

**NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND  
TRAINING**



**APRIL 2023**

**PROPOSED OCCUPATIONAL STANDARDS**

**OCCUPATION: MECHANICAL EQUIPMENT MAINTENANCE TECHNICIAN**

**LEVEL: NTA 6**

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## **ABBREVIATIONS**

|                |                                                                      |
|----------------|----------------------------------------------------------------------|
| <b>CBET</b>    | Competency Based Education and Training                              |
| <b>GMP</b>     | Good Manufacturing Practice                                          |
| <b>HACCP</b>   | Hazard Analysis and Critical Control Point                           |
| <b>NACTVET</b> | National Council for Technical and Vocational Education and Training |
| <b>NOS</b>     | National Occupational Standards                                      |
| <b>OS</b>      | Occupational Standards                                               |
| <b>OSHA</b>    | Occupational Safety and Health Administration                        |
| <b>SOPS</b>    | Standard Operating Procedures                                        |
| <b>TET</b>     | Technical Education and Training                                     |
| <b>TVET</b>    | Technical and Vocational Education and Training                      |

## GLOSSARY OF TERMS

|                                        |                                                                                                                                                                                                                                    |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Circumstantial Knowledge:</b>       | Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.                                                                                                                |
| <b>Competence:</b>                     | The ability to use knowledge, understanding, practical and thinking skills to perform effectively to the workplace standards required in employment.                                                                               |
| <b>Competency:</b>                     | A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.                                                                                                             |
| <b>Competency-based Education:</b>     | An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.                                                                                                        |
| <b>Curriculum:</b>                     | A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".                                     |
| <b>Educational/Training Programme:</b> | The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.                                                                     |
| <b>Occupation:</b>                     | A specific position requiring the performance of specific tasks - essentially the same tasks are performed by all employees having the same title. (Example: baker)                                                                |
| <b>Occupational Area:</b>              | This is a broad grouping of related jobs. (Example: food service)                                                                                                                                                                  |
| <b>Occupational Standards:</b>         | Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as performance tool of assessment of the prescribed outcomes. |
| <b>Performance Criteria:</b>           | Indicate the expected end results or outcome in form of evaluative statements.                                                                                                                                                     |
| <b>Skills:</b>                         | The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.  |
| <b>Standards:</b>                      | It is a set of statement, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.                                                                            |

|                                 |                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Task Analysis:</b>           | The process of analysing each task to determine the steps, related knowledge, attitudes, performance standards, tools and materials needed, and safety concerns required of employees performing it.                                                                                               |
| <b>Task:</b>                    | A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to a product, service, or decision.                                                                                                                       |
| <b>Underpinning Knowledge:</b>  | This is crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.                                                                                                                                                      |
| <b>Verification Process:</b>    | The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation. |
| <b>Occupational Competence:</b> | The application of knowledge and skills to perform consistently to the standards required in the work context.                                                                                                                                                                                     |

## 1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs troubleshooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet

the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Mechanical Equipment Maintenance Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM Charts, and the Occupational Standards.

## **2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS**

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The *10-year National Skills Development Strategy (2016-2026)* was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The occupational standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, supervisory technicians on the job, and experienced Mechanical Equipment Maintenance Technicians were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ..... online surveys were completed by

experts from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ..... participants from different parts of the country representing various companies.

### **3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR MECHANICAL EQUIPMENT MAINTENANCE TECHNICIANS**

The standards cover a broad range of duties and tasks that can be performed by an Mechanical Equipment Maintenance Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Mechanical Equipment Maintenance Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

Scope of occupational standards for Mechanical Equipment Maintenance Technician: Personnel engaged in installation, debugging, maintenance and repair of mechanical part and playing an important role in the fields such as mechanical product collection, transportation, storage and processing. Mechanical equipment maintenance technicians assemble and debug the mechanical parts, components or product assembly with fitter's tool, drilling machine, tooling or other tools. Staff in this post shall strictly abide by internal agreement, standard operation procedures (SOP) and current good manufacturing practice (cGMP). Generally, the Mechanical Equipment Maintenance Technician performs the following responsibilities:

- a) Open-box inspection of mechanical equipment;
- b) Reading of installation drawings of mechanical equipment;
- c) Selection of installation and maintenance tools;
- d) Safety protection for mechanical equipment installation;
- e) Powering on/off and simple maintenance of the mechanical equipment
- f) Cleaning of the internal and external equipment parts



- g) Selection of suitable lubricant for equipment lubrication
- h) Filling in the maintenance record
- i) Reading of the mechanical equipment drawings
- j) Identification of the common mechanical faults
- k) Implementation of the safety measures for workplace
- l) Preparation before mechanical equipment installation
- m) Installation of the ordinary cutting equipment
- n) Debugging of the ordinary cutting equipment
- o) Basic operation for benching of mechanical components
- p) Hole and thread machining of mechanical components
- q) Diagnosis of the faults of ordinary cutting equipment
- r) Repairing of the transmission mechanism of mechanical equipment
- s) Repairing of the hydraulic/pneumatic system of mechanical equipment
- t) Standard operation and maintenance of mechanical equipment

The Occupational standards have been clustered into NTA qualification levels, i.e. NTA Level 4, 5 and 6.

#### **4.0. VALIDITY PERIOD**

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

#### **5.0. OCCUPATIONAL STANDARDS**

## 5.1 OCCUPATIONAL STANDARDS FOR MECHANICAL EQUIPMENT

### MAINTENANCE TECHNICIAN – NTA 6

|                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                     |      |
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| OCCUPATION                                                                                                                                                                                                                                                     | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                    | OCCUPATION<br>CODE                                                                                                  |      |
| DUTY TITLE                                                                                                                                                                                                                                                     | INSTALLATION OF PRECISION<br>MACHINING EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                  | DUTY NO.                                                                                                            | 601  |
| TASK TITLE                                                                                                                                                                                                                                                     | POSITIONING OF GRINDING,<br>BORING AND PLANO MILLING<br>MACHINE                                                                                                                                                                                                                                                                                                                                                                                   | TASK NO.                                                                                                            | 6011 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                        | The person performing this task must be able to position correctly before installing grinding, boring and plano milling machine according specified standards, procedures as well as mastered knowledge and skills.                                                                                                                                                                                                                               |                                                                                                                     |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                             | The task can be performed in the factory under the supervision of mechanical engineers.<br><br>The tools and equipment to be used include:<br><br>1. Grinding machine;<br><br>2. Boring machine;<br><br>3. Plano milling machine;<br><br>4. Supporting tool;<br><br>5. Installation tool;<br><br>6. Measuring tool;<br><br>7. Positioning tool;<br><br>8. Removal tool;<br><br>9. Cleaning tool;<br><br>10. Clamps;<br><br>11. Lifting equipment. |                                                                                                                     |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                     |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UNDERPINNING KNOWLEDGE                                                                                              |      |
| The person performing this task must be able to do the following:<br><br>1. Be familiar with installation requirements and choose suitable equipment installation environment;<br><br>2. Read the equipment instruction and construction installation drawing; |                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Detailed knowledge about:<br><br>1.0 Methods<br><br>The person performing this task must be able to explain how to: |      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| 3. Install and use clamps;<br>4. Install foundations, including ordinary structure foundation and vibration-proof foundation;<br>5. Lift the machine tool;<br>6. Pour the concrete into foundation hole;<br>7. Install the pad iron;<br>8. Install the lathe bed;<br>9. Install columns and beams;<br>10. Install the turret;<br>11. Installing the Motor;<br>12. Adjust the levelness of lathe bed and perpendicularity of stand column;<br>13. Operate the mechanical equipment in trial;<br>14. Fill in whole forms, records and other documents;<br>15. Clean the working tools and equipment;<br>16. Store the tools, equipment and safety device properly;<br>17. Pay attention to the health and safety when performing tasks. | 1.1 Operate the working machine;<br>1.2 Use the operation manual of grinding, boring and plano milling machine;<br>1.3 Fix the mechanical equipment.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles:<br>2.1 Positioning installation principle;<br>2.2 Equipment fixing principle.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Basic theory knowledge of machining;<br>3.2 Machining process and method;<br>3.3 Tolerance Fit and Technical Measurement;<br>3.4 Fitter's skills;<br>3.5 Electrical knowledge;<br>3.6 Characteristics of grinding, boring and plano milling machine.<br><br><b>4.0 Essential Skills</b><br>4.1 Teamwork;<br>4.2 Communication skills;<br>4.3 Quality record;<br>4.4 Engineering consciousness;<br>4.5 Safe operation skills;<br>4.6 Time management skills. |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The grinding, boring and plano milling machines are positioned correctly according to technical requirements and installation process specifications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Detailed knowledge about:</b><br>1. Occupational Safety and Health;<br>2. ISO standards;<br>3. Safety and civilized construction and environmental protection;<br>4. Quality management.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



