

Positive impacts of having good maintenance management in the manufacturing industry

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Abstract

Many companies, especially family-owned businesses, do not offer the proper maintenance for their machinery. Such sloppiness in any company is responsible for more expenditure on operations as well as a decrease in production capacity, which puts them at risk of not meeting the demands of the market; it also disturbs the quality of the products. This project consisted on the analysis from a management perspective of a company that did not have any type of maintenance program or a hierarchical order that worked directly with the employees in charge of maintenance. Focused in the hierarchical structure of the company, and with the implementations of various tools of Industrial Engineering, the maintenance management system was implemented, which lead to the company increasing their sales in 11%.

Introduction

The author of this poster was contracted by a company that manufactures aluminum products such as doors, security windows, Miami windows, among others, in order to find the reason for the poor performance in several lines of business through the company due to high cost of production were profits had been drastically reduced in recent months. This was attributed by the board of trustees due to a significant increase in the labor force, and to a lack of supervision, where employees were not giving their maximum effort and were not producing the amount required by management. Within the period of research of the business, the author determined that the company lacked a system of maintenance.

There was not a hierarchical order in the factory. Employees received instructions from the different levels of management. The mechanics received different and sometimes conflicting instructions from different entities, such as the board of trustee, (which is composed of 5 members and a controller), the Manager of the company and the production floor supervisor. This was causing mechanics to leave jobs inconclusive to go and solve another problem as requested by any of the superiors. This can cause a mess in the production floor because the mechanic will leave a broken machine unfixed, delaying the production, affecting the quality of the product due to the use of a broken machine that is not performing as supposed.

Background

As a general culture of an Industrial Engineer, the preventive maintenance increases production and operation capacity. Having a preventive maintenance program will provide an advantage between competitors, improving the quality of the products and lowering cost of production. A planned maintenance strategy is critical to reducing failure and downtime, extend the useful life of production machinery, meeting industry safety, ensuring business continuity and availability in order to maximize productivity and profitability.

Poor maintenance practices will have a negative effect on profit and associated costs. These costs can include, loss or output, idle workers, schedule disruptions, injuries, damage to other equipment, products or facilities, and repairs which may involve maintaining inventories of spares parts, repairing tools equipment and repair specialists.

Problem

There was a lack of a maintenance program and it was difficult to ignore the state of the machines that were used in the production area. Also, the lack of mechanics in the company was evident, because they were solving some other issue outside the plant. Sometimes the mechanics were repairing a machine and another problem arise and they had to leave the machine they were fixing unattended to solve the other issue that somebody in the top management wanted fixed in the minimum time possible. Also, the mechanics and operators lacked tools. They had to make homemade tools so they could perform the job of assembling the products due to poor maintenance of the equipment.

