



TRAKKA TIPS

TO HELP YOU RUN SMARTER™

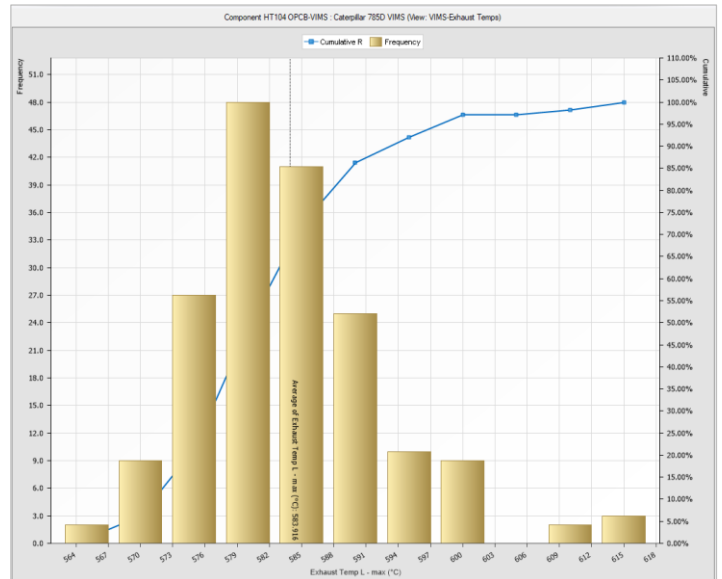
ONBOARD SENSOR DATA

Several of DINGO’s customers are utilizing the powerful analytics and data visualization capabilities of Trakka®, to manage their sensor data, coming from systems such as MineCare®, Minestar™, PitRam®, Wonderware® and PI System™.

As with any condition monitoring data, the key is to produce actionable insights that enable teams to quickly identify and correct emerging issues. One customer has identified 250 events and recorded \$5M in estimated savings by using Trakka to analyze, understand, and apply the insights from its sensor data to machine health.

Here’s how:

- 1 Extract the important information from the source system (MineCare, Minestar, etc.) and transmit to Trakka.
- 2 Determine site specific alerts and rules to streamline the data analysis process.
- 3 Review incoming data, using rules and human intelligence, to make decisions on any corrective maintenance actions required



Inbox 2 - Unreviewed Observations							
1. Unconnected Observations (0)		2. Unreviewed Observations (45)		3. Incomplete Reviews (22)		4. Completed Reviews	
Component Type	Observation Type	Trakka Rating	Observation Date	Meter Reading	Lab	Date Imported	Component has a meter error
VIMS	Onboard Monitoring	Critical	11/28/2018	44111.54	Minestar VIMS	11/29/2018 6:07:35 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	72025.38	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	82566.13	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Warning	11/28/2018	83399.41	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Warning	11/28/2018	86097.49	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	86991.16	Minestar VIMS	11/29/2018 7:12:52 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	87261.14	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Warning	11/28/2018	89094.22	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	92382.83	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	96578.06	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>
VIMS	Onboard Monitoring	Critical	11/28/2018	110714.41	Minestar VIMS	11/29/2018 6:12:21 AM	<input type="checkbox"/>

MineCare is a trademark of Modular Mining Systems, Inc., Minestar is a trademark of Caterpillar Inc, PITRAM is a trademark of Micromine Pty Ltd., Wonderware is a trademark of AVEVA Group Plc, and PI System is a trademark of OSIsoft LLC



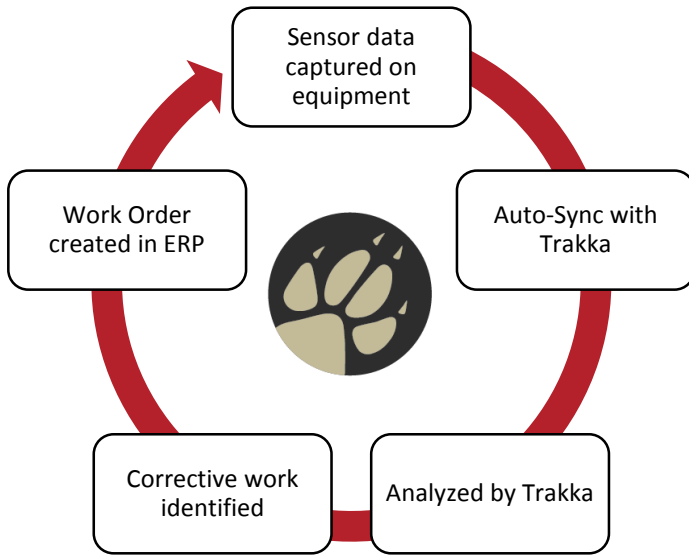
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The data is automatically imported into Trakka® and compared against alerts to highlight any unusual results. Rules can be configured so that any understood issues will create a Work Request in an ERP system for the repairs.



