CMVA 60 ULS (Ultra Low Speed) SKF Microlog

By Dr. Bob Jones • SKF

Purpose

Engineers and technicians involved in vibration analysis often have a need to observe the velocity behavior of very slow speed equipment. The SKF Microlog CMVA 60 ULS (Ultra Low Speed) provides the user with the ability to routinely observe velocity measurements as low as 12 r/min.. In addition, the CMVA 60 ULS continues the SKF Condition Monitoring tradition of providing the best bearing analysis ability with the use of Enveloped Acceleration, which has routinely analyzed rolling element bearings at speeds of 0,5 r/min.

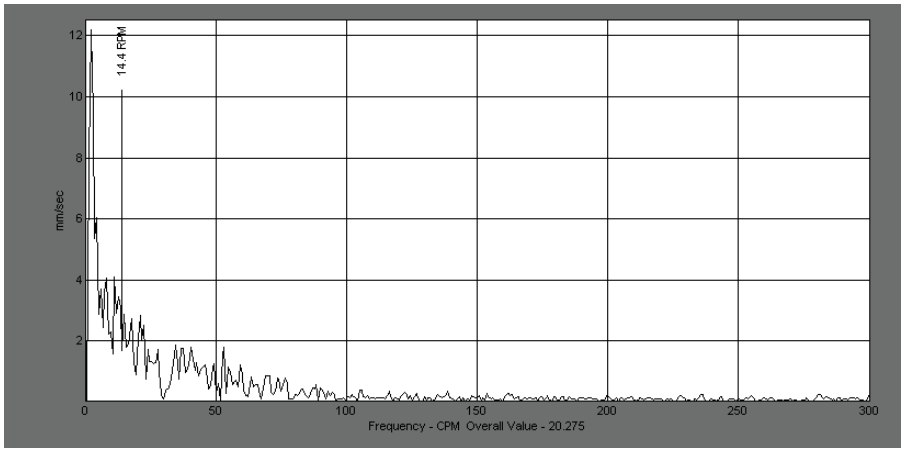

Fig. 1. Velocity spectrum of screw press at 14,18 r/min. – CMVA 60.

Application

The data collector does not require any special knowledge or software to perform the low speed function. It is recommended that the accelerometer be rated at 500 mv/Eu for increased sensitivity. Specific internal electronic circuits have been enhanced to provide an exceptionally quiet environment to reduce the “ski slope” generated with the integration of the acceleration signal into the velocity signal. The user can apply the data collector to any existing velocity application using all the existing techniques.

Data collection

The following data was collected at the Shotton Paper Company, Flintshire, United Kingdom. The technicians are Andy Roberts and Jason Dowd. The data was collected on two screw presses used to extract excess water from the pulp.

Velocity

For the first example, the rotation speed of the unit is 14,18 r/min. **Fig. 1** is data that was collected with a CMVA 60. **Fig. 2** is simultaneous data collected with a CMVA 60 ULS and **fig. 3** is an overlay of the two spectrums. Note that the data seen with the CMVA 60 ULS is completely covered by the "ski slope" and could not be utilized using the CMVA 60 without the enhanced velocity circuitry.

In the overlay of the two spectrums, the superiority of the CMVA 60 ULS for low speed velocity measurements shows how the normal velocity measurement covers the lower frequency information.

The second example involves a similar machine operating at 33,7 r/min. In this case, the 1x rotation speed can be seen; however, if there was lower frequency information, it can be seen how it would be lost with the normal velocity measurements.

In this example, the 1x rotation speed of 33,7 is visible; however, the electronic noise of the standard velocity could cause the analysis concern about signals that are not really vibrations.

