PredictMate ®

Receiving data from
  Handheld Devices
  Maunal data entry
  SCADA Systems
to resolve alarm conditions

Davison Systems, LLC
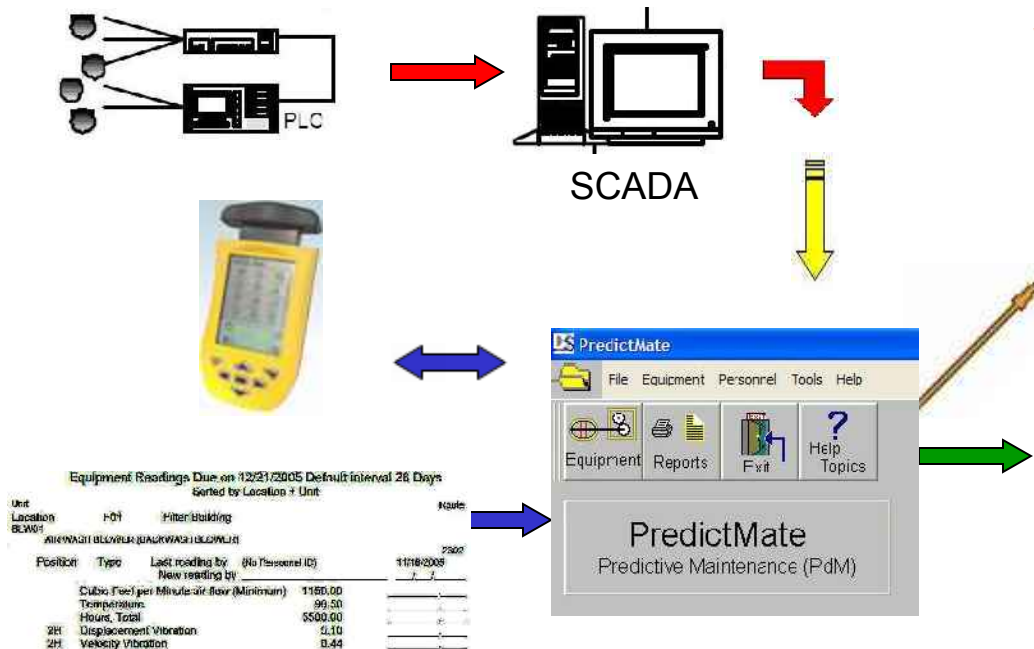
www.DavisonSoftware.com

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PredictMate ® acts on accumulated data to resolve alarm conditions.

- Accumulated data from field devices for alarm notifications.

- SCADA can send data to PredictMate by the Hour, Day, or Month.

- PredictMate schedules data collection from handheld devices or printouts.

- PredictMate sends only verified alarms as work orders to the CMMS.

- PredictMate instead can create work order lists for another system.

SCADA

Work Order List

File format as needed (CSV, Tab-delimited)

Optional formats for direct load to MS-Excel or SQL databases

```
WO_NUM     PRIORITY  STATUS    EQ_CODE   COMP_CODE    DA_REQUEST ...
0000000004  2    R    BLW01    5/25/2006    ...
0000000005  2    R    BBB02    6/1/2006     ...
0000000006  3    R    FAN01 MOTOR ...
```
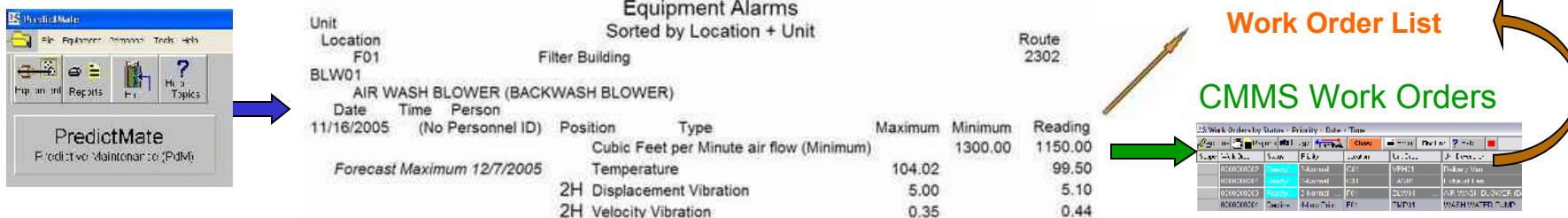
Davison CMMS Work Orders

PredictMate
Predictive Maintenance (PdM)

Work Order List

Reviewed, no duplicates.