Observation Information						
Connection Code	HTK0538	HTK0538	HTK0538	HTK0538	HTK0538	HTK0538
Observation Type	Onboard Monitori...	Onboard Monitori...	Onboard Monitori...	Onboard Monitori...	Onboard Monitori...	Onboard Monitori...
Observation Date	11/23/2018	11/24/2018	11/25/2018	11/26/2018	11/27/2018	11/28/2018
Observation Code	HTK0538;2018-1...	HTK0538;2018-1...	HTK0538;2018-1...	HTK0538;2018-1...	HTK0538;2018-1...	HTK0538;2018-1...
Meter Reading	72429.93	72453.98	72477.96	72497.86	72522.07	72545.19
All Time Meter Reading	72429.93	72453.98	72477.96	72497.86	72522.07	72545.19
Component Age	72429.93	72453.98	72477.96	72497.86	72522.07	72545.19
Observation Interval - days	15.07	24.05	23.98	19.91	24.21	23.12
Observation Rating	Normal	Normal	Normal	Normal	Normal	Normal
Trakka Rating	Critical	Warning	Warning	Critical	Critical	Critical

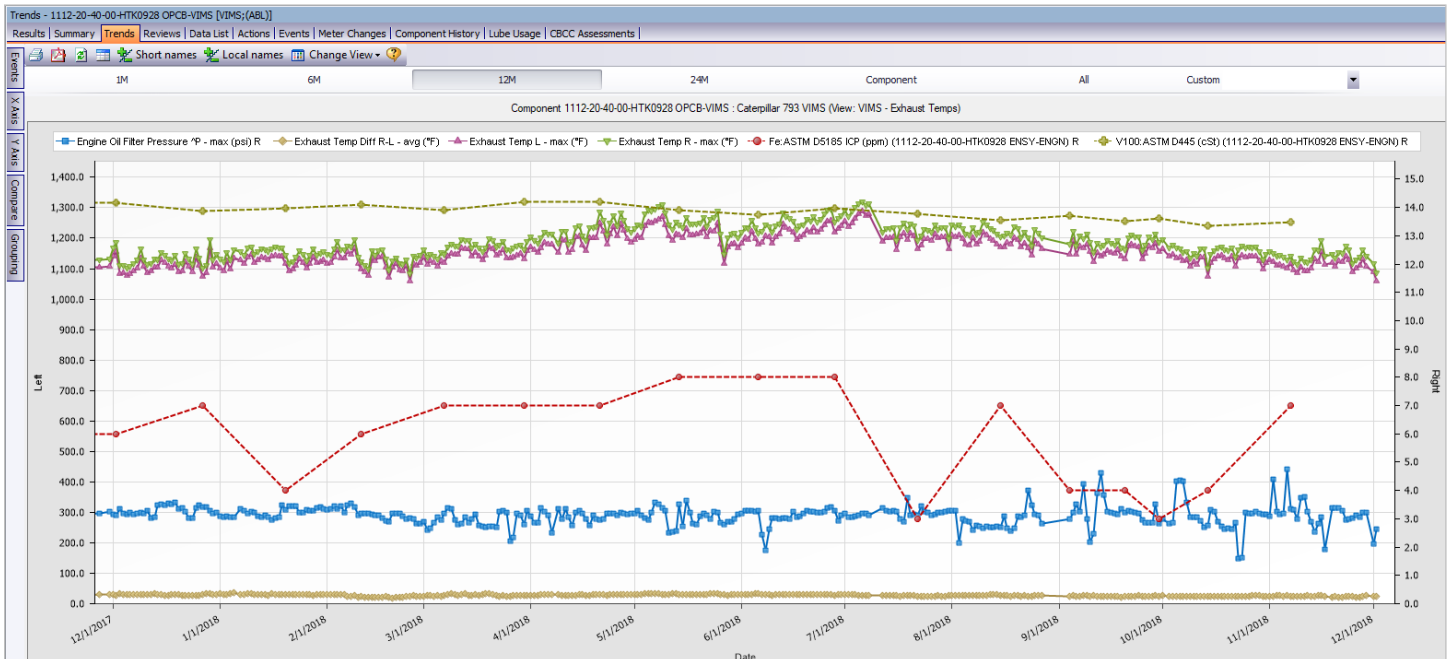
Onboard Data						
Ambient Air Temp (Running) - avg (°F)	30.29	29.54	19.57	33.80	37.58	43.05
Brake Temp Diff RF - LF - avg (°F)	4.71	4.91	5.40	4.59	4.77	4.91
Brake Temp Diff RR - LR - avg (°F)	0.00	-0.33	0.00	0.00	0.00	0.00
Brake Temp LF - avg (°F)	192.20	186.20	189.07	180.14	190.71	193.35
Brake Temp LR - avg (°F)	201.05	197.09	202.22	191.48	201.12	203.41
Brake Temp RF - avg (°F)	199.10	192.71	196.82	187.07	196.15	200.79
Brake Temp RR - avg (°F)	198.80	194.94	199.56	189.32	198.46	201.12

