

# IFE Level 3 Diploma in Fire Safety and Fire Science

## Unit 4 – Aviation Fire Operations

### Examiner Report – March 2019

#### Introduction

41% of the candidates that sat the examination achieved a Pass.

Candidates generally performed best on questions 4 and 7. They performed least well on question 8. It was noted that many candidates appeared to lack basic understanding of the hazards and risks encountered by airport fire and rescue services and that questions testing understanding of this area of the syllabus (and of the control measures required to manage incidents) generally received the poorest responses.

Many candidates provided brief responses even where a high number of marks was available; as a result, the lack of detail in responses limited the marks that could be awarded.

#### Question 1

*Describe the construction features (materials and components) of small commercial helicopters and explain how these present hazards and risks to Airport Rescue and Firefighting Services (ARFFS) crews when dealing with an accident on an airfield. (20 marks)*

#### **Examiner Feedback**

This question was a popular option for candidates but many candidates failed to demonstrate knowledge and understanding of the construction features of helicopters or relevant hazards.

Many candidates did not read the question properly and produced pages of information (usually addressing control measures which were not required by the question) which did not attract any marks.

Marks were available for descriptions of construction features but few candidates provided any detail. Examples of construction features and hazards which could have been covered include the following:

- Construction materials are primarily lightweight aluminium alloys - lightweight construction means likely to roll over or break up in an accident.
- Tail rotors consist of between two and five blades constructed from metal and composite materials
- Rotors – droop, continue to turn, can be thrown large distances.
- Tail Rotors – difficult to see when moving.
- Helicopter fuel tanks may be either integral or bag type tanks i.e. flexible rubberised bags that withstand shock.
- The number of tanks varies according to the type of helicopter.
- Fuel tanks – both external and internal are easily damaged in an accident leading to spillage/fire risk.

- Undercarriages – generally lightweight may be wheels, skids or a combination and may easily collapse leading to aircraft rolling onto its side; this may puncture the fuselage leading to rupture of fuel tanks.
- Wheeled undercarriages may incorporate pressurised fluid systems for retraction and braking.
- Rapid spread of fire is possible due to construction/location of fuel tanks.
- Interior Furnishings – similar materials to those used in fixed wing aircraft with the same problems of toxic fire gases
- Engines – position may be high up (difficult access), difficulty in accessing engine, proximity to passengers/crew.

## **Question 2**

- a) *It is essential that cordons are put in place as soon as possible at an aircraft accident site. Detail the considerations when setting up Inner and Outer Cordons. (14 marks)*
- b) *Describe the considerations when managing access through cordons to the scene of the incident. (6 marks)*

### **Examiner Feedback**

This question was not a popular option for candidates. Those candidates that did attempt the question rarely scored high marks – the average mark attained for this question was six marks.

In responding to part a), few candidates demonstrated understanding of the issues to take into account when setting up cordons. Candidates should be aware that cordon distances will depend on many different factors such as smoke plume, wind direction, aircraft debris, aircraft slide path, whether military weapons are involved, ejection seats, hazardous material either due to the aircraft or its cargo, resources available (to include number of appliances/personnel in attendance or en-route) assessment of risk, tactical mode etc

Some candidates appeared to guess at the considerations in relation to access when responding to part b). Few candidates fully explored the issues around security and safety

## **Question 3**

- a) *Describe the hazards faced by Airport Rescue and Firefighting Services (ARFFS) crews in attending an on-airfield engine fire and describe the control measures to be employed when dealing with this type of incident. (14 Marks)*
- b) *Identify and describe three different types of jet engine currently in use. (6 marks)*

### **Examiner Feedback**

This question was the most popular question on the paper. Although there were some good responses, there were also some poor responses.

Part a) was often poorly answered with few candidates providing detailed responses. The poor level of understanding was concerning.

In responding to part b), candidates were often able to name three different types of engine but few provided sufficient information to secure the additional marks available for description.

#### **Question 4**

- a) *Produce a table to illustrate the Airport Rescue and Firefighting categories from Category 1 to Category 10. (10 marks)*
- b) *Identify the key considerations for Airport Rescue and Firefighting Services (ARFFS) crews when responding to an aircraft accident on the airfield. (10 marks)*

#### **Examiner Feedback**

The average mark attained for this question was 9.

