SkillsUSA Tennessee PS
Virtual Interview Contest

Manufacturing Engineering Technologist

SkillsUSA is focused on preparing students for career success. With the changes in our world, it is now more important than ever that you know not only how to interview for your future career, but how to do it in a virtual format.

Starting in summer 2020, SkillsUSA Tennessee Postsecondary is hosting statewide Virtual Interview Contests in all industry sectors!

Virtual Interview Contest Process:

Step #1: All chapters will receive *"How to Prepare for Virtual Interviews*" training packet created by the SkillsUSA Tennessee PS State Director

Step #2: Students practice virtual interviewing skills with their instructor. Create a professional resume geared towards the job description included. Participate in a virtual in-class competition to determine top 3 overall students in their program area.

Step #3 The top 3 students from each program submit their recorded virtual skills demonstration interviews and their professional resumes to the state director to be judged by industry professionals.
**Scenarios and detailed instructions are included in this packet*

Step #4 The Top 10 finalists from each sector will be notified of their scheduled time to interview in using *Microsoft Teams* with a panel of industry professionals from their sector. Interviews will be recorded, and once all are scored the overall winners will be awarded Gold, Silver, and Bronze medals.

SkillsUSA TENNESSEE POSTSECONDARY

SkillsUSA STATE STANDARDS OF EXCELLENCE GOLD LEVEL

Manufacturing Engineering Technologists

Job Summary and Responsibilities:

Manufacturing engineers design manufacturing processes for different kinds of production processes. They integrate those specificities and constraints posed by the industry or the product being produced with general and wide-spread Manufacturing Engineering Technologist using principles into the design and planning of manufacturing processes.

Required Competencies:

Occupational Competencies

- **Scientific research:** Gain, correct or improve knowledge about phenomena by using scientific methods and techniques, based on empirical or measurable observations.
- **Technical drawing software:** Create technical designs and technical drawings using specialised software.
- **Production processes:** Experience with materials and techniques required in the production and distribution processes.
- **Engineering principles:** Familiarity with the engineering elements like functionality, replicability, and costs in relation to the design and how they are applied in the completion of engineering projects.
- **Manufacturing processes:** Knowledge of the steps required through which a material is transformed into a product, its development and full-scale manufacturing.
- **Technical drawings:** Experience with drawing software and the various symbols, perspectives, units of measurement, notation systems, visual styles and page layouts used in technical drawings.
- **Engineering processes:** Familiarity with the systematic approach to the development and maintenance of engineering systems.
- **Consumer protection:** Knowledge of the current legislation applicable in relation to the rights of consumers in the marketplace.
- **Industrial engineering:** Experience with the field of engineering concerned with the development, improvement, and implementation of complex processes and systems of knowledge, people, equipment, etc.

Foundational Competencies

- **Critical Thinking:** Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- **Mathematics:** Using mathematics to solve problems.
- **Judgment and Decision Making:** Considering the relative costs and benefits of potential actions to choose the most appropriate one.
- **Systems Analysis:** Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.
- **Active Learning:** Understanding the implications of new information for both current and future problem-solving and decision-making.
- **Active Listening:** Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

- **Complex Problem Solving**: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- **Operation Monitoring**: Watching gauges, dials, or other indicators to make sure a machine is working properly.
- **Reading Comprehension**: Understanding written sentences and paragraphs in work related documents.
- **Speaking**: Talking to others to convey information effectively.

Preferred Competencies:

Occupational Competencies

- **Continuous improvement philosophies:** Underlying ideas of quality management systems. Implementation process of lean manufacturing, Kanban, Kaizen, Total Quality Management (TQM) and other continuous improvement systems.
- **Design principles:** The elements used in design such as unity, scale, proportion, balance, symmetry, space, form, texture, color, light, shade and congruence and their application into practice.
- **CAE software:** The software to perform computer-aided engineering (CAE) analysis tasks such as Finite Element Analysis and Computational Fluid Dynamics.
- **Reverse engineering:** The process of extracting knowledge or design information from anything man-made and reproducing it or anything else based on the extracted information. The process often involves disassembling something and analyzing its components and workings in detail.