Issue only valid work orders from a CMMS

Work orders created by PredictMate are an accumulation of all alarms for each equipment. This is **one** work order with related alarms, **not many** work orders for every alarm.

Work orders that were already added for equipment from PredictMate are not duplicated.

Alarms in PredictMate can differ from SCADA, allowing an operator to set alarm limits separate from the SCADA system.

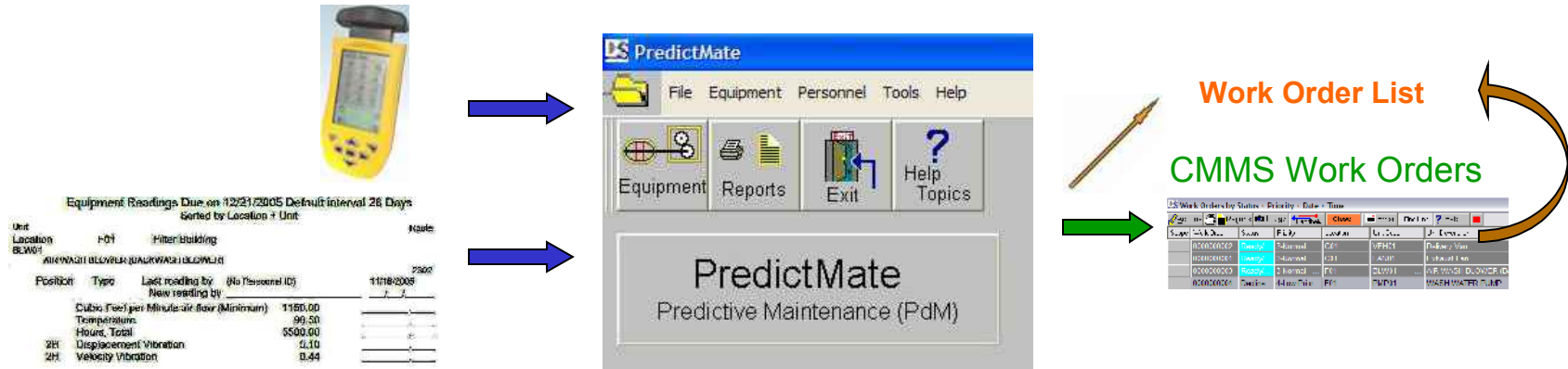## Options for creating CMMS Work Orders from PredictMate ®

- Create corrective work orders and condition-directed preventive maintenance (PM) in the Davison CMMS.

- Export work order lists to files for upload to another CMMS.

- Use Davison CMMS as a standalone or local network system to avoid nuisance work orders in an enterprise CMMS. Then export a work order list for the enterprise CMMS.

You have two opportunities to accept or decline alarms for a work order list:

1) In PredictMate you can confirm the alarm conditions for transfer to a work order. If you do not want to review and select alarms for work orders, PredictMate can transfer alarms to work orders in the CMMS with a single run command from a scheduler.

2) In the CMMS you can decline or delay work orders that are unnecessary or low priority.

Alarm Conditions not from SCADA

You can enter predictive information that you might not retrieve by SCADA points. This might be values for hour meters, cycles, oil analysis, or anything that is more easily collected by printouts or on handheld device (PDA) to PredictMate.