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| OCCUPATION                                                                                                                                                                                                                                                                                                                               | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                    | OCCUPATION<br>CODE                                                                                          |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                               | INSTALLATION OF<br>PRECISION MACHINING<br>EQUIPMENT                                                                                                                                                                                                                                                                                                                                               | DUTY NO.                                                                                                    | 601  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                               | FIXING OF THE GRINDING,<br>BORING AND PLANO<br>MILLING MACHINE                                                                                                                                                                                                                                                                                                                                    | TASK NO.                                                                                                    | 6012 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                  | The person performing this task must be able to position correctly before installing grinding, boring and plano milling machine according specified standards, procedures as well as mastered knowledge and skills.                                                                                                                                                                               |                                                                                                             |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                       | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Grinding machine;<br>2. Boring machine;<br>3. Plano milling machine;<br>4. Supporting tool;<br>5. Installation tool;<br>6. Measuring tool;<br>7. Positioning tool;<br>8. Removal tool;<br>9. Cleaning tool;<br>10. Clamps;<br>11. Lifting equipment. |                                                                                                             |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                             |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                   | UNDERPINNING KNOWLEDGE                                                                                      |      |
| The person performing this task must be able to do the following:<br>1. Choose suitable equipment installation environment;<br>2. Read the equipment instruction and construction installation drawing;<br>3. Install and use clamps;<br>4. Install foundations, including ordinary structure foundation and vibration-proof foundation; |                                                                                                                                                                                                                                                                                                                                                                                                   | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to: |      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| 5. Lift the machine tool;<br>6. Pour the concrete into foundation hole;<br>7. Install the pad iron;<br>8. Install the lathe bed;<br>9. Install columns and beams;<br>10. Install the turret;<br>11. Install the motor;<br>12. Adjust the levelness of lathe bed and perpendicularity of stand column;<br>13. Operate the mechanical equipment in trial;<br>14. Fill in whole forms, records and other documents;<br>15. Clean the working tools and equipment;<br>16. Store the tools, equipment and safety device properly;<br>17. Pay attention to the health and safety when performing tasks. | 1.1 Prepare the technical data;<br>1.2 Confirm the mechanical equipment structure;<br>1.3 Prepare the tools and materials;<br>1.4 Confirm the installation steps and operation;<br>1.5 Confirm the fixing forms and methods of machinery.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles:<br>2.1 Lifting principle of mechanical equipment;<br>2.2 Positioning installation principle;<br>2.3 Equipment fixing principle.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Basic theoretical knowledge of machining;<br>3.2 Machining process and method;<br>3.3 Tolerance fit and technical measurement<br>3.4 Fitter's skills;<br>3.5 Electrical knowledge;<br>3.6 Characteristics of milling, boring and plano milling machine;<br>3.7 Safety civilized construction and environmental protection.<br><br><b>4.0 Essential Skills</b><br>4.1 Teamwork;<br>4.2 Communication skills;<br>4.3 Quality records;<br>4.4 Engineering consciousness;<br>4.5 Safe operation;<br>4.6 Time management. |
| <b>DESCRIPTION OF THE END PRODUCT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | The grinding, boring and plano milling machines are correctly fixed according to technical requirements and installation process specifications.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Detailed knowledge about:</b><br>1. Occupational safety and health;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|  |                   |
|--|-------------------|
|  | 2. ISO standards. |
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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                      | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | INSTALLATION OF PRECISION<br>CUTTING EQUIPMENT                                                                                                                                                                                                      | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 602  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ADJUSTMENT OF INSTALLATION<br>PRECISION OF MILLING, BORING<br>AND PLANO MILLING MACHINE                                                                                                                                                             | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6021 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The person performing this task must be able to position correctly before installing grinding, boring and plano milling machine according specified standards, procedures as well as mastered knowledge and skills.                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The task can be performed in the factory under the supervision of mechanical engineers.<br><br>The tools and equipment to be used include:<br><br>1. Supporting tool;<br><br>2. Testing tools;<br><br>3. Positioning tool;<br><br>4. Cleaning tool. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                     | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |
| The person performing this task must be able to do the following:<br><br>1. Prepare the detection tools;<br>2. Align the leveling equipment;<br>3. Detect the linearity of X-axis motion;<br>4. Detect the linearity of Y-axis motion;<br>5. Detect the linearity of Z-axis motion;<br>6. Detect the axis perpendicularity of Z-axis and X-axis motion;<br>7. Detect the axis perpendicularity of Z-axis and Y-axis motion;<br>8. Detect the axis perpendicularity of Y-axis and X-axis motion;<br>9. Detect the parallelism of spindle and Z-axis;<br>10. Detect the perpendicularity of spindle axis and X-axis;<br>11. Detect the perpendicularity of spindle axis and Y-axis;<br>12. Detect the parallelism of work surface; |                                                                                                                                                                                                                                                     | Detailed knowledge about:<br><br>1.0 Methods<br><br>The person performing this task must be able to explain how to:<br><br>1.1 Operate the working machine;<br>1.2 Use the operating manual;<br>1.3 Use the equipment.<br><br>2.0 Principle<br><br>The person performing this task must be able to explain the following principles:<br><br>2.1 Aligning and leveling principle;<br>2.2 Adjustment standard of X, Y and Z axis.<br><br>3.0 Theories<br><br>The person performing this task must be able to explain the following: |      |



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| 13. Detect the perpendicularity of work surface and Z-axis;<br>14. Detect the perpendicularity of work surface and X-axis;<br>15. Detect the perpendicularity of work surface and Y-axis;<br>16. Detect the end run-out of spindle;<br>17. Detect the radial run-out of spindle taper hole;<br>18. Adjust axial movement of spindle. | 3.1 Classification knowledge of production system;<br>3.2 Quality guarantee methods;<br>3.3 Quality control method;<br>3.4 Operation skills of different precision cutting equipment;<br>3.5 Material science knowledge;<br>3.6 Basic mechanics knowledge;<br>3.7 Basic electrical engineering skills.<br><br><b>4.0 Essential Skills</b><br>4.1 Teamwork;<br>4.2 Communication skills;<br>4.3 Quality records;<br>4.4 Engineering consciousness;<br>4.5 Safe operation;<br>4.6 Time management. |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>                                                                                                                                                                                                                                                                                      | The equipment installation precision is detected and adjusted according to technical requirements and installation process specification                                                                                                                                                                                                                                                                                                                                                         |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                      | <b>Detailed knowledge about:</b><br>1. Safety operation equipment and tools;<br>2. Occupational safety and health;<br>3. ISO standards.                                                                                                                                                                                                                                                                                                                                                          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                      | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DEBUGGING OF PRECISION<br>MACHINING EQUIPMENT                                                                                                                                                                                       | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 602  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIAL OPERATION OF MILLING,<br>BORING AND MILLING MACHINE                                                                                                                                                                           | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6022 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The person performing this task must be able to position correctly before installing grinding, boring and plano milling machine according specified standards, procedures as well as mastered knowledge and skills.                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The task can be performed in the factory under the supervision of mechanical engineers.<br><br>The tools and equipment to be used include:<br>1. Supporting tool;<br>2. Testing tools;<br>3. Positioning tool;<br>4. Cleaning tool. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                     | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| The person performing this task must be able to do the following:<br><br>1. Read the electrical diagram of machine tool;<br>2. Choose suitable tools, safety device, materials and equipment;<br>3. Identify and operate the controller and button;<br>4. Be familiar with equipment structure and performance;<br>5. Check the power supply;<br>6. Check each fastener;<br>7. Clean and lubricate the machine tool;<br>8. Operate the motor;<br>9. Operate the hydraulic/pneumatic system in trial;<br>10. Operate the spindle in trial;<br>11. Operate the feed system in trial;<br>12. Check the roughness of manufactured surface;<br>13. Check the machining flatness; |                                                                                                                                                                                                                                     | Detailed knowledge about:<br><br>1.0 Methods<br><br>The person performing this task must be able to explain how to:<br><br>1.1 Prepare the technical data;<br>1.2 Confirm the performance indexes of mechanical equipment;<br>1.3 Prepare the tools and materials;<br>1.4 Confirm the trial operation steps;<br>1.5 Confirm the trial operation method.<br><br>2.0 Principle<br><br>The person performing this task must be able to explain the following principles: |      |

