

# Oil Analysis in the Digital Era

How to Properly Manage Your Oil Analysis Data

**RELIABLEPLANT** 2018

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“The goal is to turn data into information, and information into insight.”

-Mark Zuckerberg  
Facebook

## ➤ CMMS Programs

Hippo, Lubelt, Maximo, SAP... All of these are database driven asset maintenance software programs to help companies manage their maintenance activities.

## ➤ Condition Monitoring Tools

Oil Analysis, Thermography, Vibration, Ultra Sound, etc... All of these are condition monitoring tools that collect data points to provide information to companies on the current state of their assets

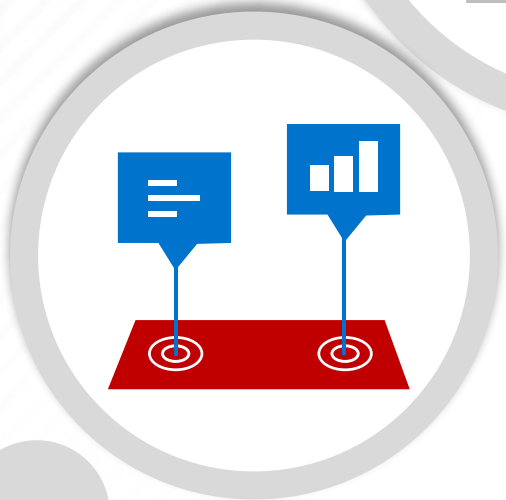
## ➤ Telematics / Sensors

Real time data collectors that can measure everything from geography to pressure and temperature to particle sizes

## ➤ Machine Learning

Uses statistical techniques to give computer systems the ability to "learn" (i.e., progressively improve performance on a specific task) with data, without being explicitly programmed





# Big Data

Big Data technology is now being applied within numerous sectors including the asset management. Big Data comprises the collection and handling of a huge quantity of diverse, unstructured data. The technical response to this challenge is two-phased: a Hardware part (IT architecture based extensively on parallelism) and a Software part, with a dedicated operating system

1. Determine Your “Master” System
2. Define Your Integration Requirement
3. Understand Laboratory Database Structure
4. Create (or Cleanse) Your Oil Sample Database
5. Maintain Database

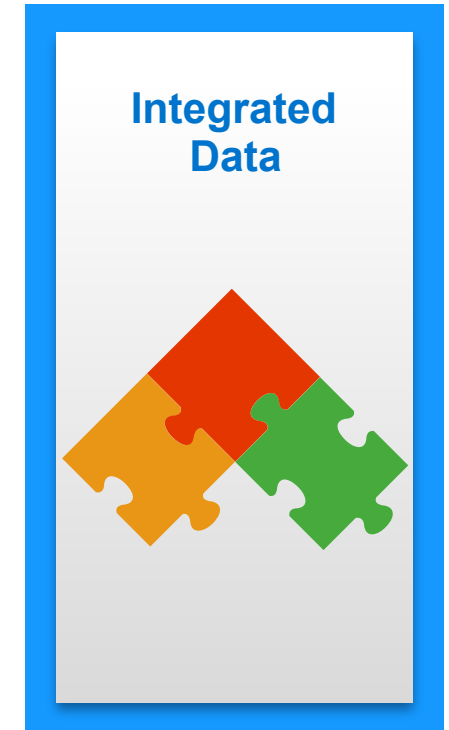
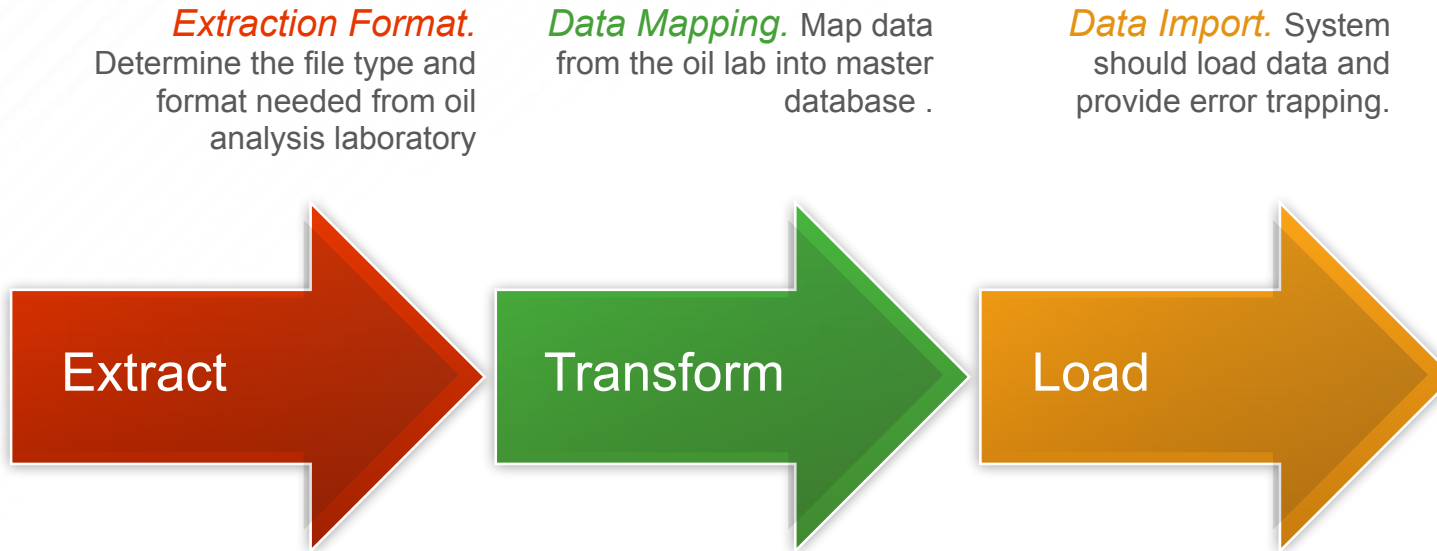
## Determining the Master System

