Designing a manufacturing process

Design

The final workstation 9 handles tasks 16 and 17 (120). The sum of task time therefore equals 583 seconds. The assembly line Is designed assuming that one notebook would be assembled every 2 minutes by six workers. Therefore, daily capacity of the assembly line would be 225 units (450 minutes operating time per day), assuming that on each one of the six workstations a computer is positioned at the beginning of the day. Initial production for the new model is 150 units per day, increasing to 250 the following week and eventually up to 300 units, depending on and 5.

Workstation 4 completes its tasks (7, 8, and 9) within 105 seconds whereas workstation 5 finishes after 101 seconds. This results in a slack of 4 seconds per unit at workstation 5. A potential solution to this problem might be assigning higher skilled staff to workstation 4 in order to push on assembly time. More detailed recommendations will follow. This bottleneck constitutes the major issue within this production process and will be examined in more detail in the following. Analyzing the major issues concerns calculating potential slack times at workstation 5 guarding different amounts of units being produced.

With the initial production of 150 units per day, a slack of 600 seconds (10 minutes) at workstation 5 would appear per day. It takes 3 minutes to finish one unit, assuming that 150 units are produced per day with an operating time of 7. 5 hours. Producing 250 units per day means that one unit is assumed to be finished after 1. 8 minutes or 108 seconds. When production increases up to 300 units per day, operating time per unit would be 1. 5 minutes or 90 seconds. Hence, increasing production results in increased slack times t workstation 5.

With a production of 250 units per day, slack time would be 1000 seconds or 16. 67 minutes. Within those 16. 7 minutes of slack time, 9. 3 units could have been produced. With a production of 300 units per day, slack time would even increase up to 20 minutes in which 13. 3 units could have been produced. These calculations clearly illustrate inefficiency at workstation 4 which results in major costs due to relatively high idle times. Extrapolating these numbers up too working week, assuming that 5 days Γ 7. 5 hours the assembly line is in operation, significantly high lack times and therefore unnecessary costs arise.

Assuming a production of 250 units per day, slack time at station 5 per week would be 83. 5 minutes in which an additional 46 units could have been produced. Efficiency of the assembly line will be calculated in the following with regard on different amounts of units being produced. Eventually the optimal number of units to reach an efficiency of 100% will be calculated. With 250 units produced per day, a cycle time of 108 seconds per unit results. Hence, using the formula for calculating the line's efficiency, (sum of task mimes = 583 seconds/6 workstations x 108 seconds cycle time) results in an efficiency rate of 89. 7% (-? 90%). Running at a maximum capacity of 300 units per day (583/xx), line efficiency would be 107. 96% which is not close to reality. Relative to its use of labor, an efficiency of -? 108% producing at maximum capacity is not achievable. More workers would be needed and staff would have to work on one task simultaneously. An efficiency of 100% can be reached with a daily production of 277 units per day assuming that the assembly line maintains its initial set up of 6 arrogations with the same labor time. The actual efficiency rate (with 277

units produced per day) constitutes 99. 6% which is the maximum that can be reached. In order to dispense the previously discussed issue of inefficiency at workstation 4, several recommendations will be highlighted. Firstly, the easiest solution in relation to not changing the assembly set up would be to assign more skilled workers to station 4 in order to speed up the assembling process. Going hand in hand with this assumption is that the supporter might help staff at workstation 4. The problem is elf is needed but his/her task is not to stay in one spot at all times.

Moreover, redesigning the assembly set up might benefit workstation 4. The redesign is concerned with the optimal placement of staff. In the case of Toshiba 's assembly line it might be helpful to expand the section of workstation 4 in order to place one or two additional workers. Another possible solution might be to place additional staff not just on one side of the conveyer belt but on the other one as well. Especially in the section of workstation 4 additional help from across might be a solution. The assembly line has space for a total of 12 positions.

Not all are being used. Another potential determination might be to split up workstation 4 into two and place the new one in a free spot. Regarding the calculations of slack times and efficiency with different amounts of units being produced, one can conclude that Toshiba 's assembly line is relatively efficient but has space to improve. Workstation 4 represents the main problem of this case but several potential solutions were presented. Overall efficiency of this assembly line is quite high and appropriate.