**Simulation Case Study Report**

IEM Lab Rotation IV

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Team #

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Task Evaluation Report

Task 1

a.

|  |  |
| --- | --- |
| Performance Indicators | |
| Profit | -16402€ |
| Revenue | 63880€ |
| Costs | 80282€ |
| Average WIP | 118 |
| Average TTP | 3:33:18.6285 |
| DDR | 99.5% |
| UT Cutting | 91.206% |
| UT Drilling | 45.528% |
| UT Milling | 52.820% |
| UT Assembly | 97% |
| UT Grinding | 83.300% |

Table 1: Performance Indicators of Initial Setup

b.

In the initial setup of the manufacturing process of company XYZ, the total profit is a negative number. This indicates whether the Revenue is not at maximum or the Costs are over budget.

The Revenue can only be reduced by late products that one late product will sell for 100€ instead of 160€; however, the DDR (Due Date Reliability), as calculated below,

*DDR =*

tells the percentage of the non-late products, in this case, 99.5%.

Only the Costs can be improved since only two products out of 400 are late. According to Table 1, the average WIP (Work in Process) is 118 which cost 5€ per unit per day. This can be reduced by having less total buffer size, because WIP products can only be stored in these buffer storages, if there are not enough space, the sources will stop sending raw materials. How and which ones of the buffers need to be changed will be explained in the next tasks.

On the other hand, the UT (utilization rate) of Drilling and Milling are demonstrating the WS (workstations) of Drilling and Milling are too much. Again, how many to change will be talked in later tasks.

Task 3:

a.

According to the UT Drilling and UT Milling in Table 1, which is the initial setup, and according to the formula of Utilization Rate as shown below,

45.53% and 52.82% shows that only about half of the workstations are actual working at their max available usage. In order to get the exact number of workstations the company need in this simulation, use the formula below.

In this case:

Drilling WS:

Milling WS:

The above results lead to the Drilling WS number of 3 or 4 since there is no 0.6 workstation, and the Milling WS number of 4 or 5. The trial Performance Indicators are shown in part b Table 3.

b.

|  |  |  |  |
| --- | --- | --- | --- |
| Key Performance Indicators | | | |
|  | 4Drilling 5Milling | 3Drilling 4Milling | 4Drilling 4Milling |
| Profit | -9402€ | -16931€ | -8402€ |
| UT Drilling | 90.71% | 99.78% | 90.71% |
| UT Milling | 84.51% | 96.28% | 98.10% |
| Finished Products | 400 | 391 | 400 |
| Non-Important indicators | | | |
| Costs | 73282€ | 73731€ | 72282€ |
| Average WIP | 97.64 | 146.62 | 97.64 |
| Average TTP | 4:07:44.2207 | 1:02:08:57.7454 | 15:04:00.6224 |
| DDR | 99.5 | 75.4 | 99.5 |
| UT Cutting | 91.206% | 96.052% | 91.206% |
| UT Assembly | 97% | 97% | 97% |
| UT Grinding | 83.300% | 74.378% | 83.300% |

Table 3: Performance Indicators of different WS numbers

c.

Since Drilling can be changed into 3 or 4 and Milling 4 or 5, take the bigger numbers for the first trial. As shown above in Table 3, 4 Drilling and 5 Milling workstations increases the profit and fulfills customer demand. However, the Utilization Rate of Drilling and Milling can still be improved.

The second trial takes the smaller numbers. The Utilization Rate of both Drilling and Milling have reached the maximum; however, only 391 products are finished and out of these products only 75% are on time which leads to a great loss of Revenue.

The last trial is the most fit scenario of the Workstations, which takes 4 Drilling and 4 Milling respectively. It has high Utilization Rates, the maximized profit and has fulfilled the customer demand of 400 units.