Effective Work Order Requests And Scheduling Tool Design for Maintenance Jobs

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Abstract

A company located in Puerto Rico, which provides maintenance services and project management for various private properties, identified a problem of delays in maintenance work order response time and completion of requests. It was identified that a tool was needed for effectively planning work order requests and scheduling for maintenance jobs.
The Plan-Do-Check-Act cycle was used as a Lean methodology tool. In the Plan Phase the Simplex Process was used to identify the problem and present solutions where a Computerized Maintenance Management System was proposed as a possible solution and later was selected as it proved to be a low-cost solution for the high impact in maintenance output. It resulted in a reduction of 52% in work requests by having a system which ensured the best use of time and resources for the company to obtain the quality requested by those who request the work.

Problem

A company located in Puerto Rico provides maintenance services and project management for various properties. These properties require high maintenance of superior quality in materials and work, and in most cases, are time sensitive. Work requests and schedules are managed mostly by email, text messages, phone calls and word of mouth. This format creates a non-continuous and, in most cases, unmanageable work rhythm where miscommunication can delay effective job executions.

Project Description

The intention of this research is to identify what is the cause of the non-efficient workflow in the maintenance company. A solution is being sought that can reduce time, reduce work delay and increase quality. It is needed to make tasks more manageable and effective on a regular basis.

Project Objective

The goal is to create a solution for the maintenance company where job request and work scheduling can be managed in a more effective manner.

A study of the causes will help identify the proper process and tools needed to achieve the objective of reducing the amount of open work orders to 50% and complying with scheduled preventive maintenance to an average of 4 days for open requests.

Methodology

PDCA is a four-phase cycle tool for continually improving products, processes, services, and resolving problems. The cycle is performed by testing in a structured system possible solution, analyzing the results obtained, and implementing the ones that provide the best results .

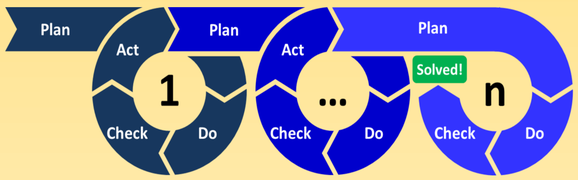

Figure 1
PDCA Cycle Model

Results and Discussion

Problem analysis and results using the Plan-Do-Check-Act lean problem-solving Cycle for the improvement of maintenance work order scheduling is presented.

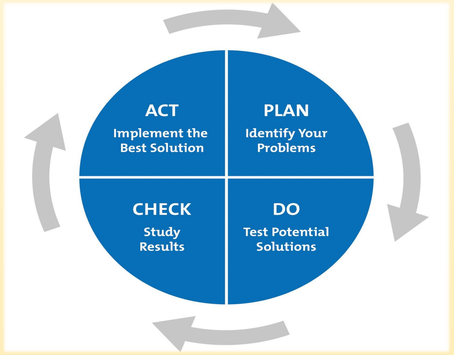

Figure 2
PDCA cycle

PLAN

The company's management noticed that work orders would take an extended amount of time to be completed and, in some instances, would not be performed. After analysis of the cause of delay in work order completion, miscommunication and the absence of an established work order and job scheduling tool accounted for the inconsistent performance.

A project to improve performance and reduce the amount of queued job requests was decided by management to be performed after completing a Simplex Process.

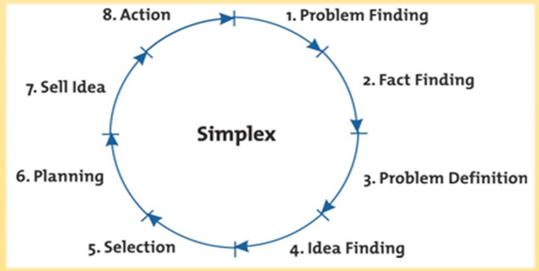

Figure 3
Simplex Cycle

Work requests were compiled into a single location with more than 100 work requests documented as open work requests with dates up to one year since being requested and still not completed.
With the specifications generated, a query was performed to evaluate what options were available in the market as off-the-shelf maintenance software that would meet the following requirements:

- Could place corrective work orders
- Could create preventive maintenance work orders
- The software should be capable of pushing notifications
- It should be able of allowing users to view historical data of work orders on demand
- Be able to sort data by location, work type, employee, date and priority
- Give users the ability to include pictures and notes when creating work requests
- Have multiple levels of users and security as administrators, workers and requesters
- Be accessible, remotely or on mobile devices, to not limit or require the addition of specialized hardware.

