

# Management and Optimization of a Moroccan Industrial Location of Production by the Method of Links

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**Abstract**— To identify and manage the physical flows of matter first up to the storage of the finished product, a good implantation of the workstations is necessary and essential. An inventory of workstations with a collection of data relating to the operating ranges of products to treat allows us to optimize the physical flow by a new settlement by the method of the links. The method of the links has allowed us to compare the three products on a relevant criterion linked to the handling. We have chosen to calculate the number of products manufactured which flows on average of each week

**Keywords**— Relocate, flow, tapestry, method of links, analysis of strengths and weaknesses.

## I. INTRODUCTION

There are several methods to optimize the settlements as the approach of King, Kusiack, the methods of the anticipations, of proximity, of the links [1]. Relocate the machines, reorganize a workshop, put posts of work online have become operations more common in businesses, most of the time, these resettlements are done with simple good sense.

The method of the links will be adopted in our work, it is one of the best-known methods at this day, it gives reliable and effective results. It allows an optimized location of the desktops based on the intensity of the flow [2].

## II. PRINCIPALE OF THE METHOD OF LINKS

According to the analysis of the actual implantation [3], we found that the workshop of Tapestry is the only workshop that has a complex and non-optimized stream. In this sense, our study will only converge on the workshop of tapestry. The application of the method of links is treated according to the following steps [4]:

1. Fill the matrix of intensity of traffic,
2. Classification of posts of work according to their number of connections,
3. Achievement of the implantation of theoretical work stations,
4. Verification of the results of the new location.

To facilitate the understanding, definitions will be presented:

- Link: A connection between two workstations
- Index of Traffic IT: Number of movements of products semi finished, from one workstation to another position downstream. In our case, the index of traffic will be the number of products manufactured by week.

Table 1 presents the indices of traffic of workstations for the tapestry workshop for the month 3 and 4 of 2014.

TABLE I. OPERATING RANGES AND THE INDEX OF AVERAGE TRAFFIC OF PRODUCTS

Workstations		Ranges		Indices of traffic on average / week				
Code	Name	Products	Ranges	Weeks	Sofas	Mattress	Ottomans	
MM	Placing Foam	P1 : Sofas	MM-GD-CO-TA-HB-MT-CQ	month 3	W <sub>1</sub>	70	124	204
GD	Guindage	P2 : Mattress	MM-CO-TA-MT-CQ		W <sub>2</sub>	75	120	200
CO	Couture	P3 : Ottomans	MM-TA-CQ		W <sub>3</sub>	77	122	205
TA	Tapestry				W <sub>4</sub>	74	120	195
HB	Trim			month 4	W <sub>5</sub>	70	125	198
MT	Mount				W <sub>6</sub>	75	126	200
CQ	Quality Control				W <sub>7</sub>	76	120	202
					W <sub>8</sub>	75	119	192
					<b>Average</b>	<b>74</b>	<b>122</b>	<b>200</b>

The traffic of product that comes from the post MM (Placing foam) to extension CO (Couture) is for example:

- 74 articles / week for the product P1, on average for 2 months.
- 122 Articles / week for the product P2, on average for 2 months.

The total thus relates to 196 articles / week circulating between the post MM and the post CO. On the basis of this example we will fill the matrix of the intensities of the traffic (Figure 1), in order to propose an approach to optimization.

