MARTS
Annual Technical Meeting
September 19, 2011
10:30 am

CEPM-Wheelsets
Ron Tsolis, CEPM Program Manager, Railinc
Jerry Bohacik, Director, GATX
Nichole Fimple, Product Manager, Railinc
Discussion Topics

- Introduction to CEPM
- Manufacturers
- Wheel Shops
- Repair Shops
- CEPM Next Steps
The goal of the CEPM Program is to identify and track critical components on Railcars. The industry has been working with Railinc on the systems to support component tracking and rollout freight car wheelset tracking in Phase I.

This presentation will provide an overview of CEPM and provide information to manufacturers, wheel shops, and repair shops to get them ready for CEPM reporting requirements.
About Railinc

Railinc applications and services are critical in operations and financial systems throughout the industry and support railroads, equipment owners and rail industry suppliers.

As subsidiaries of the AAR, Railinc and TTCI support standards and systems to ensure the safe and efficient operation of the North American fleet.
CEPM Component Tracking Objectives

- Support Recall of Components identified with safety issues
- Support equipment owners with details of components on their equipment
- Capability to track performance of components related to component life, failure rates, and history of the component.
Industry Requirements

- Establish *industry rules* for reporting component details and application to equipment
- Develop a *re-usable framework* that can support a list of priorities for tracking wheelsets, castings, valves, PTC, GPS devices, brakes, cushioning, traction motors, etc.
- Maintain *Confidentiality* of reported data
- Support *Bar Code* and RFID standards
The CEPM Task Force is chaired by Dr. Todd Snyder (UP) and includes members and representatives from across the Industry.

- Equipment Owners
- Wheel Shops & Repair Shops
- Manufacturers
- Railroads
- Software Providers
- Industry Committees, AAR, & TTCI
CEPM Wheelset Process Flow

1. Manufacture, Barcode, & Ship Components
2. Assemble & Tag Components
3. Register Component Details with Railinc
4. Ship Component to Repair Shop with Tag
5. Report Repair via CRB or EHMS
6. Update Component Status
7. Confidential Reporting

EXAMPLE REGISTRATION DATA:
- Manufacturers
- Mfg Dates
- Wheel Size
- Lot Numbers
- Serial Numbers
Key Contributions for Success

Manufacturers – Communicate Specs to Shops via Barcode

Wheel Shops – Data Entry to register wheelset details

Repair Shops – Report wheelset application to equipment

Railinc – Data processing and Integration

Railroads – Event reporting for mileage

3rd Party Software Providers – System changes for Shops
Thursday, August 25, 2011

C-11496

Circular Letter

Subject: SOLICITATION FOR COMMENTS — Comprehensive Equipment Performance Monitoring (CEPM) Standards
To: MEMBERS AND PRIVATE CAR OWNERS

This Circular Letter is soliciting comments to the proposed Comprehensive Equipment Performance Monitoring (CEPM) Standards.

The Association of American Railroads (AAR) Comprehensive Equipment Performance Monitoring (CEPM) task force (sponsored by ATSI), in conjunction with the Wheels, Axles, Bearings, and Lubrication (WABL) Committee invite your review of the following documents that pertain to the newly developed bar-coding standard and the data definitions that support the electronic tracking of wheel sets. This request is being done in anticipation of the January 2012 implementation that will require component manufacturers to label wheels, axles and bearings for use in the AAR system.

There is an overview of the entire component tracking project at Railinc.com/CEPM. That overview contains proposed timelines and additional background.

One attachment is for the bar code standard. The other attachment details the data that will be required.

Comments from interested parties are herewith solicited under the provisions of AAR Standard S-050. Please submit any comments or questions to Ken Rownd, Manager, WABL Committee at TTCl.
Bar Codes, RFID primer

BarCode: 1D BarCode
ABCD1234567890 =
Used for AAR Component Identification, Little Data

BarCode: 2D BarCode or Bar Code Matrix
ABCD1234567890 =
Used for Carrying much data, with redundancy

RFID: Example: AEI

Used for Carrying much data, wireless/remote
Discussion Topics

- Introduction to CEPM
- Manufacturers
- Wheel Shops
- Repair Shops
- CEPM Next Steps
Manufacturers of Wheels, Axles, and Bearings will be responsible for accurate barcoding that includes necessary data to support Wheel Shop reporting requirements.

