



## 2021 SKILLS CANADA VIRTUAL NATIONAL COMPETITION

CONTEST DESCRIPTION

### **Heavy equipment technology**

POST-SECONDARY

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## 1 THE ESSENTIAL SKILLS FOR CAREERS IN THE SKILLED TRADES AND TECHNOLOGY

SCC is currently working with Employment and Social Development Canada (ESDC) in order to bring awareness to the importance of Essential Skills that are absolutely crucial for success in the workforce. Part of this ongoing initiative requires the integration and identification of Essential Skills in contest descriptions, projects, and project documents. The next phase and very important aspect of our Essential Skills (ES) initiative is to provide an ES report card to each competitor at the Skills Canada National Competition. The purpose of the ES report card is to inform the competitor about their current level of essential skills based on their competition scores. With this knowledge, the competitor will be made aware which essential skill may require improvement. Full implementation is expected in the next Skills Canada National Competition.

The following 9 skills have been identified and validated as key essential skills for the workplace in the legend below:

<sup>1</sup>Numeracy, <sup>2</sup>Oral Communication, <sup>3</sup>Working with Others, <sup>4</sup>Continuous Learning, <sup>5</sup>Reading Text, <sup>6</sup>Writing, <sup>7</sup>Thinking, <sup>8</sup>Document Use, <sup>9</sup>Digital

These essential skills have been identified within your Contest Description. The top three Essential Skills for your area of competition have been identified on your Project and all other supporting project documents.

## 2 CONTEST INTRODUCTION

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

<http://skillscompetencescanada.com/en/careers/transportation/heavy-equipment-service/>

The Heavy Vehicle Mechanic maintains, diagnoses, and repairs large machines and industrial equipment including towed and self-propelled equipment used in mining, forestry, agriculture, landscaping, and material handling industries. The mechanic must be able to maintain, diagnose, and repair internal combustion engines and components on stationary, mobile, tracked rubber-tired equipment, ground-engaging equipment, and earth-moving equipment.

Maintenance, diagnosis, and repair can involve competitor components or entire systems, requiring the mechanic to have skill with engines, hydraulics, drive trains, electronics, braking systems, and much more. The mechanic must use specific tools to diagnose function, make adjustments, repair, or replace defective components or systems, test repairs for proper performance, interpret instructions in technical manuals, write service reports, and ensure that the work meets manufacturers' specifications and the requirements of legislation. The mechanic is frequently the interlocutor between the employer, the customer, and the manufacturer. This experience can allow the mechanic to advance to senior roles such as trainer, supervisor, or manager.

Although mechanics often specialize in certain machines or equipment, either by choice or as a result of employment, the diversity of heavy equipment and, along with rapid

changes in technology, require broad knowledge and adaptability. Mechanics must also be able to work alone or as part of a team, at a variety of hours, and in an employer's shop, a customer's building, or outdoors in urban or rural locations, regardless of weather. Machines often require quick intervention to enable uninterrupted activity to resume.

The work is most rewarding for those who enjoy working with their hands and are logical, curious and interested in problem solving. The mechanic also needs good vision, hearing, sense of feel and sense of smell to diagnose problems. The occupation requires strength and stamina. Proper safety standards must be maintained at all times to avoid risk of injury involved in working on heavy vehicles and with power tools.

## 2.2 Purpose of the Challenge.

Provide competitors with an opportunity to display their skills, knowledge, and professionalism as they safely and efficiently diagnose, repair, and maintain any part of the power train, including its control systems, using components from mobile and stationary industrial equipment.

## 2.3 Duration of contest.

7.5 hours

## 2.4 Skills and Knowledge to be tested.

Use hand, power, and diagnostic tools to safely and competently carry out repairs according to manufacturer's specifications.<sup>7</sup>

Read and understand work orders<sup>5</sup>, interpret technical manuals<sup>8</sup>, and keep service records<sup>8</sup>.

*Essential Skills – <sup>5</sup>Reading Text, <sup>7</sup>Thinking (critical thinking, problem solving), <sup>8</sup>Document Use*

# 3 CONTEST DESCRIPTION

## 3.1 List of documents produced and timeline for when competitors have access to the documents.

- All competition documents will be posted as they are ready for distribution
- Assessment Process

## 3.2 Tasks that may be performed during the contest

Competitors will complete practical tasks in the following categories relating to on-road, off-road, mobile, and stationary heavy equipment. The tasks are designed to evaluate the competitor's ability to safely and efficiently maintain, diagnose, and repair heavy equipment (on-road and off-road, mobile and stationary).