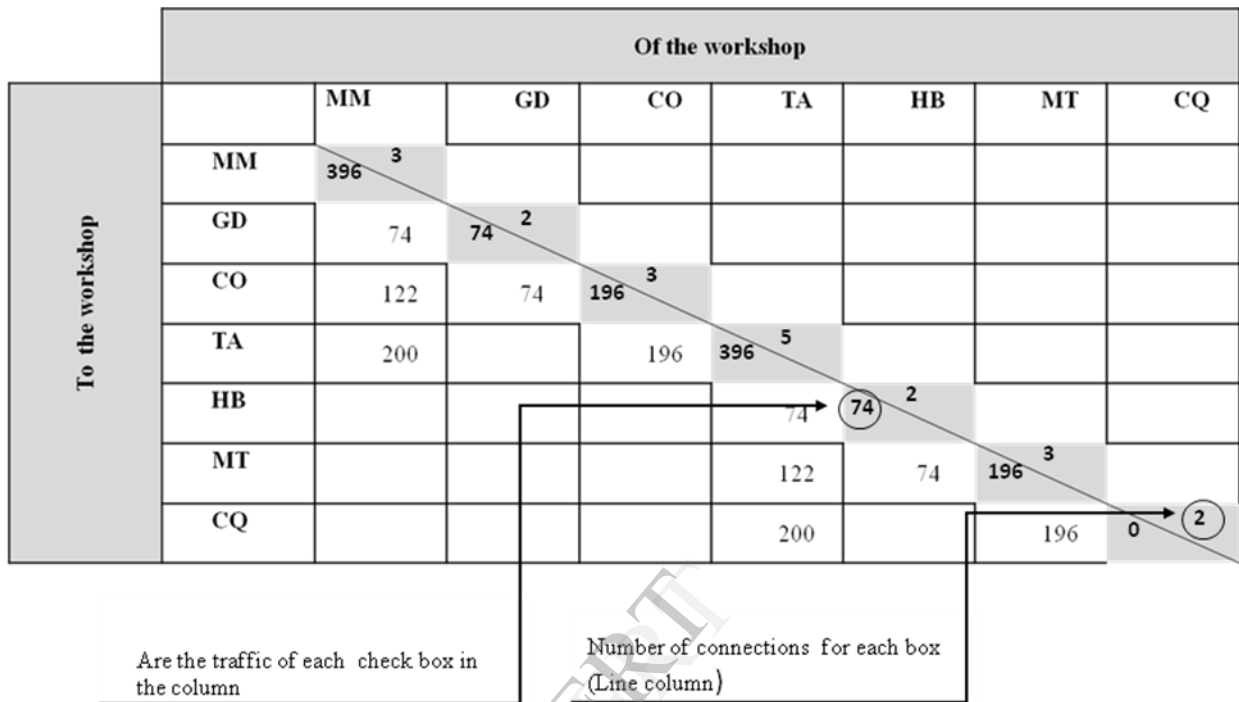


Fig.1. Matrix of intensity of traffic between the workstations, depending on the method of links

A first analysis of the table 2 the intensity of the traffic has used to categorize the posts by order of importance.

TABLE II. CRITERIA FOR THE CLASSIFICATION OF WORK STATIONS, ACCORDING TO THE METHOD OF LINKS

Ordre N°	1 <sup>st</sup> Criterion	2 <sup>nd</sup> Criterion	Workstations
	Number of link	Total Traffic by post	
1	5	396	TA
2	3	396	MM
3	3	196	CO
4	3	196	MT
5	2	74	GD
6	2	74	HB
7	2	0	CQ

An optimization iteration graphically through a mesh rectangular module. It was placed on a node in the center of mesh size the extension that has the largest number of connections (TA).

Around this post, we will put the other posts with which it forms a link, in the decreasing order of total traffic per link. Figure 2 illustrates the theoretical and final implantation.

### III. THEORETICAL LOCATION

Figure 2 presents the distribution of operating modes according to a theoretical location

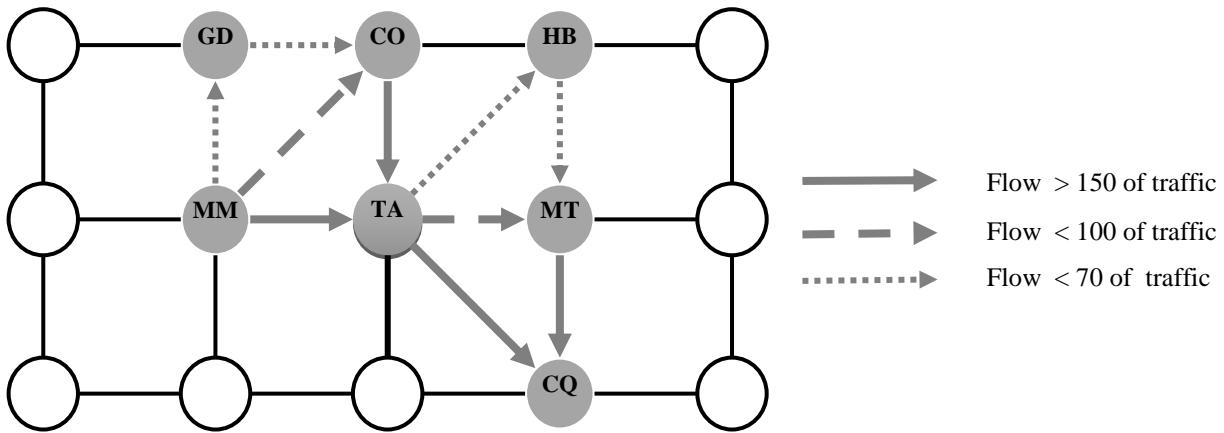


Fig.2. Theoretical settlement by the method of links

On the basis of a first theoretical implantation, we are going to change by moving one workstation at a time, to obtain the final implementation which must take into account

the technical constraints (premises, means of handling, etc. ...) [5], illustrated by Figure 3.