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| 14. Check the machining parallelism;<br>15. Check the machining perpendicularity. | 2.1 Aligning and leveling principle;<br>2.2 Installation precision standard.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Manual and automatic operation skills of precision machining tool;<br>3.2 Quality inspection method;<br>3.3 Material science knowledge;<br>3.4 Basic electric control knowledge;<br>3.5 Hydraulic and Pneumatic Transmission;<br>3.6 Reading of mechanical and electrical drawings.<br><br><b>4.0 Essential Skills</b><br>4.1 Drawing reading;<br>4.2 Communication skills;<br>4.3 Honest and trustworthy;<br>4.4 Engineering consciousness;<br>4.5 Safe operation;<br>4.6 Time management. |
| <b>DESCRIPTION OF THE END PRODUCT</b>                                             | The precision machining tool is correctly debugged according to specified standards and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                   | <b>Detailed knowledge about:</b><br>1. Occupational safety and health;<br>2. Safety operation equipment and tools;<br>3. Scope of duties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MACHINING OF MECHANICAL<br>EQUIPMENT COMPONENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 603  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DEFORMED WORKPIECE<br>SCRIBING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 6031 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The person performing this task must be able to scribe the deformed workpiece of mechanical equipment according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br><div><div>1.</div><div>Scribing tools (scribing platform, square box, V-shaped block, scribing needle/compass, steel plate ruler, height Vernier caliper and sample punching pin);</div></div> <div><div>2.</div><div>Measuring tools (steel tape, Vernier caliper, universal bevel protractor and 90° angle ruler);</div></div> <div><div>3.</div><div>Coating of scribing.</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| The person performing this task must be able to do the following: <div><div>1.</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>2.</div><div>Obtain the detailed information of task;</div></div> <div><div>3.</div><div>Conduct plane and stereo scribing on crankshaft of machine tool;</div></div> <div><div>4.</div><div>Conduct plane and stereo scribing on crankshaft of machine tool;</div></div> <div><div>5.</div><div>Conduct plane and stereo scribing on complicated and deformed workpiece of machine tool;</div></div> <div><div>6.</div><div>Submit the work reports;</div></div> <div><div>7.</div><div>Fill in whole forms, records and other documents;</div></div> <div><div>8.</div><div>Clean the tools, equipment and workplace;</div></div> <div><div>9.</div><div>Store the tools, equipment and safety device properly.</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to: <div><div>1.1</div><div>Choose suitable tools, safety device, materials and equipment;</div></div> <div><div>1.2</div><div>Obtain the detailed information of task;</div></div> <div><div>1.3</div><div>Conduct plane and stereo scribing on crankshaft of machine tool;</div></div> <div><div>1.4</div><div>Conduct plane and stereo scribing on crank connecting rod of machine tool;</div></div> <div><div>1.5</div><div>Conduct plane and stereo scribing on complicated and deformed workpiece of machine tool.</div></div><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles: <div><div>2.1</div><div>Principle of good manufacturing practice (GMP);</div></div> |      |

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|                                                 | <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Scribing on workpiece in complicated shape;</p> <p>3.2 Category and purpose of crankshaft and dimensional calculation/scribing of different portions;</p> <p>3.3 Purpose of crank connecting rod and dimensional calculation/scribing of different portions.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | Plane and stereo scribing on complicated and deformed workpiece such as crankshaft and crank connecting rod of machine tool are conducted according to approved standards and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties.</li> <li>4. Occupational safety and health</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                               | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MACHINING OF MECHANICAL<br>EQUIPMENT COMPONENTS                                                                                                                                                                                                                                                                                                                                                              | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 603  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | FILE CUTTING/CHIPPING                                                                                                                                                                                                                                                                                                                                                                                        | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6032 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The person performing this task must be able to file cut and chip the mechanical equipment components according to the standard and procedures.                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The task can be performed in the factory under the supervision of mechanical engineers.<br><br>The tools and equipment to be used include:<br><br>1. Operation equipment (work table, bench vice, bench drilling machine and grinding machine);<br>2. Fitter's tools (chisel, hammer, file and twist drill);<br>3. Measuring tools (Vernier caliper, knife straight edge, 90° angle ruler and feeler gauge). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                              | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| The person performing this task must be able to do the following:<br><br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Conduct file cutting till the workpiece meets the machining precision requirement;<br>4. File cut and finish the arc surface till the workpiece meets the assembly requirements;<br>5. Submit the work reports;<br>6. Fill in whole forms, records and other documents;<br>7. Clean the tools, equipment and workplace;<br>8. Store the tools, equipment and safety device properly. |                                                                                                                                                                                                                                                                                                                                                                                                              | Detailed knowledge about:<br><br><b>1.0 Methods</b><br><br>The person performing this task must be able to explain how to:<br><br>1.1 Choose suitable tools, safety device, materials and equipment;<br>1.2 Obtain the detailed information of task;<br>1.3 Conduct file cutting;<br>1.4 File cut and finish the arc surface.<br><br><b>2.0 Principle</b><br><br>The person performing this task must be able to explain the following principles:<br><br>2.1 Principle of good manufacturing practice (GMP);<br>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);<br>2.3 Principle of standard operation procedure (SOP). |      |

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|                                                 | <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Improve the file cut precision and surface quality;</p> <p>3.2 File cut the arc surface.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | <p>The 45# steel part is filed according to approved standard and procedures till it meets the machining precision requirement; the arc surface is filed and finished till the workpiece meets the assembly requirements.</p>                                                                                                                                                                                     |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties.</li> <li>4. Occupational safety and health</li> </ol>                                                                                                                              |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                             | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | MACHINING OF MECHANICAL<br>EQUIPMENT COMPONENTS                                                                                                                                                                                                                                                                                                                                                            | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 603  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CLASS-7 HOLE MACHINING WITH<br>DRILLING AND REAMING                                                                                                                                                                                                                                                                                                                                                        | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 6033 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The person performing this task must be able to drill and ream Class 7 holes in machinery and equipment components in accordance with the standard and procedures.                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The task can be performed in the factory under the supervision of mechanical engineers.<br><br>The tools and equipment to be used include:<br><br>1. Operation equipment (work table, bench vice, electric hand drill, bench drilling machine and grinding machine);<br>2. Fitter's tools (center drill, twist drill, reamer and tap wrench);<br>3. Measuring tools (Vernier caliper and 90° angle ruler). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                            | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| The person performing this task must be able to do the following:<br><br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Machine small holes, deep holes, blind holes, hole series and crossing holes in the 45# steel part;<br>4. Grind the reamer;<br>5. Machine high-precision hole series in 45# steel part through drilling, expanding and reaming till it meets the machining precision requirement;<br>6. Sharpen the masses drill;<br>7. Submit the work reports;<br>8. Fill in whole forms, records and other documents; |                                                                                                                                                                                                                                                                                                                                                                                                            | Detailed knowledge about:<br><br><b>1.0 Methods</b><br><br>The person performing this task must be able to explain how to:<br><br>1.1 Choose suitable tools, safety device, materials and equipment;<br>1.2 Obtain the detailed information of task;<br>1.3 Machine high-precision hole series through drilling, expanding and reaming;<br>1.4 Grind the reamer;<br>1.5 Sharpen the masses drill.<br><br><b>2.0 Principle</b><br><br>The person performing this task must be able to explain the following principles: |      |



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| <p>9. Clean the tools, equipment and workplace;</p> <p>10. Store the tools, equipment and safety device properly.</p> | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Machine small holes, deep holes, blind holes, hole series and crossing holes;</p> <p>3.2 Cutting characteristics and grinding of reamer;</p> <p>3.3 Structure and cutting characteristics of masses drill and sharpening.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>                                                                       | <p>The reamer is ground according to approved standard and procedures; drilling, expanding and reaming of small holes, deep holes, blind holes and hole series in 45# steel part are conducted till them meet the machining precision requirement; and the masses drill is sharpened.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                                       | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties.</li> <li>4. Occupational safety and health</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FAULT DIAGNOSIS OF PRECISION<br>MACHINING EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 604  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FAULT DIAGNOSIS OF MILLING,<br>BORING AND MILLING MACHINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 6041 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The person performing this task must be able to conduct visual fault diagnosis on precision machining equipment according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Mechanical equipment (grinding machine, boring machine, gantry milling machine, etc.);<br>2. Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);<br>3. Screwdrivers (straight screwdrivers and cross-head screwdrivers);<br>4. Pliers (wire cutter, needle-nose pliers and circlip pliers);<br>5. Knocking tools (hammers and copper rods);<br>6. Electric tools (electric hand drill, angle grinder and straight grinder);<br>7. Special tools (crow bars and pullers). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| The person performing this task must be able to do the following:<br><br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Diagnose the common faults of grinding, boring and plano milling machine;<br>4. Submit the work reports;<br>5. Fill in whole forms, records and other documents;<br>6. Clean the tools, equipment and workplace;<br>7. Store the tools, equipment and safety device properly. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Detailed knowledge about:<br><br>1.0 Methods<br><br>The person performing this task must be able to explain how to:<br><br>1.1 Choose suitable tools, safety device, materials and equipment;<br>1.2 Obtain the detailed information of task;<br>1.3 Operate the grinding, boring and plano milling machine;<br>1.4 Diagnose the common faults of grinding, boring and plano milling machine.<br><br>2.0 Principle<br><br>The person performing this task must be able to explain the following principles: |      |