- Defining the master data source is the critical first step in managing your oil analysis data.
- Typical Master Data Sources:
  - *CMMS*
  - *Lubrication Mgmt System / Lube Survey (Audit)*
  - *ERP System (i.e. SAP)*
  - *Asset Listing*
- Unique database ID's (primary keys) can be utilized to link master data to several other databases

# Defining Your Integration Requirements



**PdM Technologies.**  
When combined, different technologies help to provide a full picture of the condition of your equipment



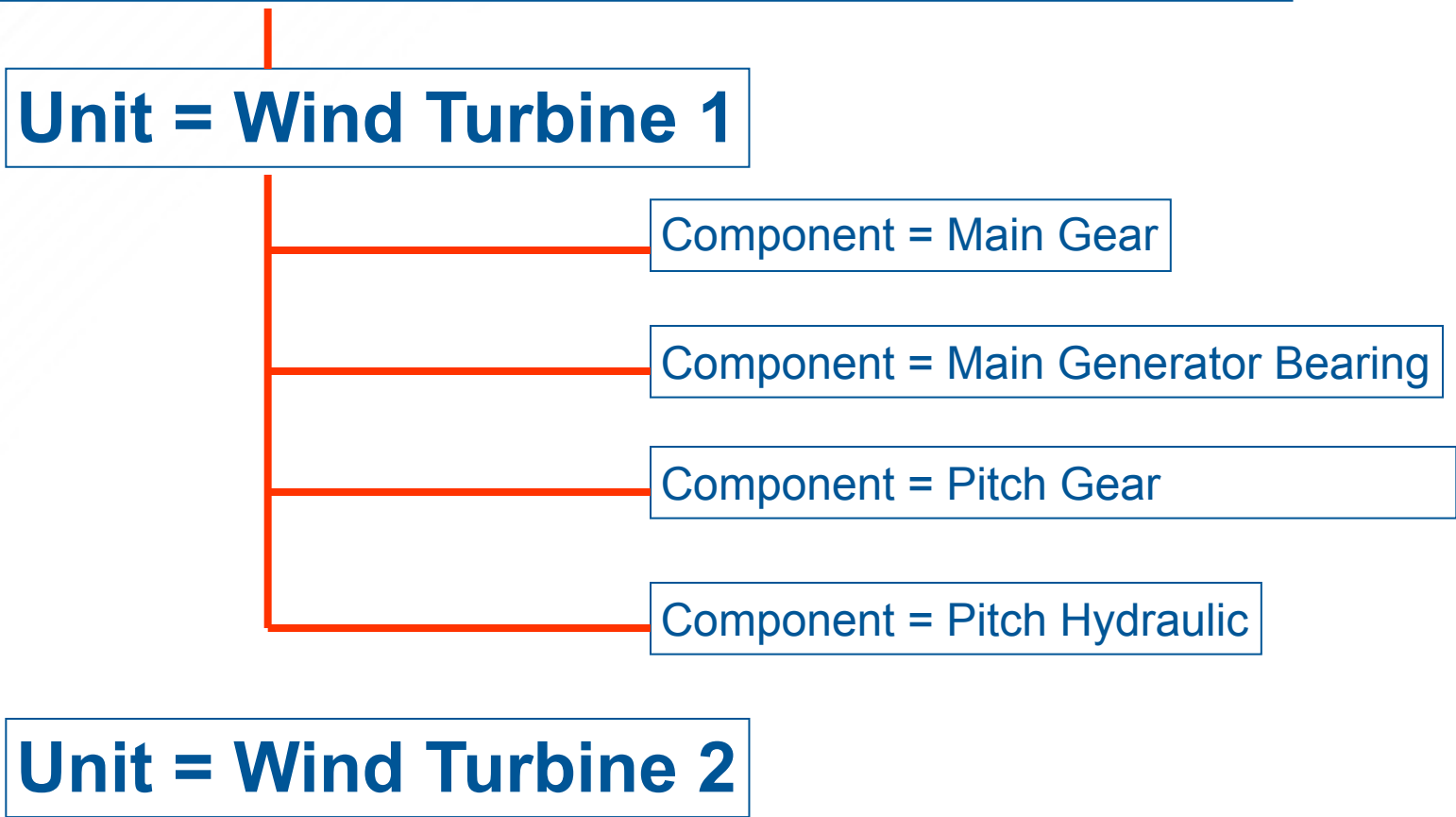
**Single Access Point.**  
Managing a single application can provide a simplified approach to managing your

