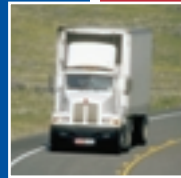
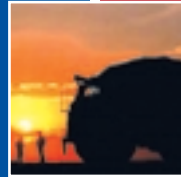
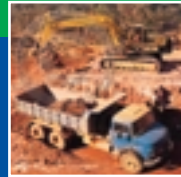


Dingo Lube Explorer[®]

OIL ANALYSIS MADE EASY



USER
GUIDE



D i n g o
Maintenance Systems

Dingo Software Pty Ltd is the sole owner of this documentation and may change this documentation without issuing notice. No person or entity may reproduce or transmit any part of this documentation without written permission from Dingo Software Pty Ltd.

©2001 Dingo Software Pty Ltd. All rights reserved.

Dingo, FleetOil for Windows are Trademarks, Dingo Lube Explorer and Dingo Lab Manager are registered trade marks of Dingo Software Pty Ltd

Microsoft is a registered trademark and Windows, Windows 95, Windows NT, Windows NT Server, SQL Server, Microsoft Word, Microsoft Excel, Microsoft Project and Microsoft Access are trademarks of Microsoft Corporation.

Oracle and SQL*Net are registered trademarks of Oracle Corporation

Delphi is a registered trademark of Borland Corporation.

Brand names and product names mentioned in this document and in this software are trademarks or registered trademarks of their respective owners.

Dingo Maintenance Systems

PO Box 1203

Toowong Qld. 4066

Australia

Phone: (07) 3115 9000

Fax (07) 3115 9010

Dingo Maintenance Systems

6551 S Revere Pkwy

Suite 210

Englewood CO 80111 USA

Phone: (303) 662 9103

Fax (303) 662 9269

www.dingo.com

solutions@dingo.com

Printed in Australia and the United States of America

Build 04112001

table of contents

CHAPTER 1: INTRODUCTION	4
INSTALLING LUBE EXPLORER.....	4
THE BASICS	4
LAYOUT.....	4
BUTTONS.....	5
TABS OR PAGES	5
VERSION NUMBER.....	5
TRIAL VERSION	5
REGISTRATION.....	5
CHAPTER 2: SETUP INFORMATION	6
FLUIDS.....	6
ACTIONS.....	6
SYSTEM	7
CHAPTER 3: EQUIPMENT	8
EQUIPMENT HIERARCHY & DETAILS	8
CREATING A PIECE OF EQUIPMENT.....	8
MAKING THE EQUIPMENT A SUB-COMPONENT	8
MOVING A PIECE OF EQUIPMENT TO THE TOP LEVEL.....	9
MERGING ONE PIECE OF EQUIPMENT TO ANOTHER	9
EQUIPMENT DETAIL FIELDS.....	10
CHAPTER 4: RESULTS	11
GETTING RESULTS FROM THE LAB	12
EQUIPMENT STATUS (FLAGS)	12
INSTALLING A DATA DRIVER	12
CONFIGURING THE DATA DRIVER.....	12
CHECKING MODEM SETTINGS.....	13
REVIEWING RESULTS.....	14
EQUIPMENT STATUS.....	14
AUTOMATIC SYMBOLS	15
PRINTING EXCEPTIONS.....	15
ACTIONING RESULTS — WORK ORDERS	15
SCHEDULING TOOL.....	16
LAB REPORT.....	17

CHAPTER 5: GRAPHS	18
VIEWING GRAPHS.....	18
CHANGING THE PREDICTORS/TESTS DISPLAYED	18
CREATING AND SAVING GRAPH SETTINGS	19
BAR CHART OR LINE CHART OR 3D	19
DATE OR METER.....	20
X-AXIS SCALING	20
GRID LINES	20
LEGEND	20
ZOOMING.....	21
PRINTING.....	21
CHAPTER 6: HISTORY	22
HISTORY	22
RE-POSITIONING PREDICTOR COLUMNS.....	23
HISTORICAL ALARMS.....	23
ADDING AND DELETING RECORDS	23
CHAPTER 7: REPORTS	24
PRINTING REPORTS	24
CHANGING THE DATE RANGE	24
LAB RESULTS REPORT	24
OIL ANALYSIS REPORT	25
GRAPH REPORT	26
EXCEPTION REPORT	26
EQUIPMENT REPORT	26
LUBRICANT SURVEY	27
WORK ORDERS	28
TUTORIAL EXERCISES	29
APPENDIX	30

1 introduction

What you'll learn:

- ▶ How to install your program
- ▶ Basic layout and navigation
- ▶ How to register your software

This short guide is designed to help the user or prospective user become familiar with the operation of Dingo's Lube Explorer. The intent is to get you, the user, up and running as quickly as possible with a good understanding of the basics so you can explore everything the software has to offer in your own time. If you have any questions at all about anything in this guide or anything not covered by this guide don't hesitate to visit our website at www.dingo.com or call Dingo Technical Support.

- ▶ Asia /Pacific — 61 7 3115 9000
- ▶ USA — (303) 662 9103.

Installing Lube Explorer

Lube Explorer is installed in two parts:

- ▶ Lube Explorer Installation
- ▶ Interface Modules Installation

Lube Explorer Software Installation

Lube Explorer comes on a single CD ROM. It works on Windows 95 or NT v4.0 operating systems. It will not work on Windows 3.11. **To install Lube Explorer:**

- ▶ insert installation disk into the CD drive
- ▶ from Windows Explorer, select D drive then double click the program file setup.exe
- ▶ follow the instructions on the install program screens. If it is a network workstation install, point to the database on the network drive. It is advisable to accept the default paths suggested by the install program
- ▶ once the program has finished installing you can open it by selecting **Start | Programs | Dingo Maintenance Systems | Dingo Lube Explorer**
- ▶ go to **Help | Register**
- ▶ select the Number of Users and Number of Laboratories according to your License Agreement.
- ▶ type in the Registration Key which was supplied with your software. If you don't have a Registration key, you can continue to use Lube Explorer for 45 days. Call Dingo to get the correct Registration Key.
- ▶ click the Register button. The 45 day trial evaluation message disappears.

The system comes with a preloaded example database so you can see how data will appear on non-network installs.

Note: Do Not Delete the preloaded equipment from the database until after you have installed the Interface modules and have read in your first results.

It is advisable to keep a backup copy of the database in case you do something you don't want to, it's easy:

- ▶ Create a backup folder C:\Program Files\ Dingo\Lube Explorer\Backup
- ▶ Copy the file Lubex.mdb from C:\Program Files\Dingo\Lube Explorer to C:\Program Files\Dingo\Lube Explorer\Backup

Lube Explorer looks for the file Lubex.mdb in the same directory as the program file whenever it starts for non network installations.

Interface Module Installation

Note: Dingo Lube Explorer must be installed prior to installation of interface modules



- ▶ Insert your Interface Module diskette into the a:drive
- ▶ Create a folder on your C: drive temp directory c:\temp\dingo
- ▶ Copy the files from your diskette to the c:\temp\dingo directory
- ▶ Double click on the setup.exe file in the c:\temp\dingo directory
- ▶ Follow the installation instructions on the screen (which vary for each module).

Receiving Results for the First Time

Note: Your laboratory may require some time to establish a user account.

