

SYSTEMS OF MECHANICAL REPAIRS OF THE INSTALLATIONS FROM THE HYDRO POWER PLANT

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Abstract: The systems of organizing of the repairs execution should give the possibility to obtain the following basic requirements:

- a) to know the date of the decommissioning of the equipment for repairs;
- b) early determination of the type of repairs to be made and of the duration of execution in order to prepare materials, equipments and of the labour needed to their execution ;
- c) to determine the financial means for the repairs achievement.

Starting from these requirements were developed two systems of organizing the execution of the equipment repair, namely: repair system based on the finding and the system of the repairs preventive – planned.

Keywords: repairs system, maintenance, equipment, technological operations, maintenance platform.

1. CURRENT CONCEPTS IN FIELD

The necessity to reduce production costs led the evolution in time of different systems and maintenance concepts.

The corrective maintenance system (or in damage) in that the equipments work until to their accidental stop due to the instituted wear or due to the appearance of some damages. The repair means, usually, the replacement of the damage subassembly or even of the entire equipment.

The planned maintenance system in which the equipments are stopped in a planned manner, depending on the number of operating hours accumulated, to make technical revision does not (RT), current repairs (RC1, RC2) and capital repairs RK. In this system does not matter the degree of wear installed, important is the accumulated operating hours. Thus, it is possible that functional components and subassemblies to be discarded.

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Preventive maintenance system and predictive in which the equipments work safely to install a certain level of wear, or the appearance of a defect. In this system, the equipments will be stopped on an early date anticipated for weeks before and the repairs will be made only where it is necessary. The preventive and predictive maintenance system allows early detection, the location and the identification of the disturbance or of the wear part, and the calculation of the lifetime of the machine safely. Thus it is possible the planning of the stopping, the intervention team training, ordering of the spare parts needed and minimizing of the stationary period for repair.

The advantages of the predictive maintenance are the follows:

- Reduces the costs related to the downtime of the equipments and increases the profit by increasing the production time;
- Reduces or eliminates the costs due to the technical incidents or serious damage of the cars;
- Reduces the maintenance costs;
- Reduces or eliminates the unplanned maintenance costs, the repairs can be made with minimal losses for production;
- Reduces the stock of spare parts, many parts can be ordered even while performing repair;
- Optimizes the performance of the cars, which often operates without technical specifications;
- Reduces the excessive consumption of electricity;
- Reduces the necessary of equipment and the costs related to the “standby ” phase;
- Capital made available for increase production capacity;
- Reduces the capital investment, the equipment can be used for longer time;
- Eliminates unnecessary repair costs and the equipments will be repaired only when needed;
- Reduces the risk of an unsuccessful operation;
- Reduces or eliminates the number of the customers dissatisfied because of the delay to satisfy orders or of the customers dissatisfied by the quality of the products delivered;
- The staff availability for other activities related to production;
- Reduces or eliminates the scraps or the waste products due to the poor performance of the equipments;
- Eliminates the extra time and costs determined by the restore of the appearance and of the conditions necessary for the restart and operation in optimal conditions;
- Reduces the guarantee period for the products, due of an operation under the optimal parameters of the equipments;
- Reduces the possibility of selling defective equipments;
- Increase the machines reliability;
- Reduces the risk of penalty for the use of the unsafe machines;

- Reduces the insurance costs;
- Can increase the operating system of machines;
- Improves technology performances and operating of the machines.

2. THE MAINTENANCE OF THE RETOOLING EQUIPMENTS

2.1. The maintenance of the helicoids compressors

Combined with an excellent ease of performing the maintenance operations, the helicoids compressors represent the latest advances in design and construction of the compressed air systems. Each unit uses an optimized compression block with injected coolants and high efficiency of the engine to ensure an excellent specific power with more energy efficiency. The engine and the compression block are connected by a drive system with belts equipped with an automatic tensioning system. More, an efficient cooling system fuels the engine and the exchangers for cooling the fluid and of the compressed air with fresh air from the room, aspirated directly, thus obtaining a very low temperature at the compressed air outlet. The internal controller provides the automatic monitoring of the systems and the adaptation of the debit of the compressor to the real consumption of compressed air.