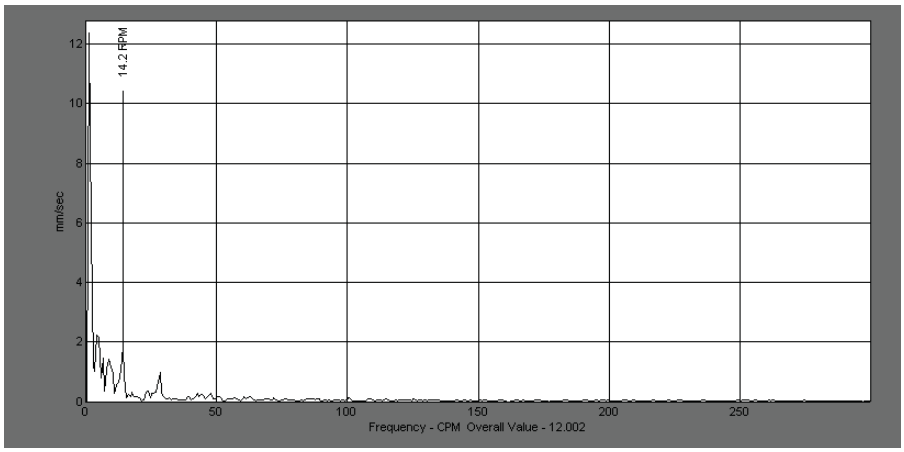

Fig. 2. Velocity spectrum of screw press at 14,18 r/min. – CMVA 60 ULS.

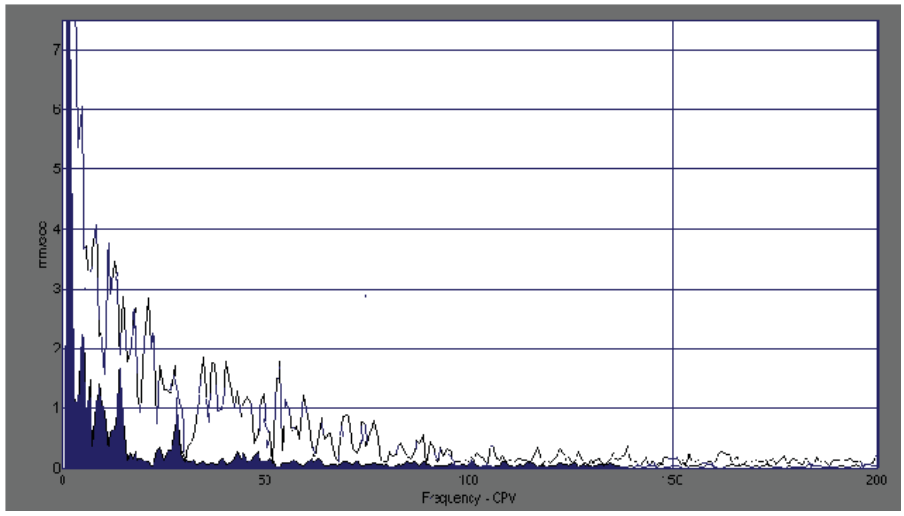

Fig. 3. Overlay of velocity spectrums from CMVA 60 and CMVA 60 ULS with speed marker removed for clarity.

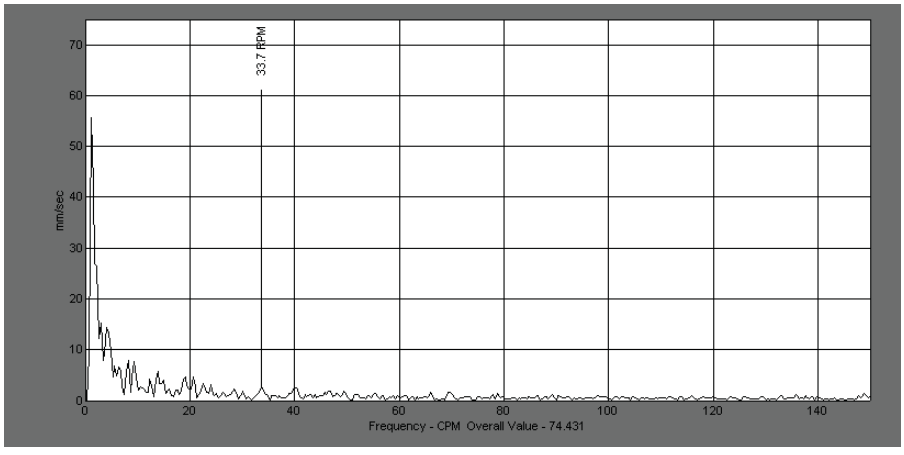

Fig. 4. Velocity measurement using a CMVA 60 Rotation speed is 33.7 RPM.

