2024

BRICS SKILLS COMPETITION

(BRICS FUTURE SKILLS & TECHNOLOGY CHALLENGE)

Aircraft Maintenance

BRICS-FS-21

Technical Description

(International Final- Offline)

July, 2024

Contents

1. Introduction

1.1. Name and Description of the Skill Competition

1.1.1. Name

2024 BRICS Skills Competition (BRICS Future Skills Challenge) Aircraft Maintenance, skill No. BRICS-FS-21.

1.1.2. Description of the Skill Competition

The 2024 BRICS Skills Competition (BRICS Future Skills Challenge) - Aircraft Maintenance is a skill competition that assesses the comprehensive skills of Competitors. The Skill Competition incorporates the talent demands of the aviation industry and emerging technologies into the competition contents, promoting educational reform in aviation colleges and college-enterprise cooperation. It aims to optimize the talent training model for aviation maintenance professionals, improve teaching and training quality, and drive rapid development in the aviation industry while further enhancing the professional abilities and vocational qualities of the participants.

The Skill Competition focuses on developing aircraft maintenance vocational skills by using aircraft, aviation turboshaft engines, and aircraft hydraulic systems as platforms. It fully showcases the entire work process, including line maintenance walkround check, disassembly and assembly of aviation engine components, and troubleshooting of aircraft hydraulic systems. The Skill Competition comprehensively assesses Competitors' capabilities for aircraft maintenance manual consultation, aircraft parts removal and installation, soft/hard tube operations, standard wiring practices, visual inspection, fault diagnosis and troubleshooting, etc.

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.

2. Skill Specification

2.1. General Notes on the Skill Specification

The Skill Specification 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.

The Skill Competition is intended to reflect international best practice as described by the Skill Specification, and to the extent that it is able to. The Skill Specification is therefore a guide to the required training and preparation for the Skill Competition.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Skill Specification. 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 Skill Specification. They will reflect the Skill Specification as comprehensively as possible within the constraints of the Skill Competition.

2.2. Skill Specification

Skill Specification Section		Weighting (%)
1	**Work organization and management**	**5**
	The Competitors need to know and understand: • Laws, regulations and normative documents for civil aviation; • Approved manuals from manufacturers; • Situations when personal protective equipment (PPE) must be used; • Workshop safety protection measures; • The uses, maintenance and storage of aviation materials; • Sustainability measures with respect to the use of environmentally friendly materials and minimization of waste; • Workflow and time management; • The importance of analysis, planning, checking, and attention to detail; • The importance of time and costs to teamwork; • The importance of competition discipline.	
	The Competitors shall be able to: • Follow competition rules, discipline and safety requirements; • Use the appropriate personal protective equipment; • Organize site protection measures and ensure the safety of the work environment; • Apply professional skills to each assignment; • Select, use, maintain, and store all tools and equipment correctly; • Select, use, and store all auxiliary and consumables materials correctly; • Have a clear understanding of the professional skills of oneself; • Plan work areas to maximize efficiency; • Use the latest versions of approved manuals and documents, following defined processes and procedures for aircraft maintenance; • Establish and consistently maintain high quality standards and working processes when under pressure; • Reasonably allocate the operation time to complete competition tasks in a safe and efficient manner.	
2	**Communication and interpersonal skills**	**5**
	The Competitors need to know and understand: • The significance of establishing and maintaining confidence; • The roles and responsibilities of related colleagues;	

