

# IFE Level 3 Diploma in Fire Science and Fire Safety

## Unit 6: Fire Service Operations and Incident Command

Unit Reference Number: L/505/6008

### Introduction

This unit focuses on the activities required to resolve fire and rescue incidents. It covers incident command as well as fire and rescue operations and techniques.

Candidates managing fire and rescue operations need to have a wide range of technical knowledge and understanding to enable them to assess risks and manage incidents of different types in different contexts and environments. They need to be able to apply their technical understanding to assess situations, identify an appropriate course of action, prioritise actions and manage risks.

### Learning Outcomes

Candidates who achieve this unit should be able to:

- assess fire and rescue incidents and identify appropriate action to resolve the incident safely and with regard to environmental issues
- understand how to supervise activities at incidents including the management of sectors
- assess the scale of an evolving incident and know when and how to escalate/handover to appropriate colleagues
- explain the operation of firefighting equipment, knowing when to use equipment and how to manage risks associated with the use of different equipment
- evaluate risk and identify appropriate action in order to preserve the safety of firefighters and members of the public

### Unit Status

This unit is an Optional Unit for candidates undertaking the Level 3 Diploma in Fire Science and Fire Safety.

*Note: candidates are **not** permitted to use this unit in combination with Unit 3: Fire Service Operations and Incident Command - International.*

## Content

### 1. Pre-planning

Assessment Objective	Knowledge, Understanding and Skills
1.1 Explain the purpose of pre-planning for incidents and assess the issues within different contexts	<ul style="list-style-type: none"> <li>• Incidents to include:               <ul style="list-style-type: none"> <li>○ All fire situations</li> <li>○ All rescue situations</li> <li>○ Major incidents and incidents involving civil disturbance</li> <li>○ Acts of terrorism</li> <li>○ Natural disasters (eg wildfires, flooding)</li> <li>○ Incidents involving hazardous materials</li> </ul> </li> <li>• Information gathering on local risks</li> <li>• The safety of all emergency responders, non-emergency personnel working alongside and members of the public, including bystanders</li> <li>• The mitigation of environmental impact</li> <li>• Calculations with regard resources, equipment and personnel</li> <li>• Liaison with other agencies, key site personnel, responsible persons, government representatives and other external partners/stakeholders</li> <li>• Conformation with legal requirements</li> <li>• Working to meet policy and organisational objectives</li> </ul>

### 2. Incident Command and Management

Assessment Objective	Knowledge, Understanding and Skills
2.1 Explain the key principles of the Incident Command System	<ul style="list-style-type: none"> <li>• The three functional areas of the Incident Command System (ICS)</li> <li>• The three levels of management applied at operational incidents</li> <li>• The role of other agencies within the ICS</li> <li>• JESIP and JESIP Principles</li> <li>• The common framework under which responders integrate at multi-agency incidents</li> </ul>
2.2 Explain the roles and responsibilities of personnel within the incident command structure and explain the factors affecting structuring of incidents	<ul style="list-style-type: none"> <li>• The role and responsibilities of the following:               <ul style="list-style-type: none"> <li>○ Incident Commander</li> <li>○ Sector Commander</li> <li>○ Operations commander</li> <li>○ Safety Officer</li> <li>○ Command Support</li> <li>○ BA Entry Control Operative</li> <li>○ Mass Decontamination Officer</li> <li>○ Tactical Adviser and specialist roles to include the following remits: Hazmat, HVP, USAR, Flooding etc.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• The relationship between the different roles and the Incident Command system</li> <li>• Sectorisation</li> <li>• The progression at an incident from first pump attending to the arrival of a dedicated vehicle</li> <li>• Deployment of BA wearers</li> <li>• The responsibility for determining the cause of an incident</li> <li>• The range and the types of evidence available at an operational incident</li> </ul>
<p>2.3 Explain the requirements for the successful management of risk at operational incidents</p>	<ul style="list-style-type: none"> <li>• Definition of a hazard, risk and control measure</li> <li>• The categories of risk assessment</li> <li>• The risk philosophy applied to the management of operational incidents</li> <li>• The Dynamic Risk Assessment</li> <li>• The hierarchy of control measures in relation to managing risks</li> <li>• Firefighter safety maxim</li> </ul>
<p>2.4 Explain the factors and processes that affect effective decision making at operational incidents</p>	<ul style="list-style-type: none"> <li>• Situational awareness</li> <li>• Decision control process (DCP)</li> <li>• Decision making at multi-agency incidents</li> </ul>
<p>2.5 Describe the tactical mode options available at incidents and explain how they are implemented</p>	<ul style="list-style-type: none"> <li>• Modes: offensive mode, defensive mode, no overall mode</li> <li>• Factors determining mode and changes in mode</li> </ul>
<p>2.6 Explain the need for effective lines and methods of communication at incidents</p>	<ul style="list-style-type: none"> <li>• The lines of communication available at incidents in relation to an Incident Commander's span of control</li> <li>• The impact of poor or inappropriate communication</li> <li>• The methods of briefing of crews at operational incidents</li> <li>• Sectorisation utilised at operational incidents</li> <li>• Barriers to effective communication</li> </ul>
<p>2.7 Explain the principles for general control and tactics for resolving emergency incidents and explain when and how these principles should be applied to different contexts</p>	<ul style="list-style-type: none"> <li>• Need for, and management of, evacuation at fires</li> <li>• Strategy and tactics involved in rescue work</li> <li>• Objectives of ventilation at fires</li> <li>• Procedures for ensuring the safety of both personnel and public</li> <li>• Use of cordons at incidents</li> <li>• How to identify signs and symptoms of stress in relation to trauma and/or work based activity and strategies to manage stress</li> <li>• Actions to reduce the exposure to and impact on operational personnel and casualties</li> </ul>

