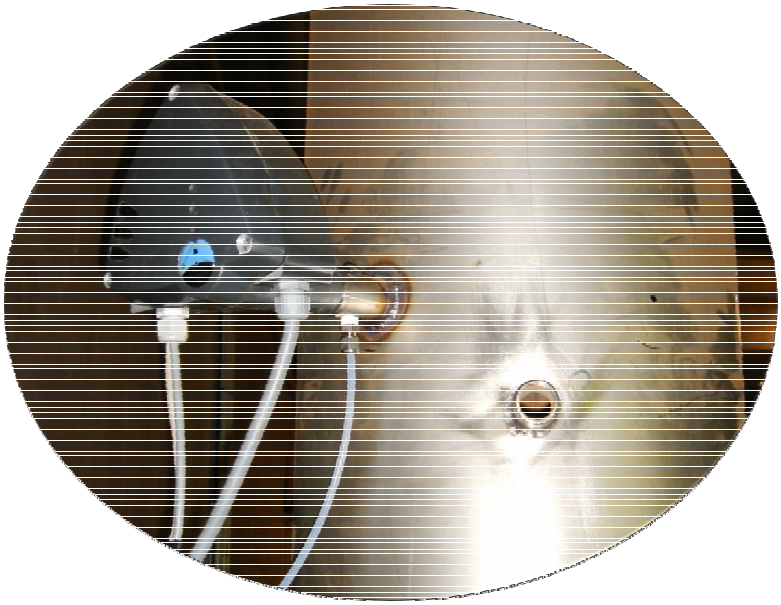
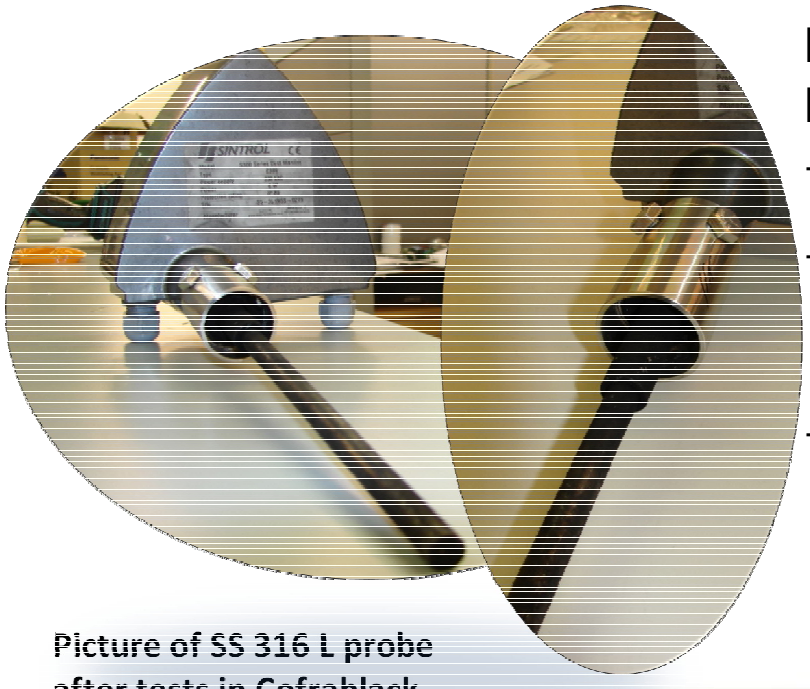
Mechanical Advantages



- Robust design ensures easy installation and maintenance.
- The signal is collected by a stainless steel SS 316 L probe.
  - Can stand heavy conditions such as vibration in process.
  - Can easilly coat with teflon or ceramic material if needed.
  - Easy to clean if necessary.