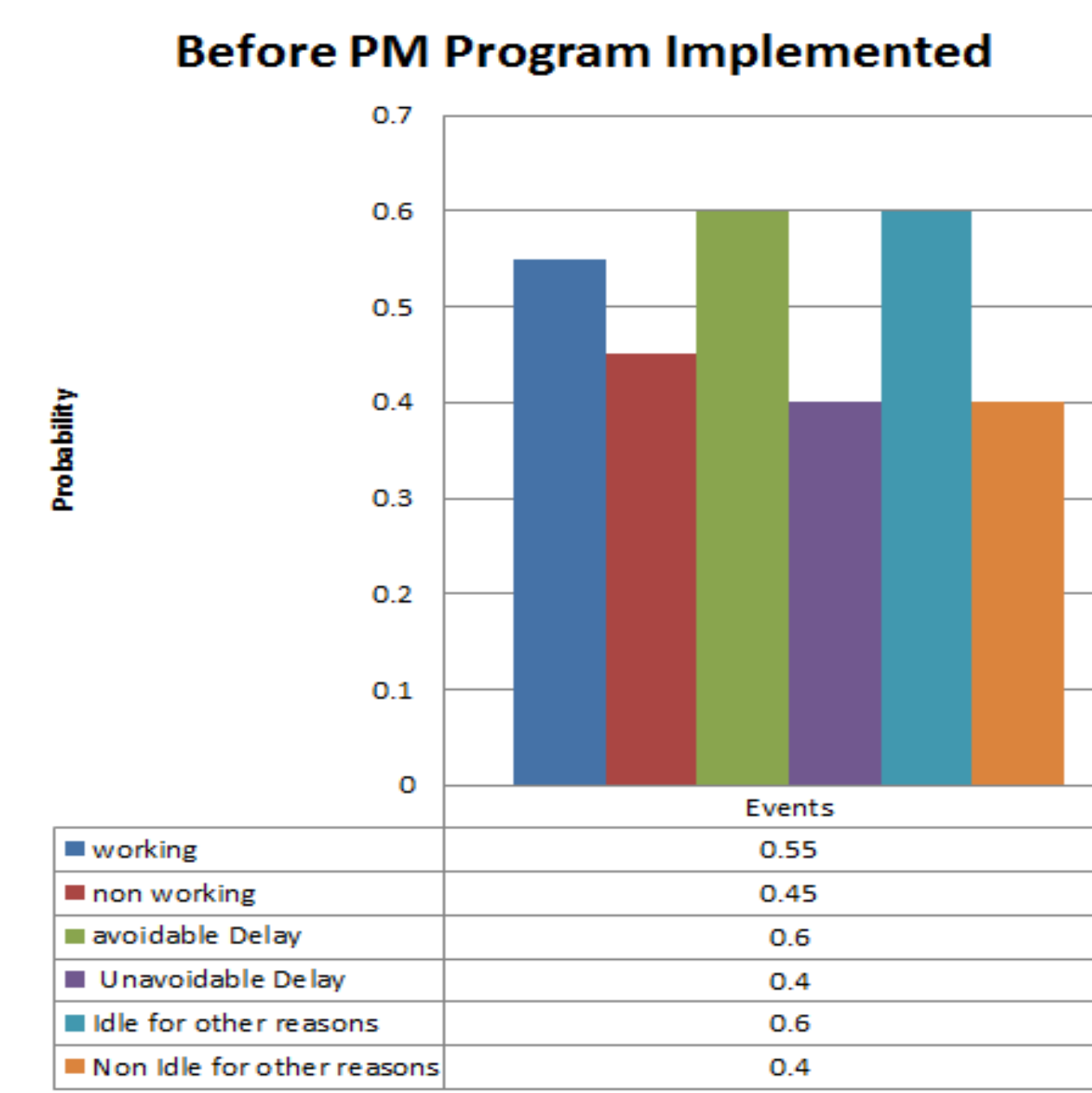
In addition none of the managers of the 3 levels of management were following a hierarchical order. The mechanics were receiving instructions from the different management levels. Bellow is illustrated how the structural hierarchy on the company was.



Methodology

A sampling was used focused on knowing if the machines were operating, were detained waiting for material processing, detained for lack of maintenance, or damaged, or if it was stopped due to a changeover. It was conducted for 20 days of production, with random visits to the different areas of production.

Work Sampling Sheet						
Maintenance Area: _____						
Date:	7:00:00 AM		11:00:00 AM		3:30:00 PM	
Observations	Hours	Working	Unavoidable Delay	Idle for other Reasons	Notes	Number of attempts
1	7:32:24 AM					
2	8:03:46 AM					
3	8:22:20 AM					
4	8:37:13 AM					
5	8:52:28 AM					
6	8:55:50 AM					
7	9:36:28 AM					
8	9:43:32 AM					
9	10:03:54 AM					
10	10:50:27 AM					
11	10:55:15 AM					
12	11:39:32 AM					
13	12:07:12 PM					
14	1:14:26 PM					
15	1:21:50 PM					
16	2:43:03 PM					
17	2:41:14 PM					
18	2:51:31 PM					
19	3:03:37 PM					
20	3:11:22 PM					
Number of success	0	0	0	0		

