

The Importance of Preventive and Corrective Maintenance in Works

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Abstract— *The present study addresses the problems brought by the lack of preventive and corrective maintenance. The purpose of this work is to focus on the importance of preventive and corrective maintenance, for the prevention and conservation of engineering works. This work will focus and indicate some guidelines and measures that must be taken to keep the engineering works in order and in a good state of repair. The importance of the implementation of preventive and corrective maintenance for engineering works will also be mentioned, as well as the importance of always having at disposal a specialized team to be always ready to attend such eventualities that may occur in the facilities of this type of service and what are the basic requirements for a good manutentor.*

Keywords— *Prevention and correction, importance of maintenance.*

I. INTRODUCTION

Preventive and corrective maintenance is something that is very important, because maintenance tends to minimize major repairs inside or outside engineering works that, when performed, tend to decrease the number of users in that environment, because they prefer to stay in a safe, quiet and comfortable place, which is not the case for an engineering project that is undergoing a major renovation, presenting risk and discomfort because of it. (COSTA, 2005).

Looking for quality in service delivery and with the intention of always keeping the clients happy with customer care, quality of the services provided, good accommodations and a physical space that provides security and convenience, and in this case, we must be always prepared for unforeseen events that may occur over time. The concern with quality is not recent, and the quality of the services rendered are fundamental for the performance and success of the venture (CASTELLI, 2001).

In the case of preventive maintenance, which is a type of maintenance and review where the components are

exchanged or remade before wearing down, through the schedule established with periods of exchange or repairs recommended by manufacturers of components and machines. It is also understood to be preventive, re-settling, lubrication, clearing, cleaning and undercutting, among others (GOMIDE, 2009).

Preventive maintenance is performed at predetermined time intervals or according to the prescribed criteria, designed to reduce the likelihood of failure or degradation in the operational lifespan of a given item. These maintenances are performed to maintain equipment and facilities under satisfactory operating conditions and to prevent adverse occurrences and helping to save resources, raise the standard of services provided to your employees and guests, and improve safety and convenience for all your users.

In the case of corrective maintenance, which generally occurs when the equipment is defective and cease to operate, and this may be harmful to the production for not being able to be programmed, and this occurs along with a cease in the production.

With a high flow of people transiting or even working in a building, logically there will be wearing and tearing of the premises of this environment, which in turn will be in need of repairs to prevent a simple problem from becoming a chaos for administrators and users of this project (CASTRO, 2007).

To avoid such embarrassment, it is necessary for the company to implement a system of preventive and corrective maintenance, to repair/correct the wearing process of its facilities, to maintain the environment in perfect conditions, and also leaving it with a safety aspect to be used by its users.

Currently, due to several factors, such as concern for the safety and comfort of the users of a facility, it is necessary to implement the system of preventive and corrective maintenance, to try to minimize the inconvenience caused by damaged installations over time and by the lack of maintenance that must be made/performed periodically through obligatory norms and

according to the required standards (PINTO AND XAVIER, 1998).

Therefore, the main goal of the present work was to suggest that, after the finished work constructions, a preventive and corrective maintenance program should be created, for the satisfaction of the users and an improvement in the facilities of the engineering work.

Having achieved successfully a good functionality of the facilities, convenience, security, obtaining a maximum productive capacity of the equipment and, consequently, a return of the investment made, always taking into account the guarantee of the quality of the service to be provided to the client (VILLANUEVA, 2015).

II. METODOLOGY

The methodology adopted in this article was to optimize the management of the activity exposed by the aforementioned theme, with the perspectives of obtaining information and to be able to perform this work, in which were used the following methodologies: a checklist where it was described the real conditions in which the facilities are found, in a detailed manner, and the need to replace and perform maintenance, such as electrical, hydraulic, painting, structural, roofing and parking. Shortly after this check-list is ready to be used, it is important to follow the steps described on its annexed schedule, for the proper maintenance to be performed (James Q. Wilson, and George Kelling, 1982).

With the definition and programming of the needed repairs, it is also necessary to mobilize a specialized team to execute the proper services with efficiency and quickness.

III. RESULTS

We have the expectative that if the works maintenance system is properly applied, the occurrences and unnecessary spending with sudden and random renovations will reduce, and the quality of services for the users will increase without any doubt and is also worth to remember the safety and convenience that the works will provide (VILLANUEVA, 2015).

The lack of maintenance generates obstacles, losses and critical problems that should be avoided or minimized, through an efficient maintenance management program, designed to avoid wearing and accidents (COSTA, 2005). Maintenance engineering has gained an increased importance due to the improvements of equipment, appliances, systems, machines and infrastructure that has been occurring constantly since the industrial revolution. Their high number and diversity require a growing set of professionals and specialized systems in their maintenance (CASTRO, 2007).

