



THE SCOPE AND EXTENT OF EXTRA WORK CAUSED BY MANAGEMENT AND WORKERS' ISSUES IN THE TURKISH FURNITURE INDUSTRY

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ABSTRACT

Within all production systems that produce goods or services, the use of research aims to increase efficiency. In business, it is of great importance to identify in advance how to reduce costs in order to increase productivity and shorten production time. Work Study aims to solve this problem by calculating a standard production time and increasing the effectiveness of current methods.

The purpose of this research is to try and determine factors that reduce efficiency due to issues of management, production processes, supervision of workers and aspects of the products themselves, thus helping enterprises take necessary measures in light of these factors. Important decisions made by enterprises in this context will be reflected in their production policies, and there should be an increase in the efficient troubleshooting of any production problems, an increased production volume, an increased production flow rate. This should enable enterprises to make great leaps forward in how they manage each factor involved.

For the purpose of this research, times of non-productivity, due to business management and/or issues affecting workers, were investigated in medium and large scale furniture businesses in the Inegöl district of Bursa. The aim was to help these businesses increase their efficiency. Results obtained were analyzed using pareto charts and cause-effect diagrams, both of which are simple, yet effective techniques for diagnosing and analyzing problems.

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1. INTRODUCTION

The furniture industry sector, its resources, and the labor intensity of this sector all play an important role in developing countries. This sector is a basic industry sector in many developed countries, with an added value of 2-4% of all production carried out [1]. In Turkey the furniture sector has the strategic importance contributing added value to the the national economy, and being one of the fastest growing sectors with high potential for employment [2].

The furniture industry in our country has grown especially quickly in the last 15-20 years, with an increasing number of medium and large-sized businesses. Turkey has one of the oldest and most thriving furniture industries. In recent years the sector has established world-class production facilities. Dealerships located throughout the country sell the products, and the international market has also been reached. The sector is developing and increasing the diversity of products every year. The furniture sector is the country's leading exporter in terms of value added. This sector's contribution to the economy continues to increase as it utilizes the maximum amount of local resources for export while being the least dependent on imported products. The total number of retail stores in the furniture industry is 61,728, while the total number of employees is estimated to be around 258,213. Most furniture businesses are small and medium sized enterprises. Given the difficulties and tribulations faced by a typical SME around the world, it is important to try and promote cooperation between and thereby strengthen small firms in order to open up markets. Understanding the sector and the importance of its strategic position, as well as of export promotion activities abroad are all factors in driving growth in the international furniture market [3]. The furniture industry provides final products which are used in many areas – at home, in the office, in vehicles, in gardens – as well as intermediate goods, and it thus has an important role in the economy. The industry now utilizes imitation wood products, made of metal and plastic where required, in stretchable, sensitive areas instead of simple wooden furniture and has thus widened its usage. Moreover, the furniture industry interacts with other sectors such as construction, shipbuilding, metal production, plastic manufacturing and glass industries. It also supports twenty different sub-sectors [3].

An adverse effect on the output of the furniture industry is often the unavailability of the means of production. Issues related to the production of furniture industry in Turkey include: both qualitatively and quantitatively insufficient raw materials; a lack of skilled and stable labor; a lack of access to technological innovations; unplanned and unscheduled production. A number of problems regarding production inefficiency are result of certain characteristics specific to this industry. These include: a lack of qualified technical personnel, the absence of a rational transport and cost management system, poor planning, poor ergonomic measures etc. [4].

Further difficulties can be added to the above problems. Here, though, it is important to seek out the solutions that can be developed and implemented for these problems. In business, the early detection and reduction of costs and the increase of productivity are of great importance in terms of production time. Given our competitive era, businesses are required to maintain a certain level of production and to use resources both rationally and as economically as possible. No matter what field, the main aim is to achieve maximum efficiency using the available resources in the best way. If resources are limited, the importance of this aim increases. For this reason, it is advisable to use

techniques that are able to give an idea of which resources will be used in advance, to reduce possible problems coming from a loss of resources [5].

2. MATERIALS AND METHOD

2.1. Materials

Most enterprises in the Turkish furniture industry, are traditional small-scale workshop-type businesses. However, in recent years, the number of medium and large-sized enterprises has started to increase rapidly. According to the provisional results of State Institute of Statistics 2012 'Census of Industry and Business Establishments', the number of businesses operating in the furniture industry in Turkey is 29,346. The number of people employed in this area, according to the same census, is 158,213. On the other hand, the total employment in the sector, considering the high number of uninsured employees, is likely to be a lot more than this figure. The number of firms engaged in the manufacturing sector is increasing day by day.

