Case Study

Plant FCA Verrone, Italy

*World Class Manufacturing*

CBM
Condition Based Maintenance
- Monitoring in real time -

ifm electronic

Date: December 1, 2015
Version: 1
1. Document change history

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2. Contacts

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3. What’s behind

Fiat Verrone in Italy is producing gearboxes / transmissions.

This example shows which kind of datas are evaluated in the different machines and processes and how they are collected.

In this study we have a look at the following operations:

- OP.310 - Groove grinding
- OP.320 - Contour grinding
- OP.320 - Contour grinding
- OP.330 - Teeth grinding
- OP.350 - Shot-peening
- OP.340 / 360 - Washing

**Indication**

Sensors control vibrations of all axes of rotation.

All linear axes placed directly involved in parts production.

All pump high pressure size of more than 5 kW.

To be installed on machine tools:
Presssure sensors, flow, temperature with analog out 4-20mA scalable.

Can be connected to VSE100 control units;
VSE100 interconnection via Industrial Ethernet switch Cisco IE3000.

Through a cycle "empty" dedicated to the machine tool,
Once per shift will be performed vibration measurements by sensors installed.
4. Overview – machine types / data evaluation and -collection

- Continuous condition monitoring of machines and systems
- Values in real time
- Time quality check
- Trend analysis
- Presentation of limit values
- Telemonitoring everywhere
- Display and evaluation of all process parameters

- Process data acquisition of all available parameters
- Evaluation to DIN ISO 5591 (vibration)
- Visualization and evaluation with trend displays for pressure, flow, temperature, rotational speed, vibration
- Organization and planning of maintenance tasks
- Data provision for higher-level systems (ERP, SAP, HANA, MI, MF)
- Pre-alarm and alarm escalation chains
5. **OP.310 / OP.320 Groove and contour grinding**

![Diagram of OP.310 and OP.320 with Groove grinding Junker EJ 50 tg. 081240030 and Contour grinding Junker EJ 50 tg. 081240028]

**JUNKER 081240028 / 081240029 / 081240030**

Diagnostics electronics for vibration sensors
- VSE100
- VSE100
- VSE100

Vibrational sensor
- V1: Piece spindle
- V2: Grinding spindle
- V3: High pressure pump
- V4: Axis X
- V5: Axis Z
- V6: Tailstock

Analog sensor
- High pressure pump
  - PR2: Pressure sensor
  - FL2: Flow sensor

Hydraulic unit
- PR2: Pressure sensor
- FL2: Flow sensor
- T2: Temperature sensor
6. OP.330 Teeth grinding

**REISHAUER 081240019 / 081240021**

**Diagnostics electronics for vibration sensors**
- VSE100
- VSE100
- VSE100

**Analog sensor**
- **High pressure pump**
  - Pressure sensor
  - Flow sensor
  - Temperature sensor

**Vibrational sensor**
- Piece spindle 1
- Piece spindle 2
- Grinding spindle
- Spindle C3
- Axis Y
- Axis A
- Axis X
- High pressure pump

**Teeth grinding Reishauer t.g. 081240019**

**Teeth grinding Reishauer t.g. 081240021**
7. OP.350 Shot-peening

OP.350

Shot-peening Sisson
tg. 081240006

SISSON 081240006

Diagnostics electronics
for vibration sensors

VSE100

Vibrational sensor

V1: Axis X
V2: Axis Z
8. OP.340 / 360 Washing

Data collection / SMART Observer

9. Data collection via Hubs
9. Data collection / SMART Observer

![SMART OBSERVER SOFTWARE](image-url)
10. Visualization

![Graph showing data trends over days with thresholds for trend, pre-alarm, and alarm levels.](image-url)
11. Objectives of the Condition Based Monitoring

- Continuous condition monitoring of machines and systems
- Values in real time
- Time quality check
- TreReal nd analysis
- Presentation of limit values
- Telemonitoring everywhere
- Display and evaluation of all process parameters
- Process data acquisition of all available parameters
- Evaluation to DIN ISO 50001 (vibration)
- Visualization and evaluation with trend displays for pressure, flow, temperature, rotational speed, vibration
- Organization and planning of maintenance tasks
- Data provision for higher-level systems (ERP, SAP, HANA, MII, ME)
- Pre-alarm and alarm escalation chains