IV. DISCUSSIONS

Since the evolution of the XXI century, the maintenance system is undergoing through several transformations, since it suffered from the lack of mechanization, due to the equipment being quite rusty and oversized.

Due to these circumstances and conditioned to a still at the time precarious economy, productivity growth was not treated as priority. In consequence of these factors, maintenance was something treated with little urgency, and in this environment only extremely basic maintenance services were performed, such as cleaning, lubrication and the replacement of parts only when they were broken (PINTO E XAVIER, 1998).

The maintenance costs also began to increase sharply compared to other operating costs. This fact brought urgency in the improvement of the maintenance planning and control systems that are now an integral part of modern maintenance. Finally, the amount of capital invested in physical items, along with the sharp increase in the cost of capital, led people to start looking for ways to increase the equipment lifespan (GOMIDE, 2009).

We understand the great need and importance of having a reference model for the preparation and application of preventive and corrective maintenance, helping with clarity and detailing the work that must be done in the item undergoing through maintenance.

V. CONCLUSION

We conclude that the checklist, which will be mentioned shortly thereafter, will provide an effective condition, with the hiring of an engineering company to provide preventive, corrective and operative maintenance services for residential, ordinary and special facilities and equipment and electrical energy system at the premises of the contracting company. It follows the model used by the State Department of Infrastructure-TO, adapted for the construction of this article, where it details the checklist for performing preventive and corrective maintenance.

SERVICE EXECUTION

ARCHITECTURE AND URBANISM ELEMENTS:

Architecture conservation and maintenance services are usually restricted to replacing broken or deteriorated elements. This replacement must be performed after the removal of the defective element and the reconstitution of the original shape, if it is the case, of its base of support, adopting, then, the same constructive process described in the corresponding Construction Practices.

According to each case, it will be necessary to replace an entire area surrounding the damaged element, and, in the reconstitution of the component, it should not be

noticed stained areas with a different aspect, as well as guaranteed the same performance of the set.

If the deterioration of the element is derived from base defects or causes, it also must be replaced. Other causes arising from damaged systems of several technical areas, such as hydraulic, electrical and others, should be verified and corrected before the architecture correction.

The most common occurrences are the following ones:

Masonry and Partitions: In masonry - The coating of the entire component must be peeled or removed, leaving cracks or deteriorated areas exposed. Next, it must be performed the enlargement and verification of the cause for its proper correction. After the correction, fill it with cement and sand in the volumetric trace 1:3, until obtaining a perfect

Subsequently the coating will be applied to rebuild the finishing of the entire original component, taking the proper measures to avoid the formation of different areas of appearance and performance

In the Partitions – replacement of the damaged ones and relocation according to the layout, including the supporting metal structure and door rust.

Paintings - floor, walls and ceiling

In the occurrence of faults or stains, or even in the case of preventive conservation of any painting component of the building, it must be performed a complete grinding process of the affected area or component, treatment of the base or the cause of the appearance of the spots or faults if it is the case.

Next, it will be necessary to perform a total painting replacement in the same characteristics of the original, or with new characteristics if determined.

Coatings

The restoration of coating elements should be done whenever leaks or broken tiles are observed. It must always be performed following the manufacturer's technical manuals, and the inspection or exchange of elements should never be performed with the tiles wet.

Waterproofing

Waterproofing of coatings should be periodically remade according to the manufacturer's recommendations. It will be recommended the removal of all the coating, cleaning of the area to be treated, checking the seams, mortars, drills, and complete reconstruction of the waterproofing. When it is possible, it may be replaced by a roof cover.

Frames, Glass and Hardware

Replacement and/or recovery of doors, windows, gates and other sealing elements, in the materials usually available in the market - PVC, Iron, Wood, Aluminum.

5.1 HYDRAULIC AND SANITARY INSTALLATIONS

The services of maintenance of hydraulic and sanitary installations, will be preferably performed by professional or specialized companies, or by the manufacturer of the equipment.

COLD WATER:

I. Reservoirs:

- a) Cleaning, internal washing and disinfection;
- b) Inspection and repairs of level gauge, float cock, spillways, automatic pump operational system, foot and retention valve registers;
- c) Inspection of air ventilation of the environment and the access openings;
- d) Control of the water level to verify leaks;
- e) Inspection of pipes immersed in water.

II. Hydraulic Pumps

- a) Inspection of gaskets, manometers, air ventilation of the environment;
- b) Lubrication of bearings and others;
- c) Checking of the operation of the automatic control.

III. Valves and Discharges Boxes

- a) Leakage inspection;
- b) Adjustments and repairs of the component parts;
- c) Leakage test on valves or discharge boxes.

