

TRANSPORTATION AND LOGISTICS

Aircraft Maintenance



WorldSkills Occupational Standards

WorldSkills Occupational Standards (WSOS)

Occupation description and WSOS

The name of the occupation is

Aircraft Maintenance

Description of the associated work role(s) or occupation(s)

Industrial mechanics design and plan, install and commission, maintain, repair, and decommission, industrial plant. They work in a large range of industrial settings and production plants and may either have specialist knowledge about one particular industry or work across several. They may be employed within a large single plant, installing and maintaining production equipment, or work for subcontractors across a number of industrial settings. They normally work both indoors and outdoors, on small and large projects.

Industrial mechanics may manufacture parts and equipment, improve, modify, maintain, troubleshoot, and repair industrial machinery, mechanical equipment, and, increasingly, automated and robotics systems. They work in teams, or alone, according to each project and circumstance. They are likely to have ongoing contact with other trades, professions, and stakeholders such as customers and employers. The working environment may well be hazardous; therefore, industrial mechanics need proactively to promote best practice, with rigorous adherence to health and safety legislation, as a minimum.

Industrial mechanics must take on a high level of personal responsibility and autonomy. The role is wide-ranging, and every step is important. They must design, plan and provide a safe mechanical installation and maintenance service, in accordance with relevant standards; diagnose and correct malfunctions; and commission stand-alone industrial mechanical and automated systems. Concentration, precision, accuracy, and attention to detail are all essential because mistakes are largely irreversible, costly and potentially life threatening.

Industrial mechanics must recognize the implications, both financially and for businesses' reputations, of delays in production as a result of reliability issues on production lines. They therefore need to work logically and flexibly to find solutions that meet time constraints. They also need to provide Expert technical advice and guidance, and provide innovative and cost-effective solutions to production issues. Therefore, in addition to their specialist and technical expertise, the industrial mechanic must have strong work organization, communication and interpersonal skills, and be self-managing. Given the pace of industrial change, and growing environmental concerns, they must also maintain high levels of awareness and openness to their own professional development.

General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

WorldSkills Occupational Standards

Section	Relative importance (%)
1 The individual needs to know and understand	5

The individual needs to know and understand:

- The Company Maintenance Policy Manual (MPM)
- ATA chapters or equivalent
- Health and safety legislation, obligations, and documentation
- Approved manuals, data from manufacturers and government
- Situations when personal protective equipment (PPE) must be used, to include safety footwear, eye and hearing protection, gloves, and respirators
- Situations when electro-static dissipative equipment must be utilized to prevent system damage
- The purposes, uses, care, maintenance and storage of hand, power, and machine tools/equipment together with their safety implications
- The purposes, uses, care and safe storage of materials
- Sustainability measures with respect to the use of environmentally friendly materials, minimization of waste, disposal of waste and recycling of materials
- Principles of workflow and time management
- The importance of researching, planning, accuracy, checking, and attention to detail in all working practices
- The significance of certifying the completion of tasks to an international airworthy standard.

The individual shall be able to:

- Consistently and diligently follow health and safety standards, rules, and regulations
- Select, use, and store personal protective equipment including safety footwear, ear, and eye protection appropriate for the task
- Select, use, and store all tools and equipment safely
- Select, use, and store all materials safely
- Plan work areas to maximize efficiency
- Maintain the discipline of keeping work areas clean and tidy
- Measure accurately and check regularly
- Consistently and diligently follow regulated processes and procedures to an international airworthy standard using the latest revision of approved manuals and data
- Recognize the boundaries of one's own authority
- Apply the principles of "Human Factors in aircraft maintenance"
- Establish and consistently maintain high quality standards and working processes under pressure.

Section	Relative importance (%)
2 Communication and Interpersonal skills	5

The individual needs to know and understand:

- The significance of establishing and maintaining customer confidence
- The roles and requirements of related colleagues
- The value of building and maintaining productive working relationships
- The importance of having/developing an industry accepted attitude, aptitude, and ability – “Triple A” success
- The importance of swiftly resolving misunderstandings and conflicting demands
- The principles of teamwork
 - The broader importance of working as teams
 - Individual roles and responsibilities within team settings
 - Interpersonal techniques of effective teamwork
 - The importance of working within teams to accomplish tasks in a timely and economical manner
- Team values, imperatives, and contributions.

The individual shall be able to:

- Undertake investigative discussions e.g. to resolve technical problems
- Reflect positively and respond constructively to feedback on own performance
- Recognize and respond to the needs of support organizations e.g. logistical suppliers, engineering authorities, and manufacturers’ technical support
- Work within teams to accomplish tasks within a timely and economical manner
- Contribute positively to teams e.g. in order to maintain safety and airworthiness.

3 Problem solving, innovation, and creativity	5
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The individual needs to know and understand:

- The common types of problem which can occur within the work process
- Work methods and conduct to ensure an international airworthy standard is achieved
- Diagnostic approaches to problem solving
- The importance of following the latest revisions of manufacturers’ maintenance manual and documentation during the problem-solving processes
- Trends and developments in the industry including new materials, methods, and technology.

Section	Relative importance (%)
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The individual shall be able to:

- Check work regularly to minimize problems at a later stage
- Challenge incorrect information to prevent problems
- Follow self-managed processes for identifying and resolving problems, using the latest revisions of manufacturers' maintenance manuals and documentation
- Persist in resolving complex problems
- Recognize and respond to opportunities to contribute ideas to improve the product and overall level of customer satisfaction
- Take ideas forward to management
- Try new methods and embrace change within approved practices
- Exploit the potential of new technologies within approved practices
- Interpret and apply information from maintenance publications
- Encourage the checking and verification of one's own work, as well as co-workers working in a team environment, to an international airworthy standard.

