

***TIME TEMPLATE 1: manufacturing workshop***

|  |  |  |
| --- | --- | --- |
| **Work place** | **Task description** | **Operator name** |
| Nuts | Place nuts | * Borja Sanz * Ignacio Loyola * Pablo Stemmer * Enrique Llopis |
| Washers | Place washer | * Jorge Fernández * Nicolás Fernández * Antonio Uribe * Andrés Naves |
|  | To move material and pack them | * Stéphane Díaz-Alejo |
|  | Time controls | * Joan Colom |

**1st ATTEMPT**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start | End | Duration |
| WP-NUTS | 0:00:00 | 0:03:07 | 0:03:07 |
| WP-WASHER | 0:00:15 | 0:02:40 | 0:02:35 |
| FULL PROCESS | 0:00:00 | 0:03:07 | 0:03:07 |

**2nd ATTEMPT**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Start | End | Duration |
| WP-NUTS | 0:00:00 | 0:02:17 | 0:02:17 |
| WP-WASHER | 0:00:14 | 0:01:46 | 0:01:32 |
| FULL PROCESS | 0:00:00 | 0:02:17 | 0:02:17 |

***Example:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Start | | | End | | | Duration |
| WP-NUTS |  | *0:00:00* |  |  | *0:05:06* |  | 0:05:06 |
|  | | |  | | |
| WP- WASHER |  | *0:00:29* |  |  | *0:04:00* |  | 0:03:31 |
|  | | |  | | |
| FULL PROCESS | 0:00:00 | | | 0:05:06 | | | 0:05:06 |

***TIME TEMPLATE 2: Line type manufacturing (Best case)***

|  |  |
| --- | --- |
| **Task description** | **Operator name** |
| Place the 1st nut | Nicolás Fernández/Ignacio Loyola |
| Place the large washer | Jorge Fernández/Pablo Stemmer |
| Place the 2nd nut | Andrés Naves/Borja Sanz |
| Place the small washer | Antonio Uribe/Enrique Llopis |
| Place the golden nut | Antonio Uribe/Enrique Llopis |
| Packing | Nobody (It wasn’t specified in the practice) |
| Time controls | Joan Colom / Stéphane Díaz-Alejo |

**1st ATTEMPT**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Start** | **End** | **Duration** |
| Operator 1 | 0:00:00 | 0:02:37/0:02:35 | 0:02:37/0:02:35 |
| Operator 2 | 0:00:20/0:00:18 | 0:02:46/0:02:44 | 0:02:26/0:02:26 |
| Operator 3 | 0:00:26/0:00:23 | 0:02:55/0:02:53 | 0:02:29/0:02:30 |
| Operator 4 | 0:00:41/0:00:37 | 0:02:56/0:02:54 | 0:02:15/0:02:14 |
| Operator 5 | 0:00:43/0:00:40 | 0:03:00/0:02:57 | 0:02:17/0:02:17 |
| Operator 6 | - | - | - |
| Full process | 0:00:00 | 0:03:00/0:02:57 | 0:03:00/0:02:57 |

**2nd ATTEMPT**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Start** | **End** | **Duration** |
| Operator 1 | 0:00:00 | 0:02:21/0:02:18 | 0:02:21/0:02:18 |
| Operator 2 | 0:00:17/0:00:16 | 0:02:38/0:02:20 | 0:02:21/0:02:04 |
| Operator 3 | 0:00:24/0:02:18 | 0:02:48/0:03:10 | 0:02:24/0:00:52\* |
| Operator 4 | 0:00:42/0:02:38 | 0:02:58/0:03:20 | 0:02:16/0:00:42\* |
| Operator 5 | 0:00:44/0:02:39 | 0:03:07/0:03:28 | 0:02:23/0:00:49\* |
| Operator 6 | - | - | - |
| Full process | 0:00:00 | 0:03:07/0:03:28 | 0:03:07/0:03:28 |

**\*Here other workers had to help as there was a bottleneck and we had to finish quickly. We already were the last group.**

**Example:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Start** | **End** | **Duration** |
| Operator 1 | ***0:00:00*** | ***0:01:50*** | 0:01:50 |
| Operator 2 | ***0:00:08*** | ***0:01:53*** | 0:01:45 |
| Operator 3 | ***0:00:11*** | ***0:02:09*** | 0:01:58 |
| Operator 4 | ***0:00:19*** | ***0:02:11*** | 0:01:52 |
| Operator 5 | ***0:00:22*** | ***0:02:19*** | 0:01:57 |
| Operator 6 | ***0:00:30*** | ***0:02:20*** | 0:01:50 |
| Full process | 0:00:00 | 0:02:20 | 0:02:20 |

**In addition to the questions in the text you must answer the following:**

**1. Compare and analyze the results obtained and their differences in both cases, workshop and line.**

**2. Which phase of the production line is slower (bottleneck), which slows down the process? Justify it.**

**3. How would absentee in the production affect both cases?**

**4. How can information systems help analyze the flow of the production process?**

1.- As we can see from the full process, the workshop model has resulted approximately 1 minute faster in our case than the line model. One of the reasons can be that in the workshop each step is done simultaneously by four people, and that while the washers group were working in one lot, the nuts group could work in the previous stage of the next lot. However, we can also see that the time used in the nuts is, in both methods, higher than the time used in the washers, related in the first to the fact that there are more nuts than washers and in both to the difficulty of the processes.

2.- Putting the nuts is the phase of the production line that is slower as it requires more ability to make it fast than putting the washer (mainly if the pieces are the little ones, were it is so much more difficult).

3.- An absentee in the manufacturing workshop would make that someone would have to replace the absentee, and the production would be a little slower, but not too much as there are more workers doing the same phase.

On the other hand, we can see perfectly how an absentee would affect the line type manufacturing as we had an absentee. The absentee makes that someone has to do two phases, and this makes a bottleneck that increases a lot the amount of time of finishing because making two stages to cover the absentee means making one in which you are not specialized.

4.- Information systems can help analyze the flow of the production process as it can see where a bottleneck is to solve it.