Technical Description

Aircraft Maintenance

TRANSPORTATION AND LOGISTICS

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WorldSkills International, by a resolution of the Competitions Committee and in accordance with the Constitution, the Standing Orders and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

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1 INTRODUCTION

1.1 NAME AND DESCRIPTION OF THE SKILL COMPETITION

1.1.1 The name of the skill competition is

Aircraft Maintenance

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

An aircraft maintenance technician works in the commercial and public service sectors, performing a range of processes on aeronautical products. The aircraft maintenance technician has a critical responsibility to work professionally to ensure the safety of customers and maintain the reputation of the team or organization.

The aircraft maintenance technician normally works in an aircraft hangar. However, there are times when working outdoors is required. He or she may work for large and small organizations and occasionally directly for individual customers. He or she will undertake a number of processes including inspection, servicing, troubleshooting, removal, installation, rigging, testing, and repairing. An aircraft maintenance technician may specialize by working on particular aeronautical products such as helicopters and UAVs (Unmanned Aeronautical Vehicles), and tilt wing aircraft. Whether or not he or she specializes, work organization, and self-management, communication and interpersonal skills, problem-solving and the ability consistently to work safely and rigorously, adhering to industry regulations and manufacturers' instructions are the universal attributes of the outstanding aircraft maintenance technician.

In a mobile labour market, the aircraft maintenance technician may work in teams, or alone, or in both from time to time. Whatever the structure of the work, the trained and experienced aircraft maintenance technician takes on a high level of personal responsibility and autonomy. From safeguarding the safety of the customer through scrupulous attention to safe working, to undertaking complex repairs, every process matters and mistakes can be life threatening. The aircraft maintenance technician is one of the last lines of defence to ensure the safety of the aircraft before flight.

As a part of a global industry the aircraft maintenance technician faces rapidly expanding opportunities and challenges (including maintaining drones and space vehicles). For the talented aircraft maintenance technician there are many commercial and international opportunities; however, these carry with them the need to understand and work with different regulations and technological advancements. The diversity of skills associated with aircraft maintenance is therefore likely to expand.

1.2 THE RELEVANCE AND SIGNIFICANCE OF THIS DOCUMENT

This document contains information about the standards required to compete in this skill competition, and the assessment principles, methods, and procedures that govern the competition.

Every Expert and Competitor must know and understand this Technical Description.

In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

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1.3 ASSOCIATED DOCUMENTS

Since this Technical Description contains only skill-specific information it must be used in association with the following:

- WSI – Competition Rules
- WSI – WorldSkills Standards Specification framework
- WSI – WorldSkills Assessment Strategy WSI Online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations

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2 THE WORLDSKILLS STANDARDS SPECIFICATION (WSSS)

2.1 GENERAL NOTES ON THE WSSS

The WSSS 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/WSSS).

The skill competition is intended to reflect international best practice as described by the WSSS, and to the extent that it is able to. The Standards Specification 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 not be separate tests of knowledge and understanding.

The Standards Specification 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 Specification. The sum of all the percentage marks is 100.

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

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

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- WorldSkills Standards Specification

SECTION		RELATIVE IMPORTANCE (%)
1	**Work organization and management**	**5**
	The individual needs to know and understand: • ATA chapters or equivalent • Health and safety legislation, obligations and documentation • Approved manuals, data from manufacturers and government • The situations when personal protective equipment (PPE) must be used, to include: safety footwear, eye and hearing protection • 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 applying to the use of 'green' materials and recycling • The ways in which working practices can minimize wastage and help to manage costs • The principles of work flow and measurement • The importance of planning, accuracy, checking and attention to detail in all working practices • The significance of 'signing off' a completed task to an international airworthy standard (I.A.W) • The role of the 'licensed practitioner' as the signing authority to release the aircraft for service	
	The individual shall be able to: • Consistently and diligently follow health and safety standards, rules and regulations • Identify and use the appropriate personal protective equipment including safety footwear, ear and eye protection • Select, use, clean, maintain and store all tools and equipment safely • Select, use and store all materials safely • Plan the work area to maximize efficiency • Maintain the discipline of keeping the work area clean and tidy • Measure accurately and check regularly • Consistently and diligently follow regulated processes and procedures to an international airworthy standard (I.A.W) using approved manuals, at the latest 'Amended Issue' and data • Recognize boundaries of own authority • Work to the requirements of the industry 'Human Factors' qualifications regarding the recruitment/employment of technicians • Establish and consistently maintain high quality standards and working processes under pressure	

