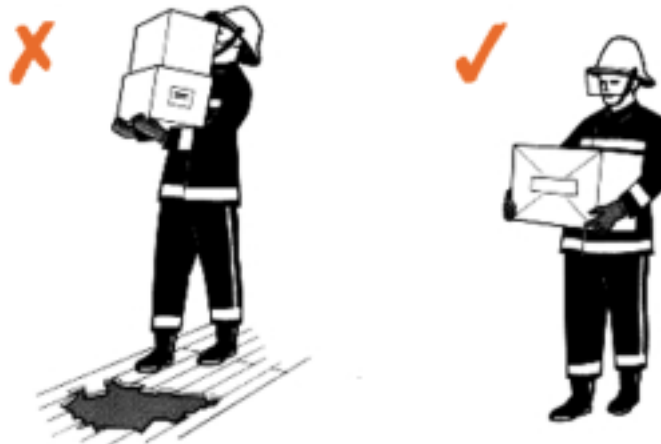
The 'WRONG' method of carrying a load and being unable to see the hazards ahead.	The 'RIGHT' method allowing the carrier to see any obstructions.

3.2.7 Multi-person Carrying

When a number of persons are carrying a load together it is important that they work as a team and that no undue strain is placed on any individual. There must be sufficient persons to carry the load and the

orders 'prepare to lift', 'lift' and 'raise' should be given to ensure a concerted effort.
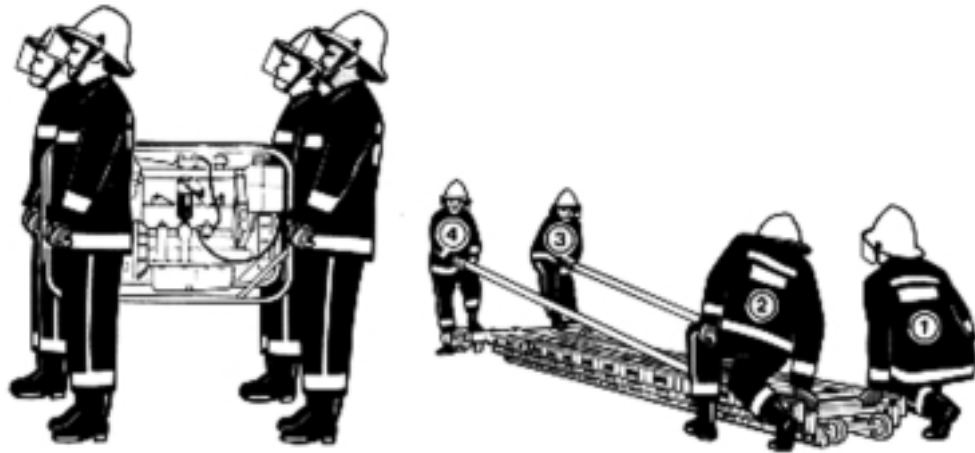
Illustrates the principle of sufficient people to share a load and ease the burden.

Illustrates the use of multi-person lifting by the application of forces at different points to move or raise a heavy object.

3.3   Occupational Health Systems in the Fire Service

3.3.1   Introduction

The fire service is a front-line emergency service. It is made up of staff who are trained, equipped and available to respond to a variety of emergency situations which arise. To ensure that fire-fighters are capable of safely and efficiently undertaking the tasks which they are required to perform, arrangements are in place for ensuring that fire-fighters are healthy and fit. This is in the interest of fire-fighters themselves and their colleagues, the authorities who employ them, and the public whom they serve.

This section describes the elements of Occupational Health Systems in the fire service as follows :

-    general arrangements;

-    medical examinations;

-    tasks for the medical adviser;

-    health education; and

-    research.

3.3.2   General Arrangements

Medical surveillance of existing fire-fighters is undertaken on a periodic basis, generally recommended not to exceed two year intervals. Fire authorities engage doctors (medical advisers) who undertake functions in this area. In the case of employees with certain medical conditions, more frequent medical examinations may be required, and the advice of the medical adviser may be sought. Medical surveillance of existing employees also takes place at the request of the fire authority.

A health interview is included as part of a routine medical examination, where employees are provided with a health declaration form, listing medical conditions, and the employee is advised to inform the medical adviser and seek his/her advice if any of these conditions occur.

Assessment of physical fitness is regarded as an integral part of ongoing medical surveillance, and fitness is usually assessed using the step-test.

3.3.3   Medical Examinations

Ongoing health surveillance of fire service personnel usually includes :

- measurement of height/weight ratio;

- pulse/blood pressure;

- visual acuity;

- urinalysis; and

- pulmonary function testing, forced expiratory volume in one second (FEV 1.0) and forced vital capacity (FVC).

Strength testing is not generally required as part of routine surveillance, but it is necessary on some occasions, if a fire-fighter has been sick for a substantial period, or is encountering problems with certain tasks which require strength.

A medical condition which in the opinion of the medical adviser would represent a danger to the fire-fighter or would place a colleague or member of the public at risk in operational circumstances may render an applicant unsuitable for operational duties as a fire-fighter.

3.3.4 Tasks for the Medical Adviser

Tasks undertaken by the Medical Adviser may include :

- making hepatitis and other immunisation available to fire-fighters;

- advising on rehabilitation of employees who have been sick;

- guidance on stress and as a point of reference for counselling;

- advising on preventative medicine and general health education; and

- advising on any other medical questions relevant to the fire service.

3.3.5   Health Education

The opportunity of medical surveillance can be used to introduce the principles of health education, focusing particularly on smoking, diet, and alcohol in relation to work, as well as on questions relating to infectious diseases, immunisation and care of the skin.

3.3.6   Research

Medical advisers may provide data and information from time to time for research studies undertaken in relation to occupational health in the fire service.

For this purpose the medical adviser usually keeps an occupational health record in addition to the normal personal clinical record. Such occupational health records, being separate to the confidential clinical records, contain medical information but not personal details sufficient to identify the individual, and are used for statistical and epidemiological purposes. This helps achieve consistency and comparability of medical records, and thus assist statistical research.

3.4   Infectious Diseases

3.4.1   Introduction

This section considers the issue of the risk to fire service personnel exposed to the infectious diseases hepatitis B and HIV (the AIDS virus), particularly when they are involved in the treatment of victims of fires or road accidents.

The guidance aims to promote :

-       safe operational practices and procedures for situations which may pose a risk of infection from hepatitis B, HIV and other blood-borne infections;

-       greater awareness among fire service personnel and civilians about hepatitis B and HIV/AIDS, thus reducing unnecessary fear; and

-       sensitive and informed treatment of people who have hepatitis B and/or the HIV/AIDS infection.

The guidance is based on the latest information available from a number of sources, including a letter from the UK Home Office, reference DCOL 10/1995.

3.4.2   Scope

The guidance covers :

-       operational precautions;

-       procedures in cases of possible contact with infected body fluids;

-       hepatitis B vaccination;

-       education and training;

-       references to basic information about HIV/AIDS and Hepatitis B; and

-       references to specific advice about hepatitis B and immunisation.

3.4.3   Distribution of Information

The guidance in this section is prepared for the information of fire brigade personnel who may come into contact with blood or body fluids. Fire authorities may find it helpful to designate and publicise a single point of expertise and advice within their brigade, such as the medical adviser appointed under the Occupational Health Scheme, whom staff could approach in the event of an incident.

3.4.4   Operational Precautions

3.4.4.1   Background

Surveillance data does not show fire-fighters as an occupational group to be at a greater risk than the general public of becoming affected with hepatitis B or HIV. However, it is recognised that within that group there may be some fire-fighters at increased risk, i.e. those designated to handle casualties at incidents. As with all occupational groups the risks of becoming infected are substantially less than the risks of being infected from sexual activity. Training or educational programmes about HIV/AIDS should ensure that the relative risks are placed in perspective.

Some aspects of fire brigade work may expose personnel to particular risk of infection. The risk can be substantially reduced if safe working practices are routinely adopted. All incidents involving spillage of blood and body fluids should be treated with care because of the possible risk from blood-borne infections including hepatitis B and HIV.

The main operational risk to personnel occurs if blood from an infected person comes into contact with broken skin, eyes or mouth, or if the skin is punctured by a contaminated needle or other sharp object. This is most likely to occur at a road traffic accident or while recovering a body.

3.4.4.2   Operational Procedures

In such circumstances personnel should :

-       cover cuts, grazes or abrasions with a waterproof plaster or dressing while on duty;

-       wash off blood splashed onto the skin with soap and warm water as soon as possible;

- whenever practicable, and in accordance with normal operational practice, heavy duty gloves should be worn if there is heavy bleeding or spillage;

- wear disposable plastic, latex or vinyl gloves whenever there is likely to be contact with another person's blood or other body fluids; plastic bags should be used for the disposal of used gloves as clinical waste; and

- wash their hands with soap and warm water at the first opportunity after contact with another person's blood, or other body fluids whether or not wearing protective gloves. Other body fluids, for example saliva, may contain blood borne infections such as hepatitis B.

A pack containing disposable gloves, plastic bags for used material, paper towels and liquid hand cleaner should be carried on all fire service vehicles.

Waste should be disposed of safely in accordance with local procedures.

3.4.4.3   Resuscitation

The most common reason for resuscitation is cardiac arrest, which requires resuscitation without delay. The risk of hepatitis B or HIV transmission during direct mouth-to-mouth resuscitation is regarded as negligible. In these circumstances, mouth-to-mouth resuscitation should not be withheld. It is essential that resuscitation attempts are not delayed.

Where blood is present in the mouth or is visible in the saliva the theoretical risk of infection is higher. In such cases the use of a protective device which prevents direct contact between the rescuer and victim should be used. The "Resusci Face Shield" or equivalent is currently recommended for this purpose. Such devices should be available on all fire service vehicles described at paragraph 3.4.4.2 above.

3.4.4.4 Cleaning and Disinfecting

Staff responsible for cleaning contaminated vehicles, equipment or premises should be properly equipped and familiar with the following procedures, techniques and safety precautions :

-       where a fire service vehicle or an area of fire brigade premises has been soiled by blood, saliva, blood-stained secretions or other body fluids, that vehicle or area should be taken out of service and cleaned;

-       staff should always wear household rubber gloves and an apron when cleaning; after use these items should then be placed in yellow (the clinical waste colour code, indicating potentially infectious material) plastic bags, and disposed of safely in accordance with procedures;

-       in the event of extensive floor spillage, staff should use protective footwear such as operational fire boots which should be cleaned and disinfected after use;

-       the area of any spillage should be disinfected by using a freshly prepared solution or one part bleach diluted with nine parts of water, or a granular chlorine compound; some brands of bleach are relatively weak; to ensure adequate cleaning a solution of no less than 10 percent hypochlorite should be used; all disinfectants are potentially hazardous and should be used with caution.

As with all other contaminated items, clothing which has come into contact with blood or other body fluid should be handled with care and placed in suitable bags for safe storage before laundering. Non-washable suits and uniforms may present a special difficulty. Dry-cleaning followed by steam pressing is the most appropriate form of decontamination. Contaminated clothing can otherwise be washed with detergent in the hot cycle (at least 80 degrees centigrade) of a washing machine. These cleaning processes should normally be sufficient to

render contaminated articles safe for re-use. However, any cleaning which leaves residual blood stains may run the risk of leaving viruses which remain active for some time. The risk of subsequent infection remains remote, if the wearer has no open wounds or ensures that any cuts, especially to the hands and fingers are covered.

3.4.5   Procedures in cases of Possible Contact with Infected Body Fluids

3.4.5.1   Identifying Potential Threats

Staff should have information to help them to identify incidents which may pose a threat to their health, and what to do in an emergency and where to seek advice. In the event of an accident where there has been contact with body fluids personnel should seek medical advice and guidance as soon as possible (from the brigade occupational medical adviser where applicable, or the nearest hospital casualty department, or their own general practitioner according to local arrangements) if :

-        skin has been punctured with the needle of a syringe or other sharp and contaminated instrument;

-        blood has been splashed over any part of the body which has cuts or abrasions;

-        blood has been splashed into the eyes or mouth; or

-        biting has resulted in a break in the surface of the skin.

3.4.5.2   Immediate Action

While medical advice is being promptly sought :

-        the affected area should be thoroughly washed with soap and water;

- if possible the syringe or sharp instrument should be safely retained for testing;

- the mouth and eyes should be thoroughly rinsed with water;

- if the skin has been punctured the cut should be encouraged to bleed a little whilst being thoroughly washed under running water;

- personnel who believe themselves to have been put at risk of infection should abstain from sexual intercourse without the protection of a condom or from giving blood until they can seek further advice and guidance; and

- personnel should remember that the risk of hepatitis B or HIV infection from an injury is very low; recent studies of health care workers indicate that the risk of acquiring HIV infection as a result of a single "sharps" injury (i.e. a needle-stick injury involving an infected patient) is less than one in 275; the overall risk is therefore minimal; the risk from contact with the eyes and mouth is even smaller.

3.4.5.3 Post-Incident Arrangements

In the event of any significant risk arising from the circumstances described above, the doctor or medical adviser consulted should arrange counselling for the individual about the risk of infection and the advantages and disadvantages of being tested for HIV antibodies. Such counselling should only take place under the full rigours of medical confidentiality.

Authorities should ensure that personnel are aware that they could consider, with their medical advisers, active and passive immunisation against hepatitis B (see paragraph 3.4.6). Following an incident, passive immunisation should be given as soon as possible and within 28 hours of the incident's conclusion.

Personnel may also wish to consider with their medical advisers having a sample of blood taken at the time of the consultation and put aside securely by the doctor in charge of the test in case they need to establish their HIV status at the time of the incident.

On balance there may be clinical advantages for the individual in terms of treatment available to know their HIV antibody status. This is very much a matter for individual decision, but some sources do advise that if people think they have been at risk, they should consider seeking a test. If they decide to do this they will first be counselled about the implications of taking the test and, if it proves positive, what effect this may have on them.

Personnel are referred to further advice contained in the Health Promotion Unit leaflets - "AIDS The Facts" and "Hepatitis B - The Other Virus".

Personnel who wish to be tested may wish to arrange an appointment with their local Genito-Urinary Medicine (Sexually Transmitted Diseases) Clinic, or with their own doctor. A list of clinics and contact numbers is given in the Health Promotion Unit leaflets referred to above.

3.4.6   Hepatitis B Vaccination

Vaccination against hepatitis B is possible. Recent guidance from the UK Department of Health on immunisation against infectious diseases states :

"Other occupational risk groups.
In some occupational groups, such as morticians and embalmers there is an established risk of hepatitis B. In other groups, the incidence of infection is not apparently greater than in the population as a whole. This applies to members of the police, ambulance, rescue services and staff of custodial institutions. Nevertheless, there may be individuals within these occupations who are at higher risk and who should be

considered for immunisation. Such a selection has to be decided locally by the occupational health service or as a result of appropriate medical advice".

Section 16 of this UK document is particularly relevant. Passive immunity and adverse reactions is covered in paragraphs 16.10 and 16.6 of this document, respectively.

Adherence to the precautionary measures set out in this document should minimise the risk of fire-fighters contracting hepatitis B. However, it is for each fire authority (as the employer), in consultation with their medical advisers, to determine whether fire-fighters thought to be at risk of contracting hepatitis B should be offered the vaccine. Fire-fighters designated to handle casualties at an incident may be considered as a priority for immunisation. Those fire-fighters who are immunised should be tested to ensure they have seroconverted as the vaccine does not confer adequate protection in all cases.

3.4.7   Education and Training

Although the operational risk to fire brigade personnel from hepatitis B and/or HIV infection is very low, staff need to understand how the virus can and cannot be transmitted, both for their own protection and to ensure the appropriate and sensitive treatment of others. For this reason it is highly desirable that this information is made available and a level of training or education is given to ensure that personnel understand the basic facts about HIV and hepatitis B and have sufficient knowledge to deal safely and confidently with situations where blood is spilt or personnel are injured and possibly at risk of infection.

3.4.8   Further Advice and Information

More general advice and information may be obtained from the Health Promotion Unit, Department of Health and Children, Hawkins House, Dublin 2. (Tel : (01) 6714711)

3.5   Fitness Training

3.5.1   Introduction

The fire-fighter's work will frequently be physically demanding and require sustained effort for long periods, often in arduous conditions. Consequently a fire-fighters' stamina and fitness to do the job is of paramount importance.

This fact was recognised when it was recommended to fire authorities that they establish Occupational Health Systems (see paragraph 3.3), which placed emphasis on the periodic health monitoring and regular fitness assessment of fire-fighters.

This section, which is based on the UK Fire Service Training Manual (Part 5) provides information and advice on fire-fighters' fitness training.

Fire-fighters are, from time to time, called upon to undertake extremely arduous tasks which, occasionally, demand exertion close to their limits of physical strength and endurance. By the nature of the job these physical demands vary in intensity and frequency, to such an extent that, in many cases. they do not occur often enough to maintain a fire-fighter at the peak of physical fitness. The sudden over-stretching of a muscle or limb can, at best, produce stiffness lasting several days, or at worst, an injury which may have permanent effect. It is therefore in the personal interest of all operational members of the service to maintain themselves at a reasonable peak of physical fitness. Safety from injury not only depends upon fitness, but on agility, mental alertness and speed of reaction.

Note : Some of the exercises suggested in this section require the use of equipment. It is emphasised that any equipment used must be suitable and properly maintained.

3.5.2   Components of Fitness

The following elements have been identified as the important areas of general fitness required by today's fire-fighter :

(i)   cardio respiratory and cardiovascular fitness - aerobic respiration;

(ii)   strength and endurance; and

(iii)   flexibility.

The fitness programmes set out in this section is designed to improve fitness levels in each of these vital areas.

3.5.2.1   Cardio Respiratory and Cardiovascular Fitness - Aerobic Respiration

Aerobic respiration is responsible for carrying oxygen from the air into the muscle fibres. The lungs provide the interface between the body and the atmosphere.

Within the lungs oxygen is extracted from the air and is absorbed into the blood. Here it is transported by the cardio vascular or blood transport system. The heart facilitates the carriage of blood to the muscle cells where oxygen is exchanged for carbon dioxide and is available for energy production.

Aerobic exercises are designed to increase the efficiency of the body's intake of oxygen. Typical aerobic exercises (e.g. walking, running, swimming, cycling etc.) stimulate the activities of the heart and lungs long enough to produce beneficial changes in the body.

The 'Aerobic System' is a specially designed system of physical conditioning using aerobic exercises.

3.5.2.2   Strength and Endurance

Muscular endurance is an integral component of fitness as muscular effort has to be sustained without fatigue if aerobic fitness is to be maintained. Increased muscle strength will contribute towards an improvement in aerobic endurance.

3.5.2.3   Flexibility

Research has shown that flexibility is a vital component of fitness. As the human body ages, the extensile and contractile qualities of muscles and tendons are lessened.

A programme of exercises which are designed to gently stretch muscles and tendons will have the following beneficial effects :

(a)   promote circulation;

(b)   increase range of motion;

(c)   reduce muscle tension and makes the body more relaxed;

(d)   assist co-ordination by allowing freer and easier movements;

(e)   prevent injuries such as muscle strain; and

(f)   prepare muscles for strenuous activities.

3.5.3   Benefits of Fitness Training

A carefully organised fitness training programme will usually ensure that each of the body systems will improve, become more efficient and the body generally will be less prone to injury and illness.

Regular exercise comprising three periods of fitness training in a week, each of about 30 minutes duration, combined with sensible eating habits should provide the following advantages :

(a)   reduced risk of heart and arterial disease;

(b)   better control of blood pressure;

(c)   better body flexibility;

(d)   controlled weight loss;

(e)   better sleep;

(f)   improved concentration; and

(g)   a feeling of well-being.

3.5.4   Levels of Fitness

Prior to starting a programme of fitness training, or to establish bench marks to monitor progress or development, a series of basic fitness tests should be taken, these are :

(i)   resting pulse;

(ii)   aerobics fitness and stamina;

(iii)   flexibility; and

(iv)   body weight.

These will establish fitness levels and identify any areas in which improvement may be needed.

3.5.5   Fitness Training Programmes

A fitness programme should be practical, rational, enjoyable, varied, progressive and provide the participants with a sense of achievement. It should aim at all round fitness but with a special emphasis upon the cardio vascular system, local muscle endurance and the fostering of team spirit.

Exercises or games aimed at improving cardio-respiratory efficiency are particularly important.

A fitness programme should be of a minimum duration of thirty minutes and should comprise three parts :

(i)   warm up;

(ii)   main exercise programme; and

(iii)   warm down.

3.5.5.1   Warm Up

It is essential that this vital part of the programme is conducted to gently warm the body and prepare the mind for the more demanding activities of the main exercise programme.

During the warm up the pulse rate should be raised TOWARDS the training range which is between 120 and 200 beats per minute less the age of the participant, e.g., the training range for a 40 year old fire-fighter would be between 80 and 160 bpm.

Full blood flow through the muscles will be achieved prior to greater exertions by gentle progressive movements of the large muscles. The muscles, tendons, etc., will by these movements, become warm and more 'elastic'.

Similarly, the fluid within the joints of the body will thicken to provide protection and the joint cartilages will swell temporarily to provide protection to the articular surfaces of the bones.

The fitter the fire-fighter, the longer the need for the warm up as muscles will have a greater capacity in the very fit.

Warm up exercises are an adjunct to aerobics exercise and should not exhaust the participant prior to the main exercise programme.