Example Activities:

- Ensure adherence to safety rules and practices.
- Monitor manufacturing processes to identify ways to reduce losses, decrease time requirements, or improve quality.
- Recommend corrective or preventive actions to assure or improve product quality or reliability.
- Identify opportunities for improvements in quality, cost, or efficiency of automation equipment.
- Plan, estimate, or schedule production work.
- Evaluate manufacturing equipment, materials, or components.
- Identify or implement new or sustainable manufacturing technologies, processes, or equipment.
- Develop or maintain programs associated with automated production equipment.

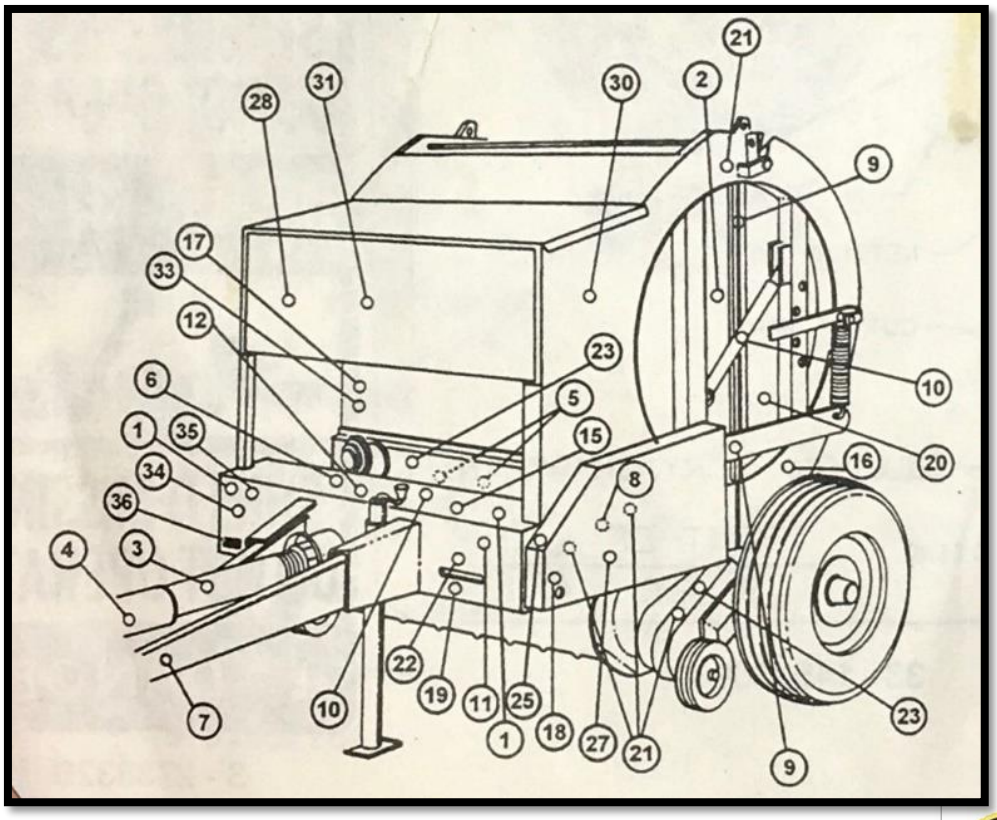
Pre-Recorded Skills Demonstration Scenario

Manufacturing Engineering Technologist

For this portion of the virtual interview contest, you are to record yourself responding to the following scenario. You may choose to use props, but they are not required. You will be scored on your ability to communicate the process clearly, and to demonstrate your knowledge of the technical skill.

Scenario: As a part of your probationary work at SkillFAB: A SkillsUSA Company, you have been given the challenge to work with a new customer who has recently bought a farm implement design from another company (a round baler for harvesting hay). Contract wording places the burden of ongoing maintenance parts for the baler on SkillFAB if we win the job – 5000 units annually on the cam arms! You are read into this project after an experienced engineering salesperson wins the bid to make three replacement parts for the baler.

The Scope Of Work (SOW) indicates that we need to produce assembly components 11, 15, and 31 on the attached Figure 2. Based on the Failure Mode Effect Analysis (FMEA) inherited by our new customer, our salesperson has also landed SkillFAB an opportunity to quote an improved lubrication system to better lubricate the bearing plate (Item 15) similar to a one-shot oiler found on a Bridgeport-style vertical milling machine.