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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 • Techniques of effective team work • The importance of swiftly resolving misunderstandings and conflicting demands	
	The individual shall be able to: • Interpret customer requirements and manage customer expectations positively • Make recommendations which meet/exceed the customers' requirements and budget • Produce a cost and time estimate for customers • Contribute positively to a team e.g. in order to maintain safety • Undertake investigative discussions e.g. to resolve technical problems • Keep colleagues regularly informed/up-dated on planned maintenance procedures and negotiate timings to minimize negative impact on work/productivity levels • Reflect positively and constructively to feedback on own performance • Recognize the needs of support organizations e.g. logistical supplier, engineering authority	
3	**Problem solving, innovation, and creativity**	**5**
	The individual needs to know and understand: • The common types of problem which can occur within the work process • Diagnostic approaches to problem solving • The importance of following the manufacturer's manual, at the latest 'Amended Issue'/industry problem solving processes to ensure an international airworthy standard (I.A.W.) is achieved • Trends and developments in the industry including new materials, methods and technology	
	The individual shall be able to: • Check work regularly to minimize problems at a later stage • Challenge incorrect information to prevent problems • Recognize and understand problems swiftly and follow a self-managed process for resolving them using manufacturer's manual, latest 'Amended Issue' • Undertake fault diagnosis discussions with pilots to determine the underlying causes of technical problems • Persist in resolving complex problems • Recognize opportunities to contribute ideas to improve the product and overall level of customer satisfaction • To take ideas forward to management • Demonstrate a willingness to try new methods and embrace change • Exploit the potential of new technologies • Interpret and apply maintenance procedures	

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4	**Daily inspection**	**10**
	The individual needs to know and understand: • ATA chapter(s) 05, 20, 51, 60 or equivalent • The maintenance manual • Airworthiness responsibilities	
	The individual shall be able to: • Interpret the appropriate maintenance manual, latest "Amended Issue" and consistently use to support the inspection process • Accurately determine if an aircraft is safe for flight or if further inspection is required as per the Defect and Daily Inspection Checklists • Open and close a range of inspection panels • Accurately complete corresponding documentation to reflect the status of the completed Daily Inspection (D.I.) • Clearly and accurately document any defects and refer to the Controller for his/her attention	
5	**Sheet metal repair**	**10**
	The individual needs to know and understand: • ATA chapter 51 or equivalent • Engineering drawings • Different types of metal and their characteristics • Formulae for calculating bends and rivet lengths • Types of rivet and their purposes • Precision measuring instruments • Repair/fabrication techniques	
	The individual shall be able to: • Recognize the need for a repair and obtain authority to carry out • Interpret manufacturer's engineering drawings for a range of complex repairs including: Top Hat, Lobster Back Bend, OGEE (curved bend), and Joggled • Accurately calculate the dimensions for flat layout • Form a complex section and channel and fit as required to make an assembly in accordance with Standard Practices (AC 43-13) • Bend sheet metal with a high degree of accuracy with corners rounded, smooth and nick free • Layout fastener, accurately determine the rivet length and install solid rivets in accordance with the supplied engineering drawings • Troubleshoot any defects found in repair and accurately report to a licensed engineer	

