Increasing the Productivity of Liquid Filling Line for EVYAP

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ABSTRACT

This Graduate Project is about the liquid filling line of EVYAP's production department. The aim of this Project is to increase productivity of Liquid Filling Line for EVYAP. EVYAP performs an important part of the soap and personal care product exports of Turkey and transports its name to more than 100 countries. EVYAP has been manufacturing in 3 different countries: Europe and standards and Besides it has built the world's biggest Glass Plant in Malaysia. Durs, Abu Men, Abu Mult, Bavy, Fan and Advisors are important contacts embedded by EVYAP.

The main goal of this Project is to increase Overall Equipment Efficiency from 60% to 70% with analyzing failure rates and other methodologies. OEE is the gold standard for measuring manufacturing productivity and OEE takes into account the various sub-components of the manufacturing process - Availability, Performance and Quality. The other goal is decreasing the time during mold changing process. During mold changing process many time less has been observed. The reasons behind that and how to have a better mold changing process has been analyzed.

Objectives/Results

The main aim of our project is increasing the OEE rate of the liquid filling line from 60% to at least 70%. 

• Detecting the unknown failures which had not been described in the system before 
  Due to our analysis, we concluded that even the workers who are responsible for their station do not have the technical knowledge of the machines. With this information, we could not solve many problems.

• Result of our objectives: 
  Project: Role of the Kapak Elevar is to make sure that the production line is running smoothly. If there is a problem, the worker should change chips and if the machine is working well, the worker should leave the machine. With the new system, the new chips must be inserted before the worker starts working. This is an important result of the project. It shows the statistical approach for mold changing process.

• Result of our objectives: 
  Project: With a buffer application we have obtained that stoppage times may decrease. A problem at any station is sent to an additional station to work on it while the previous station is working. By this way the production time of the whole production line is increased. 

• Result of our objectives: 
  Project: To analyze the unknown failures which are not described in the system before. After analyzing, these failures are explained as follows:
 1. Unknown failure of unknown causes: 
  - Due to our analysis, we could detect that the workers could not detect some problems caused by the machines. They were not able to see the machine's limits and they were not aware of the working conditions. Therefore, they could not give any help to the workers who were working on the machines.
  - With the new system, the workers are able to detect the problems and solve them. The workers who are working on the machines are aware of the machine's limits and they are able to solve the problems. Therefore, the production time of the whole production line is increased.

Analysis of Unknown Failures

Although there is a system to describe the type of the failures, some of the failures cannot be recorded to the system by operators.

• This system has three different description levels: failures, problems, and sources.

• The different verifications at each station were examined and the problems which cause failures at each station were detected. The types and the duration of unknown failures which had not been described to the system before, were recorded by our group members.

According to our data analysis, the percentage of unknown failures varies from month to month. It can be seen from table T, without stopping the production.

Result of our objective: 

• Remove the unknown failures. This is the most important result of the project. It shows the statistical approach for mold changing process. Due to the new system, the workers are able to detect the problems and solve them. Therefore, the production time of the whole production line is increased.

Mold Changing Process

Process: During the mold changing process usually there are 3 workers who are responsible for their station. In every station, there is at least one worker who is responsible for the mold changing operation. Only one kapak elevator machine is used in this process. With a buffer application we have obtained that stoppage times may decrease. A problem at any station is sent to an additional station to work on it while the previous station is working. By this way the production time of the whole production line is increased.

Mold Changing Process:

• Unknown failure: 
  Project: There are approximately 55 modules inside of the kapak machine. During the mold changing process the worker who is responsible for that machine, must change each mold which is found in that machine with the new molds. With this change, the new molds should be fixed to the machine with the help of a hammer.

  After that, the machine is changed to a different station, the operator starts to work on the new station's machine and in the meantime the previous station worker continues to work. The new station worker should change each station and the machine is working well. In the last day of this week the worker who is responsible for this machine is responsible for the other machine. The worker who is responsible for this machine should change each module. If the machine is working well, the worker should leave the machine. With the new system, the new module must be inserted before the worker starts working. This is an important result of the project. It shows the statistical approach for mold changing process.

• Likelihood: 
  Project: The kapak elevator machine is one of the most important machines in the production line. The kapak elevator machine is used during the mold changing process. The kapak elevator machine is used during the mold changing process. The kapak elevator machine is used during the mold changing process.

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Conclusion

We have offered different approaches and analysis for EVYAP to increase the OEE rate of the liquid filling line. The most important result of the project was the detail analysis of the unknown failures which shows the statistical approach for mold changing process. For the next steps of the project, the unknown failures should be also analyzed and an accurate solution from the analysis. Type of the unknown failures should be also updated regularly. For the mold changing process, the more observation and the data record will give the better solution to reduce the mold changing time.