GOAL:

Create comprehensive tracking records on every shipment including safety and environmental effects
Olin’s North American Position

- Largest shipper of chlorine by rail in North America
- #1 merchant marketer of chlorine
- #1 industrial bleach producer in North America
- #1 producer of on-purpose Hydrochloric Acid
- Widest geographic coverage of any N.A. producer
### Olin Chlor Alkali Plants & Distribution

#### 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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<tr>
<td>McIntosh, AL</td>
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<td>Becancour, PQ</td>
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<td>Tracy, CA</td>
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</table>
ACC - Responsible Care

- Olin is a Responsible Care Member
- Olin cares about all distribution events even non-custodial events
- All in together....
Entering / Leaving Olin

Read AEI Tags

Capture HD Car Images

Due REG. Maintenance

EHM Alerts

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

Entering / Leaving Plant

- Plant Rail Crew
  - Email Alert
  - Inspect Car
  - Fix Car Defect
  - Remove Alert
Condemnable Wheel Alerts

Entering / Leaving Plant
OLNX117040 CHLORINE Do Not Load

Empty

+a dégazer et à purger (levage). Michel, fini de purger le 21-sept-2013 par lc
126A 2013 SAFETY VLV CHK-OUT - TANK WASH - 40 MTH;
111A 2013 ANGLE VLV CHK-OUT - MIDLAND - 40 MTH;

EHM Alerts: MA0124
Olin Rail View – EHM Alerts

- SHPX205389 CAUSTIC
  LOADED 198900.000 LBS
  EHM Alerts: THD THD WILD

<table>
<thead>
<tr>
<th>EQUIPID</th>
<th>ALE...</th>
<th>L.</th>
<th>Clea...</th>
<th>COM...</th>
<th>A.</th>
<th>ALERT...</th>
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<td>THD</td>
<td>W</td>
<td>Active</td>
<td>TRUCK</td>
<td>A</td>
<td>8/30/2009</td>
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<tr>
<td>SHPX205389</td>
<td>THD</td>
<td>W</td>
<td>Active</td>
<td>TRUCK</td>
<td>B</td>
<td>8/30/2009</td>
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<tr>
<td>SHPX205389</td>
<td>WILD</td>
<td>W</td>
<td>Active</td>
<td>WHEEL 02</td>
<td>L</td>
<td>2/22/2009</td>
<td></td>
</tr>
</tbody>
</table>

Email Good Inspection
Email Bad Inspection
EHM Results

• Averaging $20K/mon savings by removing alerts on new WheelSets
• Found Dangerous Trucks – 1 newly Shopped car
• Focus and streamline our inspections
• Save by preferring Turned Wheels over New
• Win Win !!!
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
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
Hurricane and Severe Weather
Integrated Release modeling
EPA Aloha, WISER
Multi-K Sensor Equipped GPS Devices

Olin uses 2 GPS Vendors
Location and shape for each

Lat-Lon GPS
Only 1 GPS device per car
No external wires

14'

4'

Chlorine Tank-Car
In-Transit Monitoring GPS

SECURITY (Tampering)
- Motion detection Image capture
- 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
• 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: dataservice@olin.com [mailto:dataservice@olin.com]
To: Loftis, Don CHAS
Subject: OLNX 114016, Alarm: OPEN, 0 ppm, 08/01/2008 9:48AM(EST), Charleston, TN

This is an automatic Olin.com Transportation alarm message.

Customer: Olin
Car Number: OLNX 114016
Message Received: Aug 1 2008 10:15AM(EST)
Message Created: Aug 1 2008 9:48AM(EST)
Message: Alarm: OPEN, 0 ppm
Location:
town: Charleston
state: TN
distance: 1.4091 mi
bearing: 60.137 deg

Latitude: 33.8042
Longitude: -84.7736
Railroad: N3
Extra Data: For additional information contact Olin 423-336-9340
• Takes only a few minutes
• Enjoy the Free Art…
Motion Image Capture

FALSE ALARMS

• Wildlife
• Drastic light changes
  • Locomotive
  • Yard Lights
  • Fast moving clouds

But It works...

• False Alarms can be reduced
• Takes about 2 minutes to review images each day (~120 images)
No HCL Tampering 2012
Document Trips via GE Flights
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
Impacts on Images

7 MPH with 5.5 G Vertical

8 MPH with 4.9 G Lateral
Rollover Image – Into a Field
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
Decelerations 2011-2013

By Week MPH Decel

By Mon MPH Decel
Coupling Speeds Analysis

FEEDER OR FLAT TRACKS
Olin’s Intent

• Share a RR’s Data with THAT RR
• **Not** share a RR’s 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

Thank You ♥