PredictMate can substitute when SCADA field devices are out of service.
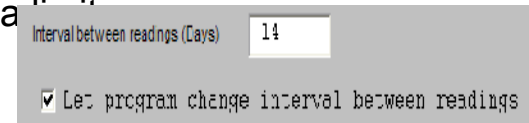
Preventive Maintenance

Predictive readings can print with PM Tasks in Davison CMMS.

Condition-Directed (CD) tasks are PM Tasks that schedule according to a PredictMate alarm. For example, changing oil based on contamination.

Frequency of Readings

After an equipment reading is entered, the next reading is scheduled according to the "Frequency" (Days) for that equipment. PredictMate can adjust the scheduled frequency (Days) between readings. The interval is increased if the equipment unit readings are stable (within 10 percent). The interval is shortened if equipment readings exceed the reading limit or trend toward a limit.
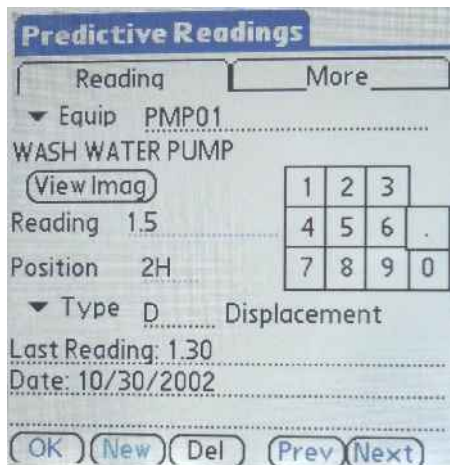
Scheduled readings are sorted by location, route, priority, or equipment group.

Equipment Readings Due on 12/21/2005 Default interval 28 Days
Sorted by Location + Unit

Unit					Route
Location	F01	Filter Building			
BLW01					

AIR WASH BLOWER (BACKWASH BLOWER)

2302

Position	Type	Last reading by	(No Personnel ID)	11/16/2005
		New reading by _____		__/__/_____

Cubic Feet per Minute air flow (Minimum)	1150.00	_____._____
Temperature	99.50	_____._____
Hours, Total	5500.00	_____._____
2H Displacement Vibration	5.10	_____._____
2H Velocity Vibration	0.44	_____._____

With the handheld, equipment can be identified by barcode or picture. Tap the number pad on screen to put numbers in the Reading field.
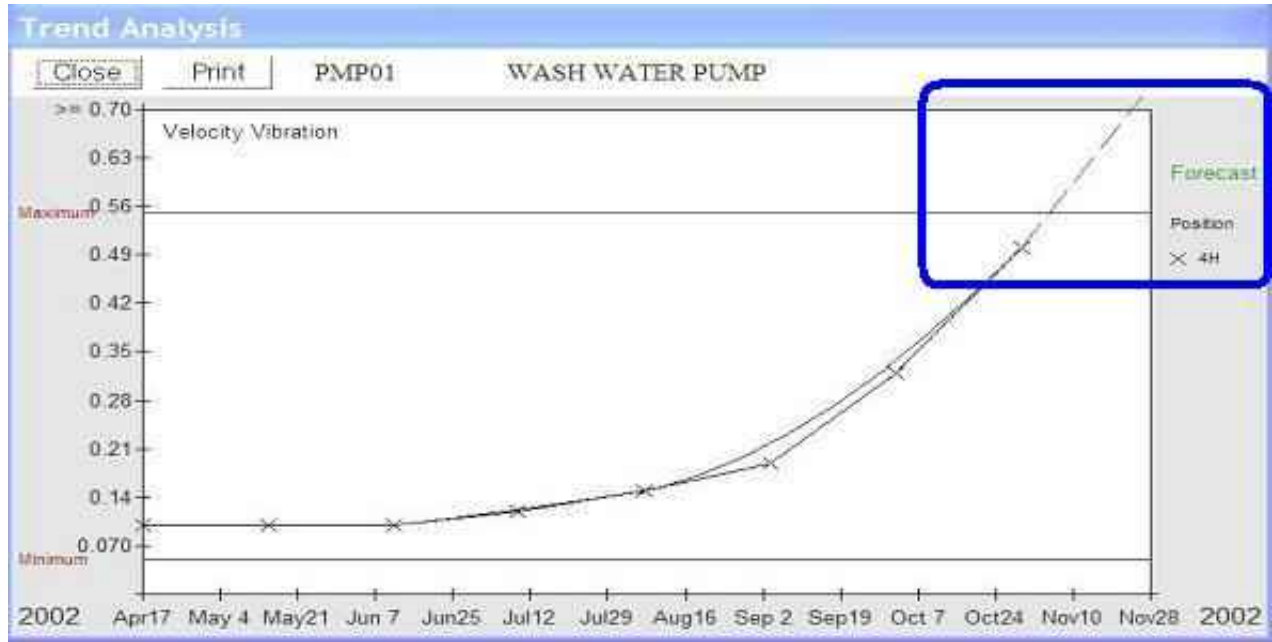
Predictive Readings

