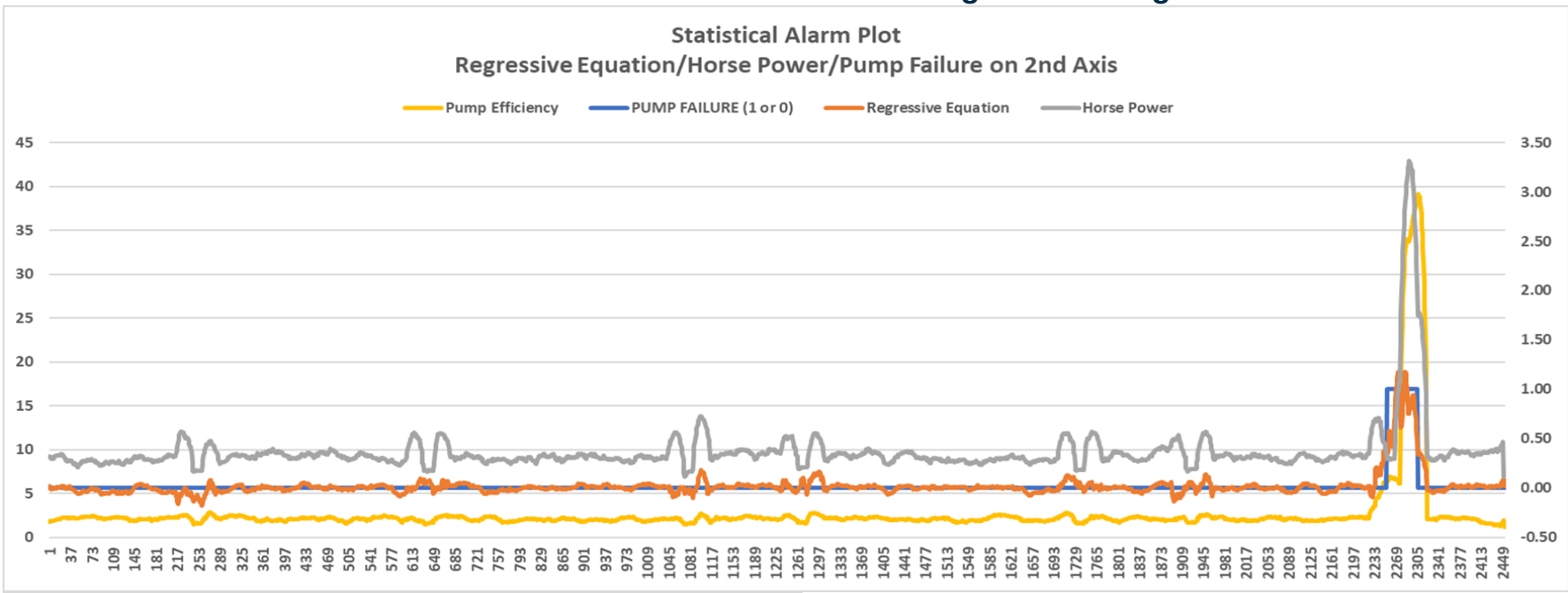
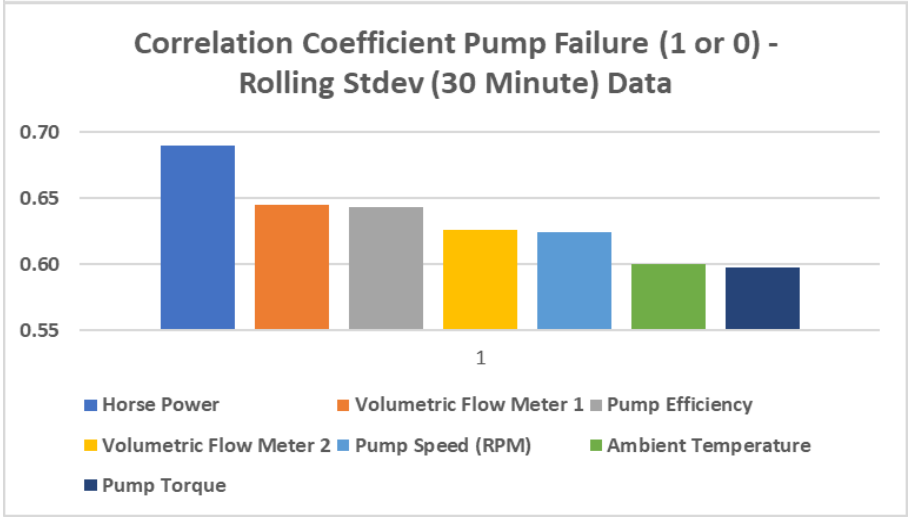
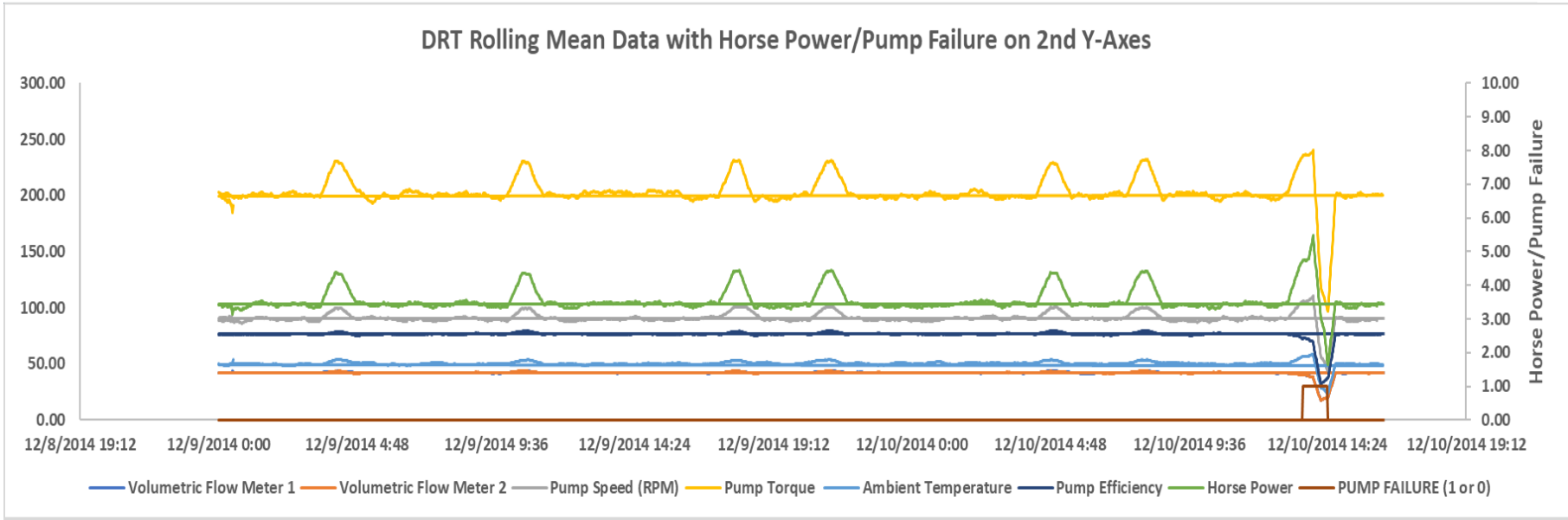
Descriptive and inferential statistical methodologies have proven effective in creating a proactive 'alarm', accurately identifying Pump Failures with Horse Power (HP) and Pump Efficiency (PE) emerging as key variables of interest with deviations of 15 HP and > 3 % PE being our core signal thresholds.