- ▶ contact your laboratory to set up an account and passwords
- ▶ once the program has finished installing you can open it by selecting **Start | Programs | Dingo Maintenance Systems | Dingo Lube Explorer**
- ▶ select **Edit | Options**
- ▶ select the Data Drivers tab
- ▶ your laboratory module should appear in the Default Data Driver box
- ▶ Close the Options window by clicking the Cancel button
- ▶ ensure that your modem is connected and switched on

Note: if you receive results files by e-mail and do not use a modem, simply copy the files you have been sent into the C:\Program Files\Dingo\[Lab Name]\Input directory

- ▶ Click the **Get New Results** button 
- ▶ Complete any required fields
- ▶ Click **OK**
- ▶ The modem dials and gets your results (or reads your samples if no modem is used)
- ▶ Lube Explorer creates new equipment items for the samples it receives. (you can rename these).
- ▶ Delete sample equipment by selecting the equipment in the **All Equipment tree** and clicking the minus sign  on the **Equipment Details** tab

2 set-up

Introduction

Two lists which act as reference throughout the programs are the Fluids and Actions Lists. Use the Fluids Tab to set up all the lubricants, coolants and other fluids that you test and use. Store contact details for the suppliers. A handy Lubricant Survey report will calculate your total fluid volume and cost on site by fluid type, and list all equipment with similar fluids. Use the Actions tab to set up reminders and simple work order lists. Items from this list can be dragged and dropped onto a calendar after reviewing samples, and then a simple work order list can be printed listing the actions required sort-ed by date.

The System tab shows you which predictors are received from your labs and enables you to control whether Print and Action flags on equipment are automatically reset after printing.

Fluids

- ▶ Select **Edit | Options**
- ▶ Select the **Fluids** tab
- ▶ Enter the Fluids details



The screenshot shows a software window titled 'Options' with a tabbed interface. The 'Fluids' tab is selected. The window contains several input fields and controls:

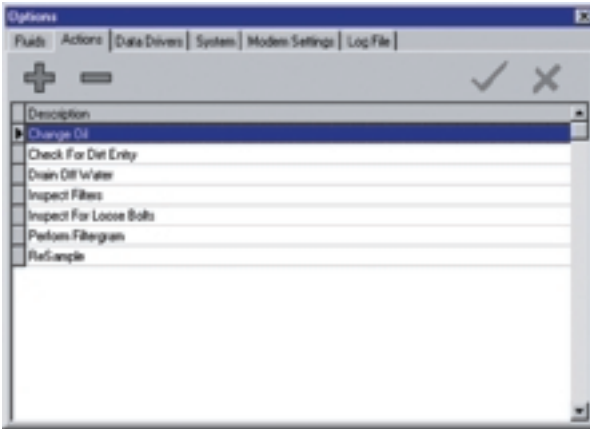
- Navigation buttons: back, forward, add (+), delete (-), and close (X).
- Fluid: Text input field.
- Fluid Type: Dropdown menu with 'AA-T68' selected.
- Alternate: Dropdown menu with 'Ampol 85wT40' selected.
- Price/Unit: Text input field with '\$0.00'.
- Units: Dropdown menu.
- Order Quantity: Text input field with '0'.
- Cost/Order: Text input field.
- Vendor: Dropdown menu.
- Phone: Text input field.
- Fax: Text input field.
- Contact: Text input field.
- Description/Comments: Text area with the text 'AutoMAGically added on 5/15/90'.

What you'll learn:

- ▶ Fluids, Actions and System set-up for your new software

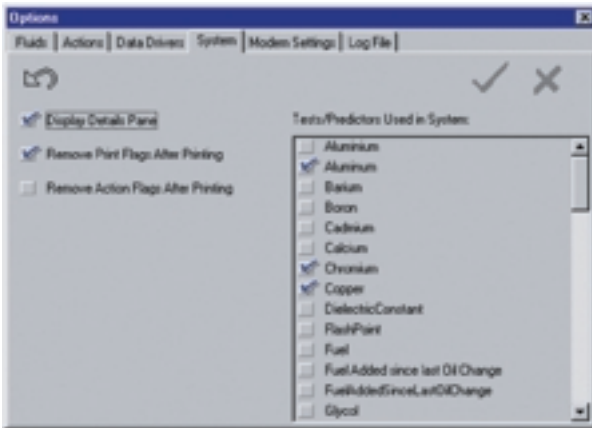
Actions

- ▶ Select **Edit | Options**
- ▶ Select the **Actions** tab
- ▶ Select  or  to add or delete actions that can be taken.



System

- ▶ Select **Edit | Options**
- ▶ Select the **System** tab
- ▶ Select the Predictors that you wish to be available for use in the system.



3 equipment

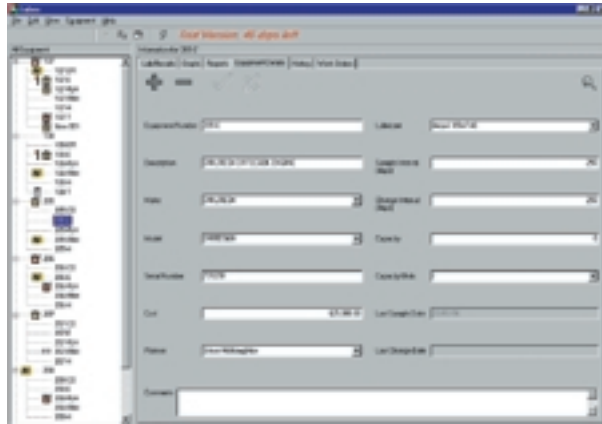
What you'll learn:

- ▶ How to create a new piece of equipment in your database
- ▶ How to create subcomponents
- ▶ How to move and merge pieces of equipment within the software

Introduction





The Equipment Details area is where you enter information about your Assets. This information is used in reports. Establish a simple database of equipment and lubricants. Quick, simple access to this basic information aids in diagnosis of faults. Store details of the sample frequency and oil change interval.

Equipment Hierarchy and Details



The equipment list and hierarchy is displayed on the left hand side of the application. The equipment number is displayed in alphanumeric order.

Creating a Piece of Equipment

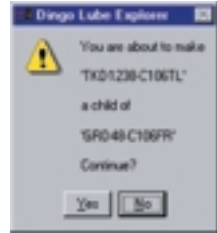
- ▶ Select the **Equipment Details** tab.
- ▶ Press the  button to add new an equipment record or the  button to delete an equipment record.
- ▶ A new equipment record at the bottom of the hierarchy is created. Enter the required details then press  (this commits the record to the database) or press  to cancel the changes to the record.

Making the Equipment a Subcomponent

The new piece of equipment just created may not be in the correct position in the hierarchy. Like Windows Explorer, you can simply drag the new equipment to its correct position. Drop it on top of the equipment of which it is a sub-component. You can do this at any time and the complete history ,etc., moves with the equipment.



The message box at right will appear when you try to make a piece of equipment a child of another. The message box will tell you what piece of equipment you are about to make a child of another piece of equipment. To confirm this action select Yes else select No.

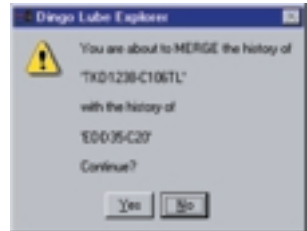


Moving a Piece of Equipment to the Top Level

Perhaps you just moved the new piece of equipment to the wrong position as a sub- component . To move it back to the top level of the hierarchy, hold down the shift key and drag the equipment to the left side near the border. "Top" should appear in the tag below the cursor.

