Industry Innovations Fleet
Health Safety and Security

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Principle Software Engineer
Rail Security Coordinator
Olin Corporation

GOAL:
Create comprehensive tracking records on every shipment including safety and environmental effects
Olin’s C/A North American Position

- Largest shipper of chlorine by rail in North America
- Largest bleach producer in North America
- Largest Manufacturer of on-purpose Hydrochloric Acid
- Widest geographic coverage of any N.A. producer
### Plant Location

<table>
<thead>
<tr>
<th>Plant Location</th>
<th>Chlorine</th>
<th>Caustic</th>
<th>KOH</th>
<th>HCL</th>
<th>Bleach</th>
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ACC - Responsible Care

• Olin is a Responsible Care Member
• Olin cares about all distribution events even non-custodial events
• All in together....
How often does this happen?
RailInc - Fleet Health Service

Safety + Savings = WIN!!
RailRoad Equipment Health

Class I RR – Wayside Sensor Network ➔ ALERT Data ➔ EHM

- THD- Truck Hunting Detector
- TPD- Truck Performance Detector
- WILD- Wheel Impact Load Detector
- ABD- Acoustical Bearing Detectors
- Others (Profilers, Hot/Cold Boxes, etc)

AAR Rules allow InTransit repairs based on Alerts

- Running Repair Bills and Service Interruptions – 70 WS / month and 4 days / car transit
EHM  DDCT  EW  MA Olin Alerts directed to Rail Crew

- Cost Avoidance
- ORC Dist. Avoidance

Plant Rail Crew

Inspect Car

Remove Alert

Fix Car Defect

Email Alert
Weekly Average Condemnable Wheels 2012-2015
Receive 128 Cars

SBLX024061 105782 POTASH T8:56
LOADED 190500.000 LBS
Loaded for 1.03 Days
NEEDS REFLECTIVE SHEETING REPLACED
070C 2015 RULE 88.B.2 INSPECTION - 10 YR;
060B 2015 STUB SILL INSPECTION - 10 YR;
050B 2015 PRESS REL DEVICE QUALIFICATION - 10 YR;
040B 2015 SERVICE EQPT QUALIFICATION - 10 YR;
030C 2015 THICKNESS TEST QUALIFICATION - 10 YR;
020A 2015 TANK QUALIFICATION - 10 YR;
010C 2015 TANK QUALIFICATION - 10 YR;

EHM Alerts: THD WILD CHARLESTO, TN PLACEMENT-ACTUAL (Z)
Olin Rail View – FHS Alerts

Entering / Leaving Plant
Fleet Health Results

• Averaging $$K/mon savings by removing alerts on new WheelSets
• Found Dangerous Trucks – 2 newly Shopped car
• Focus and streamline our inspections
• Save by preferring Turned Wheels over New
• 2014 resulted in favorable maintenance budget
• Win Win !!!
Additional Info

• Study 50 cars False Wild Alerts (passed 2 WAS)
• 10 % of cars reoccurred WILD Alert within 3 M
• 4 of 5 cars wrong AEI Tag Locations
• Adjusting our secondary inspections to look for proper Tag placements
• Future: Correlate and Dive Deeper into Car Repair information (CRB is Delayed)
Entering / Leaving Olin

Read AEI Tags

Capture HD Car Images

Due REG. Maintenance

FHS Alerts

Send Notifications/Alerts to RIGHT PERSON - RIGHT DEVICE
Entering / Leaving Plant

- Inspection Station
- TANK ID
- VOOCR
- 24x30x12 Enclosure @ Pole 10' from Truss 120vac
- Linear Panorama

- Pelco Espirit PTZ Cam 5
- Pelco 1390 Fixed Cam 4
- Sony Ipela Fixed Cam 1
- Sony Ipela Fixed Cam 2
- Sony Ipela Fixed Cam 3

4" Conduit
Document Car Damage

Entering / Leaving Plant

Return to Plant

Leaving Plant
In-Transit Monitoring

- GPS with Open/Close Dome Detection
  - Motion Detection Image Capture
  - Impact and Deceleration Data
- NOAA – Hurricanes Storms
- USGS – EarthQuake Data
- ALOHA Plume Modeling
- EHM Alert Data
  - CLM Data