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6	Composite repair	10
	The individual needs to know and understand: • ATA chapter 51 or equivalent • Engineering drawings • Different types of composite materials and their characteristics • Health implications of repairs with composite and special precautions necessary including increased time allocation • Formulae for calculating bends • Precision measuring instruments • Repair/fabrication techniques • How to use a Standard Composite Repair Manual	
	The individual shall be able to: • Recognize the need for a repair and obtain authority to carry out • Interpret manufacturer's engineering drawings for a range of complex repairs including Anchor Nut Insert install and replace, Wet Layup to fabricate a panel and repair using vacuum pack repair, Panel edge potting of a Honeycomb panel • Calculate the dimensions for flat layout • Form a complex section and channel and fit as required to make an assembly in accordance with Standard Practices (Standard Composite Repair Manual) including a vacuum pack repair • Troubleshoot any defects found in repair and accurately report to a licensed engineer	
7	**Rig aircraft control systems**	**15**
	The individual needs to know and understand: • ATA chapter(s): Fixed Wing 10, 20, 27, 51; Helicopters 10, 20, 51, 67 or equivalent • The critical interaction of pilot requirements and systems constraints • The effect of atmospheric conditions on aircraft control systems • The effect of the computer hardware and software interaction with each other and the aircraft • The correct procedure for removing, inspecting installing and rigging all primary and secondary Flight Controls	
	The individual shall be able to: • Interpret engineering drawings, graphs and maintenance manual procedures for mechanical/software control systems • Accurately set up complex aircraft control systems using charts supplied with tensiometer with the ailerons centred (using a rigging pin) • Accurately set all aircraft control travel limits by checking and adjusting as necessary • Check control movement, direction and sense of operation • Submit for independent inspection and safety of all aircraft hardware and travel stops	

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8	Remove and install aircraft component	10
	The individual needs to know and understand: • ATA chapter(s) 10, 11, 12, 20, 24, 27, 29 or equivalent • The impact of removing an aircraft component on the work of colleagues • The effect and consequences on the aircraft systems when a particular component is removed • Correct procedures of removing, inspecting and installing components	
	The individual shall be able to: • Interpret engineering diagrams and follow maintenance manual procedures and use the latest 'Amendment Issue' • Ensure the aircraft is safe to work on • Remove access panels as required and store safely on racking • Remove system pressure hoses, if applicable, ensuring systems pressures have been dissipated • Ensure each attachment, bolt and nut are kept as a set to avoid • Misalignment of split pin holes on a refit • Remove wire locking, split pins, nuts and washers, maintaining awareness of potential loose articles • Clean, inspect and lubricate as required • Refit aircraft component ensuring correct orientation • Re-connect systems hoses, where disconnected and restore system pressure, making sure colleagues are aware • Carry out functionality test	
9	**Gas turbine engine boroscope inspection**	**5**
	The individual needs to know and understand: • ATA chapter(s) 71, 72, 81 or equivalent • The airflow and dynamics through a gas turbine engine • Manufacturer's maintenance manual • Effects of metallurgy in very hot areas	
	The individual shall be able to: • Interpret engineering diagrams and follow maintenance manual procedures and ensure it is at the latest Amendment Issue • Use a fixed and flexible Boroscope to inspect and report defects found inside a Gas Turbine Engine without removing any components from the engine other than for access purposes • Accurately interpret the visual image to determine the level of any damage • Determine the limits, which have been established by the manufacturer and if a limit has been exceeded, what maintenance action(s) are required • Complete defect report accurately	

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10	Fabricate an aircraft electrical loom	10
	The individual needs to know and understand: • ATA chapter 24 or equivalent • Engineering/electrical diagrams • Different types of wire and their characteristics • Formulae for the bends in looms • Precision measuring instruments • Fabrication techniques as per standard wiring practices manual	
	The individual shall be able to: • Install and terminate an aircraft wire loom as per aircraft wiring diagram • Check operational circuit • Correctly secure the loom to the aircraft structure • Use calibrated tools (i.e. multi-meter, mega meter, oscilloscope etc.)	
11	**Fault diagnose an aircraft electrical circuit**	**15**
	The individual needs to know and understand: • ATA chapter 24 or equivalent • Standard wiring practices manual • The importance of discussion with the other trades as it affects them • how to use and interpret a multi meter	
	The individual shall be able to: • Accurately identify and isolate faults in a wiring harness and correct • Report any defects found to a licensed engineer • Use calibrated tools e.g. multi-meter, mega meter, oscilloscope	
	Total	**100**

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3 THE ASSESSMENT STRATEGY AND SPECIFICATION

3.1 GENERAL GUIDANCE

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform.