Merging One Piece of Equipment to Another

Sometimes you may have entered equipment information for a new piece of equipment and not yet received a lab result. On the first input of this piece of equipment a new piece of machinery will be made with a new connection code. To merge this result with your existing equipment hold down the control (CTRL) key and drag the equipment on top of the equipment you wish to merge with. The message box below will appear, to continue select yes else select no. This will merge together the history and input a connection code for the existing piece of equipment.




Equipment Detail Fields

The screenshot shows a software interface for entering equipment details. At the top, there are navigation tabs: 'Sub Reports', 'Graph', 'Reports', 'Equipment Detail', 'Notes', and 'Work Orders'. Below the tabs are navigation icons (back, forward, home, search) and a search icon. The form fields are arranged in two columns:

- Equipment Number:** Text input field containing '123456'.
- Lubricant:** Dropdown menu showing 'Shell Helix R4'.
- Description:** Text input field containing 'CAT 3306E (EPT) RAC 3306E'.
- Sample Interval (Days):** Text input field containing '90'.
- Make:** Dropdown menu showing 'CAT'.
- Change Interval (Days):** Text input field containing '90'.
- Model:** Dropdown menu showing '3306E'.
- Capacity:** Text input field containing '25'.
- Serial Number:** Text input field containing '123456'.
- Capacity Units:** Dropdown menu showing 'Litres'.
- Cost:** Text input field containing '1,500.00'.
- Last Sample Date:** Text input field containing '2010-10-10'.

- ▶ **Equipment Number** - the unique identifier for the equipment
- ▶ **Description** — Standard description. Be consistent in naming equipment. The description is included in some reports and helps those unfamiliar with equipment numbers to identify equipment.
- ▶ **Make** — The Original Equipment Manufacturer (OEM). Pressing the button at the right hand side of the field displays a list box including all previously used entries in that field - simply make a selection to enter that value in the field.
- ▶ **Model** — Model number of the equipment. As above, the list box displays all previously used field entries.
- ▶ **Serial Number** — The equipment serial number. This is just for reference purposes to help positively identify an equipment item.
- ▶ **Cost** — The original purchase cost of the equipment. This helps keep your work in perspective - don't waste too much time on lower value items.
- ▶ **Planner** — The name of the person responsible for work planned against the equipment. This name appears on the work order report and helps organize workload assignment.
- ▶ **Comments** — Free form field for any comments relevant to that equipment.
- ▶ **Lubricant** - The lube used in the equipment. The button displays a list box of all available types.
- ▶ **Sample Interval** — The number of days between oil samples. This figure is used together with the last sample date to calculate when the next sample is due. It is then displayed on the work order calendar.
- ▶ **Change Interval** — The number of days between oil changes. This figure is used together with the last change date to calculate when the next change is due. It is then displayed on the work order calendar.
- ▶ **Capacity** — Fluid refill capacity of the equipment. This field is used in the **Lubricant Survey** report.
- ▶ **Capacity Units** — Litres, US Gallons, British Gallons etc.
- ▶ **Last Sample Date** — Date of the last oil sample - system generated.
- ▶ **Last Change Date** — Date of the last oil change - system generated.

Getting Results From the Lab

Lube Explorer is designed to operate with Dingo Smart Data Drivers. The data drivers are what retrieve your results from the lab. They are programmed specifically for each lab and do the hard work for you. Simply press the Lightning Bolt button  "Get New Results". Lube Explorer's installed Data Driver then does the following steps:

- ▶ dials the lab
- ▶ logs in to the electronic bulletin board service
- ▶ accesses your account
- ▶ downloads your latest result files
- ▶ loads them into Lube Explorer and flags the relevant equipment condition

Note: You must have a Data Driver installed for this to work. These ship on separate disks.

All the download settings are stored as preferences in the Options section.

Split View - This function is special. It shows the connection codes in history against that piece of equipment. Normally there should only be one connection code. The presence of two connection codes indicates either:

- ▶ lab details for the equipment have changed
- ▶ History for two equipment items are stored against the one equipment number

To select Split View right click on the piece of equipment required and select Split View.







The message box at left will appear. If there are two connection codes shown, it is possible to split the history simply by selecting the connection code which doesn't belong to the selected equipment item and dragging it to the correct equipment number.

What you'll learn:

- ▶ How to get results from the lab via Dingo Smart Data Drivers
- ▶ Installing and troubleshooting the Data Drivers

Equipment Status (Flags)

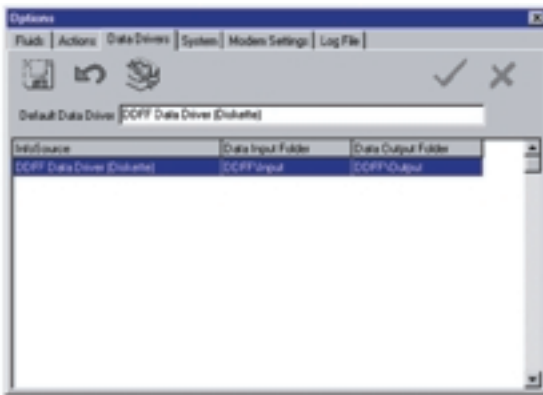
On results read-in, Lube Explorer flags the equipment with graphic symbols as follows:

-  **Red Flag** — a new sample result has been received.
-  **Red Alarm Clock** — An exception. The sample was classed "critical" by the lab.
-  **Yellow Alarm Clock** — An exception. The sample was classed "warning" by the lab.
-  **New** — Black "N" on yellow background. Indicates a new equipment item. This symbol is attached to all equipment records automatically generated by Lube Explorer. The user can then correct the equipment details if necessary. It must be turned off manually.

Installing a Data Driver

- ▶ Insert the Data Driver diskette into A drive
- ▶ Using Windows Explorer, select A drive
- ▶ Double-click the file **setup.exe** to begin the installation program
- ▶ Follow the instructions, accepting the default path unless there are specific reasons to do otherwise

Configuring the Data Driver

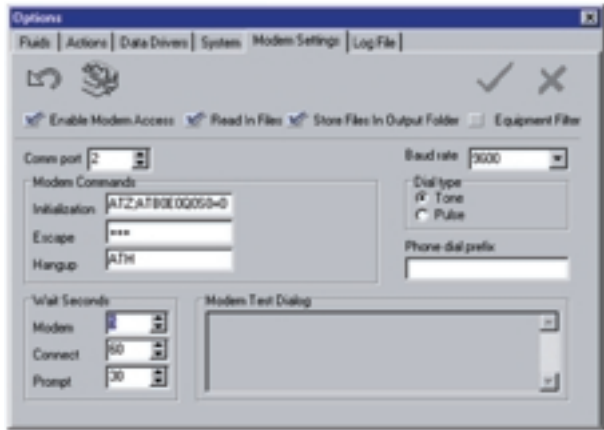


- ▶ From the file menu select **Edit | Options...**
- ▶ Select the Infosource you wish to configure
- ▶ Press the button "Configure Data Driver"
- ▶ In the dialog box that appears, enter the phone number for the lab, user ID, password and any other required details. The last download date and time do not need to be filled in. They are filled in automatically by Lube Explorer during results read-in.

Checking Modem Settings

- ▶ From the file menu select **Edit | Options**
- ▶ Select the tab "Modem Settings"

All modem settings listed may be changed as necessary. These are then stored as preferences. Below is an explanation of each item.



