24/7 Systems, Inc. Newsletter

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Get Operations Involved in Reliability with Handheld PDA's and Tango

In the last two newsletters we covered methods for measuring Condition-Based Maintenance effectiveness:

1)   Tracking the time it takes a maintenance organization to follow-up on problems discovered through condition monitoring, and
2)   Trending how the organization reduces the quantity of discovered problems over time.

For most people, Condition-Based Maintenance implies the use of high-tech monitoring systems such as vibration analysis, infrared thermography, or oil analysis by specialized maintenance technicians or contractors. However, several companies are now using hand held Personal Digital Assistants (PDA's) to capture equipment condition information from human sight, sound, touch, and smell as a critical part of their reliability effort. For example, in a paper by Eastman Chemical's Reliability Engineers, the use of handheld PDA's by machine operators is cited as one of the most proactive elements in their effort to mitigate equipment failures.

Tango Web Service offers an optional Rounds Logging function that can be used with a variety of industrially hardened or consumer grade PDA's. In this issue we'll cover the first of three Rounds Logging applications:

1)   Operations and maintenance personnel using PDA's for gauge readings & inspections, and integrating results with problems found though 'higher-tech' condition monitoring.

The applications that will be featured in upcoming newsletter issues are:

2)   Oilers using PDA's to guide & document lube routes and inspections;
3)   Thermographers using PDA's to guide IR routes and ensure compliance with standard operating procedures.

Tango Rounds Logging is an economical way to involve operators and mechanics in a plant's reliability program. In the initial setup, inspections and gauge readings are defined for each asset or component in the functional location tree (Fig. 1), including the alarm values for problem conditions (Fig 2). Numeric readings can be set for low and high alarm levels (Fig 3).
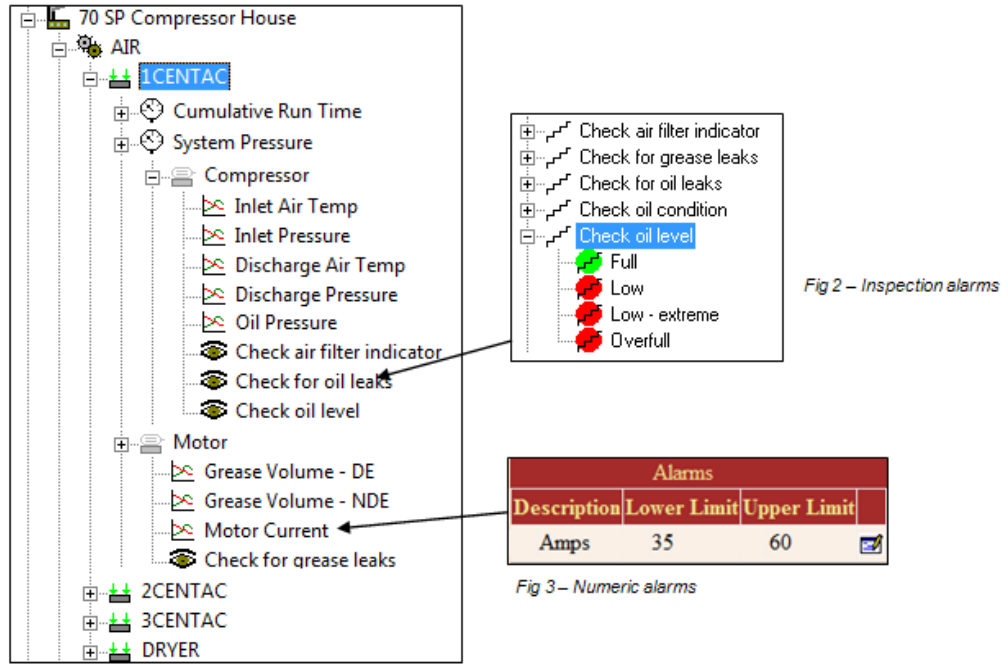
Fig 2 – Inspection alarms

