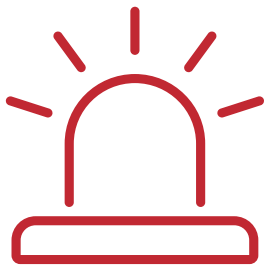# WDMS

Wheel Data Management System

# Wheel Data Management System
## Keeping You Informed

L.B. Foster's **Wheel Data Management System (WDMS)** is a custom web-based application that allows subscribers to review train data and configure and manage alerts from any **WILD IV data**. The application is available anywhere there is an internet connection.

PRODUCT FEATURES

## Reports & Alarms

Each time a train is measured by a WILD system, a report is generated listing all measured train weights, impacts, lateral forces, and hunting data.

Through the **Thresholds** page, the value for alarm parameters can be configured. Users may designate personnel to automatically receive alerts when certain alarms are generated, and multiple thresholds may be set for each parameter to classify the severity of alarms.

## Data & Analytics

Users can **browse recent trains** to see every measured train consist on their network in reverse chronological order. In addition to the measured data, reports indicate the site, location, train speed, train direction, and vehicle information.

Every train report contains a table of data for each vehicle, listing all measured parameters for every axle.

**Historical performance for any train, vehicle, or wheel** may be filtered through the vehicle history, wheel history, and train search pages.

## Site Health

Each WILD IV system listed in WMDS is equipped with a **graphical interface** which provides a real-time overview of the health status of all major components. Hovering over any component will provide information on the nature of any issue as well as recommendations for troubleshooting.

Every report generated by WILD IV sites also captures a time-stamped **health status overview**, allowing users to review any issues that may have been present at the time of an alarm.

# Wheel Data Management System
## Train & Vehicle Reports

When a train is detected by a WILD system, a report is automatically generated and added to WDMS. Train reports may be found by reviewing browsing recent trains, reviewing daily or statistical reports, or by using the history and search functions.

**Train reports** can be found through several reporting and search features found within WDMS. Selecting any train's timestamp will produce the train report.



**Browse Recent Trains**

Date: 08/03/23
Site: All
Direction: All
Search result limit: 1000

Train Date and Time (EDT)
08/03/23   00:00   Prev 24 hours from Now

| ▼ Train Date Time | WILD Status | Location | Trk | Dir | Lead Loco | Speed MPH | Total Locos | Total Cars | Total Axles |
|---|---|---|---|---|---|---|---|---|---|
| 2023-08-03 12:03 EDT | N/A | Wexford | 1 | N | NS-1138 | 24 | 3 | 75 | 318 |
| 2023-08-03 12:00 EDT | N/A | Harrisburg | 1 | W | NS-9820 | 51 | 1 | 14 | 134 |
| 2023-08-03 11:50 EDT | N/A | Pittsburgh | 2 | S | NS-8043 | 52 | 4 | 133 | 556 |
| 2023-08-03 11:47 EDT | N/A | Greentree | 1 | E | BNSF-5296 | 45 | 4 | 49 | 428 |

Train reports provide a comprehensive table of all vehicles in the consist with relevant data and can be filtered to view reports specific to alert types – **impact exception, overload, imbalance, and hunting.**

**Consist/Weight Report**

Consist/Weight Report • Impact Exception Report • Overload Report • Imbalance Report • Hunting Report

Train Header On ☐   Page Size 10000   Submit   Back

SOUTHBOUND  Train passed Bessemer, Track (2), Detector at 11:50 EDT  Aug 3, 2023        **Consists - Weight Report**

| Car | B-E Axle# | Lead End | Type | Tag | Tons | Speed MPH | Wild Alarm |
|---|---|---|---|---|---|---|---|
| 1L | 1 - 6 | A | 6 Axle Loco | USTX1234 | 223.5 | 52.2 | |
| 2L | 7 - 12 | B | 6 Axle Loco | USTX1235 | 219.0 | 52.2 | |
| 3L | 13 - 18 | B | 6 Axle Loco | USTX1236 | 219.4 | 52.2 | |
| 4L | 19 - 24 | U | 6 Axle Loco | USTX1237 | 209.9 | 52.3 | |
| 5 | 25 - 28 | A | Long Fr. Car | USTX1238 | 125.4 | 52.3 | |

