



TECHNICAL DESCRIPTION AIRCRAFT MAINTENANCE



WorldSkills International, by a resolution of the Technical 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 the last line 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 travelling into space). 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.



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 (when available)
- WSI – Online resources as indicated in this document
- Host Country – Health and Safety regulations



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.



2.2 WORLDSKILLS STANDARDS SPECIFICATION

SECTION		RELATIVE IMPORTANCE (%)
1	Work organization and management	5
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 	



2	Communication and Interpersonal Skills	5
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • The significance of establishing and maintaining customer confidence • The roles and requirements of related colleagues • The value of building and maintaining productive working relationships • Techniques of effective team work • The importance of swiftly resolving misunderstandings and conflicting demands 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 	



4	Daily Inspection	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • The maintenance manual • Airworthiness responsibilities 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 	
6	Composite Repair	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	



	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Interpret engineering drawings, graphs and maintenance manual procedures for mechanical/software control systems • Accurately set up complex aircraft control systems using charts supplied with tensiometre 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 	
8	Remove and Install Aircraft Component	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	



	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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	Blend a Compressor Unit	5
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • The airflow and dynamics through a gas turbine compressor unit • Precision measuring instruments • Blending techniques 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Interpret engineering diagrams and follow maintenance manual procedures and use the latest 'Amendment Issue' • Accurately determine the damage level and decide whether recoverable through immediate repair or repair following concession of higher engineering authority (normally field representative of manufacturer) • Blend out a compressor wheel blade of a Gas Turbine Engine to within the manufacturer's airworthy tolerance • Complete a compressor blade map for archive purposes 	
10	Gas Turbine Engine Boroscope Inspection	5
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • The airflow and dynamics through a gas turbine engine • Manufacturer's maintenance manual • Effects of metallurgy in very hot areas 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 • Complete defect report accurately 	



11	Fabricate an Aircraft Electrical Loom	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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.) 	
12	Fault Diagnose an Aircraft Electrical Circuit	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • Standard wiring practices manual • The importance of discussion with the other trades as it affects them • how to use and interpret a multi meter 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 	



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 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 judgment. These are referred to as **objective** and **subjective**, respectively. 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 agreed by the Experts and 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.



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 by one person, or several, or by all Experts. The detailed and final Marking Scheme and Test Project 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.

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 CIS Team 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.

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 aspect of assessment within that Assessment Criterion.



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 either objective or subjective Aspects to be marked. Some Sub Criteria have both objective and subjective aspects, 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 objectively or subjectively 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
STANDARD SPECIFICATION SECTIONS											
TOTAL MARKS PER CRITERION											100

SAMPLE OF TABLE FROM CIS



4.5 SUBJECTIVE MARKING

Subjective marking uses the 10 point scale below. To apply the scale with rigour and consistency, subjective marking should be conducted using:

- benchmarks (criteria) to guide judgment against each Aspect
- the scale to indicate:
 - 0: non attempt;
 - 1-4: below industry standard;
 - 5-8: at or above industry standard;
 - 9-10: excellence.

4.6 OBJECTIVE MARKING

A minimum of three experts will be used to judge each aspect. Unless otherwise stated only the maximum mark or zero will be awarded. Where they are used, partial marks will be clearly defined within the Aspect.

4.7 THE USE OF OBJECTIVE AND SUBJECTIVE ASSESSMENT

The final deployment of objective or subjective assessment will be agreed when the Marking Scheme and Test Project are finalized. The table below is advisory only for the development of the Test Project and Marking Scheme.

SECTION	CRITERION	MARKS		
		Subjective	Objective	Total
A	Assembly sheet metal	0	20	20
B	Rigging flight controls	0	15	15
C	Daily inspection of aircraft	0	10	10
D	Removal and installation of aircraft component	0	20	20
E	Hot Section inspection using boroscope	0	10	10
F	Fabricate and troubleshoot electrical wiring circuit	0	15	15
G	Compressor Blade Blending	0	10	10
Total		0	100	100



4.8 COMPLETION OF SKILL ASSESSMENT SPECIFICATION

A – Assembly

- Completion time;
- Area clean-up;
- Hat section dimensions ($\pm 0.025''$);
- Channel dimensions ($\pm 0.025''$);
- 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;
- Lockwire as per Standard Practices (AC 43-13);
- Safety clips installed correctly as per Standard Practices (AC 43-13);
- Up travel stop set to $15^\circ \pm 1^\circ$;
- Down travel stop set to $13^\circ \pm 1^\circ$;
- Travel stops correctly safetied;
- 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.

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 – Compressor Blade Blending

- Blend Compressor Blade i.a.w. Manufacture's Maintenance Manual



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.



5 THE TEST PROJECT

5.1 GENERAL NOTES

Sections three and four 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 0 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.



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 as follows:

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



5.8 TEST PROJECT COORDINATION (PREPARATION FOR COMPETITION)

Coordination of the Test Project will be undertaken by the Chief Expert.

The Chief Expert 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 objectively marked and comply with ICAO standards. Evaluation questions (written) pertaining to any of the modules can be changed and approved by the Chief Expert and Deputy Chief Expert. 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.