The Turkish furniture industry is concentrated around certain areas from which forest products are collected. The most important areas of furniture manufacturing with total employment in Istanbul, Ankara, Bursa, Kayseri, Izmir and Adana respectively are listed in the table according to their share of the market.

2.2. Method

Cause-and-effect diagrams and Pareto analysis were used in this research. Pareto analysis is a histogram created by sequencing/sorting reasons for a certain problem by severity. It is a technique developed by Italian economist Vilfredo Pareto. In Pareto analysis, the relevant items are identified, measured within a general scale and then sorted in descending order via cumulative distribution. Generally, 20% of sorted items represent 80% of total activity. Thus, this technique is sometimes referred to as the 80-20 rule. By using this technique, quality assurance staff are able to focus their efforts more, and in a more efficient manner. As an example, if 80% of error variation cause 20% of waste and vice versa, it surely makes more sense to try and prevent the lesser percentage of error variation (20%) which cause 80% of waste [6]. The Pareto chart/diagram is referred by quality assurance groups in order to direct the efforts to the most productive areas and to make the right decisions [7].

Ishikawa developed his cause-and-effect diagrams in the early 1950s. They are also referred to as fishbone diagrams because of how they look. This method consists of factors originating from an undesired event or occurrence and factors which are identified later on. It introduces a systematic approach to investigate the causes of the event of interest. The main causes of this event are divided into five or six sub-categories and each of these categories is also divided into sub-causes. The process continues until the whole list of reasons is made clear. After editing the chart/diagram, the work of trying to control the process and mitigating the effect of the error starts. Focusing on all causes at the same time would be very costly and it would be difficult to identify and isolate the specific cause that would help to fix the problem (and to identify to what extent this cause would help in fixing the problem as well) [6]. The diagram is an effective tool in terms of explaining which specific causes lead which results to occur [8].

3. RESULTS

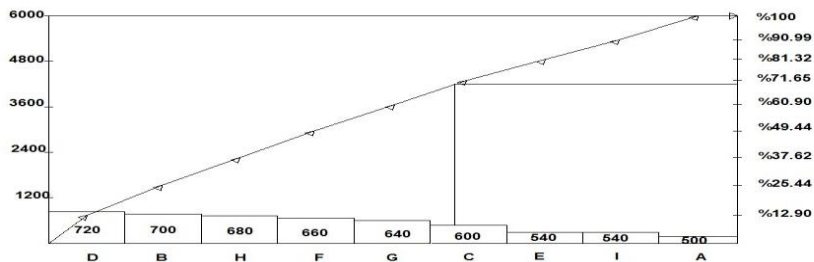
9 questions regarding additional work needs caused by management issues were asked to furniture companies. The Pareto analysis which shows answers to these questions and other related data is shown in Table 1.

Table-1. Pareto Analysis Data Regarding Additional Work Caused by Management Issues.

Code	Queried Factors	Score	Percent	Cumulative (percent) %
D	Work flow problems	720	12.90	12.90
B	Affected by the availability of crop production because of the times	700	12.54	25.44
H	Lack of protective measures for workers	680	12.18	37.62
F	Time required for machine repairs	660	11.82	49.44
G	Low quality material	640	11.46	60.90
C	Marketing according to customer’s requirements	600	10.75	71.65
E	Raw materials cannot be obtained in time	540	9.67	81.32
I	Employees working in poor workshop conditions	540	9.67	90.99
A	Marketing policies which affect the production of a variety of products	500	8.96	100.00
Total		5580	100.00	-

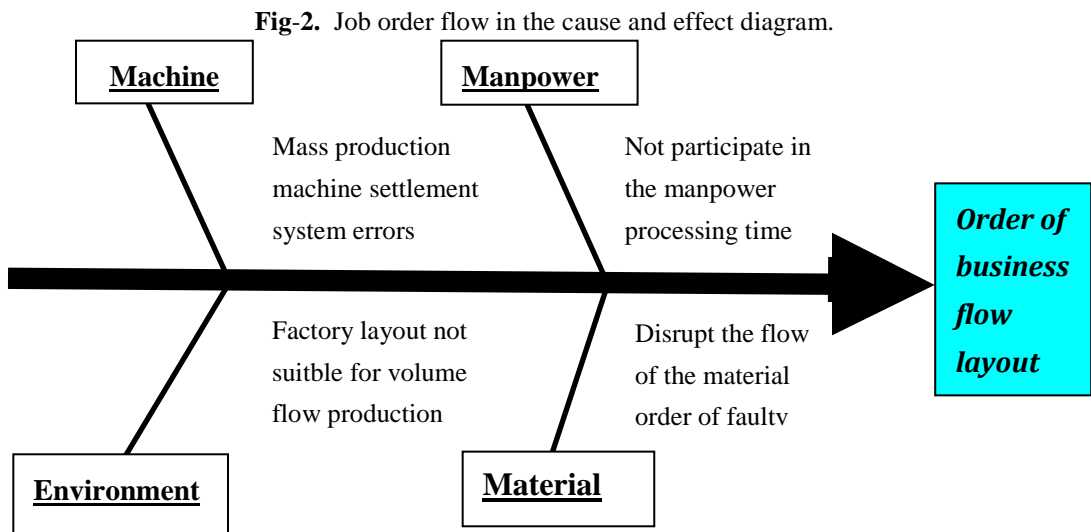
The Pareto diagram is drawn in the light of this information. Pareto diagram formed by these values is shown in Figure 1 below.