Within a train report, selecting any specific vehicle tag number will produce a **vehicle report.**

**Multi System By Car Report**

Owner Code: ABC, Car Number: 12345, Location: DEFG, Track: 2, Train date and time: Thu Aug 03 11:50:00 EDT 2023        Vehicle History   Wheel History

**Impact Exception Report**

| Axle | Car/Truck/Axle | Lead End | B-Axle | Type/Tag | Axle Speed MPH | Veh Wgt KIPS | Trk Wgt KIPS | Nom KIPS | Dyn KIPS | Ratio | Peak KIPS | Lat Nom KIPS | Lat Peak KIPS | Dyn Alarm | Ratio Alarm | Peak Alarm | Lat Nom Alarm | Lat Pk Alarm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | 6 / 1 / 1 | B | L 1 R 1 | TOFC/COFC ABC-12345 | 52.4 | 192.3 | 94.8 | 23.3 23.1 | 7.3 13.1 | 1.3 1.5 | 30.6 36.2 | -1.4 -0.5 | -3.6 -3.7 | | | | | |
| 30 | 6 / 1 / 2 | B | L 2 R 2 | TOFC/COFC ABC-12345 | 52.4 | 192.3 | 94.8 | 24.5 23.8 | 21.6 9.8 | 1.8 1.4 | 46.2 33.7 | 0.0 -1.1 | -1.8 -2.2 | | | | | |
| 31 | 6 / 2 / 1 | B | L 3 R 3 | TOFC/COFC ABC-12345 | 52.4 | 192.3 | 97.5 | 24.9 23.0 | 8.1 4.9 | 1.3 1.2 | 33.0 27.9 | -0.8 -1.3 | -3.0 -4.2 | | | | | |
| 32 | 6 / 2 / 2 | B | L 4 R 4 | TOFC/COFC ABC-12345 | 52.4 | 192.3 | 97.5 | 25.7 23.6 | 5.7 4.4 | 1.2 1.1 | 31.4 28.0 | -0.2 -0.7 | -3.1 -3.5 | | | | | |

Export options: Comma-separated | Tab-separated

**Overload Report**

| Car | Lead End | Car Type | Tag | Vehicle/Platform | Speed MPH | Vehicle Confidence Trk 1 Conf/Trk 2 Conf | Weight In Tons | Max Weight In Tons | Overweight In Tons | Overweight In Percent | Overload Alarm Level |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | B | TOFC/COFC | ABC-12345 | Vehicle | 52.4 | 0.77 | 96.2 | 143.0 | | | |

Export options: Comma-separated | Tab-separated

**Imbalance Report**

| Car | Lead End | Car Type | Tag | Vehicle/Platform | Speed MPH | Vehicle Confidence/ Trk 1 Conf and Trk 2 Conf | Platform Weight In Tons | Truck Weights In KIPS | B-End Axle Number | Vehicle Left/Right Wheel Weight In KIPS | Wheel Weight Difference In KIPS | Wheel Weight Difference In % | S-S Diff in KIPS | S-S Offset in In | Front/Back Imb. Alarm | S-S Imb. Alarm Truck 1 Truck 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | B | TOFC/COFC | ABC-12345 | Vehicle | 52.4 | 0.77 | 96.2 | 94.8 | 1 | 23.3 / 23.1 | 0.2 | 0.4% | 0.4 | 0.2 | | |
| | | | | | | | | | 2 | 24.5 / 23.8 | 0.7 | 1.4% | | | | |
| | | | | | | | | 97.5 | 3 | 24.9 / 23.0 | 1.9 | 4.0% | | | | |
| | | | | | | | | | 4 | 25.7 / 23.6 | 2.1 | 4.3% | 2.0 | 1.1 | | |

Export options: Comma-separated | Tab-separated

**Hunting Report**

| Car | Lead End | Car Type | Tag | Vehicle/Platform | Speed MPH | Platform Weight In KIPS | Truck Letter | Truck Weights In KIPS | Truck Confidence | Truck Hunting Index | Hunting Alarm Truck 1 Truck 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | B | TOFC/COFC | ABC-12345 | Vehicle | 52.4 | 192.3 | B | 94.8 | 0.77 | 0.04 | |
| | | | | | | | A | 97.5 | 0.90 | 0.06 | |

Export options: Comma-separated | Tab-separated

Vehicle reports provide detailed data **for each individual axle of a car.** Reports are shown for each alert type, just like with train reports.