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 Chief Expert (or an Expert nominated by the Chief Expert) 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
- Health and Safety documentation
- 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 Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six 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).



7 SKILL-SPECIFIC SAFETY REQUIREMENTS

Refer to Host Country/Region Health and Safety documentation for Host Country/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.



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 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 Experts must review and update the Infrastructure List in preparation for the next Competition. Experts must advise the Technical Director of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition.

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 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
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"



EXAMPLE OF TYPICAL BASIC HAND TOOLBOX
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

8.3 MATERIALS, EQUIPMENT AND TOOLS SUPPLIED BY EXPERTS

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

8.4 MATERIALS AND EQUIPMENT PROHIBITED IN THE SKILL AREA

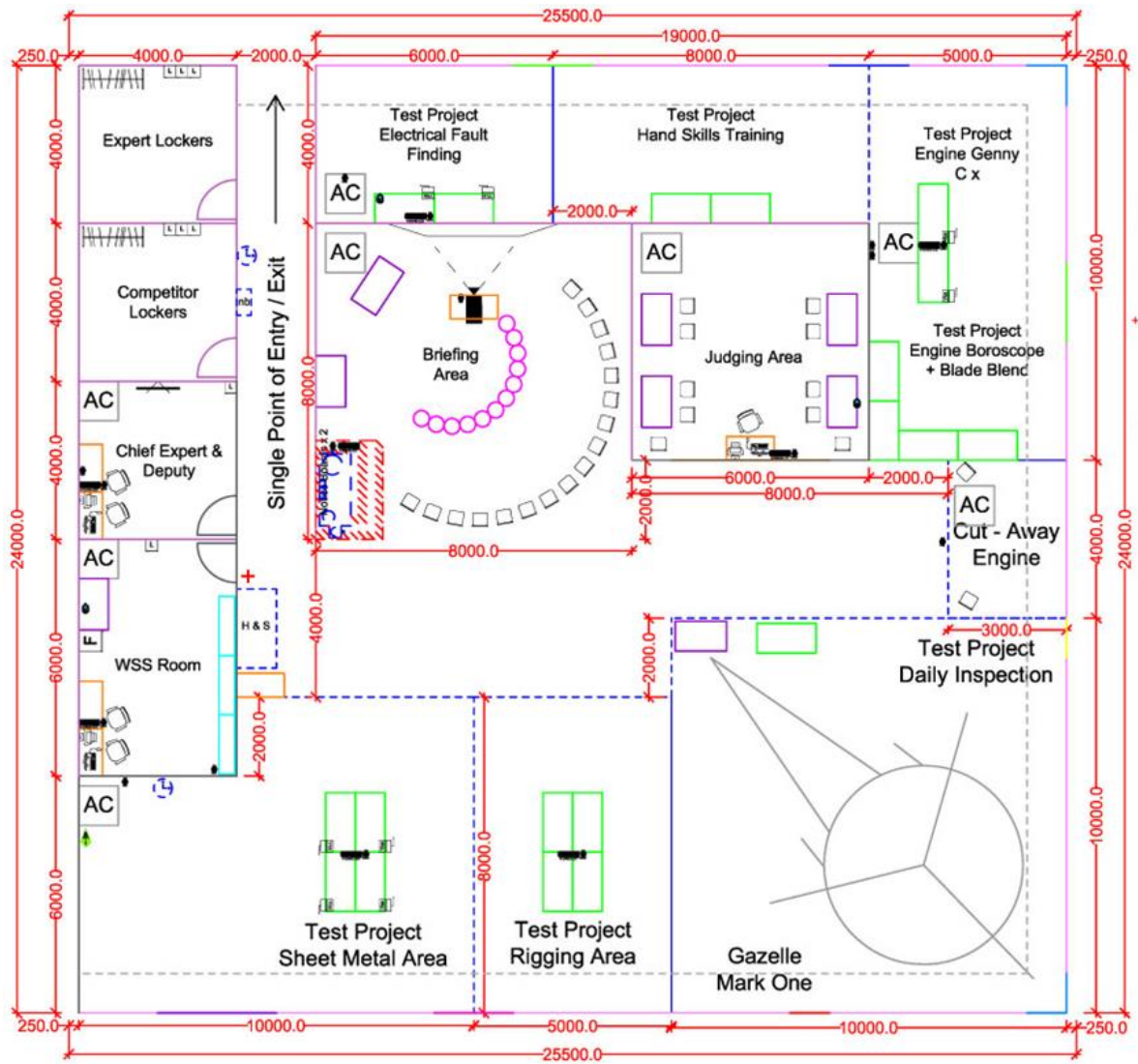
- Storage device;
- Programmable calculator;
- Any CD, floppy disk, flash memory or any other recording equipment.



8.5 PROPOSED WORKSHOP AND WORKSTATION LAYOUTS

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

Example workshop layout:





9 VISITOR AND MEDIA ENGAGEMENT

Following is a list of suggestions to maximize visitor and media engagement:

- 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.



10 SUSTAINABILITY

- Recycling;
- Use of 'green' materials