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|                                                 | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Structure and working principle of grinding, boring and plano milling machine;</p> <p>3.2 Diagnose the common faults of grinding, boring and plano milling machine.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The common faults of precision machining equipment correctly are diagnosed, such as grindings, borings and plano milling machines according to approved standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties.</li> <li>4. Occupational safety and health</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | OCCUPATIO<br>N CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FAULT DIAGNOSIS OF PRECISION<br>MACHINING EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 604  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | GEOMETRIC ACCURACY<br>DETECTION OF GRINDING,<br>BORING AND MILLING MACHINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6042 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The person performing this task must be able to conduct geometric accuracy detection on precision machining equipment with optical measuring instruments according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br><div><div>1.</div><div>Mechanical equipment (grinding machine, boring machine, gantry milling machine, etc.);</div></div> <div><div>2.</div><div>Detection tools (precision level gauge, precision square box, dial gauge, magnetic meter stand, steel ruler, straight ruler, testing rod and gauge block);</div></div> <div><div>3.</div><div>Measuring instruments (optical collimator, micrometer dial and interferometer).</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| The person performing this task must be able to do the following: <div><div>1.</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>2.</div><div>Obtain the detailed information of task;</div></div> <div><div>3.</div><div>Detect the geometric accuracy of grinding, boring and plano milling machine with optical measuring instruments;</div></div> <div><div>4.</div><div>Submit the work reports;</div></div> <div><div>5.</div><div>Fill in whole forms, records and other documents;</div></div> <div><div>6.</div><div>Clean the tools, equipment and workplace;</div></div> <div><div>7.</div><div>Store the tools, equipment and safety device properly.</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to: <div><div>1.1</div><div>Choose suitable tools, safety device, materials and equipment;</div></div> <div><div>1.2</div><div>Obtain the detailed information of task;</div></div> <div><div>1.3</div><div>Operate the grinding, boring and plano milling machine;</div></div> <div><div>1.4</div><div>Detect the geometric accuracy of the grinding, boring and plano milling machine.</div></div><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles: |      |

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|                                                 | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Geometric accuracy of grinding, boring and plano milling machine and its relationship with machining precision;</p> <p>3.2 Variety, purpose and working principle of optical measuring instruments;</p> <p>3.3 Geometric accuracy inspection of grinding, boring and plano milling machine and use of relevant instruments;</p> <p>3.4 Processing of experimental data such as geometric accuracy of grinding, boring and plano milling machine.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | <p>The working accuracy of precision machining equipment such as grinding, boring and plano milling machine is detected with the optical measuring instruments according to approved standard and procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties.</li> <li>4. Occupational safety and health</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FAULT DIAGNOSIS OF PRECISION<br>MACHINING EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 604  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DETECTION OF WORKING<br>ACCURACY OF GRINDING,<br>BORING AND MILLING MACHINE                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6043 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The person performing this task must be able to conduct working accuracy detection on precision machining equipment with processing methods according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br><div><div>1.</div><div>Mechanical equipment (grinding machine, boring machine, gantry milling machine, etc.);</div></div> <div><div>2.</div><div>Measuring tools (micrometer, level gauge, gauge block, dial gauge and magnetic meter stand);</div></div> <div><div>3.</div><div>Detection tools (standard sample, testing rod and special precision detection tools).</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| The person performing this task must be able to do the following:<br><div><div>1.</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>2.</div><div>Obtain the detailed information of task;</div></div> <div><div>3.</div><div>Detect the working accuracy of grindings, borings and plano milling machines with the trial processing method;</div></div> <div><div>4.</div><div>Submit the work reports;</div></div> <div><div>5.</div><div>Fill in whole forms, records and other documents;</div></div> <div><div>6.</div><div>Clean the tools, equipment and workplace;</div></div> <div><div>7.</div><div>Store the tools, equipment and safety device properly.</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br><div><div>1.1</div><div>Choose suitable tools, safety device, materials and equipment;</div></div> <div><div>1.2</div><div>Obtain the detailed information of task;</div></div> <div><div>1.3</div><div>Operate the grinding, boring and plano milling machine;</div></div> <div><div>1.4</div><div>Detect the working accuracy of grindings, borings and plano milling machines with the trial processing method.</div></div><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles: |      |

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|                                                 | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Working accuracy of grinding, boring and plano milling machine;</p> <p>3.2 Working accuracy inspection of grinding, boring and plano milling machine;</p> <p>3.3 Processing of experimental data such as working accuracy of grinding, boring and plano milling machine.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The working accuracy of precision machining equipment is detected such as grinding, boring and plano milling machine with the trial processing method according to approved standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties;</li> <li>4. Occupational safety and health.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OCCUPATION<br>CODE                                                                                                        |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | REPAIRING OF TYPICAL<br>COMPONENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DUTY NO.                                                                                                                  | 605  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | REPAIRING OF SPINDLE PARTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TASK NO.                                                                                                                  | 6051 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The person performing this task must be able to repair the spindle parts of lathe according the standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                           |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br><div><div>1.</div><div>Operation equipment (spindle parts of CA6140 and CA6140 lathe);</div></div> <div><div>2.</div><div>Detection tools (dial gauge, magnetic meter stand, micrometer, testing rod and ring gauge);</div></div> <div><div>3.</div><div>Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);</div></div> <div><div>4.</div><div>Screwdrivers (straight screwdrivers and cross-head screwdrivers);</div></div> <div><div>5.</div><div>Pliers (wire cutter, needle-nose pliers and circlip pliers);</div></div> <div><div>6.</div><div>Knocking tools (hammers and copper rods);</div></div> <div><div>7.</div><div>Electric tools (electric hand drill, angle grinder and straight grinder);</div></div> <div><div>8.</div><div>Special tools (crow bars and pullers);</div></div> <div><div>9.</div><div>Auxiliary tools (files, oil pans, cleaner, abrasive papers, clean cotton yarns and kerosene).</div></div> |                                                                                                                           |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                           |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | UNDERPINNING KNOWLEDGE                                                                                                    |      |
| The person performing this task must be able to do the following: <div><div>1.</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>2.</div><div>Obtain the detailed information of task;</div></div> <div><div>3.</div><div>Remove the spindle parts of lathe;</div></div> <div><div>4.</div><div>Clean and check the spindle parts and components of lathe;</div></div> <div><div>5.</div><div>Repair and change the spindle parts and components of lathe;</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to: |      |



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| <ol style="list-style-type: none"> <li>6. Remove the spindle parts of lathe;</li> <li>7. Operate the static balance of spindle components of lathe;</li> <li>8. Submit the work reports;</li> <li>9. Fill in whole forms, records and other documents;</li> <li>10. Clean the tools, equipment and workplace;</li> <li>11. Store the tools, equipment and safety device properly.</li> </ol> | <ol style="list-style-type: none"> <li>1.1 Choose suitable tools, safety device, materials and equipment;</li> <li>1.2 Obtain the detailed information of task;</li> <li>1.3 Remove the spindle parts of lathe;</li> <li>1.4 Clean and check the spindle parts and components of lathe;</li> <li>1.5 Repair and change the spindle parts and components of lathe;</li> <li>1.6 Remove the spindle parts of lathe;</li> <li>1.7 Operate the static balance of spindle components of lathe.</li> </ol> <p><b>2.0 Principle</b></p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> <li>2.1 Principle of good manufacturing practice (GMP);</li> <li>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</li> <li>2.3 Principle of standard operation procedure (SOP).</li> </ol> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> <li>3.1 Structure characteristic of lathe spindle and assembly method of spindle parts (directional assembly method)</li> <li>3.2 Variety and characteristics of spline;</li> <li>3.3 Part repair of variety and purpose of common measuring tools for machine tool maintenance;</li> <li>3.4 Static balance principle, characteristic and device.</li> </ol> <p><b>4.0 Essential Skills</b></p> <ol style="list-style-type: none"> <li>4.1 Calculative skills;</li> <li>4.2 Communication skills;</li> <li>4.3 Customer service skills;</li> <li>4.4 Teamwork skills;</li> <li>4.5 Report writing skills.</li> </ol> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                                                                                                                                                                                                                                                                                                                       | <p>The rail guide components of lathe are repaired according to approved standard and procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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| <p><b>CIRCUMSTANTIAL<br/>KNOWLEDGE</b></p> | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties;</li> <li>4. Occupational safety and health.</li> </ol> |
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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                              | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OCCUPATION<br>CODE                                                                                          |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                              | REPAIRING OF TYPICAL<br>COMPONENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DUTY NO.                                                                                                    | 605  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                              | REPAIRING OF RAIL GUIDE PAIR<br>OF LATHE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TASK NO.                                                                                                    | 6052 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                 | The person performing this task must be able to repair the rail guides of lathe according the standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                             |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                      | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Operation equipment (rail guides of CA6140 and CA6140 lathe);<br>2. Detection tools (dial gauges, magnetic meter stands and micrometers);<br>3. Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);<br>4. Screwdrivers (straight screwdrivers and cross-head screwdrivers);<br>5. Pliers (wire cutter, needle-nose pliers and circlip pliers);<br>6. Knocking tools (hammers and copper rods);<br>7. Electric tools (electric hand drill, angle grinder and straight grinder);<br>8. Special tools (crow bars and pullers);<br>9. Auxiliary tools (files, oil pans, cleaner, abrasive papers, clean cotton yarns and kerosene). |                                                                                                             |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                             |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | UNDERPINNING KNOWLEDGE                                                                                      |      |
| The person performing this task must be able to do the following:<br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Remove the rail guide pair of lathe;<br>4. Clean and check the rail guide parts and components of lathe;<br>5. Repair and change the rail guide parts and components of lathe; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to: |      |

