

Managing IR Surveys with Tango

Most Industrial facilities perform infrared scanning of plant electrical and mechanical equipment to detect equipment condition problems which can be identified by heat generated by the problem. In many cases IR scans are performed by walking around the plant with an IR camera scanning equipment passed along the path, and recording any problems. Often there is no master list of equipment to be surveyed and no record of what was inspected, and found OK, or found not active or not loaded.

These program management problems combined with the problems of sending problem results through large e-mail files sent to a few key managers demonstrates the need to establish a standard system to manage and report IR results.

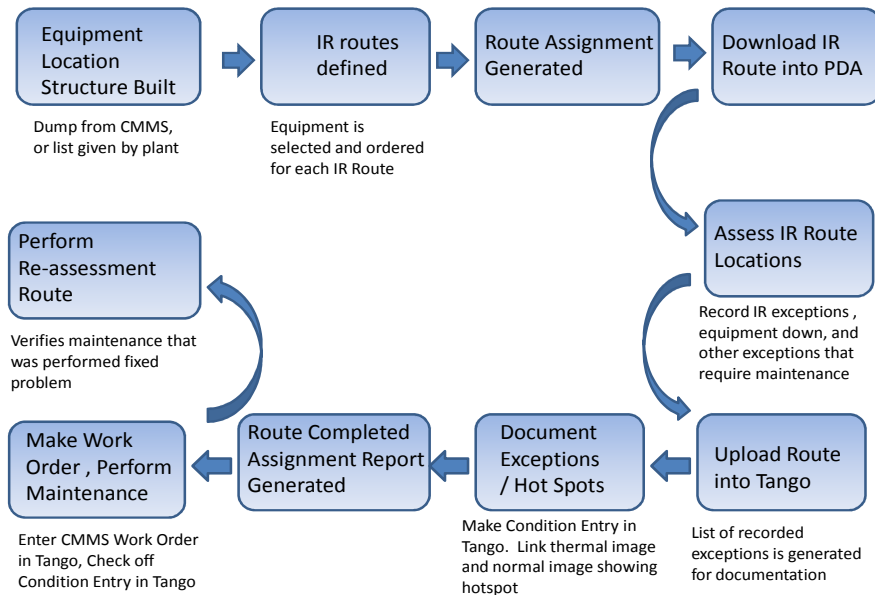


Figure 1

The Tango Reliability Management Web Services helps standardize and integrate IR Condition Monitoring results from multiple contractors into a single database for effective task management communication. The basics of using Tango to manage and communicate IR Survey data is illustrated in Figure 1. To set-up the database equipment locations are defined in Tango to match CMMS systems if possible. This allows ease of work order generation in the CMMS system when exceptions are found. Each IR Route is defined, equipment locations are selected to be scanned for the task, and each equipment locations are ordered for ease of work execution (Figure 1-2,3). Each equipment location is given an order value which the IR analyst

will follow for ease of work execution. An IR scan assignment is created stating the due date and the analyst to perform the scan (Figure 1-4, 5). The IR Route is then downloaded into a PDA. Barcodes can be applied to locations, so when scanned with PDA the point is located in the route and can be documented promptly (Figure 2).

Adding a Barcode to a Location

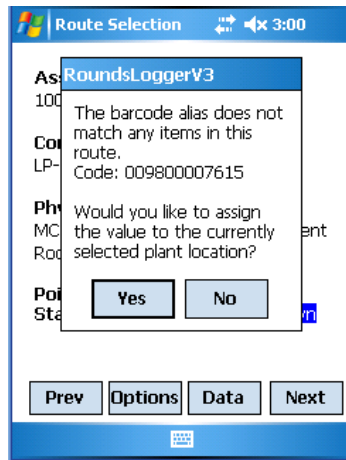
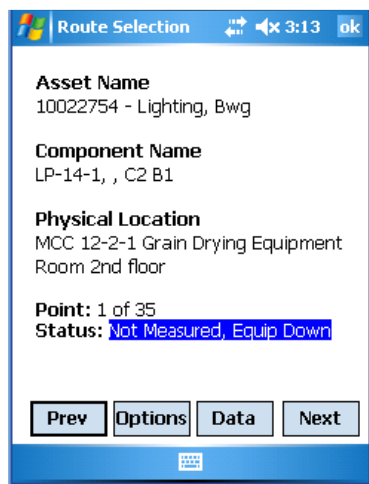


Figure 2

As the IR contractor is led through the route the user selects an assessment of the location such as OK, Condition Entry / exception, equipment that is down and other exceptions that require maintenance for each location (Figure 3)

Location Screen before barcode is scanned



Assessment State screen opens after barcode is scanned

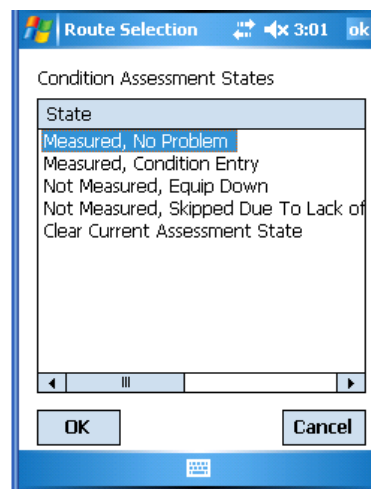


Figure 3

When a route is uploaded back in to Tango a list of the recorded exceptions opens. Detailed information such as severity, faults, action to fix fault is entered for each exception

Exceptions are documented in Tango when the route is completed. Each exception uses a standardized forum (Figure 4) listing the severity, the problems with the location, recommended actions to fix the problem and any additional comments. Pictures from the scan are linked to each exception to quickly reference which part of the equipment needs maintenance.

