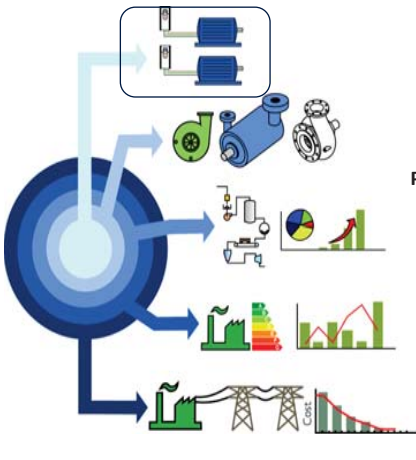


Electromachinery - Work Package 1

ABB Corporate Research Center, Cracow & Cracow University of Technology

WP 1 in Energy-SmartOps.



Fault diagnosis

Equipment monitoring

Advanced control

Parameter identification

Real-time optimization

Maintenance

Scheduling

Optimization

Process industries

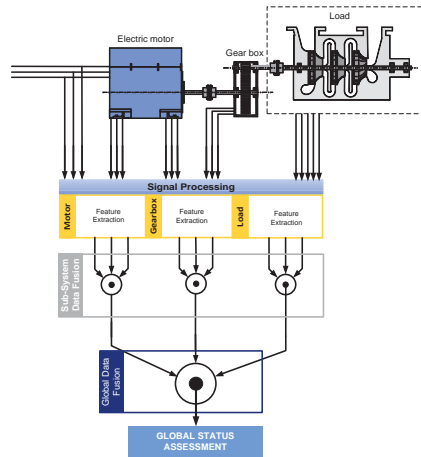
WP 1 Objectives

Modelling of electromechanical system with effects of interactions for diagnostic purpose

Undertake data capture, conditioning and analysis with advance signal processing methods for diagnosis of electrical/mechanical interactions

Create diagnostic algorithms based on intelligent calculation (neural network, fuzzy logic, pattern recognition) for machines assessment in industry electric drives.

Develop a systematic framework for increasing diagnostic reliability through combination of global diagnostic signals or diagnostic indicators



EARLY STAGE RESEARCHERS IN WORK PACKAGE 1

Alejandro Fernandez.



Cracow University

Continuous and discrete time dynamic models of induction motor and fault diagnosis.

Jose Gregorio Ferreira



Cracow University

Condition monitoring of electric drives system using advance signal processing methods.

Victor Jaramillo



ABB - Cracow

Data Fusion of different condition monitoring indicators on electric drives systems.

Cristóbal Ruiz



Cranfield University

Multivariate statistical process predictive monitoring using operational data

Giampaolo Torrisi



ETH Zurich

Loss modelling and control of electrical drives

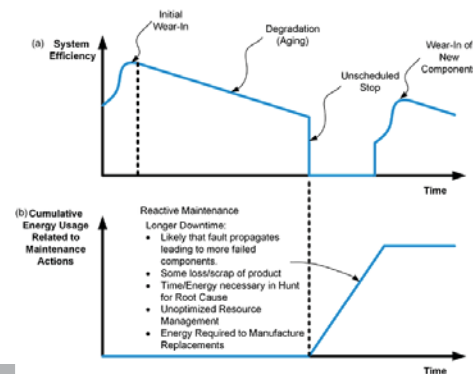


Figure 1: Schematic showing how (a) the efficiency and (b) the amount of energy required for maintaining a particular system varies with time when no condition monitoring is employed.

Condition Monitoring and its Link to Energy Savings.

Addressing technology gaps at the interfaces between the process, mechanical and electrical domains, and realizing energy savings from integrated operation are the cases that motivate and are pursued on this work package.



Integrated systems demands continuous information of the assessment of their components; the control and operation of processes, rotating machinery and electrical equipment is becoming more integrated giving new opportunities for energy saving through equipment management, automation, and optimization

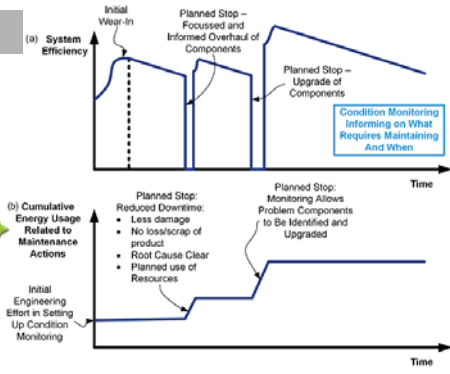
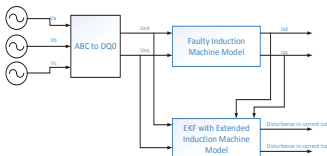


Figure 2: Schematic showing how (a) the efficiency and (b) the amount of energy required for maintaining a particular system varies with time when condition monitoring is employed.

"The goal of this research is to achieve continuous and discrete time dynamic models of induction motor under fault condition suitable for drives applications and fault diagnosis. Moreover, as secondary objectives, develop algorithms for machine parameter identification and Motor Current Signature Analysis (MCSA)". Alejandro Fernandez



"Developing a smart multivariate method capable of early fault detection is the aim of this research. It is intended to identify which mechanical or electrical signals are best suited to monitoring and prediction of faults in electrical machines. Integrating the condition of the system assessment it might lead to improvements in efficiency." José Gregorio Ferreira



"The purpose of the tasks in the work package is to Identify potential global indicators that could point to specific faults in systems comprised of several components, in this sense novel technique for the Data Fusion of different condition monitoring indicators has been developed." Victor Jaramillo