Reading	More

▼ Equip PMP01
WASH WATER PUMP

(View Imag)

	1	2	3
Reading 1.5	4	5	6	.
Position 2H	7	8	9	0

▼ Type D   Displacement

Last Reading: 1.30
Date: 10/30/2002

(OK)(New)(Del) (Prev)(Next)

Forecasting Alarm Conditions

PredictMate ® forecasts the date that alarms will occur, shown in both the Alarm Report and trend graphs.

Equipment Alarms
Sorted by Location + Unit

		Route
Unit Location		
F01	Filter Building	2302
BLW01		
AIR WASH BLOWER (BACKWASH BLOWER)		

Date	Time	Person					
11/16/2005	(No Personnel ID)	Position	Type	Maximum	Minimum	Reading	
			Cubic Feet per Minute air flow (Minimum)		1300.00	1150.00	
Forecast Maximum 12/7/2005			Temperature	104.02		99.50	
		2H	Displacement Vibration	5.00		5.10	
		2H	Velocity Vibration	0.35		0.44	

Trend Analysis

Close   Print   PMP01   WASH WATER PUMP

Velocity Vibration

Forecast

Position

X 4H

>= 0.70
0.63
Maximum 0.56
0.49
0.42
0.35
0.28
0.21
0.14
0.070
Minimum

2002   Apr17 May 4 May21 Jun 7 Jun25 Jul12 Jul29 Aug16 Sep 2 Sep19 Oct 7 Oct24 Nov10 Nov28 2002

Setting PredictMate ® Alarm Limits

PredictMate will report alarm limits by **one** of the following four methods for each equipment unit, depending on how much information you enter.

1. Let PredictMate set limits from past data. At least six (6) readings for a type and position are required before a limit is calculated.

2. By the type of reading where no other limit exists for the equipment.

3. By a group of equipment, related by components where no specific limit exists.

4. Setting the specific limit for each equipment reading.

Reading Type

Example reading types are vibration displacement and velocity, amperage, run-time hours, speed, temperature, and cycles – anything that can indicate an alarm condition.

The following types are reserved for special purpose:

- "D" and "V" for Displacement and velocity vibration
- "FREQ" for graphing the vibration frequency (frequency = velocity / 3.1416 / displacement * 60000)
- "TOT" for totalized readings can be followed by a number like "TOT1", "TOT2"
- "ALRM" for alarm conditions received from SCADA.

DS Reading Types

Actions	No Calc	All Calc	? Help	■

Scope	Type	Description	Calc Limits
	A ...	Amperage	☑
	ALRM ...	Alarm condition (1=Alarm 0=No Alarm)	☐
	AV01 ...	Time-weighted average from SCADA	☐
	CFM ...	Cubic Feet per Minute air flow (Minimum)	☐
	CYCL ...	Cycles	☑
	D ...	Displacement Vibration	☑
	FREQ ...	Vibration Frequency (Calculated)	☐
	GPM ...	Gallons per minute (Minimum)	☑
	MPG ...	Miles per gallon (Minimum)	☐
	SP01 ...	Speed	☑
	TEMP ...	Temperature	☐
	TOT ...	Totalizer change per day	☐
	TOT1 ...	Hours, Total	☐
	V ...	Velocity Vibration	☑

Reading Position

Position is **where** the reading is taken on the equipment. More than one type of reading might be entered with one Position, like displacement and velocity vibration both in the same Position. **Position can be empty** for readings like temperature, count, or hours.

