THE FUTURE OF MAINTENANCE …ExtenSave™

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1.0 PREAMBLE:

Traditionally maintenance has been carried out using techniques such as preventive or breakdown maintenance. Typically the equipment manufacturer suggests overhaul schedules based on running hours of the equipment. Users are expected to follow these schedules
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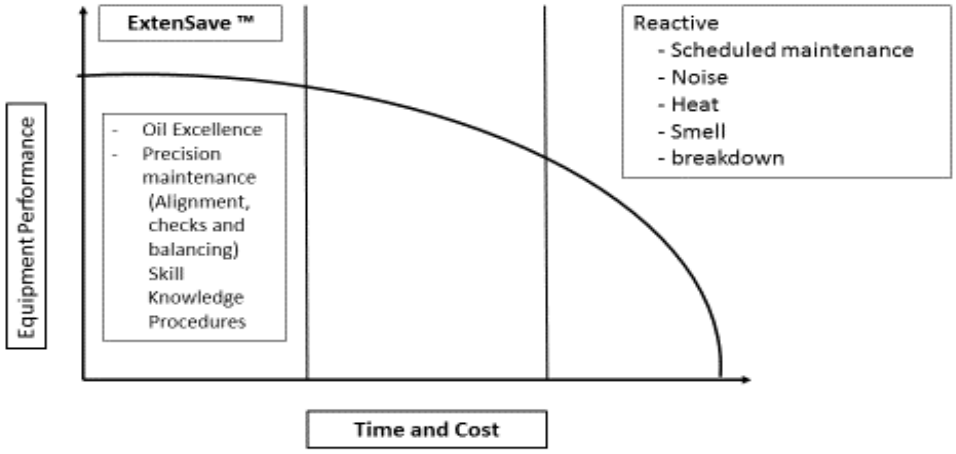
These are the reactive methods. The equipment may be overhauled either before (it is actually required) or later (after it fails) than is actually essential. In both cases the cost of maintenance is very high.

2.0 PREVENTIVE MAINTENANCE vs. ExtenSave™

We recognize that companies spend millions of dollars on maintenance, sometimes this cost exceeds their profits. DuPont believes that maintenance is the largest controllable expense in a plant. **ExtenSave™** revolves around the principle that the life of any machine depends upon the internal cleanliness. Research has proven that more than any other factor, fluid contamination is the cause of equipment failure. Even microscopic particles eventually grind a machine to a halt.

Preventive Maintenance focuses on the cause of failure, where as **ExtenSave™** focuses on symptoms of wear and action on the root causes.

Maintenance Strategy	**Techniques Employed**	**Human Body comparison**
ExtenSave™	Oil Excellence by cleaning oil to 0.1 micron, precision engineering, skill and knowledge, regular monitoring of the equipment vitals using non-invasive equipment, processes	Mechanism similar to monitoring cholesterol, blood pressure, healthy eating habit sand regular exercise
Preventive Maintenance	Periodic component replacement	Bypass or other surgeries
Breakdown Maintenance	Action when machine fails	Medication after a stroke or heart attack



Oil has an important role to play in any mechanical machinery maintenance and **ExtenSave™** is centrally built on the concept of Oil Excellence.

2.1 The invisible problem

'Oil needs to be changed regularly and machine parts continue to break down'. We are so used to this philosophy that we don't think that there is any other approach. However, if oil can be kept 100% clean then in theory it should never degrade or require changing. Machine parts could be used for significantly longer period and the risk of breakdown and production stops would be drastically reduced. Oils, in general do not wear out. They become contaminated, oxidized and thus lose their characteristics.

2.2 Large and small particles

Most machines are equipped with online filters typically of 8 to 10 microns. These provide protection against large particles that can cause direct damage to machine components. However these large, dangerous particles are few in number. Tests have shown that 70% of the total weight of particles in oils in general consists of particles that are smaller than 1 micron. It is these smaller particles which escape the online filters oxidize the oil thus causing premature failures.

2.3 Smaller the particlesize, bigger is the problem

Earlier it was thought that small particles were not dangerous for machines. Research has shown that these micro-particles bind together other contaminants and accelerate oxidation in the oil. This causes the oil to lose its lubricating qualities and leads to the formation of resins and deposits. These forma sticky surface that eventually causes valves and moving mechanical parts to jam and seize. It is believed that 85% of all breakdowns in hydraulic systems are caused by contaminated oil.

2.4 Modern precision machines demand cleanliness

New machines are manufactured to stricter tolerances than older machines. Tolerances and fault margins are much smaller, which implies that these machines are more sensitive to failures due to contaminated oil. The necessity for proactive maintenance on oil cannot be over emphasized.

2.5 Don't change the oil – change the filter

When the oil is ultra-clean it stops oxidation. This requires the smallest of particles and all traces of water to be removed from the oil. Without oxidation the oil retains all its desired qualities and in theory never needs to be changed. Since 70% of the damaging particles in oil, based on weight, are less than 1 µm it is important that the oil filtration system is capable of meeting these demanding requirements.

2.6 Introducing the world's most efficient nano filtration system from Europafilter.

- Offline, kidney loop filtration system, suitable for any mineral or synthetic oil.

- Cleans oil to 0.1micron, removes water in free form and in emulsion. Does not remove additives.

- Prolongs the life of lube oil and expensive online filters by 200 to 800%.

- Applications in hydraulic systems, gear boxes, transmission lines, gas turbines, steam turbines, compressors, transformers and engines. Practically any application which has oil needs a Europafilter.

- Mean Time Between Overhauls and regular Maintenance intervals can be extended by 30 to 80%.

- Pay back in less than 6 months, increased reliability of equipment. Eliminates breakdowns.