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| <ol style="list-style-type: none"> <li>6. Assemble the rail guide pair of lathe;</li> <li>7. Submit the work reports;</li> <li>8. Fill in whole forms, records and other documents;</li> <li>9. Clean the tools, equipment and workplace;</li> <li>10. Store the tools, equipment and safety device properly.</li> </ol> | <ol style="list-style-type: none"> <li>1.1 Choose suitable tools, safety device, materials and equipment;</li> <li>1.2 Obtain the detailed information of task;</li> <li>1.3 Remove the rail guide pair of lathe;</li> <li>1.4 Clean and check the rail guide parts and components of lathe;</li> <li>1.5 Repair and change the rail guide parts and components of lathe;</li> <li>1.6 Assemble the rail guide pair of lathe.</li> </ol> <p><b>2.0 Principle</b></p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> <li>2.1 Principle of good manufacturing practice (GMP);</li> <li>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</li> <li>2.3 Principle of standard operation procedure (SOP).</li> </ol> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> <li>3.1 Variety and structure characteristic of rail guide pair of lathe;</li> <li>3.2 Calculation of the linearity error of rail guide;</li> <li>3.3 Repair of the parts of rail guide and rail guide pair;</li> <li>3.4 Removal of the rail guide pair of lathe.</li> </ol> <p><b>4.0 Essential Skills</b></p> <ol style="list-style-type: none"> <li>4.1 Calculative skills;</li> <li>4.2 Communication skills;</li> <li>4.3 Customer service skills;</li> <li>4.4 Teamwork skills;</li> <li>4.5 Report writing skills.</li> </ol> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                                                                                                                                                                                                                                                   | <p>The rail guide components of lathe are repaired according to approved standard and procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>CIRCUMSTANTIAL KNOWLEDGE</b></p>                                                                                                                                                                                                                                                                                   | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Scope of duties;</li> <li>3. Occupational safety and health.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | OCCUPATION<br>CODE                                                                                                 |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                | REPAIRING OF TYPICAL<br>COMPONENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | DUTY NO.                                                                                                           | 605  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                | REPAIRING OF SELF-ACTING<br>SLIDING BEARING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TASK NO.                                                                                                           | 6053 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The person performing this task must be able to repair the self-acting sliding bearings of lathe according the standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                    |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Operation equipment (self-acting sliding bearings of CA6140 and CA6140 lathe);<br>2. Detection tools (dial gauges, magnetic meter stands and micrometers);<br>3. Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);<br>4. Screwdrivers (straight screwdrivers and cross-head screwdrivers);<br>5. Pliers (wire cutter, needle-nose pliers and circlip pliers);<br>6. Knocking tools (hammers and copper rods);<br>7. Electric tools (electric hand drill, angle grinder and straight grinder);<br>8. Special tools (crow bars and pullers);<br>9. Auxiliary tools (files, oil pans, cleaner, abrasive papers, clean cotton yarns and kerosene). |                                                                                                                    |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                    |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | UNDERPINNING KNOWLEDGE                                                                                             |      |
| The person performing this task must be able to do the following:<br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Remove the self-acting sliding shaft of lathe;<br>4. Clean and check the self-acting sliding shaft of lathe;<br>5. Adjust and change the self-acting sliding shaft of lathe;<br>6. Remove the self-acting sliding shaft of lathe;<br>7. Submit the work reports; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Detailed knowledge about:<br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to: |      |

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| <p>8. Fill in whole forms, records and other documents;</p> <p>9. Clean the tools, equipment and workplace;</p> <p>10. Store the tools, equipment and safety device properly.</p> | <p>1.1 Choose suitable tools, safety device, materials and equipment;</p> <p>1.2 Obtain the detailed information of task;</p> <p>1.3 Remove the self-acting sliding shaft of lathe;</p> <p>1.4 Clean and check the self-acting sliding shaft of lathe;</p> <p>1.5 Adjust and change the self-acting sliding shaft of lathe;</p> <p>1.6 Remove the self-acting sliding shaft of lathe;</p> <p><b>2.0 Principle</b></p> <p>The person performing this task must be able to explain the following principles:</p> <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Working principle, characteristic and classification of self-acting sliding shaft;</p> <p>3.2 Repair the of self-acting sliding shaft;</p> <p>3.3 Remove the self-acting sliding shaft of lathe.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <p><b>DESCRIPTION OF THE END PRODUCT / SERVICE</b></p>                                                                                                                            | <p>The self-acting sliding shaft of lathe is repaired according to approved standard and procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>CIRCUMSTANTIAL KNOWLEDGE</b></p>                                                                                                                                            | <p><b>Detailed knowledge about:</b></p> <p>1. Safety operation equipment and tools;</p> <p>2. Standard of international standardization organization (ISO);</p> <p>3. Scope of duties;</p> <p>4. Occupational safety and health.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |





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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MAINTENANCE OF HYDRAULIC<br>AND PNEUMATIC SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 606  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ADJUSTMENT OF PRESSURE AND<br>FLOW OF<br>HYDRAULIC/PNEUMATIC<br>SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6061 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The person performing this task must be able to adjust the pressure and flow of hydraulic/pneumatic system according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Operation equipment (work tables and bench vices);<br>2. Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);<br>3. Screwdrivers (screwdriver, etc.)<br>4. Pliers (wire cutter, needle-nose pliers and circlip pliers);<br>5. Measuring tools (vernier calipers and steel rulers);<br>6. Auxiliary tools (lubricating oil, chemical fiber fabric, and hydraulic/pneumatic/auxiliary elements). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |
| The person performing this task must be able to do the following:<br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Adjust the pressure and flow of hydraulic system;<br>4. Adjust the pressure and speed of pneumatic system;<br>5. Submit the work reports;<br>6. Fill in whole forms, records and other documents;<br>7. Clean the tools, equipment and workplace;<br>8. Store the tools, equipment and safety device properly. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Detailed knowledge about:<br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br>1.1 Choose suitable tools, safety device, materials and equipment;<br>1.2 Obtain the detailed information of task;<br>1.3 Repair the hydraulic pumps;<br>1.4 Adjust the pressure and flow of hydraulic system;<br>1.5 Adjust the pressure and speed of pneumatic system.<br><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles: |      |

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|                                                 | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Working principle of basic control circuit of hydraulic system;</p> <p>3.2 Working principle of basic control circuit of pneumatic system.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The pressure and flow of hydraulic/pneumatic system are adjusted according to approved standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties;</li> <li>4. Occupational safety and health.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                  |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                    | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                    | MAINTENANCE OF HYDRAULIC<br>AND PNEUMATIC SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 606  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                    | ADJUSTMENT OF SEQUENTIAL<br>CIRCUIT OF<br>HYDRAULIC/PNEUMATIC<br>SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6062 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                       | The person performing this task must be able to adjust the sequential circuit of hydraulic/pneumatic system according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                            | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Operation equipment (work tables and bench vices);<br>2. Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);<br>3. Screwdrivers (straight screwdrivers and cross-head screwdrivers);<br>4. Pliers (wire cutter, needle-nose pliers and circlip pliers);<br>5. Measuring tools (vernier calipers and steel rulers);<br>6. Auxiliary tools (lubricating oil, chemical fiber fabric, and hydraulic/pneumatic/auxiliary elements). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| The person performing this task must be able to do the following:<br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Repair the hydraulic pumps;<br>4. Adjust the sequential circuit of hydraulic system;<br>5. Adjust the sequential circuit of pneumatic system;<br>6. Submit the work reports;<br>7. Fill in whole forms, records and other documents; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Choose suitable tools, safety device, materials and equipment;<br>1.2 Obtain the detailed information of task;<br>1.3 Repair the hydraulic pumps;<br>1.4 Adjust the sequential circuit of hydraulic system;<br>1.5 Adjust the sequential circuit of pneumatic system.<br><br>2.0 Principle<br>The person performing this task must be able to explain the following principles: |      |