1. Engine Systems (20%)	1.5 hours
2. Hydraulic Systems (20%)	1.5 hours
3. Electrical and Electronic Systems (20%)	1.5 hours
4. Steering, Braking and Undercarriage Systems (20%)	1.5 hours
5. Work-Place Practices (20%)	1.5 hours

## 4 EQUIPMENT, MATERIAL, CLOTHING

### 4.1 Equipment and/or material provided by Skills/Compétences Canada.

Below are the manufactures that may be used along with the service information software:

- Caterpillar – software (Service Information System)
- Volvo – Process, Tech Tool
- Cummins – software (Insite)

### 4.2 Equipment and/or material provided by the competitor and/or the host facility.

- Competitor must bring
  - Pencils and pens,
  - Flashlight
  - Multimeter
  - No other tools or toolbox is required by the competitor

### 4.3 Required clothing provided by the competitor.

- Competitors must wear pants and a shirt plus either coveralls or a shopcoat will long sleeves. All must be clean and in good condition. Clothing must not be loose-fitting and must not have drawstrings or dangling pieces.

## 5 HEALTH AND SAFETY

### 5.1 Safety program

SCC has implemented a comprehensive safety program as health and safety is an integral part of our competitions. Our safety program includes guidelines and procedures in order to make the work environment in each skill area safer.

#### 5.1.1 Safety manual

As part of our program a safety manual has been created in order to monitor and document health and safety within each skill area. It includes a definite plan of action designed to prevent accidents. The safety manual will be provided for every skill and these instructions must be followed and respected by all participants and officials at the SCNC.

### 5.1.2 Safety workshop

During orientation, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety and environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

### 5.2 Personal protective equipment (PPE) provided by Skills/Compétences Canada

- Bump caps

### 5.3 Personal Protective Equipment (PPE) provided by the competitor.

- Snug fitting mechanics gloves
- Barrier gloves
- CSA-approved safety footwear
- CSA-approved safety eyewear (clear lenses)
- Hearing protection (ear plugs or ear muffs)

### 5.4 COVID-19 Protocol

The final COVID-19 guidelines will be shared with participants closer to the event.

The COVID guidelines already in place within the participants' jurisdiction would take precedence to the below protocol.

The following are suggested COVID-19 protocols that might be in place for the duration of the competition. It is the responsibility of the participants (Competitor, Proctors, NTC members, and anyone onsite during the competition) to ensure that the COVID guidelines are respected.

- Participants to complete and sign electronically a self-screening form at the beginning of each day of the competition. If a competitor is showing any symptoms, they might not be allowed to participate in the competition.
- Participants will be assigned a workspace in which they must remain at for the duration of the competition.
- Participants to ensure a minimum of 2m physical distancing from others at all times.
- Participants entering the competition space must use hand sanitizer provided at each entrance/exit.
- Participants to wipe work surfaces (e.g. desks, tables, and chairs) and objects (e.g. headsets, keyboards, equipment) with antibacterial wipes before and after use.
- Face covering as per the local health authority requirement.