Expert assessment practice lies at the heart of the WorldSkills Competition. For this reason, it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: measurement and judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards Specification. The Test Project is the assessment vehicle for the skill competition, and also follows the Standards Specification. The CIS enables the timely and accurate recording of marks, and has expanding supportive capacity.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed and developed through an iterative process, to ensure that both together optimize their relationship with the Standards Specification and the Assessment Strategy. They will be submitted to WSI for approval together, in order to demonstrate their quality and conformity with the Standards Specification.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors in order to benefit from the capabilities of the CIS.

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4 THE MARKING SCHEME

4.1 GENERAL GUIDANCE

This section describes the role and place of the Marking Scheme, how the Experts will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standards that represent the skill. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards Specification.

By reflecting the weightings in the Standards Specification, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Standards Specification, if there is no practicable alternative.

The Marking Scheme and Test Project may be developed externally by one person, or several, or by all Experts. The detailed and final Marking Scheme and Test Project designed externally must be approved by the whole Expert Jury prior to submission for independent quality assurance. The exception to this process is for those skill competitions which use an external designer for the development of the Marking Scheme and Test Project where the final versions of the Marking Scheme and Test Project are quality approved and quality assured by the Skill Competition Manager.

In addition, Experts are encouraged to submit their Marking Schemes and Test Projects for comment and provisional approval well in advance of completion, in order to avoid disappointment or setbacks at a late stage. They are also advised to work with the Skill Advisors at this intermediate stage, in order to take full advantage of the possibilities of the CIS.

In all cases the complete and approved Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition using the CIS standard spreadsheet or other agreed methods. The Skill Competition Manager is responsible for this process.

4.2 ASSESSMENT CRITERIA

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived in conjunction with the Test Project. In some skill competitions the Assessment Criteria may be similar to the section headings in the Standards Specification; in others they may be totally different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme must reflect the weightings in the Standards Specification.

Assessment Criteria are created by the person(s) developing the Marking Scheme, who are free to define criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I).

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria.

The marks allocated to each criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each A within that Assessment Criterion.

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4.3 SUB CRITERIA

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills marking form.

Each marking form (Sub Criterion) has a specified day on which it will be marked.

Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement. Some Sub Criteria have Aspects marked by both measurement and judgement, in which case there is a marking form for each.

4.4 ASPECTS

Each Aspect defines, in detail, a single item to be assessed and marked together with the marks, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or judgement, and appear on the appropriate marking form.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it and a reference to the section of the skill as set out in the Standards Specification.

The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the skill in the Standards Specification. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1)

		CRITERIA								TOTAL MARKS PER SECTION	WSSS MARKS PER SECTION	VARIANCE
		A	B	C	D	E	F	G	H			
STANDARDS SPECIFICATION SECTION	1			2.75	1.00	1.25	0.25	1.00		6.25	6.00	0.25
	2		4.25			2.00		0.50	1.00	7.75	6.00	1.75
	3	11.00	9.75							20.75	22.00	1.25
	4			10.25	11.00					21.25	22.00	0.75
	5					9.50	10.00	1.50		21.00	22.00	1.00
	6					2.00		7.00	14.00	23.00	22.00	1.00
TOTAL MARKS		11.00	14.00	13.00	12.00	14.75	10.25	10.00	15.00	100.00	100.00	6.00

SAMPLE OF TABLE FROM CIS

4.5 ASSESSMENT AND MARKING USING JUDGEMENT

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, judgement must be conducted using:

- benchmarks (criteria) for detailed guidance for each Aspect
- the 0-3 scale to indicate:
  - 0: performance below industry standard
  - 1: performance meets industry standard
  - 2: performance meets and, in specific respects, exceeds industry standard
  - 3: performance wholly exceeds industry standard and is judged as excellent

Three Experts will judge each Aspect, with a fourth acting as a judge where required to prevent compatriot assessment.