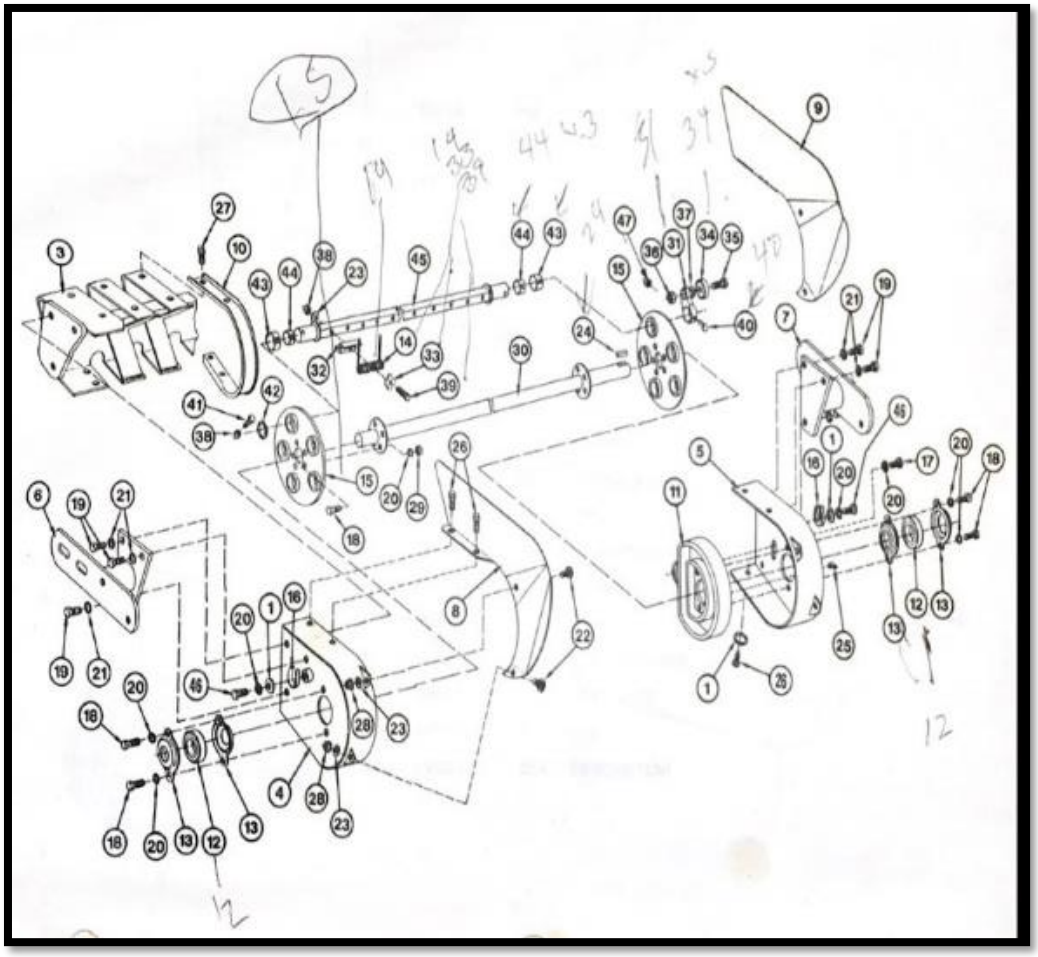


Fig 2. Hay intake exploded view

ITEM	PART NO.	QTY.	DESCRIPTION
1	1432034	4	Washer
3	1450301	1	Pick-up Frame
4	1450302	1	End Plate, RH
5	1450303	1	End Plate, LH
6	1450304	1	Pick-up Mount, RH
7	1450305	1	Pick-up Mount, LH
8	1452041	1	Windrow Guide Shield, RH
9	1452042	1	Windrow Guide Shield, LH
10	1452189	21	Pick-up Band
11	1455505	1	Pick-up Cam
12	1456005	2	Ball Bearing
13	1456006	4	Bearing Flangette
14	1437434	55	Pick-up Tine, Double Spring
15	1450300	2	Bearing Plate
16	29N132	2	Thimble
17	000130	1	Bolt
18	00753642	14	Bolt
19	02030700	6	Bolt
20	35003C	17	Lockwasher
21	35005C	6	Lockwasher
22	37021C	4	Carriage Bolt
23	00023500	4	Flatwasher
24	40621.25	1	Key

