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Study and Analysis of the Actual Implantation of an Industrial Unit of Moroccan Production

Abdelmajid Daya
Laboratory of MMESA
Faculty of Science and Technology
Boutalamine BP 509, Errachidia 52000
MOROCCO

El Hassan Boudaia
Laboratory of Industrial Engineering
Faculty of Science and Technology
Mghrila, BP. 523, Beni Mellal, 23000
MOROCCO

***Abstract*— To identify and manage the physical flows of raw materials through to the storage of the finished product, a good implantation of the workstations is necessary and essential. In this context, a study and an analysis of an actual implantation of an industrial unit of Moroccan production are performed. The objective of this work is to seek the production unit, which is the major cause of the complexity of internal streams.**

***Keywords*— implantation, flow, production, analysis of strengths and weaknesses.**

I. TYPOLOGIES OF EXISTING PRODUCTION

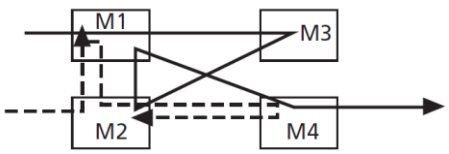
There are several types of production [1], the most important are:

- The continuous production
- The discontinuous production

Each typology has advantages and disadvantages, when grouped in table 1.

TABLE I. TYPOLOGIES OF PRODUCTION FLOWS

	Continuous Type
Flow of products	***Linear Flow*** 
Flexibility	Production Lines rigid
Effectiveness	Important
Delays	Low
In-course	Low

	Discontinuous Type
Flow of products	***Complex Flow*** 
Flexibility	Flexible Production Lines
Effectiveness	Low
Delays	Long
In-course	Important

II. ACTUAL IMPLANTATION OF AN INDUSTRIAL UNIT OF MOROCCAN PRODUCTION

The plan of the current geographical location of machines and workstations in the workshops of the industrial unit of Moroccan production vary. In some companies, this plan is kept up-to-date by the service of the office of methods [2]. In others companies, there is no plan of the current geographical location and therefore it must be traced.

The repetitive meetings with the people of the office of methods have allowed us to achieve a version of the plan of implantation (Figure 1) of the industrial unit of Moroccan production. This plan presents the machines of carpentry, the posts and their locations and the rest of the workshop. Symbols are used in the Figure 1, their meanings are mentioned in table 2.

TABLE II. SYMBOLS USED IN THE CURRENT GEOGRAPHICAL LOCATION OF MACHINES AND WORKSTATIONS

Symbol	**Meaning**
	Machines (Planer, bandsaw, Spinner to wood)
	Passage
	Posts of mounting
	Robot
	Post of Couture
	Finished Product

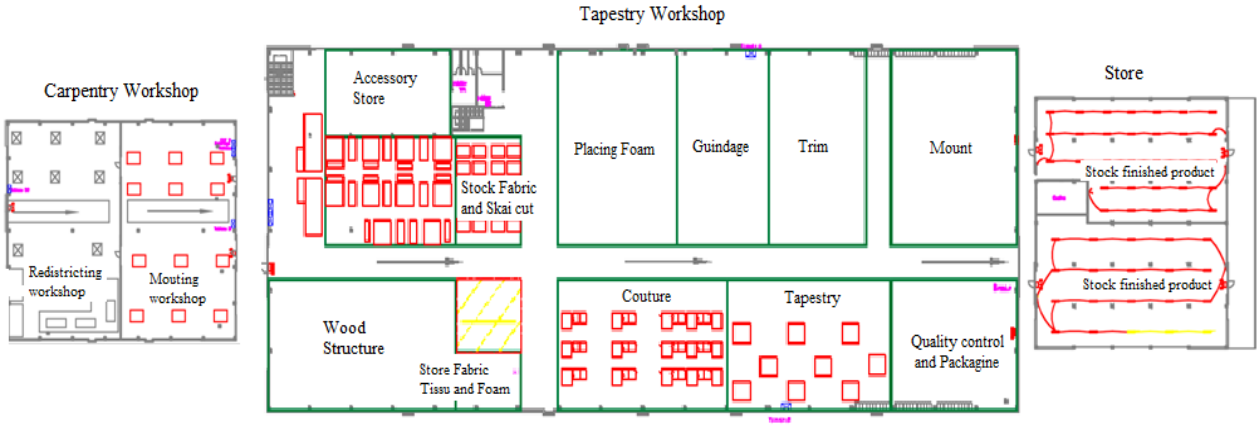


Fig 1. Current geographical location of the industrial unit of Moroccan production

III. MAPPING OF PHYSICAL FLOWS

The industrial unit of Moroccan production manufactures 3 types of products: sofas, mattresses, ottomans with different operating ranges.

Table 3 summarizes all of the products manufactured in the workshops, with a list of machines and desktops contributing to their manufacture by chronological order.

TABLE III. OPERATING RANGE AND AVERAGE TRAFFIC OF PRODUCTS

Product	**Sofa**	**Mattress**	**Ottoman**
Average Traffic / week	75	120	200
Phases	**Range**		
10	Raw Materials	Raw Materials	Raw Materials
20	Workshop wood cutting	Workshop wood cutting	Workshop wood cutting
30	Workshop Assembly and Mounting	Workshop Assembly and Mounting	Workshop Assembly and Mounting
40	Post Implementation in Foam	Post Implementation in Foam	Post Implementation in Foam
50	Post Guindage	Post Couture	Post Tapestry
60	Post Couture	Mounting Post	Post Quality Control
70	Post Tapestry	Post Quality Control	Finished Products
80	Post Trim	Finished Products	
90	Mounting Post		
100	Post Quality Control		
110	Finished Products		

On a theoretical implantation, the stream link two posts in a straight line, whereas on a plan, the trace of the stream represents the real displacement [3]. These flows are mapped according to a plan which is called "graph of movement".