On a driven machine follow the torque from beginning to end, starting with the outboard end of the driver (motor) or for each phase of amperage use "A", "B", "C". In the CMMS a machine can be divided into components like motor, pump, control. In PredictMate a unit can be divided into many more positions depending on how many readings are needed.

Host-Reporting Server

Davison "ODBC Replication" is a host-reporting server. In the host-reporting server Site Number separates each remote site. Reports can run for a single remote site or can access all sites for information, like a list of common inventory parts or cost comparison among groups of equipment. You can create reports from the host-reporting server with tools in the database system of your choice among MS Access, SQL Sever, SyBase, MySQL, or Oracle.

<Site Number> <Unit> <Component>

00001 PMP01   MOTOR

In Davison CMMS the Unit + Component combination must be unique. However, in the host-reporting server the unique combination is Site + Unit + Component. In the host-reporting server Unit + Component, Stock codes, Equipment Group, and other codes can be identical among several sites.

Getting work orders from SCADA through PredictMate ®

An outline of scheduled jobs or review by the user

Configuration

■ In PredictMate select File, ODBC Import, Create in DSN, Predictive Only.

■ Then SCADA can add rows to the staging tables. Configure SCADA to add rows to the staging tables continuously, usually at the top of every hour.

■ ODBC Import usually runs from a scheduler every hour, soon after the staging tables are filled by SCADA.

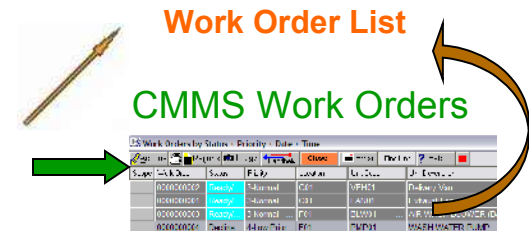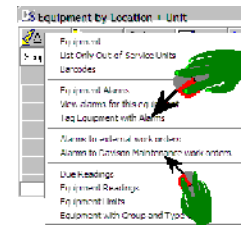Run C:\DMSystem\ImportRun.exe from the scheduler.

Routine Review or Scheduled Jobs

Review alarms for valid work orders or schedule run commands to create a work order list.

■ After review and tagging equipment in PredictMate, select "Reports", "Alarms to external work orders" or "Alarms to Davison Maintenance work orders". See "How to Create Work Orders from Alarms".

Equivalent run commands from a scheduler:

▪ External work order list (CSV or Tab-delimited): "c:\dmsystem\DSPdM.exe ALRMTOEX"

▪ Add Davison CMMS work orders: "c:\dmsystem\DSPdM.exe ALRMTOWO"

■ Upload the external work order list (CSV or Tab-delimited file) to another, enterprise, CMMS.

■ Or manage the work orders in Davison CMMS.

■ As an option, export a work order list from Davison CMMS for the enterprise CMMS.

Work Order List

CMMS Work Orders

Menu options to export to CSV or Tab-delimited from Davison CMMS Work Orders:

▪ Select Actions, Export, Export to text file (CSV/TXT).

▪ Special command provided by Davison Software for work order lists in CSV or Tab-delimited files.

Special options include formatting for direct upload to MS-Excel or for upload to SQL databases for another system.

Conclusion

Data is retrieved from various sources, such as Handheld Devices or SCADA.

PredictMate ® confirms and forecasts alarm conditions for work orders.

The CMMS manages work orders until the alarm condition is resolved.