



Featured Senior Design Project Sponsor



And the 2021 ISE Student Team



Company overview: The senior project that the team had the honor to work on was sponsored by Morgan Advanced Materials. Morgan is a company that creates unique ceramics out of recycled materials, the plant's location is in Hayward, CA.

Sponsor name and position: Ms. Ha Nguyen Process and Quality Engineer

Project Goal: The project's goal was to improve the efficiency of the ceramic making process in order to reduce waste and improve savings

Unique challenges/ problems to overcome: Originally, the goal in the first half of the project was to improve the efficiency of energy in the kilns. While implementing those suggestions, we had to broaden our view and look at other solutions to improve the efficiency of the ceramic making process. During the second half of our project, we implemented our design solutions from the first semester. We then proceeded to focus on how to improve the throughput and decrease lead time on the customer orders. We had to scrap some ideas in the middle of the project. For example, our initial solutions that we planned to design were a Kanban system and an aggregate plan. However, we saw that implementing a Kanban system defeated the purpose of our aggregate plan, which determined on what day Morgan should fire their kilns. Since our aggregate plan was no longer needed, we decided to focus on how we could improve the assembly process.

Spring 2021 Activities Next Page....



Featured Sponsor, cont.

Approach and methods:

By using methods we had learned in our coursework at San Jose State, we decided to experiment with the methodology of poka yoke and design of experiments. The assembly process consisted of workers who had to manually glue and insert pins into the ceramics, which was very tedious. We experimented and improved this process by using an EFD machine which is a precision fluid dispensing system that shoots fluid out of a syringe. The company already owned this machine, so there was no need to purchase as they can be costly. During the experimental phase of this solution, there was a trial-and-error process to find the optimal amount of paint needed for the pins. By experimenting with the amount of pressure to disperse the paint and duration of time that the paint is being dispensed, the company was able to find the optimal amount of glue needed for each pin that went into each ceramic. This improvement decreased the process time and minimized the factor of possible human error.

To improve the overall ceramic process, we needed to change the whole production process because it was very outdated and inefficient. We designed a kanban system with certain stock checkpoints. Kanban is the Japanese word for sign. It's a lean manufacturing term that uses just-in-time manufacturing and visual cues to prompt a needed action in order to keep the work process flowing. The Kanban system allowed the company to grab ceramics from the created supermarket (inventory bin), which improved the process time significantly because the product before that was a make to order product. During the times where the supermarket does go low on stock, a kanban card would appear near half of stock, which would signal the firing and press machine team to produce more to maintain an optimal amount of stock.

Finding/ Recommendations/ Savings

With the poke yoke, we were able to speed up the assembly time by 50% and decrease the overall defect rate significantly. The Kanban system decreases the product lead time by ~30 days less than usual and increased the quantity shipped by 2.5 times the monthly average. Both of our proposed solutions have been implemented as they have shown to the company's process of making ceramics.

Overall experience:

This project has allowed the team to gain real work experience that will benefit us in their future endeavors. The team is glad that they chose this senior project to work on because the experience has been fulfilling and rewarding.

Carlos Angulo
John Tran