IV. Records, Taps and Sanitary Metals

- a) Corrosion inspection;
- b) Inspection of leakage;
- c) Cleaning and clearing services;
- d) Repair of stretches and fixings, including repainting;
- e) Inspection of the joints of the pipes x connections.

V. Drains and Sanitary Appliances

- a) Inspection of the operation;
- b) Cleaning and clearing services.

VI. Pressure Regulating Valves

- a) Inspection of operation;
- b) Repairs needed.

SANITARY SEWERS:

I. Sewage Pumps

- a) Inspection of gaskets, manometers, ventilation of the environment;
- b) Lubrication of bearings and others;
- c) Checking of the operation of the automatic control.

II. Pipes (tubes, connections, fixings and accessories)

- a) Corrosion inspection;
- b) Inspection of leakage;
- c) cleaning and clearing services;
- d) Repair of stretches of fasteners, including repainting;
- e) Inspection of the joints of the pipes x connections.

III. Drains and Sanitary Appliances

- a) Periodic inspection of operation;
- b) Cleaning and clearing services.

IV. Septic Tanks

- a) Inspection of covers and overflows;
- b) Repairs needed.
- c) Tank Cleaning

V. Collecting boxes and grease boxes

- a) General inspection;
- b) Removal of solid materials;
- c) Removal of oils and greases

RAINWATER:

I. Booster Pumps

- a) Inspection and repair of hermetic covers, pump actuators, drawer valve and check valve;
- b) Inspection of air ventilation of the environment and the access openings, periodic inspection of the cracks in the walls to verify leaks.

II. Pipes (tubes, connections, fixings and accessories)

- a) Corrosion inspection;
- b) Inspection of leakage;
- (c) cleaning and clearing services;
- d) Repair of stretches and fixings, including repainting;
- e) Inspection of the joints of the tubes x connections.

III. Drains

- a) Periodic inspection of operation;
- b) Cleaning and clearing services.

IV. Gutters

- a) Leakage inspection;
- b) Cleaning and clearing services;
- c) Repairs of stretches and fixings;
- d) Inspection of troughs and tubes;
- e) Painting of metal rails and conductors.

V. Inspection Boxes and Sand Boxes

- a) Inspection of operation;
- b) Cleaning and clearing services.

ELECTRICAL AND ELECTRONIC

INSTALLATIONS

LOW VOLTAGE

Generator and Emergency System: Emergency group maintenance should be performed in accordance with the equipment manufacturer's recommendations. The services must be performed by a professional or specialized company, or by the equipment manufacturer.

DISTRIBUTION SYSTEM

I. General Switch Panels of Force and Light:

- a) Reading of the measuring instruments and verification of possible overloads or imbalances;
- b) Verification of heating and operation of thermomagnetic circuit breakers;
- c) Checking for abnormal electrical or mechanical noise;
- d) Measurement of amperage in the feeders at all outputs of thermomagnetic circuit breakers;
- e) Verification of compliance with the maximum permissible amperage limits for cable protection;
- f) Verification of the heating in the power cables;
- g) External and internal cleaning of the frame;
- h) Verification of the general security conditions in the functioning of the Electric Box Switch Panel;
- i) Insulation of insulation and connections;
- j) Reaper of the contact screws of the circuit breakers, busbars, disconnectors, contactors etc;
- k) Verification of ground resistance, based on standard limits.

I. Magnetic Keys

- a) Verification of operation without excessive sparks;
- b) Checking and regulating of the contacts (pressure);
- c) Check the state of conservation of the fuses.

II. Breakers

- a) Cleaning of the contacts;
- b) Retighten of the connecting screws;
- c) Insulation test;
- d) Lubrication.

III. Contactors

- a) Cleaning of the contacts;
- b) Retighten of the connecting screws;
- c) Lubrication of moving parts;
- d) Cleaning the extinguishing chamber;
- e) Adjusting the pressure of the contacts.

- IV. **Lamps**
- Inspection and cleaning;
 - Replacement of evaluated parts (reactors, sockets, protection glasses and others).
- V. **Switches and sockets**
- Inspection and execution of necessary repairs.
- VI. **Bulbs**
- Inspection and replacement of burned bulbs.
- VII. **Wires and Cables**
- Insulation tests;
 - Inspection of the insulation layer;
 - Temperature and overload; the terminals.
- VIII. **Grounding Networks**
- Verification of the grounding loop, its normal conditions of use, connections, bare copper mesh etc;
 - Verification of the resistance to the use conditions of the connections between the ground and the stabilizers;
 - Verification of the ohmic resistance, based on the normalized limit values;
 - Verification of soil moisture and alkalinity indexes, based on normalized values.
- IX. **Electrical Discharge Protection System - Lightning Protection**
- Checking the conservation status of the insulation rods;
 - verification of the insulation measure;
 - Checking the continuity of the earth cable, protection tube and electrode.
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