Fig-1. Scope management Pareto diagram caused by the additional



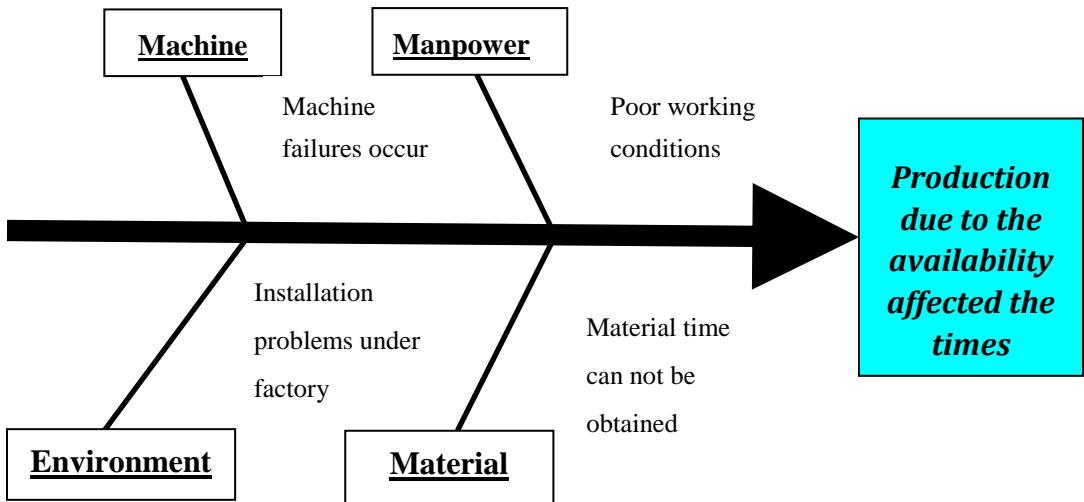
- A- Does the marketing policy affect production of a wide variety of products?
- B- Is production affected due to availability at certain times?
- C- Is production affected by the customer’s marketing requirements?
- D- Is the flow of the production process affected by the work queue?
- E- Does downtime, due to the lack of raw materials and workers, have any influence on production?
- F- Does the time required to repair machines affect the production?
- G- Is the quality of the product affected?
- H- Do workshop conditions affect production?
- I- Do worker protection measures have any influence on the flow of production?

Pareto analysis shows that 70% of total dissatisfaction is caused by “Work queue affecting process flow” (represented by letter D), “Non-productive time affecting product manufacturing” (represented by letter B), “Lack of ideal workshop conditions affecting production” (represented by letter H), “Time required to repair equipment affecting production” (represented by letter F) and “Poor quality of materials” (represented by letter G). This shows the need to investigate these five factors. Pareto analysis also shows that the “Impact of customer requests on marketing policy” (represented by letter C) is within the 70%. However, since this is rarely observed, researchers saw no need for this issue to be included in this research. Company representatives were interviewed again, this time regarding most common factors for dissatisfaction (represented by letters D, B, H, F and G). Company representatives were asked about the sub-levels of these factors in which they encounter the said problems. There may be several reasons causing D-, B-, H-, F- and G-coded factors that lead to most dissatisfaction. This research utilizes a cause-and-effect analysis (fishbone diagram) in order to determine these possible reasons. The cause-and-effect analysis regarding “Work queue affecting process flow”, the biggest factor that causes the highest level of dissatisfaction is shown in Figure 2.



