

NATIONAL SKILLS COMPETITION  
Competitions Sub-Committee  
**TRANSPORT & AUTOMOTIVE – AUTOMOTIVE TECHNOLOGY (AL)**

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## **INTRODUCTION**

WorldSkills Jamaica , by a resolution of the National Organizing 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 National Skills Competition.

The Technical Description consists of the following:

- Section 1 – Technical/Competition Description (TD)
- Section 2 – Project Design Criteria (PD)
- Section 3 – Skill Management Procedures (SM)
- Section 4 – Workshop Setup (WS)
- Section 5 – Infrastructure List (IL)
- Section 6 – Appendices

Effective 01.04.07

Grace Mclean (GM)  
Chairman, Competition Committee  
01.04.07

Daphne Simmonds  
Co-Chair

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The National Skills Competitions Sub-Committee has adopted the following minimum requirements for applicants' entry in the World Skills Jamaica Competition.

The effective date will be that date on which this document is issued, and is subject to change by the WorldSkills Jamaica Competition organizing Committee.

## **1. NAME AND DESCRIPTION OF TRADE**

1.1 The name of the trade is:

### **1.1.1. Automotive Technology**

1.2 Description of the trade

Automotive Technology encompasses the maintenance, diagnostics and repairs of the motor vehicle with emphasis on light vehicle (cars).

## **2. SCOPE OF TASKS AT THE NATIONAL SKILLS COMPETITION**

### **2.1. LIMITS OF TASKS**

Tasks will be limited to practical tasks realizable within limited time.

Theoretical tasks will be limited to specific theoretical requirements.

### **2.2. PRACTICAL TASKS**

The participant will be required to fulfill selected tasks independently. Each competition may comprise of one task or a number of tasks selected for that competition.

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**2.3. KNOWLEDGE REQUIREMENT**

2.3.1 The competitor will be required to use and interpret illustrations, schematics and drawings.

2.3.2 Knowledge of theoretical material and processes in the preparation of study and calculation.

**2.4. MATERIAL**

All tasks are based on the Jamaican Automotive industry consultation and will be reviewed previous to each subsequent competition.

**3. SKILL MANAGEMENT PROCEDURES (SM)**

**3.1. DOCUMENTS REQUIRED**

3.1.1 The Chief Expert will have available a current copy of all documents associated with this skill for the Competition.

3.1.2 The documents required are:

- Technical Description
- Competition Rules
- Health and Safety documents
- QAMS – all documents
- Any other documents referred to in the documents listed above.

3.1.3 While it is understood that the Chief Expert will have a copy of these documents in there shall also be a complete set that is available for the experts and other competition workers.

3.1.4 The Chief Expert is expected to have a sound knowledge of the requirements and procedures specified in the documentation.

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3.1.5 The Jury President is expected to have a thorough knowledge and understanding of the requirements and procedures specified in the documentation.

### 3.2. PRE-COMPETITION RESPONSIBILITIES

3.2.1 In the period between one National Skills Competition and the next, the elected Chief Expert is responsible to ensure that the requirements of Section 2 – Project Design Criteria are complied with.

### 3.3. SKILL MANAGEMENT PROCEDURES FOR THE CHIEF EXPERTS

The following speaks to the procedures prior to and during the Competition:

3.3.1 The procedures specified below must be adhered to.

3.3.2 On arrival at the Competition site for the first time, the Chief Expert must:

- Welcome the experts and ensure introductions are made
- Inform them of their duties and responsibilities in terms of the Competition Rules and Standing Orders
- Ensure that the project is endorsed by all the experts and that a copy is signed by all the experts

3.3.3 The Chief Expert will then divide the experts into teams for the following activities:

- Verify that the material on site is appropriate and sufficient
- Verify again that the quantities of material as specified on the material list is accurate
- Develop a program for the competitors to complete the modules
- Develop timetables for activities
- Set up equipment
- Confirm that the layout, work areas and equipment are in accordance with the workshop setup requirements
- Confirm that all machinery/equipment is in a safe working order

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- Confirm that all workstations/machinery/equipment are in accordance with the plan, and that they are numbered
  - Confirm that there is sufficient illumination
  - Confirm that there is sufficient space for the competitors to work efficiently
  - Confirm that the barriers are far enough removed from the competitors to ensure that there will be no interference, and if they are not, set up a roster among the experts to police the area during the Competition
  - If necessary, set up duty rosters for activities during the Competition – e.g. keeping watch during lunch, preventing access of unauthorised persons, etc
- 3.3.4 The Chief Expert will then divide the experts into teams for purpose of marking and setting up marking schedules in accordance with the requirements.
- 3.3.5 Suggestions and comments for the revision and improvement of the Technical Description are to be provided to the Deputy Chief Expert in writing. The Deputy Chief Expert will reduce the information to a single typed document ready for discussion by all experts. Prior to leaving the Competition site, the Chief Expert, the Deputy Chief Expert and the Jury President will facilitate the discussion and revision of the Technical Description.
- 3.3.6 At any time that a unanimous decision is not achieved within a reasonable time, the Chief Expert will put the matter under discussion to the vote. A majority will be 50% of the experts present plus one. This decision will be final. In the event that an expert is absent at the time that the vote takes place, he/she has the right to be informed of the decision but the matter will not be raised again or voted upon again. The exception to this majority rule will be in the case of approval of the changes to the Technical Description, where the majority of 80% is required.
- 3.3.7 In the event that an extension of time is requested for the Competition to exceed the allotted hours, the matter must be discussed with the Jury

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President. All possible alternative solutions must be investigated before approval of an extension of time is requested, or will be approved.