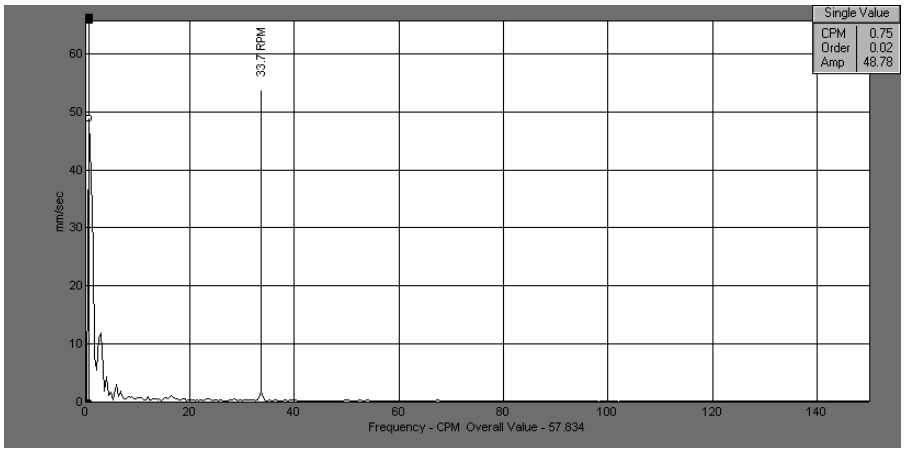

Fig. 5. Velocity measurement using a CMVA 60 ULS.

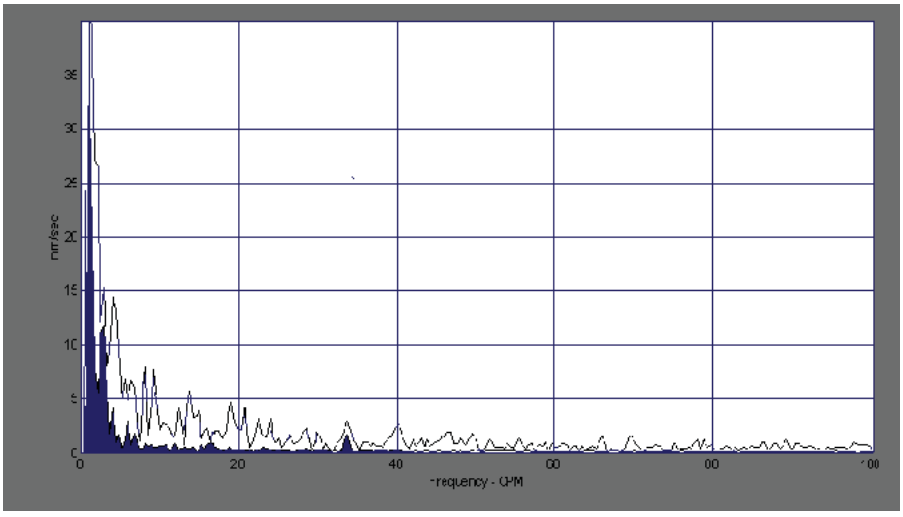

Fig. 6. Overlay of CMVA 60 and CMVA 60 ULS, speed is 33,7 r/min.

Conclusion

The CMVA 60 ULS has the demonstrated ability to provide the user with accurate velocity measurements on rotating equipment at speeds of 12 r/min. In addition, it maintains the ability to provide the Enveloped Acceleration measurements for rotating element bearing analysis at any speed, including 0,5 r/min.

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