Work under the scope of the above analysis, order management, order additional work on the cause-and-effect diagram examined the issue of flow. Cause and effect diagram was drawn to this problem were uncovered, and the possible causes. These reasons formed a team and brainstorm method while showing the reasons given in the decision. After sequence analysis of the issue of job order flow again gathered a team to find the root cause of the problem in the exchange of ideas. In determining the most basic reasons, which may affect the flow of the layout, and is considered the most notable reasons. Company officials accordance with the opinion given in terms of the most noticeable factor is the cause of mass production system of the machine the machine is concluded, a consensus regarding the settlement could be effected without errors. Pareto analysis of the management of crop production from the second to be affected due to the dissatisfaction of the idle times of the cause and effect diagram is given in Figure 3.

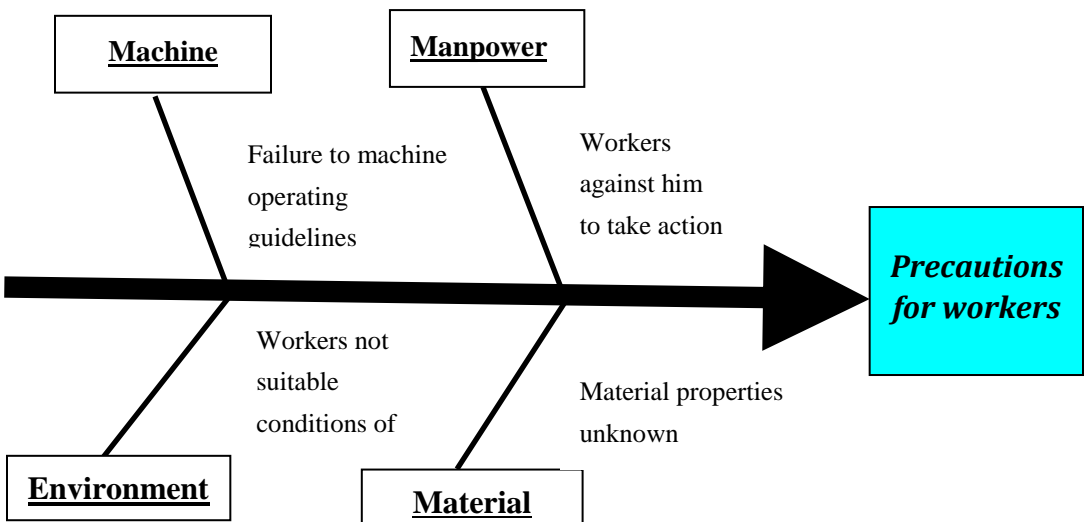
Fig-3. Influences on the availability of crop production during night times because of cause and effect diagram.



Availability under the scope of additional work on the above analysis, the management of the main reasons for the determination of the times, and the most notable causes that may affect the production of the product are taken into consideration. Company officials accordance with the opinion of the most noticeable impact on the failure reason can supply materials regarding the time factor to consider in terms of material, a consensus was concluded.

Not provided for worker protection measures should be examined in the third dissatisfaction cause and effect diagram is given in figure 4.

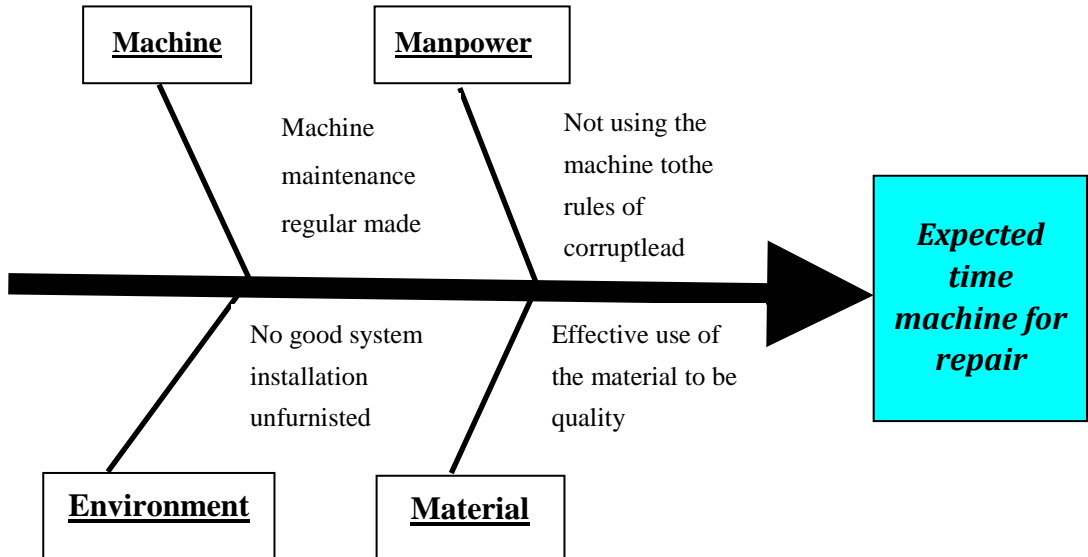
Fig-4. Providing the protective measures for the employee on the cause and effect diagram.