Most candidates secured most, if not all, of their marks for their response to part a).

Part b) was less well answered with many candidates appearing to lack relevant knowledge. Examples of points that would have secured marks include:

- Ensure safe and appropriate positioning of appliances and crews taking into account escaping passengers, smoke, wind direction and slope of the ground.
- Establish appropriate rendezvous points and marshalling areas for supporting vehicles that will be arriving.
- Ensure appropriate personal protective equipment and respiratory protective equipment is worn at all times.
- Control/Extinguish fires to prevent spread and threat to the integrity of the fuselage.
- Keep clear of known hazard areas such as rim/tyre disintegration zones, engine intakes and exhausts, propellers, etc.
- Consider the possibility of the aircraft becoming unstable or of aircraft undercarriage collapse
- Where possible, emergency evacuation of the aircraft should take place on the unaffected side.
- Entry into the aircraft should not be made until the exterior fire is under control.
- Ensure minimum numbers of personnel required to complete tasks are within the Inner Cordon.

#### **Question 5**

*Polymer Composite Materials/Man Made Mineral Fibres (MMMFs) are used extensively in the construction of modern aircraft.*

- a) *Describe the hazards to Airport Rescue and Firefighting Services (ARFFS) crews when responding to an aircraft accident involving an aircraft known to have composites within its construction. (12 marks)*
- b) *Describe the control measures to be implemented both during and post-incident when MMMFs are present. (8 marks)*

## **Examiner Feedback**

Although candidates were often able to attain at least some marks for part a), few candidates demonstrated understanding of appropriate control measures as required by part b). Examples of appropriate control measures include the following:

- Identify and continue to assess correct level of personal protective equipment/ respiratory protective equipment.
- Post-crash wreckage should have all fires extinguished and debris cooled to below 150°C before the decision to withdraw breathing apparatus is taken by the incident commander.
- If eye contact risks are present, the use of protective goggles is essential.
- The Incident Commander will need to assess the likelihood of fibre liberation by fire service operations or by other causes such as wind and weather, other aircraft movements or other agency activities and implement more enhanced levels of respiratory protective equipment/personal protective equipment as appropriate.
- The application of water in the location of cutting operations will help to reduce the liberation of fibres.
- Contamination – consideration should be given to the need to clean non-disposable personal protective equipment at the earliest opportunity.
- Casualties contaminated with fire residues from composites should have outer clothing removed, where possible, to prevent fibres being transported away from the crash site
- Establish and strictly manage inner cordon with a single entry and exit point allowing access to essential personnel only.
- Avoid excessive disturbance of wreckage and consider structural weakness and instability due to crash and fire damage
- To control fibres from wreckage, damp with a fine mist spray or special compounds to suppress the dust particles.

## **Question 6**

*a) High-speed accidents off-airport can generate additional hazards and increase the risks to Airport Rescue and Firefighting Services (ARFFS) crews when responding. Describe the hazards associated with this type of incident. (10 Marks)*

*b) Describe the considerations relevant to scene preservation and the actions to be taken. (10 marks)*

## **Examiner Feedback**

This was a popular option for candidates. The average marks scored for this question was seven with candidates generally scoring the majority of the marks for their response to part b).

As in previous responses, the lack of detail and understanding presented limited the marks that could be awarded for part a).

### **Question 7**

*Describe four different types of fuel tanks found in aircraft. (20 marks)*

#### **Examiner Feedback**

Some candidates were able to score very high marks for this response. Unfortunately, there were also some very low marks with some candidates providing responses which contained only the names and some basic information on fuel tanks.

The four types of fuel tanks that should have been covered in responses were Rigid tanks, Integral tanks, Flexible tank and Auxiliary tanks.

### **Question 8**

*Describe in detail the operation of doors and evacuation systems on commercial aircraft and explain the implications for Airport Rescue and Firefighting Services (ARFFS) crews attending incidents involving these aircraft. (20 marks)*

#### **Examiner Feedback**

This question was the least popular option for candidates and those candidates that did attempt the question often scored only low marks – the average mark attained for this question was four. Few candidates were able to demonstrate detailed understanding of the operation of doors or evacuation systems or how this might affect the actions taken by ARFFS crews during emergencies.

Responses should have covered doors (including the impact of different configurations and opening mechanisms), the two different types of escape slides that might be encountered and over-wing exits.