- ▶ **Enable Modem Access** (default - checked) — If checked, Lube Explorer will access the modem to dial out and retrieve results from the lab. If unchecked, Lube Explorer will not access the modem but will go straight to the input directory (see "Data Drivers" tab) to look for files. This way you can re-read lab files in without having to request a re-send and dialling the lab.
- ▶ **Read In Files** (default - checked) — If checked, Lube Explorer will get your files from the lab. If unchecked, it will not. This allows you to test access to your account without actually retrieving your files. It is useful in the cases where the labs have an auto file delete feature set after files have been downloaded.
- ▶ **Store Files in Output Folder** (default - checked) — If checked, all files read in will be moved to the designated output folder (see "Data Drivers" tab). The files remain there until deleted by the user. If unchecked, files are simply deleted from the input folder after being read in.
- ▶ **Equipment Filter** (default - unchecked) — If unchecked, Lube Explorer reads in ALL results regardless of whether they match existing equipment in the database or not. If checked, Lube Explorer ignores ALL results which do not match existing equipment in the database.
- ▶ **Comm Port** (default - 2) — The communications port your modem is attached to. If you are unsure, try different numbers and press the button "Test modem connection with computer".
- ▶ **Modem Commands** — Initialization (default ATZ;ATB0E0Q0S0=0V1X4&C1&D2L3) — These are special commands to initialize your modem for downloading results. They rarely need to be changed but do on occasion. Call Dingo if you think there is a problem.
- ▶ **Modem Commands** - Escape (default - +++) — Character sequence required by the modem to terminate a session. This is usually followed by the hang-up command.
- ▶ **Modem Commands** - Hang-up (default - ATH) — Character sequence for the modem to hang-up - disconnect from the bulletin board service.
- ▶ **Baud Rate** (default 9600) — The data transmission rate (characters per second) for modem communication. When connecting to a bulletin board service, your

modem and the remote modem "handshake" to determine what baud rate to use. The agreed baud rate will depend on line quality and maximum modem speed. The lower the line quality, the lower the determined baud rate. If you have problems with disconnection halfway through a download, try a lower baud rate.


- ▶ **Dial Type** (default - Tone) — Most phones now are "tone" type phones. Pulse type phones may still exist in remote areas. These usually have a rotary dial mechanism instead of push-buttons. You will hear a series of clicks or pulses when you dial.
- ▶ **Phone Dial Prefix** (default - blank) — If your modem dials out through the switchboard you may need to enter a prefix, eg "0" or "9". If your switchboard takes a little time to connect you may need to enter "0," or "0,," as the prefix. The "," indicates a wait period.
- ▶ **Modem Test Dialog** — This field is generated by the system when you test the modem connection. It helps for troubleshooting and initial setup.

Reviewing Results


After getting your results, you will want to review them. Lube Explorer helps by flagging only those results which need to be addressed. Scroll down the equipment list to determine which equipment to address or check. You may wish to work with the exceptions list.


Equipment Status


Graphic symbols next to the equipment items allow easy recognition of status or condition. Status may be set manually by right-mouse clicking on the desired equipment item and selecting the desired status. Status options are as follows:

 **Print** — A red flag. This indicates that equipment has received a new result from the lab. The flag symbol is set automatically when new results are downloaded from the lab. Many reports on the Reports page tie-in with the print symbol. This enables printing of new result reports quickly and easily. After printing the Lab Results Report, the flag is turned off automatically if set to do so in Options. Under equipment / options there are three options with regards to print flags:

- ▶ Set all print flags — puts flags on all pieces of equipment
- ▶ Clear all print flags — turns off all flags
- ▶ Clear all new flags — clear all new equipment symbols


 **High Alarm** — A red alarm clock. This indicates a high alarm condition - the latest result received from the lab for that equipment was critical. It is generated automatically on results read in if your lab supports 2 level alarm conditions. It must be turned off manually.


 **Moderate Alarm** — A yellow alarm clock. This indicates a moderate alarm condition. It is generated as above. Abnormal sample results are assigned this alarm symbol where your lab supports single level alarm conditions.

 **New** — Black "N" on yellow background. Indicates a new equipment item. This symbol is attached to all equipment records automatically generated by Lube

Explorer. The user can then correct the equipment details if necessary. It must be turned off manually.

The following symbols can be input by the user to distinguish various information:

 **Watch** — **A pair of eyeballs.** This indicates that you want to keep an eye on a piece of equipment. It may be a warranty equipment item, one that you know is having problems or one on which you are testing new predictive techniques.

 **Work Order** — **A sheet of printed paper.** Use this symbol to indicate a work order has been raised against that equipment item. Remove the work order symbol when the work order is closed.

Printing Exceptions

- ▶ Select the **Reports** tab
- ▶ Press the **Date Range ... through ...** button
- ▶ Select the desired data range and click **OK**
- ▶ Press the **Flagged** option below the **Exception Report** button
- ▶ Press the **Exception Report** button

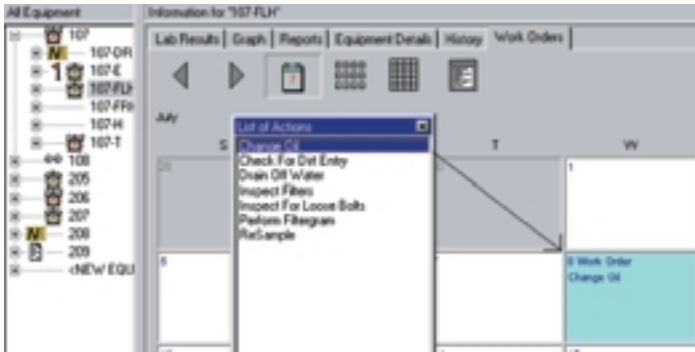
Note: *The report will generate a preview or be sent straight to the printer depending on which option you have selected at the top of the page - buttons "Preview reports without printing" or "Print reports without preview".*

You may wish to view the graphs for equipment which appears on the exceptions list — see the section on viewing graphs.

Actioning Results — Work Orders

Once you have reviewed the exceptions and decided what to do about them, you can action them on Lube Explorer.

- ▶ Select the desired equipment on the list
- ▶ Select the **Work Orders** tab on the right
- ▶ Press the "List of Actions" button
- ▶ From the list box, select the desired action and drag it onto a date on the calendar



- ▶ Right mouse click on the equipment on the left and uncheck the **Alarm**
- ▶ Right mouse click on the equipment on the left and uncheck **Print**
- ▶ Right mouse click on the equipment on the left and check **Work Order**



You have now taken your equipment from alarm status to work order status. When the work order is completed you can uncheck the work order symbol. That way you always know which equipment has outstanding work orders.

Scheduling Tool

On the work order scheduling toolbars a blue box indicates work order. Lube Explorer also automatically puts a purple box on the next sample date as worked out from your equipment information as well as a red box for the next change interval.



