

# **The Comparison of Piezoelectric and MEM Sensors Intended for Vibration Condition Machinery Monitoring**

**George Zusman, Ph.D., D.Sc.**

Vibration Measurement Solutions, Inc.

1710 Dairy Asford Rd., Suite 206, Houston, TX 77077, USA

Email: zusger@gmail.com

**Key Words:** Vibration, Sensors, Piezoelectric, MEM, Noise

## **ABSTRACT**

The paper offers a comparison between the traditional piezoelectric and modern MEMs based vibration sensors used for machinery condition monitoring and fault diagnostics. The prognoses of what technology and where will be used in the future is discussed.

Group of parameters is selected for defining a capability and perspective of particular sensor to be used for vibration measurements and diagnostics. That group consists of the follow parameters:

- 1) Required supply power,
- 2) Cost (parts and assembly),
- 3) Working frequency range,
- 4) Working temperature range and
- 5) Output noise level.

For reference the piezoelectric and MEMs based sensors by the parameters 1) to 4) is presented. For instance it is known that for the vibration machinery protection the frequency range of 10-1000 Hz is commonly used, but for diagnostics goals the up frequency is required to be in a range of 10 kHz -20 kHz.

The experimental data and detailed comparison for parameter 5) – output noise level/spectrum density – for several popular piezoelectric and MEM vibration sensors are presented.