Fig 3 – Numeric alarms

Once these definitions are in place, routes are created to specify tasks to be covered and time interval between each data collection. Tango Web Service makes it easy to manage the route collection activity by communicating which routes are overdue, being collected, or scheduled for a future date (Fig 4).
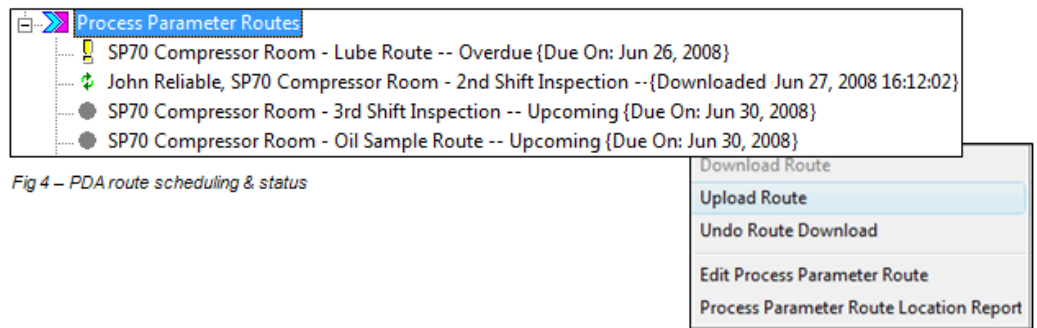

Fig 4 – PDA route scheduling & status

The technician downloads a route from a PC workstation list to the PDA, and the PDA screen walks them though each data collection step. For inspection tasks, the technician selects an observation from a predefined list; when an alarm condition is selected the PDA prompts them for additional comments on the problem (Fig 5).
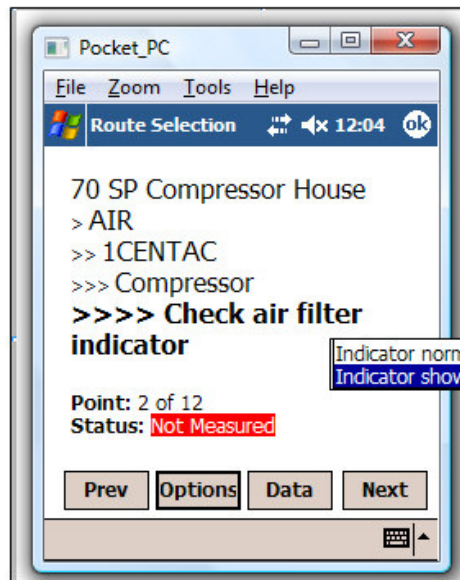
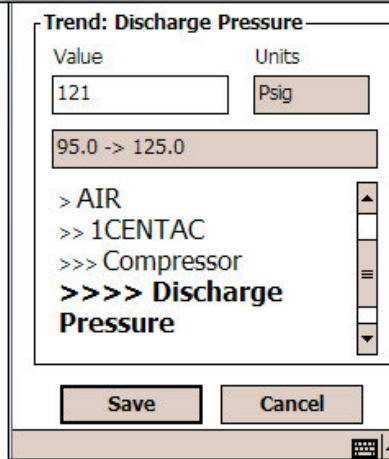Fig 5 – PDA Inspection task, with added comment for problem observation

Fig 6 – PDA gauge reading screen, with 'OK' value range

For a gauge reading, the technician enters a numeric value (Fig 6). If that value is above or below the listed range the PDA again prompts from additional comments.

As soon as the route is uploaded, two items are updated in the database (Fig 7):
1)   the route's next due date
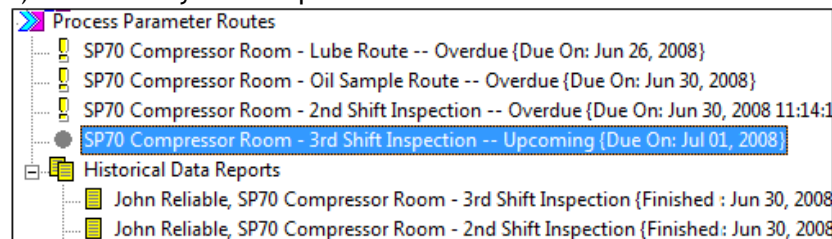2)   a summary route report

Fig 7 – Updated route status and list of summary reports

The summary report is color coded for easy review, and shows which are items are 'OK', which are in alarm, and which items were missed (Fig 8).

