ADVISORY NOTE
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Using Analytics for Improving Building Performance

Advances in digital technology are providing valuable information to help improve the operation and maintenance of installed building systems including HVAC, electrical and lighting systems, and lifts and escalators.

New technology is facilitating the cost effective acquisition of detailed information about plant assets and their real-time operation. This powerful asset management system and 'rules based' analytics software enables us to sort, assess and evaluate this new wealth of data to provide powerful insights into how to better manage, operate and maintain building services systems for improved systems performance, life cycle cost and energy efficiency outcomes.

There are broadly two approaches that are being applied, these can be termed Asset Analytics, and Operational Analytics. Whilst separately effective, when used together they provide particularly good insights to support improved performance, plant reliability, and reduced asset life cycle costs and overall maintenance and energy spends.

Asset Analytics considers both the static physical, and historical attributes of an asset including make, model, age, installed environment, condition rating, hours of operation, maintenance and repair history and expenditure.

Low cost and large scale acquisition of this data is now enabled through the development of 'asset apps' to support the field collection of information, and powerful data storage and manipulation capabilities. This data can be analysed to develop and support tailored predictive maintenance programs that are a 'best budget fit' for the needs of the equipment and its purpose, and inform capital upgrade and or replacement plans, ensuring money is spent where it's needed. Whilst predictive, and condition based maintenance has long been widely applied in industry, its application in the built environment has often been limited by cost and capability to large items of equipment such as chillers, and plant and systems serving critical facilities.

Operational Analytics considers the real-time operational performance of systems and equipment to identify poor or out of specification performance, inefficient operation, wear and malfunction, incorrect interaction between system elements and system instability.

Operational analytics is not a new concept, and has previously been carried out as a manual intervention by specialist technicians using the Building Management and Control System (BMCS) as part of fault finding and fine tuning of building services systems. What is new is the emergence of software that continuously acquires and analyses detailed operational data from the BMCS.

This uses an automated 'rules based' data analysis approach to look for system operational and maintenance issues that would previously have been masked or hidden. Once identified these issues can be rectified with adjustments to control strategies or settings, or through targeted maintenance activities. These rules can be complex, or as simple as identifying heating and cooling operating concurrently.

These software systems are typically deployed either via a direct link into the BMCS database or by duplicating the BMCS field points into a separate module. In either case, care must be taken not to place undue burden on the performance of the BMCS. It also should be recognised that many BMCS have in-built automated analytics capabilities which can often be programed to provide real-time graphical visualisation of system operation to highlight issues, capture operational data in trend logs, and apply rules to determine alarm conditions. This capability should be reviewed before implementing additional operational analytics software applications.

Together Asset and Operational Analytics can offer particularly valuable insights; with asset records providing the historical financial and technical framework for decision making, and operational analytics identifying issues in real time. This enhanced information base can underpin significant improvements in building services asset management and targeted maintenance resulting in lower overall costs, improved system performance and enhanced energy efficiency.

For more information on Asset and Operational analytics please contact:

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