3.5.5.2   Main Exercise Programme

There are a wide variety of exercises and games that can be incorporated into a main exercise programme within the constraints of the fire-fighter's working environment. Physical training equipment will add to the scope and variety of the programme but is not essential.

The following principles should be borne in mind :

(i)   the workload must be individually based upon individual capacity and rate of progress;

(ii)   exercises must be simple to perform because any undue complication in movement interferes with the maintenance of the predetermined work rate;

(iii)   the exercises must be readily standardised; it is essential that the performer knows how much work they are doing, not merely how tired they feel; so each repetition of each exercise should be performed in the same way every time;

(iv)   the main exercise programme should take about twenty minutes;

(v)   working pulse rates should be taken on a random check basis to ensure that maximum safe pulse rates are not exceeded;

(vi)   the keeping of Progress Charts is recommended.

3.5.5.3   Warm Down

The warm down after vigorous exercise is both vital and beneficial.

During the main exercise programme lactic acid will have been produced within the muscle tissues and unless dispersed will cause pain, stiffness and 'cramps' for some period after the exercise has finished.

By performing a series of 'stretches' this unwanted product of exercise will be dispersed into the blood stream. By correct stretching techniques, the return of blood from the muscles through the veins will be greatly facilitated and the valves of the venous return system will be assisted.

Stretching eases muscle tension and relaxes the body after a vigorous exercise programme. Injuries and strains will be prevented and the range of motion/flexibility will gradually improve along with an improvement in the circulation.

Other exercises such as walking, paying special attention to poise and bearing, coupled with concentration on breathing can also be employed to assist the warming down process.

At least ten minutes should be spent on this vitally important part of physical training.

3.5.6   Flexibility Training Exercises

Muscles are the body's means of movement. A muscle needs strength, but it also needs length. Because muscles work in pairs, it is not possible to have strength without length otherwise this would mean that one muscle in a pair would not be able to contract fully without resistance from the other.

Natural muscle shrinkage with age, tends to result in problems of stiffness and lack of mobility, a problem which a regular programme of stretching will also address.

Whilst stretching is an integral part of overall fitness, it is not in itself a means of burning body fat which can come from a programme utilising aerobic energy.

Guidelines for stretching are as follows :

(i)   start the stretching routine with a feeling of relaxation;

(ii)   begin to stretch only after the muscles are warmed-up;

(iii)   ease into the stretch to the point where it is comfortable not painful;

Do Not Strain

(iv)   stretch so that the pull is felt in the bulky, central portion of the muscle; it maybe helpful to concentrate the mind on relaxing the muscle or muscle group being stretched; also, slight shifts in the position of the limbs will often relieve excess tension at the joints;

(v)   as the feeling of the stretch eases, stretch a little further, but be sure it is still comfortable;

(vi)   do not bounce in the end position;

(vii)   do not hold your breath, but try to breathe calmly and rhythmically;

(viii) whenever possible, stretch in either a sitting or reclining position;

(ix)   emphasise stretching the weight-bearing muscles of the lower back, hip, knees and ankles;

(x)   stretch BEFORE and AFTER each work out as a minimal requirement.

3.5.6.1   Stretching Routine - 'Active Stretching'

The following series of stretching exercises are designed to meet the needs of the participants generally. However, variations of these and other stretches may be added depending on individual limiting weaknesses and positional requirements. Always consult a qualified instructor before varying ANY exercise.

The programme should take a minimum of ten minutes. Unless otherwise stated, assume each stretching end position for approximately 30 seconds or, with progressive decreases in joint angle, for three consecutive periods of 6 to 10 seconds. Take the time to enjoy the exercises rather than rushing in an effort to get them over and done with.

Neck
Starting Position :
Sit or stand in a comfortable position.

Movement :
Slowly move your head from side to side, keeping the chin low. Keep your back straight.

Repetitions :
10 times.

Outer Shoulders and Chest
Starting Position :
Stand with your legs apart. Gently bring your arms together behind your head into the position shown in the diagram.

Movement :
Bend sideways at the waist and try to pull your elbows down to the floor. Keep your arms behind your head.

Time :
15 seconds on each side.

Arms, Shoulders and Outer Chest
Starting Position :
Stand with your legs apart. Hold your arms extended up above your head with your palms together.

Movement :
Stretch your arms upwards and slightly backwards. Breathe in as you do so.

Time :
15 seconds.

Arms and Top of Shoulders
Starting Position :
Sit or stand with your legs apart. With your arms behind your head, hold the elbow of one arm with the hand of the other arm.

Movement :
Gently pull the elbow across behind your head.

Time :
15 seconds with each arm.

Hamstrings
Starting Position :
Sit down with your legs straight.

Movement :
Keeping your head up and your
back flat, reach down with both
hands towards your toes. You can
produce extra stretch by pointing the
toes back towards your head or by
grasping your ankle and pulling
your chest down to your knee.

Time :
15 seconds.

Note : If you can't reach down far
enough to grasp your toes or ankles,
hook a towel around your feet.

Lower Back
Starting Position :
Lie on your back with your fingers
clasped behind your head and
elbows touching the floor, bend your
knees, keeping your feet shoulder
width apart.
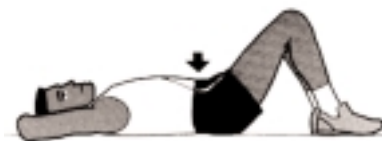
Movement :
Tighten the buttock muscles and
your abdominal muscles all at the
same time, so that your lower back
is flat against the floor.

Time :
Hold this tension for 10 seconds
then relax. Repeat this three times.

Buttocks and Hips
Starting Position :
Lie flat on your back with your legs
out straight.

Movement :

(a)   Keeping your left leg
      straight and flat on the floor,
      bend your right leg and
      grasp it just below the knee
      with your fingers clasped.
      Pull the right thigh down to
      your chest. Hold for 15
      seconds and then repeat the
      sequence with the other leg.

(b)   Bend your left leg and with
      your right hand pull it up
      and over the right leg,
      which should be held
      straight. Look across to
      your left shoulder and
      down your left arm which
      is stretched out to the side.
      Keep your shoulders flat
      on the floor and pull the
      bent leg down towards the
      floor. Hold for 15 seconds
      and repeat the sequence with
      the other leg.

Groin, Hips and Inner Thighs
Starting Position :
Sit up with your legs spread as wide apart as they will go, and the knees locked.

Movement :

(a)   Slowly bend forward from your hips, keeping the muscles at the top of your thigh (quadriceps) relaxed. Try to keep your hips from rolling backwards. Put your hands out in front for support. Hold for 15 seconds and then relax.

(b)   Now turn to face one foot and bend forward in that direction; trying to grasp hold of the ankle. Hold for 15 seconds and then repeat with the other leg.

Note : This second exercise will also stretch the muscles of the outer shoulder and chest.

Groin
Starting Position :
Sit with the sole of your feet held flat together, and grasp hold of your toes.

Movement :
Gently pull forward, bending from the hips. Squeeze your knees down with your elbows.

Time :
15 seconds.

Ankles
Starting Position :
Sit with your legs spread
comfortably in front of you.

Movement :
Rotate your left ankle as far as it will
go either way, with gentle pressure
from your right hand.

Repetitions :
10 times in each direction for each
ankle.

Hips and Thighs
Starting Position :
Place your right foot flat in front of
you. Move it forward until your
right knee is directly above the ankle
and your left knee is touching the
floor behind you. Point your left
foot.

Movement :
Bring your hips downwards,
keeping them straight. Use your
hands for balance. Check that both
feet are in line and not turned out.

Time :
15 seconds for each leg.

Note : To increase the stretch,
straighten the rear leg and gently
move your body up and back. You

can push with your arms by placing your hands on the bent knee.

Calves
Starting Position :
Stand close to a solid support and lean against it, supporting your weight on your arms. Bend one leg and place the foot in front of you, keeping the other leg straight.

Movement :
(a)   Slowly move your hips forward, keeping your back flat. Keep the heel of the straight leg firmly on the ground with the toes pointing straight ahead. Hold for 15 seconds. Repeat with the other leg.

(b)   To stretch the lower calf, lower your hips by slightly bending over your knee. Again, keep your heel on the ground. Hold for 15 seconds. Repeat with the other leg.

3.5.6.2   Stretching Routine - 'Passive Stretching'

The following are examples of flexibility exercises using passive stretching where the individual works with a partner

Sitting Press

One person sits on the floor with legs out straight. The partner stands behind and puts their hands on the back at shoulder blade level and applies pressure gently.

Shoulder Stretch

One person sits on the floor with legs out straight and arms above head. The partner puts their own leg against the back of the seated person and pulls arms back slowly and gently.

Lying Shoulder Stretch

One person lies on the floor face downwards with arms out on either side. The partner stands astride the person on the floor, takes hold of the arms and pulls upwards, slowly and gently.

Wall Press

One person sits with their back against a wall with legs out straight. Partner faces the person sitting takes the legs and lifts them upwards towards the head slowly and gently.

3.5.6.3 Tests of Flexibility

It is useful to set minimum requirements in flexibility. The following simple tests should be of help in finding out your limitations as well as in deciding on criteria for further development.

In the first test; keep your legs straight and your toes pointing vertically upwards, hold your head up and attempt to place your fingers on your toes.

In the second test; sit with your legs spread out, bend forward and rest your forearms on the floor. Put one fist on top of the other and attempt to rest your forehead on the top fist.

Each position should be held for 5 seconds. Note that these are minimum tests of flexibility.

3.5.7 Strength Exercises

The development of muscular strength depends on a number of factors which can be adapted by training. When subjected to particular kinds of stress such as weight training, the muscle fibres respond by becoming better organised, more responsive to impulses coming from the central nervous system and more efficient.

More efficient control from the central nervous system also means that the muscles are better co-ordinated. Strength training can also result in an increase in muscle mass known as muscle hypertrophy.

In general there are two types of muscle contraction :

(i)   ISOMETRIC : as the muscle contracts it does not cause any movement at the joints, but creates tension and thus exerts a force; and

(ii)   ISOTONIC : when the muscle contracts, it is either shortened or lengthened, thus producing movement.

Fire-fighters embarking on their first strength training schedule should do so under close supervision of a qualified instructor to learn the correct techniques of movement with a suitable weight.

3.5.7.1   Exercises using Body Weight

Using body weight alone is a highly convenient way to start strength training - although, for long term strength gains you will need to progress to other resistance work such as weight training.

Resistance work can involve a wide range of activities, whether by using variations of a single basic exercise, or by employing a number of different exercises. Resistance work can provide for an effective and varied training programme of strength training and requires the minimum of space and equipment. You should carefully consider the type of exercise used, the purpose it is intended for, the amount and nature of the resistance, the number of repetitions used and the quality (i.e. efficiency) of the movements.

The following are examples of resistance exercises using body weight; they require no equipment or facilities, and can be done anywhere :

Press-ups

(a)   Press-up : Front support with your back straight.

(b)   Finger-tip Press-up : Press-up on your finger tips.

(c)   Press-up clapping hands :
        Clap your hands between
        press-ups.

(d)   Press-up with feet raised :
        Front support with your feet
        on a bench.

(e)   Press-up raising one leg :
        Front support with your back
        straight.

(f)   One-Arm Press-up : Front
        support, with one hand
        behind your back.

(g)   Extension Press-up : Front
        support, with arms and legs
        extended.

(h)   Press-up from handstand :
        From a handstand against a
        wall, touch your forehead on
        the ground.

Knee Raise
Lie on your back with your legs
straight and your arms beside your
body. Bring your knees to your
chest and then back to the starting
position.

Sit-ups with Knees Bent
The feet may, or may not, be
anchored.

Diagonal Sit-ups with Knees Bent
Sit-ups, moving one elbow across to the opposite knee.

3.5.7.2   Exercises with a Partner

Combined Press-ups
With one partner's feet on the other partner's shoulder or back.
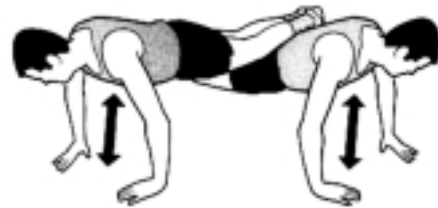
Separate Wrist
Face your partner, hold their wrists and try to pull them apart.
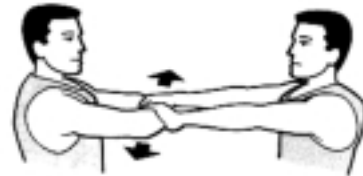
Separate Legs
Sit facing your partner with your feet astride but inside theirs. Using your legs try to force your partner's legs apart.

Clap Hands
Both lie on your back with your heads together and your arms apart. One partner tries to clap hands whilst being held back by the other.

3.5.7.3   Exercises using Equipment

Using a Beam or High Bar Chins
Keep your arms wide apart,
grasping the beam on top
(overgrasp).

Grasp the beam from underneath
(undergrasp).

or

Keep your legs parallel to the
ground.

Pull-ups to Back of Neck

Keep your arms wide apart, grasping the beam on top (overgrasp).

Leg Raises

Hang from the beam (undergrasp) and raise your knees to your chest.

Using Wall Bars
Back-Hanging Leg Lifts

Suspended with your back to the bars, raise your knees to your chest and then lower them again.

Against a Wall
Static Sitting
Sit with your back against the wall and your knees at an angle of 90 degrees.

3.5.8 Use of Progressive Resistance Exercise Equipment

If available, this equipment can be used to develop and sustain stamina and body conditioning. It can also be used as a component of a circuit training programme and allows for easy monitoring of progress in a range of activities.

Equipment should not be used by fire-fighters who have not been trained to a level of competence which satisfies the Brigade's criteria.

The following personal safety factors should be adhered to at all times:

(i)   sensible training weights should be established for each exercise before it is started;

(ii)   clothing should be suitable, allowing unrestricted movement and ventilation;

(iii)   jewellery should be removed prior to exercise, particularly necklaces which may cause injury to face and eyes; rings which cannot be removed should be taped;

(iv)   footwear should be in a good state of repair with a grip pattern on the soles;

(v)   no refreshments should be allowed in the training area; the equipment can be dangerous if it becomes wet;

(vi)   suitable material should be on hand to remove perspiration from the equipment; and

(vii)   exercises should be preceded with a 'warm up' and finish with a 'warm down' period.

3.5.8.1   Exercises

A range of exercises suitable for this equipment is provided here. Instructors will be able to advise of other exercises which might be more appropriate in certain circumstances.

The following circuits can be adapted to suit particular needs. Fire-fighters should ensure that they know exactly how to perform each exercise BEFORE starting each particular exercise. The numbers of sets and repetitions can be varied to suit differing levels of fitness and instructors can determine how many of each is appropriate.

Local Musclar Endurance Circuit

Equipment :   9 Stage Multi-Gym
                   Exercise Bench
                   Medicine Balls

Purpose :   To develop the endurance qualities of local muscle groups

Station	Exercise	Sets		Repetitions
1.	Bench Press	3	x	15
2.	Sit-ups	3	x	10
3.	Seated Pull-ups	3	x	10
4.	Seated Leg Press	3	x	15
5.	Lats; Pull Down	3	x	15
6.	Arm Curls	3	x	15
7.	Knee Raises	3	x	15
8.	Shoulder Press	3	x	15
9.	Step-ups	3	x	2 mins
10.	Inclined Press-ups	3	x	15
11.	Squats with Medicine Balls	3	x	15
12.	Hyperextension with Medicine Balls	3	x	10
13.	Leg Raise with Medicine Balls	3	x	10

A short rest period is quite acceptable between each exercise.

Strength Circuit

Equipment :   9 Stage Multi-Gym
            Medicine Balls
Purpose :   To develop the endurance qualities of local
            muscle groups

Station	Exercise	Sets		Repetitions
1.	Bench Press	5	x	5
2.	Lats; Pull Down	5	x	5
3.	Leg Press	5	x	5
4.	Shoulder Press	5	x	5
5.	Arm Curl	5	x	5
6.	Knee Raise with Medicine Ball	5	x	3
7.	Chins	5	x	6
8.	Sit-ups with Medicine Ball	5	x	8
9.	Dips with Medicine Ball	5	x	8

It can be seen that while the sets are high the repetitions are low. This is to facilitate the lifting of relatively heavy weights, allowing a short rest period between each set.

General Fitness Circuit

Equipment :   9 Stage Multi-Gym
            Exercise Bench
            Medicine Balls
Purpose :   To prepare the body for more arduous
            exercise and form a base level of fitness

Station	Exercise	Sets		Repetitions
1.	Shoulder Press	2	x	8
2.	Knee Raise	2	x	6
3.	Seated Rowing	2	x	8
4.	Lats; Pull-down	2	x	8
5.	Seated Leg Press	2	x	8
6.	Chins	2	x	4
7.	Sit-ups	2	x	6
8.	Seated Pull-ups	2	x	6
9.	Bench Press	2	x	8
10.	Step-ups	2	x	1 min
11.	Leg Raise with Medicine ball	2	x	8

3.5.9   Aerobic Exercises

The purpose of aerobic training is to increase the efficiency of the body's intake of oxygen and the efficiency with which the muscles produce energy.

An efficient aerobic system will mean that the heart will have a lot less work to do, will be stronger and far less prone to disease.

The heart is made of muscle and, like any other muscle, it will become stronger if it is used and weaker if it is not used. A sudden increase in the rate at which it has to work is bad for it, but a gradual increase trains the heart so that it acquires a greater working capacity.

Exercise improves the flow of blood through the coronary artery and the branches within the heart muscle itself causing extra capillary vessels to develop. The major blood vessels also become stronger and able to deal comfortably with greater work rates.

3.5.10 Circuit Training

Fire-fighters can achieve a significant improvement in aerobic fitness by means of circuit training. It involves very little in the way of specialist equipment and as such can be performed almost anywhere.

Circuit training has three main characteristics :

(a)   it aims at the development of muscular and aerobic fitness;

(b)   it applies the principle of progressive loading;

(c)   it enables large numbers of performers to train at the same time, irrespective of their varying standards of fitness, by employing a circuit of consecutively numbered exercises around which each performer progresses; each does a prescribed allocation of work at each exercise and they check their progress against the clock.

As with any other fitness training session the programme should commence with a warming up period and finish with a warming down period, each of approximately 10 minutes.

Circuit Training should have the following distinct features :

(i)   the work allocation must be individually based upon individual capacity and rate of progress;

(ii)   the exercise must be strenuous since each exercise must contribute to the maintenance and progressive increase in work rate;

(iii)   the exercises must be simple to perform as any undue complication in movement interferes with the maintenance of a predetermined workrate; and

(iv)   the exercises must be readily standardised; it is essential that the performers know how much work they are doing, not merely how tired they feel; each repetition of each exercise should be performed the same way every time.

3.5.10.1 Compiling a Circuit

The basic design of a circuit should be such that the participants work their way three times round the circuit doing repetition doses well below their maxima. The activities should be arranged so that different muscle groups are exercised in turn. Since the repetition dose is not exhaustive they can proceed without pause, applying continual pressure in an attempt to equal or reduce previous lap times.

3.5.10.2 Fixing the Dose

The repetition dose at each exercise must be established for each individual. It must not be so high as to cause them to stop through exhaustion in under three laps, but it must be high enough to ensure that on the last lap the dose approximates their maximum capability.

Three methods for fixing the dose are as follows :

(i)   individual measurement : the individuals are tested to their maximum at each activity with one minute's rest between each exercise; the score for each exercise is then halved and becomes a guide for the training dose;

(ii)   beginners dose and progression : after some experience with the compiled circuit and a general idea of the standard of fitness of the group, the instructor can stipulate a circuit time; this should normally be the time in which a good performer can complete three laps at half maximum doses; the instructor can then fix various lower doses to suit degrees of fitness, and these should be displayed on circuit cards around the circuit itself; when performers can do a particular dose in the prescribed time they increase to the next prescribed dose; and

(iii)   fixed dose : the instructor fixes the dose and the performers attempt to reduce their own times; instructors may increase the dose or the resistance when they think advisable.

A full circuit should take between 20 to 30 minutes to complete and ideally all fire-fighters should train to their individual standard about three times a week.

The following circuit is designed to strengthen the muscles of the leg, stomach, arms and back and to produce a good level of aerobic fitness.