Process Parameter Route Info

Task Name: SP70 Compressor Room - 3rd Shift Inspection

State	Value	Trend	Unit	Function	Asset	Component	Condition Entry Request
Out of Bounds	Leak heard and location marked	N/A	70 SP Compressor House	AIR	1CENTAC	Air leaks	Ref Code:263 Comment: discharge fitting leak tagged
Out of Bounds	Indicator shows filter is dirty	Check air filter indicator	70 SP Compressor House	AIR	1CENTAC	Compressor	Ref Code:M Comment: yellow, almost to red
Ok	93 deg F	Inlet Air Temp	70 SP Compressor House	AIR	1CENTAC	Compressor	
Not Taken		Inlet Pressure	70 SP Compressor House	AIR	1CENTAC	Compressor	
Above Upper Limit	117 deg F	Discharge Air Temp	70 SP Compressor House	AIR	1CENTAC	Compressor	
Ok	121 Psig	Discharge Pressure	70 SP Compressor House	AIR	1CENTAC	Compressor	
Ok	32 Psig	Oil Pressure	70 SP Compressor House	AIR	1CENTAC	Compressor	
Out of Bounds	Low	Check oil level	70 SP Compressor House	AIR	1CENTAC	Compressor	Ref Code:M Comment: added 1 qt exxon rarus
Out of Bounds	Oil leak seen and source marked	Check for oil leaks	70 SP Compressor House	AIR	1CENTAC	Compressor	Ref Code:M Comment: shaft seal leak
Not Taken		Motor Current	70 SP Compressor House	AIR	1CENTAC	Motor	
Ok	No leaks found	Check for grease leaks	70 SP Compressor House	AIR	1CENTAC	Motor	
Ok	870 kPa	N/A	70 SP Compressor House	AIR	1CENTAC	System Pressure	

Fig 8 – Rounds Logging summary report showing status of all items in the route

Alarm items also appear on a 'Condition Entry Request' list, for review by someone who will determine if maintenance action should be taken. When a Rounds Logging item is elevated to a Condition Entry, it is integrated with issues coming from 'higher-tech' condition monitoring sources (Fig 9). This dynamic status report allows a large plant audience to keep track of current problems along with what's being done to resolve them.

Open Condition Entries

	Severity	Asset	Component	Technologies	Days Awaiting Checkoff	Work Order Status	Work Order Numbers	Case Closure
●	1	CLDWELL	MOTOR1	Thermography, Vibration - Route	523	1 of 2	• 02-14056	Close Entry
●	1	2CENTAC	Air leaks	Visual Inspection	490	0 of 1		Close Entry
●	2	REACTOR	1FAN	Vibration - Special Test	377	0 of 1		Close Entry
●	2	CASTING	2SPM1	Oil - Screening, Vibration - Special Test	521	1 of 2	• 03-02011	Close Entry
●	2	WASTE	FANS2	Electrical - Online	638	0 of 1		Close Entry
●	2	7120067	Gearbox	Oil Analysis - Lab, Vibration - Special Test	656	0 of 5	• Awaiting (x1)	Close Entry
●	3	1CENTAC	Air leaks	Visual Inspection	0	0 of 1	• Awaiting (x1)	Close Entry
●	4	FLUIDIZ	BLWR1	Vibration - Route	Checked Off	1 of 1	• 01-23423	Close Entry

Sorted By: Severity {Descending}

Compared to traditional handwritten check-lists , PDA-based data collection and web-browser distribution of results through Tango Rounds Logging offers several advantages:

·The web-hosted database provides consistent scheduling and management of Rounds Logging tasks;
·PDA's enforce the use of standardized equipment definitions, data entry, and alarm reporting;
·Integrated results are efficiently distributed to a wide plant audience via web browser - according to the

Eastman Chemicals paper this kind of feedback encourages operators and mechanics who collected data to take more ownership of equipment reliability.

Learn more about Tango Web Service at www.tf7.com, or call Forrest or Dick at 865-681-0282 to discuss how Rounds Logging can help your plant's reliability.

→ New Tango Features

It can be useful for contractors to enter data directly into Tango for you. Of course you don't want contractors looking at other sensitive information you may have stored in Tango, so it can be useful to limit their access. Tango has several methods to limit someone's access to what they can see or edit.   Click here
for instructions on how to set up a contractor with limited access.