



**SMART PUMPS
NEW BUSINESS MODELS WITH IOT
(INTERNET OF THINGS)**



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Centrifugal slurry pumps are used in many applications such as in the mining, chemical and in the industrial plants. Making pumps smart by implementing IoT has enabled the companies to change the business model and go from reactive to predictive operating strategies.

Business Model

Let us look at how the business model is evolving in the mining industry by the pump manufacturers. Mining companies use dewatering pumps. The presence of groundwater can impede or even completely halt the productivity of an open-pit mine. Dewatering pumps are used to take the water that accumulates at the bottom of the mine. These pumps are kept onsite as it is not known when they will have to be used. Some days the pumps are in almost continual use; other days the pumps simply sit idle. The companies moved from capital purchase to rental model. But paying a daily rent for the equipment that is not in active use has further made the companies develop solutions for tracking pump usage. Implementation of IoT driven automation and control has enabled pumps to a more sophisticated where the charges are based on the time rented equipment was in use.

Reactive to Predictive Condition Monitoring

Condition monitoring is a methodology for observing a parameter related to the health of a machine or system. Deploying sensors and further analysis of the data using artificial intelligence has enabled the companies to move from Reactive to Predictive Condition Monitoring. The goal is to distinguish or filter out a responsible component or portion that is leading to performance deficiency. It is by comparing the base line signature (vibration, temperature, pressure etc.) with the signature in the suspected or chosen signature at any other condition not matching with base line. New pump health monitoring solutions combine process and equipment data to drive higher reliability through a more holistic view of pump health.

Some of the innovative methods for increasing pump availability using predictive technologies using IoT are outlined below:



Vibration: Vibration is normal in pipes, but it is important to understand the level and determine the root cause of excessive vibration is crucial. Excessive vibration can be caused by a variety of mechanical or hydraulic issues.

Excessive vibration can damage pipe seals and internal systems. Analyzing Vibration data can give details on the Bearing Fault.

Temperature:

Excessive temperature within a motor can cause damage. Temperature within motors can increase for a variety of reasons, including ambient temperature or mechanical issues.

Cavitation:

Cavitation is the formation of vapor cavities in a liquid. Cavitation may occur when the liquid pressure falls below its vapor pressure, bubbles form and, as the pressure rises, the bubbles implode causing mechanical damage on impellers and interior pump case surfaces. When the vapor cavity rapidly collapses, it can cause shockwaves – or vibration – throughout the system that can harm internal mechanisms. This state, can damage pump components, disrupt flow, accelerate bearing wear, and lead to seal failure. Cavitation detection through a combination of pressure and vibration monitoring. Some advanced pump monitoring solutions monitor discharge pressure fluctuations to give “pre-cavitation” alerts when cavitation is suspected.

Pressure:

Excessive pump case pressure or pressure spikes can damage pump seals – especially in an aging infrastructure. Pressure spikes are particularly common during pump starts/stops.

Current Fluctuations:

Motor heating caused by current overloads or locked rotor conditions can cause damages. Some of the sensor measurements to detect pump fault conditions are outlined below:

Fault Condition	Vibration	Pressure			Temperature
		Discharge	Differential	Seal Fluid	
High Vibration	X				
Cavitation	X	X			
Bearing Fault	X				
Pre-cavitation		X			
Low Head		X	X		
Low Discharge		X			
Seal Pressure			X		
Low Suction			X		
Low Flow			X		
Strainer Fault			X		
Seal Failure				X	
Bearing Temperature					X

About Accrete Solutions

Accrete Solutions is a leader in SAP EAM implementations and have a long track record of success in the space, uniquely combining SAP EAM capabilities with a real-world IoT device connectivity platform. Accrete offers an End-To-End Smart SAP EAM IoT enabled solution to customers. Let us connect to schedule a presentation to showcase the IoT platform, which manages 6+ million devices connected to 200+ command centers generating 22+ million records per day. Smart EAM IoT Platform can offer you measurable improvements in Asset Performance, Regulatory Compliance, Proactive Maintenance, and increased Customer Satisfaction.

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