Skills Compétences Canada

Skills Canada National Competition 2018
National Training Guide – Aerospace Technology

Created and maintained by: Skills Canada Aerospace Technology National Technical Committee (NTC)

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Introduction

Purpose

This document is to act as a guide for the Skills Canada National Competition. It has been developed to address the question "How should I be studying for the competition?" The goal of this document is to standardize the information provided by Skills Canada with the goal to maintaining fairness and transparency.

A Message to Instructors, Coaches or Trainers

Please feel free provide coaching and support to competitors showing a keen interested. Your time and effort plays an important role in their success. We kindly requests that any restricted information directly related to the current competition is not shared with your competitor. If you have a question about what can be shared, please feel free to contact a NTC Member or you Provincial Skills Office and asked to be connected with a member of Trade 14 – Aerospace Technology. We welcome ideas and suggestions on how to grow and evolve the competition. We are excited to see how each team approaches their training.

Competitor Driven Training

The following information is to act as a guide for competitors. This resource has been developed so competitors can develop projects to practice and hone their skills. The role of instructors, coaches and trainers is to evaluate the competitor's performance and provide guidance.

Health and Safety Considerations

- Work safely and within the rules and regulations of the facility, company or school.
- Train with someone else present (work-alone situations not permitted).
- Gain approval from an instructor or supervisor before starting a project.
- Clean up and return the training area to a condition the same or better then when you started.

Tips and Tricks and Important Information

- Competitors will not be made aware of the five modules selected until "Competitor Orientation" on the day before the competition.
- Competition modules are developed with the applicable standards of airworthiness in mind. Work carried out at the competition will be evaluated to this standard.
    - Airmanship and work habits will be taken into account.
- Set clear goals for completing a training task prior to beginning
    - Ex. "I will have this project finished in 2.5 hours and be within 0.030" of all dimensions"
- Critically analyze your workflow to maximize efficiency.
- Develop strategies to handle time constraints.
- Prepare for competing in distracting environments.
- In cases where equipment and training aids are unavailable, concepts can still be practiced or paper exercises can be developed.
- Critical thinking, legible writing and research skills play a significant part in overall performance.
    - Focus on the process and developing the underlying skills. Training to a specific training aid or task, without understanding the process, will not be effective.

Training Project Development

General Information

Development

- Projects do not have to be complicated or lengthy. In most cases a single page describing the task (like a job card) and a few particular points is all that is needed.
- Task difficulty level should reflect what an apprentice engineer would be expected to be able to do with no prior experience on the equipment. Structure Repair and Sheet Metal Fabrication are the exceptions. These projects reflect the skills developed in the school environment.
- Develop projects according to manufacture's instructions and aircraft standard practices.

Training Aids

Consider selecting training aids that can be used for multiple projects. For example, a small airplane could cover the Aircraft Inspection, System Troubleshooting and Component Replacement, Reciprocating Engine Maintenance, Mass and Balance Report and Control Rigging. This could greatly reduce development time as the documentation has already been collected and understood.

Data Collection and Research

The ability to pick up a manual for the first time and find the required information is critical.
Some projects could simply be researching a given task.
Common Data Sources:

- Aircraft Maintenance Manuals
- Engine Maintenance Manuals
- Component Maintenance Manuals
- Wiring Diagrams
- System Descriptions
- AC43.13

Materials and Tooling

Selecting specialty and calibrated tooling.
Using tools safely and correctly.
Selecting consumable material and parts.

Regulatory Document Preparation

- Aircraft Journey Logs
- Maintenance Logs
- Independent Checks
- Maintenance Releases
- Conditional Maintenance Releases
- Check Sheets
- Defect Reports
- Repair Schemes
- Mass (Weight) and Balance Reports and Amendments

Structural Repair

Contest Description (Excerpt)

- Determine repair requirements in accordance with standard practices (AC43.13) and/or supplied engineering information.
- Fabricate repair parts.
- Install repair parts.
- *Example: Punctured Skin, Cracked Rib, Cracked Skin, and Channel Splice*

Training Exercise

Find a section of scrap fuselage or sheet metal structure to repair. Document the damage (may need to create a defect), develop a repair scheme and carry it out. Damage should be non-specialized and considered to be within the scope of an AME Cat. M. Composite repairs are considered out-of-scope.

