

VIBRATION WILL TELL YOU HOW HEALTHY A BEARING IS

To reduce number of unscheduled downtimes related to bearing operation. To promote safety of work. To increase functional efficiency of mill divisions. The Reliability Service believes that development and updating of vibration monitoring systems are the key solution to these and other problems.

History of vibration monitoring began about half a century ago. In 1968 the Swedish company SPM Instrument produced the first device making it possible to monitor bearing wear in industrial machines right in operation. In 1995 Vibration Monitoring Service was launched in the Bratsk Pulp and Containerboard Mill. In February 2016 the mill was reorganized: nowadays Pavel Vikhteyev is in charge of the service whose total number of employees is 15 people, one specialist for each division of the mill.

Even a common man can understand the essence of vibration monitoring. When a bearing rotates, it generates vibration which can

be registered by means of special devices. There are no considerable vibrations and noises under normal conditions provided that a bearing is correctly mounted, properly used and timely lubricated. But readings change if something wrong happens, for example, a defect, shaft misalignment (coupling halves of mating

parts are not aligned), poor lubrication. This means that when monitoring vibration, a specialist can easily notice the risk of failure and prevent it.

Nowadays, 7462 bearings are under control of the Vibration Monitoring Service of the Bratsk Branch of Ilim Group. As the director of the Reliability Service, Aleksei Zakharov, notes all these bearings are different: each one has its own character, its own service life and operating conditions. At the same time, the existing monitoring instruments and equipment do not let cover the whole scope of rotating equipment.

First of all, not all the bearings can be monitored with those devices that exist nowadays. In case of low-speed machines one unit measurement time can be too long. Secondly, not all the bearings are easily accessible,

some of them are inaccessible at all. In the latter case it is impossible to prevent bearing failures,

which causes unscheduled downtimes.

But progress does not stand still: state-of-the-art devices make it possible to carry out more accurate diagnostics. For example, to determine quantity of lubrication in a bearing.

For this reason, nowadays, the Reliability Service turns equipment improvement plans into reality. The equipment is brought to conformity with necessities of the time. Thus, new portable spectral diagnostics devices will be implemented. Some of the machines will be equipped with permanently installed and semi-permanent systems which will continuously collect data – the only things a specialist has to do are to analyze them and to make decisions.

This system will soon be provided, for example, for softwood pulp production. In future, all low-speed pulp production machines will be equipped with this system.

In fact, many of these devices and systems will be used in Russia for the first time.

Pavel Vikhteyev, Head of Equipment Diagnostics Area: Start of conversion to new instrumentation



Career in Ilim Group:

Pavel Vikhteyev graduated from the Bratsk Pulp and Paper College, then from the Bratsk State University.

He started his career at the Mill in 1995 working as a first category technician in the repair and mounting department No.1. He was a senior engineer in the repair and mechanic production, in the overhaul and mounting shops, in the equipment diagnostics and adjustment area. Since the middle of 2015 he is the head of Equipment Diagnostics Area in the Reliability Service.

For the present we use out-dated devices produced by the company “VAST” (vibroacoustic systems and technologies). There are several devices. They represent “data collectors” with uploaded preformed routes. A specialist checks equipment following these routes.

At the same time the process of conversion to new instrumentation has already started. Presently, we work with SPM, one of leading companies in Europe. We purchased seven advanced instruments Leonova Diamond from them. Moreover, we are in the process of mounting of SPM permanently installed system on low-speed equipment of pine production -

from the upper retainer to the bottom scraper, as well as Twin Roll wash presses.

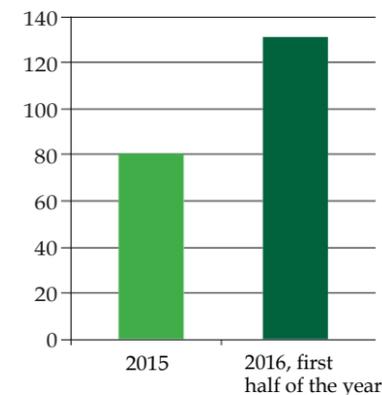
Simultaneously, we are updating the permanently installed monitoring system on the cardboard machine. It will have 165 measuring points: as a result the whole machine will be covered with a so-called “monitoring dome”. All the bearings will be continuously monitored.

What are the planned purposes? First of all, the number of unscheduled and emergency downtimes will be reduced. Secondly, the system will become clear: our specialists will know the current condition of all machine parts and will plan maintenance work more thoroughly. In other words, they will be proactive and will prevent failures in the early stage instead of acting when the machine part is no longer operational and needs to be repaired immediately.

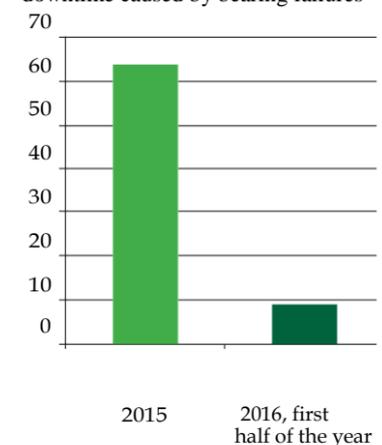
The number of production process breakdowns due to technological reasons will be lessened; it will become easier to maintain operating schedule. In short, it will have an impact on quality and stability of the cardboard machine operation.

Furthermore it will have an effect on labor safety as well. Permanently installed systems are mounted on the low-speed equipment and sampling time can be 20-40 min. It is quite difficult for a specialist to bear severe conditions of operating machine: high temperature and gas content in air. There will be no longer any need to get access to rotating parts of the cardboard machine. It will be more convenient and safer for specialists.

Discovered bearing defects in cardboard machine



Hours of cardboard machine downtime caused by bearing failures



Creation of common database

In future, the common database on the server will become a significant element of reliability assurance. We have already laid the basis, but it will become possible to appraise its capabilities in full only after installation of all vibration monitoring equipment.

Installation of the server and new software will enable the common monitoring environment. All the data will be collected in a single machine condition database. Theoretically, the monitoring service specialists, the management of the mill and maintenance service specialists will be able to get information on condition of any machine being monitored at any time. The common database will give more time for decision making with regard to repair planning, replacement of equipment and purchase of spare parts. The conversion from a scheduled maintenance to diagnostics and replacement according to the actual machine condition will take place. It will minimize both equipment downtimes and storage costs.



Leonova Diamond vibration monitoring instrument

Prepared by Mikhail Gorbunov