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2019 extern at John Deere Harvester Works

Part I: Overview of Workplace

- John Deere was founded in 1837 in Moline Illinois.
- The company has many divisions including agriculture, construction, and forestry among others.
- John Deere Harvester works began manufacturing harvesting equipment in 1912 in East Moline. Today the facility is at the same location and also produces front end equipment for their combine harvesters.

Part II: Workplace Focus

- My main job focus has been assisting a manufacturing engineering team designing an assembly line for a combine.
- Some project that I have been working on this summer include: fixture design to hold parts during sub assembly, writing operator instructions., obtaining and recording hoist speeds into a database, and helping implement an assembly robot into front end equipment production.

Part III: Introduce the Problem

- An operator must attach a plate to a machine at his/her operating station. The torque pattern of the bolts requires that the bolts need to be tightened to different torque values.
- The two torque values that the operator must be able to reach are 675 Nm and 350 Nm.
- The manufacturing engineer (Student) must account for the two position the operator will be in when performing the operation.
- The manufacturing engineer (Student) must determine what tool the operator needs to use for him/her to safely reach the required torque without overstraining their body and putting themselves at risk.

Part IV: Background

Skills needed:

- Math-Calculate moment arm of wrench
- Basic Ergonomics-What body positions put an operator at a greater risk
- Critical thinking
- Research- Find information on ergonomics and safe forces for operators to use

Resources:

- JDS-D86- John Deere Standard for Ergonomics in Manufacturing Design
- Fundamentals of Ergonomics-<https://ergo-plus.com/fundamental-ergonomic-principles/>

Part V: Workplace Solution

- Look at wrenches available to use on the assembly line
- Calculate how much force must be exerted by the operator to reach the required torque value
- Use the JDS-D86 to determine if the force is within safe requirements for the operator in that position

Part VI: Educational Pathways

- Bachelor's degree in engineering or industrial technology
- Intern experience in manufacturing engineering, design engineering, quality engineering or operations