Qualification: Date Completed: 20 Feb ‘17
Unit: FIA AO Level 3 FD&A Commissioner
Development Group: FD&A Development Group

Guided Learning Hours (GLH) 16 Invigilated Assessment Hours (IA) 2 Total Qualification Time (TQT) 18

Assessment Method: Multi Choice and Short Answer

Learning Outcomes: This is the advanced unit specialising in the role of the systems commissioner for the Fire Detection and Alarm sector. Before completing this unit learners should already have successfully completed the FIA AO Level 2 Common Core Unit.

Learners who have successfully completed this unit along with;

- FIA AO Level 2 FD&A Common Core
- FIA AO Level 2 Environment for Field Service Technicians
- FIA AO Level 2 Health and Safety for Field Technicians

Will be awarded the FIA AO Level 3 in Fire Detection and Alarm Commissioning, Theory and Regulatory Requirements.

Learners completing this unit will have gained advanced knowledge and understanding of the Legislative requirements, Codes of Practice and Guidance for systems commissioning in the FD&A sector of the Fire Industry. They will also have gained best practice methodology, testing and inspection, interface with other systems, maintenance methodology, false alarm management, instructional techniques and documentation.

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<tr><th>Subject</th><th>Knowledge and Understanding</th><th>Performance Criteria</th></tr>
<tr><td rowspan="2">A. BS 5839/IS 3218/BS 6266/BS 7273</td><td>Learners will have knowledge and understanding of:
1. Test and inspection requirements for Fire Detection & Alarm (FD&A) systems in accordance with the UK and EU standards relevant to the UK country in which the learner will be working
2. Standards that are called up and referenced from the appropriate Codes of Practice
3. Certificate templates required by the relevant Codes of Practice</td><td>Learners will be able to:
1. State the title and intent of standards relevant to the UK region in which the learner will be working
2. State which tests and inspections are required when commissioning a system
3. State the technical limits and dimensions from the relevant codes of practice
4. Apply the technical limits and dimensions from the relevant Codes of Practice when carrying out tests and inspections on the fire alarm systems
5. State where to obtain and reference other standards that are called up by the relevant Codes of Practice
6. State the information required when certifying the compliance of an Fire Detection & Alarm (FD&A) system to the relevant Codes of Practice
7. Select the relevant forms to use when certifying the compliance with the appropriate Codes of Practice</td></tr>
<tr><td colspan="2">Explanatory Notes
Commissioning Technicians/Engineers must understand the legislative requirements and codes of practice for the fire alarm systems that they work on, where Technicians/Engineers are working in border areas they will be required to have knowledge and understanding relevant to all countries in which they will be working.</td></tr>
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B. Testing and inspection the fire alarm system	Knowledge and Understanding	Performance Criteria
	Learners will have knowledge and understanding of: 1. The appropriate detector type(s) 2. The positioning of systems components (e.g. detectors, Control and Indicating Equipment, Zone plans, alarm devices) 3. Workmanship, including fixings, cable type, connections and terminations and fire stopping 4. Confirmation of labelling has been carried out (devices and batteries) 5. Building features that are not covered by the design specification (e.g. beams, pitched roofs, voids) 6. Testing requirements and methodology for detectors and call points and confirming the correct Control and Indicating Equipment (CIE) indication is given at the CIE 7. Confirming system monitoring 8. Measuring standby and alarm currents and confirming that the battery size is correct 9. Verifying the cause and effect program through system test 10. Confirming the correct audible alarm levels are achieved and that visual alarm requirements are met 11. Confirming correct signalling to a remote monitoring station 12. Confirming that any changes to the building will not adversely affect the operation of the system 13. Confirming the customers specification is met	Learners will be able to: 1. Explain where different detector types are best suited to the premises and their limitations to use. 2. Explain the tests and inspections required in order to identify and confirm the appropriate detectors for all applications within buildings 3. Explain what is required for the correct positioning and spacing of detectors according to applicable codes of practice 4. Explain the requirements for the correct positioning of control and indicating equipment (CIE) and Zone plans according to applicable codes of practice 5. Explain the requirements for alarm devices ensuring that installed devices fulfil performance requirements both according to the applicable codes of practice and any specific additional requirements for the building and end user 6. Explain what checks are required and the methodology necessary in order to assess that the workmanship of the installation is of an appropriate quality and that the correct materials have been used. Both with reference to the installation and fixing of the fire detection and Alarm (FD&A) System, materials used and with regard to making good, ensuring the integrity of passive fire protection systems and compartmentation 7. Explain the checks required and method of identifying the correct installation standards have been met for hazardous areas where appropriate 8. Explain the labelling requirements for a system ensuring that customer specification and the code of practice have been met