### 3. Fire & Rescue Procedures – Operations and Tactics

Assessment Objective	Knowledge, Understanding and Skills
3.1 Explain the process and principles of fire development in relation to the procedures for extinguishing fires in different contexts.	<ul style="list-style-type: none"> <li>• The identification of different types of burning material and the effects on building construction</li> <li>• Ways in which fires can spread detected and undetected both internally and externally</li> <li>• Principles and application of ventilation – natural, mechanical and technical</li> <li>• Flashover, backdraught and fire gas explosion.</li> </ul>
3.2 Assess the operational response and tactics along with both general and specialist techniques that may be required for dealing with fires that occur in different contexts.  <i>(Note: further amplification of the range of situations is provided in sections 5 and 6 below.)</i>	<ul style="list-style-type: none"> <li>• Fires in the built environment including fires in:               <ul style="list-style-type: none"> <li>○ Buildings under construction and demolition or derelict</li> <li>○ High rise properties or buildings with atriums, basements and tunnels</li> <li>○ Leisure facilities, camp sites and temporary structures</li> <li>○ Waste sites (including renewable energy facilities)</li> <li>○ Retail and leisure facilities</li> <li>○ Commercial premises and industrial/petrochemical processes</li> <li>○ Hospitals, health care and educational establishments</li> <li>○ Prisons and places of lawful detention</li> <li>○ Places of research and laboratories</li> <li>○ Premises used for the generation, distribution, storage or supply of gas, LPG, electricity, solar panels and other sources of power</li> <li>○ Historical buildings and premises containing valuable artefacts including Heritage buildings, museums and galleries</li> </ul> </li> <li>• Fires involving transportation by road, rail, air and waterways, to include:               <ul style="list-style-type: none"> <li>○ Modes of transportation, ie vehicles rolling stock, aircraft and vessels</li> <li>○ Infrastructure, such as roads, terminals, stations, tunnels, docks, marinas, etc.</li> </ul> </li> <li>• Wildfires including rural areas such as forests, heath land, wildland, crops, bush, etc</li> <li>• Farms, farm buildings, processes and equipment</li> </ul>
3.3 Evaluate the benefits of salvage operations and controlled burn strategies	<ul style="list-style-type: none"> <li>• Salvage considerations to prevent avoidable damage and mitigate the effects of fire and firefighting operations</li> <li>• Subsequent effects on business continuity and restoration of normality</li> <li>• Environmental, community and business impacts of control burn strategies</li> </ul>
3.4 Assess the operational response and tactics along with the specialist techniques and	<ul style="list-style-type: none"> <li>• Rescues from the built environment, to include:               <ul style="list-style-type: none"> <li>○ Entry into and searching of buildings and collapsed structures</li> </ul> </li> </ul>