Sheet Metal Fabrication

Contest Description (Excerpt)

- Fabricate a part based on supplied documentation and standard practices (AC43.13).
- Demonstrate ability to correctly calculate a layout (Bend Radius, Bend, Allowance, Set Back, etc.)
- *Example: Corner Section, Hat Channel*

Training Exercise

A sample project has been made available and is attached in this document. Additional projects may be posted on the Skills Canada Website in the Contest Description Section.
Note: Notifications will not be provided when new projects are posted.

- Appendix A: SCNC2018-TP-1A – Hat Section Channel Splice

System Troubleshooting (Electro-Mechanical)

Contest Description (Excerpt)

- Read and interpret technical documents.
- Determine repair and/or modification requirements.
- Perform the required repair and/or modification as applicable.
- Perform functional tests as appropriate.
- Demonstrate an understanding of system function. If required, work alongside another competitor completing a different module on the same aircraft/training aid.
- *Example: Aircraft Flap System, Janitrol Aircraft Heater*

Training Exercise

Have an instructor or fellow student create a fault in an electrical or electro-mechanical system. Research applicable documents, identify and correct the fault(s).
Bonus: Prepare a step-by-step breakdown of what was checked and why. Develop a general troubleshooting methodology to apply to other situations.

Aircraft Inspection

Contest Description (Excerpt)

- Read and interpret technical documents.
- Perform requested maintenance activities.
- Complete a defect report detailing finding if required.
- Perform functional tests as appropriate.
- *Example: 100 hour Inspection Tasks, Daily Inspection Tasks*

Training Exercise

Referencing a scheduled inspection, select inspection items that only require minor disassembly (access panels, etc.) Carry out the tasks and list defects in a report. Detail work carried out in the applicable maintenance documents.

Reciprocating Engine Maintenance

Contest Description (Excerpt)

- Read and interpret technical documents.
- Perform required maintenance activities.
- Perform functional tests as appropriate.
- *Example: Magneto Timing, Driveshaft Run-out Check*

Training Exercise

Select a maintenance task or tasks, which require partial disassembly and/or analysis of the engine or related system. Carry out the task(s) and detail work carried out in the applicable maintenance documents.

Gas Turbine Engine Maintenance

Contest Description (Excerpt)

- Read and interpret technical documents.
- Perform required maintenance activities.
- Perform functional tests as appropriate.
- *Example: Fuel Nozzle Inspection, Internal Bore Scope Inspection.*

Training Exercise

Select a maintenance task or tasks, which require partial disassembly and/or analysis of the engine. Carry out the task(s) and detail work carried out in the applicable maintenance documents.

Aircraft Mass (Weight) and Balance

Contest Description (Excerpt)

- Read and interpret technical documents.
- Perform required activities.
- Complete documents and reports as required.
- *Example: Weigh a model aircraft and prepare reports*

Training Exercise

Select an aircraft and carry out a full Mass and Balance report from weighing process to finished report. Detail work carried out in the applicable maintenance documents.
Prepare the following reports:

- Weighing Report
- Equipment List
- Empty Weight and C of G Charts
- Ballast
- Loading Consideration
- Amendment Process

Control Rigging

Contest Description (Excerpt)

- Read and interpret technical documents.
- Perform required maintenance activities.
- Perform functional tests as appropriate.
- *Example: Elevator Trim Rigging, Aileron Rigging, Engine Throttle Rigging.*

Training Exercise

Rig an aircraft or training aid involving cables. Consider environmental variables and standard practices. Detail work carried out in the applicable maintenance documents.