According to Figure 4, the main factors in determining the most noticeable and causes that may affect the safety precautions taken into consideration. Company officials accordance with the opinion given in terms of the most noticeable factor is the cause of labor protections for worker self-respect, a consensus could be effected concluded omission.

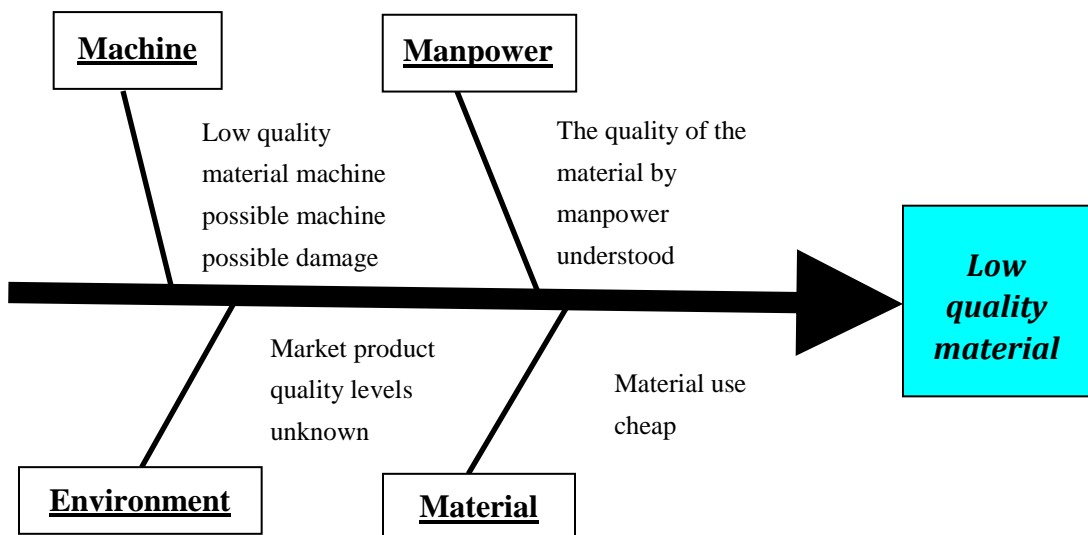
The expected time to be examined in the fourth dissatisfaction with the cause-effect diagram for machinery repair given in Figure 5.

Fig-5. Expected time to repair the machine on the cause and effect diagram.



According to Figure 5, and the most notable causes that may affect the flow of the business are taken into consideration. Company in accordance with the opinions of the authorities in terms of the most noticeable factor in the cause of labor machine machinery operating under the periodic maintenance of the factory for not considering the effect was concluded, a consensus could respect. Dissatisfaction with the quality of the material that should be examined in the cause-and-effect diagram in Figure 6 are low.

Fig- 6. Cause and effect diagram in low quality material.



According to Figure 6 may affect the quality of the material is low, and is considered the most notable reasons. Company officials accordance with the opinion given in terms of environmental factors cause the most noticeable impact on the market, product quality levels are not known, a consensus could regard concluded. The scope of the additional work under the supervision of the working section of the six questions were asked to the company officials.