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4.6 ASSESSMENT AND MARKING USING MEASUREMENT

Three experts will be used to assess each aspect. Unless otherwise stated only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect.

4.7 THE USE OF MEASUREMENT AND JUDGEMENT

Decisions regarding the selection of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

4.8 COMPLETION OF SKILL ASSESSMENT SPECIFICATION

A – Assembly

- Completion time;
- Area clean-up;
- Hat section dimensions (±0.025”);
- Channel dimensions (±0.025”);
- Grain direction;
- Bend radius;
- All edges smooth and nick free;
- All corners rounded to 0.125” radius;
- Fastener pitch;
- Edge distance;
- Fastener selection;
- Shop heads;
- Manufacturer heads;
- Surface finish/tooling damage.

B – Completion of required rigging procedure

- Ailerons faired in neutral;
- Cable tension within limits;
- Lock-wire as per Standard Practices (AC 43-13);
- Safety clips installed correctly as per Standard Practices (AC 43-13);
- Up travel stop set to 15° ±1°;
- Down travel stop set to 13° ±1°;
- Travel stops correctly safe-tied;
- Area clean up;
- No tension on rigging pin when ailerons faired in neutral position.

C – Daily inspection

- All process steps have been followed satisfactorily;
- Proper use of appropriate maintenance manual;
- Procedure followed to inspect the Helicopter (Expert observes procedure);
- Accuracy of the written defects;
- Paperwork correctly completed.

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D – Removal and installation of aircraft component

- Correct removal and installation of hydraulic hoses;
- Correct removal and installation of control rods;
- Correct removal and installation of bell crank;
- Correct removal and installation of torque tube assembly;
- Correct adjustment of all controls for reinstalled items including freedom of movement.

E – Gas turbine hot section inspection using a Boroscope

- All process steps have been followed in accordance with the manufacturer's MM;
- Hot Section Inspection defect report filled out correctly.

F – Troubleshoot and electrical wiring defect

- Install and terminate wires to terminal block and switched on lamp;
- Operational check of lighting circuit;
- Trouble electrical wiring defects

G – Composite inspection and repair

- *Currently in design with Lead Expert and to be finalized. Details will be added to the Technical Description when complete and a new version circulated.*

4.9 SKILL ASSESSMENT PROCEDURES

- The Chief Expert will divide the Experts into teams for purpose of marking and setting up marking schedules. Consideration will be given to WorldSkills experience, language and culture;
- Each module/task/section will be completed on the assigned day so that progressive marking can take place;
- Marking is to be entered after each section has been completed, and a program has been developed for computer calculation after time and task data has been entered;
- The Experts marking criteria and Competitor evaluation sheets, for each of the modules will be given to the Experts at the Competition.

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5 THE TEST PROJECT

5.1 GENERAL NOTES

Sections 3 and 0 govern the development of the Test Project. These notes are supplementary.

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the skills in each section of the WSSS.

The purpose of the Test Project is to provide full and balanced opportunities for assessment and marking across the Standards Specification, in conjunction with the Marking Scheme. The relationship between the Test Project, Marking Scheme and Standards Specification will be a key indicator of quality.

The Test Project will not cover areas outside the Standards Specification, or affect the balance of marks within the Standards Specification other than in the circumstances indicated by Section 2.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work.

The Test Project will not assess knowledge of WorldSkills rules and regulations.

This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards Specification. Section 2.2 refers.

5.2 FORMAT/STRUCTURE OF THE TEST PROJECT

The format of the Test Project is a series of standalone modules.

5.3 TEST PROJECT DESIGN REQUIREMENTS

- Comply with current ICAO standards where applicable;
- Be modular;
- Be in accordance with the current Technical Description;
- Comply with WorldSkills requirements and numbering standard;
- Be accompanied by a marking scale that will be finalized at the Competition;
- Be accompanied by proof of function/proof of construction/completion in the set time etc. – as appropriate to this skill competition.

5.4 TEST PROJECT DEVELOPMENT

The Test Project MUST be submitted using the templates provided by WorldSkills International (www.worldskills.org/expertcentre). Use the Word template for text documents and DWG template for drawings.

