Overview

This standard identifies the competences you need to restore mould, press tool or die components to usable condition by repair or modification, in accordance with approved procedures. You will be required to rework a range of tool and die assemblies, sub-assemblies, components and equipment to operational condition, by reforming, reworking the surface, replacing threads or replacing worn parts. This will require you to select the appropriate equipment to use, based on the nature of the repair, the operations that will need to be carried out, and the accuracy to be achieved.

In repairing or modifying the components, you will be expected to use a range of hand tools, machine tools, portable power tools, and shaping and fitting techniques, appropriate to the type of material and repair/modification being carried out. These will include activities such as sawing (hand, band), drilling, reaming, grinding (hand or machine), filing, scraping or lapping, threading (internal or external), turning, milling, and the use of thermal processes such as brazing and welding.

Your responsibilities will require you to comply with organisational policy and procedures for the tool and die reworking activities undertaken, and to report any problems with these activities, or with the tools, equipment or materials used, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will demonstrate a good understanding of your work, and will provide an informed approach to applying mould, press tool or die repair or modification procedures. You will understand the function and operating conditions of the components being repaired or modified, in adequate depth to provide a sound basis for carrying out the activities to the required specification, and to ensure that any repairs carried out are safe and practical in operation. You will also understand the organisational policy on repairing components, and its application.

You will understand the safety precautions required when carrying out the repair or modification activities, especially those for preventing movement of the press/machine and for isolating the equipment. You will also understand your responsibilities for safety and the importance of taking the necessary safeguards to protect yourself and others in the workplace.
SEMET310

Repairing or modifying mould, press tool or die components

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 and components and methods and
5. procedures
6. ensure that the repaired component meets the specified operating conditions
7. produce accurate and complete records of all repair work carried out
Knowledge and understanding

You need to know and understand:

1. the health and safety requirements of the area in which you are carrying out the repair or modification activities, and the responsibility they place on you
2. the isolation procedure or permit-to-work procedure that applies
3. the specific health and safety precautions to be applied during the repairing procedure, and their effects on others
4. the importance of wearing protective clothing and equipment (PPE), and of keeping the work area safe and tidy
5. the hazards associated with the repair or modification operations being carried out (such as sawing (hand, band), drilling, reaming, grinding (hand or machine), machining and thermal processes), and how they can be minimised
6. the procedure for obtaining the required drawings, sketch, development sheets, job instructions and other related specifications, and how to interpret them to carry out the process successfully
7. how to interpret tool and die reference/datum points and system of tolerancing
8. the factors to be taken into account when deciding if a repair is practical and possible (such as, is a replacement component available, cost of replacing, safety of repair, age and condition of equipment.)
9. the types of repairs or modifications that can be made to tool and die components in order to prolong their useful life (such as bushing worn holes, fitting thread inserts, building up surfaces by thermal process or metal spraying, making stepped or oversize dowels or studs)
10. the need to liaise with other departments to have specialised operations carried out on the components (such as thermal processes, metal spraying)
11. the shaping and profiling methods and techniques to be used, and the sequence in which the operations will need to be carried out
12. how to produce flat, square and curved surfaces, and how to achieve the required surface finish using a variety of hand and portable powered tools
13. how to cut external threads using hand dies, and the method of fixing and adjusting the dies to give the correct thread fit
14. how to determine the drill size for tapped holes, and the importance of using the taps in the correct sequence
15. how to produce a sliding or mating fit, and the techniques to be adopted
16. the types and application of portable power tools that can be used for the hand fitting operations
17. how to use hand power tools and specialist equipment correctly (such as electrical, pneumatic, lifting equipment)
18. how to check that portable power tools and extension cables are free from damage and are in a safe, tested and usable condition
19. the company recording procedures to be used following repair or modification, and how to apply them
20. the problems that can occur with the repairing and modifying of the tools and dies, and how these can be overcome
21. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
Scope/range related to performance criteria

1. Carry out all of the following during the mould, press tool or die component repair or modification activities:
   1. plan the repair/Modification activities to cause minimal disruption to normal working
   2. use the correct issue of company and/or manufacturer’s drawings and maintenance documentation
   3. adhere to risk assessment, CoshH and other relevant safety standards
   4. ensure that jacks/chocks or safety rams are fitted and are operating correctly
   5. ensure the safe isolation of equipment (such as mechanical, electricity, gas, air or fluids)
   6. provide safe access and working arrangements for the maintenance area
   7. carry out the tool and die repair or modification activities using appropriate techniques and procedures
   8. re-connect and return the system to service on completion of the activities
   9. dispose of waste items in a safe and environmentally acceptable manner
   10. leave the work area in a safe and tidy condition

2. Use a range of fitting and repair methods, to include five of the following:
   1. sawing
   2. drilling
   3. reaming
   4. grinding
   5. polishing
   6. chiselling
   7. filing
   8. brazing
   9. threading external
   10. tapping
   11. scraping
   12. electro-discharge machining
   13. welding
   14. machining
   15. metal spraying

3. Repair or modify mould, press tool or die components which combine several features and cover three of the following:
   1. flat datum faces
   2. faces which are square to each other
   3. curved profiles
4. drilling and reaming
5. internal and external threads
6. faces which are parallel to each other
7. faces at an angle to each other
8. profiles produced from template/pattern
9. guide media
10. sliding or mating parts

4. Use appropriate techniques to carry out four of the following types of repair:
1. reforming the component surface by adding metal
2. reconditioning by replacement of worn components
3. reworking the surface finish (using techniques such as filing, scraping, grinding)
4. sleeving worn components
5. making a temporary fix
6. replacement of internal thread (inserts)
7. reworking the fit (shimming)
8. plugging holes
9. stopping cracks running and filling them
10. bushing worn holes
11. other specific repair procedure

5. Repair components made from different types of material, to include two from the following:
1. low carbon steel
2. high carbon steel
3. stainless steel
4. aluminium
5. brass
6. cast iron
7. composite alloy
8. non-metallic
9. other specific material

6. Ensure that the repaired or modified mould, press tool or die components conform to all of the following quality and accuracy requirements:
1. all dimensional tolerances are to specifications
2. all geometric tolerances are to specification
3. the surface finish is to specification
4. the profile meets production specifications
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