Preventive Maintenance Management System comparison

Scale used 0-5 to value requirement being met. I.e.: "0" does not meet requirement, "5" requirement met fully, "1 - 4" partially meets requirement.

Requirements	*Facilities Management Express*	*Maintenance Connection*	*UpKeep*
Have the ability to place corrective work orders	5	5	5
Have the ability to create preventive maintenance work orders	5	5	5
The software should be capable of pushing notifications	0	3	5
It should be able of allowing users to view historical data of work orders	3	3	4
Be able to sort data by location, work type, employee, date and priority	4	4	5
Give users the ability to include pictures and notes when creating work requests	2	2	3
Have multiple levels of users and security as; administrators, workers and requester	5	5	5
Be accessible remotely or on mobile devices to not limit or require the addition of specialized hardware	3	1	5
TOTAL	27	28	37

Figure 4
Preventive Maintenance Management System comparison chart

DO

After defining that the Preventive Maintenance Scheduling software would be obtained from UpKeep, being off-the-shelf software, it would need to be set up and have settings adjusted accordingly to the operations needed from this company. A trial period of one month would allow for the software to be tested and any concerns to be cleared before purchasing it, allowing its practicality to be measured.

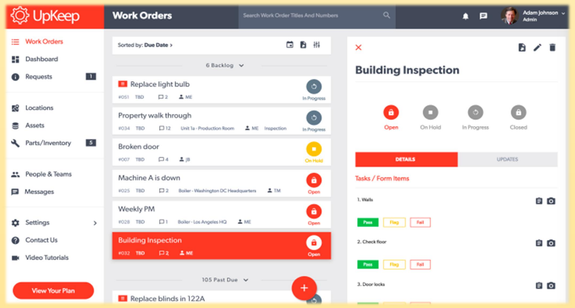

Figure 5
UpKeep Program Work Order Screen

An automated preventive maintenance schedule was developed with the historical data provided by supervisors and the manager. The data included items which would need regular preventative maintenance such as HVAC equipment, paint, cleaning and inspection.

CHECK

After performing tests on the software from UpKeep for maintenance management during the trial period of one month, it met the requirements that were being requested as the criteria. It also proved to be user friendly for people of different levels of technology expertise.

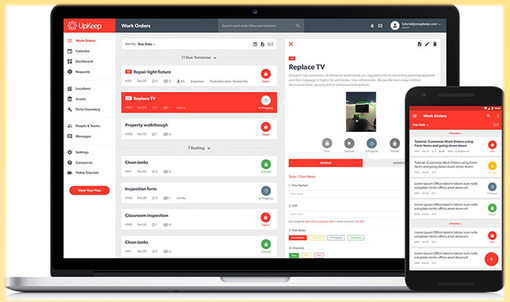

Figure 6
UpKeep Program Desktop and Mobile Application Work Order Screens

ACT

After a successful trial period of one month and a following two months of continuous testing and use, with the benefits obtained, UpKeep software has been decided to be the approved software to be officially used in the company by its personnel.

It met the required criteria and for the size of the company because the cost of under $350 dollars was well accepted by management, as it is considered a low investment for the productivity obtained, by reducing the amount of 113 work requests, many past due, to 54 open requests in the three months since the program testing begun. Follow up training was provided to the employees working directly with the program to further expand expertise on work order management.

Conclusions

The PDCA Cycle provides flexible problem-solving strategies which proved effective for this project. It is a tool that can and, in most cases, is unconsciously used in problem solving as it requires identifying the problem (Plan), having ideas of strategies to resolve the problem (Do), testing the best ideas and if it proves to be effective (Check), continue improving on the solution (Act) or otherwise returning to the planning phase.

With the use of this lean problem-solving cycle, the 113 corrective maintenance requests were reduced by 52% to 54 in three months. The advantage of having the software allowed team members to access and manage work orders in an organized manner, while providing updates almost instantly. The system kept other team members informed on the statuses, allowing for other tasks to be done simultaneously and effectively. With historical data being analyzed, it also allowed for predictive measures to be implemented and preventive maintenance to be modified to ensure proper maintenance and life longevity on equipment and hardware, which required to be increased or decreased according to each need.

With the implementation of the software, it has been considered a low-cost solution for the high impact it has produced. The adjusted maintenance schedules ensure the best use of time and resources for the company to obtain the quality requested by those who request the work.

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