Any alarms generated for specific axles or cars cascade to the train report and are displayed alongside train reports anywhere they are tabulated within WDMS

All reports can be **exported** as either comma-separated (.csv) or tab-separarted (.tsv) files.

WDMS – Wheel Data Management System

# Wheel Data Management System

## Browse Recent Trains

All detected train consists for the day are automatically displayed. Users can filter recent trains by date, site, and direction.

The Browse Recent Trains page provides a table listing all pertinent information including the time and location of the measurement, speed and direction, max measurements for alarmable parameters, and the alarm status of the report.



**Browse Recent Trains**

Date: 08/03/23
Site: All
Direction: All
Search result limit: 1000

Train Date and Time (EDT)
08/03/23   00:00 ▾   Prev 24 hours from Now ▾

Site: All
Direction: All
Search   Chart

| ▼ Train Date Time | WILD Status | Location | Trk | Dir | Lead Loco | Speed MPH | Total Locos | Total Cars | Total Axles | Total Tons | Max Peak KIPS | Max Dyn KIPS | Max Ratio | Max Lateral Nom KIPS | Max Lateral Pk KIPS | Max Hunt Idx | WABL Qualified | Train Alarm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2023-08-03 12:07 EDT | N/A | Carnegie | 1 | W | ABC-1234 | 48 | 2 | 78 | 324 | 4,032 | 76.4 | 49.1 | 5.8 | 2.4 | 5.5 | 0.15 | Qualified | |
| 2023-08-03 12:03 EDT | N/A | Butler | 1 | N | DEF-5678 | 24 | 3 | 75 | 318 | 6,348 | 61.7 | 32.5 | 4.7 | 4.1 | 6.7 | 0.11 | Qualified | |
| 2023-08-03 12:00 EDT | N/A | West Mifflin | 1 | W | GH-9101 | 51 | 1 | 14 | 134 | 2,441 | 72.0 | 42.9 | 4.1 | 2.9 | 6.3 | 0.14 | Qualified | |
| 2023-08-03 11:50 EDT | N/A | Coraopolis | 2 | S | IJK-1123 | 52 | 4 | 133 | 556 | 8,987 | 95.8 | 64.8 | 5.5 | 6.8 | 11.7 | 0.16 | Qualified | |
| 2023-08-03 11:47 EDT | N/A | Cranberry | 1 | E | LMN-1213 | 45 | 4 | 49 | 428 | 9,214 | 85.5 | 52.3 | 3.6 | 3.3 | 6.1 | 0.11 | Qualified | ● |
| 2023-08-03 11:47 EDT | MAR4-1 | Moon | 1 | E | OPQ-1415 | 45 | 4 | 49 | 428 | 9,207 | 86.7 | 47.3 | 3.8 | 4.0 | 6.5 | 0.07 | Not-Qualified | ● |
| 2023-08-03 11:44 EDT | N/A | Sewickley | 2 | E | RST-1617 | 49 | 3 | 55 | 238 | 7,622 | 117.3 | 82.0 | 3.3 | 3.0 | 8.4 | 0.11 | Qualified | |
| 2023-08-03 11:43 EDT | N/A | Bridgeville | 2 | N | UV-1819 | 46 | 3 | 30 | 246 | 3,621 | 65.1 | 37.2 | 5.7 | 3.1 | 5.5 | 0.30 | Qualified | ● |
| 2023-08-03 11:30 EDT | N/A | Bellevue | 1 | S | WX-2021 | 38 | 2 | 44 | 304 | 6,285 | 60.2 | 33.4 | 2.6 | 5.5 | 7.2 | 0.22 | Qualified | |
| 2023-08-03 11:27 EDT | N/A | St. Clair | 2 | E | YZ-2223 | 53 | 3 | 31 | 136 | 2,321 | 83.4 | 52.0 | 4.7 | 2.6 | 7.1 | 0.25 | Qualified | |
| 2023-08-03 11:25 EDT | N/A | Beaver | 1 | N | AB-2425 | 38 | 2 | 50 | 372 | 7,195 | 72.1 | 45.1 | 4.7 | 4.4 | 8.5 | 0.17 | Qualified | |