		9. Explain how the building can have an effect on the fire alarm system, and what features to look out for when inspecting the building and system to ensure comprehensive coverage 10. Explain what measures should be taken when a risk in the building has been identified that has not been covered by the system design 11. Explain the tests required to ensure detectors and call points function in accordance with manufacturers recommendations, that Code of Practice requirements have been met and confirm that the correct indication is displayed at the CIE 12. Carry out calculations to verify correct functionality and explain what measures may be taken to rectify faults 13. Explain the requirements for system monitoring and the tests required to verify function in an installed system. 14. Explain how to relate test results to identify faults in the system transmission paths and the measures that may be taken in order to rectify faults. 15. Measure the standby and alarm currents and carry out calculations to confirm that the standby battery is of the correct size and specification 16. Explain the tests required to confirm that the cause and effect programming is correct, that the customers specifications and the requirements of the applicable codes of practice are met. Specifically with respect to response times, system integrity and operational reliability 17. Explain how to measure audible alarm levels and the required levels in accordance with the applicable Code of Practice and any specific requirements of the end user. 18. Explain how required sound levels may be achieved in difficult environments and what alternative measures may be taken to raise alarm

		19. Explain the inspections required for visual alarm devices and the required standards of applicable Codes of Practice with respect to visibility, positioning, spacing and operation 20. Explain the tests required to confirm the operation of remote signalling equipment and that the circuit monitoring meets the requirements of the Code of Practice 21. Inspect and confirm that the building has not changed such that the system design is no longer appropriate 22. Confirm that the customers specification has been met by the installed fire alarm system
	Explanatory Notes The commissioning technician/engineer must be able to confirm that the customer's specification has been met and that the system meets the requirements of the relevant codes of practice, legislation and standards, appropriate to the UK country in which the technician/engineer is working. This requires a confirmation of the design, a confirmation that the installation is faithful to the design and verification that the system performs as intended both with respect to its fire response and also with respect to its ability to monitor and indicate faults.	

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<tr><td rowspan="3">C. Verifying the interface to other systems</td><td>Knowledge and Understanding</td><td>Performance Criteria</td></tr>
<tr><td>Learners will have knowledge and understanding of:
1. How to confirm the required system functions through testing and observation.
2. How to confirm electrical safety requirements are met by inspection and test
3. The requirements of the maintenance engineer during the operational life of the system
4. Good Engineering practice with respect to EMC requirements
5. System compatibility requirements, particularly with respect to the interface with other systems and how this can be verified by test and inspection</td><td>Learners will be able to:
1. Explain how to initiate events on the fire alarm system that will result in outputs to interfaced systems, enabling the interfaced system response to be verified
2. Explain the expected results and what actions should be taken for fault rectification
3. Explain how to initiate events on the interfaced system to confirm that the fire alarm system responds correctly to the inputs
4. Explain the measures that can be taken to rectify any faults that may be identified
5. Explain the tests required in order to confirm that the interface between the systems comply with relevant electrical safety rules, carrying out any necessary calculations
6. Explain the measures that may be taken to rectify faults
7. Explain what tests/inspections are required to confirm that maintenance requirements are met, e.g. by disablements, tests, fault monitoring.
8. Explain what tests/inspections are required in order to ensure good engineering practice has been followed to meet the EMC requirements of the interfaced systems
9. Explain the tests, measurements and inspections required for the interface between systems, ensuring that they are electrically and operationally compatible and that signalling protocols operate correctly and reliably
10. Explain what measures should be carried out in order to rectify faults</td></tr>
<tr><td colspan="2">Explanatory Notes
Interfacing with other systems may be unique to the site in question, therefore the commissioning engineer must be able to verify that the systems operate correctly together and that good engineering practice has been adopted so as to confirm that the compatibility and electrical safety requirements have been met as well as all appropriate legislation.</td></tr>
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D. Documentation	Knowledge and Understanding	Performance Criteria
	Learners will have knowledge and understanding of: 1. Reading and understanding the customers specification, including cause and effect requirements 2. Reading and understanding the design specification 3. Checking the Fire Risk Assessment and confirming systems fulfils its requirement 4. Review of design/installation certificates 5. Review installation test results 6. Review of as fitted drawings 7. Completing test records 8. Completing the commissioning certificate 9. Recording the soak test 10. Completing the log book 11. Access to and knowledge of product documentation 12. Zone Plans 13. O&M manual 14. Other documentation as required by the contract	Learners will be able to: 1. Read and understand the customer's specification for the fire alarm system, identifying the detailed requirements that must be fulfilled by the system 2. Relate the customers required cause and effect specification to the site specific configuration of the fire alarm system and verify that the customers' requirements are met 3. Read and understand the design specification and verify that the specification is met by the installed system 4. Review the fire risk assessment and confirm that the risks identified have been adequately addressed through the system category and any additional specific coverage in the system design 5. Review the design and installation certificates identifying any specific issues e.g. variations that need to be checked and confirmed during commissioning 6. Review the installation test results and compare with the design specification and as fitted drawings to confirm that all necessary tests have been carried out 7. Ensure that any missing tests are subsequently carried out and verify results and calculations are correct 8. Review and confirm the as-fitted drawings to confirm that the design specification have been met 9. Review and confirm as-wired drawings with system device addresses. 10. Confirm device isolator devices have been shown on the as-wired drawings where isolators are not in every fire device. 11. Record the results of all reviews/inspections/tests such that the commissioning activity can be audited for sufficiency 12. Complete the commissioning certificate identifying any possible causes of unwanted alarms, all non-conformances