Circular for Comments to WABL by October 15th.

Key Documents;
• AAR CEPM Bar Coding Specification (Wheelsets)
  • What the OEM 2D bar code should look like
• Wheelset Data Glossary
  • Data Elements that need to be reported
• Reference File
  • Permissible Values
CEPM-Wheelsets Reference Materials

Reference materials play an important role in helping you understand CEPM-Wheelsets and the Ulmer Component Registry. Here are some essential resources for doing work related to CEPM-Wheelsets:

- **The CEPM User Guide (pdf)** - This is a key resource for understanding how to accomplish tasks related to CEPM-Wheelsets. The guide lists topics in the order they appear in the Ulmer user interface.

- **Ulmer Component Registry Reference Files (xls)** - This spreadsheet contains much of the data that supports CEPM-Wheelsets and provides an offline reference resource for data elements used in the Ulmer Component Registry.

- **CEPM FAQs (pdf)** - These frequently asked questions provide a quick reference resource for the CEPM program and CEPM-Wheelsets.

- **Wheelset Data Glossary (pdf)** - This document contains detailed specifications on the data recorded about wheelsets and key information to help manufacturers and wheel shops meet reporting requirements.

- **AAR Component ID Bar Code Specification (pdf)** - This key resource for manufacturers and wheel shops helps them meet the requirements for bar code specifications for AAR components. Future components will follow similar standards for tagging CEPM-related components.

- **CSV Upload Guide (pdf)** - This document provides guidance for users who want to enter information into a spreadsheet offline and upload the data for...
1 AAR Component Identification (CID) Bar Code Specifications

2 Specification M-XXX
3 Adopted: XXX 1, 2011

4 Purpose and Scope

5 The purpose of this specification is to establish an industry standard for the AAR Component Identification Bar Code.

6 This standard defines the method and content of bar code labels on components to be tracked within the AAR systems. This will better support the management, administration and maintenance of railroad equipment assets by providing traceability of component performance throughout their life cycle.
Manufacturers – Bar Coding Specification

```xml
<Wheel>
<C101/></C101>
<C102/></C102>
<C103>GRFT</C103>
<C104>2/1/2011 18:55:12</C104>
<C105>11</C105>
<C106>01</C106>
<C107>GK</C107>
<C108>D</C108>
<C109>22</C109>
<C110></C110>
<C111>1231</C111>
<C112>1234abcd</C112>
<C113>36</C113>
<C114>CH</C114>
<C115>CrvS</C115>
<C116>241.25</C116>
<C117>N</C117>
<C118>AMST1234</C118>
</Wheel>
```

**WHEEL**

GK 123456 11 / 01

CH 36  D  241.25

Rim / Finger : 22 / 0
Plate: CrvS
Facility: GRFT
Heat: 1234ABCD
Date: 2/1/11 18:55:12

Railroad Wheel Corp
Wheel, Axle and Bearing  OEM 2D Bar Codes

**WHEEL**
**NEW**
**GK 123456 11 / 01**
**CH 36 D 241.25**
Rim / Finger: 22 / 0
Plate: CrvS
Facility: GRFI
Heat: 1234ABCD
Date: 2/1/11 18:55:12

**AXLE**
**6.5 x 12 F+**
SN / Heat: 123123 ABCDEF
Type: RWS
Class: 7
Condition: 2
Facility: GRFI
Converter: ABCD
Plating: AXIS1234
Conv Date: 6/1/11 18:55:12
Mfg Date: 2/1/11 18:55:12

**BEARING**
**NEW**
**12345678 11 / 01**
**6.5 x 12 GG**
Facility: TRBC
Seal: HDL
Cert: 01A
Ring: SureFit
Cage: STD
Grease: 3201
Date: 2/1/11 18:55:12

Railroad Wheel Corp
Railroad Axle Corp
Railroad Bearing Corp
Decoding the Data in the Bar Code

The Data Glossary describes the data, who is required to report the information, and which barcode the data should be reported on.

