Exclusive Value Adding by iCenter Analytics on Transient Condition

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Abstract : During decades of Baker Hughes (BH) iCenter experience, it is demonstrated that in addition to conventional insights on equipment steady operation conditions, insights on transient conditions can add significant and exclusive value for anomaly detection, downtime saving, and predictive maintenance. Our work shows examples from the BH iCenter experience to introduce the advantages and features of using transient condition analytics: (i) Operation under critical engine conditions: e.g., high level or high change rate of temperature, pressure, flow, vibration, etc., that would not be reachable in normal operation, (ii) Management of dedicated sub-systems or components, many of which are often bottlenecks for reliability and maintenance, (iii) Indirect detection of anomalies in the absence of instrumentation, (iv) Repetitive sequences: if data is properly processed, the engineering features of transients provide not only anomaly detection but also problem characterization and prognostic indicators for predictive maintenance, (v) Engine variables accounting for fatigue analysis. iCenter has been developing and deploying a series of analytics based on transient conditions. They are contributing to exclusive value adding in the following areas: (i) Reliability improvement, (ii) Startup reliability improvement, (iii) Predictive maintenance, (iv) Repair/overhaul cost down. Illustrative examples for each of the above areas are presented in our study, focusing on challenges and adopted techniques ranging from purely statistical approaches to the implementation of machine learning algorithms. The obtained results demonstrate how the value is obtained using transient condition analytics in the BH iCenter experience.

Keywords : analytics, diagnostics, monitoring, turbomachinery

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