Circuit Training Layout

3 Press Ups (10)

4 Dorsal Curls (10)

5 Squat Thrusts

2 Abdominal Curls (10)

6 Bicep Curls (10)

1 Step Ups (20)

7 Shuttle Runs (10)

11 Deltoid Raises

9 Bend / Twist / Touch (10)

10 Squat Jumps (15)

8 Presses
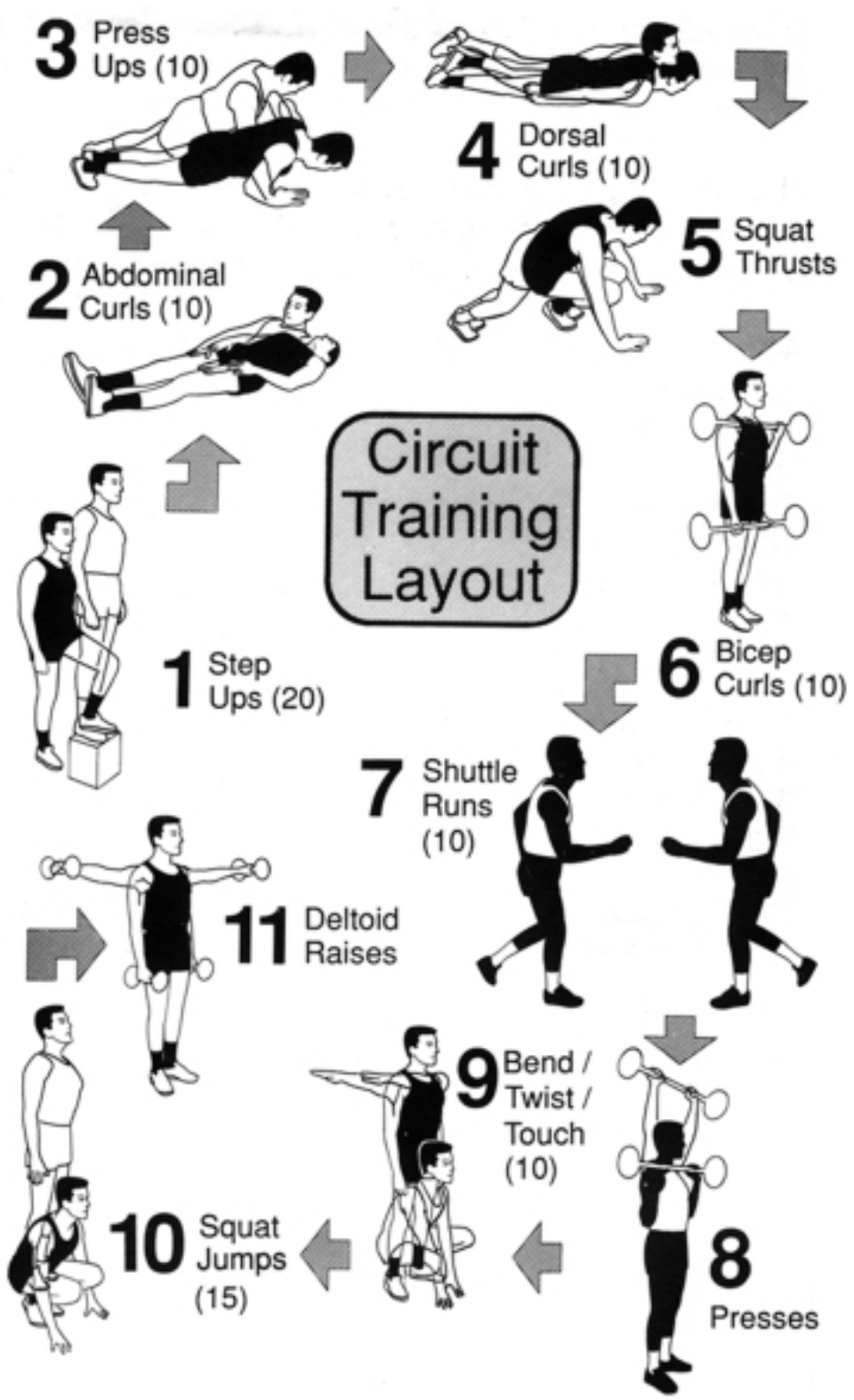
3.5.10.3 How to Use the Circuit

(a)   Each exercise should be performed correctly. It is important that the full range of movements is gone through each time.

(b)   Illustrations showing each exercise are shown overleaf. The instructor should be able to demonstrate any exercise where there is any doubt.

(c)   The circuit should be completed three times at moderate pace.

(d)   The time taken to complete the whole circuit or parts of it if desired, should be recorded. This establishes a target time which the person can aim to improve upon in subsequent sessions.

(e)   The repetitions indicated should be varied to take account of different levels of fitness of the participants. Those indicated are suitable for fire-fighters with a reasonable level of aerobic fitness.

Exercise	Repetitions
Step-ups	20
Abdominal Curls	10
Press-ups	10
Dorsal Curls	10
Squat Thrusts	20
Bicep Curls	10
Shuttle Runs (x 10 metres)	10
Presses	10
Bend/Twist/Touch	10
Squat Jumps	15
Deltoid Raises (2 x 5 kg)	10

3.5.11 Training for Stamina, Strength and Flexibility

There are various routes to cardiovascular fitness, increased strength and flexibility; some more appealing than others.

At the simplest level, brisk walking is an excellent stamina building exercise. But so is running up stairs, jogging, skipping, cycling (hard) or swimming.

It should not be assumed that the benefits received from different exercises are the same. The benefits gained from say weightlifting, are not the same as those gained from cycling.

The following table indicates the benefits in terms of Stamina, Flexibility and Strength which each activity can offer. As a great deal will depend on how much effort is put into the activity, the actual benefits may vary from those shown.

Activities	Stamina	Flexibility	Strength
Badminton	* *	* * *	* *
Climbing Stairs	* * *	*	* *
Cricket	*	* *	*
Cycling (Hard)	* * * *	* *	* * *
Football	* * *	* * *	* * *
Gymnastics	* *	* * * *	* * *
Jogging	* * * *	* *	* *
Rowing	* * * *	* *	* * * *
Squash	* * *	* * *	* *
Swimming (Hard)	* * * *	* * * *	* * * *
Walking (Briskly)	* *	*	*
Weightlifting	*	*	* * * *
Yoga	*	* * * *	*

*	No Real Effect	* * *	Very Good Effect
* *	Beneficial Effect	* * * *	Excellent Effect

Appendix 3.1   References

1.   UK Dept of Health, 1992, Joint Committee on Vaccination and
      Immunisation (JCVI) "Immunisation against infectious diseases",
      HMSO.

Contents

4.6

Section 4.   Standard Drills

4.1   Foot Drill

Foot drill is a disciplinary exercise which aims at making obedience and steadiness automatic under the most trying conditions. Foot drill is put to good use when fire-fighters are on parade and during other such formal occasions.

Foot drill should be carried out in accordance with the 'Manual of Foot Drill – All Arms', published by the Department of Defence.

4.2   Introduction to Standard Drills

4.2.1   Purpose of Standard Drills

The standard drills set out in this part of the handbook are for the purpose of :

-       achieving uniformity in the basic training of personnel in the use of appliances and equipment; and

-       ensuring that the appliances and equipment may be used with speed, efficiency, confidence and without confusion.

Many of the drills can also be used in applications other than the training of local authority fire service personnel, e.g. the training of fire crews in industry, competitions, etc.

4.2.2   Safety Procedures

Safety must be the concern of all personnel while engaged in drills, it is the responsibility of each person involved to observe safety procedures at all times. Examples of the responsibilities of the different personnel are set out below.

Each crew member should ensure that :

-       all items of personal fire gear are cleaned on a regular basis and maintained in good manner and repair;

- neckerchiefs, if worn, are not knotted, but folded around the neck and covered by the tunic collar;

- helmets and safety boots are worn;

- personal jewellery which can be hazardous has been removed before taking part in drills;

- assigned functions in a drill are carried out in such a manner that neither his/her own safety nor that of another crew member is put at risk;

- when working aloft, no personnel are below when dropping objects, (e.g. a line) and they give the warning "Stand from under" when equipment is being dropped.

The driver of an appliance should ensure that :

- before leaving the driving seat, the handbrake is firmly on and the gear-lever is in the correct position;

- before driving off, the appliance is correctly stowed, all doors are properly closed and the power take-off is disengaged;

- before reversing, a crew member who can be seen by the driver is stationed at the rear to act as a guide and to make sure that the area is clear and safe; remember that verbal signals may not be heard, so a suitable handsignal should be pre-arranged; the guide must always remain in view of the driver; and

- the engine is switched off immediately on completion of a drill.

The officer-in-charge should ensure that :

- all drills are performed in a safe manner using accepted practices having regard to the circumstances and conditions under which the drills are performed;

- each crew member understands the role and functions assigned and the reasons for them;

- all equipment needed for a drill should be available before starting; and

- all equipment used in drills is tested and cleaned on a regular basis and maintained in good order and repair; equipment on which the safety of life depends (such as lines) should have undergone normal standard tests.

If the officer-in-charge decides to undertake training in the hours of darkness and/or under adverse weather conditions, then such extra safety precautions as necessary should be introduced.

An officer-in-charge should make the maximum use of breathing apparatus in training, but wearers should not be overtaxed.

Every crew member should also fully understand the duties of other member of the crew, good teamwork is essential on the fireground, particularly if conditions are bad. The officer-in-charge should therefore use the 'change-round' command to ensure that members of the same crew occupy the various drill positions, see also paragraph 4.1.5.

Drill towers should be used carefully; in particular :

- dry risers in drill towers should not be tested or used in a drill whilst other tower drills are in progress; and

- staircases, landings, windows, etc. should be checked and cleared of obstructions and objects not required before drills take place.

For all rescue drills, the officer-in-charge should ensure that all agreed procedures are complied with. An experienced member of the brigade (to be known as the Safety Officer) should :

- be stationed on the floor of the drill tower from which the rescue is to be effected (or in an appropriate position at whichever site is chosen for the drill) close to the participants in the rescue;

- be satisfied that all appropriate precautions have been taken before the drill commences;

- stop the drill if any unsafe activity is observed (although the officer-in-charge retains overall responsibility);

- where live rescues are being carried out, ensure that the safety device is properly attached to an anchorage fitted to a drill tower;

- ensure that, during drills and practices of lowering a fire-fighter for the purpose of carrying out an operational task, a turntable ladder or hydraulic platform (not an escape or extension ladder) is used as the anchorage if a fixed anchorage is not conveniently positioned;

- ensure that the standard test is applied to the safety device;

- ensure that the belt of the safety device is properly fitted and adjusted;

- ensure that the line of the safety device is properly secured to the belt.

When taking drills, the officer-in-charge should stand in a position so as to see and be seen and hear and be heard whilst the whole drill is carried out.

All commands should be clearly audible, not only for training purposes, but also in case warnings such as "Still" or "Stand from under" are needed.

All personnel must be aware of the meaning, purpose and correct procedure for using such warnings, see paragraphs 4.2 and 4.3.

On completion of any drill, Number 1 will report to the officer-in-charge "Drill complete". Other commands are listed in paragraph 4.4.

4.2.3   Advanced Training

As the fire service is a hazardous profession, it is essential that personnel should be well trained in standard drills and procedures. As soon as personnel become proficient, the standard drills will have served their purpose and more advanced training should be given.

Advanced training should take the form of actual fire situation exercises. It should recognise that while training and practice can be carried out in comparatively safe conditions, at a real incident the situation may be very different. Accordingly, in advanced training personnel should be encouraged to use initiative under varying conditions, including the use of more than one appliance and several items of equipment in combination and in a flexible manner.

However, the skills and safety procedures learned in basic drills should be maintained.

4.2.4   Make Up Drills

During training exercises, following the carrying out of make down drills, make up drills should be incorporated where relevant. These drills are normally the reverse of make down drills and it is important that personnel become proficient in them.

As in all drills the officer-in-charge should ensure that all safety precautions are adhered to and that care is taken to ensure that equipment is not damaged.

4.2.5   Numbering of Crews

Crews are numbered to facilitate the allocation of tasks on a pre-determined and uniform basis. In all drills, the driver is Number 1.

4.2.6   Initiative

Crew members should be encouraged to use their initiative under varying conditions, including the use of more than one appliance and several items of equipment in combination.

4.3   Words of Command

The words of command are to be used both in drills and, where applicable, at fires are set out below. A dash (-) indicates the pause between the cautionary and the executive parts of the command. An underscore (_) indicates that the word is given as a single order. The cautionary words preceding the executive part of a command are displayed in light print, while the executive part is in bold print to help emphasise the correct method for giving the command, and the exact time when action is expected.

Command	Action or meaning
..Rest!	To be used if necessary by the instructor when carrying out a drill to point out a mistake; the crew remain still. This order can apply to a nominated crew member (members) or to the entire crew e.g. Number 3 Rest!; Number 2 and 5 Rest!; Crew Rest!
STILL!	Only to be used in an emergency (i.e. to prevent an accident), and then with maximum force; the crew remain perfectly still exactly where they are. This order can be given by the officer-in-charge, instructor or by any member of the crew.
Well!	To indicate that the position desired has been reached, for example, when extending or lowering a ladder.
As_you_were	Cancels an order previously given; the crew resume their previous positions.

Command	Action or meaning
Carry_on	Given after Rest! or Still!; the crew carry on with what they were doing.
Change-Numbers	The purpose of this order is to rotate the position of the crew members.
Depress	To decrease the angle of a turntable ladder with the horizontal, or the height of the cage of a hydraulic platform above the ground.
Dis_mount	The crew dismount from the appliance and return to the "Fall in" position.
Elevate	To increase the angle of a turntable ladder with the horizontal, or the height of the cage of a hydraulic platform above the ground.
Extend	To increase the overall length of a ladder.
Extend to Lower	To raise the extending portion of an extending ladder to clear the pawls for lowering.
Fall in	The named crew turn smartly to the right, pause, and moving at the double, fall in three paces to the rear of and facing the appliance and equipment, come to attention and then stand at ease.
Fall out	The crew turn to the right, pause, break away and fall in on the left of the squad in single rank and stand at ease.
Head_in	To move the head of a ladder towards the building.

Command	Action or meaning
Head_out	To move the head of a ladder away from a building.
Heel_in	To move the heel of an extension ladder in toward the building.
Heel_out	To move the heel of an extension ladder outwards from a building.
House	To reduce the extended length of a turntable ladder.
Knock off	To close down the water supply.
Lower	To lower the extending portion of an extension ladder.
Make_down or Get to work	The crew carry out the drill as detailed.
Make_up	The crew make up and re-stow all gear.
Mount	On the command 'Mount' from the "Fall in" position Numbers 2 and 4 take one pace to the rear, and mount the appliance on the near side, while Numbers 3 and 5 mount the appliance on the off-side.
Pawls	To indicate when descending that the pawls are fitted on the next round below and that the feet should be placed towards the centre of the round. See Note *.
Pitch	To erect a ladder against a building e.g. Pitch to the third floor.

Command	Action or meaning
Slip	To remove a ladder from the appliance.
Stand_from_under	To be used by anybody who has to lower equipment or drop debris from a height when there is a risk that it might strike someone standing below. It should also be used when equipment is accidentally dropped from a height.
Step_in	To indicate that the overlap of extensions is reached when descending a ladder with extensions on the upper side. See Note *.
Step_out	To indicate that the overlap of extensions is reached when descending a ladder with extensions on the underside. See Note *.
Train	To move the head of a turntable ladder or the cage of a hydraulic platform by rotating the turntable.
Under_run	To raise a ladder from a horizontal to a vertical position and vice versa.
Water_on	To turn on a hydrant, open a delivery valve on the pump, etc. according to the drill being performed.

Note * : The command "Pawls" and "Step_in" and "Step_out" should be used during drills to accustom personnel to the procedure, particularly when performing rescue drills. The order should be given when the leading foot reaches the round immediately above the hazard.

4.3.1   Focail Ordaithe

Ba cheart na focail ordaithe seo a leanas a úsáid le linn druileanna agus, nuair is cuí, ag dóiteáin. Cuirtear an mhoill idir na codanna rabhaidh agus na codanna feidhmiúla in iúl le fleasc. Cuirtear in iúl le _ go dtugtar an focal mar aon ordú amhain. Taispeántar na focail rabhaidh roimh na focail feidhmiúla i gcló éadrom agus na focail feidhmiúla i gcló trom chun béim a chur ar an modh ceart chun an t-ordú a thabhairt agus ar an am díreach a mbíonn súil le gníomh.

Ordú	Gníomh nó míniú
....SOS!	Le húsáid, mas gá, ag an teagascóir nuair a dhéantar botún le linn druileanna; fanann an criú socair. Is féidir an t-ordú seo a thabhairt do dhuine amháin den chriú nó don chriú uilig m.s. Sos, uimhir 3!;Sos, uimhir 3 agus uimhir 5!;Sos, an criu!
STAD	Le húsáid i gcásanna éigeandála amháin (i.e. chun timpist a sheachaint) agus ansin le huasmhéid nirt : ba choir don chriú fanacht an-socair mar a bhfuil siad. Is féidir leis an oifigeach i gceannas/an teagascóir no le haon duine den chriú an t-ordú seo a thabhairt.
Go Maith!	Le taispeáint go bhfuil an suíomh ceart sroichte m.s. nuair a shíntear nó nuair a íslítear dréimire.
Mar_a_Bhí!	Cuireann sé sin an t-ordú roimhe ar ceal : filleann an criú ar an suíomh a bhí acu roimhe sin.
Leanaig Oraibh!	Tugtar an t-ordú sin tar éis "Sos" nó "STAD"; leannan an criú ar aghaidh lena raibh ar siúl acu.
Athraig-Uimnhreacha	Tugtar an t-ordú seo chun ionaid an chriú a chasadh timpeall.

Ordú	Gníomh nó míniú
Lagraigí	Chun uillinn an dréimire chaschláir in aghaidh an chothromáin nó an ordáin hiodrálaigh os cionn na talún a laghdú.
Tuirling_igí!	Tuirlingíonn an criú den fhearas agus filleann siad ar an suíomh "luigí-isteach".
Ardaigí	Chun uillinn an dréimire chaschláir in aghaidh an chothromáin nó an árdáin hiodrálaigh os cionn na talún a mhéadú.
Sínigí!	Chun fadú leis an dréimire.
Sínigí chun Isliú!	Chun cuid insínte dréimire insínte a ardú chun na ceapachóirí a shaoradh sula n-íslitear iad.
Luigí Isteach!	Casann an criú ainmnithe díreach ar dheis, stopann siad meandar, agus ag gluaiseacht ar sodar, luíonn siad isteach trí choiscéim taobh thiar den fhearas agus den treallamh agus, a n-aghaidh dírithe orthusan, tagann siad ar aire agus ansin seasann siad ar áis.
Luigí Amach!	Casann an criú ar dheis, stopann siad meandar, briseann siad agus luíonn isteach, ar chlé an scuaid, i rang singil agus ansin seasann siad ar áis.
Barr_isteach!	Chun barr dréimire a bhogadh i dtreo foirgnimh.
Barr_amach!	Chun barr dréimire a bhogadh ó threo foirgnimh.

Ordú	Gníomh nó míniú
Bun_isteach!	Chun bun dréimire insínte a bhogadh i dtreo foirgnimh.
Bun_amach!	Chun bun dréimire insínte a bhogadh ó threo foirgnimh.
Isteach Leis!	Chun fad insínte dréimire chaschláir a laghdú.
Scoirigí é!	Chun an soláthar uisce a scor.
Isligí!	Chun cuid insínte dréimire insínte a isliú.
Cuirigí_i _ bhFeidhm!	Cuireann an criú an druil i bhfeidhm mar a sonraíodh.
I_dTaisce!	Eagraíonn an criú an treallamh agus cuireann i dtaisce é.
In Airde Libh!	Ar an ordú "In Airde Libh" ón suíomh "Luigí Isteach", glacann uimhir 2 agus uimhir 4 áit ar gcúl agus téann siad in airde ar an bhfearas ar an taobh abhus, téann uimhir 3 agus uimhir 5 in airde ar an bhfearas ar an taobh thall.
Ceapachóirí!	Le cur in iúl, ar theacht anuas, go bhfuil na ceapachóirí feistithe ar an gcéad runga eile thíos agus gur chóir na cosa a chur i dtreo lár an runga. Féach Nóta **.
Cuirigí Suas	Chun dréimire a chur suas i gcoinne foirgnimh m.s. "Cuirigí suas chuig an triú urlár".
Scaoiligí!	Chun dréimire a scaoileadh den fhearas.

Ordú	Gníomh nó míniú
Seasaigí_Amach!	Le húsáid ag aon duine atá ag ísliú treallaimh nó ag cur síos smionagair ó áit árd nuair is baol go mbuailfear duine atá ag seasamh thíos faoi. Is cóir é a úsáid, freisin, nuair a thiteann treallamh anuas de thimpist.
Céim_Isteach	Le taispeáint go bhfuil sínte an dréimire thar a chéile bainte amach nuair atáthar ag dul síos dréimire le sínte ar an taobh uachtarach. Féach Nóta **.
Céim_Amach!	Le taispeáint go bhfuil sínte an dréimire thar a chéile bainte amach nuair atáthar ag dul síos dréimire le sínte ar an taobh íochtarach. Féach Nóta **.
Dírigí!	Chun barr dréimire chaschláir nó cábán árdáin hiodrálaigh a bhogath tríd an caschlár a rothlú.
Cuirigí_Faoi!	Chun dréimire a ardú ón suíomh cothrománach go dtí an suíomh ingearach nó vice versa.
Uisce_ar_Siúl!	Chun hiodrant a chur ar siúl, seolchomhla a oscailt ar an gcaideal, etc., de réir na druile atá á déanamh.

Nóta ** : Ba chóir na horduithe "Ceapachóirí", "Céim Isteach", agus "Céim Amach" a úsaid le linn druileanna chun taithí a thabhairt don foireann ar an gcleachtas, go háirithe nuair atáthar ag cleachtadh druileanna tarrthála. Is cóir an t-ordú a thabhairt nuair a shroicheann an chos tosaigh an runga díreach os cionn na guaise.