Mechanical Advantages



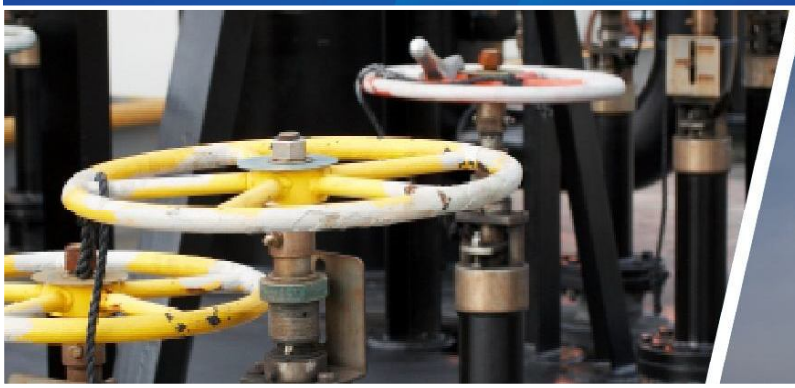
Picture of SS 316 L probe after tests in Cofrablack.

Example from France: Evonik Cofrablack

- **Produced material: Carbon black**
- **High dust concentration together with material high conductivity caused bridging.**
- **After coating probe with teflon there were no grounding problems due to conductivity.**

SINTROL

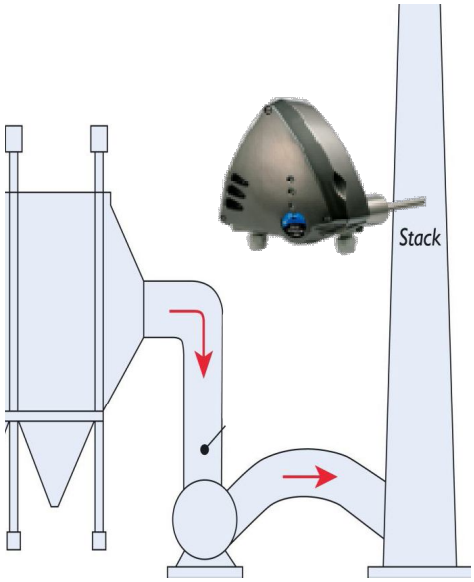
Dust control with a difference



Applications

Optimal Technology and Solutions for Many Applications

Emissions Monitoring



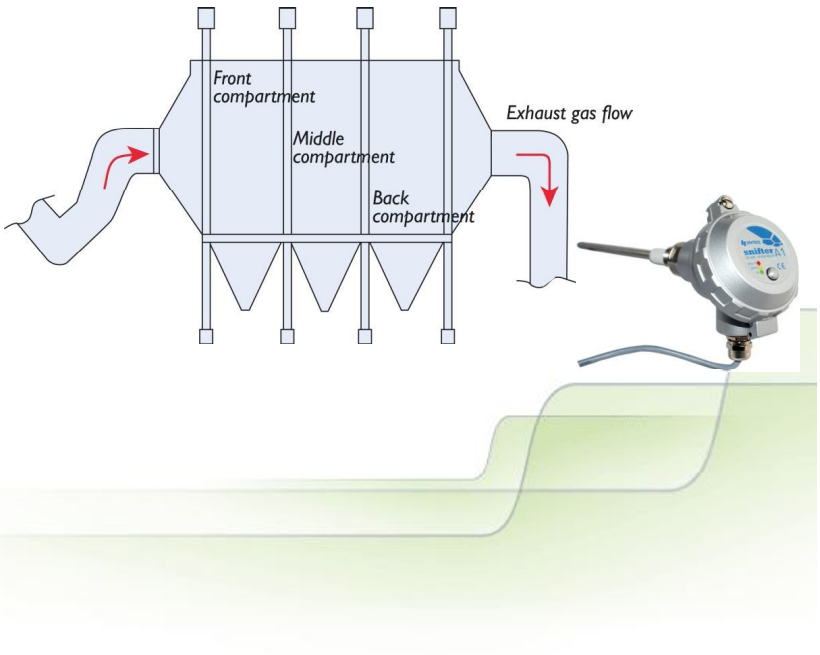
Continuous Measurements

- Snitrol S305 can be calibrated to mg/mg^3 for government reporting
- TUV Certified, complying with EN 14181
- Coated probes available for wet/corrosive environments.
- Installations:
  - India
  - Europe
  - South Africa
  - South America

Process Monitoring

Broken Bag Detection

- Sintrol Snifter can provide relay signals indicating deterioration or breaks in bags.
- mA Snifter available to provide a continuous measurement system.
- Save money on maintenance and prevent downstream equipment.
- Installations Worldwide



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Dust control with a difference

Industrial applications

-Cement (ItalCementi, Lafarge...)
-Pulp and Paper (StoraEnso...)
-Food (Barilla...)
-Metal (Outokumpu,
-Aluminium Corporation of China...)
-Chemical (BASF, Henkel...)