5.4.1 Who develops the Test Project or modules

The Test Project modules are developed by nominated Experts.

The Experts will be nominated at the end of the previous Competition. All Experts can put forward an idea and then the nominated Experts will choose and develop modules that are relevant to Aircraft Maintenance.

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5.4.2 How and where is the Test Project or modules developed

The Test Project/modules are developed jointly on the Discussion Forum.

The nominated Experts will initially be allowed to start developing the modules on their own. However, every four months the module, under development, will be posted on the Discussion Forum for all Members to review and post their feedback.

5.4.3 When is the Test Project developed

The Test Project is developed according to the following timeline:

TIME	ACTIVITY
At the previous Competition	Experts are nominated to develop the Test Project for the next Competition.
Every four months between Competitions	Experts developing the Test Project are required to post their Test Project on the Discussion Forum for all Experts to review.
Six (6) months before the Competition	The Test Project is developed.
Four (4) months before the Competition	Experts vote to select the Test Project.
Three (3) months before the Competition	The Test Project is circulated.
At the Competition	All Experts ensure the validity of the Test Project. Evaluation questions pertaining to any of the modules are changed to constitute the 30% change.

5.5 TEST PROJECT VALIDATION

At the Competition all Experts ensure that:

- The sheet metal designs are accurate and complete;
- There are no installation requirements that cannot be completed;
- The tasks can be completed in the prescribed time of 22 hours;
- Proper function is achievable;
- The material/equipment list is accurate;
- Competitor instructions are kept to a minimum of text, and that they do not exceed the available space permitted on the approved instruction sheet for any one module.

5.6 TEST PROJECT SELECTION

The Test Project is selected by vote of Experts on the Discussion Forum four months prior to the Competition.

This will be done in conjunction with the feedback from all Experts on new modules that are being developed as well as existing modules.

5.7 TEST PROJECT CIRCULATION

The Test Project is circulated via the website as follows:

Three months before the current Competition

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5.8 TEST PROJECT COORDINATION (PREPARATION FOR COMPETITION)

Coordination of the Test Project will be undertaken by the Skill Competition Manager

The Skill Competition Manager is responsible for ensuring the following:

- The sheet metal designs are accurate and complete;
- There are no installation requirements that cannot be completed;
- The tasks can be completed in the prescribed time of 22 hours;
- Proper function is achievable;
- The material/equipment list is accurate;
- Competitor instructions are kept to a minimum of text, and that they do not exceed the available space permitted on the approved instruction sheet for any one module;
- The Test Project is complete in all aspects.

5.9 TEST PROJECT CHANGE AT THE COMPETITION

Not applicable for practical modules. All of the modules are assessed using judgement marking and comply with ICAO standards. Evaluation questions (written) pertaining to any of the modules can be changed and approved by the Skill Competition Manager. This will satisfy the 30% module change for the theoretical part.

5.10 MATERIAL OR MANUFACTURER SPECIFICATIONS

Specific material and/or manufacturer specifications required to allow the Competitor to complete the Test Project will be supplied by the Competition Organizer and are available from www.worldskills.org/infrastructure located in the Expert Centre.

Specific material or manufacturer specifications required by the Competitor to complete the Test Project modules will be supplied by the Competition Organizer. The Infrastructure List will be updated for the current Competition no later than six months prior to event.

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6 SKILL MANAGEMENT AND COMMUNICATION

6.1 DISCUSSION FORUM

Prior to the Competition, all discussion, communication, collaboration, and decision making regarding the skill competition must take place on the skill specific Discussion Forum (http://forums.worldskills.org). Skill related decisions and communication are only valid if they take place on the forum. The Skill Competition Manager (or an Expert nominated by the Skill Competition Manager) will be the moderator for this Forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

6.2 COMPETITOR INFORMATION

All information for registered Competitors is available from the Competitor Centre (www.worldskills.org/competitorcentre).

This information includes:

- Competition Rules
- Technical Descriptions
- Marking Schemes
- Test Projects
- Infrastructure List
- WorldSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

6.3 TEST PROJECTS [AND MARKING SCHEMES]

Circulated Test Projects will be available from www.worldskills.org/testprojects and the Competitor Centre (www.worldskills.org/competitorcentre).

