Structural Airframe Assemblers [Level 1] Selection & Learning Program

Information for Employee Trainees

Program Overview

This initiative was conceived by the Ontario Aerospace Council in response to a substantive requirement in the Ontario aerospace industry to attract and hire Structural Airframe Assemblers. The objectives of the program are to select, train and certify 100 employee trainees in Ontario-based companies over the next year. The program takes approximately 5 months from selection to certification as a Structural Airframe Assembler [Level 1] for each trainee.

The program received a $1.25 million contribution by the Ontario government, under the Youth Skills Connections Program.

The Ontario Aerospace Council entered into a Memorandum of Agreement with the Ontario Manufacturing Learning Consortium to design, deliver and operate the program using proven OMLC methods and systems for highly effective selection and learning programs.

Training Program Description

Orientation and In-class Training

The first phase of your learning program is a training shop/classroom program delivered by MHI Canada Aerospace, Inc. This firm is a major participant and training partner in the program. Attending with you will be your peers who were hired by other participating firms. The purpose of this initial training is to provide you with an orientation to manufacturing environments and an opportunity for you to learn the theory and practices of assembling aircraft components and basic manufacturing and aerospace assembly practices such as –

- Orientation to Aerospace
- Workplace Safety
- Measuring Instruments
- Blueprint Reading
- Applied Math
- Materials
- Tools
- Measurement
- Manufacturing Terminology
- Drilling, Fastening and Sealing practices and techniques

Tests will be administered and you must pass these to proceed to the next step. We want you to understand that you need to take this opportunity quite seriously. You will have a very responsible position at the conclusion of the training period with an opportunity to make a significant contribution

to your firm and make a highly competitive wage or salary. Thus, during the training program, we need to assess your progress and determine in an objective fashion how well you are doing.

This initial training period will be eight weeks in length. It will consist of classroom work and 'hands-on' work in a production environment on practice pieces.

You must demonstrate satisfactory achievement of the required technical learning outcomes (see Appendix A), through testing and demonstration, per OMLC requirements. If you successfully pass all of the assessments during this phase of the program, you will then begin working in a production environment at your employer's site. You have the knowledge and capability to enter the workplace to work and learn – safely and confidently, based on the foundation knowledge and skills you have learned in this phase of the program.

In-firm Training – Working on "Live Airframes"

This part of the program will take approximately 3 months. We have carefully defined what we expect you will have learned and what you need to know and be able to do at the conclusion of the program in order to graduate. These requirements are called **technical learning outcomes**. These technical learning outcomes were developed by industry experts – so what you will be learning is based on their technical expertise and experience.

During the production floor training, you will not be on your own to learn the job. Each participating firm has agreed to appoint a trainer. Your trainer will be your principal go-to person to provide instruction, assistance and direction. Your trainer will review the technical learning outcomes with you and be responsible for ensuring you are progressing towards completing them by the end of the in-firm training period.

We have developed a process to guide both of you in this goal. Every week your trainer will discuss with you what you need to learn and to accomplish over the next week or so. This discussion will take into consideration what you have learned to date, what things are going well and what areas you need additional work in order to improve. Once discussed and agreed to, both of you will complete a learning contract to document the plan. The learning contracts are on a special OMLC web-based system that we have developed to support the program. We will contact you by email to give you an access code to the web site so that you may use it during the training. It is a mandatory condition of the program that you register your profile on the site.

At the end of each learning contract, your trainer will evaluate your progress and, based on that plus the work schedule of your employer, a new learning contract will be developed and entered into the OMLC system.

To further support both your Trainer and yourself this period of in-firm training, an OMLC Monitor/Coach will be assigned to each employer. The role of this individual – an experienced aerospace production individual – is to assist both Trainer and you in your attainment of the technical learning competencies. Your OMLC Monitor/Coach will visit your company from time to time, to check in with

your Trainer and you. He will also have access to the Learning Contracts and Progress Reports. The OMLC Monitor/Coach's role is to help Trainees, if needed. You should feel comfortable in asking for assistance, if required. There is no down-side to a Trainee contacting his/her OMLC Monitor/Coach at any time, even after work hours, if he/she has questions or concerns.

We are all committed to providing Trainees with all the support needed so they can be certified as a Structural Airframe Assembler [Level 1].

Certification

At the end of the program, you have the opportunity to be certified as a Structural Airframe Assembler [Level 1]. Certification is a public statement that you have passed and are highly qualified to perform the specified duties of a Structural Airframe Assembler [Level 1]. The certification process consists of the following components:

- Successful passing the tests administered during the orientation and in-class training
- Demonstrating to our assessor that you are capable of assembling and installing fabricated units, parts and sub-assemblies and producing finished work product meeting quality and standards and demonstrating the correct work practices for installing fasteners, bushings, countersinking, deburring, drilling, sealing applications and riveting. This outcome will be assessed by having the assessor visiting your firm and observing you proficiently demonstrating these technical learning outcomes while working on "live airframes".
- Demonstration by you of your knowledge of general manufacturing technical practices and procedures and knowledge of Structural Airframe Assembler specific technical work practices by completing an on-line examination.