-Filter manufacturers (Donaldson, Omar, AL-KO, Freudenberg, Dantherm Filtration...)
-Electronical industry (Panasonic...)
-And many more: pharmaceutical, crematoriom, refineries, power plants, waste incinerator plants etc.

Conclusions

- *Evolution of triboelectric technology*
- *Validation of measurement pricinple*
- *Triboelectric monitors are a viable alternative for emissions measurement.*
- *Proven application experience worldwide*

Optimal Technology for Dust Measurements Today and Tomorrow

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Thank you!

Monitoring plant assets by optimum selection of "Technology & Methodology"

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ISA(D) POWAT-INDIA 2012, New Delhi January 13th -14th, 2012

imagination at work

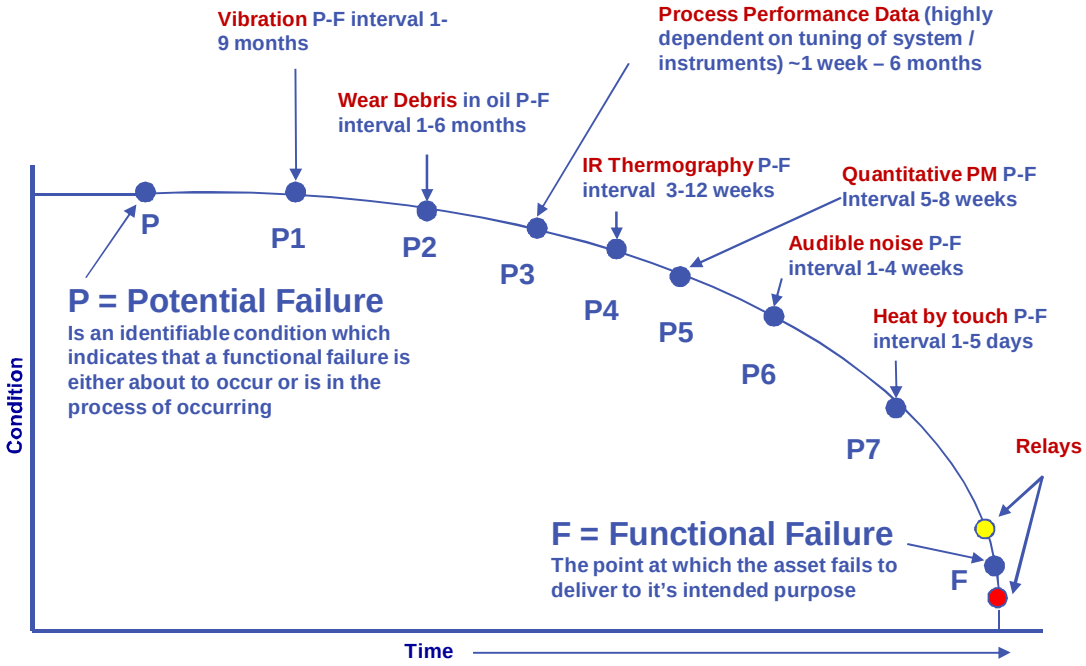
ISA Delhi Section

Outline of the Presentation

- Criticality ranking
  - P-F curve
  - Equipment classification
- Methodology & Technology
  - Selection of transducer
  - Selection of transducer arrangement
  - Selection of vibration monitoring program
  - Critical elements for asset monitoring
  - Preparedness for surprises
- Conclusion
  - Power Plant scenario