4.4   Other Commands / Orduithe Eile

English Version	Leagan Gaeilge	
Drill Complete	Druil Críochnaithe	
Plumb to the Left	Socraigh ar Chlé	(LD 3)
Plumb to the Right	Socraigh ar Dheis	(LD 3)
Tilt Number 2	Claon Uimhir a dó	(LD 4)
Tilt Number 3	Claon Uimhir a trí	(LD 4)
One extra length of delivery hose Make Down	Fad bhreise amháin de sheolphíobán Déan Síos	(HD 2.2)
Replace burst length Make Down	Athraigh an fhad phléasctha Déan Síos	(HD 3)
Water Off	Uisce ar Scor	(HD 3)
Divide line at first length	Roinn an líne ag an gcéad fhad	(HD 4)
One line of delivery hose Make Down	Líne amhin de sheolphíobán Déan Síos	(PD 3)
Second line of delivery hose, Make Down	An Dara líne de sheolphíobán Déan Síos	(PD 5)

4.5   Fire Brigade Signals

4.5.1   Pumping Signals

There are many occasions when messages or orders may have to be passed by signal. It should be remembered, however, that there are occasions when the use of signals would be unwise and likely to result in danger or confusion, for example :

- where two or more pumps are at work;

- when giving instructions to raise or lower pressure when more than one branch is working from the same pump; or

- at night or in poor visibility.

  Signals may be divided into two categories :

- verbal : by word of mouth or radio using specified procedures; these signals are given by word of mouth or radio direct to the pump operator, as it is usually impossible for him to hear from a distance; and

- visual : using the arms (referred to as arm signals); all such signals should be given smartly with the palms open.

Whistles should not be permitted as a means for passing signals. Whistles should be used only for the standard evacuation signal, see paragraph 4.5.3.

(Order)	(Arm Signal)
Water On	Both arms raised to their full extent above the head, open palms forward. This signal should never be given until a branch is under control and the crew member at the branch is ready and prepared.
Knock Off	Fully extend both arms from chest outward to sides, open palms downwards.
Increase Pressure	Fully extend both arms from chest forward, open palms upwards. Then raise both arms in unison to vertical position. See Note ***.

(Order)	(Arm Signal)
Reduce pressure	One arm is extended horizontally from the shoulder and the other arm is raised vertically. See Note ***.
Make up all gear	Fully extend both arms from chest outward to sides open palms downwards, then drop both arms to the sides in unison.
All crew report to officer	The arm is swung round the head and then the right hand is placed flat on the head.

Note * :** In the absence of instructions to increase or reduce pressure by a specific amount, pump operators should raise or lower the pressure by 1 bar.

Use of messengers : Where circumstances preclude verbal or visual communication with the pump operator, the best way to convey orders is by messenger.

4.5.2   Line Signals

There may be occasions when a fire-fighter has to be lowered down a shaft, a well, or over a cliff in order to effect a rescue or for other reasons. In the absence of other means of communication e.g. breathing apparatus communication equipment, the fire-fighter should be lowered on one line and have a second line attached for signalling purposes.

The following signals should be employed :

Signal on Line	Given by Wearer	Given by Attendant
One pull	I am all right	Are you all right?
Two pulls	Pay out more line	I am paying out more line
Two pulls - pause - two pulls	Stop lowering	I am ceasing lowering
Three pulls	Haul in slack line, or haul up	I am hauling in slack line, or I am hauling up.
Repeated Sharp Pulls	Danger help me out	Danger - I am hauling up as quickly as possible.

4.5.3   Evacuation of Personnel

The signal recommended for the evacuation of personnel from an incident is repeated short blasts on a good quality whistle. It is advisable that all officer ranks in the fire service should carry such a whistle. On hearing the evacuation signal, all officers should relay the signal using their own whistles. Whistles should be used only for the standard evacuation signal and not for any other purpose. All fire-fighters hearing repeated short blasts from a whistle should make their way as quickly as possible out of the incident location, but the withdrawal should be orderly so that a dangerous situation is not caused.

4.5.4   Warning Signals - Railways

Special warning horns may be carried on appliances. The approach of trains should be signalled by blasts on the warning horns.

4.5.5 Acknowledgement of Signals

In cases where signals are employed, they should be acknowledged where practicable by the recipient repeating the signal to show that it has been understood and is being acted upon.

4.6   Hydrant and Hose Drills

This section covers the following hydrant and hose drills :

-        HD 1 : Hydrant Drill (Crew of Three);

-        HD 2.1 : Hydrant Drill (Crew of Four);

-        HD 2.2 : Hydrant Drill (Extra Length Added On) (Crew of Four);

-        HD 3 : Replacing a Burst Length of Delivery Hose (Crew of Four); and

-        HD 4 : Inserting a Dividing Breeching to Make Two Lines (Crew of Five).

4.6.1   HD 1 : Hydrant Drill (Crew of Three)

4.6.1.1   Objectives

On completion of training, crew members will be able to :

-        ship a standpipe;
-        carry a length of delivery hose;
-        run out lengths of delivery hose;
-        connect lengths of delivery hose;
-        carry a branch and length of delivery hose;
-        connect the branch to the hose;
-        manoeuvre a charged length of delivery hose;
-        hold a branch;
-        operate a branch;
-        operate a hydrant;
-        disconnect a length of delivery hose;
-        under-run a length of delivery hose; and
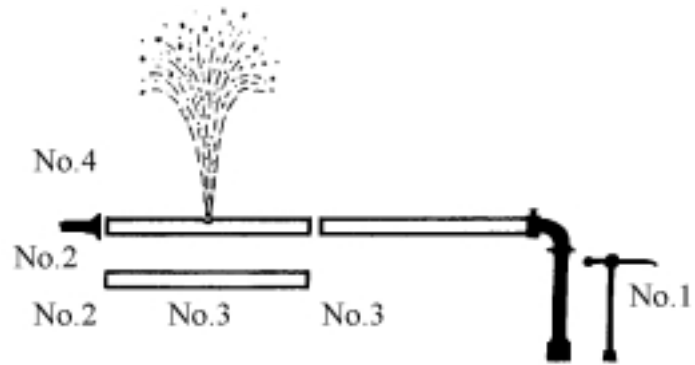-   make up a length of delivery hose.

4.6.1.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
B	Number 2 makes down first length of delivery hose from hydrant.
C	Number 3 takes branch and second length of delivery hose and makes down to fire.
D	Number 2 backs up number 3 on the branch.
E	Number 3 calls, or signals 'Water on".

Diagram HD 1
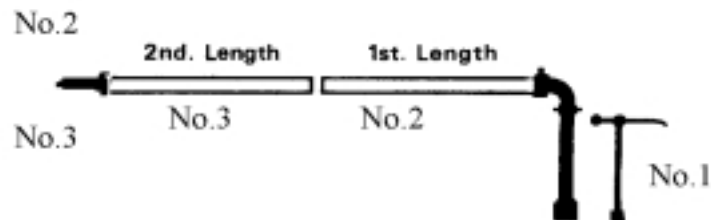
4.6.2 HD 2.1 : Hydrant Drill (Crew of Four)

4.6.2.1 Objectives

On completion of training, crew members will be able to :

- ship a standpipe;
- carry a length of delivery hose;
- run out lengths of delivery hose;
- connect lengths of delivery hose;
- carry a branch and length of delivery hose;
- connect the branch to the hose;
- manoeuvre a charged length of delivery hose;
- hold a branch;
- operate a branch;
- operate a hydrant;
- disconnect a length of delivery hose;
- under-run a length of delivery hose; and
- make up a length of delivery hose.

4.6.2.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
B	Number 2 makes down first length of delivery hose from hydrant.
C	Number 4 takes branch and second length of delivery hose and makes down to fire.
D	Number 2 backs up number 4 on the branch.
E	Number 4 calls or signals "Water on".
F	Number 3 reports to the officer and assists as directed.

Diagram HD 2.1 (i)

No.2

2nd. Length   1st. Length

No.4   No.4   No.2

No.1

Diagram HD 2.1 (ii)

No.2

2nd. Length   1st. Length

No.4

No.1

OiC   No.3

4.6.3   HD 2.2 : Hydrant Drill (Extra Length Added On) (Crew of Four)

4.6.3.1   Objectives

On completion of training, crew members will be able to :

- ship a standpipe;
- carry a length of delivery hose;
- run out lengths of delivery hose;
- connect lengths of delivery hose;
- carry a branch and length of delivery hose;
- connect the branch to the hose;
- manoeuvre a charged length of delivery hose;
- hold a branch;
- operate a branch;
- operate a hydrant;
- add a length of hose to a line of delivery hose;
- disconnect a length of delivery hose;
- under-run a length of delivery hose; and
- make up a length of delivery hose.

4.6.3.2   Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
B	Number 2 makes down first length of delivery hose from hydrant.
C	Number 4 takes branch and second length of delivery hose and makes down to fire.
D	Number 2 backs up number 4 on the branch.
E	Number 4 calls, or signals "Water on".
F	Number 3 reports to the officer and assists as directed.

It is now decided to add an extra length of delivery hose to the line.

G	On the order "one extra length of delivery hose make down" number 3 takes a length of delivery hose and proceeds to number 4.
H	Number 3 informs number 4 of an extra length being added at the branch, and then makes down extra length in required direction.
I	Number 3 calls, or signals to number 1 "Water off".
J	Number 4 unclips branch, proceeds to end of third length, and connects branch.
K	Number 2 connects female couplings to added length.
L	Number 2 backs up number 4 on the branch.
M	Number 4 calls or signals "Water on".
N	Number 3 reports to the officer and assists as directed.

Diagram HD 2.2

(Drill starts as at HD 2.1)
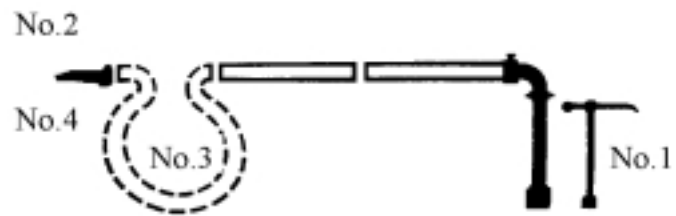
4.6.4 HD 3 : Replacing a Burst Length of Delivery Hose (Crew of Four)

4.6.4.1 Objectives

On completion of training, crew members will be able to :

- ship a standpipe;
- carry a length of delivery hose;
- run out lengths of delivery hose;
- connect lengths of delivery hose;
- carry a branch and length of delivery hose;
- connect the branch to the hose;
- manoeuvre a charged length of delivery hose;
- hold a branch;
- operate a branch;
- operate a hydrant;
- remove a burst length of hose from a line of delivery hose;
- replace a burst length of hose with a new length;
- disconnect a length of delivery hose;
- under-run a length of delivery hose; and
- make up a length of delivery hose.

4.6.4.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number I makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
B	Number 2 makes down first length of delivery hose from hydrant.
C	Number 3 takes second length of delivery hose and makes down to fire.
D	Number 4 takes branch and connects to the end of the line.
E	Number 2 backs up number 4 on the branch.
F	Number 4 calls or signals "Water on".
G	Number 3 reports to the officer and assists as directed.

It is now decided to replace a burst length.

H	On the order "Replace Burst Length (i.e. first or second) Make Down", number 3 takes length of delivery hose and runs it out parallel to the burst length.
I	Number 3 informs number 4 who releases number 2 to assist.
J	Number 2 goes to female coupling of new length.
K	Number 3 returns to male coupling of new length and calls to number I "Water off".
L	Numbers 2 and 3 disconnect burst length and connect new length.
M	Number 2 returns to number 4, informs him or her that length has been connected, and remains to back up number 4 on the branch.
N	Number 4 calls, or signals "Water on".
O	If number 3 cannot make up burst length immediately, s/he puts an overhand knot on each end. If s/he can make it up, the hose is rolled up on the male coupling.
P	Number 3 reports to the officer and assists as directed.

Diagram HD 3
(Drill starts as at HD 2.1)

No.4

No.2

No.2   No.3   No.3   No.1

4.6.5   HD 4 : Inserting a Dividing Breeching to Make Two Lines (Crew of Five)

4.6.5.1   Objectives

On completion of training, crew members will be able to :

-       ship a standpipe;
-       carry a length of delivery hose;
-       run out lengths of delivery hose;
-       connect lengths of delivery hose;
-       carry a branch and length of delivery hose;
-       connect the branch to the hose;
-       manoeuvre a charged length of delivery hose;
-       hold a branch;
-       operate a branch;
-       operate a hydrant;
-       add a dividing breeching to a line of delivery hose;
-       make down a second line of delivery hose and branch from the dividing breeching;
-       disconnect a length of delivery hose;
-       under-run a length of delivery hose; and
-       make up a length of delivery hose.

4.6.5.2   Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
B	Number 2 makes down first length of delivery hose from hydrant.
C	Number 4 takes second length of delivery hose and branch and makes down to fire.
D	Number 2 backs up number 4 on the branch.
E	Number 4 calls or signals "Water on".

It is now decided to divide the line at the first length.

F	On the order "Divide Line at First Length" number 3 takes a dividing breeching to the first connection, and calls to number 4 "dividing the line".
G	Number 3 calls to number 1 "Water off" and connects dividing breeching.
H	Number 5 takes branch and length of hose, makes down length from dividing breeching in required direction, connects branch, and calls to number 3 "Water on".
I	Number 3 calls to number 4 "dividing breeching inserted" and then calls to number 1 "Water on".
J	Number 3 backs up number 5 on the branch.

Note : (i)　　If a controlled dividing breeching is to be used it should be inserted with both valves in the OPEN position.

(ii)　　The advantage of using a controlled dividing breeching is that each line can be used independently.

Diagram HD 4 (i)
(Drill starts as at HD 2.1)

No.2
1st. Delivery
No.4
No.3
2nd. Delivery   No.3
No.5
No.5   No.1
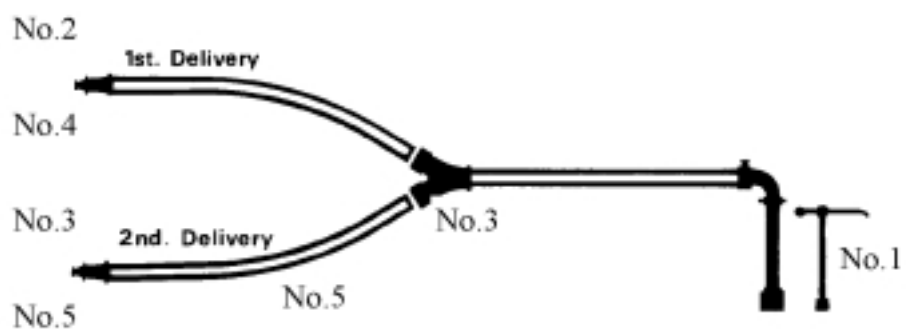
Diagram HD 4 (ii)
(Position with drill complete)

No.2
1st. Delivery
No.4
No.3
2nd. Delivery
No.5   OiC   No.1
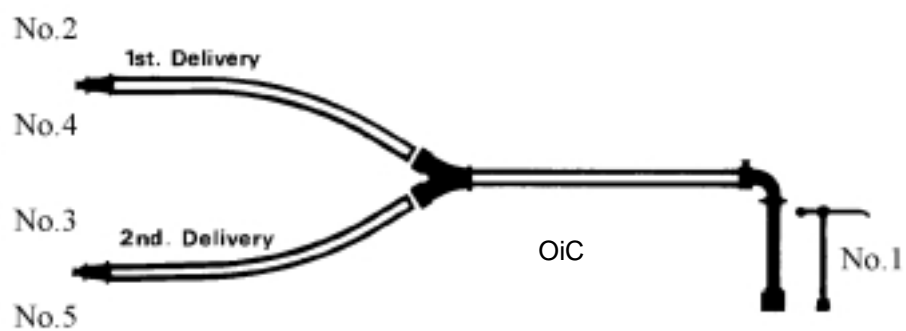
4.7 Pump Drills

This section covers the following pump drills :

-       PD 1 : Tank - Main Pump - Hose Reel (Crew of Three - one line) (Crew of Five - two lines);

-       PD 2 : Hydrant - Main Pump - Hose Reel (Crew of Five);

-       PD 3 : Hose Reel and One Line of Delivery Hose from Main Pump (Crew of Five);

-       PD 4 : Hydrant - Main Pump - One Line of Delivery Hose (Crew of Five);

-       PD 5 : Hydrant - Main Pump - Second Line of Delivery Hose (Crew of Five);

-       PD 6 : Open Source - Main Pump - One Line of Delivery Hose (Crew of Five);

-       PD 7 : Portable Pump (Open Source to Fire) (Crew of Five); and

-       PD 8 : Portable Pump (Closed Relay) (Crew of Five).

4.7.1   Pre-Requisite Proficiency

Crews should be proficient in handling all items of equipment involved in hydrant and hose drills before carrying out pump drills.

4.7.2   Objectives

On completion of training in pump drills, crews should be able to carry out all of the pump drills without error. Crew members should be capable of carrying out all of the crew roles and should be capable of operating effectively as part of a team.

4.7.3 PD 1 : Tank - Main Pump - Hose Reel (Crew of Three - one line) (Crew of Five - two lines)

4.7.3.1 Objectives

On completion of training, crew members will be able to :

- operate the main pump on an appliance, working from the water tank;

- lay out a line of hose reel to a fire; and

- hold and operate a hose reel branch.

4.7.3.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1, the driver, operates the pump.
B	Number 2 unclips the hose reel and hands it to number 4 who takes it to the fire and operates the branch.
C	Number 2 unwinds sufficient quantity of hose from the reel and then backs up number 4 at the branch.
D	Number 1, being the pump operator, stays in position at the pump.
E	Numbers 3 and 5 report to the officer and assist as directed.
F	If a second hose reel is required, number 3 unclips the hose reel and hands it to number 5, who takes it to the fire and operates the branch.
G	Number 3 unwinds sufficient quantity of hose from the reel and then backs up number 5 at the branch.

Diagram PD 1 (i)

No.1

No.2

No.2

OiC

No.4
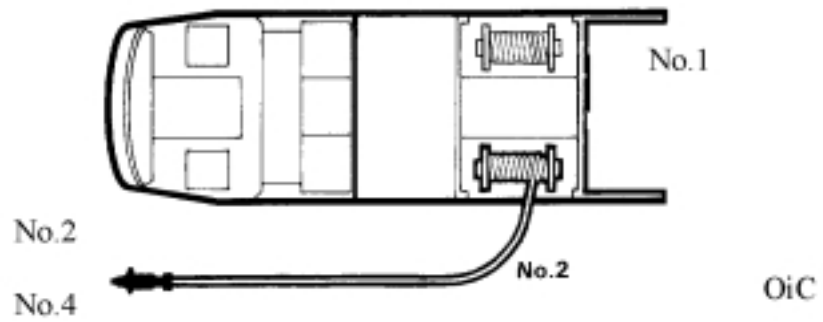
Diagram PD 1 (ii)
(Position with drill complete for crew of three)

No.1

No.2

No.4

OiC   No.3   No.5

Diagram PD 1 (iii)

No.3

No.3

No.5

No.2

No. 4

OiC
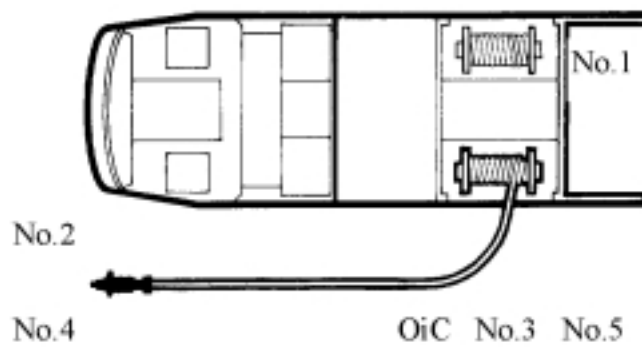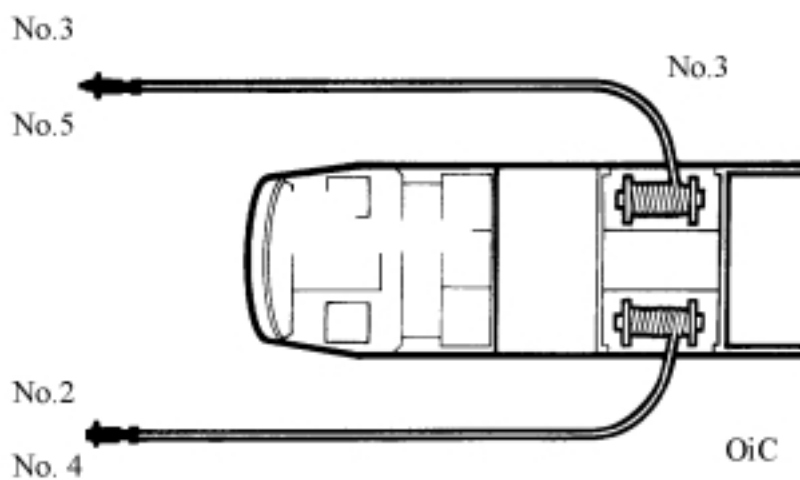
Diagram PD 1 (iv)
(Position with drill complete for crew of five)
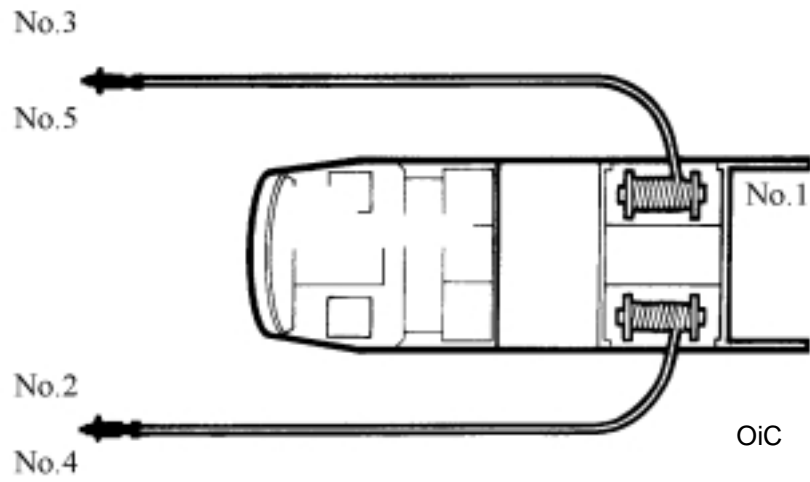
4.7.4 PD 2 : Hydrant - Main Pump - Hose Reel (Crew of Five)

4.7.4.1 Objectives

On completion of training, crew members will be able to :

- operate the main pump on an appliance, working from a hydrant;
- lay out a line of hose reel to a fire;
- hold and operate a hose reel branch;
- remove the blank cap on the pump and connect a collecting head;
- make down a water supply from a hydrant to the pump;
- carry a line of hose reel;
- disconnect and connect lengths of hose reel tubing; and
- disconnect and connect a hose reel branch.