**Trains per Site**

08/03/23 00:00 | Last 24 hours from Now | Direction: All
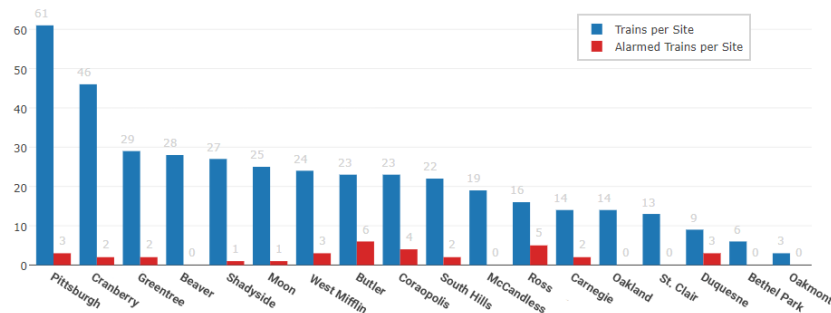


By selecting the Chart button at the top of the page, users can see the frequency of measured trains and reported alarms for each site.

**Trains per Lead Loco Owner**

08/03/23 00:00 | Last 24 hours from Now | Direction: All
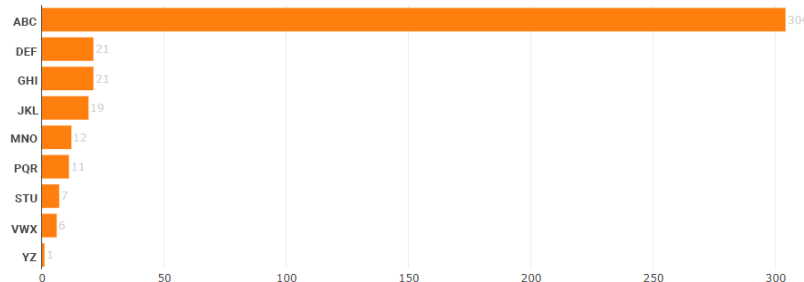


When dealing with multiple car owners on your network, it can get complicated. WMDS logs car owners and the recent trains chart feature shows the volume of trains attributed to each owner.

WDMS – Wheel Data Management System

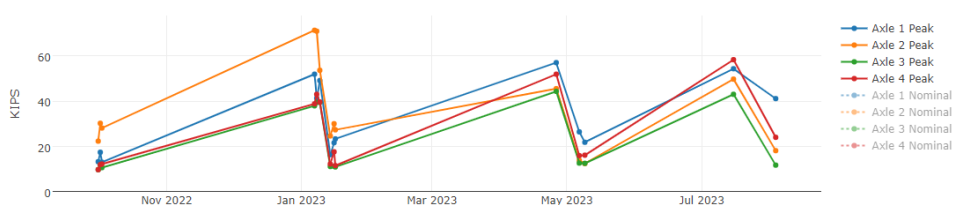# Wheel Data Management System

## Vehicle & Wheel History



Users can search for reports on **specific trains, vehicles, or wheels**, and can filter alarms by type and severity.

All search features are equipped with parameter fields to filter data, such as location, date ranges, operating speeds, track types, train and vehicle identifiers, and more.
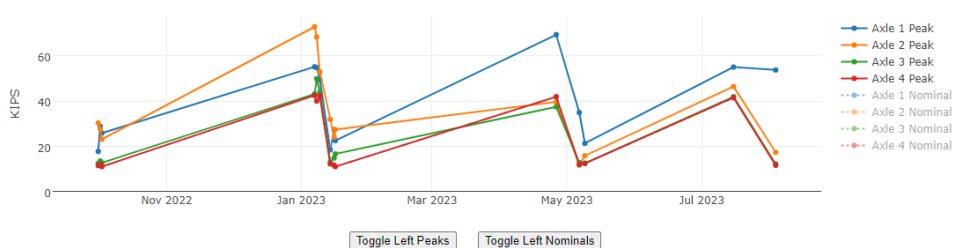
Users can view historical wheel performance in chart form, easily visualizing performance improvements after maintenance.