<table>
<thead>
<tr>
<th>CSV Heading</th>
<th>Element ID</th>
<th>What is this?</th>
<th>Sample(s)</th>
<th>On What?</th>
<th>Field by Wheel shop</th>
<th>Wheel shop by Wheel OEM</th>
<th>Wheel shop by Bearing OEM</th>
<th>Wheel shop by Axle Manufacturer</th>
<th>by Wheel OEM</th>
<th>by Bearing OEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHEEL1-C112</td>
<td>C112</td>
<td>Wheel Heat/Melt</td>
<td>1234abcd</td>
<td>Wheel OEM 2D Bar Code</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHEEL1-C113</td>
<td>C113</td>
<td>Wheel Nominal Diameter</td>
<td>36</td>
<td>Wheel OEM 2D Bar Code</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHEEL1-C114</td>
<td>C114</td>
<td>Wheel Design Code</td>
<td>CH</td>
<td>Wheel OEM 2D Bar Code</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHEEL1-C115</td>
<td>C115</td>
<td>Wheel Plate Type</td>
<td>StrP1, Crv5, CrvParab</td>
<td>Wheel OEM 2D Bar Code</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHEEL1-C116</td>
<td>C116</td>
<td>Wheel Tape Size</td>
<td>241,25</td>
<td>Wheel OEM 2D Bar Code</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHEEL1-C117</td>
<td>C117</td>
<td>Wheel New OEM</td>
<td>N</td>
<td>Wheel OEM</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Reference File lists permissible values for some data, the information must be recorded exactly as defined in the reference files. Incorrect data on a barcode will effect the value of barcoding for customers.

<table>
<thead>
<tr>
<th>ELEMENT_DEFINITION_SQN</th>
<th>ELEMENT_ID</th>
<th>ELEMENT_NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>C003</td>
<td>Component AAR Facility Code</td>
<td>4-letter code uniquely identifying the facility whose wheelset assembly is</td>
</tr>
<tr>
<td>20</td>
<td>C004</td>
<td>Component Assembly Timestamp</td>
<td>Date/time when wheelset assembly is finalized at the facility.</td>
</tr>
<tr>
<td>25</td>
<td>C005</td>
<td>Extended Wheelset Codes</td>
<td>These are internal codes, but designed to be included in the database.</td>
</tr>
<tr>
<td>30</td>
<td>C006</td>
<td>Component Vendor Shipment Information</td>
<td>Optional. For use by component manufacturer/assembly</td>
</tr>
<tr>
<td>60</td>
<td>C103</td>
<td>Wheel AAR Facility Code</td>
<td>Up to 4 character “QA Facility Code” maintained by AAR.</td>
</tr>
<tr>
<td>70</td>
<td>C104</td>
<td>Wheel Manufactured Timestamp</td>
<td>Data that identifies the month, day, year and time of manufacture.</td>
</tr>
<tr>
<td>80</td>
<td>C105</td>
<td>Wheel Stamped Year</td>
<td>Wheel stamped year from manufacturer. Physically stamped.</td>
</tr>
<tr>
<td>90</td>
<td>C106</td>
<td>Wheel Stamped Month</td>
<td>Wheel stamped month from manufacturer. Physically stamped.</td>
</tr>
<tr>
<td>100</td>
<td>C107</td>
<td>Wheel Stamped Manufacturer Code</td>
<td>1 (prior to 3-78) or 2-letter code that identifies the manufacturer.</td>
</tr>
<tr>
<td>110</td>
<td>C108</td>
<td>Wheel Stamped Class</td>
<td>The stamped wheel material class: A,B,C,D,U. Also used for material code.</td>
</tr>
<tr>
<td>120</td>
<td>C109</td>
<td>Wheel Rim Thickness Side Scale Reading</td>
<td>2-digit number reporting the measured thickness of the wheel rim.</td>
</tr>
<tr>
<td>130</td>
<td>C110</td>
<td>Wheel Finger Gauge Reading</td>
<td>2-digit number reporting the flange thickness using St.</td>
</tr>
<tr>
<td>140</td>
<td>C111</td>
<td>Wheel Stamped Serial Number</td>
<td>Serial number stamped into or cast on the wheel.</td>
</tr>
<tr>
<td>150</td>
<td>C113</td>
<td>Wheel Nominal Diameter</td>
<td>2-character wheel diameter size, based on Wheel Designation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELEMENT_VALID_VALUES_SQN</th>
<th>ELEMENT_DEFINITION_ID</th>
<th>VALID_VALUE</th>
<th>VALID_VALUE_LABEL</th>
<th>SORT_ORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1360</td>
<td>110 B</td>
<td>Heat Treated Wheels</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1360</td>
<td>110 C</td>
<td>Heat Treated Wheels</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1380</td>
<td>110 D</td>
<td>Alloy Wheels</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1390</td>
<td>110 U</td>
<td>Non-Heat Treated or Unmarked</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>160</td>
<td>26.28 inch wheel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1410</td>
<td>160</td>
<td>30.30 inch wheel</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1420</td>
<td>160</td>
<td>33.33 inch wheel</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1430</td>
<td>160</td>
<td>36.36 inch wheel</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1440</td>
<td>160</td>
<td>39.39 inch wheel</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Discussion Topics

