Fin fan monitoring

Hazardous area installations of the SKF Multilog On-line System DMx

By Dave Mellor • SKF

Introduction

Forced or induced draught fans associated with air cooled heat exchangers are known universally as "fin fans." They may be fitted in large banks to cool process fluids or be an integral part of a gas compression skid. Drive arrangements will vary and may include either belt drive or a gearbox, but all will normally be electric motor driven, sometimes by variable frequency drives.

Fin fans, if monitored at all, have historically been covered by any of the following vibration monitoring methods:

- **Earthquake Switches** to simply send a shutdown contact-closure to a control system (DCS) upon a severe vibration
- **Transmitters** to send a simple 4–20 mA signal to a DCS for indication and trending
- **Scanning Systems** to provide dynamic vibration data updated every few hours
- **Portable Data collectors** to manually collect dynamic vibration data every few weeks

Furthermore, in the hydrocarbon and petrochemical sectors, there is a frequent requirement for instrumentation to be certified for use in ATEX Zone 2 (NEC Class 1 Division 2) hazardous areas.

All the features offered by the monitoring methods – and more - can now be delivered by a single solution; the SKF Multilog On-line System DMx.

SKF Multilog On-line System DMx

The SKF Multilog DMx provides machine protection and condition monitoring in a compact, modular, field-based device that is intrinsically safe for hazardous area use.

SKF Multilog DMx Module.

The distributed nature of the product reduces installation costs which otherwise often exceed half of the project budget.

The typical system schematic illustration shows how an SKF Multilog DMx system can be applied to a bank of four fin fans.

Each fin fan is fitted with two accelerometers, one each on the motor and driveshaft. Two SKF Multilog DMx modules and their IS power supply are located centrally to the four heat exchanger fans.

Twin RS-485 communications links may be used. The first data path is to the DCS for status indication and motor control. In this configuration, the FFT processing capability of the SKF Multilog DMx provides the DCS with enhanced information compared to that of traditional methods:

- Scalar values and alarms based on the vibration of **discrete components –** shaft, belts, gears, bearings – not just a "high vibration" alert
- When using Modbus RTU protocols, data from up to 24 fans (12 SKF Multilog DMx modules) can be accommodated per link
- An optional tachometer sensor per fan may be used to report actual speed, and to determine balance condition

The second RS-485 data path can be utilized where SKF @ptitude Analyst is already deployed. An interface module enables access via an Ethernet LAN to the spectral and other dynamic data captured by the SKF Multilog DMx, for use within a Predictive Maintenance Program.

Typical system schematic
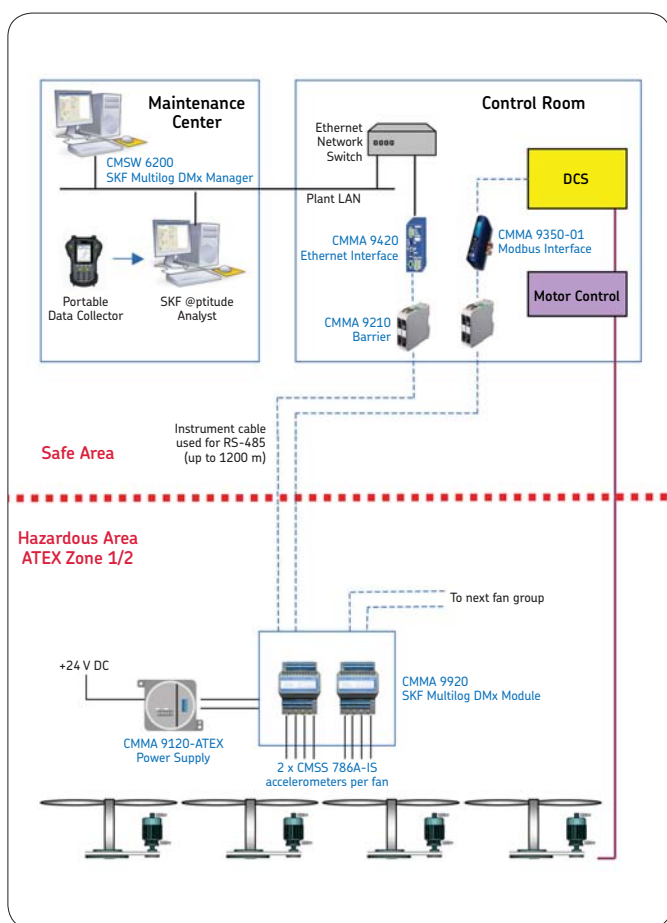
Typical Bill of Material

Item	Quantity	Model number	Description
For a group of four fans			
1	8	CMSS 786A-IS	Accelerometer, 100 mV/g, ATEX certified
2	8	CMSS R6QI-9100-xx	Accelerometer cable assembly, isolated, IP 68 connector, length TBD
(3)	(4)	(CMSS 68/CMSS 958)	(Optional IS eddy probe and cable, to provide fan tacho pulse for speed detection)
4	2	CMMA 9920	SKF Multilog DMx, four channel with transducer power, ATEX certified
5	1	CMCP150-08	Enclosure, NEMA 4X, stainless steel
6	1	CMMA 9120-ATEX	Power supply for SKF Multilog DMx. Input +24 V DC, ATEX certified.
Control room – for all fans			
7	2	CMMA 9210	Barrier, RS-485, GM INT, for SKF Multilog DMx
8	1	CMMA 9350-01	Interface module/protocol converter, Modbus RTU output (other protocols available)
9	1	CMMA 9420	Interface module/terminal server, Ethernet output
10	1	CMMA 9170	Power supply for SKF Multilog DMx interface modules, 110/220 V AC input, +24 V DC output
11	1	CMSW 6200	SKF Multilog DMx Manager configuration software

SKF