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| 8. Clean the tools, equipment and workplace;<br>9. Store the tools, equipment and safety device properly. | 2.1 Principle of good manufacturing practice (GMP);<br>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);<br>2.3 Principle of standard operation procedure (SOP);<br>2.4 Variety and working principle of hydraulic pump and motor;<br>2.5 Variety and working principle of pneumatic motor.<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Circumstantial knowledge for adjusting the sequential circuit of hydraulic system;<br>3.2 Circumstantial knowledge for adjusting the sequential circuit of pneumatic system.<br><br><b>4.0 Essential Skills</b><br>4.1 Calculative skills;<br>4.2 Communication skills;<br>4.3 Customer service skills;<br>4.4 Teamwork skills;<br>4.5 Report writing skills. |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>                                                           | The pressure and flow of hydraulic/pneumatic system is adjusted according to approved standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                           | <b>Detailed knowledge about:</b><br>1. Safety operation equipment and tools;<br>2. Standard of international standardization organization (ISO);<br>3. Scope of duties;<br>4. Occupational safety and health.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MAINTENANCE OF HYDRAULIC<br>AND PNEUMATIC SYSTEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 606  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REPAIRING OF HYDRAULIC<br>CYLINDER AND AIR CYLINDER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6063 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The person performing this task must be able to repair the hydraulic cylinder and air cylinder of hydraulic/pneumatic system according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br><div><div>1.</div><div>Operation equipment (work tables and bench vices);</div></div> <div><div>2.</div><div>Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches);</div></div> <div><div>3.</div><div>Screwdrivers (straight screwdrivers and cross-head screwdrivers);</div></div> <div><div>4.</div><div>Pliers (wire cutter, needle-nose pliers and circlip pliers);</div></div> <div><div>5.</div><div>Measuring tools (vernier calipers and steel rulers);</div></div> <div><div>6.</div><div>Auxiliary tools (lubricating oil, chemical fiber fabrics and hydraulic/air cylinder).</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| The person performing this task must be able to do the following: <div><div>1.</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>2.</div><div>Obtain the detailed information of task;</div></div> <div><div>3.</div><div>Repair the hydraulic cylinder of hydraulic system;</div></div> <div><div>4.</div><div>Repair the air cylinder of pneumatic system;</div></div> <div><div>5.</div><div>Submit the work reports;</div></div> <div><div>6.</div><div>Fill in whole forms, records and other documents;</div></div> <div><div>7.</div><div>Clean the tools, equipment and workplace;</div></div> <div><div>8.</div><div>Store the tools, equipment and safety device properly.</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to: <div><div>1.1</div><div>Choose suitable tools, safety device, materials and equipment;</div></div> <div><div>1.2</div><div>Obtain the detailed information of task;</div></div> <div><div>1.3</div><div>Repair the hydraulic cylinder of hydraulic system;</div></div> <div><div>1.4</div><div>Repair the air cylinder of pneumatic system.</div></div><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles: |      |

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|                                                 | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP);</p> <p>2.4 Working principle of pneumatic cylinder;</p> <p>2.5 Working principle of hydraulic cylinder.</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Working characteristic and classification of hydraulic cylinder;</p> <p>3.2 Working characteristic and classification of pneumatic cylinder.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b> | The hydraulic/air cylinder of hydraulic/pneumatic system is repaired according to approved standard and procedures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                 | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. Scope of duties;</li> <li>4. Occupational safety and health.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
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| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                               | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                               | STANDARD OPERATION AND<br>MAINTENANCE OF MECHANICAL<br>EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 607  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                               | MAINTENANCE OF MEDIUM-<br>SIZED GENERAL-PURPOSE<br>EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6071 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                  | The person performing this task must be able to maintain the medium-sized general-purpose equipment and system according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                       | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br>1. Operation equipment (lathe, milling machine, shaping machine, work table, bench vice and bench drilling machine);<br>2. Maintenance tools (fitter's tools, wrenches, screwdrivers, pliers, electrical tools and special tools);<br>3. Measuring tools (dial gauge, magnetic meter stand, Vernier caliper and micrometer);<br>4. Auxiliary tools (oil pan, lubricating oil, cleaner, abrasive paper, clean cotton yarn, chemical fiber fabrics and clean kerosene). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |
| The person performing this task must be able to do the following:<br>1. Choose suitable tools, safety device, materials and equipment for the task;<br>2. Obtain the detailed information of task;<br>3. Maintain the control device, safety protection device, lubricating system, cooling system and instruments of lathe, milling machine and planing machine;<br>4. Submit the work reports;<br>5. Fill in whole forms, records and other documents; |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Detailed knowledge about:<br>1.0 Methods<br>The person performing this task must be able to explain how to:<br>1.1 Choose suitable tools, safety device, materials and equipment;<br>1.2 Obtain the detailed information of task;<br>1.3 Maintain the control device, safety device, lubricating system, cooling system, temperature device and instruments of lathe, milling machine and shaping machine.<br><br>2.0 Principle<br>The person performing this task must be able to explain the following principles: |      |

|                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. Clean the tools, equipment and workplace;<br>7. Store the tools, equipment and safety device properly. | 2.1 Principle of good manufacturing practice (GMP);<br>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);<br>2.3 Principle of standard operation procedure (SOP).<br><br><b>3.0 Theories</b><br>The person performing this task must be able to explain the following:<br>3.1 Maintenance of lathe, milling machine and shaping machine.<br><br><b>4.0 Essential Skills</b><br>4.1 Calculative skills;<br>4.2 Communication skills;<br>4.3 Customer service skills;<br>4.4 Teamwork skills;<br>4.5 Report writing skills. |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>                                                           | The control device, safety protection device, lubricating system, cooling system, temperature device and instruments of medium-sized general-purpose equipment such as lathe, milling machine and shaping machine are maintained according to approved standard and procedures.                                                                                                                                                                                                                                                             |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                                                                           | <b>Detailed knowledge about:</b><br>1. Safety operation equipment and tools;<br>2. Standard of international standardization organization (ISO);<br>3. Scope of duties;<br>4. Occupational safety and health.                                                                                                                                                                                                                                                                                                                               |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MECHANICAL EQUIPMENT<br>MAINTENANCE TECHNICIAN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OCCUPATION<br>CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |
| DUTY TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | STANDARD OPERATION AND<br>MAINTENANCE OF MECHANICAL<br>EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DUTY NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 607  |
| TASK TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | REPLACEMENT AND REPAIRING<br>OF QUICK-WEAR PARTS OF<br>MEDIUM-SIZED GENERAL-<br>PURPOSE EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | TASK NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6072 |
| PERFORMANCE<br>CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The person performing this task must be able to replace and repair the quick-wear parts of medium-sized universal equipment according to this standard and procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| RANGE<br>STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The task can be performed in the factory under the supervision of mechanical engineers.<br>The tools and equipment to be used include:<br><div><div>1.</div><div>Operation equipment (lathe, milling machine, shaping machine, work table, bench vice and bench drilling machine);</div></div> <div><div>2.</div><div>Maintenance tools (fitter's tools, wrenches, screwdrivers, pliers, electrical tools and special tools);</div></div> <div><div>3.</div><div>Measuring tools (dial gauge, magnetic meter stand, Vernier caliper and micrometer);</div></div> <div><div>4.</div><div>Auxiliary tools (oil pan, lubricating oil, cleaner, abrasive paper, clean cotton yarn, chemical fiber fabrics and clean kerosene).</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| EVIDENCE REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |
| PRACTICAL PERFORMANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | UNDERPINNING KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |
| The person performing this task must be able to do the following:<br><div><div>1.</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>2.</div><div>Obtain the detailed information of task;</div></div> <div><div>3.</div><div>Change and repair the quick-wear parts of lathe, milling machine and shaping machine;</div></div> <div><div>4.</div><div>Submit the work reports;</div></div> <div><div>5.</div><div>Fill in whole forms, records and other documents;</div></div> <div><div>6.</div><div>Clean the tools, equipment and workplace;</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Detailed knowledge about:</b><br><b>1.0 Methods</b><br>The person performing this task must be able to explain how to:<br><div><div>1.1</div><div>Choose suitable tools, safety device, materials and equipment for the task;</div></div> <div><div>1.2</div><div>Obtain the detailed information of task;</div></div> <div><div>1.3</div><div>Change and repair the quick-wear parts of lathe, milling machine and shaping machine.</div></div><br><b>2.0 Principle</b><br>The person performing this task must be able to explain the following principles: |      |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7. Store the tools, equipment and safety device properly. | <p>2.1 Principle of good manufacturing practice (GMP);</p> <p>2.2 Principle of Hazard Analysis and Critical Control Point (HACCP);</p> <p>2.3 Principle of standard operation procedure (SOP).</p> <p><b>3.0 Theories</b></p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Maintenance of lathe, milling machine and shaping machine.</p> <p><b>4.0 Essential Skills</b></p> <p>4.1 Calculative skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Customer service skills;</p> <p>4.4 Teamwork skills;</p> <p>4.5 Report writing skills.</p> |
| <b>DESCRIPTION OF THE END PRODUCT / SERVICE</b>           | The quick-wear parts of medium-sized general-purpose equipment such as lathe, milling machine and shaping machine are changed and repaired according to approved standard and procedures                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>CIRCUMSTANTIAL KNOWLEDGE</b>                           | <p><b>Detailed knowledge about:</b></p> <ol style="list-style-type: none"> <li>1. Safety operation equipment and tools;</li> <li>2. Standard of international standardization organization (ISO);</li> <li>3. National Standard;</li> <li>4. Scope of duties;</li> <li>5. Occupational safety and health.</li> </ol>                                                                                                                                                                                                                                                                   |

