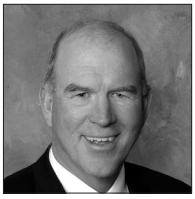
# THE EVOLUTION OF VIBRATION MONITORING



***Randall Chitwood, Vice President of BK Vibro America, discusses his history with Bently Nevada, and how vibration monitoring systems are evolving to meet the needs of modern equipment.***

### Please tell our readers about Brüel & Kjær Vibro.

Brüel & Kjær Vibro (BK Vibro) is recognized as a leader in monitoring the condition of wind turbines, but the company does much more. With the acquisition of the SetPoint product line, the company now can deliver machinery protection as well as condition monitoring hardware and software.

We serve the power generation and oil & gas markets with solutions ranging from balance of plant to critical machinery. This includes solutions for API 670 machinery protection with the SetPoint and VibroControl brands, as well as condition monitoring software sold as SetPoint and Compass solutions. BK Vibro can deliver full global projects or a simple rack retrofit.

### What was your involvement in the Bently Nevada 3300 series monitoring system?

When I first joined Bently Nevada in 1978, the flagship monitoring system was the 7200. I designed monitors for that platform during my first few years with the company. In the early 1980s, it developed a digital monitoring system branded Smart Monitor.

This system was unsuccessful, but it became the genesis of the 3300 monitoring system that I designed. Don Bently was key in driving two important factors in the 3300 development: It had to be 20% less expensive than the 7200; and it had to be reliable and simple. I led a team of about eight engineers that then designed the 3300 system.

### Why do you think the 3300 series was so successful?

I don't know how many 3300 systems were built, but 50,000 seems like a conservative number. As the 3300 achieved the two above criteria, the market embraced it. Compared to standard technology of the 1980s, the 3300 was a good blend of digital and analog technologies that kept cost down and reliability high.

### What is different in API 670-compliant continuous vibration monitoring systems?

API is a normative standard that provides a minimal set of standard features that the industry has learned are important to protect and monitor critical rotating machinery. Although API has its roots in oil & gas, the standard has found acceptance in the thermal power industries. When a user buys a non-API compliant system, there is some risk that the system could lack key features. Most serious vendors operating critical rotating machinery look to API as a way of reducing risk, and most insurance providers reward this behavior.

### How were vibration monitoring systems designed in the 1980s and mid-90s compared to today?

The process of designing electronic systems has not changed much from the 1980s. Agile processes have helped empower design teams and have kept project milestones fluid and customer-focused. This has been a good thing. But design still demands a great knowledge of the application, attention to details and a no-compromise attitude on both features and reliability.

### How have customer needs shifted in the turbomachinery world during that time?

With fewer machinery experts at most plants, we see customer needs shifting from local independent systems to systems that support remote diagnostics and the ability to make the vibration data more valuable by correlating it to process data.

This makes it more practical for one machinery expert to support multiple sites. Also, remote diagnostics enable corporations to have more detailed oversight capabilities over critical and safety related assets.

More users are asking for flight recorder capabilities so machinery protection systems that are not connected to any network can still deliver critical data when it is needed to evaluate machinery condition. This can take the risk out of critical questions like, "Is it okay to restart this machine after a trip."

### What makes today's systems better equipped to address industry needs?

Modern systems are simpler, with fewer parts that do far more. They are easier to purchase, commission and ensure the right spares are on hand. They share data easily across an enterprise or around the globe. With embedded analytics, they can operate with or without a network and still provide data, visualization and expert advice. This can be done without the cost and maintenance of a standalone vibration analysis client server network.

### How do you see vibration monitoring systems evolving?

In the next 10 years, vibration data will converge with other plant data and will no longer be housed on independent servers. This data will mostly be processed at the edge of the network and fed to data analytics engines for processing of alarms and day-to-day monitoring of assets.

We will continue to see balance-of-plant equipment to be monitored with wireless sensors. However, I believe it will be much longer before critical machinery protection systems become wireless.

Vibration systems were the pioneers of big data in many industrial plants. But now users are expecting the next wave of productivity. It will be based on machinery data and process data used in concert. Our Setpoint system embodies this philosophy by using the OSIsoft PI System for data storage and correlation rather than a purpose-built vibration server. It also features an embedded flight recorder for use without a network or software infrastructure. ■