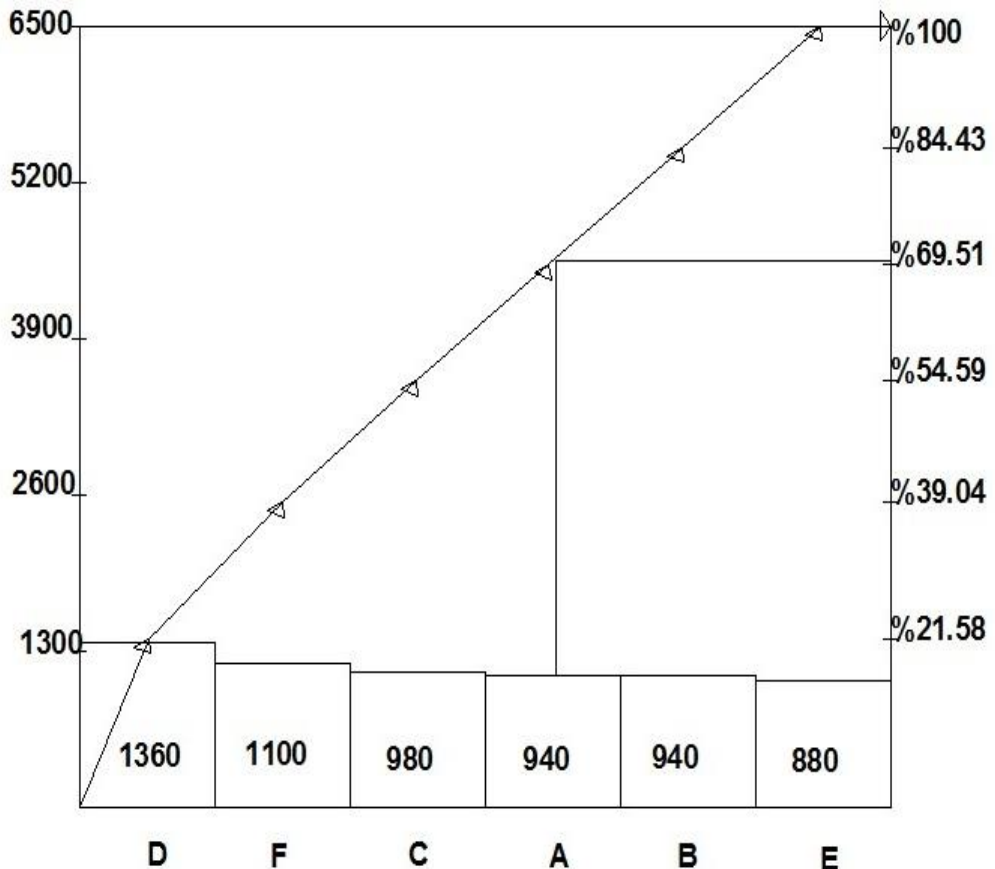
Pareto analysis of these codes and other data for the data shown in the data in Table 2 collectively.

Table-2. Pareto Analysis of additional data under the control of workers scope of work

Code	Queried factors	Score	Percentage	Cumulative %
D	The workers do not follow safety rules	1360	21.58	21.58
F	Workers to adapt to new technology and the new processes to machines	1100	17.46	39.04
C	Careless operation of worker	980	15.55	54.59
A	The workers arrive late to work	940	14.92	69.51
B	Unaware of the work of the workers breaks	940	14.92	84.43
E	Business slowing down	880	13.96	100.00
Total		6300	100.00	-

This Pareto diagram of values as in Figure 7.

Fig-7. Pareto diagram of the worker under the supervision of additional scope of work



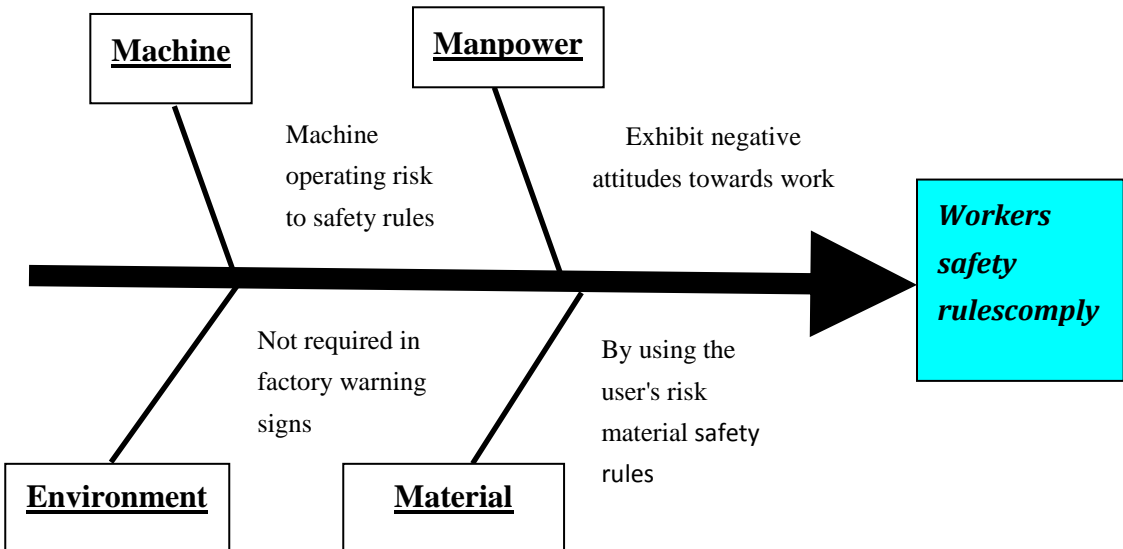
- A- Did you arrive late to work of workers leads to the loss of production time?
- B- Search leads to the loss of production time to give the workers been unaware of the work?
- C- Does the worker's careless operation leads to a loss of time?
- D- Did you always leads to the loss of the workers do not follow safety rules?
- E- Does your business has led to a loss of time slowing down?
- F- Processes to adapt to the new technology and the time leads to the loss of the workers found new machines?

