Overview

This standard identifies the competencies you need to restore rails to operational condition by resurfacing or repair, using either manual arc or self-shielded flux cored wire arc welding equipment, in accordance with instructions and/or approved welding procedures. You will be expected to check the welding equipment to ensure that all the leads/cables, electrode holders and wire feed mechanisms are securely connected and free from damage. In preparing to weld, you will need to set and adjust the welding conditions in line with the instructions or welding procedure specification. You must operate the equipment safely and correctly and make any necessary adjustments to settings in line with your permitted authority, in order to produce the repairs to the required specification.

Your responsibilities will require you to comply with organisational policy and procedures for the welding activities undertaken, and to report any problems with the welding equipment or welding activities that you cannot resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will be sufficient to provide a sound basis for your work, and will provide an informed approach to applying rail welding repair procedures and instructions. You will understand the manual arc or self-shielded flux cored arc welding process used, and its application, and will know about the equipment, materials and consumables in adequate depth to provide a sound basis for setting up and operating the equipment, recognising and correcting faults and ensuring the work output is produced to the required specification.

You will understand the safety precautions required when working with the welding equipment and will be required to demonstrate safe working practices throughout. You will understand the responsibility you owe to yourself and others in the workplace.
Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow the relevant specifications for the component to be repaired
3. prepare the component for repair
4. carry out the repairs within agreed timescale using approved materials, components, methods and procedures
5. ensure that the repaired rail meets the specified operating conditions
6. produce accurate and complete records of all the repair work carried out.
Knowledge and understanding

You need to know and understand:

1. the safe working practices and procedures to be observed when working with manual metal arc or self-shielded flux cored wire arc welding equipment (rail site safety, appropriate personal protective equipment (PPE), fire prevention, protecting other workers from arc eye, safety in enclosed/confined spaces; fume control; accident procedure; statutory regulations)
2. the hazards associated with arc welding (live electrical components, poor earthing, the electric arc, fumes and gases, spatter, hot metal), and how they can be minimised
3. the arc welding process (basic principles of fusion welding, AC and DC power sources, ancillary equipment and power ranges, care of equipment)
4. the consumables associated with manual metal arc or flux cored wire arc welding (types of wire/electrode and their application)
5. the types of repairs to be produced (resurfacing and repair)
6. identifying the various steels used in rails, switches and crossings, and how they will affect the welding repair procedure
7. preparing the area of the rail to be repaired by grinding and penetrant testing
8. preparing the welding equipment, and checks that need to be made to ensure that it is safe and ready to use (electrical connections, earthing arrangements; wire feed mechanisms, setting welding parameters, correct workpiece set-up, cleanliness of materials used)
9. the importance of complying with job instructions and the welding procedure specification
10. how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
11. how to complete and finish the repaired rails (grinding off excess material, finish profiling and penetrant testing)
12. the procedures for reinstating the track on completion of the repair activities
13. problems that can occur with the welding activities, and how these can be overcome (causes of distortion and methods of control, effects of welding on materials and sources of weld defects;
methods of prevention)
14. the techniques of operating the welding equipment to produce a range of repairs (fine tuning parameters, correct manipulation of the welding gun/electrode, safe closing down of the welding equipment)
15. the organisational quality systems used and weld standards to be achieved
16. weld inspection and test procedures used including destructive and non-destructive methods
17. personal approval tests and their applicability to your work
18. the extent of your own authority and whom you should report to if you have problems that you cannot resolve
1. Carry out all of the following during the repair activities:
   1. determine or confirm the specific repair to be carried out
   2. prepare the area of the rail to be repaired using grinding and penetrant testing
   3. use safe and approved repair welding procedures at all times
   4. finish the repair using approved methods and techniques
   5. test the repaired area using the penetrant method
   6. re-instate the track to the required standard on completion of the repair activities
   7. dispose of waste and surplus materials in accordance with approved procedures

2. Use one of the following arc welding processes:
   1. manual metal arc
   2. self-shielded flux cored wire arc

3. Set up, check, adjust and use arc welding and related equipment, to include all of the following:
   1. confirming welding equipment, consumables and ancillary equipment is available
   2. checking that all leads/cables are secure and in a safe and usable condition
   3. checking that the wire feed mechanism or electrode holder is securely connected and free from damage
   4. ensuring that the correct type and size of wire or electrode is loaded to the wire feed mechanism or electrode holder
   5. setting and adjusting the welding conditions in line with the instructions or welding procedure specification
   6. carrying out the repair welding activities safely and correctly in line with the repair specification

4. Use consumables appropriate to the rail material and application, to include both of the following:
   1. two different wire or electrode types
   2. two different wire or electrode sizes

5. Produce welded repairs in good access situations, to include both of the following:
   1. normal grade rail
2. austenitic-manganese rail

6. Produce repairs which include both of the following:
   1. resurfacing
   2. repair

7. Produce welded repairs which meet all of the following quality and accuracy standards:
   1. achieve a minimum weld quality as required by the application standard
   2. meet the required dimensional accuracy within specified tolerances
   3. are ground to the required standard
Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment
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<td>March 2017</td>
</tr>
<tr>
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<td>April 2020</td>
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