Final Exam – Module 5 Questions

Please submit your answers via Module 5 web form on the Coursera site.

50-Step Assembly Line

Consider an assembly line with 50 steps that are carried out sequentially. Each of the 50 steps has a defect probability of 1%. The final product produced on the assembly line is defective if any one of the 50 steps made a defect.

At the end of the assembly line there are two operators independently inspecting the product. Each of them is recognizing a defective product with a 90% probability. Assuming that the product is not defective, it is moved to the shipping department. Otherwise, the product is scrapped.

50SAL1. What is the probability that a defective product is produced (independent of the defect being found or not)?

50SAL2. What is the probability that a defective product is moved to the shipping department?

Process with Scrap

Consider the following four-step assembly operation with quality problems.

- The first resource has a processing time of 5 minutes per unit and one employee doing the operation
- The second resource has a processing time of 4 minutes per unit. It also has one employee doing the operation. However, this is a very delicate task and 80% of all products have to be scrapped after this step.
- Two workers are staffed for the third resource. No quality problems occur at this resource and the processing time is 20 minutes per unit.
- At the fourth and final resource, one operator handles the product. No quality problems exist at this step and the processing time is 12 minutes per unit.

PS1. For every unit of demand, how many units have to flow through the second step in the process?

PS2. Where in the process is the bottleneck?

a. Resource 1
b. Resource 2

c. Resource 3
d. Resource 4

Lean Burgers

The management of a large fast food chain evaluates the supplier of their deep-frozen beef patties. The supplier delivers frozen beef patties that according to the specifications have to weigh between 94.5 grams and 95.5 grams. All other beef patties are rejected.

A random sample of 30 patties that were inspected over the course of the last week revealed that the average weight was 95.0 grams. The standard deviation was 0.25 grams.

LB1. What is the capability score of the supplier?

LB2. What percentage of the deliveries is likely to be outside the specification limits (outside the interval of [94.5, 95.5])?

LB3. To what level would the supplier have to reduce the standard deviation of the operation if his goal were to obtain a capability score of 1 (i.e., get less than or equal to 0.27 percent defective)?

Toyota - Jidoka

TJ1. In the Toyota Production System, *jidoka* refers to

a. Level production, where different models are produced along side each other on the assembly line
b. Continuous improvement, where workers organize meetings to discuss ways of improving the production process
c. The inventory retrieval system where parts are replenished only when they are needed
d. The aggressive reduction of changeover and setup times
e. Continuous line-balancing to maximize utilization
f. The cross-training of workers for a wide range of skills
g. None of the above