

Invited lecture

VIBRATION MONITORING, ANALYSIS AND DAMPING AT THE HYDRO POWER PLANT

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Abstract

Vibration monitoring is well proven procedure for estimation of a condition of a machine system. Excessive vibrations indicate the unexpected problems in operation. Moreover, vibration analysis often can help to discover the cause of the problem.

In this paper procedure for system monitoring, data logging, collected data analysis and necessary actions for vibration level dampening at the hydro power plant is described.

In order to lower the level of vibration of an operating machine it is necessary to measure vibration intensity and frequency first. Then, through the Fast Fourier Transformation (FFT), collected data is transformed from the time to the frequency domain. Frequency domain signal indicates the possible causes of elevated vibration amplitudes. Every cause of perturbation forces and high vibration levels has its own distinctive frequency domain graph. Frequency of dominant amplitudes (most commonly seven highest amplitudes are taken into consideration) determines the cause of the problem. Rotational machines most often have a problem with dynamic imbalance and/or shaft misalignment. These problems are discovered by excessive vibrations at the rotational frequency and double rotational frequency respectively. On the other hand static structures most commonly change their modal characteristics (natural frequency) due to loss of structural integrity.

When the cause of the excessive vibrations is determined it is possible to design the optimal solution. In this case, it was provided through the tailor made modular lightweight steel construction, mounted in order to raise the stiffness of the oscillatory system

Keywords

Please Vibration monitoring, Vibrodiagnostics, Modal analysis

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