<p>methodologies involved when carrying out rescue operations</p> <p><i>(Note: further amplification of the range of situations is provided in sections 5 and 6 below.)</i></p>	<ul style="list-style-type: none"> <li>○ Release of trapped persons from machinery, lifts, escalators</li> <li>● Rescues from sub-surface and confined spaces, to include:             <ul style="list-style-type: none"> <li>○ Entry into and searching of tunnels and shafts</li> <li>○ Vat, silo, sewer, trench, pit, chimney</li> </ul> </li> <li>● Rescues from transportation incidents, to include:             <ul style="list-style-type: none"> <li>○ Extrication of persons from vehicles, trains, aircraft, ships and boats</li> </ul> </li> <li>● Rescues from height, to include:             <ul style="list-style-type: none"> <li>○ Working at height or with ropes including:</li> <li>○ Buildings, cranes, shafts, cliffs and other permanent or temporary structures</li> </ul> </li> <li>● Rescues from water and unstable ground to include:             <ul style="list-style-type: none"> <li>○ People, property and vehicles from flood water</li> <li>○ Incidents involving still and fast flowing water</li> <li>○ Incidents involving ice, mud and other free flowing solids</li> </ul> </li> <li>● Large animals and humanitarian rescues</li> </ul>
<p>3.5 Explain the operational procedures and tactical response to terrorist related incidents and civil unrest.</p>	<ul style="list-style-type: none"> <li>● Incidents involving:             <ul style="list-style-type: none"> <li>○ High level terrorist threats or acts, including release of chemical, biological, radiological, nuclear contamination.</li> <li>○ Explosive devices such as Improvised Explosive Devices or suicide bombings</li> <li>○ Marauding firearm attacks</li> <li>○ Low level threats or acts from groups making protestations.</li> <li>○ Major incidents and civil disturbances</li> </ul> </li> </ul>
<p>3.6 Explain the risks associated with different hazardous materials and explain the safe systems of work required to protect people, property and the environment when responding to operational incidents in different contexts.</p>	<ul style="list-style-type: none"> <li>● The nature of specific hazardous substances and the risks posed to operational personal and the public</li> <li>● Factors to take into account when undertaking incidents involving specific hazardous substances and the implications for establishing safe systems of work</li> <li>● Hazardous material release by defect, natural occurrence, or human act.</li> <li>● Storage of hazardous materials and implications for safety</li> <li>● Hazardous materials;             <ul style="list-style-type: none"> <li>○ Explosive hazards</li> <li>○ Ammonium nitrate-based based fertiliser</li> <li>○ Gases under pressure</li> <li>○ Acetylene</li> <li>○ Liquefied petroleum gas (LPG)</li> <li>○ Natural Gas</li> <li>○ Carbon monoxide</li> <li>○ Flammable hazards</li> <li>○ Flammable liquids</li> <li>○ Flammable solids</li> <li>○ Oxidising hazards</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Biological or infectious agents/hazards</li> <li>○ Materials containing asbestos</li> <li>○ Corrosive hazards</li> <li>○ Radioactive materials</li> </ul>
3.7 Explain the procedures and operational techniques to be followed when BA is in use	<ul style="list-style-type: none"> <li>● Procedures/operational techniques prior to donning BA</li> <li>● Entry procedures</li> <li>● Search and rescue procedures</li> <li>● Procedures for working with other equipment</li> <li>● Procedures for different contexts</li> <li>● Procedures for emergencies</li> </ul>