**TABLE 1: DACUM CHARTS FOR MECHANICAL EQUIPMENT MAINTENANCE  
ENGINEER - NTA 6**

| <b>DUTIES</b>                                     | <b>TASKS</b>                                                   | <b>ENABLERS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0 Installation of precision machining equipment | 1.1 Positioning of grinding, boring and plano milling machine. | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Machining skills</li> <li>• Fitter's skills</li> <li>• Basic theory knowledge of machining</li> <li>• Underpinning knowledge for reading mechanical drawings</li> <li>• Basic knowledge of fitter</li> <li>• Use of clamps</li> <li>• Quality guarantee</li> <li>• Quality control</li> <li>• Quality management</li> <li>• Safety and civilized construction and environmental protection</li> <li>• Characteristics of grinding, boring and plano milling machine</li> <li>• Operation of different machining equipment such as grinding, boring and plano milling machine</li> <li>• Technology for improving productivity</li> <li>• Basic electrical engineering.</li> <li>• Relevant Laws and Regulations</li> </ul> <p><b>Tools and Equipment</b></p> <ul style="list-style-type: none"> <li>• Necessary tools, clamps, measuring and auxiliary tools for mechanical equipment installation</li> <li>• Grinding machine</li> <li>• Boring machine</li> <li>• Plano milling machine</li> <li>• PPE such as safety boots, goggles, gloves, hearing protection device and safety helmet</li> </ul> <p><b>Materials</b></p> |
|                                                   | 1.2 Fixing of grinding, boring and plano milling machine.      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| DUTIES                                          | TASKS                                                                                  | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                 |                                                                                        | <ul style="list-style-type: none"> <li>• Mechanical equipment</li> <li>• Mechanical elements</li> <li>• Installation drawings of mechanical equipment</li> </ul> <p><b>Requirements for employees</b></p> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Communication skills</li> <li>• Honesty and integrity</li> <li>• Time management</li> <li>• Problem-solving ability</li> <li>• Professional ethics</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2.0 Installation of precision cutting equipment | 2.1 Installation of precision adjustment of milling, boring and plano milling machine. | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Classification of production system</li> <li>• Quality guarantee</li> <li>• Control the quality</li> <li>• Operation of different precision cutting equipment</li> <li>• Technology for improving productivity</li> <li>• Material science</li> <li>• Basic mechanics</li> <li>• Basic electrical engineering</li> <li>• Manual and automatic operation skills of precision machining tool</li> <li>• Quality test</li> <li>• Machine operation frequency</li> <li>• Relevant laws and regulations</li> <li>• Basic electrical control</li> <li>• Hydraulic and pneumatic transmission</li> </ul> <p><b>Tools and Equipment</b></p> <ul style="list-style-type: none"> <li>• Necessary tools, clamps, measuring and auxiliary tools for mechanical equipment installation</li> <li>• Grinding machine</li> </ul> |
|                                                 | 2.2 Trial operation of milling, boring and milling machine.                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| DUTIES                                           | TASKS                                                 | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  |                                                       | <ul style="list-style-type: none"> <li>• Boring machine</li> <li>• Plano milling machine</li> <li>• PPE such as safety boots, goggles, gloves, hearing protection device and safety helmet</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Mechanical equipment</li> <li>• Mechanical elements</li> <li>• Installation drawings of mechanical equipment</li> </ul> <p><b>Requirements for employees</b></p> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Communication skills</li> <li>• Honesty and integrity</li> <li>• Time management</li> <li>• Problem-solving ability</li> <li>• Professional ethics</li> </ul> |
| 3.0 Machining of mechanical equipment components | 3.1 Deformed workpiece scribing.                      | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Calculative skills</li> <li>• Communication skills</li> <li>• Customer service skills</li> <li>• Teamwork skills</li> <li>• Report writing skills</li> <li>• Circumstantial knowledge of scribing workpiece in complicated shapes</li> <li>• Circumstantial knowledge of category and purpose of crankshaft and dimensional calculation/scribing of different portions</li> <li>• Circumstantial knowledge of purpose of crank connecting rod and dimensional calculation/scribing of different portions</li> </ul>                                                            |
|                                                  | 3.2 File cutting/chipping.                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                  | 3.3 Class-7 hole machining with drilling and reaming. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| DUTIES | TASKS | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |       | <ul style="list-style-type: none"> <li>• Circumstantial knowledge for improving file cutting precision and surface quality</li> <li>• Circumstantial knowledge for file cutting arc surface</li> <li>• Circumstantial knowledge for machining small holes, deep holes, blind holes, hole series and crossing holes</li> <li>• Circumstantial knowledge on cutting characteristic of reamer and grinding</li> <li>• Circumstantial knowledge on structure characteristic of masses drill, cutting characteristic and sharpening</li> </ul> <p><b>Tools and Equipment</b></p> <ul style="list-style-type: none"> <li>• Operation equipment (work table, bench vice, bench drilling machine and grinding machine)</li> <li>• Scribing tools (scribing platform, square box, V-shaped block, scribing needle/compass, steel plate ruler, height Vernier caliper and sample punching pin)</li> <li>• Fitter's tools (chisel, hammer, file, center drill, twist drill, reamer and tap wrench)</li> <li>• Measuring tools (steel tape, Vernier caliper, universal bevel protractor, knife straight edge, 90° angle ruler and feeler gauge)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Crankshaft of machine tool</li> <li>• Crank connecting rod of machine tool</li> <li>• Complicated and deformed workpiece of machine tool</li> </ul> |

| DUTIES                                               | TASKS                                                                     | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                      |                                                                           | <ul style="list-style-type: none"> <li>• 45# steel part</li> <li>• Coating of scribing</li> </ul> <p><b>Requirements for employees</b></p> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Communication skills</li> <li>• Honesty and integrity</li> <li>• Time management</li> <li>• Problem-solving ability</li> <li>• Professional ethics</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4.0 Fault diagnosis of precision machining equipment | 4.1 Fault diagnosis of milling, boring and milling machine.               | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Calculative skills</li> <li>• Communication skills</li> <li>• Customer service skills</li> <li>• Teamwork skills</li> <li>• Report writing skills</li> <li>• Structure and working principle of grinding, boring and plano milling machine</li> <li>• Circumstantial knowledge on common faults of grinding, boring and plano milling machine</li> <li>• Circumstantial knowledge on geometric precision of grinding, boring and plano milling machine and the relationship with machining precision</li> <li>• Circumstantial knowledge on variety, purpose and working principle of optical measuring instruments</li> <li>• Circumstantial knowledge on geometric accuracy inspection and relevant instruments of grinding, boring and plano milling machine</li> <li>• Circumstantial knowledge on processing of experimental data such as geometric accuracy of</li> </ul> |
|                                                      | 4.2 Geometric accuracy detection of grinding, boring and milling machine. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                      | 4.3 Working accuracy detection of grinding, boring and milling machine.   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| DUTIES | TASKS | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |       | <p>grinding, boring and plano milling machine</p> <ul style="list-style-type: none"> <li>• Circumstantial knowledge on working accuracy of grinding, boring and plano milling machine</li> <li>• Circumstantial knowledge on working accuracy inspection and relevant instruments of grinding, boring and plano milling machine</li> <li>• Circumstantial knowledge on processing of experimental data such as working accuracy of grinding, boring and plano milling machine</li> </ul> <p><b>Tools and Equipment</b></p> <ul style="list-style-type: none"> <li>• Mechanical equipment (grinding machine, boring machine, gantry milling machine, etc.)</li> <li>• Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches)</li> <li>• Screwdrivers (straight screwdrivers and cross-head screwdrivers)</li> <li>• Pliers (wire cutter, needle-nose pliers and circlip pliers)</li> <li>• Knocking tools (hammers and copper rods)</li> <li>• Electric tools (electric hand drill, angle grinder and straight grinder)</li> <li>• Special tools (crow bars and pullers)</li> <li>• Detection tools (prevision level gauge, precision square box, micrometer, level gauge, gauge block, multimeter, magnetic meter stand, steel ruler, straight ruler and testing rod)</li> </ul> |