The plan of periodic revisions includes: check the extent of the transmission belt; the replacement of the drive belts; the cleaning and the replacement of the filter curtain; the cleaning and replacement of the air filter; the maintenance of the electric motor drive; check the safety valve on the separator; the ventilation of the compressor unit; coolants filter replacement; the restoration of the cooling fluid level; the cleaning of the cooling radiators of the cooling fluid and of the air; the exchange of the cooling fluid; change of the cartridge of the cooling fluid separator.

2.2. The maintenance of the electro submersible pumps

In the case of submersible pumps for industrial or vehicular applications of the wastewater, the inspection, maintenance and the repair include: the nominal current check absorbed by the engine; checking for wear parts of the pump and the rotor; checking and replacing of the bearings if it is necessary; checking tightness of the cable glands; verify the physical integrity of the electrical cable; check the oil level and the quality of the oil in the oil room.

3. THE MAINTENANCE PLATFORM FROM THE HYDRO - POWER PLANTS

The maintenance platform (fig. 1 and fig. 2) can be made from any of the extremities of the engines room or in the middle of its. It is used both for receiving and the download of the heavy vehicles, and as a space that can partially assemble the

equipment and where can be deposited elements of the installation during the disassembled of the machine.



Fig.1. Kaplan rotor of turbine – removed on the platform



Fig.2 Modernizations works The Oil pressure group

Thus for reason of transport the large stators can be sectioned in halves or quarters, but even in this case the platform size can be determined by the dimensions of the stator, because the case will often be reassembled here. Also, for reasons of transport, the rotors are often transported to the place of the montage with poles disassembled, and their mounting will be done on the platform.

This must to provide not only enough space for the rotor with assembled poles, but also enough space all around to be able to work comfortably during the assembly operation of the poles. While the engines are mounted, the platform is usually occupied by different equipments and in some cases it is possible that the stator to be mounted directly in the shaft or on the bottom plate even at the arrival from the factory, it is accustomed to give space on the platform for a stator and a complete rotor, situated side by side with enough space to work comfortably around them. The weights of the main parts must be determined in the initial stage (including the weight of the transport vehicle), so the structure of the platform floor to be designed accordingly.

At the types of generator of which the hub of the rotor is pressed and caught with feathers on the rotor shaft, the shaft extension may make difficult to support the rotor on the mounting platform during the assembly of the poles; in such cases is practiced a hole in the floor, in which is inserted the shaft extremity. The maintenance platform must be large enough to allow a vehicle to a road transport vehicle to enter transporting the most voluminous part and the crane of the plant to lift the charge and to sit on the floor. Thus the specifying from time of the road vehicle that will be used is absolutely necessary, and the entrance to the platform on the upstream end or on the downstream end it is preferable of an entry across the platform. It is convenient that the maintenance platform to be willing to access the pathway level, even though it is much higher than the upper floor of the turbine hall, but in some cases require that the height of the crane runway to be increased above the turbine floor with a corresponding increase in height and cost of the building. The floor of the mounting platform usually extends throughout the width of the crane and can be considered as its minimum width from a plant with multiple aggregates is approximately equal to the distance between the axes of the machines. When the transport limits require some final assembly operations to be executed on the platform maintenance, this is occupied on a large portion, for several days, during which the arrival of new large transports can cause difficulties.

So, the order of arrival of the equipments must be carefully planned to avoid congestion of the platform during the works. Bringing to the montage place of the power transformers is one of the most delicate problems of transportation. The weight to be manipulated is often at least equal with the hardest parts of the hydro aggregates. For mounting works, as they progresses, many areas of the floors, which eventually will be covered with caps, will be open and the free space on the floor for the manipulation of the light but voluminous pieces will be strictly limited.

4. CONCLUSIONS

The necessity to reduce the production costs determined the evolution in time of the different maintenance systems and concepts beginning with the corrective maintenance system, continuing with the planned maintenance system and more recently preventive and predictive maintenance system. After the retooling of the hydro power installations maintaining a range of operations existed in the stage before the retooling and additional for the new generation equipments mounted, the volume of the maintenance works extends specific operations predominant by one of the type: verification, testing, parameterization and diagnostics.

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