Component Replacement

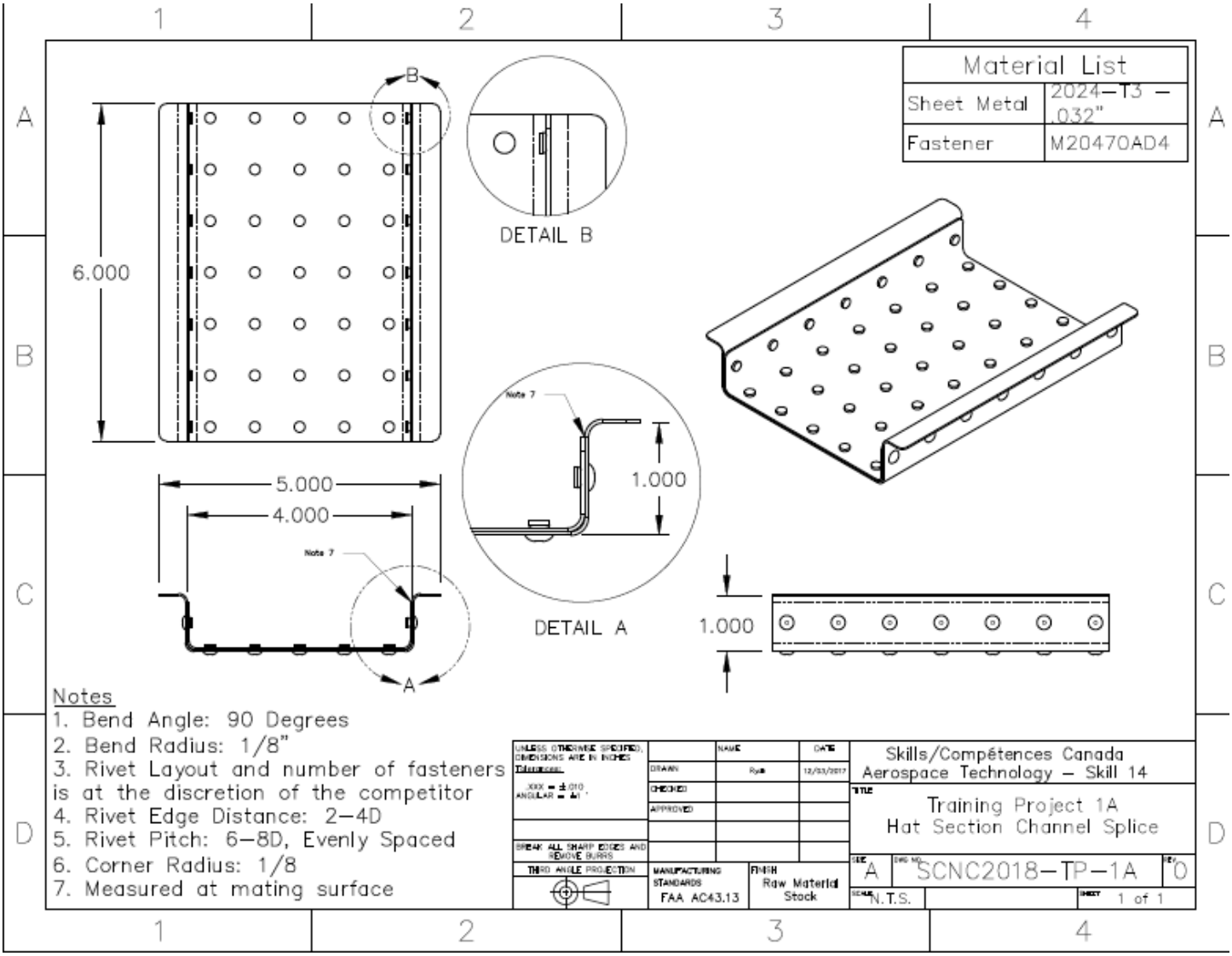
Contest Description (Excerpt)

- Read and interpret technical documents.
- Perform required maintenance activities.
- Perform functional tests as appropriate.
- *Example: Starter Replacement, Propeller Replacement, and Wheel Replacement*

Training Exercise

Carry out a component removal, inspection and replacement on an aircraft or training aid. Detail work carried out in the applicable maintenance documents.

Appendix A


Material List
Sheet Metal 2024–T3 – .032"
Fastener M20470AD4
6.000
5.000
4.000
1.000
1.000
DETAIL A
DETAIL B
Notes
1. Bend Angle: 90 Degrees
2. Bend Radius: 1/8"
3. Rivet Layout and number of fasteners is at the discretion of the competitor
4. Rivet Edge Distance: 2–4D
5. Rivet Pitch: 6–8D, Evenly Spaced
6. Corner Radius: 1/8
7. Measured at mating surface
Skills/Compétences Canada
Aerospace Technology – Skill 14
Training Project 1A
Hat Section Channel Splice
SCNC2018–TP–1A
N.T.S.
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FAA AC43.13
Raw Material Stock