

The Dumbing-Down of Vibration Analysis

Written by James I. Taylor

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The dumbing-down of vibration analysis may be described best as "the exploitation of human weakness." The following examples are not all inclusive, but they may help in understanding the problem:

- Advertising, education, and living have ingrained in us to get the cheapest. I think almost everyone knows that the cheapest is not always the most economical.
- A lot of people want something that is quick and simple and do not want to be bothered with facts about adequacy for the job. This has contributed to manufacturers adding features to aid in analysis. These features may not be effective because they keep changing. Some examples are demodulation, high frequency methods, etc.
- Many people believe everything they see in print. Many articles and papers have been written that purport to explain the various features. The first two or three paragraphs indicate an explanation is forthcoming; however, around the fourth paragraph the subject is changed to something else and the explanation never occurs.
 - In some cases, management has abdicated its responsibility to the bargaining unit.
 - The large advertising budgets and sales forces of some bearing and instrument manufacturers have capitalized the market for their products.
 - Most training courses spend too much time on how to operate equipment, software, setting alert and alarm levels, and how to set up and run a route. These courses spend very little time on actual diagnosis of problems. Some courses even teach things that are not correct. Once people have been trained in these methods, it is often difficult to change their minds.
- Certification testing is based on the above courses. Certifying vibration analysts when there is no consensus on what the data means creates a false impression for management, a sophomoric attitude in some of the certified, and improves the cash flow for the certifying organization.

Vibration analysis is the science of breaking down vibration into the various constituents to identify all problems in the machine. Constituents of vibration are the time signal; frequency spectrum; each frequency: harmonic, sub harmonic, side band; along with the phase relationship and amplitude of each. Some applied technology must be used.

For example, the FFT produces some frequencies that cannot be generated by the machine. This causes the amplitude in the frequency domain to be understated.

Engineers and technicians that have been trained in vibration analysis can, and have, developed rules to follow for accurately diagnosing machinery problems. When all problems are

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accurately diagnosed and the cause identified, priorities can be assigned. Then the worst problems can be repaired on a scheduled outage and the cause eliminated. Your machines then could operate until the next outage without a failure.

The next logical step is to develop rule-based expert diagnostic software that can, and does, diagnose problems 24/7 without human assistance. This also has been accomplished. The proven results of this type of vibration analysis program are increased run time, profits, and employee efficiency. Improved product quality and reduced down time also have been achieved.

The following recommendations may be helpful in achieving the above benefits:

1. Review the vibration course content before sending people to it. If the content does not include instructions on how to diagnose problems, the course should be avoided.
2. The importance of analyst certification should be downplayed until there is a consensus on what the data means.
3. If training on how to operate equipment/software is needed, the manufacturer may be the best source.
4. Evaluate the equipment you are using. If it is outdated, replace it.
5. Avoid being "locked in" to one manufacturer because there may not be a single company in the world that knows everything there is to know about vibration analysis.
6. Do not place so much emphasis on history data because with today's hardware, software, and technology, problems can be accurately diagnosed without history data. **MT**