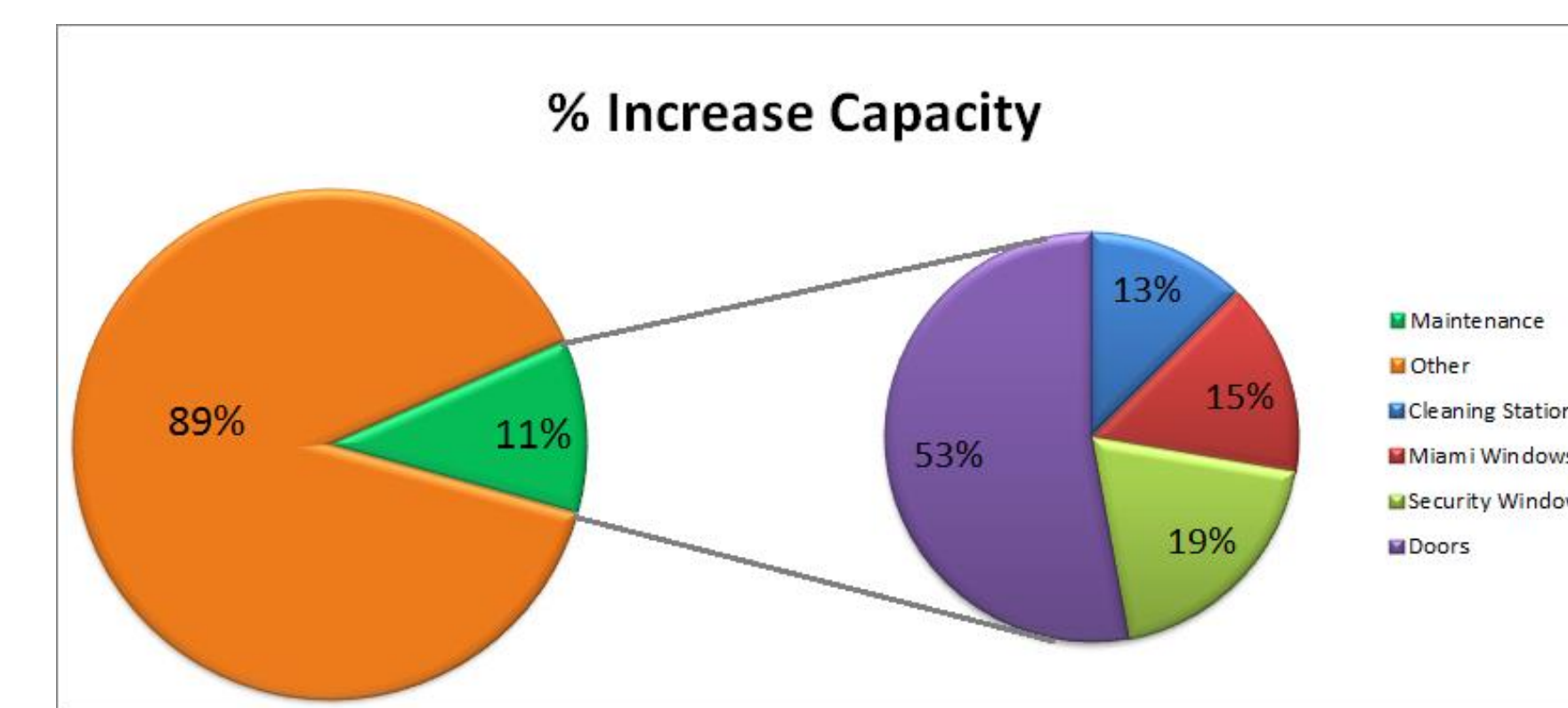


The management were instructed at all levels to follow a hierarchical order in order to improve processes in the company. This makes that all information arising on the high levels of management reaches the designated recipients using a correct and appropriate way without jumping hierarchical levels. To assure that these changes were implemented and followed, a controller was designated to be in charge of establishing the control of the board of trustees and impart the instructions to the second level management. Meanwhile, the second level management will impart instructions to third level management. These changes were seeking a reduction in production cost and an increase in production capacity within the company. Bellow is the proposed hierarchy for the company.