The OMLC Structural Airframe Assembler [Level 1] Certificate will be issued by the Ontario Manufacturing Learning Consortium and over time will be accepted by employers as evidence of an individual's capability and expertise.

The OMLC Structural Airframe Assembler [Level 1] Certificate will give your company a reliable way to gauge future potential employees who hold such a Certificate. It will provide you, as a Certified Structural Airframe Assembler [Level 1], with a solid, recognized foundation on which to build further learning to enhance your abilities, be a more valued contributor to your company's success and advance your own career.

Your Commitment – Your Success

In this job, you will be treated as a responsible adult, not as a student. We expect you to contribute, to work hard, to be punctual and to commit to learning and demonstrating your interest and capabilities on a daily basis.

In doing so, you will have made a career decision that marks you as a CERTIFIED STRUCTURAL AIRFRAME ASSEMBLER [Level 1] at the conclusion of the program. Congratulations!

Appendix A

Technical Learning Outcomes

for

Structural Airframe Assembler [Level 1]

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Technical Learning Outcomes (TLOs)

INTRODUCTION

The intent of the program is to prepare individuals to become a certified Structural Airframe Assembler [Level 1] through a combination of training shop/classroom instruction and practice and direct on-the-job experience

- such that their level of performance at the end of the program is defined as being competent in terms of understanding both the theory and practices of assembling aircraft components and parts and basic manufacturing and aerospace assembly practices and
- will be assessed as such by industry experts other than the firm where the participants were principally trained.

The purpose of this document is to outline the industry-agreed technical learning outcomes in terms of measurable competencies that define a competent level of performance for a certified Structural Airframe Assembler [Level 1].

It is the practice of the OMLC to define technical learning outcomes, to the degree possible, as competencies, not as job duties or tasks. Thus, the technical learning outcomes listed below are described as levels of performance, as capabilities and as the levels of knowledge required to perform required tasks.

Each of the learning outcomes has been defined in a precise fashion such that it can be assessed at the end of the program as part of a certification of technical competence. Where necessary, the definitions allow for interpretation to address specific sectors' various mixes of businesses and manufacturing processes and technology.

OMLC's GENERAL FRAMEWORK FOR TECHNICAL LEARNING OUTCOMES

The OMLC uses a defined, standard template for presenting the technical learning outcomes for each certified position. The consistency of the framework improves our capability for analysis and comparison amongst all certified job roles.

The learning outcome framework categorizes the outcomes into three separate elements –

- The employee's capability to operate job related power and hand tools and produce completed product as per the work order or approved drawings, meeting all required quality standards and scrap standards – consistent and repetitive output is the goal. The employee will also be expected to be meeting efficiency standards at this point assuming the employee is producing regular production. Learning objectives in this section of the framework can be primarily assessed by visual inspection.

- The employee's knowledge of specific technical work practices, such as blueprint reading, applied math concepts, tools and measurement concepts as they relate to the specified job. While closely related to the objectives in the first component of the framework, learning objectives in this section of the framework can be primarily assessed by testing.
- The employee's knowledge of general manufacturing technical practices and procedures, that are applicable to all sectors of manufacturing. Learning objectives in this section of the framework can be primarily assessed by testing.

OMLC's SPECIFIC FRAMEWORK FOR TECHNICAL LEARNING OUTCOMES OF A STRUCTURAL AIRFRAME ASSEMBLER

STRUCTURAL AIRFRAME ASSEMBLER FUNCTION AND PRODUCTION COMPETENCIES

1. Capable of assembling and installing fabricated units, fabricated parts and sub–assemblies and producing finished work product meeting quality and standards.
2. Capable of demonstrating the correct work practices for installing fasteners, bushings, countersinking, deburring, drilling, sealing applications and riveting.
3. Able to read and interpret aircraft assembly, installation and detailed drawings independently.
4. Capable of demonstrating the correct work practices of drilling holes and using drill bits including techniques, positons and posture.
5. Capable of installing a variety of commonly used fasteners using appropriate techniques and tools.
6. Able to perform a variety of sealing applications demonstrating appropriate technique and producing acceptable results.
7. Able to demonstrate general knowledge of the various materials commonly used in aerospace fabricated parts.
8. Reviews tools prior to their use, selects the most appropriate one to use, can determine if it is in a condition to be used for the application.
9. Able to demonstrate proficient use of measuring tools – choosing the correct one and its application.
10. Able to use power and hand tools as required.
11. Able to demonstrate the proper use of jigs, fixtures, Mylar's and templates.
12. Able to demonstrate proper verification practices upon completion of each job.
13. Can demonstrate importance of the interactions amongst team members and how work practices must integrate successfully.

