

How much in return will we get investing in a Condition-based maintenance strategy?

Every plant or maintenance manager asks this question. The most straightforward answer is "A lot," but how much is up to you.

"There is no reason to go into well know traps doing the same things in the same way."

5.3 USD
kW / year

The cost* of Preventive maintenance (Time-based maintenance) is **13 USD/hp/y**, and the cost of Predictive Maintenance (Condition-based maintenance) is **9 USD/hp/y**.

Thus if you move from Time-based (planned) maintenance to CBM the savings are **4 USD/hp/y**.

* According to U.S. Department of Energy "Operations & Maintenance Best Practices - A Guide to Achieving Operational Efficiency Release 3.0" from 1-AUG-2010

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According ISO 13373-1:2002

Vibration condition monitoring can provide information for the following purposes:

- to increase equipment protection;
- to improve safety for personnel;
- to improve maintenance procedures;
- to detect problems early;
- to avoid catastrophic failures;
- to extend equipment life;
- to enhance operations.

INTERNATIONAL
STANDARD

ISO
13373-1

First edition
2002-02-15

**Condition monitoring and diagnostics of
machines — Vibration condition
monitoring —**

**Part 1:
General procedures**

*Surveillance des conditions et diagnostic des machines — Surveillance
relative aux conditions des vibrations —*

Partie 1: Procédures générales



Reference number
ISO 13373-1:2002(E)

© ISO 2002

According Lloyd's Register

Condition Monitoring and Condition Based Maintenance is considered best practice as the principle means of managing assets.

- MCBM* is applicable to all surveyable items
- Due dates are removed and the system audited annually.
- MCBM enables the machinery intelligence gathered using a well structured CBM strategy to be used as a basis for survey credit.
- MCBM removes the requirement for carrying out un-necessary planned maintenance and component replacement.
- MCBM supports a living criticality assessment and review process
- MCBM demonstrates accepted best practice and is an award that shows a clear commitment to reliability.
- MCBM will demonstrate compliance in excess of TMSA 4, ISM 10, and remains in line with existing IACS guidance etc.

* MCBM Machinery Condition Based Maintenance

Ship Right

Design and construction

**Machinery Planned
Maintenance and Condition
Monitoring**

Linked Supporting Service

March 2013

**Lloyd's
Register**

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WHAT'S NEXT

It sounds excellent to gain a lot using CBM, but why do we not do it?

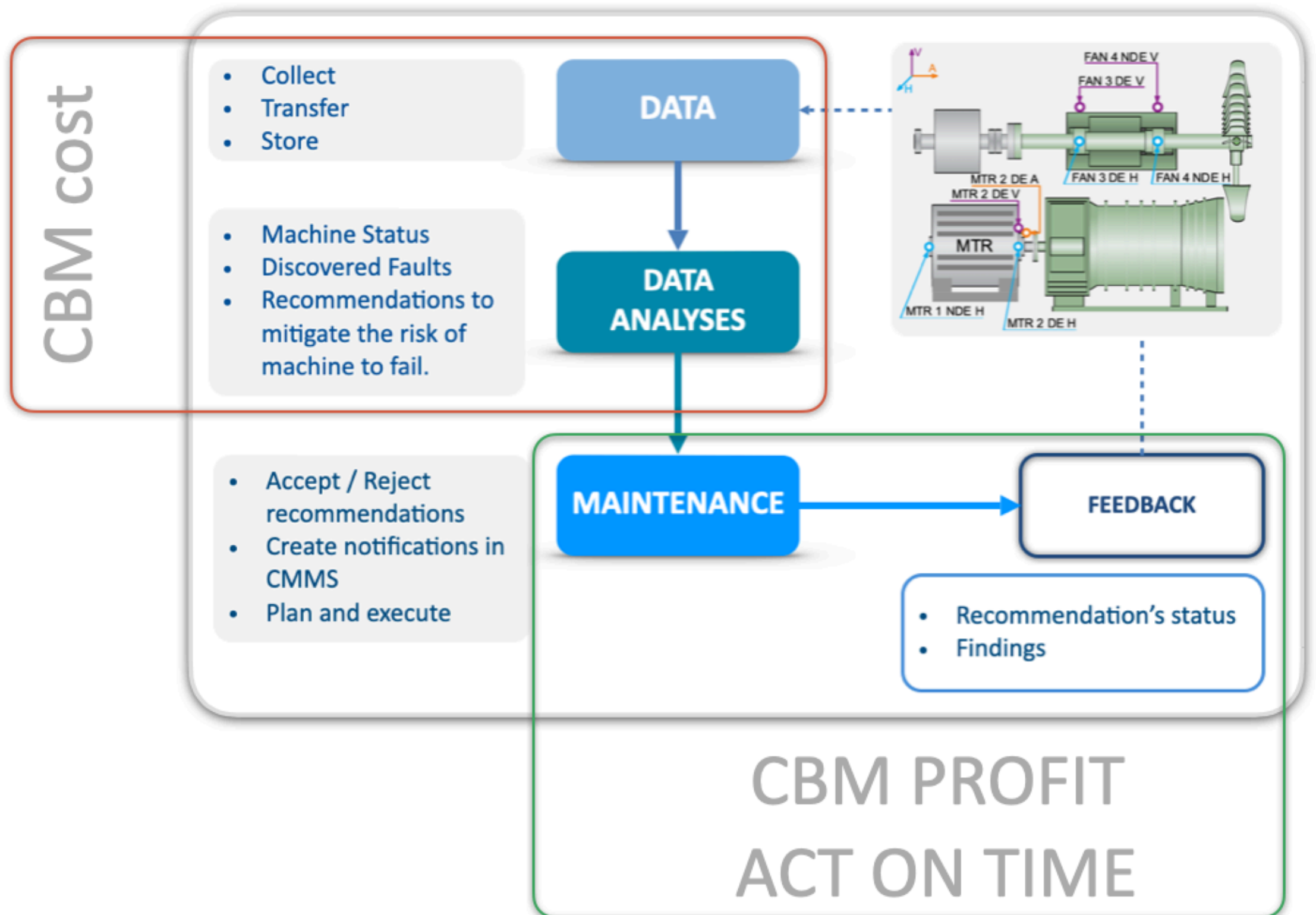
There are many factors and different opinions.