- All labs operate off a Laboratory Information Management System (LIMS)
  - LIMS programs allows Labs to effectively manage samples and associated data
- Not all LIMS databases are the same
  - Structure
  - Fields
  - Customization
- Managing Data Begins with Structured Records and Identifications
- ID's Must be:
  - Meaningful to You
  - Easy to Associate to Sampling Point
  - Easy to Relate / Repeat with Ongoing Sample Submissions



- Typical Lab Database Records Structure:
  - Account / Customer (Owner of Equipment)
    - *May be Single Customer for One or Multiple Locations*
    - *May be Individual Customers per Multiple Locations*
    - *May be Multiple Customers in One Location Based Upon Production Areas or Operating / Cost Divisions*
  - Unit (Common Denominator for Equipment)
    - *Common Denominators or “Folders” to Sort / Store Sampling Points and Histories*
  - Sample Point (Sampled System or Specific Component)
    - *Specific Record Containing Details of Component and Fluid in Service*
- Record Fields
  - Records are composed of fields, each of which contains one item of information (e.g. Oil Type, Equipment Manufacturer, Equipment Model, Component Type, etc)
  - This information is critical in the oil sampling process and should be provided in full, and visible to you on oil sample reports

# Customer Record with Specific Instructions



# Customer Record with Specific Instructions

## Sample Route A

Component = Cooling Tower Gearbox #1, Upper Bearing

Component = Cooling Tower Gearbox #1, Lower Bearing

Component = Cooling Tower Gearbox #2, Upper Bearing

Component = Cooling Tower Gearbox #2, Lower Bearing

## Sample Route B

- Labs should be able to provide a data import templates.
  - Templates can be populated with information master data source
  - Talk to your lab about data upload options
- Data migration between different labs.
  - Importing data from one lab system into another is a good way to maintain sample history, but can present challenges;
    - Missing Data
    - Different Fields
  - Review pro's and con's with your lab
- Start with a clean database, maintain a clean database

## Cleansing Your Existing Oil Sample Data

- Start with archiving “old” equipment
  - Archive equipment not sampled in the past year (tbd)
- Identify and remove / merge “duplicate” equipment records
  - Previously mis-identified samples create confusion
- Clean-up remaining equipment records
  - Labs can provide exports of databases
  - Excel is your friend and can simplify the clean-up
- Upload “cleansed” data file.

## Maintaining a Clean Database

- Preserving a clean database takes effort, it must be reviewed periodically and updated to reflect changes to you equipment
- Utilize barcoded sample labels or sample registration tools
  - Eliminate transcription errors
- Eliminate paper or writing on caps
- Provide training to maintenance team and document sampling processes



## Recap – 5 Easy Steps

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2. Define Your Integration Requirement
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## References

### *“Integrated Management of Lubrication and Lubricant Analysis Information - Part I - the Case for an Integrated System”*

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Thank you.

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