

NORMALIZATION OF VIBRATION MEASUREMENTS:
UNNECESSARY COMPLICATION OR IMPORTANT PREREQUISITE?

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Abstract

Vibration measurement results are the prime source of information of rotating machine technical condition. It is usually assumed that there is a relation between condition parameters and diagnostic symptoms vectors, the latter being considered as vibration levels measured in various points and covering specific frequency bands. With such assumption, on the basis of suitable models, critical vibration levels can be inferred, allowing for quantitative technical condition assessment.

It is, however, known that diagnostic symptom vector is influenced not only by condition parameters, but also by many other factors, their impact ranging from negligible to predominant. Even on the basis of quite simple considerations, it is possible to point out those of prime importance: machine load, long-term deterioration of material properties and so-called logistic vector. It is shown that their quantitative influence can be at least estimated. Suitable factors can then be introduced in diagnostic procedures, which may be seen as a kind of vibration measurement normalization. The question is whether inevitable complication gives justified benefits, i.e. more accurate condition assessment and, in certain cases, early identification of faults which otherwise might remain unnoticed. We are trying to answer this question, with a background of field measurement results for a number of steam turbines, covering over ten years of operation.