ITEM	PART NO.	QTY.	DESCRIPTION
25	450022	1	Grease Fitting
26	9D9003	27	Sheet Metal Screw
27	6D9007	63	Hex Flange Screw
28	6D9016	4	Flange Whiz Locknut
29	00013901	10	Hex Nut
30	1450299	1	Pick-up Shaft
31	1451095	5	Tine Bar Cam Arm
32	1451114	55	Tine Support Angle
33	1451739	55	Pick-up Tine
34	1456004	5	Ball Bearing
35	02845500	5	Bolt
36	32907C	5	Hex Locknut
37	35007C	5	Lockwasher
38	32972H5C	55	Hex Locknut
39	37027H5C	55	Carriage Bolt
40	02970595	5	Bolt
41	00007000	5	Bolt
42	380460C	5	Flatwasher
43	1456002	2	Bushing
44	1456003	2	Bushing
45	1450298	5	Tine Bar
46	31202H5C	2	Bolt
47	00015800	10	Locknut

Fig 1. Hay intake parts list

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Deliverable Items:

1. Provide a document summarizing your understanding of the new project and the operation of each specified part. Presume the following timetable:
    a. Summary due to your supervisor by CoB this afternoon – CC sales to keep her looped in!
    b. CAD models for specific item numbers with accompanying prints provided within 48 hours to release for fabrication by SkillFAB Prototype Department.
    c. Design Drawing concept sketch for proposed one-shot lube system – within 48 hours (CAD assembly and prints for presentation to Prototype -within 5 business days based on favorable feedback from Sales)

2. Provide a list of materials and purchased parts used in both the replacement parts and the proposed one-shot system to SkillFAB Purchasing within two business days for cost estimating to complete financials for the Sales proposal.

3. Finish by supplying your Engineer and Salesperson PDFs of Items 1B, 1C, and 2 all relevant project documents via PDF and hard copy all work in the Project Binder before handing off to Prototype (SkillFAB operates under ISO9000:2015 standards).

NOTES:

a. Parts were unavailable at the sales meeting and will be shipped to SkillFAB overnight for reverse engineering to verify all dimensions. Proceed with CAD measurements outlined in items b-d. Customer specifies a precision level of ±0.010 inch for all parts.
b. Item 11 follows a D-shaped cam path that is 9” across the flat section of the cam path with a 7” max arc. Material is cast iron and the ID of the cam path is 2.000 ± 0.005”. Casting is 1.500” thick.
c. Item 15 is confirmed to be fabricated from 3/8” x 12” CRS plate (11.8” OD) with 2 inch OD mechanical tubing x 0.093 wall (use to specify bearing OD as well).
d. Item 31 has overall dimensions of 2.75” x 3.5” x ¾” thick with the stepped end ½” thick. Cam bearings are retained by ½”-13 bolts 2-1/2” long and are retained on the 1.25” OD round end of the tine bars using 3/8”-16 bolts 3-1/4” long.

Skills Demonstration Scenario	Possible Points	Points Earned	Notes
Professional Appearance/Grooming	5		
Virtual Setting: Backdrop, Lighting, Audio, Technical Quality, No Distractions	5		
Eye Contact/Body Language	5		
Demonstration of technical skill/knowledge	15		
Verbal communication skills/clarity	10		
Overall Impression	10		
Total	50		
Virtual Interview	**Possible Points**	**Points Earned**	**Notes**
Greeting and Introduction	5		
Professional Appearance/ Grooming	5		
Eye Contact/Body Language	5		
Demonstration of knowledge of the position and technical skills required for the job	10		
Verbal Communication Skills/Clarity	5		
Presentation: Self-Confidence, Persuasiveness	5		
Preparation: Knowledge of Position Applied for and Personal History	5		
Overall Impression	10		
Total	50		
Resume	**Possible Points**	**Points Earned**	**Notes**
Personal Information: Name, address, phone & email	1		
Skills:	2		
Education: Include program of study/Major	2		
Employment: And/or volunteer work or list NA	1		
Activities, Awards and Honors: Should include SkillsUSA membership/activities	2		
References: Or references available upon request	1		
Spelling, Punctuation & Grammar	1		
Total	10		
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