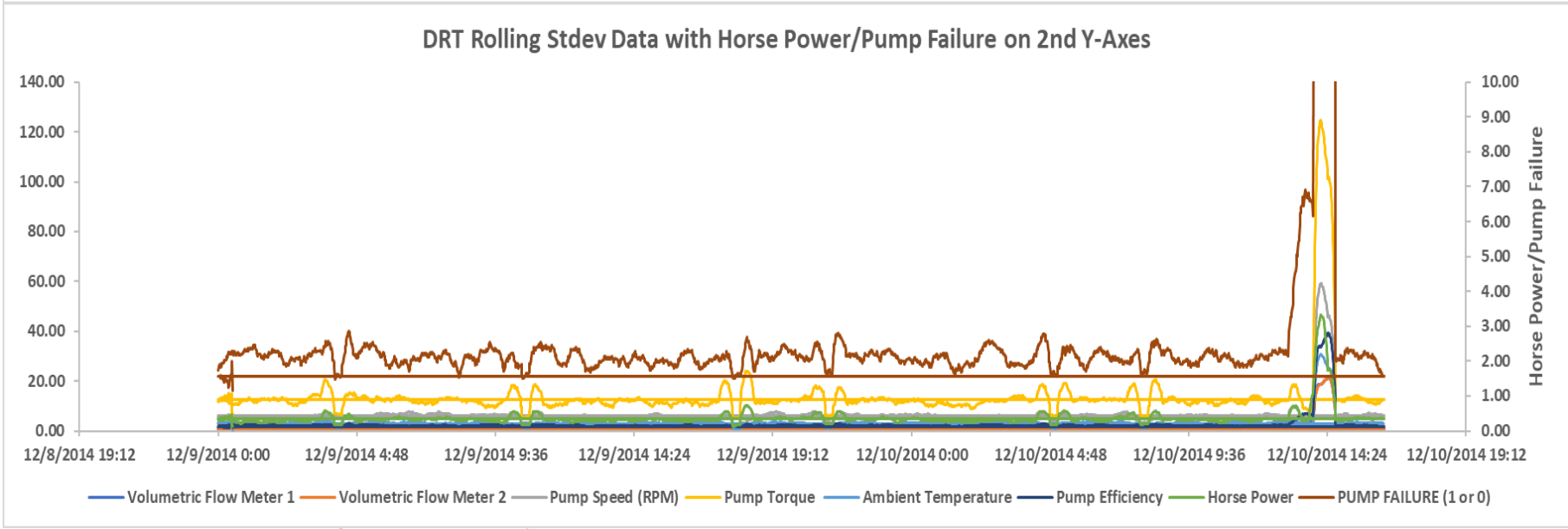




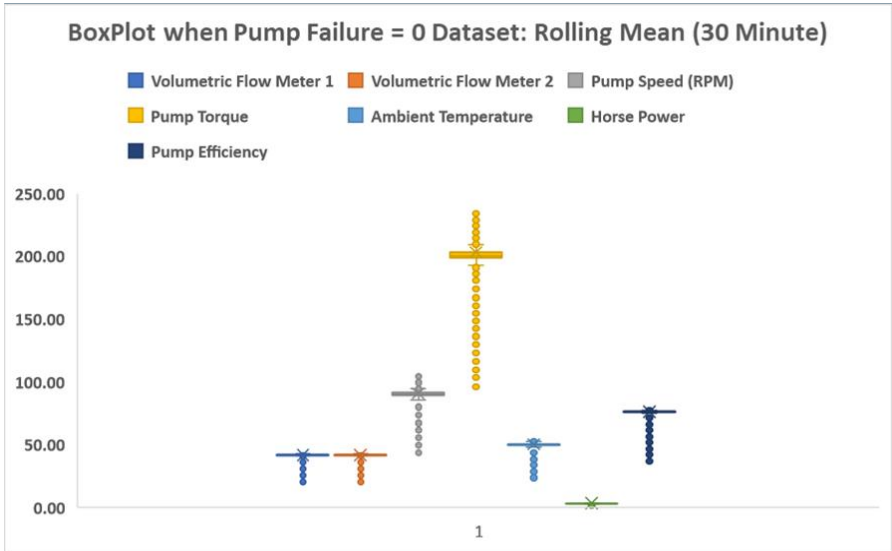
Note: We've included a sample headline for you – you can feel free to use this or modify this as you see fit

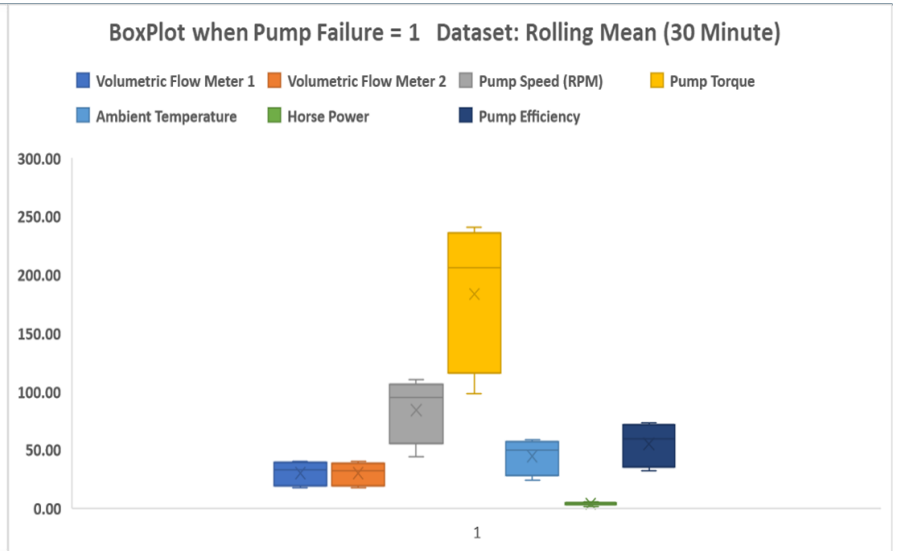
Descriptive Analysis has enabled us to clearly identify particular signature abnormalities showing clear signature changes in both Rolling Standard