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# Absenteeism Management in an Apparel Industry by using Transportation Problem

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## Abstract

Absenteeism management is a big challenge to run the industries, private sectors and the governmental organization in this current world. The study was conducted in a randomly selected cell of MAS Kreeda Vaanavil, Kilinochi for 40 days to overcome the interruption caused by the absentees during the active time of apparel industries. The selected cell consisted of 6 modules and each module consisted of 7 to 10 team members including a team leader. An operation research technique named assignment problem was used in this study to handle the good quality and finalized data from the selected cell. A package named Solver Add-ins of MS Excel was used to solve the assignment problem which is a special case of transportation problem. Initially, the skill matrix was prepared for a selected cell by direct observation and one-on-one interview method. In a module, 7 different tasks with 7 work stations were allocated for 7 team members to share the work load. If there were one, two or three absentees in a module at a time, it was possible to assign a task optimally for each employee without any mismatch by using the assignment problem. Apparel industries were the most time based competitive industries and manual assigning of the task for the employees in an optimal way was not practically feasible. Thus, this study has come with an idea to solve the absenteeism in which every single task was assigned for a specific employee in an expected level.

**Key words:** *Absenteeism, Assignment Problem, Cell, Module, Skill Matrix*

## Introduction

Absenteeism has been elucidated as a principal cause of losses in productivity and company performance (Kocakulah et al., 2016). Operations Research (OR) tools have been a decision-making aid in almost all manufacturing industries, financial and service organization. MAS Kreeda, Vaanavil runs with 15 cells and almost 2000 employees. A cell is a group of modules that consist of closely located work stations (manufacturing equipment) where multiple, sequential operations are performed on one or more families of similar raw materials, parts, components, products or information carriers.

## Materials and Methods

The study was conducted in a randomly selected cell of MAS Kreeda Vaanavil, Kilinochi for 40 days. Initially, the skill matrix was prepared for a cell which consisted of 48 team members and 6 team leaders by direct observation and one-on-one interview method. The skill matrix portrayed the ability of the employees to do the task at different expertise levels and it was designed by using Microsoft (MS) Excel as given in Table 1. If the corresponding employee had the ability to finish the corresponding task then the intersection cell of employee name and task type was denoted as "1" or otherwise, the cells were denoted as "0".

| **Employee name** | **Task type** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **T1** | **T2** | **T3** | **T4** | **T5** | **T6** | **T7** |
| Emp1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| TL (Emp2) | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| Emp3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Emp4 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| Emp5 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| Emp6 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Emp7 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| Emp8 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |

**Table 1: The skill matrix of a selected module**

OR technique named assignment problem which is a special case of transportation problem was used to assign the task for each employee in an optimal way. A package named Solver Add-ins of MS Excel was used to solve the assignment problem (Adekunle & Tafamel, 2016). Assignment Problem technique was applied for a module in a cell which consisted of 7 team members, a team leader (TL-Responsible for a module), 7 work stations and 7 different tasks . Initially, the team leader (comparatively an experienced person in a module) could be placed instead of one absentee. In case, if the team leader was not capable to complete the task of that absentee then an assignment problem was used. Sometimes the task which was assigned for an employee by assignment problem may not be included in his/her skill matrix then he/she should be interchanged between the other modules until all the employees in that module were assigned with a task. If there were two or three absentees in a module then team leader & experienced employees in that module could be substituted for those absentees. But team leader & experienced employees may or may not have the capability to do the task of those absentees. So assignment problem could be used by repeating the names of team leader & experienced employees in "Employee name" column of excel sheet.

## Results and Discussion

In this study, two absent team members (Emp 4 and Emp 7) were replaced by TL and Emp 1 who may be able or unable to fulfil the corresponding task of those absentees. Thus, the optimally obtained result was 7 (sum product value) as shown in Figure 1 which illustrated that 7 employees were assigned for 7 tasks without any mismatch.

| Employee name | Task type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T1 | T2 | T3 | T4 | T5 | T6 | T7 | Dummy | Dummy | Output | | Condition | |
| Emp1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | = | 1 | |
| TL (Emp2) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | = | 1 | |
| Emp3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | = | 1 | |
| Emp4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | **Absent** |
| Emp5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | = | 1 | |
| Emp6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | = | 1 | |
| Emp7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = | 0 | **Absent** |
| Emp8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | = | 1 | |
| Emp 1(R) | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | = | 1 | |
| Output | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | Sumproduct | | 7 | |
| | = | = | = | = | = | = | = | = | = | | | | |
| Condition | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | | | | |

**Figure 1: MS Excel interface showing the calculations done to solve the Assignment Problem by using MS Excel Solver in which Emp7 and Emp 4 were absent**

In the Figure 1, Emp 1 name was used twice as Emp 1 (R) in the Employee name column of the assignment problem because he/she was one of the experienced person in the module according to the skill matrix.

## Conclusion

Manual assigning of the task for the employees in an optimal way was not practically feasible as it was a time consuming process and also it was hard to deal with a large quantity of data. Hence, this research can be used for the absenteeism management in an apparel industry in order to get an optimal output.

## References

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