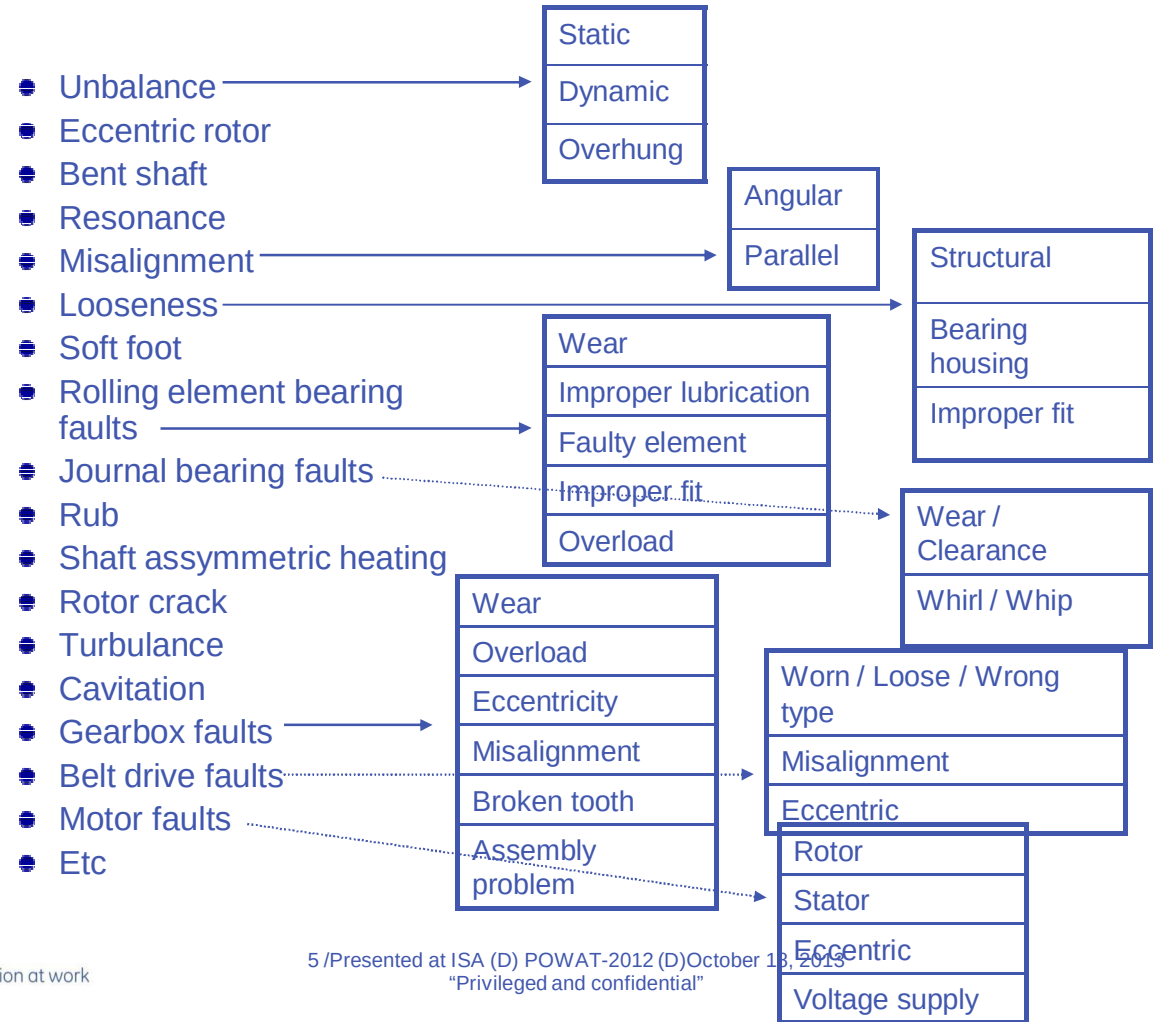
Equipment Criticality Ranking

P-F Curve



Time to get an early warning to plan maintenance

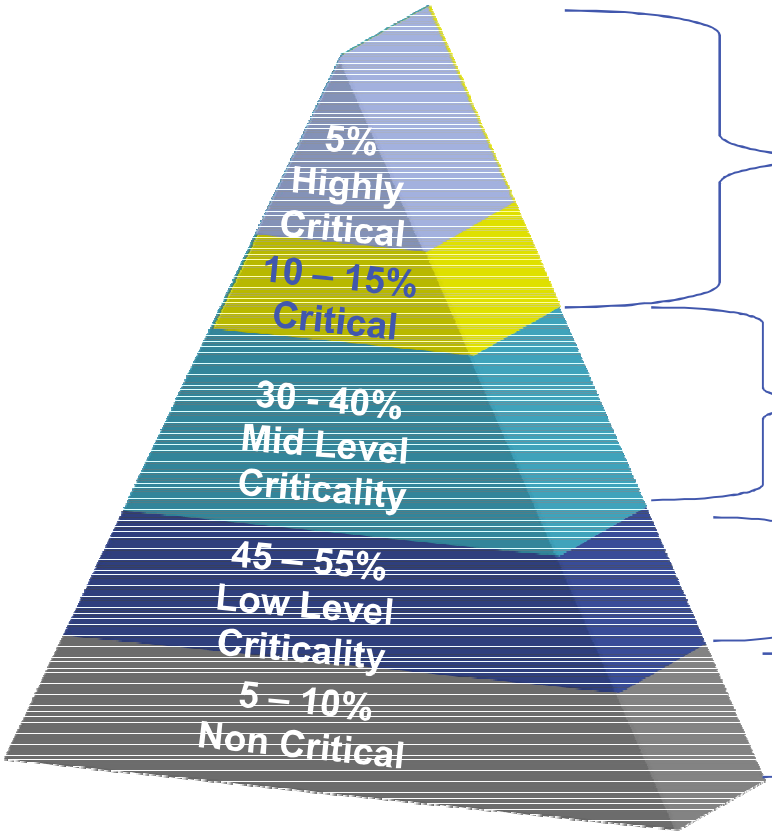
Most Common Problems on Rotating Equipments



Defining the CM Strategy Examples

Factor	W	M	Criteria	ID Fan 270 points	BFWP 240 points	Pulverizer 135 points
Criticality	40	0 2 4 8	Shut down has no efect on production Spared machine, minor product losses Significant product losses Total shut down of the plant	4: Two fans both having 50 % output	2: Two pumps both having 100% output	0: Six pulverizers, each having 33 % output
Capital cost	10	1 2 3 4 5	< 20 k€ 20 – 200 k€ 200 – 1 000 k€ 1 000 – 10 000 k€ > 10 000 k€	2	3	2
RPM	15	1 2 4 8 16	< 100 rpm 100 – 2 000 rpm 2 000 – 5 000 rpm 5 000 – 10 000 rpm > 10 000 rpm	2	4	2
Failure rate	15	1 2 4 8	High reliability Minor problems Sensitive to failures Extremely sensitive to failures	1	1	2
Output	5	1 2 4 6 8	< 5 kW 5 – 50 kW 50 – 200 kW 200 – 500 kW > 500 kW	6	8	4
Environmen	15	1 2 22	Failures have no environmental impact Minor emissions Risk for plant shutdown due to emissions	1	1	1

