

Interview Assessment 3

Name of Professional: Jeff Mueggenborg

Profession/Title: Product Process Engineer

Business/Company name: Raytheon

Date of Interview: December 1st, 2017

Assessment:

This week I managed to meet with Mr. Mueggenborg, a product process engineer at Raytheon whom I reached out to via Dr. Oberle from a previous interview. I had reached out to Mr. Mueggenborg after Dr. Oberle provided contacts and some of his coworkers who were more closely involved in the manufacturing field. Going into this interview, I had prepared several questions for Mr. Mueggenborg which pertained to the field of mechanical engineering in general as well as questions more specifically related to CNC machining and 3D printing. One of the main focuses I had for this interview was to learn more about CNC machining and 3D printing than I had in previous interviews.

Starting off, Mr. Mueggenborg explained how he had gone to school for chemical engineering but still started work at Raytheon. He said that he had learned most of the skills he needed for this job while working at Raytheon but learned other skills from taking an engineering field, despite not one in his specific career field. During his studies, he learned a myriad of hands-on skills as well as how to have the engineer-style of thinking which he applied to his current job. He also explained how for newcomers to the field, he would advise them to mainly focus on having the personality for the job rather than just focusing on what to learn in school as most engineering fields would still apply to a variety of engineering careers.

Later on, we first discussed some of the application of 3D printing such as how it can be used for various prototyping of parts made and designed with CAD software as well as for test-fitting parts before manufacture with traditional manufacturing techniques. We also discussed how certain developments in 3D printing such as the use of different materials such as metals could allow for 3D printing of circuits or conductive devices. Mr. Mueggenborg also explained how the 3D printing industry was one of the biggest developments in engineering recently and have been rapidly decreasing in price while simultaneously increasing in both detail as well as variety of materials. He also explained how 3D printed parts could allow for multiple iterations of a part to be produced quickly which was very beneficial for fine-tuning a model or product. Mr. Mueggenborg also explained that with 3D printing the test-fitting of parts could significantly save on costs; especially when using a type of tool called a “waffle-pack”. In a “waffle-pack” a standardized set of dies are used to test-fit production parts. These dies can cost as much as \$2000, but as Mr. Mueggenborg explained, 3D printed parts could be printed, tested, and updated beforehand, saving having to buy multiple dies before the part fit. Among the cost-saving benefits of 3D printing, he also explained how managers often wanted a 3D printed representation of a part before manufacturing and how managers could often win contracts by having such a physical representation to show others. 3D printing also saved on machining costs by allowing for changes in a part multiple times before finalizing and creating the part using other methods such as CNC machining. Mr. Mueggenborg explained how he would often have to interact with CNC machining when visiting and inspecting parts created on the factory floor.

During the interview, Mr. Mueggenborg also explained how he would have a meeting almost every day with the manufacturing department as much as two times a day while he also

mentioned how he would often visit the factory area each day in order to inspect manufactured parts as part of his job duties. He also explained how some of the challenges he faced daily were actually in the factory setting when having to both work and interact with individuals such as machinists and operators who were often foreigners and only had a high school diploma while simultaneously that day he may also have to work with individuals such as designers with college degrees or even managers with Ph.Ds. He also explained how some of his challenges included having to often work with outdated tech which sometimes even used floppy which would be challenging to repair and service even when contacting the manufacturer.

Mr. Mueggenborg and I also discussed some of the applications of CNC machining at Raytheon which included having to create tools for several applications. One of these tools was used for both wire-bonding and solder applications. With wire-bonding, cold-welding is used to fuse very thin 1/1000th's of an inch gold wire to connect electrical components while with soldering heat is used to melt solder to attach components. We also discussed how improvements in CNC machining allowed certain materials to be milled which could not be milled before. One of these materials included neodymium or rare-earth magnets which are known for their brittleness. He explained that the brittleness of the magnets made them very hard to cut with traditional techniques but could be cut with CNC machining due to recent advancements.

Overall , from this interview I learned a great deal of information about 3D printing and CNC machining as well as other processes which were involved with manufacturing in the factory setting. While Mr. Mueggenborg's career field was not exactly involved with mechanical engineering, he did provide a great deal of information about the subject and provided other contacts at Raytheon who were more closely associated with the 3D printing and CNC

machining field. With these future interviews in mind, I would create even more specific questions to ask about 3D printing and CNC machining which I would hope to have answered. In addition to this, from this interview I also broadened my scope of engineering as I was now also introduced to how CNC could be used to create not only parts but also tools to create other parts using other machinery. In future interviews, I will be sure to incorporate this newly-found knowledge somehow in my future interview questions.