VESKi

# FAULT ANALYSIS PROCESS HYDRO

| | FAULT DETECTION & CORRESPONDING MEASUREMENTS | Bearing vibrations | Relative shaft vibrations | Bearing temperatures | Turbine cover vibrations | Air gap | Magnetic field | Stator core vibrations | Stator frame vibrations | Generator temperatures | Process quantities | Cavitation | Electrical quantities | Partial discharge | Hydraulic quantities |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEASUREMENT | | | | | | | | | | | | | | | |
| FAULTS | Mechanical unbalance | 1x • | 1x • | | | | | | | | | | | | |
| | Electrical unbalance | 1x • | 1x • | | | | • | | | | | | | | |
| | Loose rim | 1x • | 1x • | | | 2x • | • | | | | | | | | |
| | Hydraulic unbalance | 1x, nx • | • | | • | | | | | | | | | | • |
| | Misalignment | 1x, 2x • | 1x, 2x • | | | | | | | | | | | | |
| | Eccentricity of stator androtor | | DC • | | | • | • | | | | | | | | |
| | Bearing wear | • | | • | | | | | | | | | | | |
| | Stator windings vibrations | | | | | | | 100Hz 200 Hz • | 100Hz 200 Hz • | | | | | | |
| | Insulation wear | | | | | | | | | | | | | • | |
| | Rotor shape | | • | | | • | • | | | | | | | • | |
| | Overheated stator coils | | | | | | | | | | | | | | |
| | Phase symmetry | | | | | | | | | | | | | | |
| | Bearing stiffness | • | • | | | | | | | | | | | | |
| | Excitation problems | | | | | | | | | | | | | | |
| | Load angle detection | | | | | | | | | | | | | | |
| | Pressure pulsation | | | | | | | | | | | | | | • |

## FAULT ANALYSIS PROCESS

- cross correlation of signal vector components in different operating models (e.g. Run up, steady state, partial load etc.)
- comparision to reference data in different operating models
- change detection
- fault analysis