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How Much Is Too Much

Data collection measurements are always an issue to setting up proper collection routes. To many times measurements are sacrificed to save time. As a service based company, we believe in getting enough usable data while on site to make just and proper diagnoses on one trip. We then condense down measurements for trending and monitoring.

Our diagnostic collection routes can obtain up to twelve measurements per position including several high resolution readings, phase data and time waveform measurements which leads to Time!

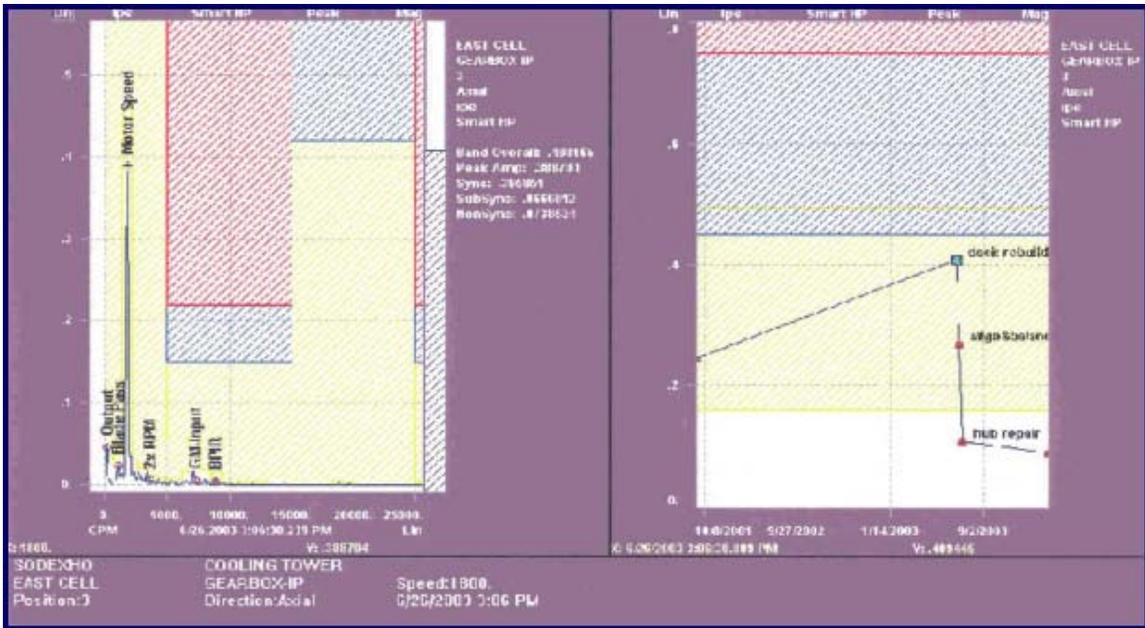
The following was taken from an existing condition monitoring account at Perot Systems in Dallas Texas.

The equipment was one of three 1100 ton built up BAC Prichard cooling tower cells with Amarillo model 135 double reduction gear reducers and 60" jackshafts. Permanent accelerometers were mounted on gear reducers h e to accessibility. Baseline data was taken and frequencies inputted into database. An outside contractor had replaced the hot deck section and some structural supports. Several weeks later a considerable in overall velocity at the gearbox in the axial direction was noticed. An increase from .24in/sec to .40in/sec. Velocity spectrum data showed 1 X motor input frequency at .38in/sec. Phase data was taken and showed 180° shift across jackshaft in both the axial and radial positions. Misalignment as well as some couple unbalance were apparent. Laser alignment was performed and motor feet repined. A couple balance was then done and overall dropped to .22in/sec. At this point our phase data was unstable and erratic. New collection route was taken and a current alarm noted. Our high frequency trend and envelope also went into alarm from .4gse to 5.9gse Envelope data showed 1X input with harmonics and .5 sub harmonics of input speed Velocity data still showed 1X input dominant but had harmonics to 4X present. Access was then gained to gear reducer and drive examined. Wear at both shaft and yoke keyways were present and key fractured. Our high frequency envelope spectrum was showing us input gear chatter due to yoke slipping on drive shaft. Unfortunately the design was changed and shaft and both coupling yokes would have to be replaced. Time was a factor due to their thermo-storage schedule.