3.3.8 Prior to the end of the Competition, the Jury President will facilitate the selection of the Chief Expert and Deputy Chief Expert for the next national Skills Competition.

3.3.9 Experts are eligible for selection as a Chief Expert if they:

- Have attended the National Skills Competition at least twice before (if less than 4 experts have been to the National Skills Competition before, this criterion may be relaxed at the discretion of the Jury President)
- Demonstrate a high degree of expertise in the skill
- Demonstrate leadership qualities.
- Are competent using a computer and the Internet – specifically to facilitate the Discussion Forum for their skill category.

3.3.10 The process by which selection will take place is by secret ballot and is as follows:

- Each expert present will list their choice of three experts in order of preference
- The Jury President will allocate a score of three (3) points to each experts first preference, two (2) points to the second preference and one (1) point to the third preference
- The Jury President will then calculate total scores and announce the three highest scoring experts
- The expert with the highest score will be appointed Chief Expert for the next National Skills Competition
- If the first choice cannot attend, then the second choice will be Chief Expert
- If the first and second choice cannot attend, then the third choice will attend
- If none of the choices can attend, then the jury president will appoint, or facilitate the appointment of a Chief Expert

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- The names of the selected experts will be entered into the provided documentation and signed by the Jury President and returned to the co-chair of the competitions committee.
- 3.3.11 Changes to the method of Competition design or suggestions offered for the next Competition design process or tasks must be written down and signed by 80% of the experts.
- 3.3.12 The Deputy Chief Expert's primary role is to ensure that the Technical Description is updated to reflect the technological advances of the skill category and include overall improvements for the preparation and running of the Competition. He/she will ensure that all changes to the Technical Description are entered, that all experts sign it, and that it is delivered to the co-chair of the competitions committee as a hard copy and digitally.
- 3.3.13 The Deputy Chief Expert also assists in the distribution and collection of the QAMS Audit Questionnaires and assists the Chief Expert where necessary.

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**3.4. HONESTY AND TRANSPARENCY**

- 3.4.1 The competitors that attend the National Skills Competition have the right to expect fair and honest treatment during the Competition in terms of the following:
- Instructions that are clear and unambiguous
  - Marking schedules that provide no advantage to an opposing competitor
  - All necessary equipment and material specified within the skill documentation that are required to complete the Competition
  - The assistance necessary from judges and officials to ensure that he is able to complete the project. (The assistance deemed necessary will be provided equally and at the same time to all competitors present)
  - No undue interference by officials or spectators that may hinder them in the completion of their project
- 3.4.2 Every competitor has the right to expect and demand that no opposing competitors will receive undue or unfair assistance or intervention that may provide that opposing competitor with an unfair advantage.
- 3.4.3 All officials and judges present on the Competition site are expected to ensure that paragraphs 3.4.1 and 3.4.2 above are complied with and maintained.
- 3.4.4 It is the responsibility of the Chief Expert or his Deputy to ensure that all competitors, interpreters, officials and judges comply with and maintain the integrity of the Competition, and additionally ensure that all necessary steps are taken to ensure that:
- Outside influences do not unduly improve or decrease competitors' abilities to provide a worthy performance.
- 3.4.5 A briefing will be provided to all experts and competitors on the requirements for integrity during the Competition.

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- 3.4.6 Additionally, the Chief Expert is expected to identify these and any other factors that may exist on the Competition site that may result in the contravention of paragraphs 3.4.1 and 3.4.2 above, and reduce them to a checklist for continuous reference.
- 3.4.7 In the event that any competitor, judge, official, observer or competitor compatriot is found to be attempting to gain or provide assistance in any form that may result in an unfair advantage, the Chief Expert is to immediately refer the matter to the Jury President.
- 3.4.8 The Chief Expert will receive nominations and appoint a Security Officer whose responsibility it will be to ensure that these requirements are carried out.
- 3.4.9 It will be explained to all experts and competitors that nothing is to come in or out of the site unless specified by the Chief Expert as being allowed after being briefed on this topic.
- 3.4.10 Security checks will be carried out each day on experts and competitors (by experts and competitors) upon entry and exit to the site.

**3.5. INFORMATION POLICY**

- 3.5.1 During the competition a modified project plan without measurements is to be made available to the public.