- Introduction to CEPM
- Manufacturers
- Wheel Shops
- Repair Shops
- CEPM Next Steps
Wheelset Assembly
Communicating data through Bar Codes

- Manufacture information
- Wheel shop information
- Wheelset identification
- Repair shop information

Example labels:
- WHEEL NEW
- GK 123456 11 / 01
- CH 36 D 241.25
- Rim / Finger: 22 / 0
- Plate: CrvS
- Facility: GRFI
- Heat: 1234ABCD
- Date: 2/1/11 18:55:12
- Railroad Wheel Corp

- Rail Services Corporation
- WHEELSET
- AAR Component ID
- SHOP1234567890
- Barcodes
Wheelset Barcodes
Wheel Shops – Keys to Success

Assemblers of Wheelsets will be responsible for accurate collection of bar code data from wheels, axles, and bearings. They will associate that data to a pre-printed 1D barcode that is applied to the assembled wheelset. The complete wheelset data will be sent to Railinc and constitutes the Wheelset Registration.

Key Documents;
- AAR CEPM Bar Coding Specification (Wheelsets)
  - Read the OEM 2D bar code for each wheel, axle, & bearing
  - Creation of 1D bar code for the wheelset
- Wheelset Data Glossary
  - Data Elements that need to be reported
- Reference File
  - Permissible Values
Prerequisites to Component Registration

1. Contact Railinc
   - Get a Company ID
   - Register for an SSO User ID

2. Read the User Guide and Specifications to understand the requirements for reporting

3. Request Access to Umler from your Umler Company Administrator (that may be you)

4. Request Component Maintenance Access from your Umler Company Administrator

5. Determine how AAR Component IDs will be managed by your company
Wheelset Registration with Railinc

Companies have two ways to register a wheelset

1) Railinc.com
   • Input one wheelset at a time
   • Upload CSV

2) XML via Web Services – Real time transactional integration

Web Service will allow Wheel Shops to automate reporting of information through their own systems
Component Registration via the railinc.com website

Login with your SSO User ID
Enter information for each component to register. Low Volume users.
Option #2 – Upload via CSV

More Efficient way to register components. Refer to the CSV Upload Guide as well as templates that are available.
Option #3 – Web Services Integration

If your company is interested in the technical specification for integrating your products with the Umler Component Registry, please contact csc@railinc.com

Railinc can provide WSDLs and technical specifications to get you started with data integration.
CEPM-Wheelsets Process Flow

1. Manufacture, Barcode, & Ship Components
2. Assemble & Tag Components
3. Data Lookup
4. Ship Component to Repair Shop with Tag
5. Report Repair via CRB or EHMS
6. Update Component Status
7. Confidential Reporting

Jan 2012
Aug 2011
July 2012
Discussion Topics

- Introduction to CEPM
- Manufacturers
- Wheel Shops
- Repair Shops
- CEPM Next Steps
Communicating data through Bar Codes
CEPM Systems to report association

Umler

*Component Registry* – Components can be registered, as well as associated to equipment

CRB – Changes to include AAR Component ID with reporting

EHMS - Changes to include AAR Component ID with Alert Closure reporting
April 29, 2011

[C-11430]

Circular Letter

Subject: Version 7.3 of the Car Repair Billing Procedures Manual is Available

To: MEMBERS AND PRIVATE CAR OWNERS

File Number: CRB-1499

IMPORTANT NOTE: It is critical that this information be distributed to all Car Repair Billing and IT personnel with your company that work with or are responsible for Car Repair Invoices submitted to and/or received from Railinc's Data Exchange.

