Hydrodynamic cleaning and flushing of steam turbines oil system

Do You know the cost of exploitation of dirty lubrication system in Your plant?

This cleaning and flushing technology developed by Ecol is the most effective method of preparing new oil systems and restoring operated oil systems regardless of their size and complexity for future reliable operation.
HYDRODYNAMIC CLEANING AND FLUSHING OF OIL SYSTEMS

One of the most costly and most often underestimated problems related to the use of machinery is the inadequate purity of the oil system resulting in low oil purity, thus leading to most maintenance problems and to related extra expenses (production stoppage, repairs, penalties, loss of customers).

Impurities are created and fed into oil systems during production and assembly as well as during overhauls and operation.

During operation, the impurities are carried by oil to lubricated elements, also depositing on the inner walls of pipelines, coolers, tanks and other elements, thus creating deposits and sludge.

Impurities are the main cause of premature wear and could lead to equipment breakdown.

The most vulnerable parts include bearings, gearboxes, drive-shaft seals, hydraulic actuators and controllers, oil coolers as well as oil filters and oil tank.

Our method guarantees the following:

- oil system will retain natural protective oxides layer on the inner walls of the pipeline system;
- long-term system and oil purity;
- reduced wear of lubricated parts and extended MTBR;
- reduced quantities of flushing oil in the process;
- significant reduction of filter insert consumption;
- significant increase in oil durability (reduced quantities of replacement oil);
- higher equipment availability reduced operation cost.

Hydrodynamic cleaning with water and high velocity oil flushing

This cleaning and flushing technology developed by Ecol is the most effective method of preparing new oil systems and restoring operated oil systems regardless of their size and complexity for future reliable operation.

Our method is entirely safe for the natural environment, since pure water is the cleaning medium and the wastewater contains only organic and mechanical impurities detached from the inner oil system surfaces plus trace quantities of oil washed from the system.

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The process comprises three phases:

- hydrodynamic cleaning using water at very high pressure;
- flushing of oil system with oil at high (turbulent) flow rates and with full filtration;
- by-pass oil filtration prior to equipment start-up.

The core of this technology is cleaning of all the inner surfaces of oil system with high pressure water jets utilizing suitable nozzles (appropriate for water pressure and tube's diameters), immediate drying and application of protective oil spray to dried surfaces followed by flushing with continuously filtered oil at sufficient pressure and flow rate.
HYDRODYNAMIC CLEANING AND FLUSHING OF OIL SYSTEMS

Step 1. Hydrodynamic cleaning of all inner walls of the system using water at high pressure (up to 150 MPa) - hydroblasting

The inner surfaces of the system are blasted with high-pressure water in order to detach soft deposits (products of oil ageing process, sludge, resins and asphalt) and well as hard deposits (such as corrosion, welding slag, varnish residues). The following activities are carried out in the course of the cleaning process:

- high-pressure hydroblasting (operating pressure of 150 MPa) of all inner walls of the pipelines and other elements of the oil system (pipelines - lube, seals, lever and hydraulic systems, coolers and tanks) using suitable equipment (lances and nozzles);
- immediate drying of cleaned surfaces using filtered compressed air;
- application of anticorrosion protection of dried surfaces until flushing (spraying with lubricating oil);
- protection of open connections against secondary soiling until the flushing process takes place.

Immediate drying of cleaned surfaces using filtered compressed air and application of protective oil layer prevents secondary corrosion of the oil system.

Step 2. Flushing of oil system with fully filtered oil flowing at high rates (turbulent flows)

During this step all impurities that persist after hydroblasting of inner walls are to be removed, while ensuring the appropriate purity of productive oil in the system.

Machine oil system is flushed using special filtration and pumping units (flushing skids with absolute filters) ensuring turbulent flows at flow rates ranging from 13,000 to 20,000 litres per minute. The units have appropriate operating parameters and are connected to the oil system using hoses, manifolds, bearing and servomotors by-passes. Flushing is performed using fresh oil, which will remain in the system for further use (no need for separate flushing oil), The flushing process continues until predetermined purity criteria are reached in each location in the system. During this time oil temperature and direction of its flow are changed in order to agitate the remaining impurities.

Purity criteria can become more stringent (depending on customer’s expectations) but this will increase the cost.

Step 3. By-pass oil filtering before and during system start-up

In order to remove post-assembly impurities (introduced during works done after flushing) we perform by-pass oil filtration in main oil reservoir before and during system start-up. The duration and filtration criteria are adapted to operational requirements.
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