Deviation and Rolling Mean Datasets when observed over the respective failure period of interest.

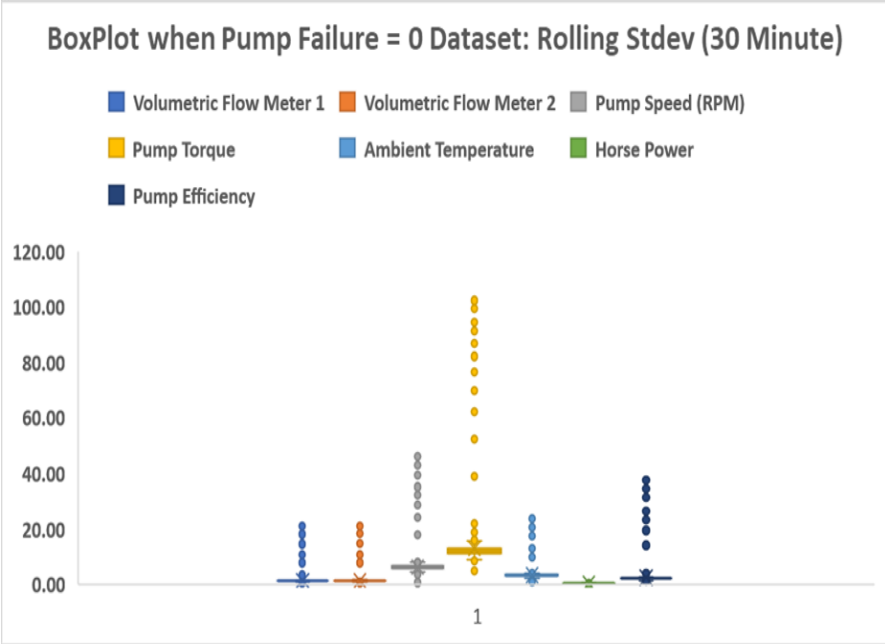


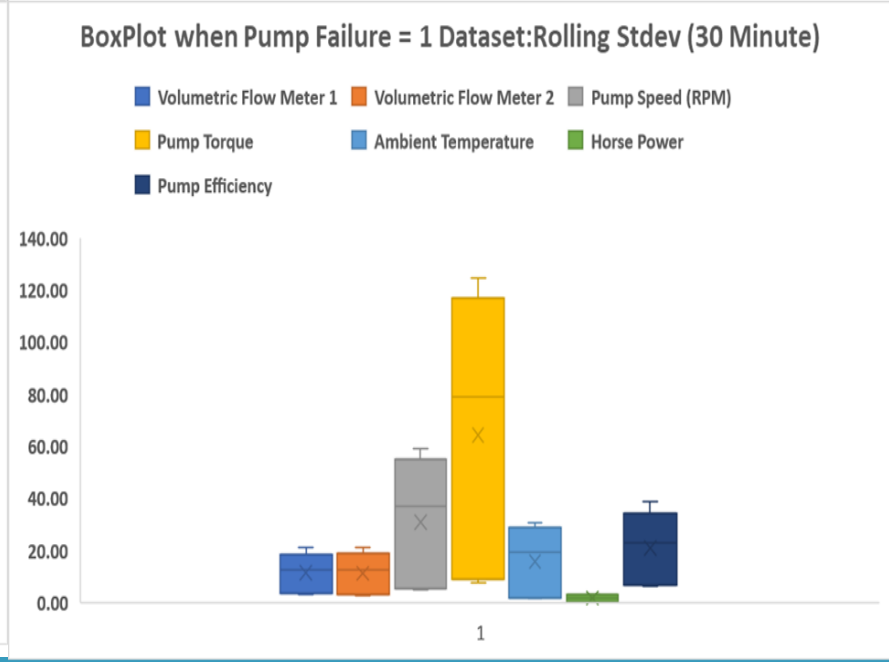


Further segmentation of the data via binary means (Pump Failure = 0 or 1) illustrated through <Rolling Stdev plots>, show a clear signature difference between that of normal behaviour and that of Failure with