Proposal to modernise the Methodology of Teaching, Assessment/ Examination

ETO - STCW III/6 COC	Name of respondent, organisation, and role:		
Competency/ Module: Electrical Systems in Potentially Explosive and Gas Hazardous Environments			
Knowledge, understanding and proficiency	**Recommendation of working group regarding the outcome and objective.**	**Rationale**	**Action required**
Outcome 1: Describe the properties of flammable materials and the hazards associated with electrical equipment for use in potentially explosive and corrosive areas	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.1Properties and characteristics of vapours and gasses likely to cause explosion.	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.2 Gas and equipment groupings	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.3 Identify hazards likely to cause ignition from electrical and other sources	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.4 Definition of hazardous areas	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.5 Zone and temperature classification	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.6 Selection of apparatus in relation to zone, temperature	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels

class and gas group BS EN 60079-14			
1.7 Standard methods of explosion protection	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.8 Ingress protection index in relation to codes IEC 529 and EN 60529	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
1.9 Ingress protection requirements of apparatus	Modernise	Modern fuels present new hazards and challenges that must be addressed in this outcome.	Include specific hazards of modern/ future fuels
Outcome 2: Outline the structure of Standards and Codes of Practice, and explain the certification process and design testing for electrical equipment	Modernise	It is important to make sure Cadets clearly understand how the outcome relates to work at sea and it is essential to make sure that this context is given with reference to current and future seagoing technologies and practices.	Include equipment directives to ensure that candidates understand how to ensure that equipment is fit for purpose. (e.g. Installation Protection ratings)
2.1 Current standards and codes of practice for the design and use of Ex equipment	Keep	Relevant	None
2.2 Test houses and notified bodies	Keep	Relevant	None
2.3 The certification process for Ex equipment	Keep	Relevant	None
2.4 Confirmation of equipment design to meet the requirements of and compliance with current standards	Keep	Relevant	None
2.5 CE marking certification and labelling of equipment	Keep	Relevant	None
Outcome 3: Describe the constructional features and installation practices for	Modernise	It is important to make sure Cadets clearly understand how the outcome relates to work at sea and it is	Include equipment directives to ensure that candidates understand how to ensure that

power electrical equipment designed to provide explosion protection		essential to make sure that this context is given with reference to current and future seagoing technologies and practices.	equipment is fit for purpose. (e.g. Installation Protection ratings)
3.1 Description of EEx 'd' (Flameproof) protection method including types of flame path and the methods of containment and suppression of and internal explosion	Keep	Relevant	None
3.2 Description of EEx 'e' (Increased Safety) protection method including the design features and methods to control temperature and eliminate arcing and sparking	Keep	Relevant	None
3.3 Description of EEx 'n' (non-incentive) protection method including constructional features to control heat, arcing and sparking	Keep	Relevant	None
3.4 Description of EEx 'p' (Pressurised) method of protection including specialist applications for purging and pressurisation	Keep	Relevant	None
3.5 Description of installation techniques including the selection of cable glands and earthing and bonding	Keep	Relevant	None

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Outcome 4: Explain the operation of intrinsically safe electrical apparatus and associated components designed to provide explosion protection	Keep	Relevant	None
4.1 Description of operation and use of Zener barrier and Galvanic interface devices including the principle of controlling fault energy levels	Keep	Relevant	None
4.2 Explanation of EEx 'i'a and EEx 'i'b (intrinsically safe) protection including the identification of zones of use, advantages and applications	Keep	Relevant	None
4.3 Description of the installation of Zener barrier and Galvanic isolators including the practices for terminating conductors, maintaining earth integrity and the security of system operation	Keep	Relevant	None
Proposal submitted by:	**Any other outcomes for this competency, above and beyond STCW which would be needed due to use of modern technology and impact of future fuels onboard:**		
	Objective	**Reason Why**	**Action required**
Cadet Training & Modernisation Working Group	Include impact of modern fuels and dangerous cargoes on electrical systems in potentially explosive environments.	As fuel types are changing and low flashpoint fuels are introduced to reduce vessel's carbon footprint, dangerous cargo and modern fuel elements should be compulsory for all officers.	Embed elements relevant to electrical systems in potentially explosive environments from dangerous cargo, oil, gas, chemical and low flashpoint fuel endorsements.

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Cadet Training & Modernisation Working Group	Ensure all outcomes are contextualised to help Cadets understand what they are learning in relation to what they will experience at sea.	While some outcomes are intrinsically linked to work carried out at sea, some need to be contextualised to show how they apply to work on board. Where this is the case, it is important to make sure Cadets clearly understand how the outcome relates to work at sea and it is essential to make sure that this context is given with reference to current and future seagoing technologies and practices.	Where outcomes do not specifically cover a topic which relates to work carried out at sea, more must be done to contextualise the outcome and make it relevant to the maritime industry, giving specific shipping examples of how the outcome may be applied in a modern shipping context. Not every template has contextualisation recommendations but please do add any you feel may have been missed.
Cadet Training & Modernisation Working Group	Include Human Element Factors throughout the syllabus	To provide seafarers with a contextualised understanding of the Human Element in the maritime industry, showing how they can put theory into practice in the work they carry out at sea.	Raise awareness throughout the Cadet's training of the areas in which human element factors will have an impact. Recommendations on where this can be included have been noted throughout the entire syllabus. Not every template has Human Element Factor recommendations but please do add any you feel may have been missed.
Cadet Training & Modernisation Working Group	Include Data Science skills throughout the syllabus	Data Science Skills (Comprehension, Analysis, Presentation, etc...) are already required within much of the syllabus. A further, specific focus on these skills needs to be taught where relevant.	A specific topic will need to be introduced to improve Cadets' Data Science skills. Practical application of data science skills should be highlighted throughout the syllabus. Not every template has Data Science recommendations but please do add any you feel may have been missed.