#### 4. Post-Incident Actions

Assessment Objective	Knowledge, Understanding and Skills
4.1 Explain how to close down the operational phase of an incident	<ul style="list-style-type: none"> <li>● Measures to hand over control of an incident to the appropriate person, agency or authority</li> <li>● Actions to identify and mitigate hazards and associated risks within operational restraints</li> </ul>
4.2 Explain the principles and the value of debriefs and apply these principles to different contexts	<ul style="list-style-type: none"> <li>● How to contribute to a post-incident debrief appropriate to the type and scale of the incident</li> <li>● How to gather all relevant information from internal and external sources</li> <li>● How to engage crews in debriefing and to review crew welfare and learning issues</li> <li>● How to implement remedial measures to improve future practice and performance</li> <li>● Effects of critical incidents on the personal resilience of attending personnel and taking steps to manage staff welfare</li> </ul>
4.3 Determine the requirements for scene preservation when required for further investigations	<ul style="list-style-type: none"> <li>● Further investigation to include:                             <ul style="list-style-type: none"> <li>○ Fire Investigation</li> <li>○ Fire Safety Investigation</li> <li>○ Health and Safety Investigation</li> <li>○ Criminal Investigation</li> <li>○ Internal Investigation</li> </ul> </li> <li>● How to identify, preserve, gather and present potential evidence identified at the incident to support a subsequent investigation</li> </ul>

## 5. Incidents Involving Buildings

Assessment Objective	Knowledge, Understanding and Skills
5.1 Assess the hazards presented and the implications for firefighting and rescue operations on the incident ground due to building structure and the behaviour of different elements of structure.	<p>Building methods to include:</p> <ul style="list-style-type: none"> <li>• Framed and unframed buildings</li> <li>• Steel and concrete frame</li> <li>• Concrete construction methods</li> <li>• Composite and Modular construction</li> <li>• Portal frame and Glulam construction</li> <li>• Traditional heritage</li> <li>• Modern methods of construction</li> <li>• Claddings and fixing methods</li> <li>• Staircases</li> <li>• Roofs, ceilings and roof lights</li> <li>• Flooring and fixing methods</li> <li>• Doors and windows</li> <li>• Non load bearing walls and partitions</li> </ul> <p>Elements of structure include:</p> <ul style="list-style-type: none"> <li>• Columns and Beams</li> <li>• Load bearing and compartment walls</li> <li>• Floors and frames</li> <li>• Enclosed protected shafts and staircases</li> </ul>
5.2 Assess the effects of building facilities in relation to fire spread and explain how fixed installations may be utilised to progress firefighting operations and assist with business continuity.	<p>Building facilities to include:</p> <ul style="list-style-type: none"> <li>• Heating and Air Conditioning systems</li> <li>• Ventilation and smoke handling systems</li> <li>• Stairwell and pressurisation systems</li> <li>• Lifts and Escalators</li> <li>• Service utilities such as electricity, gas, oil and water</li> </ul> <p>Fixed installation to include:</p> <ul style="list-style-type: none"> <li>• Sprinkler, drencher and water spray projection systems</li> <li>• Rising mains, falling mains and hoses</li> <li>• Foam and flooding systems including Gas/vapour and dry powder systems</li> <li>• Automatic fire detection and alarm systems</li> <li>• Communication and security systems</li> </ul>

## 6. Incidents Involving Transportation

Assessment Objective	Knowledge, Understanding and Skills
6.1 Explain the hazards and actions that should be considered when working with ships/boats and marine infrastructure	<ul style="list-style-type: none"> <li>• Hazards and risks when working: <ul style="list-style-type: none"> <li>○ Alongside waterways, docks, harbour and marina infrastructure.</li> <li>○ On or with ships and boats</li> </ul> </li> <li>• Measures incorporated into ships to assist firefighting and provide fire protection</li> </ul>

	<ul style="list-style-type: none"> <li>• Concept of bouyancy and procedures for ensuring stability during firefighting operations</li> <li>• Factors relevant to ship firefighting both in ports and at sea</li> </ul>
6.2 Explain the hazards and actions that should be considered when working with railways and rail infrastructure	<ul style="list-style-type: none"> <li>• Hazards and risks when working: <ul style="list-style-type: none"> <li>○ Alongside railway lines, sidings, crossings and at other rail premises.</li> <li>○ On or with trains and rolling stock</li> </ul> </li> <li>• Design features of railways and types of trains and rolling stock</li> <li>• Rail and train power systems</li> <li>• Identification of freight including signage of goods and information retrieval systems</li> <li>• Firefighting and emergency procedures for railway incidents</li> </ul>
6.3 Explain the hazards and actions that should be considered when working with vehicles and on roadways	<ul style="list-style-type: none"> <li>• Hazards and risks when working: <ul style="list-style-type: none"> <li>○ On roadways and motorways</li> <li>○ With vehicles including cars, LGVs and specialist vehicles</li> </ul> </li> <li>• General features of road networks</li> <li>• Identification of freight including signage of goods and information retrieval systems</li> <li>• Fuel systems, MMMFs and SRS</li> <li>• Firefighting and emergency procedures for incidents on roadways</li> </ul>
6.4 Explain the hazards and actions that should be considered when working with aircraft and at aerodromes	<ul style="list-style-type: none"> <li>• Hazards and risks when working: <ul style="list-style-type: none"> <li>○ At aircraft crash sites both on and off an aerodrome</li> <li>○ With civil and military aircraft, including fixed wing and rotary wing aircraft</li> </ul> </li> <li>• Firefighting and emergency procedures for incidents involving aircraft and/or airports</li> </ul>