Figure 4

Work planners automatically are sent an e-mail for each exception found in there area (Figure 5).

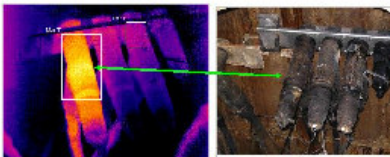
Figure 5

After all assessments are made the assignment is closed and an Assessment Assignment Report is generated (Figure 6). Work Orders are generated in the CMMS and the WO number is recorded in Tango for easy reference. Once the Work Order is completed the Condition Entry in Tango is checked off. A reassessment route is generated were the validation of the work that was performed fixed the exception.

Report Date: Apr 05, 2007
Analyst: Analyst

Assignment Close Date: 4/5/2007		Low - Schedule action as practical	
Condition Entry Date: 4/5/2007			
Plant Unit: GOSC	Plant Function: Crush	Plant Asset: High Voltage Pit Boots (Elevator Area)	Asset Component Location: Plugs

DATE OF ENTRY	4/5/2007
DATE OF NEXT	4/5/2007
DATE OF	2/0
DATE	4/5/2007



DATE	4/5/2007
DATE OF NEXT	4/5/2007
DATE OF	2/0
DATE	4/5/2007

DATE OF ENTRY	4/5/2007
DATE OF NEXT	4/5/2007
DATE OF	2/0
DATE	4/5/2007

B Ph

Faults

Problem Statement: Appears to be a connection problem inside of this plug "B phase" Left plug.

Recommendation: Disassemble, clean or replace plug and reconnect.

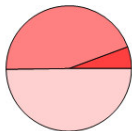
Technology	Condition Level	Work Request Number	Work Order Number
Infrared - Electrical	Low		217033

Figure 6

Work Planners and other plant personnel can view the documented exceptions over the Web without loading any special software on their PC. These exceptions are compiled in the Integrated Condition Status Report, which lists all condition entries that have not been closed. Each exception in the report is listed by its severity, days awaiting check-off, and location (Figure 7). Double clicking on an entry will expand the entry so the condition details maybe viewed. Condition Entries in the Integrated Condition Status Report are checked-off showing that the maintenance has been performed.

Integrated Condition Status Report

User: TF7, Date: 08/21/2007, Time: 14:19:49



Color	Level	Entries	Description
Red	Critical	35 (5%)	Action needed immediately
Orange	High	277 (44%)	Action needed within 30 days
Light Pink	Low	309 (49%)	Schedule action as practical

Open Condition Entries

Severity	Criticality	Asset	Component	Technologies	Days Awaiting Checkoff	Work Order Status	Work Order Numbers	Case Closure																																
Low	0	High Voltage Pit Boots (Elevator Area)	Plugs	Infrared - Electrical	138	1 of 1	217033	Awaiting Checkoff No Closure Rights																																
<p>Location: GOSC » Crush » High Voltage Pit Boots (Elevator Area) » Plugs</p> <table border="1"> <thead> <tr> <th>Entry</th> <th>Severity</th> <th>Technology</th> <th>Faults</th> </tr> </thead> <tbody> <tr> <td>Apr-05-2007 By: Analyst 1</td> <td>Low</td> <td>Infrared - Electrical</td> <td></td> </tr> <tr> <td colspan="4"><i>Recommendations:</i> Disassemble, clean or replace plug and reconnect.</td> </tr> <tr> <td colspan="4"><i>Comments:</i> Appears to be a connection problem inside of this plug "B phase" Left plug.</td> </tr> <tr> <td colspan="4">Linked Documents B_Ph</td> </tr> <tr> <td colspan="4">Work Order Request: Add</td> </tr> <tr> <td colspan="4">Work Order Number: 217033</td> </tr> <tr> <td colspan="4" style="text-align: center;">No Checkoff Rights</td> </tr> </tbody> </table>									Entry	Severity	Technology	Faults	Apr-05-2007 By: Analyst 1	Low	Infrared - Electrical		<i>Recommendations:</i> Disassemble, clean or replace plug and reconnect.				<i>Comments:</i> Appears to be a connection problem inside of this plug "B phase" Left plug.				Linked Documents B_Ph				Work Order Request: Add				Work Order Number: 217033				No Checkoff Rights			
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Department/Room	High Voltage Pit
Equipment/Panel	Elev Area Plugs
Component	B Ph
Problem	Left side plug

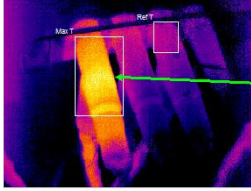




Figure 7 (w/ linked IR Image)

Locations where exceptions were found and locations that were down are compiled into a route for another scan. Condition Entries are closed once this re-assessment scan verifies the maintenance performed. If the exception was not fixed a Continued Condition Entry case is selected and the Condition Entry remains in the Integrated Condition Status Report until the exception is fixed.