According to Figure 7, 70% of dissatisfactions D, F and C are expressed in codes of workers to comply with safety rules, the new machines to adapt to new technology and the workers on work processes and dissatisfaction caused by careless workers have been identified as a priority, and the review process of these three items should commence emerged.

Pareto analysis is also encoded with A 70% slice of the workers is also seen to come to work late. However, this study is due to be present at the examination of this issue is rarely needed.

Company officials with the highest dissatisfaction, D, F, and C-coded again by interviewing clients to factors, these factors were asked what stages of their problem. Causing the most dissatisfaction D, F, and C factors can be many reasons. Cause-and-Effect Analysis of the possible reasons for this is to learn (fishbone diagram) have been used (Figure 8-9-10).

Fig-8. Security does not comply with the rules of the workers in the cause and effect diagram



Referring to Figure 8, and the most notable causes that may affect the production of the product are taken into consideration. Company officials accordance with the opinion given in terms of the most noticeable factor is the cause of labor to hire workers and to comply with the safety regulations regarding negative attitudes can influence the attitudes and concluded a consensus.

According to Figure 9, and the most notable causes that may affect the safety precautions taken into consideration. Company officials accordance with the opinion given in terms of the most

noticeable factor is the cause of labor workers to technological developments, a consensus regarding the old methods have an impact on the work is concluded.

Fig-9. Influences on the availability of crop production during night times because of cause and effect diagram

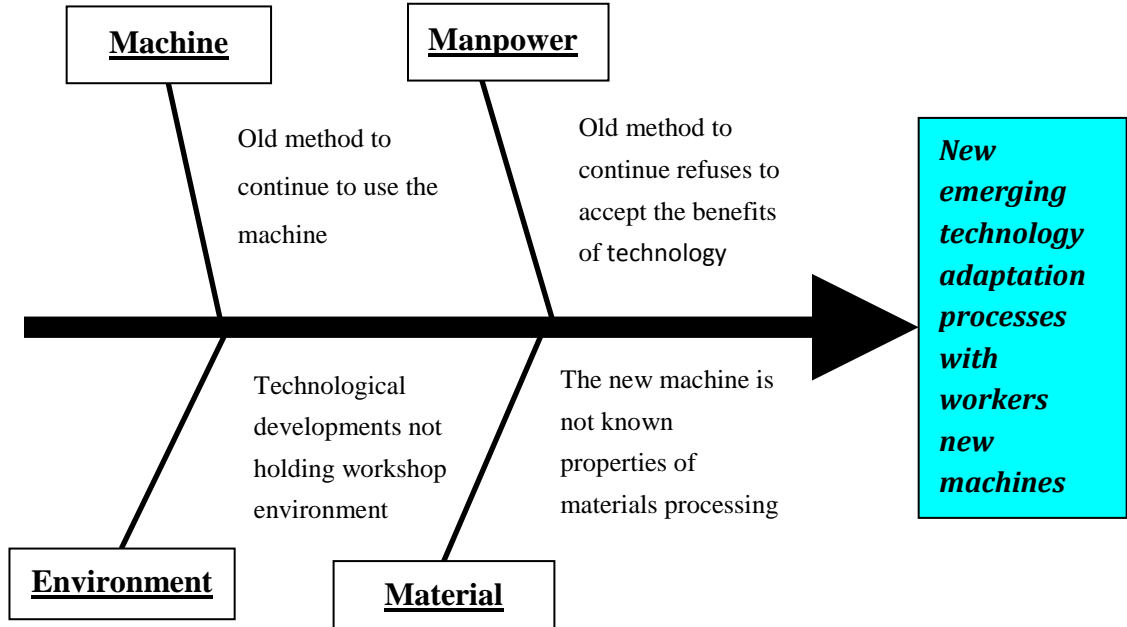
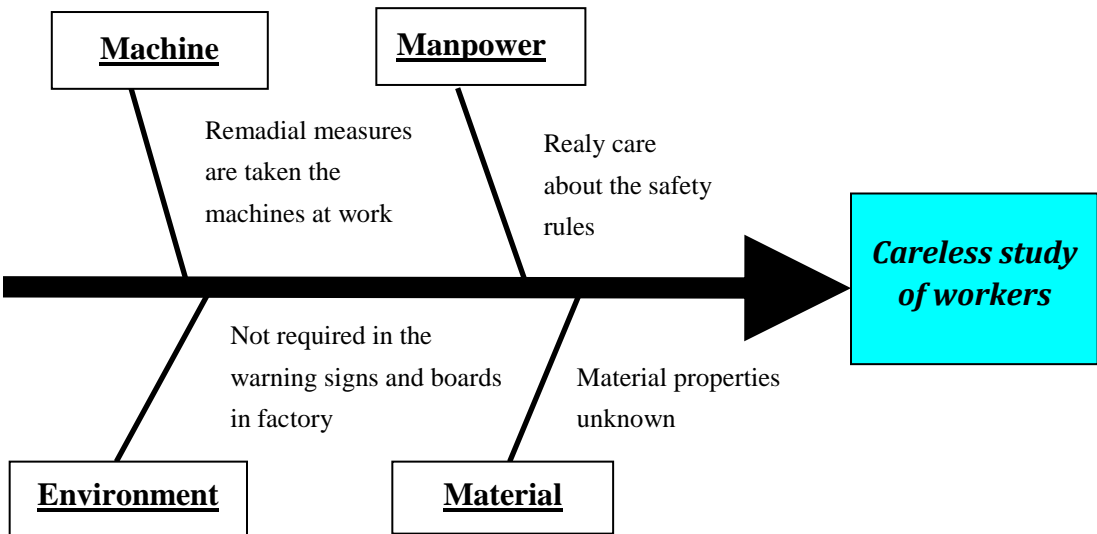