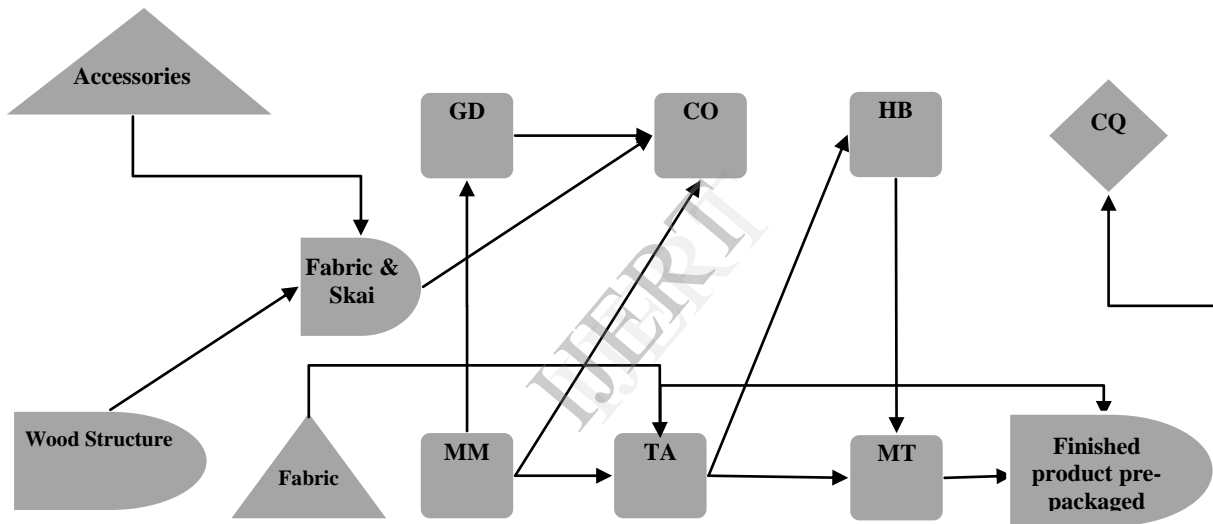


Fig.3. Settlement practice by the method of links

This implementation allows us to have an ideal overview of the work stations in the tapestry workshop. The symbols

are used in the Figure 4 above, their meanings are mentioned on table 3

TABLE III. SYMBOLS USED IN THE FINAL IMPLEMENTATION

Stock		Control		In-course		Workstation	
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The final implantation practice is illustrated by Figure 4

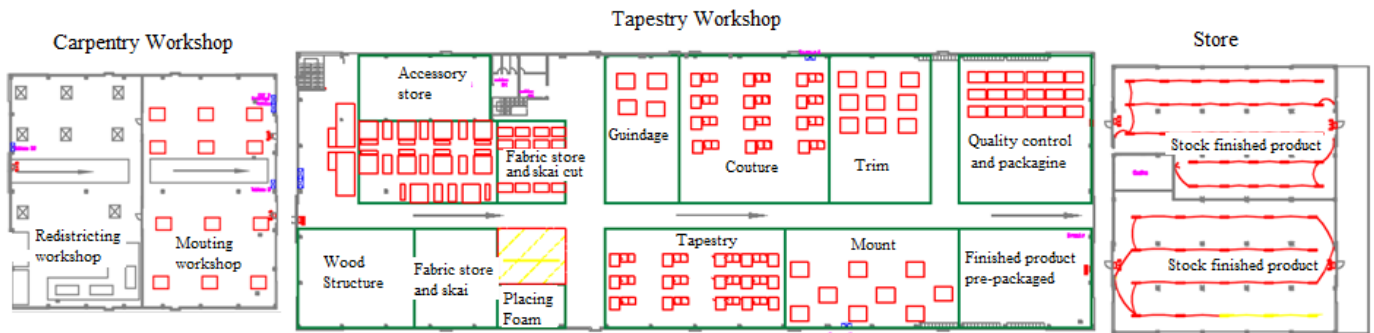


Fig.4. New location of the industrial unit of Moroccan production

#### IV. ANALYSIS OF STRENGTHS AND WEAKNESSES

The notes of each characteristic varies between (+5: very positive) and (-5: very negative).

The weight varies between 0 and 3 to designate the importance of each characteristic

TABLE IV. ANALYSIS OF THE STRENGTHS AND WEAKNESSES OF THE NEW LOCATION

Designation	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	Weight	Total
Maintenance Access						■	■	■	■	■	3	15
Raw material storage areas						■	■	■			2	6
Flow clear						■	■				2	4
Flow short						■					3	1
Movement forklift truck						■	■	■			1	3
Movement of operators						■	■				1	2
The outstanding						■					3	3
Space Management						■	■	■			2	6

#### REFERENCES

The results of analysis of the strengths and weaknesses (table 5), were given a value of 40, this note shows that our new location is profitable and positive in relation to the notes of the old location which is 7 [3].

#### V. CONCLUSION

This work has helped to resolve problems relating to the production process and in the management of the physical flows by:

- The quantification of trafficking means by posts, and the achievement of operating ranges of products.
- The reimplantation of workstations, by the application of the method of links. The new location has enabled us to have a clear stream, short and optimize.

It was detected that the posts Tapestry followed by posts in foams and seams posts have the large number of average traffic.

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