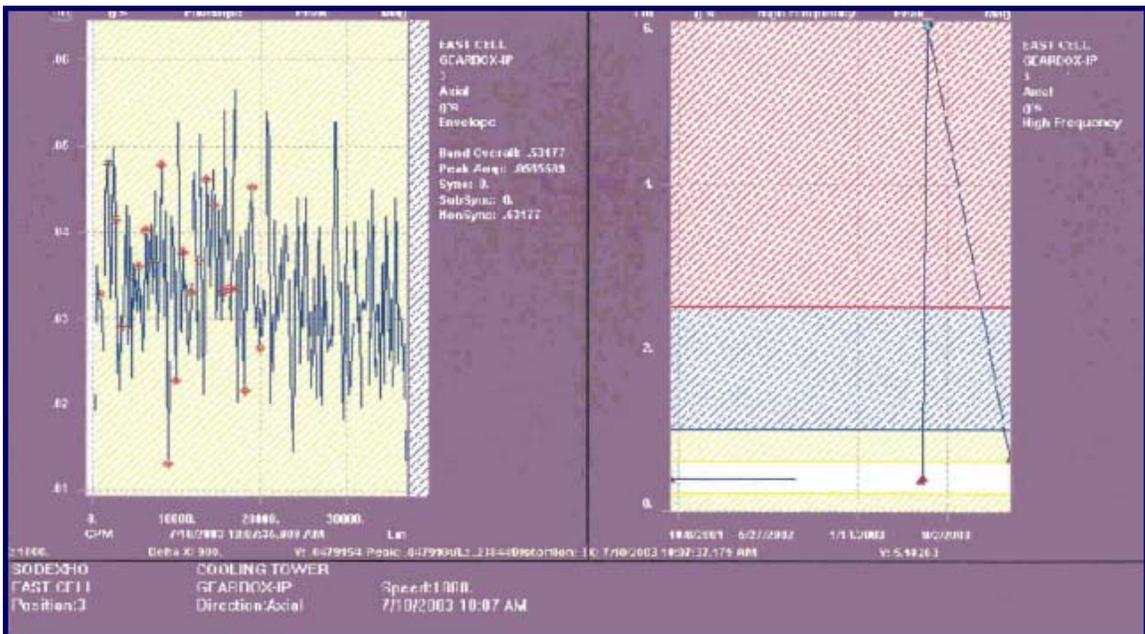
The yoke was re-machined to a machine fit and bushing retainers installed. Jackshaft was then trim balanced to standard and new collection taken. Final data showed velocity readings down to .09in/sec. overall with input frequency at .06in/sec. High frequency data was down out of alarm at .6gse.

Time is Money, but when it comes to analyzing vibration data for paying customers when time is crucial, Too Much is Better than Not Enough.