GPS

WEB

RailInc
Weather and Earthquake Tracking

• Ensure that Olin railcars do not contribute to derailments or track infrastructure decline
  – Railcars are flagged for inspection (Bearing damage – Flooding, Wheel & PRV Earthquake)

• Probability Extreme weather events is high in the Gulf regions and East Coast

• Probability Earthquake activity high on West Coast
La Habra Quake

Impact Event Detail on PROX082402 for event 146222510

10 Hz Filter Impacts

100 Hz Filter Impacts

Velocity Change MPH

La Habra Quake

In-Transit
Hurricane and Severe Weather
Dual Interface Options GE
Document Trips via GE Flights
Integrated Release modeling
EPA Aloha, WISER
Multi-K Sensor Equipped GPS Devices

Olin uses 2 GPS Vendors
Location and shape for each

Only 1 GPS device per car
No external wires

Chlorine Tank-Car
In-Transit Monitoring GPS

SECURITY (Tampering)
- Motion detection Image capture (pilot)
- In-transit valve dome access with Image

RIDE QUALITY
- Impact Accelerations in G’s
- MPH Coupling and Decelerations speed
- Image Capture for high impact events
Security Events Reported

- 21 HCL tank-car tampering since October-09
  - Working with RR, TSA, Rail Police, State police
- Tamper indicator bags
- Inspection Photos post-load
- Motion Detection GPS Cameras pilot
• Photos provide visual context  
• Paired Tank-Car Alerts (redundancy)  
• Turn Alerting on between end points
Pictures provide context

Photo Triggers:

- Deceleration Events > 5 mph
- Impacts over 5 Gs
- In-Transit Valve Dome Open Events
- Motion Detection (Tampering)
- Manual page requests
Immediate Email

From: data service@olin.com [mailto:data service@olin.com]
Sent: Friday, August 01, 2008 10:15 PM
To: Loftis, Don CHAS
Subject: OLINX 114816, Alarm: OPEN, 0 ppm, 08/01/2008 9:40AM(EST), Charleston, TN

This is an automatic Olin.com Transportation alarm message.

Customer:
OLIN

Car Number:
OLNX 114816

Message Received:
Aug 1 2008 10:15AM(EST)

Message Created:
Aug 1 2008 9:40AM(EST)

Message:
Alarm: OPEN, 0 ppm

Location:
town: Charleston
state: TN
distance: 1.4091 mi
bearing: 60.137 deg

Latitude: 38.3092
Longitude: -84.7736

For additional information contact Olin 423-335-9340
• Takes only a few minutes
• Enjoy the Free Art…
Abnormal Ride Quality Events

- Short Duration high impact events < 50 ms
- Over-Speed events (7 mph) GPS based
- Vertical or Side events
- Olin Marks these for inspection
- LOGIC to Insert Event into OEHM Alert CUE

HighG, Decel, Security, Quake, Water, Wind, EW, MA, ABD, THD, WILD, DDCT
Derailment 9/17

SBLX014016 : 9/17/2012 3:10:32 PM
Loaded Moving Haynesville, LA .7G

9/17/2012 3:10:32 PM L 1 mph Going To BROMET, AR Impact Alarm Haynesville, LA .7G LNWR 00:00:00
View Maint/Notes

SBLX014016 : 9/17/2012 7:13:44 PM
Impact Picture

After Re-Track
GPS Coupling Speeds (Decelerations)

- Speed checked in motion over 3 mph (GPS)
- Coupling Speed is reported as Speed-Drop
- Original Speed = Final Speed + Speed Drop
- Good Correlation between Delta-V from accelerometers and Speed Drop from GPS data
Coupling Speeds Analysis

In-Transit
Impacts on Images

7 MPH with 5.5 G Vertical

8 MPH with 4.9 G Lateral
Olin’s Intent

- Share a RR’s Data with THAT RR
- **Not** share a RRs ride quality data with other RR!!!
- Hope/belief RR will use data to fix issues

**As a Rule:**

- Olin will **not** report individual event to RR. This avoids RR costs to resolve single events
- Share results about systematic problems
Olin ORC Focus

• Work with carriers to improve ride quality (Share Data)
• Explore techniques to mitigate tampering
• Ensure that ZERO Olin rail equipment leaves Olin with any defects
• Strengthen relationships with industry partners and carriers to improve everyone’s safety
• Share this info with other Shippers

Thank You ♥