4.7.4.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

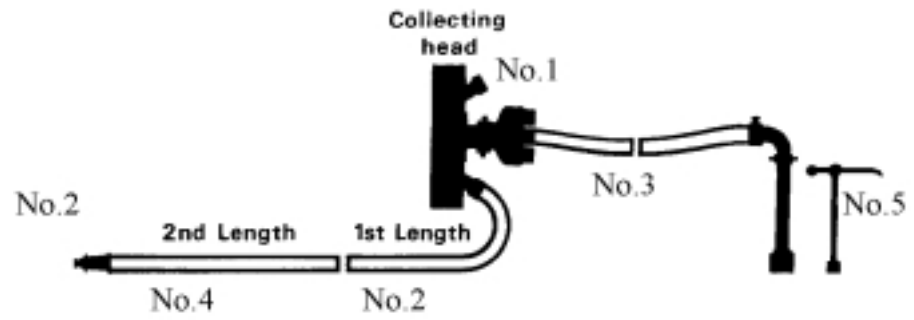|	
A	Number 1, the driver, operates the pump.
B	Number 2 unclips the hose reel and hands it to number 4 who takes it to the fire and operates the branch.
C	Number 2 unwinds sufficient quantity of hose from the reel and then backs up number 4 at the branch.
D	Number 5 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
E	Number 3 makes down hose line from hydrant to the pump.
F	When the hose is connected from the hydrant to the pump, number 1 gives the order 'Water on" to number 5.
G	Number 1, being the pump operator, stays in position at the pump, and number 5 at the hydrant.
H	Number 3 reports to the officer and assists as directed.

Diagram PD 2 (i)

Diagram PD 2 (ii)
(Position with drill complete)

No. 1

No.5

No.2

No.4

OiC   No.3
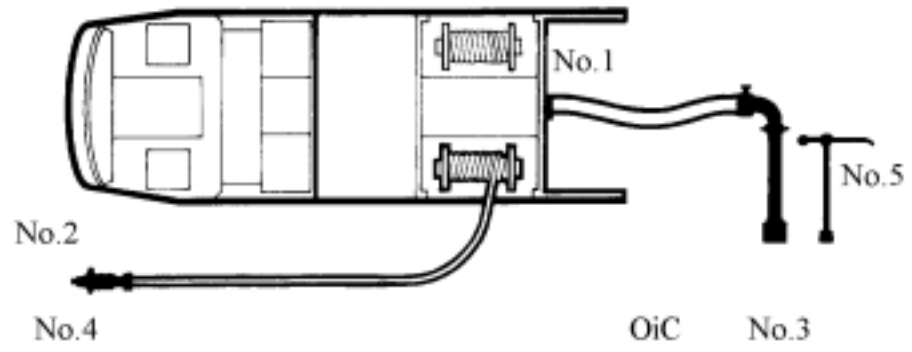
4.7.5 PD 3 : Hose Reel and One Line of Delivery Hose from Main Pump (Crew of Five)

4.7.5.1 Objectives

On completion of training, crew members will be able to :

- operate the main pump on an appliance, working initially from the water tank, and later from a hydrant;
- lay out a line of hose reel to a fire;
- hold and operate a hose reel branch;
- make down a line of delivery hose from a hydrant to the main pump;
- make down a line of delivery hose and branch from the main pump to a fire; and
- hold and operate a branch, working from the main pump.

4.7.5.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1, the driver, operates the pump.
B	Number 2 unclips the hose reel and hands it to number 4 who takes it to the fire and operates the branch.
C	Number 2 unwinds sufficient quantity of hose from the reel and then backs up number 4 at the branch.
D	Number 5 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
E	Number 3 makes down hose line from hydrant to the pump.
F	When the hose is connected from the hydrant to the pump, Number 1 gives the order "Water on" to Number 5.
G	Number 1, being the pump operator, stays in position at the pump, and Number 5 at the hydrant.
H	Number 3 reports to the officer and assists as directed.

It is now decided to provide a line of delivery hose to augment the hose reel.

| I	On the order "One Line of Delivery Hose Make Down", Number 3 makes down first length of delivery hose from pump.
J	Number 5 takes branch and second length of delivery hose, and makes down to fire.
K	Number 5 calls, or signals, for "Water on".
L	Number 3 backs up Number 5 on the branch.

Diagram PD 3 (i)
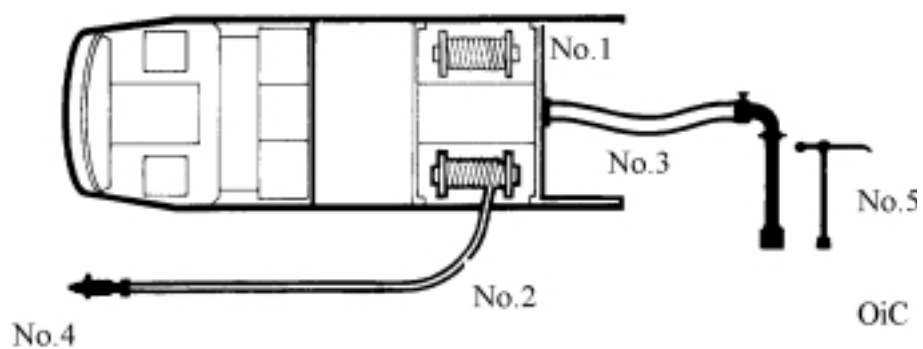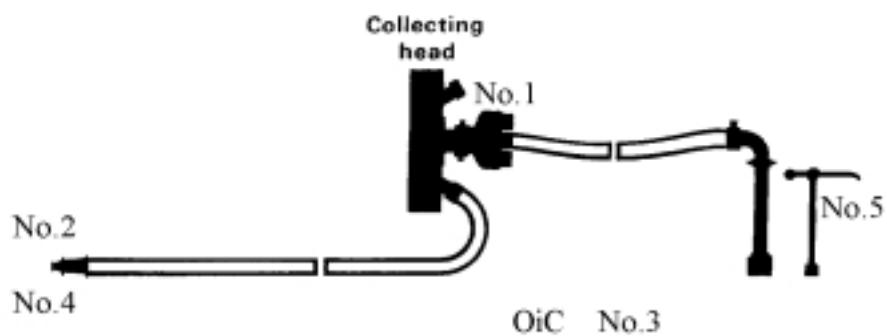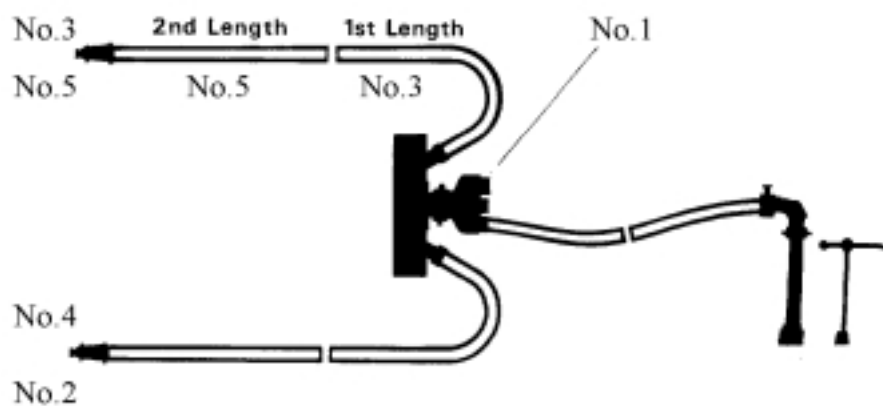

**Diagram PD 3 (ii)**
(Position with first part of drill complete)
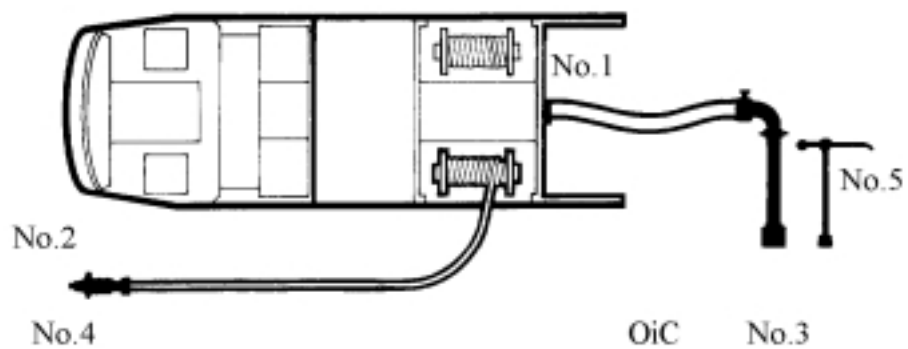
Diagram PD 3 (iii)
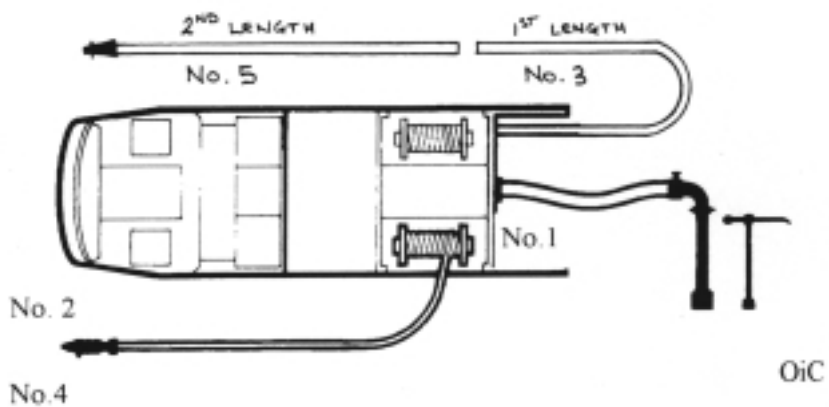
Diagram PD 3 (iv)
(Position with drill complete)
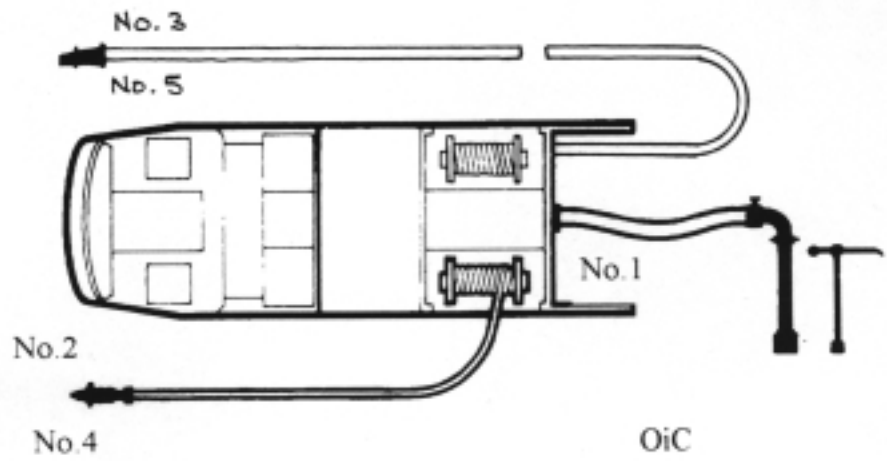
4.7.6 PD 4 : Hydrant - Main Pump - One Line of Delivery Hose (Crew of Five)

4.7.6.1 Objectives

On completion of training, crew members will be able to :

-       operate the main pump on an appliance, working from a hydrant;
-       make down a line of delivery hose and branch from the main pump to a fire;
-       make down a line of delivery hose from a hydrant to the main pump; and
-       hold and operate a branch, working from the main pump.

4.7.6.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1, the driver, operates the pump.
B	Number 2 makes down first length of delivery hose from pump.
C	Number 4 takes branch and second length of delivery hose and makes down to fire.
D	Number 4 calls, or signals, for 'Water on".
E	Number 2 backs up number 4 on the branch.
F	Number 5 makes down to hydrant with stand-pipe, key and bar, and flushes hydrant before connecting the hose.
G	Number 3 makes down hose line from the hydrant to the pump.
H	Number 1, being the pump operator, stays in position at the pump, and Number 5 at the hydrant.
I	Number 3 reports to the officer and assists as directed.

Diagram PD 4 (i)

Diagram PD 4 (ii)
(Positions with drill complete)
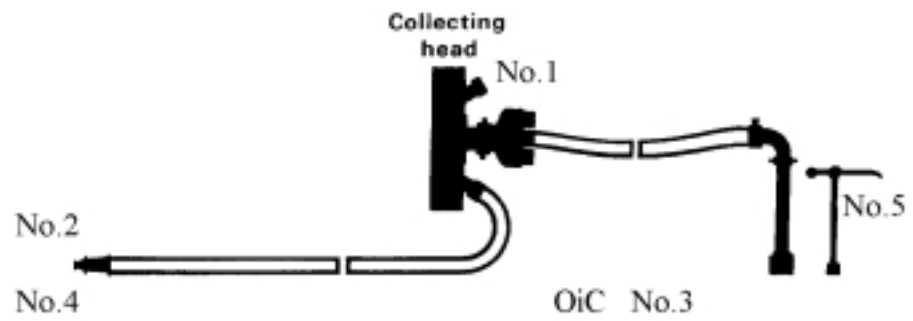
4.7.7 PD 5 : Hydrant - Main Pump - Second Line of Delivery Hose (Crew of Five)

4.7.7.1 Objectives

On completion of training, crew members will be able to :

-       operate the main pump on an appliance, working from a hydrant;

-       make down a line of delivery hose and branch from the main pump to a fire;

-       make down a line of delivery hose from a hydrant to the main pump;

-       hold and operate a branch, working from the main pump.

4.7.7.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

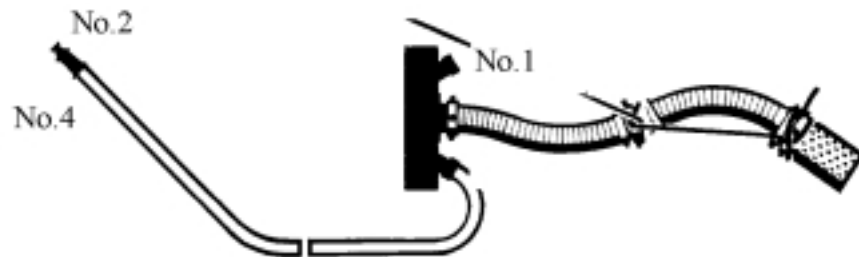| A	Number 1, the driver, operates the pump.
B	Number 2 makes down first length of delivery hose from pump.
C	Number 4 takes branch and second length of delivery hose and makes down to fire.
D	Number 4 calls, or signals, for 'Water on".
E	Number 2 backs up number 4 on the branch.
F	Number 5 makes down to the hydrant with stand-pipe, key and bar, and flushes the hydrant before connecting the hose.
G	Number 3 makes down hose line from the hydrant to the pump.
H	Number 1, being the pump operator, stays in position at the pump, and Number 5 at the hydrant.
I	Number 3 reports to the officer and assists as directed.

It is now decided to provide a second line of delivery hose to augment the first.

| J	On the order "Second Line of Delivery Hose Make Down", Number 3 makes down the first length of delivery hose from pump.
K	Number 5 takes branch and second length of delivery hose and makes down to fire.
L	Number 5 calls, or signals, for "Water on".
M	Number 3 backs up Number 5 on the branch.

Diagram PD 5 (i)
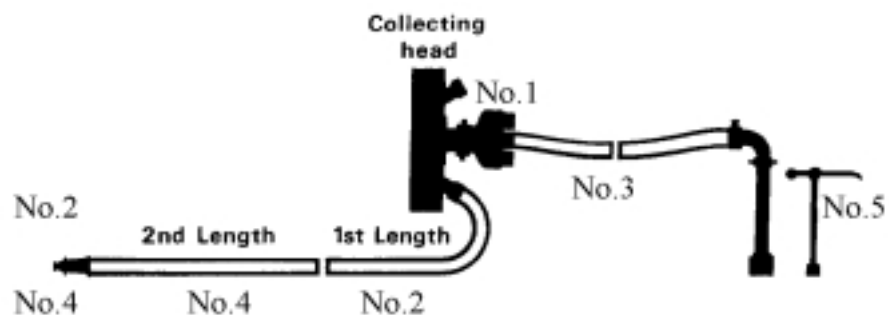
Diagram PD 5 (ii)
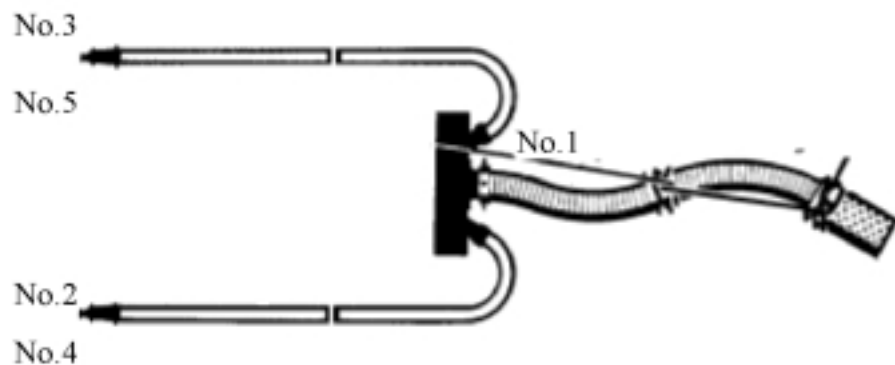## (Positions with first part of drill complete)

Diagram PD 5 (iii)
(Positions with drill complete)

Diagram PD 5 (iv)
(Positions with drill complete)
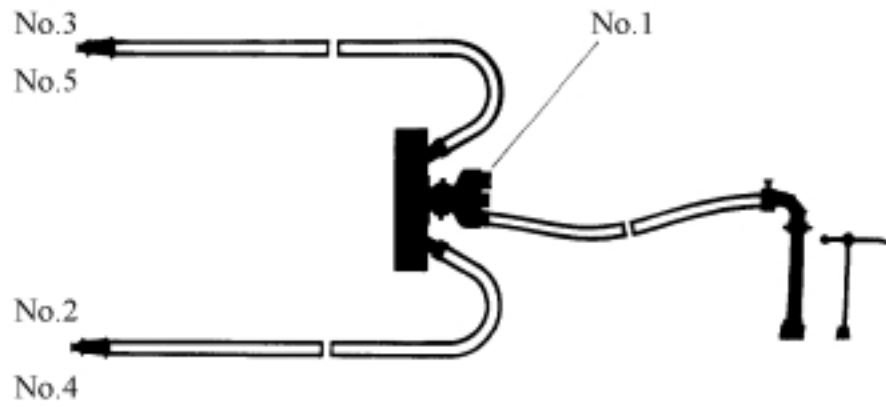
4.7.8   PD 6 : Open Source - Main Pump - One Line of Delivery Hose (Crew of Five)

4.7.8.1   Objectives

On completion of training, crew members will be able to :

- connect lengths of hard suction hose together;

- connect a line of hard suction hose to the main pump;

- connect suction strainer and basket strainer to a line of hard suction;

- secure a line of hard suction hose and strainer using lines;

- submerge a line of hard suction hose;

- operate the main pump on an appliance, working from an open source;

- make down a line of delivery hose and branch from the main pump to a fire; and

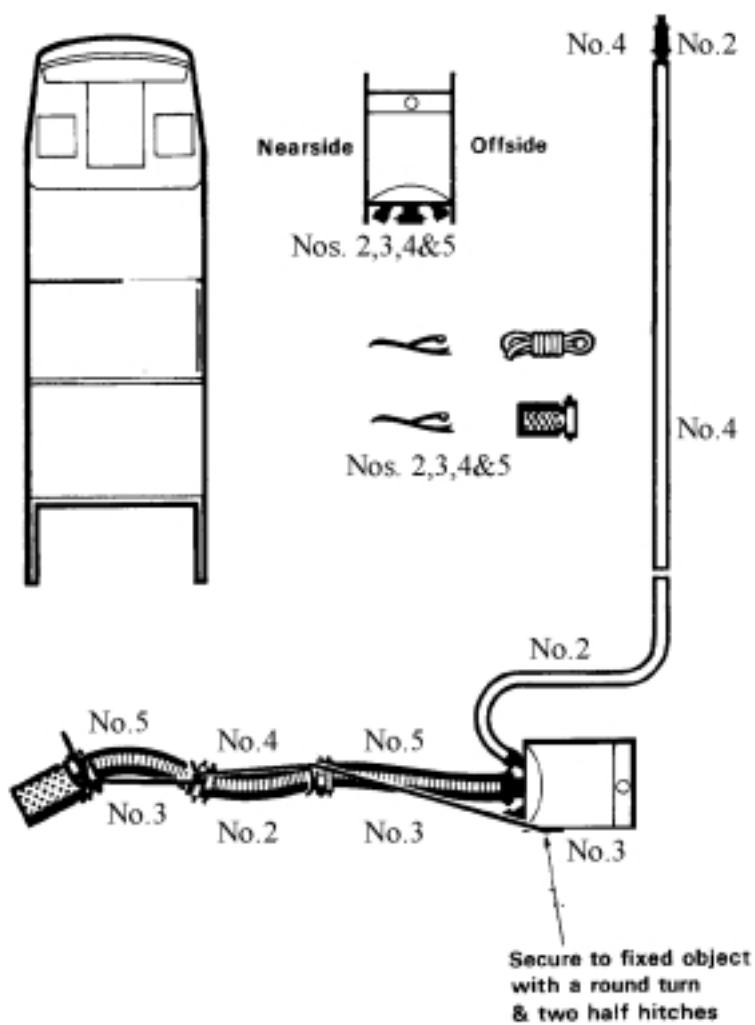- hold and operate a branch, working from the main pump.