6.4 DAY-TO-DAY MANAGEMENT

The day-to-day management of the skill during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Skill Competition Manager. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and Deputy Chief Expert. The Skill Management Plan is progressively developed in the eight months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed in the Expert Centre (www.worldskills.org/expertcentre).

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7 SKILL-SPECIFIC SAFETY REQUIREMENTS

Refer to Host country or region WorldSkills Health, Safety, and Environment Policy and Regulations for Host country or region regulations.

The following skill-specific safety requirements are to be adhered to by the Competitors and Experts.

- All Competitors must use safety glasses when using any hand, power, or machine tools or equipment likely to cause or create chips or fragments that may injure the eyes;
- Experts will use the appropriate personal protective equipment when inspecting, checking, or working with a Competitor's project.

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8 MATERIALS AND EQUIPMENT

8.1 INFRASTRUCTURE LIST

The Infrastructure List details all equipment, materials and facilities provided by the Competition Organizer.

The Infrastructure List is available at www.worldskills.org/infrastructure.

The Infrastructure List specifies the items and quantities requested by the Skill Competition Manager on behalf of the Experts for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Items supplied by the Competition Organizer are shown in a separate column.

At each Competition, the Skill Competition Manager must review, audit, and update the Infrastructure List in partnership with the Technical Observer in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any requests for increases in space and/or equipment.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

8.2 COMPETITOR'S TOOLBOX

The size of the toolbox shall be no more than 0.75 m³. We are encouraging ALL Competitors not to bring a toolbox as ALL of the tools necessary to complete the projects will be made available from the Competition Organizer.

8.3 MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY COMPETITORS IN THEIR TOOLBOX

- Safety glasses;
- Hearing protection;
- Safety coveralls;
- Safety footwear;
- Basic hand tools

EXAMPLE OF TYPICAL BASIC HAND TOOLBOX
1/4" drive socket set that has the following items: Fine tooth ratchet 3" and 6" extension Standard and deep 12 point sockets 3/16", 7/32", 1/4", 9/32", 5/16", 11/32", 3/8", 7/16", 1/2", 9/16" Universal joint Adapter 1/4" – 3/8"
3/8" drive socket set that has the following items: Fine tooth ratchet 3" and 6" extension Standard 12 point sockets 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16", 7/8", 1" Deep 12 point sockets

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EXAMPLE OF TYPICAL BASIC HAND TOOLBOX
3/8", 7/16", 1/2", 7/8", and 1" Deep 6-point socket, 7/8" Universal joint Speed handle Adapter 3/8" – 1/2" Adapter 1/2" – 3/8"
Set ignition combination wrenches 5/32", 3/16", 7/32", 1/4", 9/32", 5/16", 11/32", 3/8", 13/32", 7/16"
Set of combination wrenches 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 7/8", 1"
Set of open end wrenches 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 7/8", 1"
Set pin punches 3/32", 1/8", 5/32", 3/16", and 3/8"
set of screwdrivers Stubby slotted Stubby #2 Philips #1 Philips #2 Philips 4" slotted 8" slotted
Other items Set hex keys (Allen wrenches) from .050" to 5/16" Centre punch Line up punch 1/4" cold chisel Soft faced hammer Ball peen hammer, 10 ounce Pliers, duck bill Pliers, needle nose Diagonal cutters 5" to 7" Pliers, slip joint 8" Metal ruler 6" Feeler gauge set

8.4 MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY EXPERTS

- Note pad;
- Pens, pencils;
- Safety glasses;
- Hearing protection;
- Safety footwear