Pump Torgue, Pump Speed, Volumatric Flow Meter 1 showing the 3 largest variances.

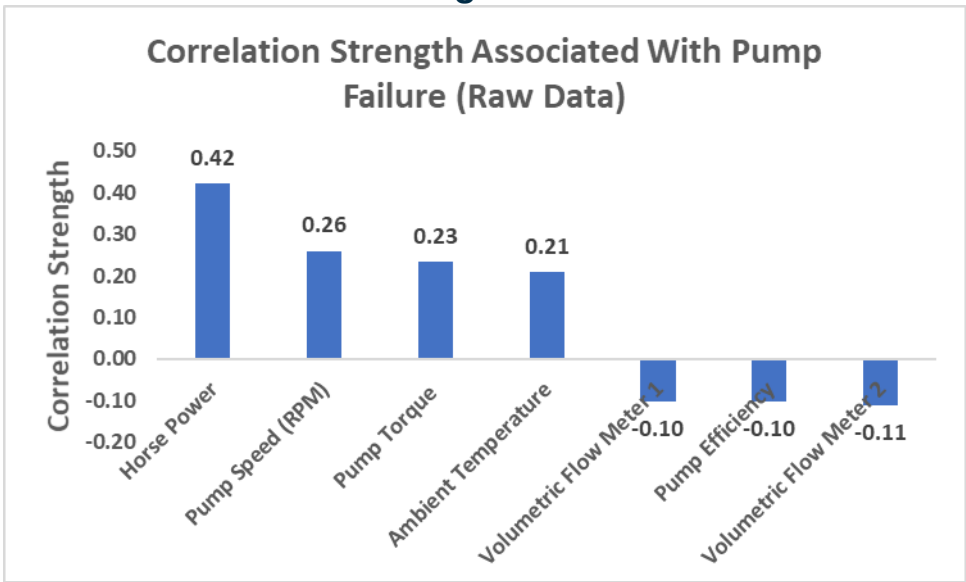


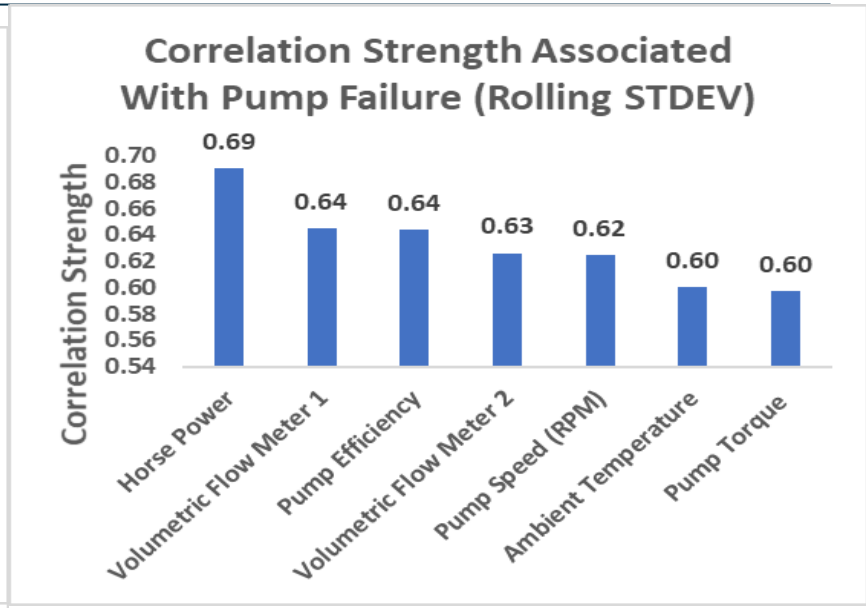


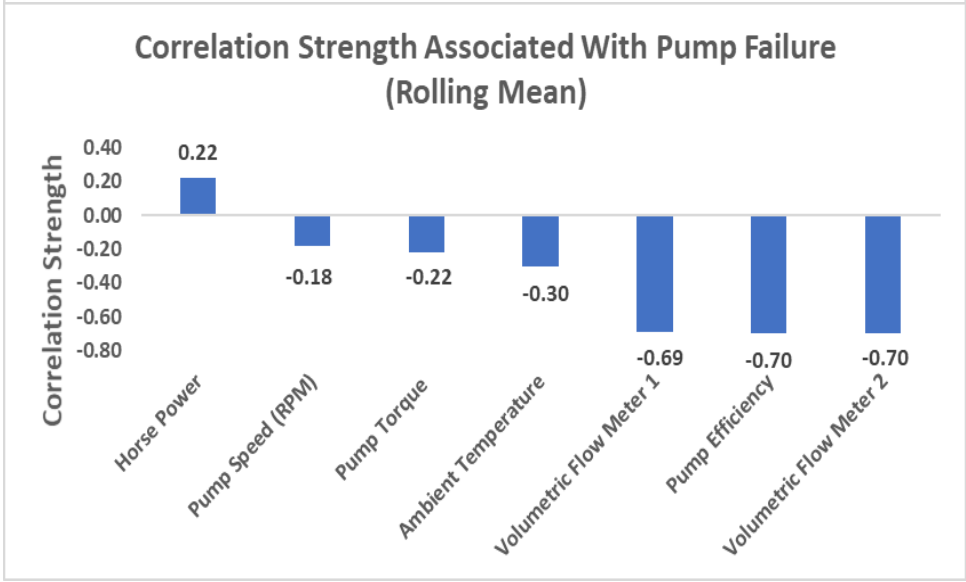




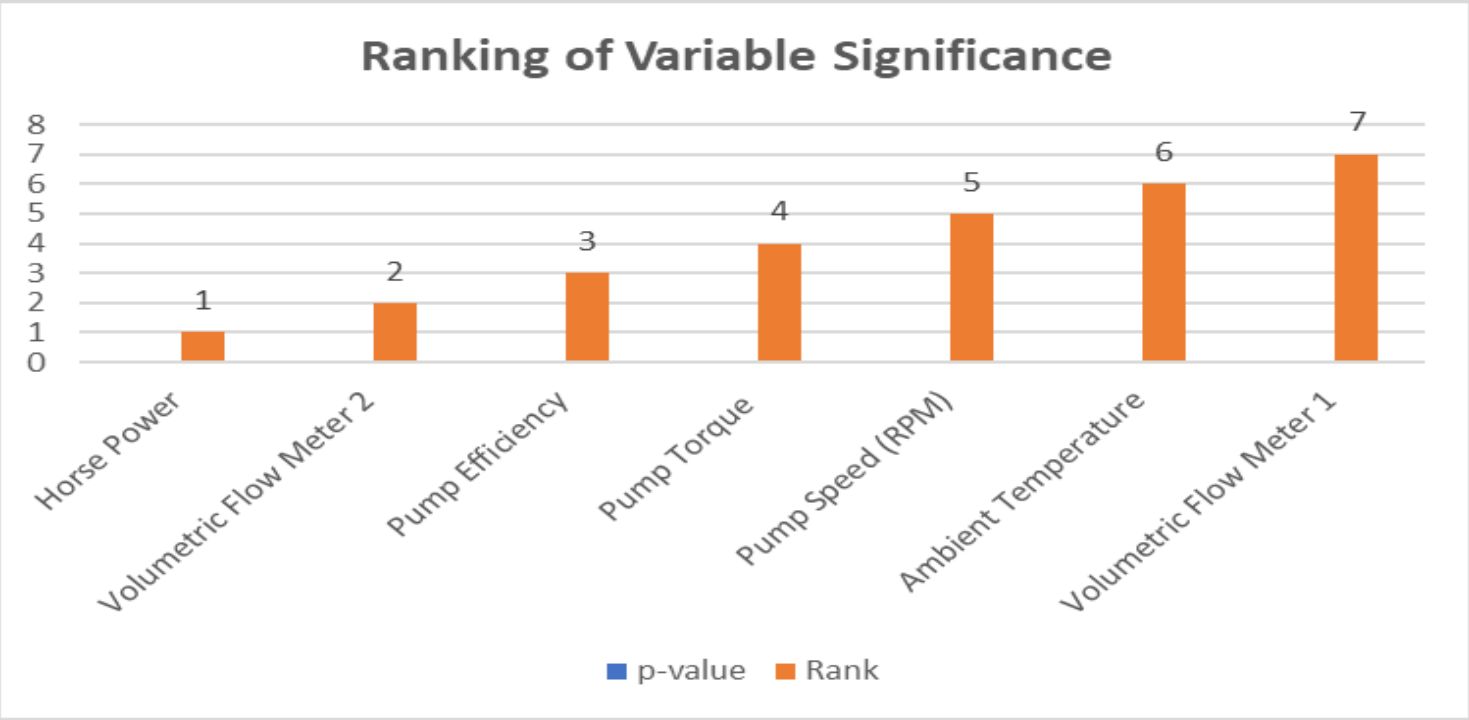
Correlation analyses across datasets yield particularly interesting insights with Pump Efficiency and Volumetric Flow Meter 1 negatively correlated with Pump Failure in the <Rolling Mean> Data, whilst Pump Efficiency and Volumetric Flow Meter 1 show a subsequently strong <positive/negative> correlation in the <Rolling Stdev> Dataset.







Lastly, analysis of the statistical significance of variables contributing towards Pump Failure reveal that with a R Squared of 0.778, a linear model is a <good> fit for the data with both Rolling Mean and Rolling Standard Deviation datasets contributing key information to understand Pump Failure mechanics.



Variable	P-Value Significance	Rank
Horse Power	3.5524E-219	1
Volumetric Flow Meter 2	2.033E-174	2
Pump Efficiency	2.592E-152	3
Pump Torque	1.0551E-102	4
Pump Speed (RPM)	1.68299E-19	5
Ambient Temperature	4.20516E-09	6
Volumetric Flow Meter 1	4.01554E-07	7