	• The value of building and maintaining productive working relationships; • The importance of developing and maintaining a competition attitude; • The importance of swiftly resolving misunderstandings and conflicting demands; • Human factors as they relate to work environments and standards; • The importance of a well-organized work plan for efficient task completion.	
	The Competitors shall be able to: • Undertake investigative discussions, for example, to resolve technical problems; • Reflect positively and respond constructively to feedback on own performance; • Coordinating time schedules for more efficient task completion; • Adhering to Competition rules and regulations.	
3	**Problem-solving, innovation, planning**	**5**
	The Competitors need to know and understand: • The common types of problem which can occur within work processes; • The distinctions between sector or national standards, and international best practice; • Diagnostic approaches to problem solving; • The importance of following manufacturers' most recent maintenance manuals and documents, for problem-solving processes; • Trends and developments in the industry including new materials, methods, and technologies.	
	The Competitors shall be able to: • Check work regularly to minimize problems at later stages; • Challenge incorrect instructions and regulations to prevent problems; • Recognize and analyze problems swiftly, using manufacturers' latest maintenance manuals and documents; • Persist and show resilience in solving complex problems; • Propose independent ideas to improve equipment technology; • Be bold to present different ideas to improve competition equipment; • Try new methods and embrace change within approved practices; • Analyze and apply aircraft maintenance technical documents; • After the work is completed, re-check the work completion to ensure it meets international airworthiness standards.	
4	**Line Maintenance Walkround Check**	**20**
	The Competitors need to know and understand: • Visual inspection techniques; • The purpose, structure, and contents of aeronautical maintenance publications i.e. ATA	

	chapters, maintenance manuals, troubleshooting manuals, minimum equipment lists, structure repair, 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, job card, etc.; • Common fault types during line maintenance; • Certifying technicians'/engineers' responsibilities for documenting and certifying scheduled and unscheduled inspections; • How and when to inspect and update related material inventories; • Hazardous elements during work, and corresponding safety protection measures.	
	The Competitors shall be able to: • Use visual inspection techniques reasonably, such as watching, touching, hearing and tapping; • Carry out scheduled and unscheduled inspections; • Recognize and fix any defects found during flight and maintenance; • Take personal and site safety protection according to operation environment; • Understand and operate as per Aircraft Maintenance Manual; • Complete work tasks according to Job Cards; • Select auxiliary tools to help complete work tasks; • Fill out work reports correctly.	
5	**Aircraft Engine Components Removal and Installation**	**32**
	The Competitors need to know and understand: • The purpose, structure, and contents of aeronautical maintenance publications, i.e. maintenance manuals, Illustrated Parts Catalogue, etc.; • The purpose and use of documents to initiate aircraft maintenance, record defects/actions and certify aircraft maintenance. i.e. journey log, repair records, job card, etc.; • Certifying technicians'/engineers' responsibilities for documenting and certifying defect rectification; • System and component construction and operation; • Specialist assistance available; • Use of general and special purpose tools.	
	The Competitors shall be able to: • Take personal and site safety protection according to the work situation; • Understand and use the technical materials provided at the Workshop; • Correctly apply troubleshooting techniques;	

	• Take proper measures to deal with defects, such as parts replacement, system or parts commissioning, system or parts cleaning, parts lubrication, and parts repair; • Complete operation tasks including Job Cards, engine maintenance records according and damage report form to the latest revision of maintenance manuals; • Fill out work reports correctly.	
6	**Aircraft Hydraulic System Troubleshooting**	**33**
	The Competitors need to know and understand: • Aircraft maintenance technical materials, such as ATA chapters, aircraft maintenance manuals, troubleshooting manuals, standard wiring practices manual, etc.; • Correct use of the Boeing Maintenance Manual; • Working principles of the hydraulic system; • Hydraulic system faults and countermeasures; • Troubleshooting techniques; • Aircraft hydraulic system components, including electrical and mechanical parts; • Proper personal and site safety protection according to site operation environments.	
	The Competitors shall be able to: • Access and use troubleshooting manuals; • Carry out aircraft power-on tests; • Understand key points of wiring practices; • Replace aircraft parts; • Bind and arrange wire harnesses; • Understand the key points of pin and wire replacement; • Correctly record faults and fault handling process.	
7	**Total**	**100**

3. Marking Scheme

3.1. Marking Method

The marking methods for this skill competition include both automated computer marking and Judge marking methods. Module A uses both computer marking and Judge marking methods. Module B and Module C both use Judge marking methods only. If a Competitor cheats on the Skill Competition or otherwise violates the rules during the Skill Competition, the Judges will deal with the violations or cancel the scores of the Competitor if the violation is serious.