4.7.8.2   Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

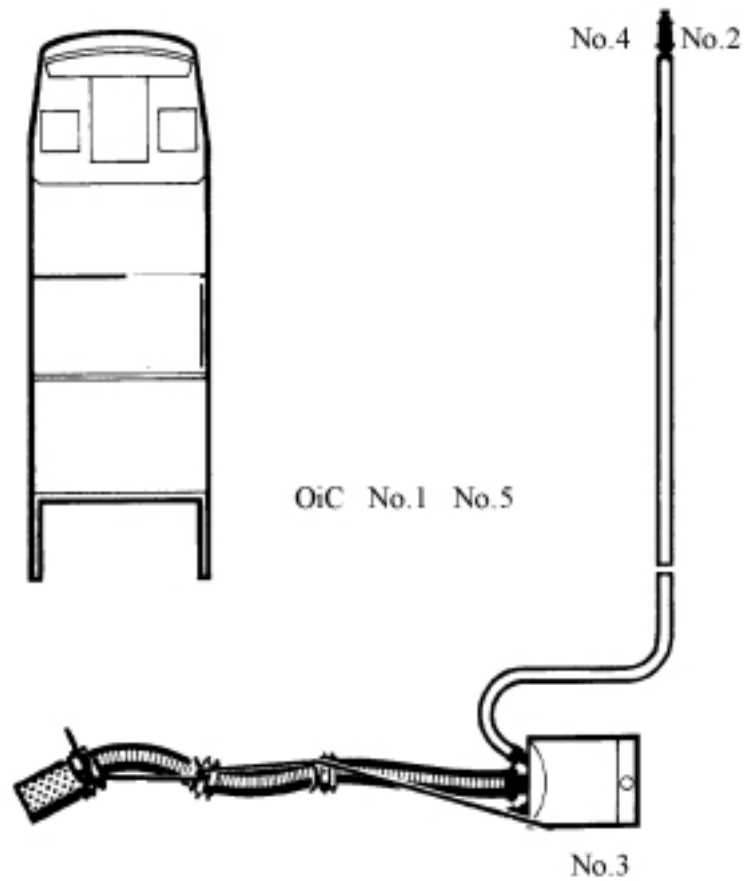| A	Number 1, the driver, operates the pump, collects basket, strainer, suction keys and drop line, and places them in position.
B	Numbers 3 and 5 make down the first length of suction hose to the pump inlet.
C	Numbers 2 and 4 make down the second length of suction hose.
D	Numbers 3 and 5 make down the third length of suction hose, and connect strainer and basket.

Note : (i) If an even number of suctions are required, Nos. 2 and 4 take the first length, Nos. 3 and 5 the second etc.

(ii) If an odd number of suctions are required, Nos. 3 and 5 take the first length, Nos. 2 and 4 the second etc.

E	Numbers 3 and 5 tighten suction joints, attach drop line and lower suctions to source.
F	Number 2 makes down first length of delivery hose from pump.
G	Number 4 takes branch and second length of delivery hose and makes down to fire.
H	Number 4 calls or signals, for 'Water on '.
I	Number 2 backs up Number 4 on the branch.
J	Numbers 3 and 5 report to the officer and assist as directed.

It is now decided to provide a second line of delivery hose to augment the first.

K	On the order ' Second Line of Delivery Hose Make Down", Number 3 makes down first length of delivery hose from pump.
L	Number 5 takes branch and second length of delivery hose and makes down to fire.
M	Number 5 calls, or signals, for "Water on".
N	Number 3 backs up Number 5 on the branch.

Diagram PD 6 (i)
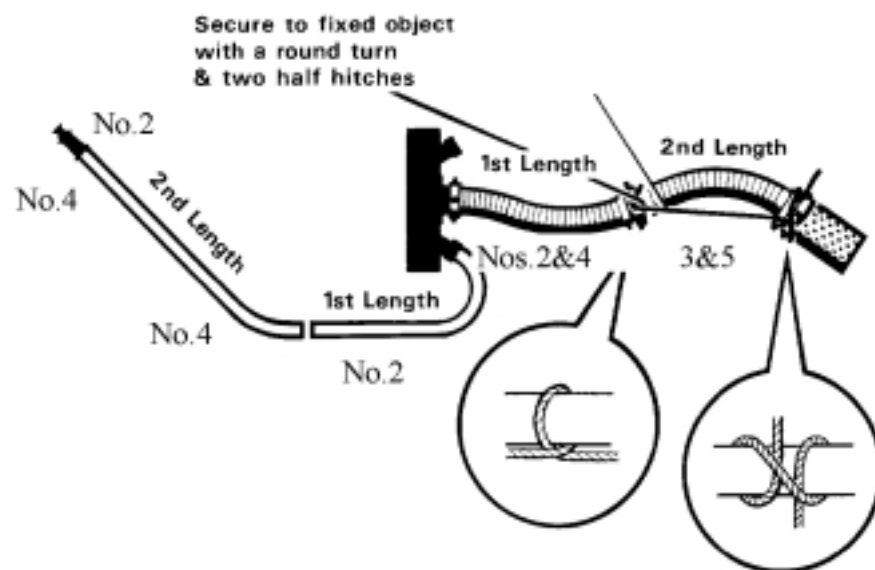
Diagram PD 6 (ii)
(Positions with first part of drill complete)

No.2

No.4

No.1

OiC   No.3   No.5

Diagram PD 6 (iii)

No.3

2nd Length   1st Length

No.5   No.5   No.3

No.1

No.2

No.4
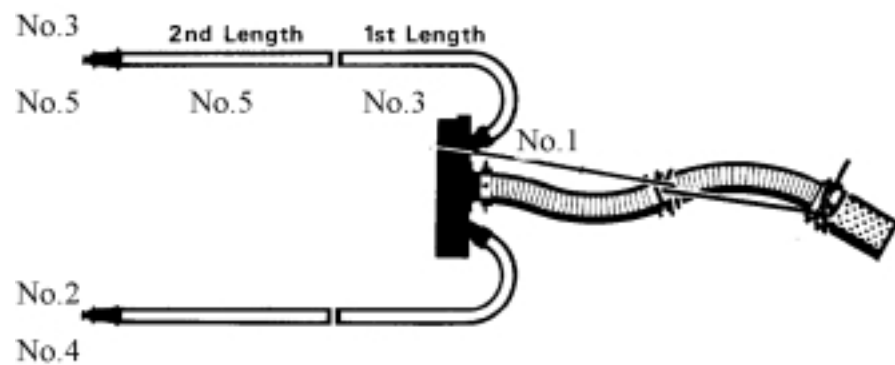
Diagram PD 6 (iv)
(Positions with drill complete)

No.3

No.5

No.1

No.2

No.4

4.7.9 PD 7 : Portable Pump (Open Source to Fire) (Crew of Five)

4.7.9.1 Objectives

On completion of training, crew members will be able to :

- carry a portable pump;
- site a portable pump;
- connect a line of hard suction hose to the portable pump;
- connect suction strainer and basket strainer to a line of hard suction;
- secure a line of hard suction hose and strainer using lines;
- submerge a line of hard suction hose;
- operate the portable pump, working from an open source;
- make down a line of delivery hose and branch from the portable pump to a fire; and
- hold and operate a branch, working from a portable pump.

4.7.9.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 3 operates the portable pump.
B	Number 4 opens the locker door.
C	Numbers 4 and 5 pull out the portable pump.
D	Numbers 2 and 3 step in behind Numbers 4 and 5.
E	Number 1 takes out basket, strainer, suction hose, suction keys and drop line and places them beside the appliance.
F	Numbers 2,3,4 and 5 carry portable pump to open source.
G	Numbers 2,3,4 and 5 collect basket, strainer, suction hose, suction keys and drop line and bring them to portable pump.

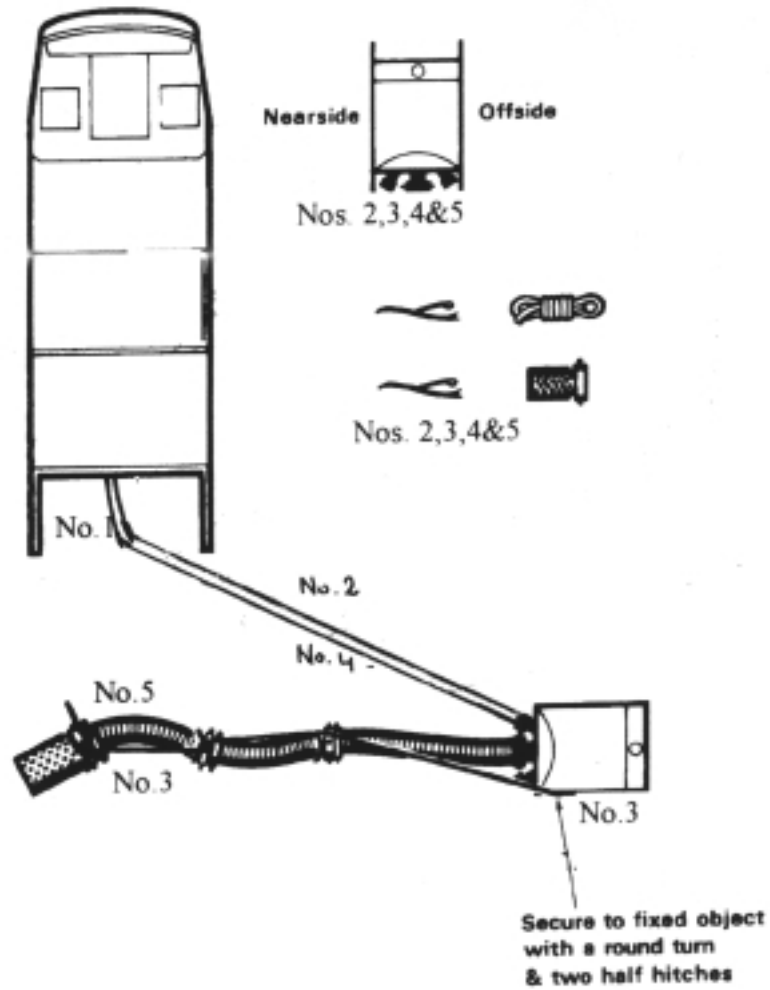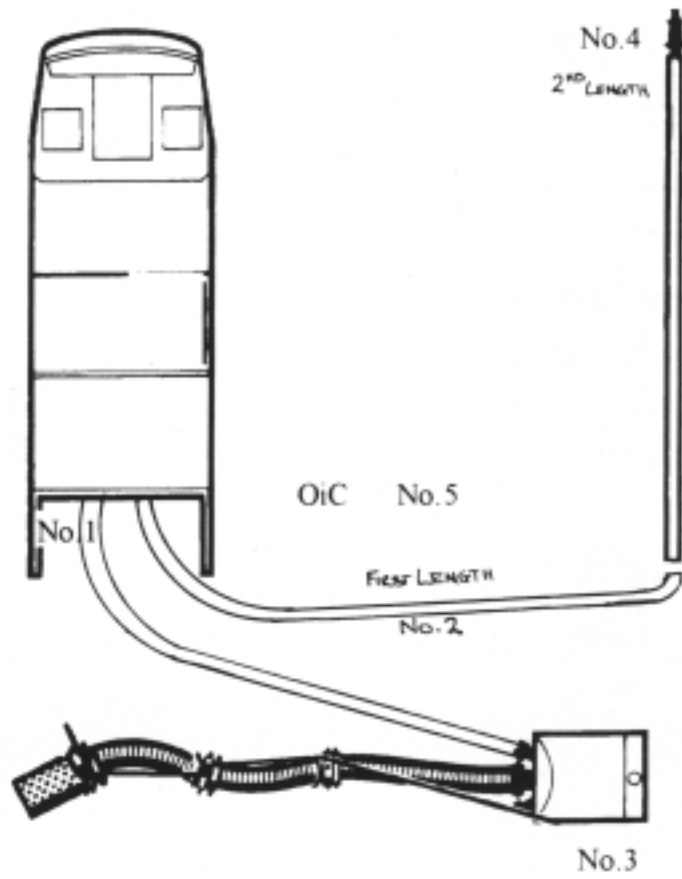|	
H	Numbers 3 and 5 make down the first length of suction hose to the pump inlet.
I	Numbers 2 and 4 make down the second length of suction hose.
J	Numbers 3 and 5 make down the third length of suction hose, and connect strainer and basket.
K	Numbers 3 and 5 tighten suction joints, attach drop line and lower suction to source - See Diagram PD 7 (i).
L	Number 2 makes down the first length of delivery hose from the pump.
M	Number 4 takes the branch and second length of delivery hose and makes down to the fire.
N	Number 4 calls, or signals, for 'Water on".
O	Number 2 backs up Number 4 on the branch.
P	Number 5 reports to the officer and assists as directed.

Diagram PD 7 (i)
(Positions with drill complete)

Nearside | Offside

Nos. 2,3,4&5

Nos. 2,3,4&5

No.4   No.2

No.4

No.2

No.5   No.4   No.5

No.3   No.2   No.3

No.3

Secure to fixed object
with a round turn
& two half hitches

Diagram PD 7 (ii)
(Positions with drill complete)

No.4   No.2

OiC   No.1   No.5

No.3

4.7.10 PD 8 : Portable Pump (Closed Relay) (Crew of Five)

4.7.10.1 Objectives

On completion of training, crew members will be able to :

-       carry a portable pump;

-       site a portable pump;

-       connect a line of hard suction hose to the portable pump;

-       connect suction strainer and basket strainer to a line of hard suction;

-       secure a line of hard suction hose and strainer using lines;
-       submerge a line of hard suction hose;

-       operate the portable pump, working from an open source;

-       make down a line of delivery hose from the portable pump to the main pump;

-       operate the main pump, working from the portable pump;

-       make down a line of delivery hose and branch from the main pump to a fire; and

-       hold and operate a branch, working from the main pump.

4.7.10.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1, the driver, operates the main pump. Number 3 operates the portable pump.
B	Number 4 opens the locker door.
C	Numbers 4 and 5 pull out the portable pump.
D	Numbers 2 and 3 step in behind numbers 4 and 5.
E	Number 1 takes out the basket, strainer, suction hose, suction keys and drop line and places them beside the appliance.
F	Numbers 2,3,4 and 5 carry the portable pump to open source.
G	Numbers 2,3,4 and 5 then return to main pump.
H	Numbers 3 and 5 collect basket, strainer, suction hose, suction keys and drop line, and make down portable pump to open source.
I	Numbers 2 and 4 make down a delivery line from portable pump to main pump.
J	Number 2 makes down first length of delivery hose from main pump.

K	Number 4 takes branch and second length of delivery hose and makes down to fire.
L	Number 4 calls, or signals, for "Water on".
M	Number 2 backs up Number 4 on the branch.
N	Number 5 reports to the officer and assists as directed.

Diagram PD 8 (i)

Nearside   Offside

Nos. 2,3,4&5

Nos. 2,3,4&5

No. 1

No. 2

No. 4

No. 5

No. 3

No. 3

Secure to fixed object
with a round turn
& two half hitches

Diagram PD 8 (ii)

No.4

2ND LENGTH

OiC   No.5

No.1

FIRST LENGTH

No.2

No.3

Diagram PD 8 (iii)
(Positions with drill complete)

No.4   No.2

OiC   No.5

No.1

No.3
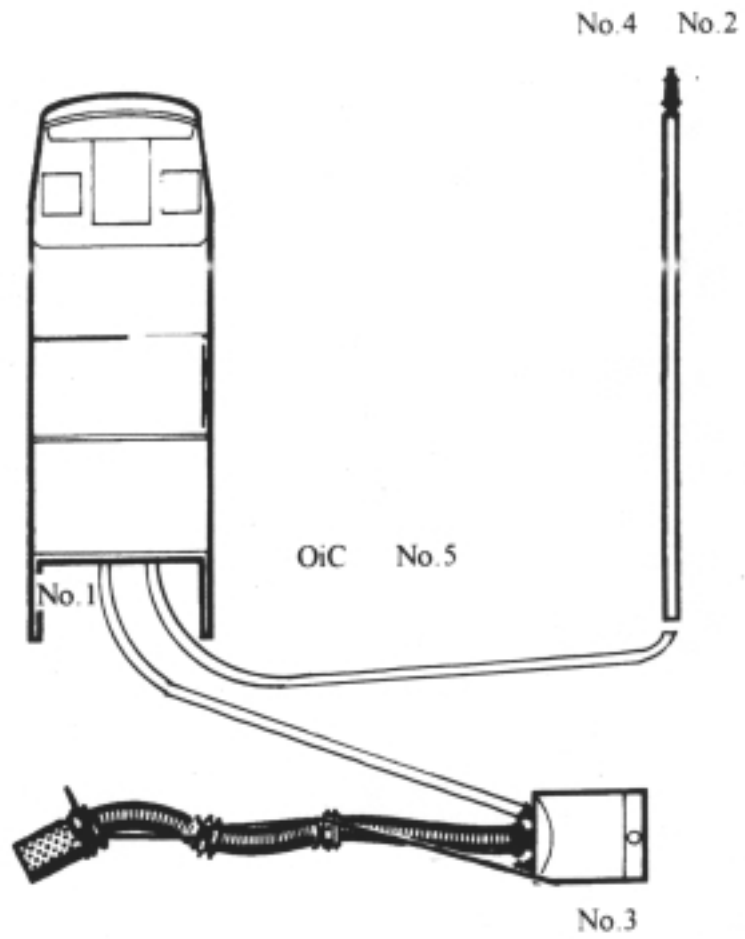
4.8   Ladder Drills

This section covers the following ladder drills :

-        LD 1 : Slipping or Pitching a 9 or 10.5 metre Extension Ladder (Crew of Three);

-        LD 2 : One Line of Hose Reel or Delivery Hose up a 9 or 10.5 metre Extension Ladder (Combined with LD1) (Crew of Five);

-        LD 3 : Slipping and Pitching a 13.5 metre Extension Ladder (Crew of Four);

-        LD 4 : Slipping and Pitching a 13.5 metre Extension Ladder in a Confined Space (Crew of Four); and

-        LD 5 : One Line of Delivery up an Extension Ladder (Combined with LD3 or LD4) (Crew of Five).

4.8.1   Pre-Requisite Proficiency

Crews should be proficient in handling all items of equipment involved in pump drills before carrying out LD 2 or LD 5.

4.8.2   Objectives

On completion of training in ladder drills, crews should be able to carry out all of the ladder drills without error. Crew members should be capable of carrying out all of the crew roles and should be capable of operating effectively as part of a team.

4.8.3   Safety Procedures for Ladder Drills

The following points must be adhered to in order to ensure maximum safety when operating with extension ladders :

(i)	All safety procedures as set out in paragraph 4.1.2 should be followed.
(ii)	A ladder should, as far as circumstances permit, be pitched to the right hand side of a window or other opening with, where possible, three rounds above the sill.
(iii)	When a ladder is pitched and extended the pawls must be properly engaged with the rounds in line and the heel correctly footed or manned before any attempt is made to climb or descend.
(iv)	When climbing or descending a ladder the arms should be kept reasonably straight, thus forcing the body well away from the ladder, the hands should grasp the rounds with thumbs on the underside. The strings should only be grasped when a ladder is bridged at a low angle, or whilst using the cradle-carry rescue technique.
(v)	When stepping off a ladder personnel should ascend to the level of, or to the round above, the parapet or window sill before stepping off with the outside foot, i.e. with the left foot if to the left, or with the right foot if to the right.
(vi)	When getting out of a window or from a parapet and stepping up on to a ladder pitched to the right, the head iron or a convenient round should be grasped from the rear underside with the left hand uppermost. The right foot should be placed on the round above the sill or parapet. At the same time the top of a round should be grasped with the right hand until the left hand has been removed and is grasping a convenient round (from the front). At no time should both hands be off the ladder and never should a step down be made on to a ladder except as outlined in paragraph 4.8.11.
(vii)	In all "Live Rescue" drills, safety harnesses should be used.
(viii)	When moving from one ladder to another, either climbing or descending, the nearest foot must always be placed on the ladder first, then the nearest hand, followed by the other hand and then the other foot.