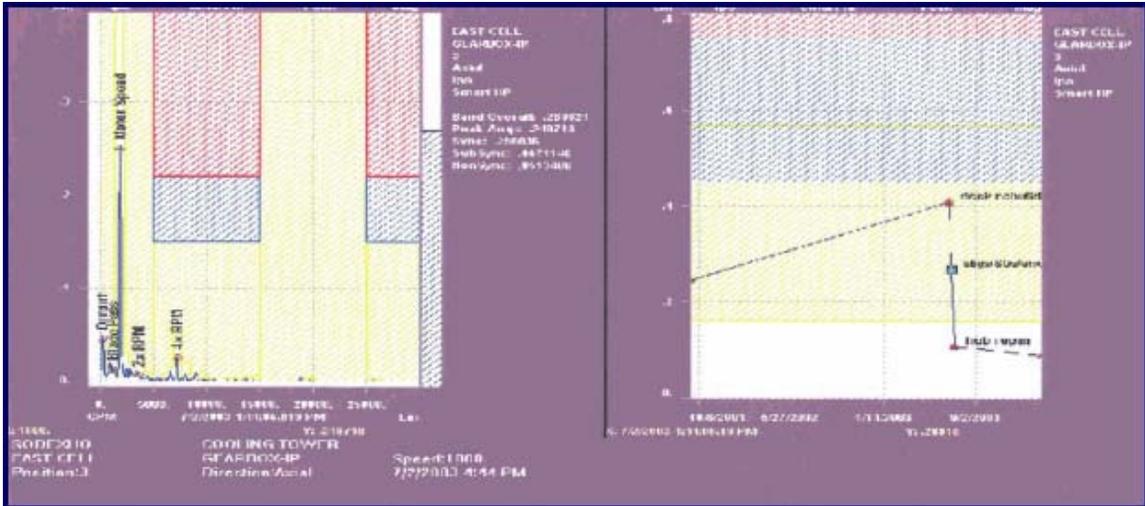
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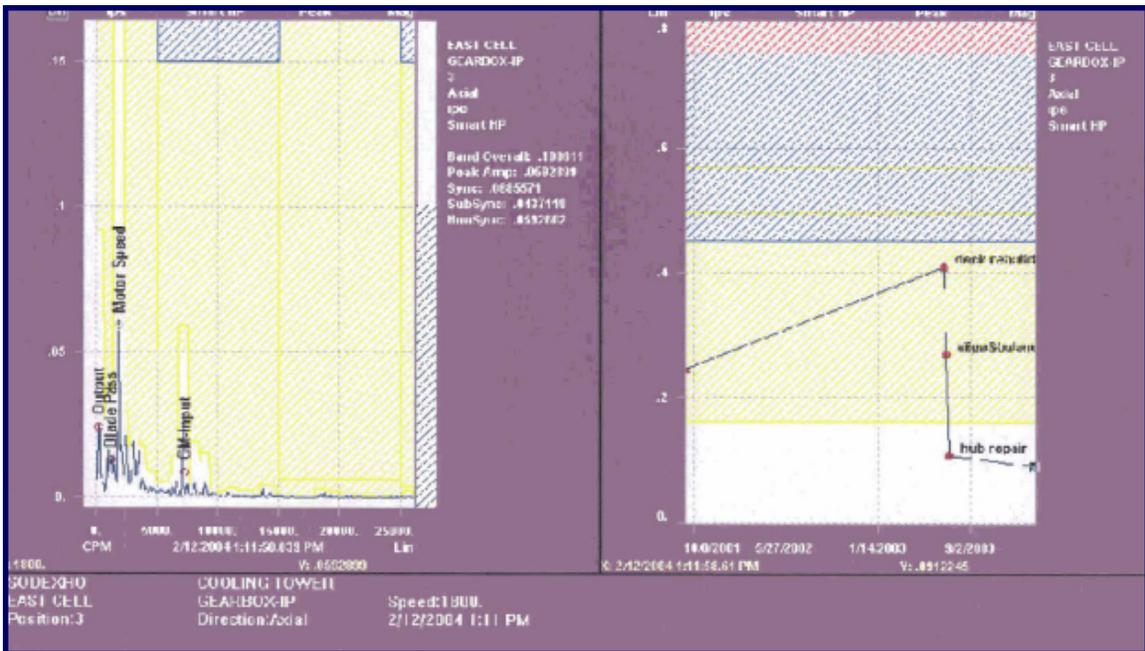
Magnitude trend shows velocity increase from .2in/sec. to .408in/sec. after deck and structure replacement. Spectrum shows input speed dominant from .22in/sec. to .38in/sec.



High frequency trend showed increase from .3g to 5.9g and triggered alarm
 Envelope spectrum showed input speed and harmonic impacts as well as 1/2X sub harmonics.



After laser alignment and couple balance dropped from .4in/sec. to .26in/sec. overall. Input speed dominant at .24in/sec. from .38in/sec. Spectrum showing input harmonics increased. Looseness present.



After shaft yoke repair velocity magnitude down to .09in/sec. Spectrum shows input speed down from .38in/sec. to .05in/sec. GM-Input appears after close coinciding 4X input harmonic went down.