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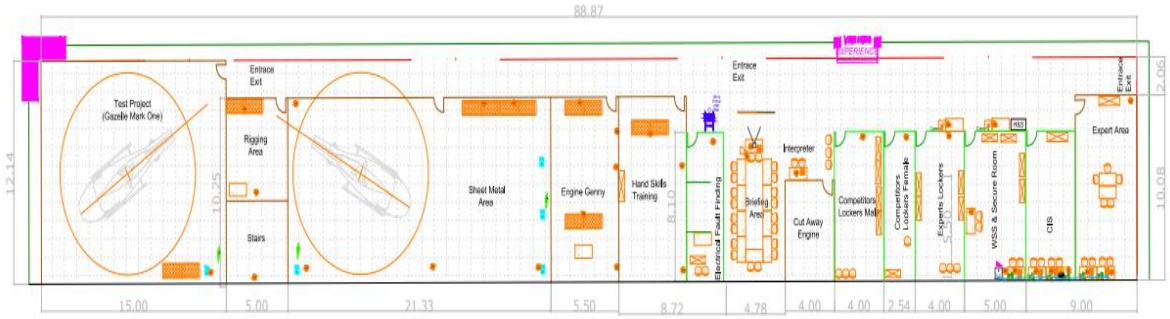
8.5 MATERIALS AND EQUIPMENT PROHIBITED IN THE SKILL AREA

- Storage device;
- Programmable calculator;
- Any CD, floppy disk, flash memory, or any other recording equipment.
- Refer to section 9 for more information

8.6 PROPOSED WORKSHOP AND WORKSTATION LAYOUTS

Workshop layouts from previous competitions are available at www.worldskills.org/sitelayout.

Example workshop layout:



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9 SKILL-SPECIFIC RULES

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from skill competition to skill competition. This includes but is not limited to personal IT equipment, data storage devices, internet access, procedures and work flow, and documentation management and distribution.

TOPIC/TASK	SKILL-SPECIFIC RULE
Use of technology – USB, memory sticks	• Competitors, Experts, and Interpreters are not allowed to bring memory sticks into the workshop.
Use of technology – personal laptops, tablets and mobile phones	• Competitors, Experts, and Interpreters are not allowed to bring personal laptops, tablets or mobile phones into the workshop.
Use of technology – personal photo and video taking devices	• Competitors, Experts, and Interpreters are only allowed to use personal photo and video taking devices in the workshop at the conclusion of the competition. • Experts are allowed to use a dedicated camera and memory device as required for the marking process. These must be approved by the Chief Expert.
Templates, aids, etc.	• Competitors are not allowed to bring templates and aids to the Competition that may give them an unfair advantage.
Drawings, recording information	• Competitors are not allowed to bring any prepared drawings or documented information to the Competition.
Health, Safety, and Environment	• Refer to the WorldSkills Health, Safety, and Environment policy and guidelines document.

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10 VISITOR AND MEDIA ENGAGEMENT

The following list provides examples of how this skill competition may be more attractive for the media and visitors:

- Try a trade;
- Display screens;
- Test Project descriptions;
- Enhanced understanding of Competitor activity;
- Competitor profiles;
- Career opportunities;
- Daily reporting of competition status - All results may be displayed in the Competition area as per previous Competitions. This will be of the progressive marking for all sections of the Competition and will display the current total aggregate result per country/region.

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11 SUSTAINABILITY

This skill competition will focus on the sustainable practices below:

- Recycling;
- Use of 'green' materials.

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12 REFERENCES FOR INDUSTRY CONSULTATION

WorldSkills is committed to ensuring that the WorldSkills Standards Specifications 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 Standards Specification on a two yearly cycle.

In addition, the career exploration and job analysis database, O*NET OnLine (www.**oneto**nline.org/), is used as a reference to all occupations represented at the WorldSkills Competition.

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Standards Specification in place for WorldSkills Abu Dhabi 2017.

ORGANIZATION	CONTACT NAME
STARS (Shock Trauma Air Rescue Society)	Mr. Ryan Gillis
Aer Lingus Maintenance & Engineering	Mr. Ciaran Dunne, Training and Standards Manager
Royal Air Force	Mr. Gary Coutts, Warrant Officer, Aeronautical Engineering Manager
QinetiQ	Mr. Chris Vaughan, Lead Internal Verifier
Aviation Skills Partnership	Mr. Andrew Gavan, Head of Engineering Aviation Skills Partnership

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