Fig-10. Regardless of the workers on the work of Cause and Effect Diagram



Judging from the perspective of Figure 10, which may affect the safety precautions and the most noticeable reasons taken into consideration. Company officials accordance with the opinion given in terms of the most noticeable factor is the cause of labor workers ignoring safety rules when working a consensus regarding work and concluded that it could impact accidents.

4. CONCLUSION

This waste of time in order to determine the scope of work consists of two main headings, business management and workers have lost time according to the survey conducted for the following results were obtained.

The scope of business management as a result of additional work, the problems caused by the first workflow. Here are factors that cause the workflow made to your machine due to the settlement is a result of errors, and periodic maintenance of the machines. Second, the production of the product is affected due to the time that has passed is empty. The biggest reason that either the failure of timely delivery of material. Company officials could be effected according to the comments regarding the employee does not receive self-directed measures, a consensus was concluded. Fourth, the quality of the materials used in production is because insufficient. The reason for this is not known and the quality level of products on the market is the result of the wrong material choices affect production efficiency.

The first of the problems arising from the scope of the additional work worker workers against work to comply with safety rules and determined that the negative attitudes and attitude. Secondly, the use of technological advances to be effective against the workers concluded that the old working methods. Third of workers without paying attention to work safety rules that work and it was concluded that either cause accidents. This has been a factor in reducing the efficiency of your business.

5. RECOMMENDATIONS

Pareto analysis through expert assistance within the scope of applications of these results on the basis of enterprises in terms of their enterprises, both in production and management measures it will take in terms of factors of production as well as increase the efficiency of the resulting entity will minimize lost time factors. Providing is accurate and that the operation of the process, such as the process used by the workers, and therefore reverse convertible in order to prevent loss of material would lead either to the defective education of the business, providing better packaging of the product to avoid damage to the customer by providing and can move through the material in raising these two cases. Business management, marketing and customer should know their own needs, and it must make sure that the product request. The first two market research and consumer research. The quality level of the product is detected, this conclusion can be made for technical reasons, you need to do research for the product. This is the person who does know the level of quality and quality standards need to change in order to achieve greater efficiency in the product development department should inform all. Production of inhibitory factors before you in order to eliminate unnecessary work and the necessary precautions are taken, these efforts can be directed to reduce the scope of the business.

Placement of factories in different parts of the layout of the furniture industry and adjusting the working methods of the workers play an important role in reducing the scope of work in the same way.

Rectify their design and branding, training of qualified personnel needed by the sector, a variety of small businesses in weak competitive incentives to businesses that can be converted into

a large and professional production. Imperfect competition that leads to the prevention of informal trade, warranty and service, together with the resolution of problems such as widespread industry is considered to be a major force in the international markets where the geopolitical situation.

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