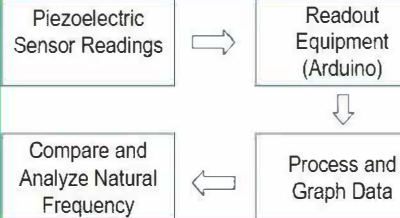


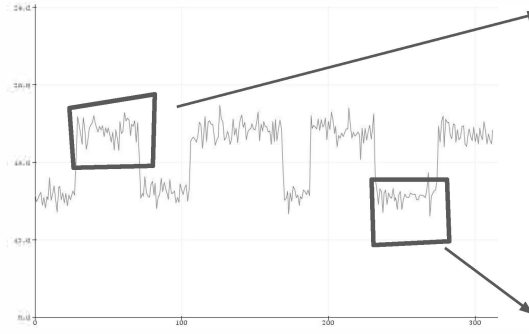
Objective

Build a non-invasive monitoring system for detecting solid particle erosion in a steam turbine system within a combined cycle plant.

Data Communication



Results and Analysis

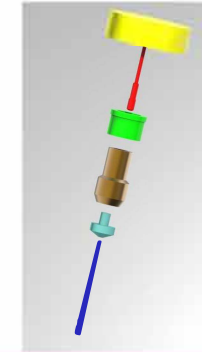


This section of the graph shows a spike in voltage output meaning that it is reading a large amount of vibrations

This section of the graph shows that the voltage output is very small meaning that it is not reading much vibration

Spindle Models

- ~ Standard Spindle 2.25"
- ~ Minimally Eroded 2.00"
- ~ Eroded Spindle 1.75"
- ~ Extremely Eroded spindle 1.50"



Electrical Circuit

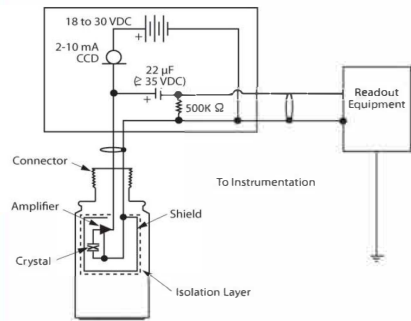


Figure 1. Powering Schematic

Cost Analysis

Current one cycle maintenance cost is \$3,025, the teams prototype one time maintenance cost is \$1,411.08, reducing the maintenance cost by \$1,613.92 for a single cycle.

Current Maintenance Method			Prototype Maintenance Method		
Subsystem	Part	Cost	Subsystem	Part	Cost
Material	Insulation	\$225.00	Material	Circuit Configuration	\$41.77
	Valve	\$1,600.00		Sensor	\$379
	Labor Rate/hour	\$100		Communication Device	\$20.98
Labor	X Number of Hours	6	Impact Hammer	\$604	
	X Number of Workers	2	Other Components	\$265.33	
			One hour of testing	\$100	
	Subtotal	\$1,200.00	Labor		
	Total	\$3,025.00		Total	\$1,411.08

Future Development

- ~ Test prototype on a functioning valve
- ~ Development of a custom PCB board
- ~ Explore applications of prototype on different valve bodies
- ~ Develop wireless data communication