



Competition Skill Set

Industrial Mechanic

POST-SECONDARY

1 INTRODUCTION

Competition skill set for Industrial Mechanic Skill 01

2 DESCRIPTION OF COMPETITION SKILL SET

The following is a list of skills that competitors should be familiar with before participating in SCNC 2025.

2.1 Total competition time: 14hrs

Competition time breakdown:

Project	Time	Marks
A. Fabrication	3.5h*	20 marks
B. Bearing Installation	3.5h*	20 marks
C. Pneumatics	2h	20 marks
D. Tube Bending	2h	20 marks
E. Shaft Alignment and Predictive Maintenance	3h	20 marks

*Projects will be given a combined 7 hours.

2.2 Competition notes

- Detail and assembly drawings will be 3rd angle projection.
- Drawings will be dimensioned using the imperial and/or metric systems.
- Measuring will be performed in the imperial and metric systems.
- Safe working procedures and practices must always be demonstrated during the competition.

3 A: Fabrication

The following is a breakdown of the required skills for the fabrication project.

3.1 The project will be fabricated from mild steel requiring:

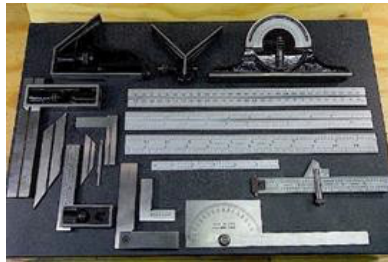
- Precision layout
- Metal cutting
- MIG Welding

- Drilling and hole tapping

3.1.1 Precision layout

Precision hand layout using combination squares, scribes, hammers, punches, and various hand tools.

- Tolerances: +/- 1/16" (0.0625")



3.1.2 Metal cutting

Measure and use a Dewalt metal chop saw to cut mild steel square tubing with a wall thickness of 0.188"



3.1.3 MIG welding

Tack and weld mild steel square tubing, 3/8" thickness mild steel plate, and flat bar using Lincoln Electric MIG welder and 0.035" diameter MIG welding wire.



3.1.4 Drilling and hole tapping

Drill holes in mild steel using vertical drill press, a Dewalt magnetic drill, and/or a Dewalt cordless drill. Perform hand tapping of holes as needed.



4 B. Bearing Installation

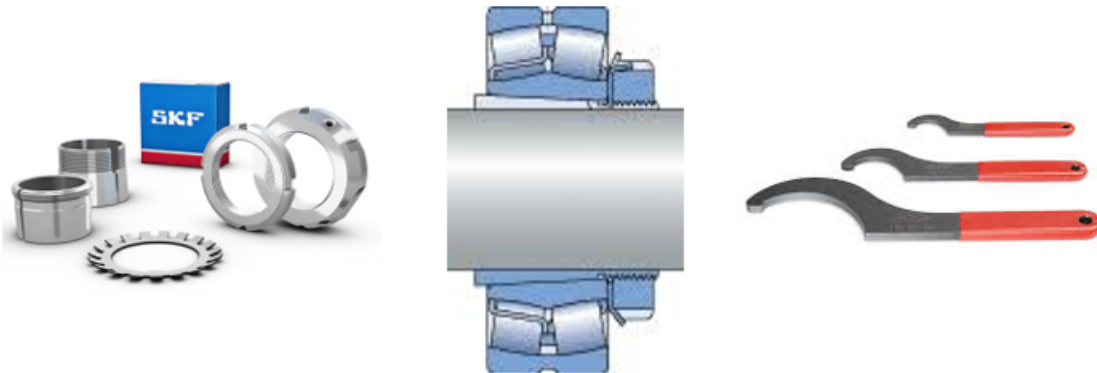
The following is a breakdown of the required skills for the bearing installation project.

- Levelling
- Bearing Assembly

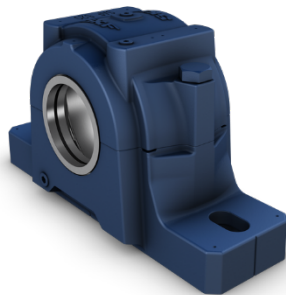
4.1 Calibrate Starrett precision machinist level and use it to level.



4.2 Assemble supplied SKF spherical roller bearing components as per assembly drawings and SKF bearing installation manuals.



4.2.1 Assemble and install of SKF pillow blocks

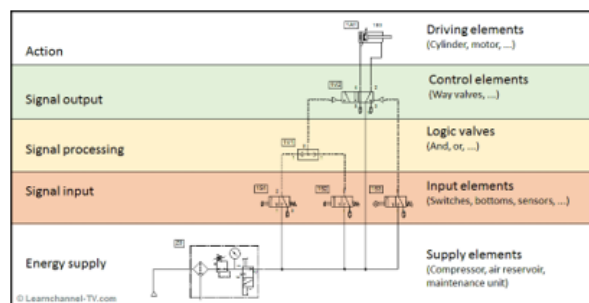


5 C. Pneumatics

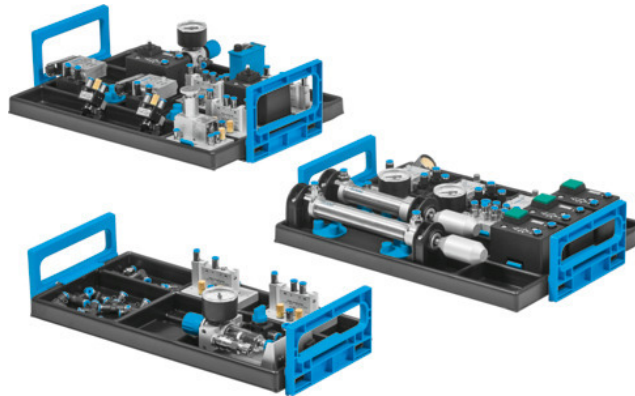
The following is a breakdown of the required skills for pneumatic project.

- Design and draw pneumatic circuit schematic
- Build pneumatic circuit
- Modify pneumatic circuit

5.1 Design and draw a pneumatic multi-cylinder sequential circuit schematic according to the supplied instructions, using the provided template with ISO-standard pneumatic symbols



- 5.2** Build a pneumatic multi-cylinder sequential circuit according the supplied instructions, using Festo Didactic components.



- 5.3** Modify pneumatic circuit according to the supplied instructions, using Festo Didactic components.

6 D. Tube Bending

Use Swagelok tube benders, cutters, and connectors to perform the necessary bending connections with $\frac{1}{4}$ " diameter stainless steel tubing, following the provided drawings and instructions.



7 E. Shaft Alignment and Predictive Maintenance

The following is a breakdown of the required skills for the alignment and predictive maintenance project.

- Rough shaft alignment
- Laser shaft alignment
- Vibration analysis
- Balancing

7.1 Use the tools provided to perform a rough shaft alignment.

7.2 Perform a laser shaft alignment using the Fixturlaser NXA (or comparable Fixturlaser model)

Fixturlaser NXA information available at: <https://stcd.ca/solutions/shaft-alignment/nxa-pro/>



7.3 Using the Fixturlaser SMC, perform a vibration measurement, record the data, and analyze the machine's vibration signature.

Fixturlaser SMC information available at: <https://stcd.ca/solutions/condition-monitoring/smc/>

7.4 Using the Fixturlaser SMC-Balancer, perform a single-plane balancing to rectify vibration using calibrated weights.

Fixturlaser SMC information available at: <https://stcd.ca/solutions/condition-monitoring/smc/>



READING



NUMERACY



PROBLEM SOLVING