



©KenzFigee 2020-Condition-Based Monitoring

Condition-Based Monitoring

REDUCE UNPLANNED DOWNTIME WITH CONDITION-BASED MONITORING WARNINGS ON THE OPERATOR SCREEN.

Is a Condition-Based Monitoring solution of interest to you? Our specialists will be happy to discuss any specific needs and to advise you, as the possibilities are enormous!

INTRODUCTION

A TAILOR MADE TOOL TO REDUCE UNPLANNED DOWNTIME

Reduce unplanned downtime by using Condition-Based Monitoring warnings on the operator screen. A data analysis module calculates the Estimated Time to Maintenance based on available measurements and triggers on-time warning messages to the control system. The operational team can act accordingly to prevent unplanned downtime.



Condition-Based Monitoring is a tailor made solution. The possibilities are enormous. These depend on the available measurements and systems. The hardware required can range from fitting a Data Analysis module and an update of the crane control system to installing additional measurements and upgrading the control system entirely.

CONDITION-BASED MONITORING

Condition-Based Monitoring is the step forward to Predictive Maintenance. Predictive Maintenance can only be applied, when the status (condition) of the equipment is assessed. While monitoring the equipment the analyzing tool will inform the operational team on the condition of the system. By comparing the condition of the system with pre-defined thresholds, warning messages will trigger the operational team to perform maintenance.

Within the maintenance spectrum, Predictive Maintenance shows balance between efficiency and unplanned downtime, see figure 1.

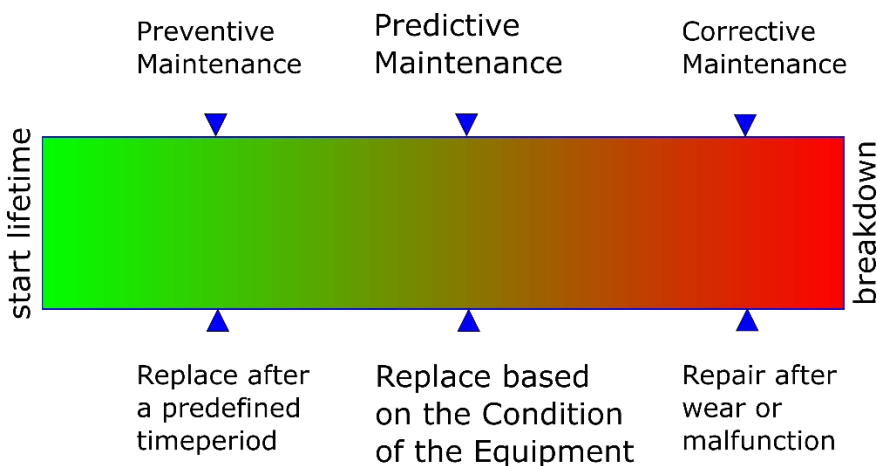


Figure 1: Maintenance spectrum

Predictive Maintenance followed by Condition-Based Monitoring is a tradeoff between using the equipment to the fullest with a high risk of unplanned downtime and prematurely replacing still healthy parts.

The Condition-Based Monitoring system combines measurements to assess the condition of the equipment. In most cases, one symptom is not enough to draw a conclusion on the health of a system. Only measuring the number of cycles an equipment has performed is not enough. The number of cycles under certain load is better. The combinations used are a result of the laws of physics, datasheets and years of experience building lifting equipment.

HARDWARE

A typical hardware setup is given in figure 2.