Plant equipment criticality



Maintenance Strategy

Reliability Centered Maintenance

Failure Mode & Effect Analysis

PM Templates

Run to Failure

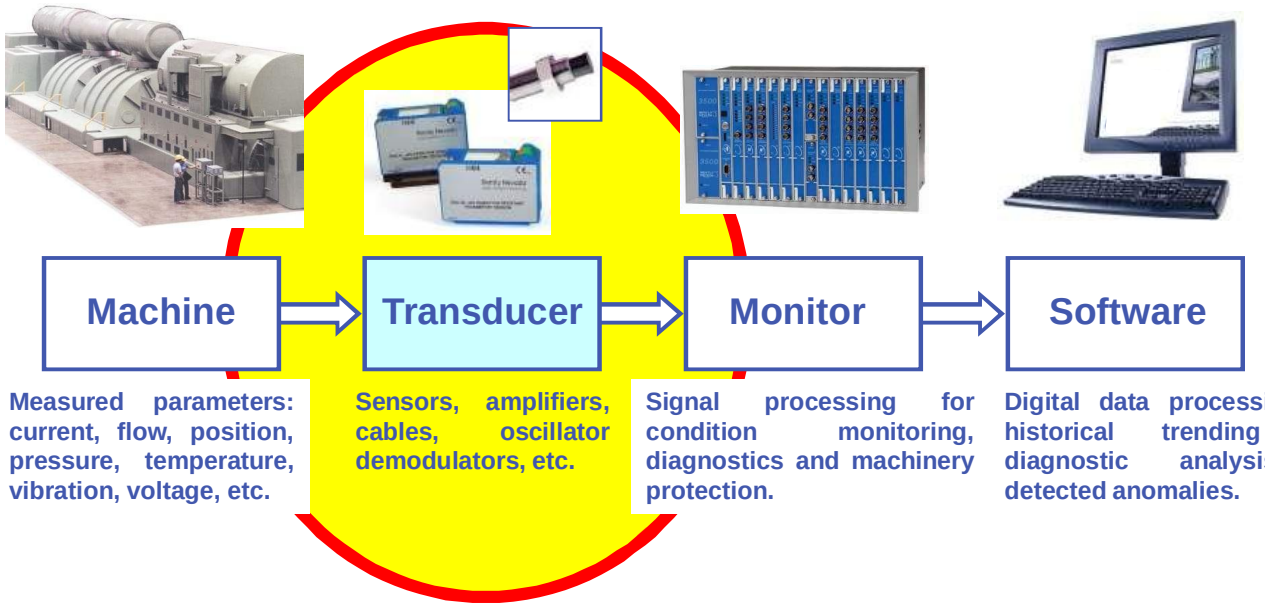
Balancing
Technology & Methodology

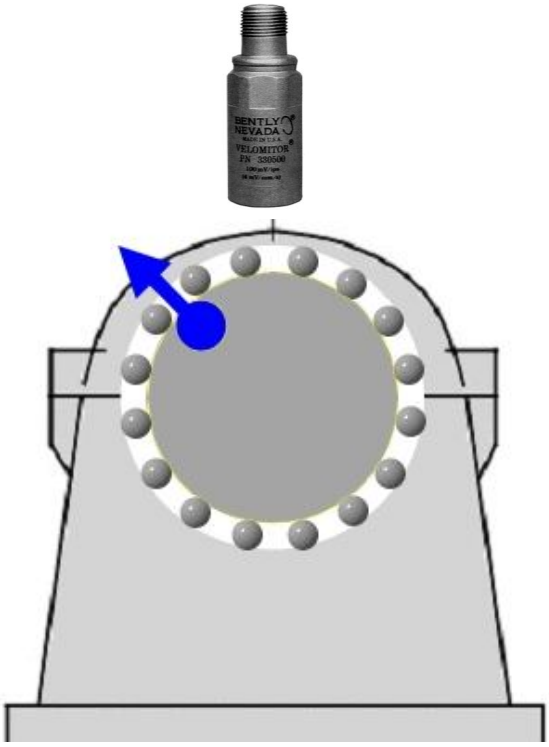
imagination at work

ISA Delhi Section

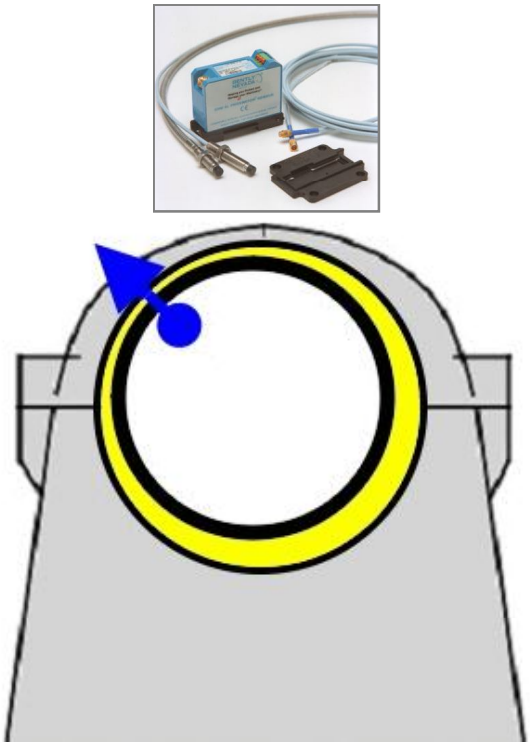
Information Flow

Machinery Monitoring History





Rolling Element Bearings



Fluid Film Bearings