To delete a work order:

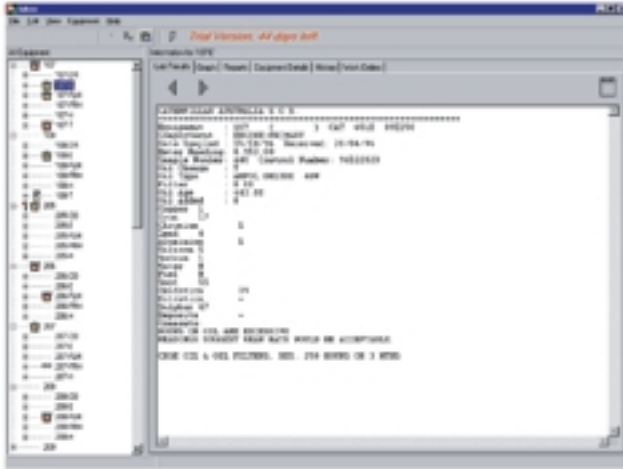
- ▶ Select the desired equipment on the list
- ▶ Select the **Work Order** tab
- ▶ Select the work order you want to delete.
- ▶ Press the "-" button (delete)
- ▶ To add your own comment on the workorder, right click on the workorder on the date you wish to place a comment and the above box will

appear. Type in your comment . By pressing the arrows you can move through comments and work orders that have been set for the piece of equipment.

Lab report

The lab report shows the levels of sampled contaminants and wear metals and meter reading for the equipment selected.

- ▶ To view the Lab Report select the **Lab Results Tab**



5 graphs

Introduction

Seeing trends is one of the most effective ways to detect problems before they become catastrophic failures. Visually compare similar components to find patterns. Examine correlations to determine the cause. Plot samples by either date or unit hours. Fully control the appearance of the graphs and print at any time with one button.

Viewing Graphs

- ▶ Select the desired equipment on the left
- ▶ Select the **Graph** tab on the right

Changing the Predictors/Tests Displayed

- ▶ Press the "Graph Palette" button
- ▶ Check on the predictors/tests you want displayed - left & right boxes correspond to left & right axes
- ▶ Click on the line colour box matching up with the predictor you wish to change the line colour of. A box named colour will appear as can be seen below. Select the colour you require. To define a custom colour select the define custom colour and make the colour you require.



What you'll learn:

- ▶ How to view and customize graphs
- ▶ Graph types available
- ▶ Printing graphs



The predictors you select will be retained when you exit Lube Explorer. Keep the graph palette open and get a "live" view as you change predictors.

Creating and Saving Graph Settings

Lube Explorer allows you to save the test results displayed against a view name or ID.

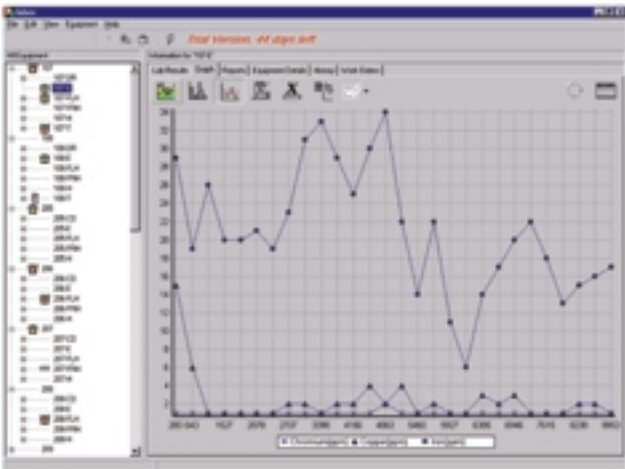
- ▶ Press the "Graph Palette" button
- ▶ Before you add your first settings ID, you will see "Default" appear in the view ID field.
- ▶ From the Graph Palette menu, select **View | New**
- ▶ Click into the view ID field and type in your view ID, eg. "Engines". At this stage the graph will be blank.
- ▶ Check on the test you want to view and the axis you want them graphed against.
- ▶ From the Graph Palette menu select **View | Save**

Your view and the settings are now saved against the name you gave. Later, you can recall those settings from the graph palette by pressing the button at the right of the view name field and selecting the desired view.

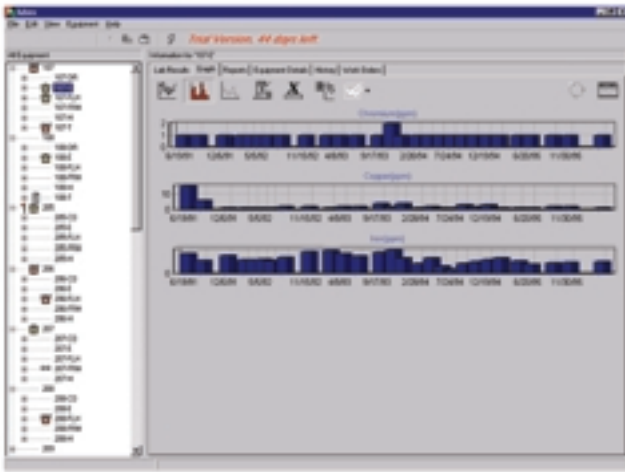
Bar Chart or Line Chart or 3D

The buttons "Display Bar Chart(s)" and "Display Line Chart" let you change the type of graph you prefer to view. The type will be set to what you selected even when you exit Lube Explorer. The graph palette works with both graph types.

To make either graph type 3D:



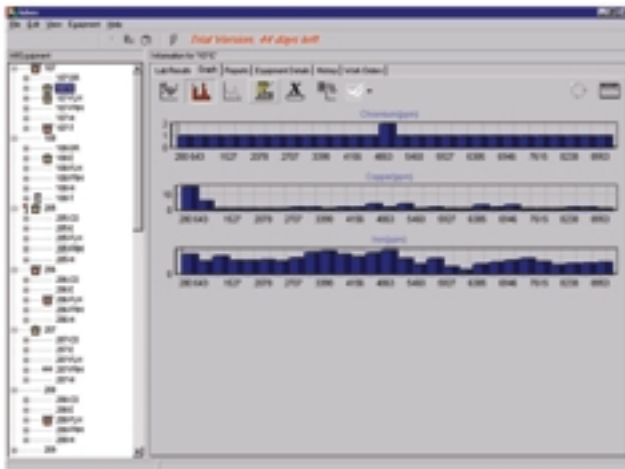
- ▶ Press the "Options Menu" button



- ▶ Select 3D Graphs

Date or Meter

The "Toggle X-Axis Date/Meter" button lets you toggle between calendar dates or meter readings on the x-axis. Meter readings are whatever you enter on the sample label and send to the lab - hours, miles, production units, etc.



X-Axis Scaling

The "Toggle X-Axis Scaling on/off" button switches between a scaled x-axis and an unscaled x-axis.

When the x-axis is scaled, sample points appear unevenly spaced. This is because they are being scaled to the sample date or meter reading - the closer together the sample point, the closer in time or meter they actually occurred. This lets you pick up inconsistencies in sampling period.

When the x-axis is unscaled, all sample points appear evenly spaced. Date or meter is still marked on the x-axis but it is not to scale. This is useful if you are only interested in the test values without time information.

Grid Lines

The grid lines run through each sample point to make it easier to estimate values against each axis. The "Toggle Grid Line On/Off" button lets you turn the gridlines on or off for display or presentation purposes.

Legend

The legend may be set to any one of 4 sides of the graph:

- ▶ Press the "Options Menu" button
- ▶ Select the desired legend position

When the legend is at the bottom or top, the number of predictors displayed in the legend is determined by the width of the legend box - not all predictors selected on the graph palette are necessarily shown. They will still be on the graph but not on the legend. When the legend is at either side, all predictors are displayed but graph space is more cramped.

Zooming

If there are a lot of sample points in history and you want to view only a certain period, you can zoom in by clicking and dragging on an area from left to right. The area then displayed is the exact area you traced by clicking & dragging.

