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| 1. Title | Verify the design of electricity power systems of electric trains and perform design reviews | |
| 2. Code | EMRADE503A | |
| 3. Range | Apply the professional knowledge and techniques of electrical circuit engineering to verify the design of power supply systems of electric trains and perform design reviews according to the design requirements and in coordination with the overall train design. | |
| 4. Level | 5 | |
| 5. Credits | 9 | |
| 6. Competency | | Performance Requirements |
| | 6.1 Design requirements for electricity power systems of electric trains to match with the overall train design | ♦ Understand the design requirements for power supply systems of electric trains and master the key points. The system equipment includes pantographs, circuit breakers, transformer devices, electricity return devices and control and protection devices<br>♦ Master the key points of the overall train design and the techniques of matching the design of electricity power systems of electric trains |
| | 6.2 Methods and procedures of verifying the design of electricity power systems of electric trains and performing design reviews | ♦ Verify the mechanical design of pantographs according to the design requirements for train speed, acceleration rate and deceleration rate, the design of the overhead line and physical environment of the railway<br>♦ Calculate and verify the electrical design of pantographs according to the total electrical load of the train equipment and the overhead line voltage<br>♦ Verify the design of pantographs control and protection according to the design requirements for the pantographs to contact and drop away from the overhead lines<br>♦ Calculate and verify the electrical design of main circuit breaker according to the total electrical load of the train equipment, circuit breaking capacity, fault current capacity and the overhead line voltage<br>♦ Verify the mechanical design of main circuit breaker according to its location and wire connection<br>♦ Verify the design of main circuit breaker control and protection according to the design requirements for train circuits<br>♦ Verify the electrical design of main transformer according to the power demand of train traction control and auxiliary equipment and the overhead line voltage<br>♦ Verify the mechanical design of main transformer according to its location and the design of the suspension system of train |

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| | | ♦ Verify the design of main transformer control and protection according to the design requirements for train circuits<br>♦ Verify the design of main power line and electricity return devices of trains according to total electrical load of the train and the system voltage<br>♦ Verify the design of the control and protection circuits and devices of electricity power systems of electric trains according to the performance requirements for the electricity power system<br>♦ Review comprehensively the design of electricity power systems of electric trains according to the requirements for the overall train design<br>♦ Consider the safety, reliability, comfort, environmental protection and efficiency of trains during design reviews |
| | 6.3 Professionalism in verifying and reviewing the design of electricity power systems of electric trains | ♦ Verify the design of electricity power systems of electric trains and perform design reviews according to the standards and requirements for work safety, health, environmental protection and quality management of railway works<br>♦ Understand the safety guidelines as required by the law and codes of practice in verifying and reviewing the design of electricity power systems of electric trains |
| 7. Assessment Criteria | The integrated outcome requirement of this unit of competency is:<br>(i) Capable to verify the design of major electricity power system equipment of electric trains efficiently according to relevant design standards; and<br>(ii) Capable to review the design of electricity power systems of electric trains efficiently according to the standards complying with the overall train design. | |
| 8. Remarks | The credit value of this unit of competency is set on the presumption that the person already possesses professional knowledge of electrical circuit engineering. | |