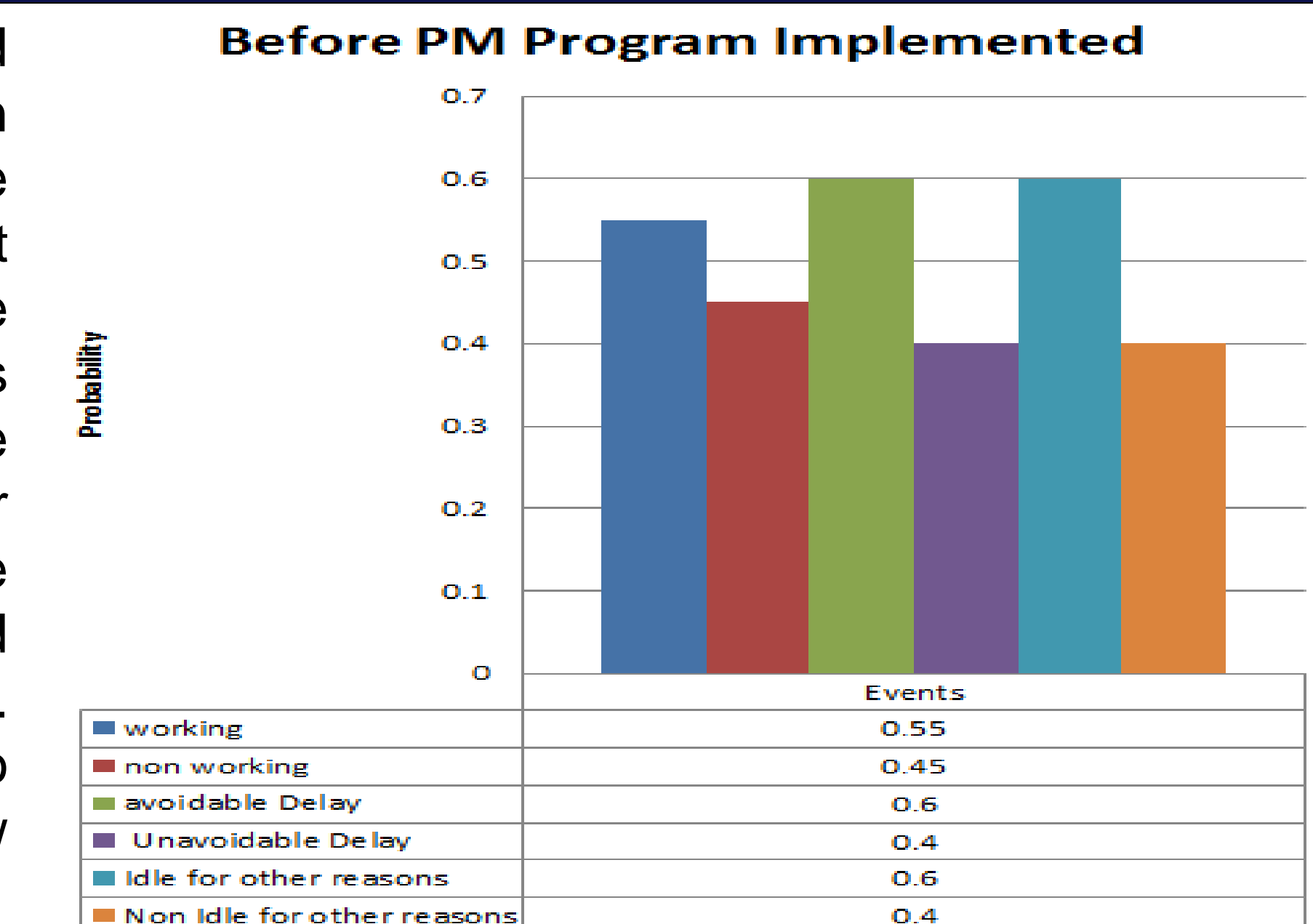


Results

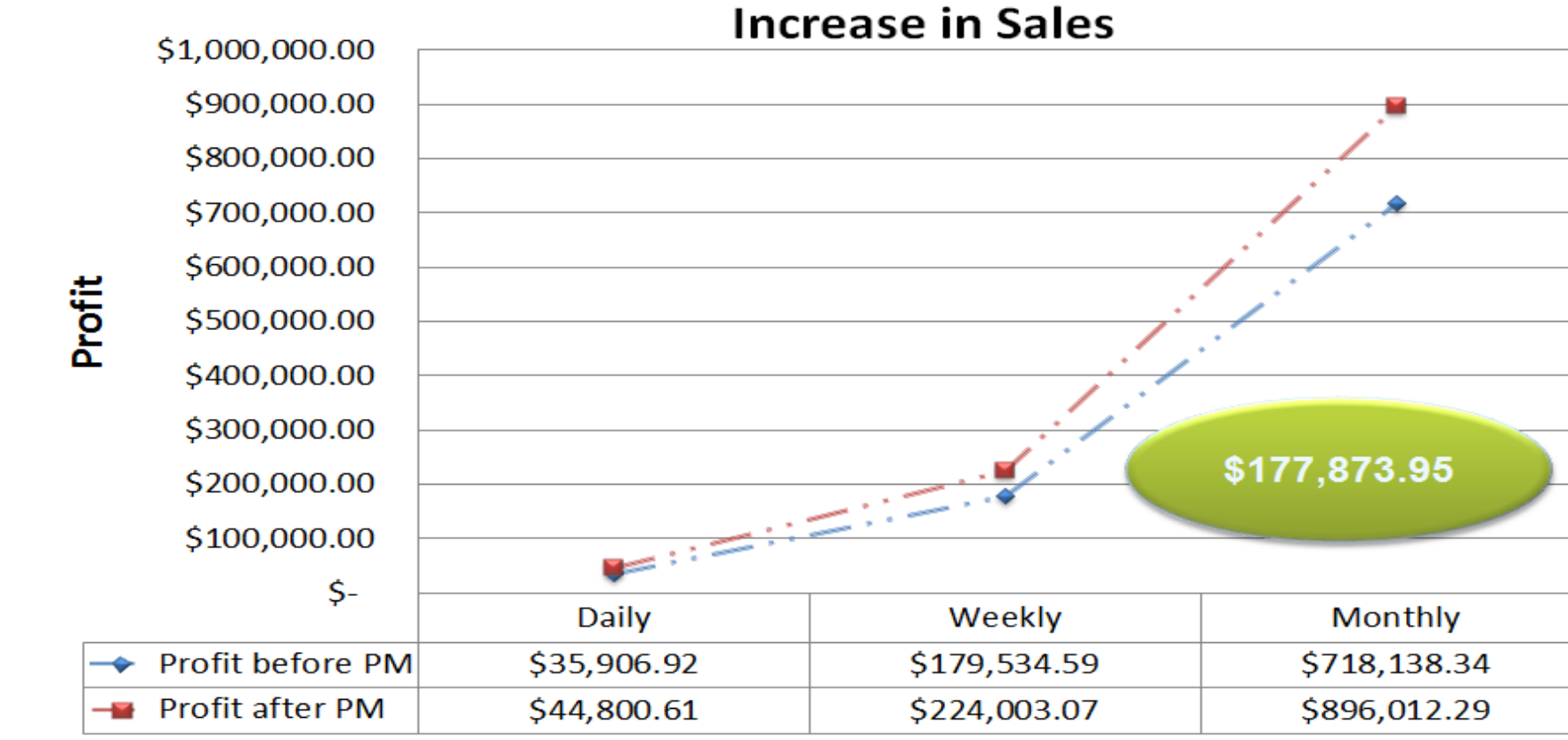
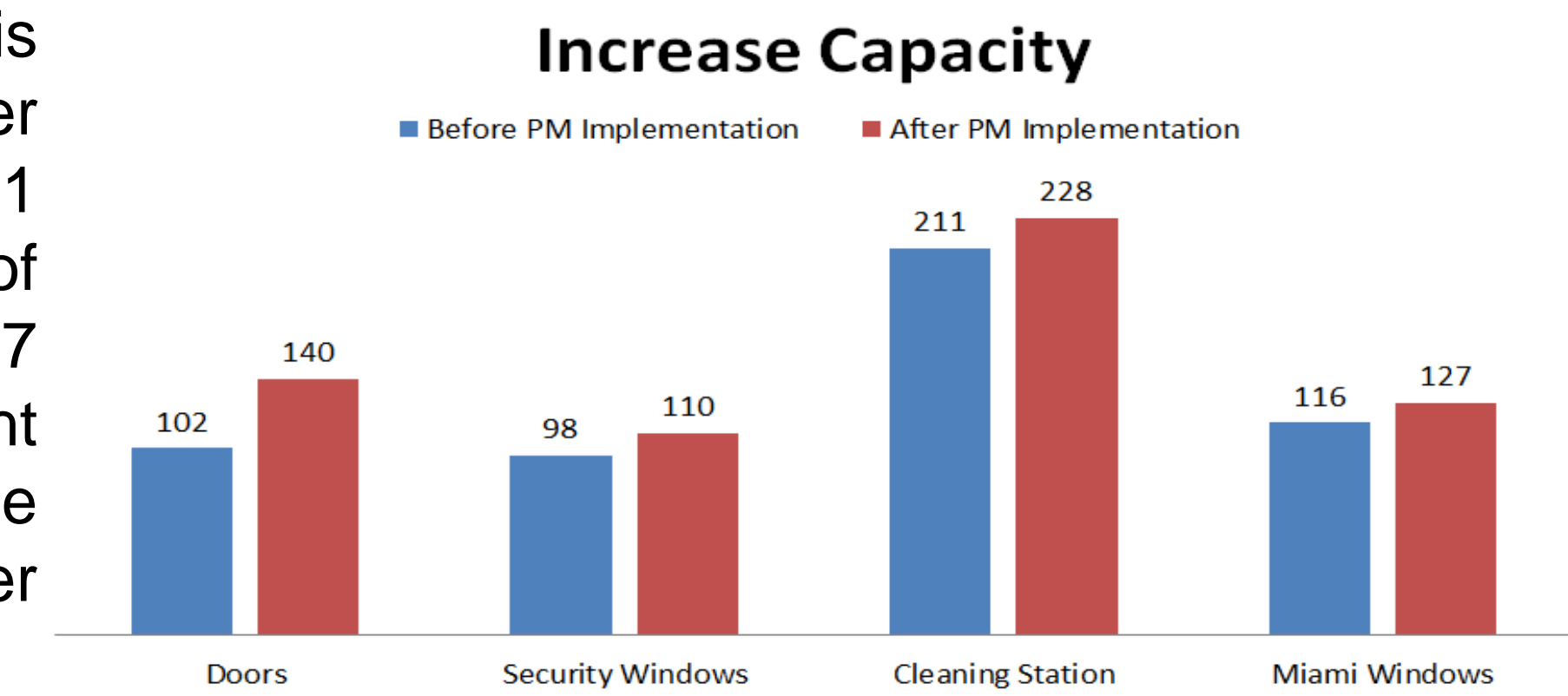
After making the changes, the information collected from the sampling, it was found that there was an increase in the time that the machines were operating. This time the machines were operating at 70% of the time. The 30% that the machines were not operating was composed of 40% cataloged as an avoidable delay. The other 60%, it might be due to the lack of an employee to operate machines for doing another task, or that the machines were stopped due to lack of materials. It should be noted that within this 60% there were unavoidable delays. The 40% of avoidable delays could be lowered to lower this 40%, tools like line balancing, product flow can be used.