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**4. WORKSHOP INSTALLATIONS**

4.1 The workshop will be set-up according to the requirements of the tasks to be performed.

4.2 Competitors will be informed of any tool or equipment they may be required to bring along with them.

**Competitors Minimum Tool Requirements:**

- 1 set of flat-bladed screwdrivers (4 pieces min.)
- 1 set of pozi-drive screwdrivers (4 pieces min.)
- 1 set of Allen (hex, inbus) key 1.5 to 10mm
- 1 set of torx drivers internal ranging from size 8 to 40
- 1 set of torx drivers external ranging from 8 to 40
- 1 open ended spanners 6 to 22mm
- 1 set of ring spanners (bos) 6 to 22mm
- 1-water pump (pipe) pliers
- 1 side cutter
- 1 long nosed pliers
- 1-combination pliers
- 1 vice grip
- 1 scribe
- 1 measuring tape 2m
- 1 metal ruler (300mm)
- 1 torch lamp (flashlight)
- 1 vernier caliper gauge, internal, external and depth gauge (accuracy 0.02mm)
- 1 micrometer (palmer) 0 – 25mm (0 – 1 inch)
- 1 multimeter, high impedance, V, A (10A), Ohms
- 1 feeler gauge set (0.05mm/0.02inch increments up to 2.00mm/0.08inch)

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- 1 test lamp 12v
- 1 test lamp (LED type)
- 1 socket set 6 to 22mm – drive 3/8\_
- 1 socket set 4 to 13mm – drive 1/4\_ adaptors 3/8\_ - 1/2\_, 1/2\_ - 3/8\_, 3/8\_ - 1/4\_
- 1 torque – wrench(s) range 20 to 100Nm
- 1 hammer 300g and torque angle adapter
- 1 soft headed hammer (mallet)
- 1 parallel drift punch set (diameter 2 to 8 mm)
- 1 magnetic pick up tool

## **5. PROJECT MARKINGS**

5.1 A panel of pre-selected experts chosen by the competition's committee will grade each assignment with the pre-set percentage point.

5.2 All assignments will be given the appropriate point according to the criteria set out for each task.

5.3 All incomplete assignments will be given a percentage point based on the criteria laid out.

5.4 Any portion of an assignment not able to be completed, due to an oversight of the competition's committee, the competitor will be awarded the appropriate percentage point.

5.5 The competitor will not be awarded the point if the fault for his/her incompleteness is due to his/her lack of adequate preparation.

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**5.1. COMPETITION RATING**

5.1.1 The following are the areas from which the tasks are selected for the competition. There may be three levels of competition each having one task from each module

5.1.2	Item Rating	Area	Maximum
	<b>Points</b>		
1.		Petrol Engine Tune-up	15
2.		Steering and Suspension	15
3.		Electrical Systems	10
4.		Braking Systems	15
5.		Engine Mechanical	15
6.		Diesel Fuel Systems	10
7.		Transmissions	10
8.		Air Conditioning	10

**Points will also be awarded for creativity, innovation, speed etc. (This will be developed by the judges depending on the nature of the test project).**

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**6. TASK AREAS**

The following tasks are being considered for the competition:

**6.1. PETROL ENGINE TUNE-UP**

- 1A Time distributor and start engine
- 1B briefly, explain the positive crankcase ventilation system
- 1C Faultfinding using the ignition oscilloscope
- 1D Fault-finding using the lab scope

**6.2. STEERING AND SUSPENSION**

- 2A Changing tyres on car rims
- 2B Wheel balancing
- 2C Check suspension spring oscillation
- 2D Front-end diagnosis – checking ball joints

**6.3. ELECTRICAL SYSTEMS**

- 3A Check electrical resistance/pressure/current using multimeter
- 3B Adjust vehicle's headlight main or dip/dim beam
- 3C Diagnose fault in turn signal circuit
- 3D Calculate electrical power on series-parallel circuits

**6.4. BRAKING SYSTEMS**

- 4A Change Disk Pads on a front wheel
- 4B Assemble and disassemble brake shoes
- 4C Adjust drum brakes
- 4D Briefly explain the three phases of the ABS

**6.5. ENGINE MECHANICAL**

- 5A Check crankshaft taper and ovality

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- 5B Time an engine's camshaft to an engine's crankshaft
- 5C Check crankshaft journal using plastic-gauge
- 5D Calculate the engines compression ratio

**6.6. DIESEL FUEL SYSTEMS**

- 6A Bleed a diesel fuel system
- 6B Check a hot plug
- 6C Diagnose a hard to start problem on the diesel engine
- 6D Analyse the emission content of a diesel engine

**6.7. TRANSMISSIONS**

- 7A Assemble synchronizing unit
- 7B Check differential backlash
- 7C Check final drive teeth pattern
- 7D Calculate gear ratio

**6.8. AIR CONDITIONING**

- 8A Check air compressor
- 8B Check air conditioning leaks
- 8C Remove and replace refrigerant
- 8D Describe the environmental advantage in not using  
fluorocarbon

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**7. COMPETITION PROCEDURE**

Each competitor will be given the specified time to complete the task average 15 min.

7.1 Competitions will be individually demonstrated unless otherwise specified.

7.2 Work area must be left clean and organized as is specified.

7.3 There will be an elimination stage depending on the number of competitors.

**8. GENERAL SAFETY REQUIREMENTS**

Competitors are required to be arranged in General Safety Clothing.

- a. Shop coat/overall
- b. Steel capped oil resistant work shoes
- c. Safety/dust mask
- d. Goggles/eye protection glasses