You can reset the graph view by clicking and dragging from right to left or by pressing the "Reset Graph View" button.

When you have zoomed in on an area, you can move it right and left by holding down the right mouse button and dragging.

Printing

Press the "Print Displayed Graph(s)" button. A print report will be sent to your Windows default printer. The graph printed will be exactly as you have the graph formatted.

6 history

Introduction

Ever had to search for an old result to check out a problem? Searching through lab sheets is inefficient and frustrating. Lube Explorer keeps an electronic history for you at your fingertips! Click on an equipment number and the history tab and the entire history as well as comments from the lab can be viewed instantly. No more filing cabinets.

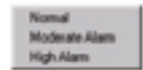
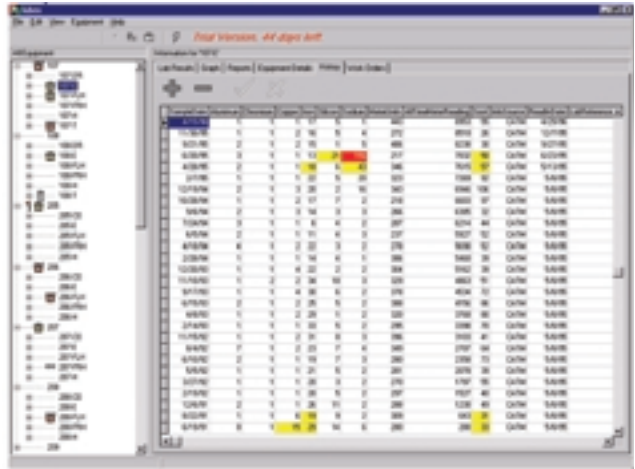
Lube Explorer's stores all historical lab test results in a single Microsoft Access database. Laboratory alarm statuses are highlighted in color on the screen for easy reference.

History

All test result history is stored numerically in Lube Explorer. It is not deleted or archived automatically. It remains on the system until deleted manually.

- ▶ Select the desired equipment on the list
- ▶ Select the **History** tab

The most recent result appears at the top of the list. A record (row) corresponds to one sample result.



What you'll learn:

- ▶ How history is stored in Lube Explorer.
- ▶ How to delete and archive histories
- ▶ How to set historical alarms

- ▶ To set a value read in with an alarm level, right click on the result and the window below will appear. Select the alarm level from the box below for the selected reading.

Repositioning Predictor Columns

The predictor or test result columns may be re-positioned - Click and drag the column heading to the desired position. This order is also used for the Lab Result and Oil Analysis reports. Column widths are definable — click and drag the column border to the desired width. Both settings are retained when you exit Lube Explorer.

Historical Alarms

Lube Explorer has two alarm levels - high and moderate. These correspond to 2 or 1 respectively in the numerical history fields. This overall sample rating will be found in a field called rating, overall rating or something similar depending on the lab used.

Test results which triggered alarms in the past will have a background colored according to the alarm triggered — yellow means moderate, red means high. So you always have a record of whether that sample triggered an alarm or not.

Adding and Deleting Records

To delete a record, select the unwanted record and press the "-" button (delete). The change is irreversible. To add a record, press the "+" button (add). A blank record with today's date is inserted. You can then select the fields and enter data as desired.

7 reports

Introduction

Access popular reports designed by Maintenance people. Preview and print them quickly and simply. Flag particular equipment of interest or report on the entire database. You can select what you want to see and make a printout for discussions with others.

Printing Reports

Select the Reports tab on the right hand side. Most reports work with the date range on the reports page and print flags on the equipment list.



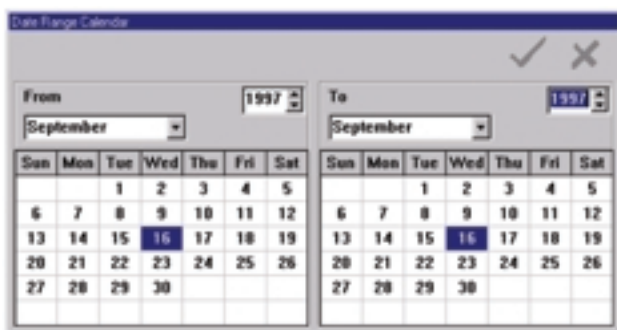
The two buttons at the top left determine whether the report is sent straight to the printer or previewed on the screen.

What you'll learn:

- How to retrieve and customize Lube Explorer's standard reports

Changing the Date Range

- Press the **Date Range ... through ...** button
- Select the desired data range and click **OK**



Lab Results Report

This prints the test results in a landscape format, samples horizontally, predictors vertically. It is linked with the data range and the print flags on the equipment list. You may select how many predictors are displayed by pressing Top10, Top 25, Top 50, All before pressing the Lab Results button. The order predictors are displayed is taken from the order they appear on the History tab.

Lab Results Report										
Print/Date	SEP 05	Date Range	10/2004 through 9/2005							Page 1 of 1
Equipment Number	107-B	Serial Number	402000							
Description	CAT (CAT610) (EUCOM)	Lubricant	Angul (SHELL)							
Name	CAT	Lube Capacity (L)								
Unit	CAT610	Phases	C (Oil Analysis)							
Sample Date	W/SAKE	11/2004	02/2005	05/2005	08/2005	07/2005	07/2005	08/2005	09/2005	
Index	001	010	001	010	001	010	001	010	001	
Oil Sample	1	1	2	2	2	2	2	2	2	
W/SAKE	1	1	1	1	1	1	1	1	1	
02/2005	1	1	2	2	1	1	1	1	1	
05/2005	1	1	1	1	1	1	1	1	1	
08/2005	1	1	1	1	1	1	1	1	1	
07/2005	1	1	1	1	1	1	1	1	1	
07/2005	1	1	1	1	1	1	1	1	1	
08/2005	1	1	1	1	1	1	1	1	1	
09/2005	1	1	1	1	1	1	1	1	1	
Totals	1	1	1	1	1	1	1	1	1	
001	1	1	1	1	1	1	1	1	1	
010	1	1	1	1	1	1	1	1	1	
001	1	1	1	1	1	1	1	1	1	
010	1	1	1	1	1	1	1	1	1	
001	1	1	1	1	1	1	1	1	1	
010	1	1	1	1	1	1	1	1	1	
Totals	1	1	1	1	1	1	1	1	1	

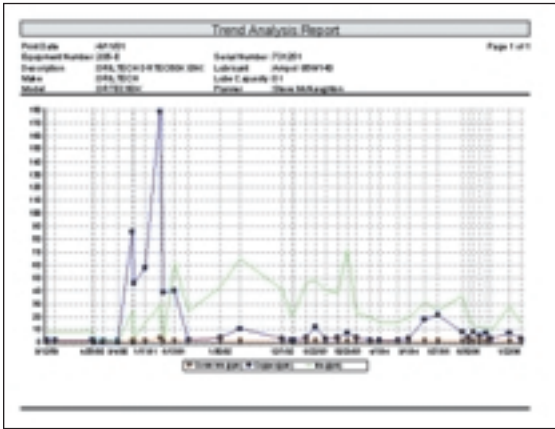
Oil Analysis Report

This prints the test results in a landscape format, samples vertically, predictors horizontally. It is linked with date range and the print flags on the equipment list. You may select how many results are displayed by pressing Last 10, Last 25, Last 50, All before pressing the Oil Analysis button. The predictor order is taken from the History tab.