## 7. Fire and Rescue Equipment

Assessment Objective	Knowledge, Understanding and Skills
7.1 Explain how and when to deploy appropriate firefighting equipment and other resources	<ul style="list-style-type: none"> <li>• Select and use appropriate equipment, resources and specialist skills to meet the needs of the incident</li> </ul>
7.2 Assess the provision and operational use of water supplies for firefighting purposes and determine tactics to resolve issues	<ul style="list-style-type: none"> <li>• Provision of supplies of water for firefighting purposes</li> <li>• Operational use of water from its supply for firefighting purposes</li> </ul>

<p>7.3 Assess the provision and operational use of various types of foam and foam making equipment and determine tactics to resolve issues</p>	<ul style="list-style-type: none"> <li>• Production and application of foam for firefighting purposes</li> <li>• Properties of the various foams and foam concentrates</li> <li>• Expansion rates of foam and factors to be taken into account when using foam to extinguish a fire</li> </ul>
<p>7.4 Explain the use of ladders and the procedures for safe working at height</p>	<ul style="list-style-type: none"> <li>• General principles and precautions when working with all ladders and aerial ladder platforms</li> </ul>
<p>7.5 Explain the performance requirements and the procedures for using Breathing Apparatus (BA) and associated equipment</p>	<ul style="list-style-type: none"> <li>• Management, control and safety procedures for using Breathing Apparatus</li> <li>• Component parts and testing procedures for Breathing Apparatus</li> <li>• Associated equipment to include; Communication Equipment, Personal Lines, Guidelines, Telemetry Equipment and all types of resuscitation equipment</li> </ul>
<p>7.6 Explain the performance requirements and the construction of the various types of chemical protective clothing and how these apply in different situations</p>	<ul style="list-style-type: none"> <li>• Operating principles of using Gas Tight Chemical Protection suits and limited protection splash suits</li> <li>• General maintenance and safety precautions</li> <li>• Factors affecting effective selection of equipment</li> </ul>
<p>7.7 Explain the selection of detection, identification and monitoring equipment used in relation to radiation incidents</p>	<ul style="list-style-type: none"> <li>• Operating principles of Radiation measuring equipment, Personal Protective Equipment and Decontamination equipment</li> <li>• General maintenance and safety precautions applicable to all detection identification and monitoring equipment</li> </ul>
<p>7.8 Explain the performance requirements and selection of rescue equipment to be used during extrication, heavy lifting and search and rescue</p>	<ul style="list-style-type: none"> <li>• Operating principles of all cutting, spreading, stabilisation equipment</li> <li>• Operating principles of all Search and Rescue Equipment</li> <li>• Operating principles of hauling and lifting equipment, including blocks and tackle, and the associated anchoring methods</li> <li>• General maintenance and safety precautions applicable to all rescue equipment</li> </ul>
<p>7.9 Explain the performance requirements and the selection of ropes and lines and how these apply in different rescue situations</p>	<ul style="list-style-type: none"> <li>• Operating principles when using ropes and lines</li> <li>• General maintenance and safety precautions applicable to all rope and line equipment</li> </ul>
<p>7.10 Explain the performance requirements and the selection of various types of water and unstable rescue equipment and ancillaries</p>	<ul style="list-style-type: none"> <li>• Operating principles when using throwlines/safety lines, Inflatable Rescue Boats, outboard motor engines, mud paths and lances</li> <li>• General maintenance and safety precautions applicable to all water rescue equipment</li> </ul>