

Analytics exercise ii: designing a manufacturing process essay sample

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What is the daily capacity of the assembly line designed by the engineers? Assume that the assembly line has a computer at every position when it is started at the beginning of the day. Assuming the assembly line has a computer at every position when it started at the beginning of the day, the daily capacity would be 225 units per day (30 units/7.5 hours). The line is operating at 7.5 hours per day and 9th workstation seems to be the jam-up is occurring which in turn limits the cycle time to 2 minutes. When it is running at maximum capacity, what is the efficiency of the line relative to its use of labor? Assume that the supporter is not included in efficiency calculations.

The sum of the task times is 583 seconds. To figure this out, I used the efficiently calculation of only including tasks performed at the work stations using labor and omitted the 310 seconds of software download. Efficiency = work content/(actual number of workstations X cycle time) = 583/6(120) = 80.97% How should the line be redesigned to operate at the initial 250 units per day target, assuming that no overtime will be used? What is the efficiency of your new design?

The cycle time will have to be reduced if overtime will not be used. To come up with the more idealistic cycle time I calculated: cycle time = production time per day/required output per day = 7.5 x 60 x 60/250 = 108 seconds/unit. Almost every workstation is below the cycle time except for workstation 6 which is assembly line position number 9. To meet the new cycle time, I believe tasks 16 and 17 need to be split. I recommend moving task 17 into assembly line number 10 to accommodate the new cycle time and adding an additional worker on the line.

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What about running the line at 300 units per day? If overtime were used with the engineers' initial design, how much time would the line need to be run each day? If they were running about 300 units per day, using the original assembly line design, the output is 30 units per hours. If overtime were used in the engineer's initial design, to reach the output of 300 units, 2.5 hours of overtime would be required each day. Can the assembly line produce 300 units per day without using overtime?

They may be able to meet the production rate with a redesigned assembly line. The cycle time needed would be: $\text{cycle time} = \text{production time per day} / \text{required output per day} = 7.5 \times 60 \times 60 / 300 = 90 \text{ seconds/unit}$. I would think you need to add more work stations to the assembly line positions to make this feasible. For example, if there were 9 workstations, the efficiency would be $583/8(90) = 81\%$. What other issues might Toshihiro consider when bringing the new assembly line up to speed?

Other issues Toshihiro might consider when bringing the new assembly line up to speed are reviewing total costs and whether it makes more sense to add additional worker to the assembly line or if overtime is worth the cost instead of adding workers. The cost of redesigning the line should be considered. A thorough analysis of demand and line options should be performed. It will minimize risk of having to redesign the line once it is operational. Redesigning the line could prove costly. Before redesigning, he should make sure he is confident the demand is there.