Predicting Agitator Failures: What are the Triggers?

Challenge Description:

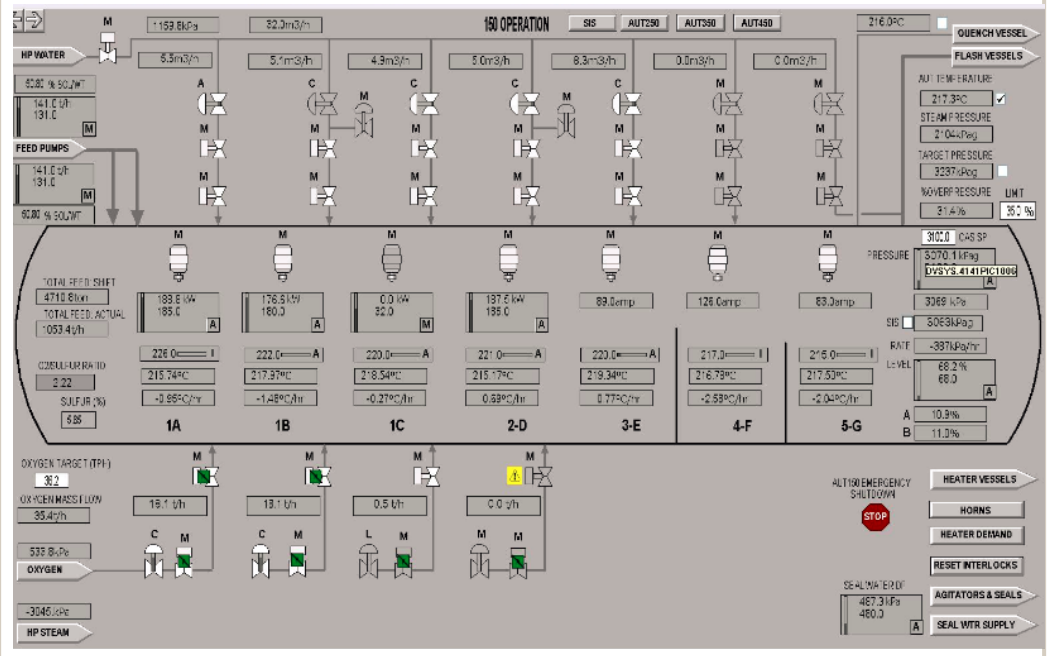
The challenge is to study the various parameters available and predict failure conditions of an agitator. Could a platform be designed to monitor and understand the relationship between parameters that could cause an agitator to fail?

User Story

The autoclave circuit uses high pressure (4000 kPa) and high temperature (250C) to remove sulfide minerals from gold through an oxidation process. A slurry is fed into the autoclave, mechanical agitators mix the slurry and oxygen is injected at the bottom of the mixer impeller for greater dispersion. At Barrick's Pueblo Viejo operations, the autoclave circuit at its processing plant is divided into 4 separate trains. Each autoclave has 7 agitators and is identical in configuration. There have been a few instances in the past when an agitator failed and caused a plant shutdown. The impact of an agitator failure on both production and safety are relatively high. For example, when an agitator fails it causes a plant shutdown, which costs over $150,000 per hour. There are several variables in the plant that are directly or indirectly responsible for these failures; understanding these underlying relationships are crucial to predicting failure condition. As it stands, recognizing failure patterns could be difficult or impossible without the use of data analytics. Using historical data and failure conditions, the task at hand is to build a platform to oversee equipment behavior and issue a warning when there is a statistically significant chance of agitator malfunction.

Potential Areas to consider:

- Is there a relationship between the failure of 2 agitators on 2 different trains?
- Can this information be made visual for the process plant operator, i.e. on a p-f curve?
- Is it possible to include a pre-processing filter to discount data abnormalities during equipment start-up?



Relevant Data

- Historical autoclave data take from 69 different sources (i.e. parameters) for the last 3 years at Barrick's Pueblo Viejo processing plant.

Challenge Owner:

Tara Rana, Digital Transformation - Enterprise Processing
Patrick Marshall, Project Manager Automated Equipment