3.2. Marking Rule

1. The Competitor with the highest total scores will be ranked first;
2. For Competitors with the same total scores, they will be ranked in order of score for Module C, Module B and Module A.

If a ranking cannot be made according to the above two rules, the Competitors will be ranked according to the time they spend on the Skill Competition, and the Competitor who spends less time wins.

3.3. Assessment Terms

During the competition design process, the standard and assessment method chosen are determined by the Marking Scheme and Test Project.

The assessment terms include but are not limited to:

- The integrity and standardization of the working process;
- The integrity and standardization of the job cards filling;
- Application proficiency of the platforms of the 3 modules;
- The process, integrity and accuracy of parts assembly;
- Fault handling results;
- Ability to consult the aircraft maintenance manuals;
- Aircraft parts removal and installation proficiency;
- Team labor division and cooperation abilities;
- Team maintenance style;
- Personal protection.

4. Test Project

4.1. General Notes

Whether it is a single module, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the application of the knowledge, skills, and behaviours set out in each section of the Skill Specification.

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

The Test Project will not cover areas outside the Skill Specification, or affect the balance of marks within the Skill Specification.

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

4.2. Format/Structure of the Test Project

The Test Project is a series of three (3) standalone modules.

- Module A: Line Maintenance Walkround Check
- Module B: Aircraft Engine Components Removal and Installation
- Module C: Aircraft Hydraulic System Troubleshooting

4.3. Test Project Time Allocation and Mark Weighting

Module	Time (min)	Mark Weighting (%)
Module A: Line Maintenance Walkround Check	45	25
Module B: Aircraft Engine Components Removal and Installation	80	37
Module C: Aircraft Hydraulic System Troubleshooting	90	38
Total	**215**	100

4.4. Operation Contents and Requirements of the Modules

The Skill consists of three (3) modules: Line Maintenance Walkround Check, Aircraft Engine Maintenance, and Aircraft Hydraulic System Troubleshooting. Operation contents cover visual inspection, aircraft maintenance technical document consultation, aircraft components removal and installation, soft/hard tube operations, standard wiring practices, aircraft power-on test, fault finding and handling, etc. and assess Competitors' basic level of aircraft maintenance skills.

Module A requires Competitors to conduct inspections based on the Line Maintenance Walkround Check Job Card, following the line inspection procedures, and adhering to the standards for civil aircraft maintenance personnel and airworthiness requirements. The inspections cover different aircraft stations and mainly focus on the identification of aircraft structures and systems, operational procedures, and damage identification and handling.

Module B requires the Competitors to complete the removal and installation of the components of a typical aero turboshaft engine, and the module mainly assesses operations of soft/hard tubes, removal and installation of parts, use of tools and gauges, application of torques and lockwires to fasteners, etc.

Module C requires the Competitors to perform troubleshooting tasks on the aircraft hydraulic system trainer using the job card provided. The assessment focuses on key points such as power-on test of the aircraft, identification and testing of hydraulic system panel functions, standard wiring practices, disassembly and assembly of aircraft parts, and sealing and lubrication of aviation components.

Module	Module Name	Operation Scope
A	Line Maintenance Walkround Check	1. Aircraft structure and system reorganization; 2. Basic knowledge of the aircraft system and layout, etc.; 3. Aircraft line maintenance walkround inspection route; 4. Aircraft power-on test; 5. Doors opening and closing of cabin and cargo hold; 6. Engine and cargo hold service operations; 7. Line maintenance common faults and recording; 8. Professional quality and work efficiency.
B	Aircraft Engine Components Removal and Installation	1. Job card reading and tools preparation; 2. Preparations before engine components disassembly; 3. Disassembly and assembly of pipeline; 4. Disassembly and assembly of engine components; 5. Torque measurement and lockwire installation for fasteners at specified positions; 6. Visual inspection on defects at specified positions; 7. Inspection after the parts installation; 8. Professional quality and behaviors on repair operations.
C	Aircraft Hydraulic System Troubleshooting	1. Maintenance manual reading and job card procedures implementation; 2. Aircraft power-on test; 3. Cockpit panel identification and power-on tests; 4. Opening and closing of circuit breakers; 5. Standard wiring practices; 6. Replacement of temperature sensor; 7. Blockage inspection on electric motor-driven pump; 8. Replacement of electric motor-driven pump; 9. Aviation fluids operational specifications;

		10. Safety protection.

4.5. Test Project Circulation

The Test Project will be circulated via the Competition website. The final Test Project will be provided on site.