(ix)	It may not always be possible to stand on a window sill to commence a carry-down, either because the height of the window opening is insufficient or because there are no convenient objects such as steps available to assist. In these circumstances the straddle method should be used, see paragraph 4.8.11.
(x)	When ascending or descending, particularly in carrying down, hands and feet should be moved in unison, i.e. right hand, right foot, left hand, left foot, and so on.
(xi)	As the overlap of extensions is reached during the descent, the warning "Step in" or "Step out" should be given, according to the type of ladder.
(xii)	On descent when the feet and one round above the pawls the warning "Pawls" should be given.
(xiii)	When working on a ladder and it is necessary to use both hands, a leg lock should always be taken particularly prior to "Water on" being ordered when working with a branch. (Caution : before the order "Water on" is given to a pump operator, the person on the ladder should ensure that he is correctly and safely positioned. Before water is delivered, care should be taken by the pump operator that persons on ladders are in safe positions).
(xiv)	The officer in charge of ladder drills is required to judge if special precautions are necessary due to inclement weather conditions.
(xv)	Before placing the heel of an extension ladder on the ground, prior to under-running ensure that the correct side of the ladder is uppermost and the ladder heel is firmly positioned. It is essential that both crew members remain in close contact until they have completed under-running, particularly when handling the heavier 13.5m ladder.
(xvi)	When a ladder is pitched the ideal distance of the heel of the ladder from the base of the building is approximately one-third of the working height of the ladder.

(xvii)	Before an extension ladder is extended it should be stable with the heel of each string or the jack pads steady on the ground.
(xviii)	While a ladder is being extended or housed (three crew members), each string should be steadied with the hand nearest the building reaching up and with the hand away from the building reaching down. The foot farthest from the building should be placed at the heel of the ladder. Feet must never be placed on the rounds when extending or lowering.
(xix)	Extension ladders must always be held in such a manner that fingers will not be trapped by the extending sections and fingers kept outside the strings, away from mounting guide brackets. when handles are fitted for this purpose, they should be used.
(xx)	When an extension ladder is being extended, the line must be pulled in to as vertical a position as possible, with the hands as close to the ladder as the rounds permit.
(xxi)	When an extension ladder is being extended, any tendency of the pull on the extending line to cause the ladder to tilt should be resisted, but a ladder should always be slightly inclined towards the building while it is being extended, and should never be allowed to lean away from the building. If at any time an officer in charge of a drill considers that the crew are losing control he should order "Head in". Each member of the crew should then strive to place the head of the ladder against the building to obtain some measure of stability.
(xxii)	When an extension ladder has been extended, manual pawls must be tripped by placing the arm around the string and not through the ladder.
(xxiii)	When an extension ladder is being housed, the extending line must be paid out hand under hand, and must not be allowed to slide through the palms of the hand.
(xxiv)	When an extension ladder is housed, the pawls should rest on the bottom or second round as appropriate.

(xxv)	The head of an extension ladder should only be secured when necessary, e.g. in high winds or when it is certain that it will not be required elsewhere. In a drill yard surrounded by buildings, care should be taken to assess the effects of the wind upon the head of the ladder when it is raised above roof level.
(xxv1)	When it is necessary to lower a ladder, the sections of the ladder should be lashed together at each end of the overlap. A guyline should be secured to each string of the ladder above the first round, and the heel should be lowered first. And
(xxvii)	When one crew member has to "foot" an extension ladder, the right foot should be placed on the lowest round. With the left leg well back, grasp both strings and press on the ladder. Where two crew members are available each should place the inner foot on the lowest round, brace the outer foot well back, grasp a string and press on the ladder.

When operating with a 13.5 metre ladder :

(i)	When a 13.5m ladder is being under-run, the maximum thrust or pull should be exerted at the head when the props are in line with the strings.
(ii)	Plumbing should be carried out after the ladder has been under-run and before it is extended. Final adjustments may be made after the ladder has been extended, and the head is resting on the building.
(iii)	When the ladder is pitched and ready for work, the jacks should be in such a position that the full weight of the ladder is on the jacks.
(iv)	During extending and housing it is essential that weight is evenly maintained on the jacks.
(v)	When footing, the jack beam is to be considered as the bottom round of the ladder. However when the extensions are not resting on the pawls (i.e. when extending or lowering) the ladder should be footed by the straddle method with the feet resting on the jack beam outside the strings of the main ladder. Exceptionally, the outside feet are used when lowering the head of the ladder into the building.
(vi)	Normally, the 13.5m ladder should be climbed at a steady pace. On occasions when rapid climbing is required or unstable conditions prevail, the props should be manned to control and restrain excessive movement of the ladder. After each ascent or descent the position of the props should be checked to ensure that the ladder remains stable.

4.8.4   LD 1 : Slipping or Pitching a 9 or 10.5 metre Extension Ladder (Crew of Three)

4.8.4.1   Objectives

On completion of training, crew members will be able to :

- operate the mechanism used to secure the ladder to the appliance;

- slip the ladder from the appliance;
- carry and position the ladder;
- pitch the ladder;
- give the appropriate words of command;
- under-run the ladder;
- brace the ladder;
- extend the ladder;
- pawl the ladder;
- foot the ladder;
- climb and descend the ladder;
- take a leg lock on the ladder;
- step off the ladder;
- step onto the ladder;
- make up the ladder; and
- stow the ladder securely on the appliance.

4.8.4.2   Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 2 and/or Number 5 releases the fastenings, and Number 2 gives the order "Slip"
B	Number 3 grips the heel of the ladder and assisted by Numbers 2 and 5 at the rear of the appliance, slips it backwards until the head of the ladder is within a distance of about two rounds from the gantry.
C	Numbers 2 and 5 lift the ladder clear of the appliance, and **rest it at shoulder level.**
D	Numbers 2 and 5 at the head, to the fore, and Number 3 at the heel, to the rear, carry the ladder to the required position.
E	Number 3 makes certain that the correct side of the ladder faces the building, and then places the heel of the ladder on the ground. Note : in a confined space it may be necessary to place the ladder parallel to the building, under-run it, and turn it so that the correct side of the ladder faces the building.

F	Number 3 places both feet on the bottom round and pulls with hands on a higher round, and numbers 2 and 5 under-run the ladder to the vertical position with both arms fully extended and working closely together.
G	Numbers 2 and 5 steady the ladder.
H	Number 3 doubles to the front and extends the ladder to the required height by means of the line, and engages the pawls by placing an arm around the outside of the strings and pulling on the line. Caution : under no circumstances should the hand be passed between the rounds to engage the pawls. Note : in ladder drills involving aluminium ladders, Number 3 remains inside the ladder, back to the building, extends the ladder to the required height and engages the pawls.
I	Numbers 2 and 5 gently lower the head of the ladder into the window or against the building.
J	Numbers 2 and 5, directed by Number 3 adjust the heel of the ladder to give a safe working angle (distance from the base of the building to be approximately one third working height of the ladder).
K	Number 3 remains at the foot of the ladder.

Diagram LD 1

4.8.5 LD 2 : One Line of Hose Reel or Delivery Hose up a 9 or 10.5 metre Extension Ladder (Combined with LD1) (Crew of Five)

4.8.5.1 Objectives

In addition to the objectives of LD1, on completion of training, crew members will be able to :

- operate the main pump on an appliance, working from a hydrant;
- lay out a line of hose reel or delivery hose (and branch) from the main pump to the foot of the ladder;
- make down a water supply from a hydrant to the main pump;
- climb and descend the ladder, carrying the hose reel or delivery hose;
- use a hose sling (becket) to support the weight of delivery hose;
- hold and operate a branch, working from the ladder; and
- charge the hose reel or delivery hose at the correct time.

4.8.5.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Simultaneous with LD1 being carried out, Numbers 1 and 4 make down hose reel, or one line of delivery hose terminating in a hand controlled branch, as required, and flake sufficient hose at the bottom of the ladder to enable the hose to be carried up the ladder and into the building, if required.
B	Number 3 remains at the foot of the ladder.
C	Number 1, the driver, returns to position as pump operator.
D	Number 4 climbs the ladder with the delivery hose under the right arm, draped over the left shoulder - (hose reel hose once over) - with the branch to the rear.
E	Number 2 follows Number 4 placing a hose sling (hose becket) on the round below the sill or parapet, and backs Number 4 on the branch. Note : if the drill being carried out is to fight the fire from the ladder Number 4 makes a leg lock, Number 2 places the hose sling (hose becket) in the round below the foot of Number 4, returns to the heel of the ladder and assists Number 4 as required.
F	Number 5 makes down standpipe and line from hydrant to pump.
G	Number 1, the driver, operates the pump and assists Number 5 where necessary.
H	Number 4, when correctly positioned, calls, or signals, "Water on". Caution : under no circumstances should the hose be charged prior to Number 4 calling or signalling "Water on". Make-up : on the order "Make-up" Numbers 2, 3 and 5 return to and make up the ladder and then assist in the making up of all other equipment.

4.8.6 LD 3 : Slipping and Pitching a 13.5 metre Extension Ladder (Crew of Four)

4.8.6.1 Objectives

On completion of training, crew members will be able to :

- operate the mechanism used to secure the ladder to the appliance;
- slip the ladder from the appliance;
- carry and position the ladder;
- pitch the ladder;
- give the appropriate words of command;
- under-run the ladder, using the props;
- brace the ladder, using the props;
- plumb the ladder;
- extend the ladder,;
- pawl the ladder;
- foot the ladder;
- use the props to place the head into the building;
- climb and descend the ladder;
- take a leg lock on the ladder
- step off the ladder;
- step onto the ladder;
- make up the ladder; and
- stow the ladder securely on the appliance.

4.8.6.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Numbers 4 and 5 release the fastenings, and Number 4 gives the order "Slip".
B	Numbers 2 and 3 grip the heel of the ladder and, assisted by Numbers 4 and 5 at the rear of and facing the appliance, slip it backwards until the head of the ladder is within a distance of about two rounds of the gantry.
C	Numbers 4 and 5 lift the ladder clear of the appliance.
D	Numbers 2 and 3 at the heel, to the rear, and Numbers 4 and 5 at the head, to the fore, carry the ladder to the required position at right angles to the face of the building.
E	Numbers 2 and 3 place the heel of the ladder on the ground, having first made certain that the correct side of the ladder faces the building.
F	Numbers 2 and 3 release the props from the clips, then, with their inside foot on the jack beam outside the strings and with the props on the outer side of the body, pull on them by throwing their weight backwards as Numbers 4 and 5 underrun the ladder.
G	Numbers 2 and 3 continue to support the heel until the ladder has reached the vertical position. Then, ensuring that the ladder is footed at all times, Numbers 4 and 5 take over the footing of the ladder from Numbers 2 and 3 with their outside feet.
H	Numbers 2 and 3 rest the props on the ground between the ladder and the building, the props in line with each other and in line with the strings. Note : if it is necessary to plumb the ladder, Number 4 gives the order to Number 5 "Plumb to the Left" or "Plumb to the Right" and Number 5 plumbs the ladder by adjusting the appropriate jack. Number 4 gives the order "Well" when the ladder is plumbed.

I	Number 2 steadies the props and Number 4 steadies the ladder from the front, by straddling the base of the ladder with both feet on the jack beam one outside each of the strings.
J	Numbers 3 and 5 at the rear extend the ladder to the required height by hauling on the line. Number 4 gives the order "Well" followed by "Lower", and Number 5 lowers the extension slightly to engage the pawls.
K	Numbers 2 and 3 then lift the props and, assisted by Numbers 4 and 5 at the heel of the ladder, lower the head of the ladder into the window or against the building.
L	Numbers 2 and 3 place the props on the ground.
M	Number 5 checks whether the ladder is properly plumbed and readjusts if necessary.
N	Number 3 remains at the foot of the ladder.

Diagram LD 3
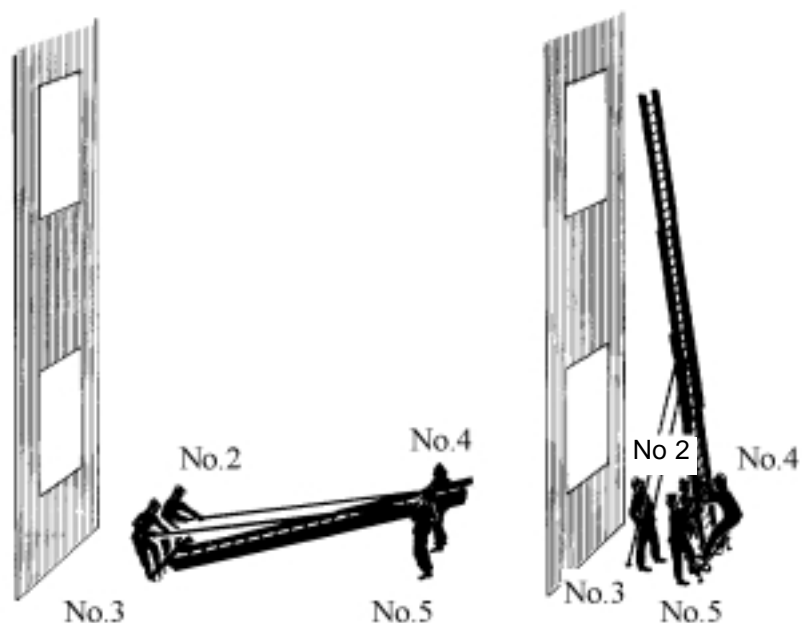
4.8.7 LD 4 : Slipping and Pitching a 13.5 metre Extension Ladder in a Confined Space (Crew of Four)

4.8.7.1 Objectives

On completion of training, crew members will be able to :

- operate the mechanism used to secure the ladder to the appliance;
- slip the ladder from the appliance;
- carry and position the ladder;
- pitch the ladder;
- give the appropriate words of command;
- under-run the ladder, using the props;
- brace the ladder, using the props;
- tilt and turn the ladder;
- plumb the ladder;
- extend the ladder;
- pawl the ladder;
- foot the ladder;
- use the props to place the head into the building;
- climb and descend the ladder;
- take a leg lock on the ladder;
- step off the ladder;
- step onto the ladder;
- make up the ladder; and
- stow the ladder securely on the appliance.

4.8.7.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Numbers 4 and 5 release the fastenings, and Number 4 gives the order "Slip"
B	Numbers 2 and 3 grip the heel of the ladder and assisted by Numbers 4 and 5 at the rear of and facing the appliance slip it backwards until the head of the ladder is within a distance of about two rounds from the gantry.
C	Numbers 4 and 5 lift the ladder clear of the appliance.
D	Numbers 2 and 3 at the heel, to the rear, and Number 4 and 5 at the head, to the fore, carry the ladder to the required position parallel to the face of the building.
E	Numbers 2 and 3 place the heel of the ladder on the ground, having first made certain that the correct side of the ladder is uppermost.
F	Numbers 2 and 3 release the props from the clips, then with their inside foot on the jack beam outside the strings and with the props on the outer side of the body, pull on them by throwing their weight backwards as Numbers 4 and 5 underrun the ladder.
G	Numbers 2 and 3 continue to support the heel until the ladder has reached the vertical position.
H	Numbers 4 and 5 grasping the strings, and Numbers 2 and 3 grasping the props, Number 4 gives the order "Tilt Number 2" or "Tilt Number 3" as appropriate (the crew member nearest the building). The nominated crew member moves to a position slightly out of line with the strings, back to the face of the building, and gently pushes upwards on the prop, tilting so that the ladder pivots on the spur or jack at the base of the far away string with Numbers 4 or 5 as appropriate (the crew member furthest from the building) standing on the jack beam and grasping the strings.

I	Numbers 4 or 5 as appropriate (the crew member nearest the building) turns the ladder to face the building. As the ladder is being turned, the "tilt" is maintained by Numbers 2 and 3 on the props, initially by the crew member at the face of the building and secondly by the crew member on the other prop.
J	Number 2 or Number 3, as appropriate, changes position as required, to join the crew member already at the face of the building.
K	Numbers 4 and 5 take over the footing with their outside feet.
L	Numbers 2 and 3 rest the props on the ground between the ladder and the building the props in line with each other and in line with the strings. Note : if it is necessary to plumb the ladder, Number 4 gives the order to Number 5 "Plumb to the Left" or "Plumb to the Right" and Number 5 plumbs the ladder by adjusting the appropriate jack. Number 4 gives the order "Well" when the ladder is plumbed.
M	Number 2 steadies the props and Number 4 steadies the ladder from the front, by placing both feet on the jack beam.
N	Numbers 3 and 5 at the rear extend the ladder to the required height by hauling on the line. Number 4 gives the order "Well" followed by "Lower", and Number 5 lowers the extension slightly to engage the pawls.
O	Numbers 2 and 3 then lift the props and, assisted by Numbers 4 and 5 at the heel of the ladder, lower the head of the ladder into the window or against the building.
P	Numbers 2 and 3 place the props on the ground.
Q	Number 5 checks whether the ladder is properly plumbed and readjusts if necessary.
R	Number 3 remains at the foot of the ladder.

Diagram LD 4 (i)

No.2

No.4

No.3

No.5

Diagram LD 4 (ii)

No.5

No.3

No 4

No.2

Diagram LD 4 (iii)

No.4

No.2

No.5

No.3

Diagram LD 4 (iv)

Diagram LD 4 (v)
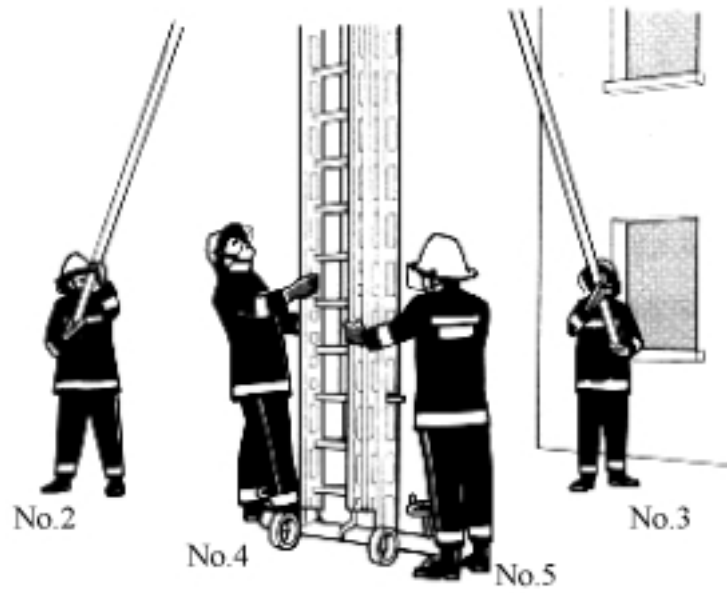
Diagram LD 4 (vi)
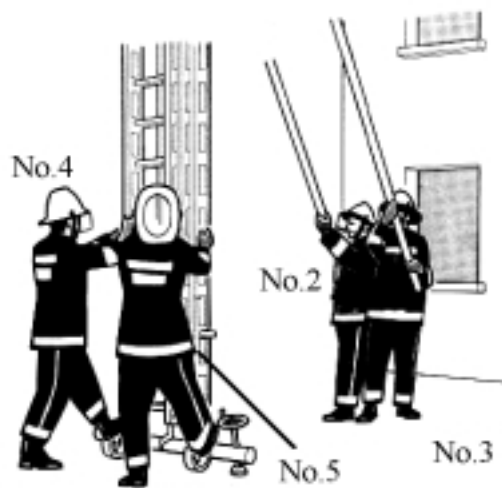
4.8.8 LD 5 : One Line of Delivery up an Extension Ladder (Combined with LD3 or LD4) (Crew of Five)

4.8.8.1 Objectives

In addition to the objectives of LD 3 or LD 4, on completion of training, crew members will be able to :

- operate the main pump on an appliance, working from a hydrant;

- lay out a line of hose reel or delivery hose (and branch) from the main pump to the foot of the ladder;

- make down a water supply from a hydrant to the main pump;

- climb and descend the ladder, carrying the hose reel or delivery hose;

- use a hose sling (becket) to support the weight of delivery hose;

- hold and operate a branch, working from the ladder; and

- charge the hose reel or delivery hose at the correct time.

4.8.8.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Simultaneous with LD3, or LD4 being carried out, Number 1 makes down hose reel, or one line of hose, terminating in a hand controlled branch, as required, and flakes sufficient hose at the bottom of the ladder to enable the hose to be carried up the ladder and into the building if required, and then returns to position as pump operator.
B	Number 3 remains at the foot of the ladder.
C	Number 4 climbs the ladder with the delivery hose under the right arm, draped over the left shoulder - (hose reel hose, twice over) - with the branch to the rear.
D	Number 2 follows Number 4 placing a hose sling (hose becket) on the ground below the sill or parapet, and backs up Number 4 on the branch. Note : if the drill being carried out is to fight the fire from the ladder Number 4 makes a leg lock, Number 2 places the hose sling (hose becket) in the round below the foot of Number 4, returns to the heel of the ladder and assists Number 4 as required.
E	Number 5 makes down standpipe and line from hydrant to pump.
F	Number 1, the driver, operates the pump and assists Number 5 where necessary.
G	Number 4, having made sure that s/he is correctly positioned, calls, or signals, "Water on". Caution : under no circumstances should the hose be charged prior to Number 4 calling or signalling "Water on". Make-up : on the order "Make up" Numbers 2, 3, 4 and 5 return to and make up the ladder and then assist in the making up of all other equipment.