		and any observations that should be brought to the attention of the customer 13. Record the results of the soak test 14. Complete the log book in preparation of handover of the system to the customers representative 15. Demonstrate that the customer has access to the relevant product documentation, that it is up to date and that the features of the system are adequately defined 16. Verify that the zone plans are suitable and sufficient to assist the FRS in responding to a fire incident and that they are correctly located in the premises 17. Review the O&M manual to verify that it is suitable and sufficient for the customer and for on-going maintenance and support over the anticipated life of the system or where O&M provided by others contribute relevant information to ensure its accuracy. 18. Verify that the customers specification for all documentation has been met
	Explanatory Notes The system documentation should be sufficient to provide evidence that the customer’s requirements have been met. The commissioning technician/engineer is responsible for pulling together and generating the documentation pack and, is the person who should have sufficient knowledge to identify any shortfall in the requirements. Where documentation has been found to be insufficient or missing, the commissioning technician/engineer will be required to know where the relevant information can be found and how to correct any errors or failings.	

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<tr><td rowspan="3">E. Maintenance Methodology</td><td>Knowledge and Understanding</td><td>Performance Criteria</td></tr>
<tr><td>Learners will have knowledge and understanding of:
1. Fault finding
2. System maintenance requirements</td><td>Learners will be able to:
1. State what features are available with the system to ensure effective and sufficient fault finding can be carried out and explain how they may be used
2. List and describe the systems and methods available to verify by test and inspection that the fire alarm system has sufficient features and facilities to allow fault finding to be carried out to identify common faults as can be expected over the life of the system
3. List the systems and equipment available to allow routine maintenance and testing of system components in inaccessible and difficult to reach positions and explain the processes to verify their correct function
4. State and describe methods and requirements to verify by test and inspection that adequate access and facilities are provided to enable the system to be tested in accordance with the maintenance program required by the customer and the Code of Practice</td></tr>
<tr><td colspan="2">Explanatory Notes
Some detectors may be installed in difficult to access locations and this may require that alternative facilities or devices have to be used to enable the maintenance program to be effectively followed. Over the life of the system certain faults and degradation can be anticipated and so facilities need to be provided to be able to ensure that maintenance technicians can identify when modifications or replacement of equipment becomes necessary. The commissioning engineer should be able to verify that the correct facilities are in place.</td></tr>
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<tr><td rowspan="3">F. False Alarm Management</td><td>Knowledge and Understanding</td><td>Performance Criteria</td></tr>
<tr><td>Learners will have knowledge and understanding of:
1. Potential causes of unwanted alarms
2. Remedial techniques for reducing the risk of unwanted alarms
3. Choice of alternative detector types
4. Filtering techniques and facilities available in EN54-2 panels
5. Soak testing</td><td>Learners will be able to:
1. List potential causes of false alarms and their triggers, indicators
2. Identify potential causes of false alarms by inspection of the location of detectors and by inspection of the fire alarm system with respect to the building and the use of each location (e.g. kitchens, loading bays, laundry facilities)
3. Explain what remedial actions may be taken to prevent/mitigate false alarms, e.g. changing or relocating detectors.
4. Explain how alternative detectors can be used on the fire alarm system, together with their relative advantages and disadvantages for preventing/mitigating false alarms.
5. Describe the two main approaches to filtering and state examples of several alternatives that are given in EN54-2.
6. Describe what is meant by soak testing for a fire alarm system, and how soak testing is carried out.
7. List possible causes of false alarms both environmental and technical and what measures may be taken to prevent or mitigate.</td></tr>
<tr><td colspan="2">Explanatory Notes
False alarms are wasteful in resource and cause complacency in building occupants putting their lives at risk, therefore they should be reduced or eliminated where possible. False alarms are most often caused by activities within the building, but can be due to faulty equipment, wrong choice of detector or bad installation. The commissioning engineer is the last competent fire alarm engineer to inspect the system before it is put into operation, therefore the commissioner is in an ideal position to identify and correct possible causes of unwanted alarms. Where there is some uncertainty with respect to a particular situation the commissioning engineer can list possible false alarm causes so that the maintenance engineer can follow this up during the first service.</td></tr>
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<tr><td rowspan="3">G. Instructional Techniques</td><td>Knowledge and Understanding</td><td>Performance Criteria</td></tr>
<tr><td>Will have knowledge and understanding of:
1. The handover process
2. Appropriate communication techniques for technical and non-technical customers</td><td>Learners will be able to:
1. Describe the handover process as prescribed in the relevant Code of Practice, identifying the main sections that should be covered.
2. Describe techniques used to instruct the end user in their duties and responsibilities to the system, the system functions and controls.
3. Describe handover methodology including confirmation of the end users understanding of their duties to the FD&A system, system functions and controls.</td></tr>
<tr><td colspan="2">Explanatory Notes
It is usually the commissioning engineer’s job to handover the fire alarm system to their customer. Their customer might be the fire alarm installer, the building contractor, the end user of the fire alarm system or the end user’s representative. Each of these people would need a different approach with respect to training and handover and the commissioning engineer should adjust their approach to suit the needs as required.</td></tr>
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