Please refer to previous industry efforts to launch the on-going Paperless/Electronic Billing initiative referred to in the most recent Circular Letters:
CEPM Industry Timeline

- Registration of Wheelsets (Optional)
  - Report Component ID via CRB (Optional)
  - Report Component ID via EHMS (Optional)

- OEMs provide required data to Shops (Mandatory)

- Wheelset Registration by Wheel Shops (Mandatory)
  - Shops provided informational notice in CRB for missing Wheelset Component IDs in Field 327-340 on changes

- All Wheelset changes must be reported with Component ID (Mandatory)
  - CRB rejected for missing or invalid Component ID
Discussion Topics

- Introduction to CEPM
- Manufacturers
- Wheel Shops
- Repair Shops
- CEPM Status and Next Steps
CEPM-Wheelsets Progress to-date

- Major capabilities for CEPM registration and tracking are already in place (Umler, EHMS, CRB)
- Railinc.com/CEPM website launched in June to provide central place for communications
- June Circular formally introduced CEPM to the industry
- July 12th AAR/CEPM Town Hall in Chicago to discuss CEPM with wide audience of stakeholders
- Broad communication effort to educate committees regarding CEPM program objectives and timelines
- August launch of initial Umler Component Registry capabilities to facilitate communication and planning for CEPM
- Circular letter requesting feedback and comment to WABL by Oct 15th Bar Code and Data Glossary.
- AAR/CEPM Town Hall #2 tentatively set for November (circular will be forthcoming)
Tentative Rules Timeline

**January 2012**
- MSRP F - Data definition of Wheelset attributes
- MSRP G, GII, H, HII – OEM/Reconditioner Attributes to be supplied to Wheelshops via 2D Barcode

**July 2012**
- MSRP GII – Wheelset component attributes must be captured at wheelshop and Registered at Railinc prior to Shipment with 1D Barcode

**January 2013**
- FM/OM - Wheelsets applied to any car must have the industry standard component identifier associated with the car and position reported to Railinc
- FM/OM - All wheelset changes must be reported to Railinc
CEPM Roadmap

2012 – Wheelsets (Freight Cars)
2013 – Castings – Sideframes, Bolsters, Couplers
2014 and Beyond

Brake Systems
Locomotive – Engines, Locomotive Wheelsets,
    Turbochargers, Traction motors
Tank Car – Valves, Appliances
Intermodal Components – Hitch, Auxiliary Power
Tracing - PTC Devices, GPS
Passenger Car Wheelsets
Mileage
Railinc is currently tracking equipment and component mileage to provide better performance analysis on wheelsets for equipment owners and manufacturers.

Car Health Reporting
Railinc will provide easier visibility to equipment owners and manufacturers by consolidating equipment and fleet information and analytics to assist with identification of performance issues.
CEPM Program Overview

The Comprehensive Equipment Performance Monitoring (CEPM) program is a multi-phase, multi-year initiative to create a rail industry process and related technology tools for capturing data around railcar equipment components. CEPM will help railroads, rail equipment owners, repair and wheel shops, and other industry participants have a complete view of rail equipment health and performance. This will enable managers to make decisions that improve rail safety, lower the cost associated with equipment maintenance, and run more efficient and effective rail operations.

The program’s first phase—CEPM-Wheelsets—centralizes the registration of wheelset component details and identifies the application of wheelset components, including AAR and non-AAR repairs. The component-level data created through the CEPM program will be available through Railinc’s Umler™...
WABL Committee - Ken Rownd – TTCI Committee Manager
CSTCC Committee – Jon Hannafious – TTCI Committee Manager
ATSI Committee – Mike Fore – AAR Committee Manager

csc@railinc.com – Registration and Web Services
www.railinc.com/cepm - project website