For me, the major ones are:

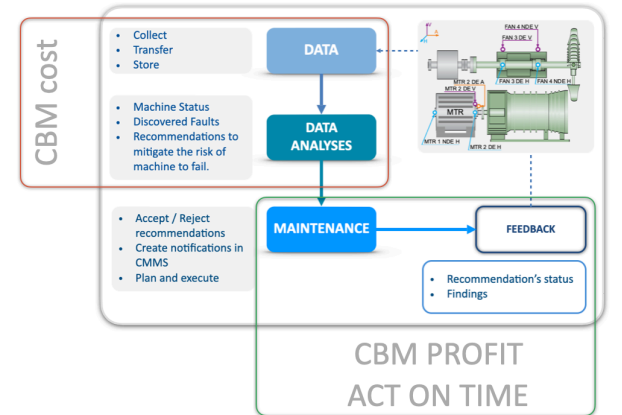
- Misunderstanding of the needs of the maintenance and process teams from the condition monitoring companies.
- Too much focus on the data instead of the information to support the decision.
- Cost and complexity of the Condition Monitoring data and quality of the CM reports.

At the same time, there are many cases when valuable CBM information has been neglected due to mistrust.

The cost CBM Information.



The cost CBM Information.



What is the cost of executing CBM strategy?

Implementing CM Program

- ▶ Data collection technology
 - ▶ Hardware
 - ▶ Software
- ▶ Building the CM database
- ▶ On site installation of CM Points
- ▶ Training of the personal to use the CM HW&SW
- ▶ **Data collection**
- ▶ **Data analyses**
- ▶ Software and Hardware subscription fees

To turn the cost into profit the following MUST be done:

- ▶ Integrating CM information into maintenance management system.
- ▶ Executing planned CBM work orders.

CAPEX of implementing vibration data collection technology in Euro.

	Per CM Point	Per Functional Location (Machine)	For a Site with 50 machines
Smart Data IoT Logger (Data collection from operators)	15	75	3 750
Single channel IoT sensors (WiFi network required)	300	1 500	75 000
Traditional on-line system (8 channel modules)	1 500	7 500	375 000

OPEX of receiving regular information (reports) based on the collected data.

The price range and quality of data analyses are broad. Different business models are available, from analyses per CM Point to analyses per quarter.

Let's play with numbers

Site (ship) with 50 machines:

CAPEX: 3 750 euro (the initial cost)

OPEX: 7 500 euro

(6 analyses per machine per year)

Based on the statistic*, we expect:

- 10% (5 machines) will be in ATTENTION and
- 50% (25 machines in ACCEPTABLE, between GOOD and ATTENTION) status

If there is no CBM information, the maintenance team won't be able to "ACT on TIME"

Cost of unplanned maintenance:

EM or Pump: 10 000 euro

Work hours: 2 000 euro

Production lost: 10 to 12 hours

* Based on data from the [ReSES.net](https://www.reeses.net) CBM platform developed by [Relianeering AB](https://www.relianeering.com).

2.5

ROI
times

CBM can help you to save at least **20 000 Euro each year**,
The return of investment (ROI) in CBM will be **2.5 times**.

Another way to compute:
If we stick to the 5.3 euro/kW/y*, the expected benefits will be $50 \times 100 \text{ kW} \times 5 \text{ euro} = 25 \text{ 000 euro/}$.

* According to U.S. Department of Energy "Operations & Maintenance Best Practices - A Guide to Achieving Operational Efficiency Release 3.0" from 1-AUG-2010

When can I start using CBM?

You should not wait.

The beauty of CBM is that everything you need is a properly implemented CM program and regular data collection, regardless of the maintenance type you have on site.

ACT on TIME

“Invest in simple as-design, easy-to-use and smart as-result solutions.”

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COMMENT BELOW