4.6. Test Project Change

The Test Project will have a 30% change before the Competition.

5. Skill Management and Communication

5.1. Expert Group

The Skill Expert Group is composed of the Chief Expert, Deputy Chief Expert and Experts. They are jointly responsible for the further revision of the Technical Description of the Skill and daily skill management.

6. Safety Requirements

Refer to the Health, Safety, and Environment Policy and Regulations provided by the BRICS Skills Competition Organizing Committee.

7. Materials and Equipment

7.1. Infrastructure List

The Infrastructure List details all equipment and facilities that need to be prepared by the participating parties. Refer to the 2024 BRICS Skills Competition (BRICS Future Skills Challenge) - Aircraft Maintenance - Infrastructure List (Online).

7.2. Competitors' Tool Box

Competitors are not allowed to bring their own toolboxes to the competition site. All necessary tools will be provided by the organizers.

7.3. Competitor-Supplied Materials, Equipment, and Tools

Competitors are not allowed to bring any materials, equipment, or tools to the competition.

Note: Competitors are required to bring their own safety shoes.

7.4. Materials and Devices Prohibited in the Workstations Area

Competitors should report/show any materials and devices they carry to Experts, and the Experts may prohibit the use of any items that are irrelevant to the execution of tasks or may bring unfair advantages to Competitors.

7.5. Proposed Workstation and Its Layout

Note: The final layout of workstations will be determined based on the actual venue arrangement.

8. 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 workflow, and documentation management and distribution.

Topic/Task	Skill-specific Rules
Use of technology – USB and memory sticks	1) Competitors are only allowed to use memory sticks provided by the Competition Organizers. 2) It is prohibited to take memory cards or any other portable storage devices outside of the Workshop. 3) Memory cards or other portable memory devices must be handed over to the Chief Expert or Deputy Chief Expert at the end of each day for safe storage.
Use of technology – personal laptops, tablets and mobile phones	1) The Experts and Interpreters are allowed to use personal laptops, tablets, and mobile phones. 2) Competitors are not allowed to bring personal laptops, tablets, or mobile phones into the Workshop.
Use of technology – personal cameras	The Competitors, Experts, and Interpreters are allowed to use personal photo- and video-taking devices in the Workshop only after the Test Project has finished or upon consent of the Chief Expert.

Assessment of Test Project	1) For each workstation (module), the Expert in charge is assigned by the Chief Expert, with the highest professionalism in this area. During the fulfillment of the Test Project by participants, this Expert controls the OHS compliance, fulfillment or non-fulfillment of Test Project points that can be assessed only during the fulfillment of the task by the participant. The assigned Expert is fully responsible for the fairness of the Competitors assessment. 2) If at the workstation, the Competitor and the Expert are from the same organization, the one-time replacement of Experts for the duration of the module takes place.
Making 30 % changes in the Test Projects	Experts, during the introduction of 30% of changes (on Day C-2), must carry out the following work: Depending on the equipment provided by sponsors of the Competition (in all modules): • update assembling drawings (or photographs) for the mounting; • update schematic electrical and pneumatic diagrams; • update descriptions of task points, with regard for software and hardware peculiarities of the equipment, provided by sponsors of the Competition.
Technical problems during completion of the tasks by the Competitors	1) If during the fulfillment of the Test Project, a technical problem occurs (through no fault of the Competitors), the Competitors will receive additional time equal to the period from the defect identification to its full elimination. 2) The Competitors do not receive additional time if it is found out that the technical problem occurred through the participants' fault.
Personal protective equipment (PPE)	Personal protective equipment such as working clothes and gloves will be provided by the Workshop, but Competitor should bring their protective shoes.

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