IV. GRAPH OFMOVEMENT

Figure 2 trace the internal flow of movement of products from raw material to the finished product.

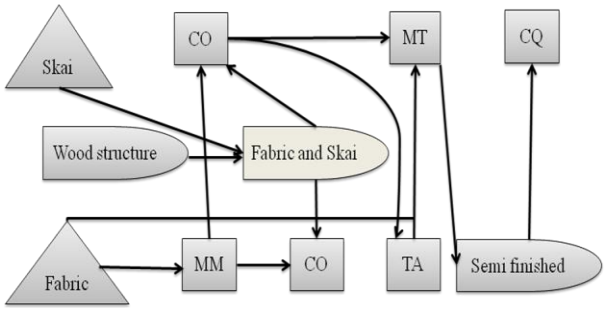


Fig.2. Graph of movement of internal streams

The symbols are used in the Figure 2, their meanings are mentioned in the table 4.

TABLE IV. SYMBOLS USED IN THE GRAPH OF MOVEMENT

Symbols		Code	Name
	Stock	**MM**	Placing Foam
	Control	**GD**	Guindage
	In-course	**CO**	Couture
	Workstation	**TA**	Tapestry
		HB	Trim
		MT	Mounting
		CQ	Quality Control

The following criteria allowed us to characterize the actual implantation and to justify that it is not optimized:

a) Complexity of physical flows: Figure 2 shows that the flow has a significant number of crosses; it is not optimized at the level of the tapestry workshop. Considerations are taken on the outstanding amount of large size.

However each workstation has an area of outstanding amounts required for its operation and inseparable from the post (this is the location of pallets next to each post).
However we find that this implantation of positions within the tapestry workshop is without doubt the major cause of the complexity of flows.

b) The quantification of traffics: it is to look for relevant criteria that will study the actual implantation. To remedy to this problem, we must seek how to measure or assess the traffic of products which circulate in the workshop.

c) Analysis of the strengths and weaknesses: On the one hand, it allows you to search the weak and strong points.

On the other hand it subsequently allows to guide the search for a solution, trying to improve the weak points without degrading the strengths [4].

This analysis allows for the evaluation of the relevant characteristics chosen:

- *Maintenance Access*: Must evaluate the ease of access of the maintenance team to areas different machines without interfering with the production,
- *Raw material storage areas*: The implantation must take into consideration the location of the storage areas of raw materials, and the fact that they are close to the workstations,
- *Flow clear*: Must characterize the movement of physical flows, in order to facilitate their identifications and their monitoring in case of non-compliance
- *Flow short*: Must characterize the length of physical flows, this is in relationship with the location of the work stations,
- *Traffic forklift truck*: Must characterize the ease of movement in order to access all the workstations,
- *Areas The outstanding stock*: Must characterize the quantity of stocks.

We have assigned to each characteristic a note. The note varies between (+5: very positive) and (-5: very negative). The weight of each characteristic is according to its importance. The weight which varies between 0 and 3 designate the importance of each characteristic.

V. ANALYSIS OF STRENGTHS AND WEAKNESSES

The results of analysis of the strengths & weaknesses (table 5), were given a value of 7, this implies that we must seek a new proposal to optimize our stream and to find a better value for the location we are going to propose.

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TABLE V. ANALYSIS OF THE STRENGTHS AND WEAKNESSES OF THE CURRENT GEOGRAPHICAL 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	**-3**
Movement forklift truck											2	**4**
Movement of operators											1	**2**
The outstanding											3	**-9**
Space Management											2	**-4**

In order to make the traffic of products in the workshop more fluid and to obtain a flow organization, following the physical flows, internal operations must be sequenced with a minimum of handling and waiting (storage of stocks). The study will therefore be representative for the tapestry workshop, it will then be generalized to all the other workshops.

VI. CONCLUSION

A mapping of physical flows theoretical of the current geographical location of workstations and machines is carried out. The graph of movement is established following the specified characteristics (Maintenance Access, storage areas, Materials First, clear stream, Stream short, Movement forklift truck, areas of outstanding amounts.

The non-optimization of the implantation is justified by the chosen criteria (Complexity of physical flows, Quantification of Traffic, Analysis forces & weaknesses)

According to the analysis of the current geographical location of workstations, dealt with in the analysis phase of the root causes, we have found that the workshop of tapestry is the only workshop that has a complex and non-optimized stream.

REFERENCES

1. P. Bédry, " Les Basiques du Lean Manufacturing, dans les PMI et ateliers technologiques", Paris, Editions d'Organisation, 2009.
2. N.S. Burume, "Etude de faisabilité d'un projet d'implantation d'une unité de production de sachets plastiques à Bukavu". Mémoire inédit, Faculté d'économie, UCB/ Bukavu, 2003.
3. A. Courtois, M. Pillet, C.M. Bonnefous, "Gestion de production les fondamentaux et les bonnes pratiques". 4ème édition, Edition d'Organisation, 2003.
4. K. Ishikawa, J.M. Douchy, "La gestion de la qualité : Outils et applications pratiques", 2006.