4 Aircraft and System Inspection	20
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The individual needs to know and understand:

- Visual inspection techniques
- The purpose, structure, and contents of aeronautical maintenance publications i.e. ATA chapters, maintenance manuals, parts manuals, minimum equipment lists, company publications, inspection schedules, etc.
- The purpose and use of documents to initiate aircraft maintenance, record defects/actions, and certify aircraft maintenance. i.e. Journey log, technical log, work order, task card etc.
- Certifying technicians'/engineers' responsibilities for documenting and certifying scheduled and unscheduled inspections.

The individual shall be able to:

- Apply visual inspection techniques
- Interpret and carry out scheduled and unscheduled inspections
- Identify and report any defects found
- Record and certify own work in accordance with relevant legislative, manufacturer and/or company requirements.

Section	Relative importance (%)
5 Aircraft Mechanical Defect Rectification	15

The individual needs to know and understand:

- The purpose, structure, and contents of aeronautical maintenance publications, i.e. ATA chapters, maintenance manuals, parts manuals, minimum equipment lists, company publications, inspection schedules etc.
- The purpose and use of documents to initiate aircraft maintenance, record defects/actions and certify aircraft maintenance. i.e. Journey log, technical log, work order, task card, etc.
- Certifying technicians'/engineers' responsibilities for documenting and certifying defect rectification
- Troubleshooting techniques
- System and component construction and operation
- System and component publications
- Specialist assistance available
- Recording and certification processes for troubleshooting

The individual shall be able to:

- Interpret and apply information from system and component publications
- Apply troubleshooting techniques
- Rectify defects by carrying out actions such as:
 - Replacing components,
 - Adjusting systems or components,
 - Bleeding or flushing systems
 - Lubrication components
 - Repairing components
- Interpret defect and rectification reports including task cards or journey log entries by following maintenance manual procedures using the latest amendments
- Record and certify own work in accordance with relevant legislative, manufacturer and/or company requirements.

Section	Relative importance (%)
6 Aircraft Electrical Defect Rectification	15

The individual needs to know and understand:

- The purpose, structure, and contents of aeronautical maintenance publications i.e. ATA chapters, maintenance manuals, parts manuals, minimum equipment lists, company publications, inspection schedules, etc.
- The purpose and use of documents to initiate aircraft maintenance, record defects/actions and certify aircraft maintenance. i.e. Journey log, technical log, work order, task card etc.
- The certifying technicians'/engineers' responsibilities for documenting and certifying defect rectification
 - Troubleshooting techniques
 - System and component construction and operation
 - System and component publications
 - Specialist assistance available
 - Recording and certification processes for troubleshooting.

The individual shall be able to:

- Interpret and apply information from system and component publications
- Apply troubleshooting techniques
- Rectify defects by carrying out actions such as:
 - Replacing components,
 - Adjusting systems or components,
 - Lubricating components
 - Repairing components
- Interpret defect and rectification reports, including task cards or journey log entries, by following maintenance manual procedures using the latest amendments
- Record and certify own work in accordance with relevant legislative, manufacturers' and/or companies' requirements.

Section	Relative importance (%)
7 Aircraft Metal Structure Fabrication and/or Repair	20

The individual needs to know and understand:

- The purpose, structure, and contents of aeronautical maintenance publications, i.e. ATA chapters, maintenance manuals, parts manuals, minimum equipment lists, company publications, inspection schedules, structural repair manuals, AC43-13-1B, etc.
- The purpose and use of documents to initiate aircraft maintenance, record defects/actions and certify aircraft maintenance. i.e. Journey log, technical log, work order, task card etc.
- The certifying technician/engineer's responsibilities for documenting and certifying defect rectification
- Aircraft construction principles
- Aircraft metal structure repair principles
- Aircraft metal structure repair/fabrication techniques
- Specialist assistance available
- Recording and certification processes.

The individual shall be able to:

- Apply aircraft metal structure repair principles
- Apply aircraft metal structure repair techniques
- Interpret and apply information from aeronautical maintenance publications such as AC 43-13-1B and aircraft Structural Repair Manual
- Interpret defect and rectification reports, including task cards or journey log entries, by following maintenance manual procedures using the latest amendments
- Record and certify own work in accordance with relevant legislative, manufacturers' and/or companies' requirements

8 Aircraft Composite Inspection/Repair	15
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The individual needs to know and understand:

- The purpose, structure, and contents of aeronautical maintenance publications, i.e. ATA chapters, maintenance manuals, parts manuals, minimum equipment lists, company publications, inspection schedules, structural repair manual, AC43-13-1B etc.
- The purpose and use of documents to initiate aircraft maintenance, record defects/actions, and certify aircraft maintenance. i.e. Journey log, technical log, work order, task card etc.
- The certifying technician/engineer's responsibilities for documenting and certifying defect rectification
- Aircraft construction principles
- Aircraft composite structure repair principles
- Aircraft composite structure repair/fabrication techniques
- Specialist assistance available
- Recording and certification processes.

Section	Relative importance (%)
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Apply aircraft composite structure repair principles • Apply aircraft composite structure repair techniques • Interpret and apply information from structural repair publications such as AC 43-13-1B and aircraft Structural Repair Manual • Interpret defect and rectification reports including task cards or journey log entries by following maintenance manual procedures using the latest amendments • Record and certify own work in accordance with relevant legislative, manufacturer and/or company requirements. 	
Total	100

References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/>)
- ESCO: (<https://ec.europa.eu/esco/portal/home>)
- O*NET OnLine (www.onetonline.org/)

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2021.

Organization	Contact name
Starlight Aviation Group (Global)	Alan O'Neill, Group Chief Information Officer