| DUTIES                              | TASKS                                         | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                                               | <ul style="list-style-type: none"> <li>Measuring instruments (optical collimator, micrometer dial and interferometer)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>Grinding, boring and plano milling machine</li> <li>45# steel part</li> </ul> <p><b>Requirements for employees</b></p> <ul style="list-style-type: none"> <li>Teamwork</li> <li>Communication skills</li> <li>Honesty and integrity</li> <li>Time management</li> <li>Problem-solving ability</li> <li>Professional ethics</li> </ul>                                                                                                                                                                                       |
| 5.0 Repairing of typical components | 5.1 Repairing of spindle parts.               | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>Calculative skills</li> <li>Communication skills</li> <li>Customer service skills</li> <li>Teamwork skills</li> <li>Report writing skills</li> <li>Circumstantial knowledge on structure characteristic of lathe spindle and the assembly method of spindle parts (directional assembly method)</li> <li>Circumstantial knowledge on variety and characteristics of spline</li> <li>Circumstantial knowledge on varieties and purpose of common gauges for machine tool maintenance</li> <li>Circumstantial knowledge of part repair</li> <li>Circumstantial knowledge on static balance principle, characteristics and device</li> </ul> |
|                                     | 5.2 Repairing of rail guide pair of lathe.    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                     | 5.3 Repairing of self-acting sliding bearing. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| DUTIES | TASKS | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |       | <ul style="list-style-type: none"> <li>• Circumstantial knowledge on variety and structure characteristic of rail guide pair of lathe</li> <li>• Circumstantial knowledge for calculating linearity error of guide pair</li> <li>• Circumstantial knowledge for repairing the parts of guide rail and rail guide pair</li> <li>• Circumstantial knowledge for dismounting rail guide of lathe</li> <li>• Circumstantial knowledge on working principle, characteristics and classification of self-acting sliding shaft</li> <li>• Circumstantial knowledge for repairing self-acting sliding shaft</li> <li>• Circumstantial knowledge for dismounting self-acting sliding shaft of lathe</li> </ul> <p><b>Tools and Equipment</b></p> <ul style="list-style-type: none"> <li>• Operation equipment (CA6140 lathe)</li> <li>• Fitter's tools (file)</li> <li>• Detection tools (dial gauge, magnetic meter stand, micrometer, testing rod and ring gauge)</li> <li>• Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches)</li> <li>• Screwdrivers (straight screwdrivers and cross-head screwdrivers)</li> <li>• Pliers (wire cutter, needle-nose pliers and circlip pliers)</li> <li>• Knocking tools (hammers and copper rods)</li> </ul> |

| DUTIES                                            | TASKS                                                               | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   |                                                                     | <ul style="list-style-type: none"> <li>• Electric tools (electric hand drill, angle grinder and straight grinder)</li> <li>• Special tools (crow bars and pullers)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Spindle parts of CA6140 lathe</li> <li>• Rail guide of CA6140 lathe</li> <li>• Self-acting sliding bearing of CA6140 lathe</li> <li>• Maintenance accessories</li> <li>• Oil pan and clean kerosene</li> <li>• Cleaning solution</li> <li>• Abrasive paper and clean cotton yarn</li> </ul> <p><b>Requirements for employees</b></p> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Communication skills</li> <li>• Honesty and integrity</li> <li>• Time management</li> <li>• Problem-solving ability</li> <li>• Professional ethics</li> </ul> |
| 6.0 Maintenance of hydraulic and pneumatic system | 6.1 Adjustment of pressure and flow of hydraulic/pneumatic system.  | <p><b>General skills and knowledge</b></p> <ul style="list-style-type: none"> <li>• Calculative skills</li> <li>• Communication skills</li> <li>• Customer service skills</li> <li>• Teamwork skills</li> <li>• Report writing skills</li> <li>• Circumstantial knowledge on working principle of basic control circuit of hydraulic system</li> <li>• Circumstantial knowledge on working principle of basic control circuit of pneumatic system</li> <li>• Circumstantial knowledge on variety and working principle of hydraulic pump and motor</li> </ul>                                                                                                                                                                                                                                                  |
|                                                   | 6.2 Adjustment of sequential circuit of hydraulic/pneumatic system. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                   | 6.3 Repairing of hydraulic cylinder and air cylinder.               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| DUTIES | TASKS | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |       | <ul style="list-style-type: none"> <li>• Circumstantial knowledge on variety and working principle of pneumatic motor</li> <li>• Circumstantial knowledge for adjusting the sequential circuit of hydraulic system</li> <li>• Circumstantial knowledge for adjusting the sequential circuit of pneumatic system</li> <li>• Circumstantial knowledge on working principle, characteristics and classification of hydraulic cylinder</li> <li>• Circumstantial knowledge on working principle, characteristics and classification of pneumatic cylinder</li> </ul> <p><b>Tools and Equipment</b></p> <ul style="list-style-type: none"> <li>• Operation equipment (work tables and bench vices)</li> <li>• Wrenches (open-end wrenches, box-end wrenches, monkey wrenches, inner hexagon wrenches, torque wrenches, socket wrenches and special wrenches)</li> <li>• Screwdrivers (straight screwdrivers and cross-head screwdrivers)</li> <li>• Pliers (wire cutter, needle-nose pliers and circlip pliers)</li> <li>• Measuring tools (vernier calipers and steel rulers)</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Hydraulic elements</li> <li>• Pneumatic elements</li> <li>• Auxiliary element</li> <li>• Maintenance accessories</li> <li>• Lubricating oil</li> <li>• Chemical fiber fabrics</li> </ul> |

| DUTIES                                                         | TASKS                                                                                        | ENABLERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                |                                                                                              | <b>Requirements for employees</b> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Communication skills</li> <li>• Honesty and integrity</li> <li>• Time management</li> <li>• Problem-solving competence</li> <li>• Professional ethics</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 7.0 Standard operation and maintenance of mechanical equipment | 7.1 Maintenance of medium-sized general-purpose equipment.                                   | <b>General skills and knowledge</b> <ul style="list-style-type: none"> <li>• Calculative skills</li> <li>• Communication skills</li> <li>• Customer service skills</li> <li>• Teamwork skills</li> <li>• Report writing skills</li> <li>• Circumstantial knowledge on maintenance of lathe, milling machine and shaping machine</li> </ul> <b>Tools and Equipment</b> <ul style="list-style-type: none"> <li>• Operation equipment (lathe, milling machine, shaping machine, work table, bench vice and bench drilling machine)</li> <li>• Maintenance tools (fitter's tools, wrenches, screwdrivers, pliers, electrical tools and special tools)</li> <li>• Measuring tools (dial gauge, magnetic meter stand, Vernier caliper and micrometer)</li> </ul> <b>Materials</b> <ul style="list-style-type: none"> <li>• Lathe, milling machine and shaping machine</li> <li>• Maintenance Accessories</li> <li>• Oil pan, lubricating oil and clean kerosene</li> <li>• Cleaning solution</li> </ul> |
|                                                                | 7.2 Replacement and repairing of quick-wear parts of medium-sized general-purpose equipment. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| DUTIES | TASKS | ENABLERS                                                                                                                                                                                                                                                                                                                                                                             |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |       | <ul style="list-style-type: none"> <li>• Abrasive paper, clean cotton yarn and chemical fiber fabrics</li> </ul> <p><b>Requirements for employees</b></p> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Communication skills</li> <li>• Honesty and integrity</li> <li>• Time management</li> <li>• Problem-solving ability</li> <li>• Professional ethics</li> </ul> |