Oil Analysis Report										
Print/Date	SEP 05	Date Range	10/2004 through 9/2005							Page 1 of 2
Equipment Number	107-B	Serial Number	402000							
Description	CAT (CAT610) (EUCOM)	Lubricant	Angul (SHELL)							
Name	CAT	Lube Capacity (L)								
Unit	CAT610	Phases	C (Oil Analysis)							
Sample Date	Index	W/SAKE	Aluminum	Chromium	Copper	Iron	Silicon	Sulfur	Total	
01/2005	001	1	1	1	1	1	1	1	1	
02/2005	010	1	1	1	1	1	1	1	1	
03/2005	001	1	1	1	1	1	1	1	1	
04/2005	010	1	1	1	1	1	1	1	1	
05/2005	001	1	1	1	1	1	1	1	1	
06/2005	010	1	1	1	1	1	1	1	1	
07/2005	001	1	1	1	1	1	1	1	1	
08/2005	010	1	1	1	1	1	1	1	1	
09/2005	001	1	1	1	1	1	1	1	1	
10/2005	010	1	1	1	1	1	1	1	1	
11/2005	001	1	1	1	1	1	1	1	1	
12/2005	010	1	1	1	1	1	1	1	1	
01/2006	001	1	1	1	1	1	1	1	1	
02/2006	010	1	1	1	1	1	1	1	1	
03/2006	001	1	1	1	1	1	1	1	1	
04/2006	010	1	1	1	1	1	1	1	1	
05/2006	001	1	1	1	1	1	1	1	1	
06/2006	010	1	1	1	1	1	1	1	1	
07/2006	001	1	1	1	1	1	1	1	1	
08/2006	010	1	1	1	1	1	1	1	1	
09/2006	001	1	1	1	1	1	1	1	1	
10/2006	010	1	1	1	1	1	1	1	1	
11/2006	001	1	1	1	1	1	1	1	1	
12/2006	010	1	1	1	1	1	1	1	1	
01/2007	001	1	1	1	1	1	1	1	1	
02/2007	010	1	1	1	1	1	1	1	1	
03/2007	001	1	1	1	1	1	1	1	1	
04/2007	010	1	1	1	1	1	1	1	1	
05/2007	001	1	1	1	1	1	1	1	1	
06/2007	010	1	1	1	1	1	1	1	1	
07/2007	001	1	1	1	1	1	1	1	1	
08/2007	010	1	1	1	1	1	1	1	1	
09/2007	001	1	1	1	1	1	1	1	1	
10/2007	010	1	1	1	1	1	1	1	1	
11/2007	001	1	1	1	1	1	1	1	1	
12/2007	010	1	1	1	1	1	1	1	1	
01/2008	001	1	1	1	1	1	1	1	1	
02/2008	010	1	1	1	1	1	1	1	1	
03/2008	001	1	1	1	1	1	1	1	1	
04/2008	010	1	1	1	1	1	1	1	1	
05/2008	001	1	1	1	1	1	1	1	1	
06/2008	010	1	1	1	1	1	1	1	1	
07/2008	001	1	1	1	1	1	1	1	1	
08/2008	010	1	1	1	1	1	1	1	1	
09/2008	001	1	1	1	1	1	1	1	1	
10/2008	010	1	1	1	1	1	1	1	1	
11/2008	001	1	1	1	1	1	1	1	1	
12/2008	010	1	1	1	1	1	1	1	1	
01/2009	001	1	1	1	1	1	1	1	1	
02/2009	010	1	1	1	1	1	1	1	1	
03/2009	001	1	1	1	1	1	1	1	1	
04/2009	010	1	1	1	1	1	1	1	1	
05/2009	001	1	1	1	1	1	1	1	1	
06/2009	010	1	1	1	1	1	1	1	1	
07/2009	001	1	1	1	1	1	1	1	1	
08/2009	010	1	1	1	1	1	1	1	1	
09/2009	001	1	1	1	1	1	1	1	1	
10/2009	010	1	1	1	1	1	1	1	1	
11/2009	001	1	1	1	1	1	1	1	1	
12/2009	010	1	1	1	1	1	1	1	1	
01/2010	001	1	1	1	1	1	1	1	1	
02/2010	010	1	1	1	1	1	1	1	1	
03/2010	001	1	1	1	1	1	1	1	1	
04/2010	010	1	1	1	1	1	1	1	1	
05/2010	001	1	1	1	1	1	1	1	1	
06/2010	010	1	1	1	1	1	1	1	1	
07/2010	001	1	1	1	1	1	1	1	1	
08/2010	010	1	1	1	1	1	1	1	1	
09/2010	001	1	1	1	1	1	1	1	1	
10/2010	010	1	1	1	1	1	1	1	1	
11/2010	001	1	1	1	1	1	1	1	1	
12/2010	010	1	1	1	1	1	1	1	1	
01/2011	001	1	1	1	1	1	1	1	1	
02/2011	010	1	1	1	1	1	1	1	1	
03/2011	001	1	1	1	1	1	1	1	1	
04/2011	010	1	1	1	1	1	1	1	1	
05/2011	001	1	1	1	1	1	1	1	1	
06/2011	010	1	1	1	1	1	1	1	1	
07/2011	001	1	1	1	1	1	1	1	1	
08/2011	010	1	1	1	1	1	1	1	1	
09/2011	001	1	1	1	1	1	1	1	1	
10/2011	010	1	1	1	1	1	1	1	1	
11/2011	001	1	1	1	1	1	1	1	1	
12/2011	010	1	1	1	1	1	1	1	1	
01/2012	001	1	1	1	1	1	1	1	1	
02/2012	010	1	1	1	1	1	1	1	1	
03/2012	001	1	1	1	1	1	1	1	1	
04/2012	010	1	1	1	1	1	1	1	1	
05/2012	001	1	1	1	1	1	1	1	1	
06/2012	010	1	1	1	1	1	1	1	1	
07/2012	001	1	1	1	1	1	1	1	1	
08/2012	010	1	1	1	1	1	1	1	1	
09/2012	001	1	1	1	1	1	1	1	1	
10/2012	010	1	1	1	1	1	1	1	1	
11/2012	001	1	1	1	1	1	1	1	1	
12/2012	010	1	1	1	1	1	1	1	1	
01/2013	001	1	1	1	1	1	1	1	1	
02/2013	010	1	1	1	1	1	1	1	1	
03/2013	001	1	1	1	1	1	1	1	1	
04/2013	010	1	1	1	1	1	1	1	1	
05/2013	001	1	1	1	1	1	1	1	1	
06/2013	010	1	1	1	1	1	1	1	1	
07/2013	001	1	1	1	1	1	1	1	1	
08/2013	010	1	1	1	1	1	1	1	1	
09/2013	001	1	1	1	1	1	1	1	1	
10/2013	010	1	1	1	1	1	1	1	1	
11/2013	001	1	1	1	1	1	1	1	1	
12/2013	010	1	1	1	1	1	1	1	1	
01/2014	001	1	1	1	1	1	1	1	1	
02/2014	010	1	1	1	1	1	1	1	1	
03/2014	001	1	1	1	1	1	1	1	1	
04/2014	010	1	1	1	1	1	1	1	1	
05/2014	001	1	1	1	1	1	1	1	1	
06/2014	010	1	1	1	1	1	1	1	1	
07/2014	001	1	1	1	1	1				

Graph Report

All active settings on the Graph tab are used to produce this report . If you have a color printer the report will print in color. Select Line or Bar as preferred.



