

Application Note

#12

Don't forget to Integrate!



Or Differentiate for that matter! Turning on Integration or Differentiation is not just an option for accommodating the different vibration sensors into more commonly used engineering units regardless of your particular discipline; it is also a double check of what your issues may be. It is pretty well recognized that if you want to see velocity data and all you have is an accelerometer, you're going to have to integrate. Just as well as integrating velocity to get units of displacement is an important step. What is more important is double checking your data regardless of sensor type in the other units to insure that you are chasing the correct problem.

Any one trained in the field of vibration trouble-shooting should fully understand that accelerometers provide acceleration data, velocity sensors provide velocity data, and that displacement sensors provide displacement data. These same people should realize that the sensors are closely related in what they are telling you. To put it in simple terms you should acknowledge the units of force, rate of change, and actual change for what they are. I was told years ago that the amount of force that a shaft exerts against a bearing is not near as important as the distance the shaft is moving within that very same bearing. The fact that that particular shaft shattered the bearing a short time later drove my mentor's point home in away that I will never forget. I immediately became aware of this very important, yet basic point.

Recently, I was reminded of this important double check. My first assumption in looking at the data in Figure 1 was to go after solving the problem at the high end of the frequency range; after all, the data was going up drastically and screamed for attention. There it was staring me in the face, a high amplitude right at my normal running speed. Those two little humps at 1100 and 2200 RPM were insignificant compared to the much higher vibration at speed, right? - - - Wrong!

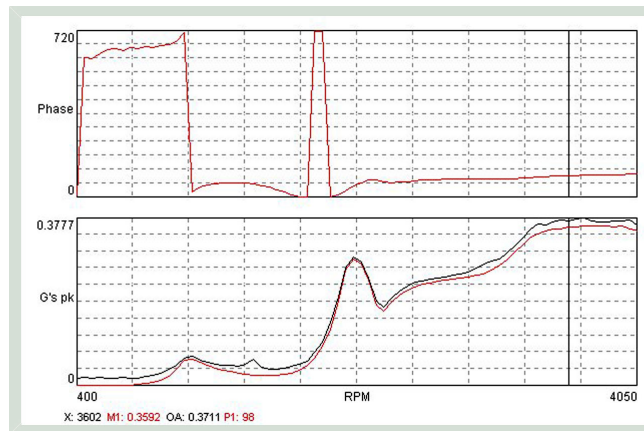


Figure 1. Acceleration Data

It took no more that 3 seconds to change the display to units of Displacement. Doing so suddenly changed my attention (See Figure 2 on the next page.).

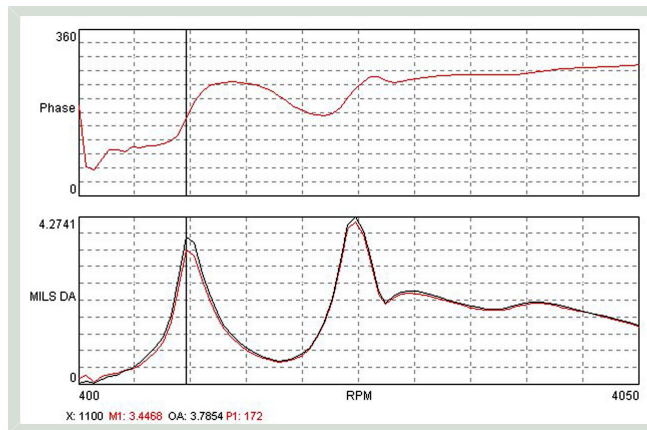


Figure 2. Displacement Data

Those two little insignificant humps at 1100 and 2200 RPM took on a whole new significance when viewed in terms of displacement. Nearly 4 mils of motion on the way up to speed would have a dramatic effect on the life expectancy of the bearing in that machine.

I'm sure glad I remembered to integrate in this situation.

Perhaps you could use this reminder occasionally. After all it's a standard feature of the CV395B you might as well use it (no extra charge).

By
 Pete Neild
 pneild@cognitivevision.com



7220 Trade Street, Suite 101
 San Diego, CA 92121-2325 USA
 Tel: 1.858.578.3778
 Fax: 1.858.578.2778
 instruments@cognitivevision.com
 www.cognitivevision.com