Left and right wheel performance are plotted independently. Peak and nominal loads for each individual axle can be toggled on and off to allow for comparative views.

WDMS – Wheel Data Management System

# Wheel Data Management System
## Configuring Alarms

On the **Thresholds** page, users can configure thresholds for each type of alarm parameter. Users can also add custom alarms for other parameters provided by WILD train reports. Alerts for alarms can be transmitted via **FTP or email** to a list of designated recipients.



Selecting **Add** or **Edit** for any alarm parameter produces a form field that allows users to edit the thresholds for up to 5 classes of alarms. Alarm thresholds can be configured so they only apply to specific sites, cars with certain tag ID's, weights, or other vehicle parameters relevant to the alarm type.

Up to **5 classes of thresholds** can be configured for each alarm. The threshold class that an alarm parameter reaches is included in the train report.

# Wheel Data Management System

## Site Health Status

Review the health status of all major WILD site components in real-time, with built-in troubleshooting and diagnostics recommendations.

The heart of the design of all WILD systems are its **Front-End-Processors**, which amplify, filter, digitize, and process signals to provide meaningful data. Each Front-End-Processor is monitored independently.

Each WILD system is equipped with a series of **strain gauges**, constantly monitoring for vertical (and optionally, lateral) impacts imparted on the rail. Each strain gauge is monitored independently.

**Tag readers** are typically installed with all WILD systems and can provide automatic car counting and identification (with a valid supplied car library). Locomotive and train identifiers are automatically added to reports when available.



Hovering over any component will display details about any potential faults or failures and may provide recommendations for **corrective actions or troubleshooting steps** to remedy the issue.

All major **Bungalow Equipment** are monitored for health status, including the power supply, CPU, Networking equipment, logic controllers, I/O modules, and comms equipment. Power and communications cabling, both on-track and installed to the bungalow, are also monitored.
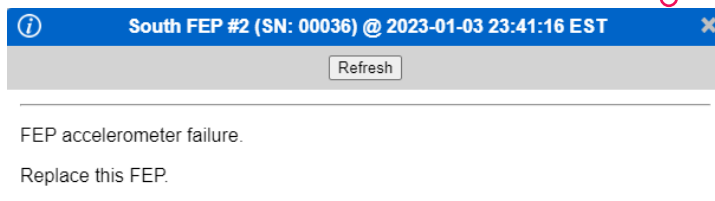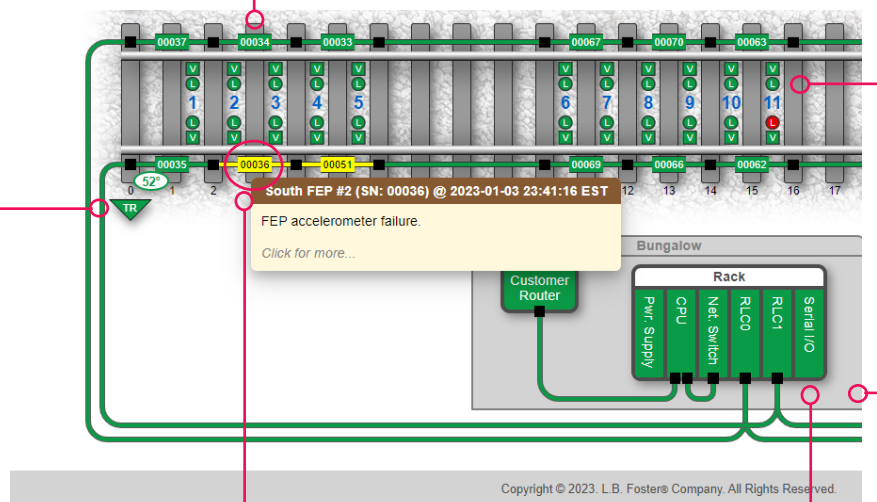


The site overview graphical interface displays the **health status** of all major components. Components listed in green are healthy with no issues; those listed in yellow are functional but are experiencing faults; red components need immediate attention. When the condition of a component is unknown due to connectivity issues or non-system related faults, they are listed as grey.

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