Onboard Data - Engine						
Air Filter #1 Restriction - max (psi)	0.81	0.70	0.74	1.83	1.28	2.14
Air Filter #2 Restriction - max (psi)	0.77	0.65	0.70	1.80	1.25	2.11
Air Filter #3 Restriction - max (psi)	0.78	0.65	0.70	1.81	1.26	2.13
Air Filter #4 Restriction - max (psi)	0.82	0.65	0.73	1.78	1.29	2.09
Engine Coolant Temp (Running) - max (°F)	171.44	178.11	179.29	176.18	179.91	179.44
Engine Oil Filter Pressure - max (psi)	4.52	4.53	4.61	4.56	4.49	4.47
Engine Oil Pressure (High & Cool-74) - avg (psi)	85.03	83.76	83.35	83.83	83.26	83.02
Engine Oil Pressure (Low & Cool-74) - avg (psi)	73.20	72.36	71.19	72.05	71.27	70.77
Exhaust Temp Diff R-L - avg (°F)	-30.30	-27.57	-27.86	-30.60	-29.19	-31.83
Exhaust Temp L - max (°F)	1103.75	1175.16	1158.33	1152.93	1165.14	1179.66
Exhaust Temp R - max (°F)	1074.65	1143.99	1123.27	1127.73	1136.89	1148.98
Fuel Actuator Position Command - avg (°)	40.75	44.09	43.87	42.43	43.09	43.13
Fuel Pressure (High & Cool-74) - min (psi)	102.23	103.19	103.13	103.82	102.47	102.99
Fuel Rail Temperature (Running) - max (°F)	153.83	151.95	148.57	151.35	160.95	161.16
Fuel Temperature (Running) - max (°F)	100.22	96.60	93.30	95.70	108.06	110.23
Intake Manifold #2 Pressure (Loaded) - avg (psi)	23.06	24.89	25.64	24.57	24.70	24.02
Intake Manifold #2 Temperature (Loaded) - avg (°F)	99.85	116.41	113.65	115.11	114.70	116.18
Intake Manifold Pressure (Loaded) - avg (psi)	22.85	24.87	25.59	24.51	24.81	24.00
Intake Manifold Temperature (Loaded) - avg (°F)	97.81	111.36	110.35	110.44	111.94	114.29

Onboard Data - Suspension						
Cycle Pitch FELA - avg	1178.64	1190.20	1310.91	952.76	1498.86	1557.64
Cycle Rack FELA - avg	2148.82	2051.70	2085.52	2061.88	2222.68	2197.50
Susp Cyl RF-LF (Empty) - avg (psi)	-89.34	-103.21	-107.52	-109.95	-109.09	-112.09

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Trakka allows the sensor data to be viewed and trended alongside other condition data using Trakka's visualization and data management tools.



For more information on how to use Trakka to drive efficiency at your operation, contact us at info@dingo.com