This increase in capacity, in terms of production is reflected in an increase of 38 additional doors per day, 12 additional security windows more per day, 11 additional Miami windows per day, and in the area of quality and cleaning a capacity to work with 17 additional products per day. The chart to the right shows the capacity of the company before the changes (in blue), and the increased in capacity after the proposed changes, in red.



This increase in time of machines working produced an increase in capacity of production. The increase represents an 11% of increase in daily capacity throughout the company. This increase is broken down as follows: an increase of 53% in the area of doors, a 19% increase in security windows, a 15% increase in Miami windows and 13% in the area of cleaning and inspection of products. This can be seen in the pie chart to the left.



After all these implementations and changes in both the hierarchical structure and the implementation of a preventive maintenance program, the company had an 11% increase in sales which is an increase in sales of \$177,873.95. In the graph to the left the red line represents the sales after changes implemented and the blue line are the sales before the changes.

Conclusion

In any process where mechanical equipment is involved, there is a need for a good maintenance program both to increase its useful life, get better performance and not affecting the quality of the products. With this was shown that maintenance is important and it can be view as a cost saving method.

Having the proper hierarchy helps the information to flow more quickly and to reach the levels that the top management wanted to reach. A proper hierarchy leads to certain economics saving since all personnel can focus on a single aspect, the development of the business to another level.