## 5.5 Skill-Specific Health, Safety, and Environment Requirements.

<p>Safety</p>	<p>Safety glasses with side protection, steel-toed boots, bump cap, and work clothes are required by everyone in the competition area.</p> <p>No unescorted visitors are allowed in the worksite due to the potential operation of our large mobile vehicles and their implements.</p> <p>Competitors and judges must not wear jewellery (rings, bracelets, watches, necklaces, pins), ties, lanyards, ID badges, or anything attached to them or dangling from them that might get caught in a piece of moving equipment</p> <p>Long hair must be tied up or tied back and tucked away down the back of the shirt so none is dangling, for protection from moving equipment.</p> <p>Consistently and diligently follow the best procedures to protect health and safety in the working environment</p> <p>Use appropriate personal protective equipment:</p> <ul style="list-style-type: none"> <li>• Competitors must wear safety footwear and eye protection with side shields, and must wear ear protection, respiratory protection, and either barrier gloves or fitted mechanic's gloves, as needed. Bump caps are not required when inside the operator's compartment.</li> </ul> <p>Select and handle appropriate substances, materials, tools, and equipment safely and in compliance with manufacturers' instructions.</p> <p>Dispose of substances and materials safely and sustainably.</p> <p>Predict and eliminate all risks related to required activities.</p> <p>Prepare and maintain an orderly workspace with regard to health and safety.</p> <p>All judges, competitors, and other authorized visitors to the competition area must at all times comply with the following skill-specific safety requirements.</p> <ul style="list-style-type: none"> <li>• Consistently and diligently follow the best procedures to protect health and safety in the working environment.</li> <li>• Use appropriate personal protective equipment: At all times all competitors must wear safety footwear, bump caps, and as needed must wear eye protection with side shields, ear protection, respiratory protection, and either barrier gloves or fitted mechanic's gloves.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Select and handle appropriate substances, materials, tools, and equipment safely and in compliance with manufacturers' instructions and procedures.</li> <li>• Dispose of substances and materials safely and sustainably.</li> <li>• Predict and eliminate all risks related to required activities.</li> <li>• Prepare and maintain an orderly workspace with regard to health and safety.</li> </ul>
1. Diesel Engine Systems	<p>Wear latex or nitrile gloves for possibly handling internal diesel engine components and fluids such as petroleum-based fuels and lubricants, glycol-based coolants, and urea-based diesel exhaust fluid.</p> <p>Wear form-fitted mechanics gloves for possibly handling heavy, sharp, or hot components.</p> <p>Wear safety glasses with side protection, steel-toed boots, , work clothes.</p> <p>Wear Hearing protection in the event the engine is operational.</p>
2. Hydraulic Systems	<p>Wear latex or nitrile gloves for possibly handling internal hydraulic components and petroleum-based hydraulic fluid.</p> <p>Wear form-fitted mechanics gloves for possibly handling heavy, sharp, or hot components.</p> <p>Wear safety glasses with side protection, steel-toed boots, bump cap, work clothes.</p> <p>Wear hearing protection in the event the vehicle is operational.</p>
3. Electrical and Electronic Systems	<p>Wear latex or nitrile gloves for possibly handling fluids such as petroleum-based lubricants, glycol-based coolants, urea-based diesel exhaust fluid, and battery electrolyte.</p> <p>Wear form-fitted mechanics gloves for possibly handling heavy, sharp, or hot components.</p> <p>Wear face shield for possible High Rate Discharge Test of vehicle batteries.</p> <p>Wear safety glasses with side protection, steel-toed boots, bump cap, work clothes.</p> <p>Wear hearing protection in the event the vehicle is operational.</p>



4. Steering, Braking, and Undercarriage Systems	<p>Wear latex or nitrile gloves for possibly handling internal hydraulic components and petroleum-based hydraulic fluid.</p> <p>Wear form-fitted mechanics gloves for possibly handling heavy or sharp components.</p> <p>Wear safety glasses with side protection, steel-toed boots, bump cap, work clothes.</p> <p>Wear hearing protection in the event the vehicle is operational.</p>
5. Workplace Practices	<p>Wear latex or nitrile gloves for possibly handling fluids such as petroleum-based lubricants, glycol-based coolants, urea-based diesel exhaust fluid, and battery electrolyte.</p> <p>Wear form-fitted mechanics gloves for possibly handling heavy or sharp components.</p> <p>Wear safety glasses with side protection, steel-toed boots, bump cap, work clothes.</p>

## 6 CONTEST SPECIFIC RULES

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during competitor orientation.

TOPIC	RULE
Technology	<ul style="list-style-type: none"> <li>• The following items are not allowed in the workshop: mobile telephones, any electronic communication transmitters and receivers, audio and visual recording equipment, and any personal tools.</li> <li>• Competitors cannot use cell phones, camera, video recorders, music playing devices, and earphones during competition times.</li> </ul>

### 6.1 Interpreter

If a competitor requires the help of an interpreter during the competition, the Skills/Compétences Canada Provincial/Territorial offices must advise Skills/Compétences Canada National Secretariat a minimum of 1 month prior to the competition or this service might not be guaranteed.

## 6.2 Ties

- Tiebreaker #1: In the event of a tie, the competitor with the highest score in the Safety criteria will be declared the winner.
- Tiebreaker #2: If a tie still remains, the competitor with the highest score in the Superior Workmanship criteria will be declared the winner.
- Tiebreaker #3: If a third tie occurs, the competitor with the highest score in the “Accurate Measurements” criteria will be declared the winner.

## 6.3 Competition rules

Refer to the competition rules of the Skills Canada National Competition which can be found on our website.

## 7 NATIONAL TECHNICAL COMMITTEE MEMBERS

MEMBER ORGANIZATION	NAME
Yukon – Safety Coordinator	Doug McRae
British Columbia	Brad Holcik
Alberta - Chair	Bobby Haraba
Manitoba - Workshop Coordinator	Bryan Neufeld
Ontario - Co-Chair	Angelo Spano
Québec -Translations	Marco Bisson
New Brunswick -Translations	Joey St-Amand
Nova Scotia	Gerry Brymer
Newfoundland and Labrador	Kent Hulan

Contact the Skills/Compétences Canada national secretariat for any questions or concerns: Nathalie Maisonneuve [nathaliem@skillscanada.com](mailto:nathaliem@skillscanada.com)