4.8.9   Notes on Splitting a 10.5 metre Ladder

In certain circumstances it may be necessary to split a 10.5m ladder. It is recommended that training be provided in splitting a 10.5m ladder and the following procedures are given for guidance :

-        having unshipped the ladder from the appliance, the ladder is placed on the ground, and both snap hooks are disconnected, and placed between the rounds clear of the extending section; two crew members, one at the head and one at the heel, move the extending section towards the head of the main ladder, the crew member at the heel holding the pawls to clear them, and then drawing the extending section towards the heel of the main ladder and clear of it;

-        the two crew members then carry the section to the required position and the heel is placed on the ground; one crew member places both feet on the bottom round and pulls with his or her hands on a higher round, while the second raises the ladder by underrunning; and

-        having split the ladder, one line is passed under the bottom round of the main ladder and both snap hooks are secured together; any slack line is taken up and secured; both sections of the ladder are then used as required.

4.8.10 Notes on Bridging Ladders

In circumstances where a gap must be crossed, or where a position cannot be reached by a ladder from ground level, bridging may be necessary. It is recommended that training be provided in the bridging of ladders and the following notes are given for guidance :

-        both sections of the ladder should be lashed together on the overlap;

-        there should be not less than 650mm of ladder (approximately three rounds) on each side of the gap being bridged;

- the gap to be bridged should be no more than the unextended portions of the ladder;

- when bridging a 10.5m ladder the overall length, when extended, should not exceed 8m, and the gap to be bridged should not exceed 6m; except in an emergency, not more than one man should be allowed on the bridged portion of the ladder; care should be taken to avoid undue oscillation when moving across the bridged ladder;

- officers, who are in charge of a bridging drill, should consider the use of safety lines, particularly for example over water, and personnel must be made aware of the danger of losing balance when crossing a bridged ladder; and

- the strings of all ladders which are used for bridging purposes should be permanently marked to indicate the maximum permissible extension for bridging.

4.8.11 Notes on Carry-Down Procedures

In a rescue situation, having carried out the Picking up Drill and the person being rescued is at the head of the ladder, the following three methods may be used for carrying down :

- face-to-face method;

- fireman's lift-walk; and

- fireman's lift-straddle.

4.8.11.1 Face-to-Face Method

This method of rescue requires a crew of four, working together. On having the ladder pitched to the underside of the window sill, two crew members mount the ladder and enter through the window. A third crew member climbs the ladder and makes a leg lock, and the fourth crew member foots the ladder. The two

crew members place the casualty on the sill, first securing a safety line around the casualty, feet facing outwards over the sill. The crew member on the ladder guides the casualty's legs, one on either side, whilst the two crew members inside the window gently lower the casualty on to his or her knee. The crew member on the ladder places his or her hands under the arms of the casualty and grips the round behind the casualty. S/he then releases the leg lock and then gets the casualty comfortable on his or her knee. The weight of the body of the casualty is borne on the same knee throughout the descent.

4.8.11.2 Fireman's Lift-Walk.

The body of the casualty is placed across the shoulders in the normal manner. When getting out of a window, or from a parapet, and stepping up onto a ladder pitched to the right, the head iron or a convenient round is grasped from the rear underside with the left hand palm uppermost. The right foot is placed on the round above the sill or parapet; at the same time, the top of a round is grasped with the right hand until the left hand has been moved and is grasping a convenient round (from the front). At no time should both hands be off the ladder and never should a step down be made on to a ladder, except as outlined in paragraph 4.8.11.3.

4.8.11.3 Fireman's Lift-Straddle

The casualty is placed across the shoulder in the normal manner for carrying down. A convenient round of the ladder is grasped from the underside with the hand palm uppermost. Placing one leg over the sill, the straddle position is taken up, facing and close to the ladder string. The outer foot is then placed on a convenient round just below the window sill and a convenient round above the sill is continuously grasped with the outer hand. Manoeuvring as close to the ladder as possible, the outer foot is transferred to a convenient lower round, the position of the outer foot being as far across the ladder as possible adjacent to the furthermost string. The weight is transferred to the outer foot at the same time pulling upon the ladder, then the inner

hand and foot are transferred on to the ladder. Both hands should be on one round and both feet on a lower round before the descent is commenced.

4.8.12 Notes on the Use of Roof Ladders

Whilst it is not possible to cater for all the circumstances in which roof ladders may be used, the following points of guidance should be observed wherever practicable :

- an extension ladder should be pitched to a point slightly to one side of the position where a roof ladder is to be used; the ladder should be extended, preferably to about 5 rounds above the eaves;

- extra care should be taken when ladders are resting on plastic guttering; (the weight of a laden ladder could cause damage to or flexing of the guttering resulting in the ladder becoming unstable);

- the roof ladder should be underrun, hook uppermost, and positioned adjacent to the strings of the extension ladder on the side where it is to be used, with the hook pointing towards the opposite string;

- one crew member should mount the extension ladder and ascend until s/he is able to place one arm between the fourth and fifth round of the roof ladder with the round resting firmly on the shoulder; s/he should then continue to ascend to a point beneath the eaves when a leg lock can be taken with the leg opposite to the side that the roof ladder is being carried;

- the roof ladder should be transferred from the shoulder and, grasping both strings with the wheels resting on the roof, manoeuvred towards the ridge at an angle of approximately ten degrees away from the extension ladder;

-       once the hook has been passed beyond the ridge the roof ladder should be turned over, towards the extension ladder, and adjusted to ensure that the hook is resting firmly on the opposite side of the roof; in cases where the hook rests on the ridge tiles, where possible care should be taken to ensure that the weight of the hook rests on more than one tile;

-       when transferring to or from the roof ladder, the sequence of movements must be "foot, hand, hand, foot", the nearest foot/hand being transferred first;

-       when making up the roof ladder, the reverse procedure must be adopted, one crew member receiving the roof ladder when the crew member on the extension ladder approaches the ground; and

-       the roof ladder should be underun and carried clear of operations.

4.9   Foam Drills

This section covers the following foam drills:

-        FD1 : Application of Foam using a Foam Making Branchpipe with Pick-Up Tube (Crew of five);

-        FD2 : Application of Foam using an In-Line Inductor (crew of five)

-        FD3 : Foam Drill with In-Line Inductor and Open Source Water Supply (crew of five)

4.9.1   Pre-Requisite Proficiency

Crews should be proficient in all preliminary hose and pump drills. Hose and pump drills provide the core objectives for foam drills.

4.9.2   Objectives

For each of the foam drills, objectives have been allocated that identify the specific training benefit relevant to that drill.

On completion of each of the foam drills (or period of training), fire-fighters should be able to carry out all the objectives individually, or as part of a crew, without error.

The conditions for carrying out the drills should be described in accordance with the general objectives for all drills.

4.9.3   General

When a drill has been completed, all hose equipment should be flushed with fresh water before being restowed. Particular attention be paid to the filters and strainers in all foam equipment.

The basic drills are to be adapted, where appropriate, to perform drills with other foam producing equipment. The extended use of foam

branchpipes requires a continuous supply of foam concentrate. This will need more than just one or two members and, for multiple branches, a whole crew may be required to maintain the supply.

4.9.4   Safety Procedures when using Foam

The following points must be adhered to at all times when using foam making equipment:

-   The fire-fighter in control of the branch should direct it away from the fire until foam has started to flow in the place of water.

-   Foam branches, pipes should be positioned so that foam may be poured in a continuous blanket over the surface of the burning liquids.

-   Any residual concentrate in a canister or tin which has been opened should be used for drill purposes and should be marked accordingly.

-   When more than one foam making branch is working from a pump operating a round-the-pump-proportioner, it is essential the line of delivery from the pump outlet containing the delivery inset adapter is not closed down whilst other foam branches are being supplied from the same pump.

4.9.5 FD 1 : Application of Foam using a Foam making Branch with Pick-Up Tube (crew of five)
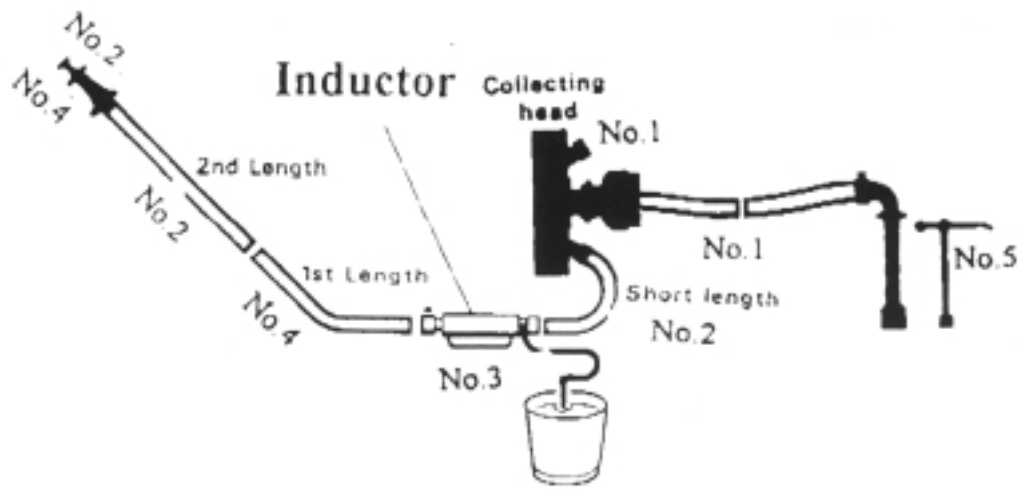
4.9.5.1 Objectives

On completion of training crew members will be able to;

- carry foam branch and pick-up tube;

- site the foam container, insert pick-up tube and connect up;

- demonstrate the method of holding a foam branch;

- operate a foam branch working from a pick up tube;

- apply foam onto a fire, or fire simulation.

4.9.5.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1 makes down a length of hose from the hydrant to the pump, and operates the main pump.
B	Number 2 makes down first length of delivery hose from the pump and backs-up No. 4 on the branch, having inserted the pick-up tube into the foam container.
C	Number 3 takes the foam making branchpipe, pick-up tube and a foam container and proceeds to the fire, and maintains foam stocks.
D	Number 4 takes the second length of delivery, runs it out from the first length and connects it to the foam making branch, and when ready calls or signals for 'water on'.
E	Number 5 collects a standpipe, key and bar and makes down to the hydrant and awaits a signal for 'water on'.

Collecting
head
No.1

Foam branchpipe
and pick-up tube

No.2   2nd Length   1st Length   No.1   No.5

No.4   No.4   No.2

No.3
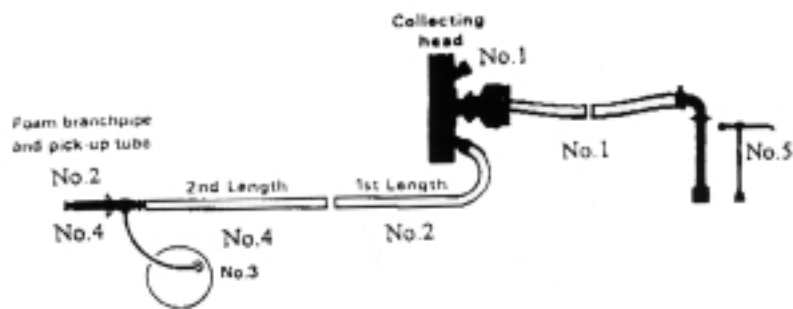
4.9.6 FD 2 : Application of Foam using an In-Line Inductor (crew of five)

4.9.6.1 Objectives

On completion of training crew members will be able to;

- carry a foam inductor and pick-up tube;
- site the foam container;
- set up a foam container and connect the pick-up tube and hose;
- apply foam onto a fire from a foam inductor.

4.9.6.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

A	Number 1 makes down a length of hose from the hydrant to the pump, and operates the main pump.
B	Number 2 makes down first length of delivery hose (usually a special short length) from the pump, and the second length of hose from the inductor to the fire, then backs-up No. 4 on the branch.
C	Number 3 collects the in-line inductor, pick-up tube and a container of foam concentrate. Inserts in-line inductor at end of first length of delivery and places pick-up tube into container of foam concentrate.
D	Number 4 collects the foam branch and makes down first length of hose from inductor to fire. Connects branch to second length, and when ready calls or signals for 'water on'.
E	Number 5 collects a standpipe, key and bar and makes down to the hydrant and awaits a signal for 'water on'. Later assists No. 3 in maintaining foam stocks.

4.9.7 FD 3 : Foam Drill with In-Line Inductor and Open Source Water Supply (crew of 5)

4.9.7.1 Objectives

On completion of training crew members will be able to;

- carry a foam inductor and pick-up tube;
- site a foam inductor;
- set up a foam container and connect the pick-up tube and hose;
- apply foam onto a fire from a foam inductor.

4.9.7.2 Drill

On the order "make_down" or "get_to_work", crew members carry out the tasks assigned as follows :

The suction side of the pump is made down as detailed in PD 6.

A	Number 1 makes down a length of hose from the pump to the inductor, and operates the main pump.
B	Number 2 makes down first length of delivery hose from the inductor to the fire, then backs-up No. 4 on the branch.
C	Number 3 collects the in-line inductor, pick-up tube and a container of foam concentrate. Inserts in-line inductor at end of first length of delivery and places pick-up tube into container of foam concentrate.
D	Number 4 collects the foam branch and makes down second length of hose from inductor to fire. Connects branch to second length, and when ready calls or signals for 'water on'.
E	Number 5 having completed suction makedown, doubles to No. 3 and assists in maintaining foam stocks.
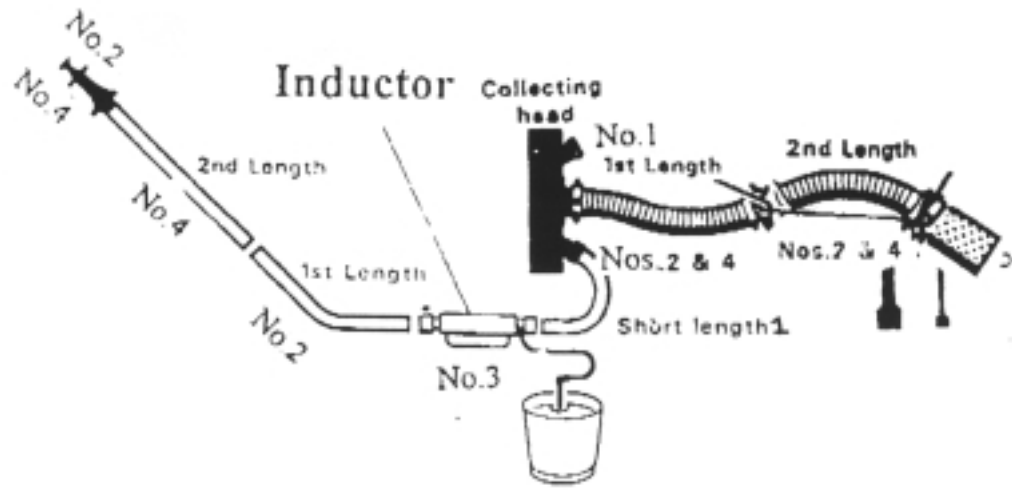
4.10   Standard Knots

4.10.1 Definition of Knot

A knot may be defined as the interlacement of any form of cordage in specific patterns for the purpose of stopping ends, pining ends together, forming bights or securing equipment etc.
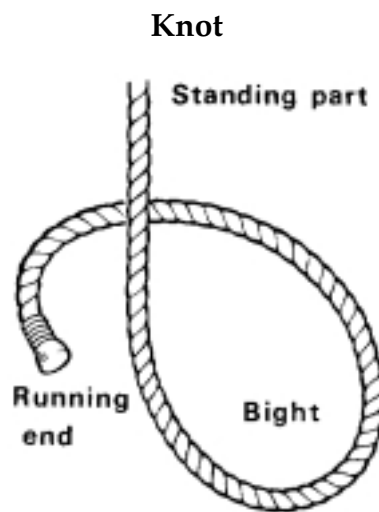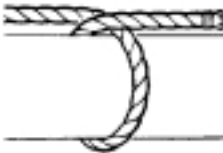
Knot

4.10.2 Standard Terms

There are a number of standard terms for use in describing parts of a knot, etc. and the terms set out below should be learnt and understood by every fire-fighter.
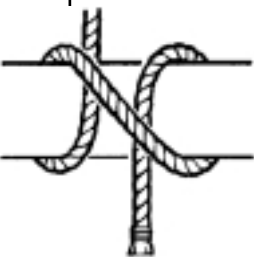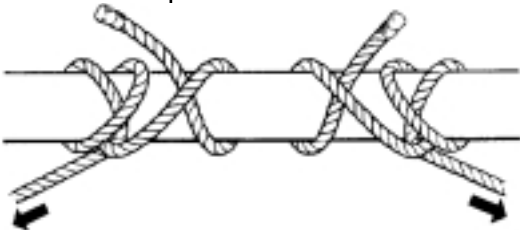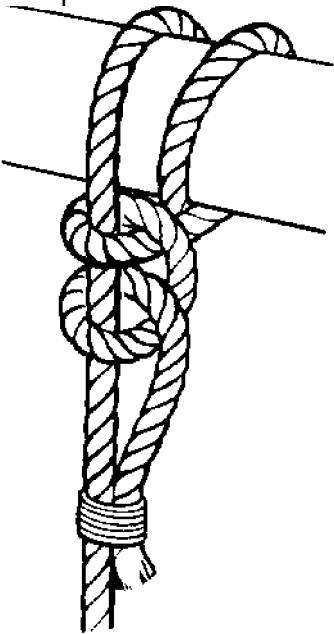
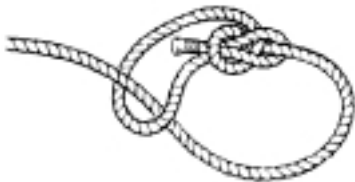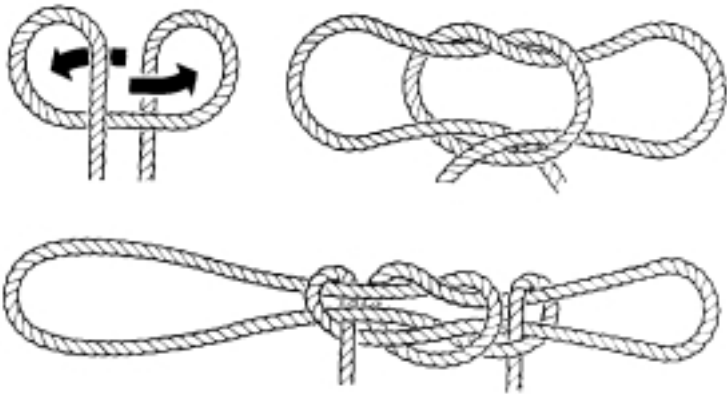|	
Bend	To fasten a line to another line or to an object.
Bight	The looped or loose part of a line between the two ends.
Hitch	A simple fastening of a line to some object by passing the line round the object and crossing one part over the other.
Running Part	The moving part of a line which is loose and used to hoist or lower.
Running End	The free end of a line.
Seizing	The binding together of two or more ropes.
Standing Part	The part of a line which is fixed.
Whipping	The binding of the end of a line with twine to prevent it unlaying.

4.10.3 Knots in Common Use in the Fire Service

The following is a list of knots, bends and hitches with which every fire-fighter should be familiar. S/he should be able to make the more important ones whilst blindfold. Those given are the basic knots for normal fire service purposes (many of these are used in the drills).

Standard Name	Detail
Overhand Knot	Sometimes known as a thumb knot. Used as a simple stopper. (Tied at each end in length of burst hose when laid out.)
Half Hitch	The basis of a number of knots. Used extensively in conjunction with other knots for securing suction, etc.
Reef Knot	Used to join two lines of equal thickness. (Diagram not available)
Double Sheet Bend	A secure method of joining two lines of unequal thickness.

Standard Name	Detail
Clove Hitch	Used to secure a line to any round object.
Figure-of- Eight Knot	Used as a stop, e.g. to prevent a line running through a sleeve. (Diagram not available)
Rolling Hitch	Used to secure a line to any round object so that the knot will not slip along the object when a sideways pull is applied.
Round Turn and Two Half Hitches	Used to secure a line to any round object

Standard Name	Detail
Bowline(also known as the single bowline)	A non-slipping noose used for a large variety of purposes.
Running Bowline	A bowline in the form of a running noose.
Chair Knot	Used as a sling to lower an insensible person.
Barrel Hitch	Used for raising or lowering barrels. (Diagram not available)
Catspaw	This is principally used for attaching a line to a hook. The two eyes are brought together and slipped over the object to which the line is to be secured. (Diagram not available)

Contents

SECTION 5   FIRE SERVICE OPERATIONS

5.2

Section 5   Fire Service Operations

5.1   Introduction

Fire service operations extend across a wide range of situations and appropriate operational methods have been developed and disseminated over the years. The UK "Manuals of Firemanship" have been the traditional reference source for fire service operations in Ireland. These UK manuals are currently being revised and produced as volumes within a "Fire Service Manual". These revised texts, which are accompanied by video material, are recommended as guidance on procedures for fire service operations.

The Institution of Fire Engineers (IFE) also disseminates very useful material on fire service operations. The reader is referred in particular to part 2 of the IFE's Preliminary Certificate handbook, which provides much useful guidance.

Contents

Section 6   Use of Breathing Apparatus

6.1   Introduction

A document entitled "The Use of Breathing Apparatus in the Fire Service" was issued by the Department of the Environment and Local Government in December 1995. This document provides guidance on the use of breathing apparatus and a copy of the document which is available from the Government Publications Sales Office should be included in this handbook.

6.4