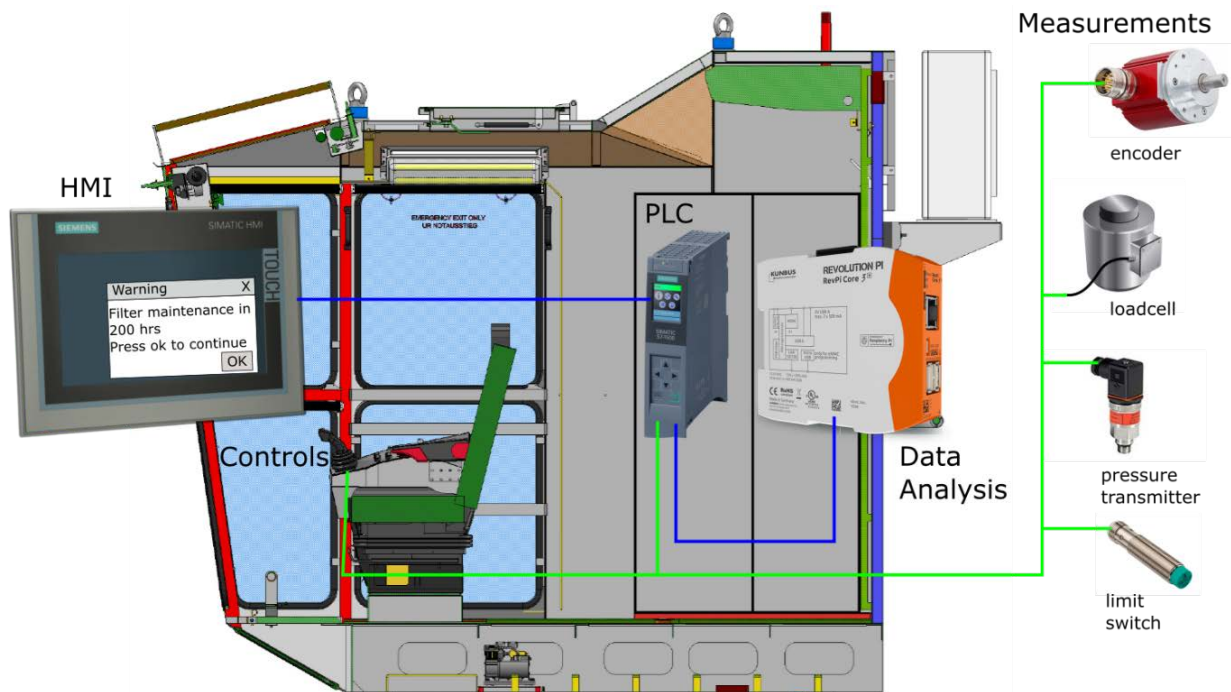


Figure 2: Hardware setup

DATA ANALYSIS MODULE NEW

The Data Analysis module will be configured, based on the available data sources in the PLC. It will combine and extrapolate data in order to produce informative messages that will give a clear insight in the appropriate action. The messages are to timely plan maintenance work in the most convenient window.

An indication on components that qualify for Condition-Based warning messages are:

1. Slew pumps
2. Hoist pumps
3. Luffing pumps
4. Auxiliary pumps
5. Luffing sheaves
6. Hoist sheave
7. Hoist motors
8. Slew motors
9. Luffing cylinders
10. Boom bearings
11. Encoders
12. Transmitters

HMI

The HMI (Human-Machine Interface) screen receives messages from the Data Analysis module via the PLC on the maintenance state of the equipment. The operator will be informed with messages on the screen and can act appropriately.

PLC

The PLC (Programmable Logic Controller) collects data from all the measurements connected to the PLC and in addition, the control commands of the operator. The PLC serves as a data source for the Data Analysis module. Only data sources that are available in the PLC can be used for Condition-Based Monitoring in the Data Analysis module.

CONTROLS

The operator controls are considered a data source and are used to calculate the Estimated Time to Maintenance on which the warning messages are based.

MEASUREMENTS

The amount and type of measuring points vary for each type of equipment and determine the level of available warnings. Each equipment will be individually assessed based on the available measurements.

The more encoder, load cells, transmitter and switches available, the more accurate the messages will be.

In a Condition-Based Monitoring assignment an advice to increase the observability of the equipment can be given.