Exception Report

This report prints an entry for each equipment item that has an exception on the last sample during the selected date range. You may select whether the report checks All equipment or Flagged equipment before pressing the Exception Report button. The lab comment is included.

Exception Report			
Print Date	:10/07/09	Date Range	:10/1/09 through 10/07/09
Equipment Number	:307-0	Serial Number	:95250
Description	:CAT CAT320E ENONE	Lubricant	:Amcol 85W140
Make	:CAT	Lube Capacity	:51
Model	:CAT320E	Placer	:ColAmbruster
Sample Date	:28/04/09	Lube Age	:0
Test Which Triggered Alarm	Test Value		
Iron	18		
Copper	53		
Sodium	43		
Soot	57		
Sulfur	57		
Lab Comments			

Equipment Report

A separate entry is created for each equipment item. Basic information found on the Equipment Details tab is included. You may select All equipment or Flagged equipment before pressing the Equipment Report button.

Equipment Report			
Equipment Number:	30426	Serial Number:	81220
Description:	CAT CATERPILLAR ENGINE		
Make:	CAT	Last Sample Date:	4/11/06
Model:	CATERPILLAR	Sample Interval:	300
Flower:	Cat Acceptor	Last Change Date:	
Lubricant:	Alquil 85W/90	Change Interval:	300
Lube Capacity:	81 l		
Equipment Number:	30426	Serial Number:	81220
Description:	CAT CATERPILLAR ENGINE		
Make:	CAT	Last Sample Date:	3/27/06
Model:	CATERPILLAR	Sample Interval:	300
Flower:	Cat Acceptor	Last Change Date:	
Lubricant:	Alquil 85W/90	Change Interval:	300
Lube Capacity:	81 l		
Equipment Number:	30426	Serial Number:	71120
Description:	DRL TECH DRIVE SHAFT CUMMINS ENGINE		
Make:	DRL TECH	Last Sample Date:	3/28/06
Model:	CATERPILLAR	Sample Interval:	300
Flower:	Dyno MultiGrader	Last Change Date:	
Lubricant:	Alquil Double 40W	Change Interval:	300
Lube Capacity:	308 l		

Lubricant Survey

This prints the whole equipment list according to what fluid is used for lubrication, fluid type by fluid type. Fluid capacity and cost are summarized for each fluid type.

Lubricant Survey						
Equipment Number	Description	Serial Number	Fluid Type	Capacity	Cost	Sample Date
Fluid: Alquil 85W/90 Type: A-000100 \$ 19 + \$ 0.00						
1010	CAT CATERPILLAR ENGINE	81220	0	0.00	300	300
1010	CAT CATERPILLAR ENGINE	81220	0	0.00	300	300
1010F	CAT CATERPILLAR 2017 TRAIL, 2010	201	20	190.00	600	600
1010F	CAT CATERPILLAR 2017 TRAIL, 2010	201	20	190.00	600	600
2040	Dyno 500 MultiGrader	010000	0	0.00	300	300
2040	Dyno 500 MultiGrader	010000	0	0.00	300	300
2040	Dyno 500 MultiGrader	010000	0	0.00	300	300
2040	Dyno 500 MultiGrader	010000	0	0.00	300	300
			00	380.00		
Fluid: Alquil Multi 750 Type: A-01700 \$ 19 + \$ 0.00						
1010	CAT CATERPILLAR 2017 TRAIL, 2010	201	100	200.00	300	300
1010	CAT CATERPILLAR 2017 TRAIL, 2010	201	100	200.00	300	300
2040	Dyno 500 MultiGrader	010000	200	380.00	300	300
			000	780.00		
Fluid: Alquil Double 20W Type: A-012000 \$ 19 + \$ 0.00						
			0	0.00		
Fluid: Alquil Double 80W Type: A-012001 \$ 19 + \$ 0.00						
2040	Dyno 500 MultiGrader	010000	200	190.00	300	300
2040	Dyno 500 MultiGrader	010000	200	190.00	300	300
2040	Dyno 500 MultiGrader	010000	200	190.00	300	300
			000	570.00		
Fluid: Selenia 100 (Selenia) Type: S-000100 \$ 19 + \$ 0.00						
1010F	CAT CATERPILLAR 2017 TRAIL, 2010	201	20	380.00	600	600

Work Orders

All work orders within the date range are listed. Lab comments are added as a useful reference. This list may be the blueprint for a planner to raise and control work orders related to the oil analysis program.

The screenshot shows a software window titled "Work Order Report". The window contains a table with the following data:

Date Range	Equipment Number	Filter	Work Order Description	Sample Date	Lab Comments
2010	1010	Oil Separator	3-Step Oil Filter	01/10/10	
2010	1010	Oil Separator	Chicago Oil	01/10/10	
2010	1010	Oil Separator	Inspect Filter	01/10/10	
2010	1010	Oil Separator	Inspect Filter	01/10/10	
2010	1010	Oil Separator	3-Step Oil Filter	01/10/10	
2010	1010	Oil Separator	Chicago Oil	01/10/10	
2010	1010	Oil Separator	Chicago Oil	01/10/10	
2010	1010	Oil Separator	Inspect For Loose Balls	01/10/10	
2010	1010	Oil Separator	Inspect For Loose Balls	01/10/10	
New Order: 1010 - New Order: 1010					
New Order: 1010 - New Order: 1010					
New Order: 1010 - New Order: 1010					
New Order: 1010 - New Order: 1010					
New Order: 1010 - New Order: 1010					
New Order: 1010 - New Order: 1010					

Tutorial Exercises

1. Get new results from lab.
2. Identify which pieces of equipment have high or moderate alarm levels and which equipment has a new result from the lab.
3. From the exception list set an oil change work order for a piece of equipment.
4. Uncheck the alarm for the selected equipment piece and check the workorder.
5. When you have completed the work order, uncheck the work order.
6. For the component select Chromium and Copper on the left axis and Iron on the right axis as the predictors.
7. Set this graph as a bar graph with meter readings.
8. Save this graph as "graph name" and print this graph.
9. Create a trend analysis report for Chromium and Copper.
10. Print out a work order scheduled report for this piece of equipment for next year and then print out a work order report for all equipment over the next year.

tutorial exercises

A appendix

Condition Monitoring

Condition Monitoring is the name given to a variety of techniques that quantitatively determine the current condition of the machine. The idea is to trend the data obtained and compare it with a specific rejection criterion. The machine is then removed from service with a lead-time before failure occurs. By having knowledge of the nature of the fault or defect, attention can be paid specifically to these particular problems. A maintenance program, which incorporates condition monitoring, is called Predictive maintenance.

Benefits

- ▶ Emergency shutdowns are minimized and the time between shutdowns can be extended with confidence
- ▶ The nature and condition of faults can be identified without having to resort to visual inspections.
- ▶ Infant mortality failures introduced by unnecessary visual inspections are minimized.
- ▶ By identifying and understanding the fault corrective action such as process changes can often be taken to prolong machine operation.
- ▶ A reduction in spares inventory can possibly be accomplished. e.g parts with long lead times can be ordered well in advance.
- ▶ By observing time trends for similar machine units, maintenance priorities can be determined with confidence.
- ▶ The early detection of faults allows the efficient planning of downtime, labor and materials.



D i n g o
Maintenance Systems