STRUCTURAL AIRFRAME ASSEMBLER APPLIED TECHNICAL KNOWLEDGE COMPETENCIES

1. Passed the assessments in each of the Structural Airframe Assembler Applied Math, Tools, Blueprint Reading, Measurement, Drilling Holes and Drill Bits, Fastener Types and Installations and Sealing Applications units at both the classroom training and the on-the-job training phases of the program.

The required minimum level of knowledge at the completion of the program is listed below.

Applied Math: is able to correctly calculate and perform mathematical functions listed below and is knowledgeable of terminology:

Basic math – addition, subtraction, multiplication, division; basic geometry; speed/feeds

Tools: for the tools listed below is able to operate the tool safely and competently and knows its intended use.

- Types – Power - drill guns; rivet guns and Snaps; angle drill gun; power ratchets; torque wrench; speed grinders; pneumatic squeeze gun; angle grinders; feed drills; deburring tools; high speed grinders; spacematic type drills

- Hand tools — files, wrench; ratchet; sockets; Allen keys, clecos/cleco plyers

- Other – drill bits and cutters; drill blocks/bushings; CSK cages

- Material Handling – quality inspection of the material prior to beginning of the assembly operation.

Blueprint Reading: is able to demonstrate knowledge of the following terms and how to read and interpret them correctly.

- Drawing representation
- Assembly Drawings
- Installation Drawings
- Detail Drawings
- Title, supplementary, change blocks, revision blocks on drawings
- Implications of drawing notes/other operations
- Tolerances and dimensions
- Understanding datum points/callouts
- Fasteners' codes
- Station line reference

- Information blocks
- Symbols
- Drawing Notes
- Templates
- Shop Aides

Measurement: is able to demonstrate, using the instruments listed below, how to make the various measurements listed and in doing so correctly demonstrates the characteristics of handling

- Handling – maintenance, care,

  - zeroing

  - determining tolerance and accuracy

  - reading

- Instruments – hand held – Vernier, micrometer, calipers, gauges such as "go/no go" gauges, counter sink gauges, Pin Protrusion, Grip Gauges

Drilling Holes and Drill Bits: is able to demonstrate knowledge of drilling holes, and tools, including usage, positioning

Type of Tools for Drilling, Spacematics, Techniques/Positions/Posture, Drill Blocks Types, Countersink Cages Cutters, Hole Sizes, Templates, Shop Aids, Deburring Tools, Types of Holes (Inter-Trans.-Clearance]

Fastener Types and Installations – can demonstrate knowledge of the following Fasteners Types and can perform Installations correctly and competently:

- Rivets, Hi-Lites, Blind Fasteners/Cherry Max, Screws/Bolts/Nuts, Anchor Nuts, Stand-offs, P-Clamps, Nuts/Dome Nuts, Torqueing

Sealing Applications - can demonstrate knowledge of the following sealing applications and can perform applications correctly and competently

- Types, Properties, Chemicals / Cleaning, Preparation, Applications, Fay – Fillet – Wet – Aerodynamic -Injection – pack, RTV'S, Composite Sealants, Liquid Shim

GENERAL MANUFACTURING TECHNICAL KNOWLEDGE COMPETENCIES

1. Passed the Safety/WHMIS assessment and demonstrated an appropriate safety consciousness while at work.
2. Passed the assessments in each of the General Manufacturing Terminology, Materials, and awareness of Quality/SPC processes units at both the classroom training and the on-the-job training phases of the program.
3. Demonstrates a general knowledge of a variety of tools are commonly used in manufacturing environments and of their intended uses.

The required minimum level of knowledge at the completion of the program is listed below.

Terminology: for the words and phrases listed below is able to correctly define, understand and use correctly with fellow employees.

bill of materials/ change order/request; engineering change order/notice; end mills; ERP; gun drill; heat treatment; indicate [datum]; part name/number; mean/medium; revision control; surface finishes; vendors/vices; station lines; chemical conversion; penetrant and inspect.

Inboard – Outboard – Forward – Aft – Port – Starboard - Fuselage – Wing Tip – Upper – Lower – Mid – Stringers – Ribs – Trailing Edge – Leading Edges – Caps – Panels – Aileron – Flaps – Spoilers – Skins – MLG – Wing Station – Frame Station – Vertical Stab. – Horizontal Stab. – Aft Fuse – Mid Fuse – Forward Fuse – Cockpit – Cleats.

Materials: for the materials listed below is knowledgeable of their machining characteristics.

- Aluminum
- Aluminum alloys
- Titanium
- Composite material
- Honeycomb

For Aluminum, is knowledgeable about its

- Preparation
- Cold work / Hot Work
- Alodine (process)
- Chemical Conversion (process)
- Paint Touch Up (process)

Quality/SPC: is able to explain the importance to a successful manufacturing firm of producing quality product and is aware of appropriate quality and SPC systems and processes.

- Quality – definition and importance of the concept; role of the worker; awareness of ISO