Seán Hayes Journal Paper Rev 0D: Ken Bruton Comments Addressed

# Heading Changed

Title changed from:

“Compressed Air System Fault Detection Using Machine Learning for Mode Identification and a Rule-Based Expert System for Performance Degradation Detection”

to:

“Performance Degradation Identification for Compressed Air Systems Using a Hybrid Machine Learning and Knowledge Based Fault Detection and Diagnostic System”

# Results in Abstract

Sentence included giving overview of results from operational trial.

# Reference for Fourth Utility

Reference inserted for compressed air being known as the fourth utility.

# Introduction Revisions

* Moved sentences around to improve flow.
* Included sentences outlining Section 1 says, Section 2 says, etc.

# Section 2

* Reference inserted for presence of sub-optimally running systems
* Reference and quantification inserted for density of CA as a form of energy transport
* Updated table 1 to incorporate planned maintenance and CMMS
* Reference inserted for effectiveness of various maintenance programs
* Changed timescale to timed
* Merged sentences of requirement for human expert intervention
* Reworked sentence outlining Pharmacy Building compressed air system
* Moved sentence giving most common types of compressor in industry
* Included representative references at first mention of current research into performance management
* Changed “Review” to “Paper”
* Added references to subsection 2.1
* Comment added on data availability and non invasiveness to subsection 2.2
* Added references to subsection 2.2
* Comment on multiple symptomatic faults
* References added to subsection 2.3

# Section 3

* Comment that nomenclature was developed for this research
* Changed all instances of “flag” to “highlight”
* Used newer reference for expert system deployment for air compressors
* Deleted repetition of compressor type
* Commented on heuristic development of threshold values
* Commented that rule 13 could also be a leakage
* Deleted repetition of explanation of adiabatic and polytropic compression

# Section 4

* Commented on typical use of K-means clustering
* Replacement of trial with analysis
* Brought subsection 4.1 back into section 4

# Section 5

* Diagram and description of overall implementation methodology inserted
* Comment that all rules were tested, and rule 14 is analysed in detail
* Comment that the compressed air is actually picking up excess heat, ruling out a sensor fault

# Section 6

* More discussion of results, problems encountered etc. included