Data Summary: Brake Health Car

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Synopsis

Purpose

The Brake Health Car data summary provides information on freight car braking effectiveness at the car level using performance-based data from wheel temperature detector (WTD) systems.

Background

Wheel temperature detectors use mature infrared sensor technology to measure the rise in wheel temperatures as a result of a brake application on a moving train. Identifying wheels that are relatively cold compared to the temperature of other wheels in the train may indicate abnormal braking conditions.

The Brake Health Car data summary is a summary of all of the truck component level data summaries for any given asset. Please refer to Standard S-6006, "Data Summary—Brake Health Truck," for information on how these truck component-level data summaries are generated. Within the Brake Health Truck data summary, a Brake Health Indicator (BHI) is calculated.

The Brake Health Car data summary pulls in all of the truck component-level BHIs and aggregates them to a car-level BHI. The BHIs used are described in "Appendix B – Brake Health Indicator Rules and Definitions" on page 8.

Data Summary Elements

	Element Name	Element Text	Element Description	Format	Aggregation Method	Action
HEADER	Type	Type	Data Summary	TEXT		
	Format Version	Format Version	Version of the data summary definition	NUMBER [1.0-999.99]		
	CreationTMST	Date Opened	GMT timestamp for when the data summary was created and the time zone offset of the originating data location	TIMESTAMP	Earliest	Update when data summary created
	RR_DB_Key	Key from originating railroad	Database key from the originating railroad (or detector owner)	NUMBER [0–999999999]		
	LastUpdateTMST	Date of last update	GMT timestamp for when the data summary was last updated (any change other than closing) and the time zone offset of the originating data location	TIMESTAMP	Last	Update every time data summary is updated, including when it is opened
	DSType	Brake Health	Data summary type	TEXT		
	DS_Owner/Reporting_ System	Who created the Data Summary	Company ID (from Railinc) of the owner/creator of data summary	TEXT		
	EquipmentMark	Equipment Mark	Current equipment initial	TEXT		
	EquipmentNumber	Equipment Number	Current equipment number	NUMBER [0–9999999999]		
	Location	Location	Location on equipment per EMIS nomenclature			
	ComponentType	Component type	TRUCK	TEXT		
	ComponentName	Part of the component location	TRUCK	TEXT		
	ComponentValue	Value for the component location		TEXT		
	State	Data Summary state	Current status of Open	TEXT		
ELEMENTS	LAST_ABT_DATE	Date of last Single Car ABT reported in Umler	Date of last Single Car ABT reported in Umler	Date	LATEST	Update date when Single Car ABT is reported in Umler
	CAR_BHI	Car level Brake Health Indicator	Car level Brake Health Indicator	NUMBER	MAX	Update each time a new BPT is added to the data summary
	BHI_TRUCK_A	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_B	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_C	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary

	Element Name	Element Text	Element Description	Format	Aggregation Method	Action
ELEMENTS	BHI_TRUCK_D	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_E	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_F	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_G	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_H	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_I	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_J	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_K	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary
	BHI_TRUCK_L	Truck Level Brake Health Indicator	Truck Level Brake Health Indicator as calculated on the Truck level Brake Health Data Summary	NUMBER	MAX	Update each time a new BPT is added to the Truck Level Brake Health data summary

Data Summary Roll Up Example

	Element Name	Element Text	RR1	RR2	RR3
HEADER	Type	DS	DS	DS	DS
	Format Version	1	1	1	1
	CreationTMST	2013-01-24T09:57:40-05:00	2013-01-24T09:57:40-05:00	2013-01-25T10:57:40-05:00	2013-01-26T11:57:40-05:00
	RR_DB_Key		772762	657646	346545
	LastUpdateTMST	2013-02-02T15:12:00-05:00	2013-01-31T13:12:00-05:00	2013-02-01T14:12:00-05:00	2013-02-02T15:12:00-05:00
	DSType	Brake Health	Brake Health	Brake Health	Brake Health
	DS_Owner/Reporting_System		RR1	RR2	RR3
	EquipmentMark	CSXT	CSXT	CSXT	CSXT
	EquipmentNumber	610555	610555	610555	610555
	Location				
	ComponentType	TRUCK	TRUCK	TRUCK	TRUCK
	ComponentName	TRUCK	TRUCK	TRUCK	TRUCK
	ComponentValue	A	A	A	A
	State	O	O	O	O
ELEMENTS	LAST_ABT_DATE	10-27-2014			
	CAR_BHI	99			
	BHI_TRUCK_A	1			
	BHI_TRUCK_B	99			
	BHI_TRUCK_C				
	BHI_TRUCK_D				
	BHI_TRUCK_E				
	BHI_TRUCK_F				
	BHI_TRUCK_G				
	BHI_TRUCK_H				
	BHI_TRUCK_I				
	BHI_TRUCK_J				
	BHI_TRUCK_K				
	BHI_TRUCK_L				

Opening Criteria

A new Brake Health Car data summary is created for equipment if a Brake Health Car data summary does not already exist for the asset and location, and a new Brake Health Truck data summary is created on the asset.

Closing / Reset Criteria

A Brake Health Car data summary does not close from data reads. Once opened, the data summary continues to aggregate Brake Health Indicators from the Brake Health Truck data summaries. A data summary will close for the following administrative actions:

- Close condition: deleted in UMLER. Message must come from UMLER system.
- Close condition: Administrative - Opened in Error (due to detector error, AEI matching error, incorrect AEI tag placement). Message may come from web service or from EHMS website input.

Appendix A – EHMS Display Information

Opening Criteria Display Text

Any new Brake Health Truck data summary is created.

Reset Display Text

A Brake Health Car data summary shall always remain open.

Appendix B – Brake Health Indicator Rules and Definitions

The Brake Health Indicator (BHI) is an index used to identify the effectiveness of brakes on a car from wheel temperature readings. The BHI shall be displayed on the truck level as well as car level. The car-level BHI is a summarization of truck-level BHIs.

The system shall determine the BHI for the truck component from the number of timestamps of BPTs greater than or equal to the industry defined threshold vs. BPTs less than the industry defined threshold. ABT reportings are also used in the calculation of the BHI.

The Brake Health Truck data summary uses the following definitions:

Term	Definition
Passed BPT	The average of all the individual wheel temperature ratios for the truck during a passing where the train is braking is greater than or equal to the industry defined threshold.
Failed BPT	The average of all the individual wheel temperature ratios for the truck during a passing where the train is braking is less than the industry defined threshold.
Reset	An ABT followed by a passed BPT *or* five sequential passed BPTs.

The following BHIs are used:

BHI	Category	Description
1	Qualified	No failed BPTs since last ABT & last passed BPT train passing is later than ABT, OR all BPTs passed and <10,000 miles since last passing.
5	Non-ABT Qualified	Last 5 BPTs passed and <10,000 miles since last passing, but it does not meet criteria for BHI 1.
6	ABT Unverified	An ABT was reported since last BPT & it does not meet criteria for BHI 1 or 5.
7	ABT Unverified:Over 10k miles	No failed BPTs since last ABT & last passed BPT train passing is later than ABT, OR all BPTs passed and >= 10,000 miles since last passing.
8	ABT Unverified:Over 10k miles	Last 5 BPTs passed and and >= 10,000 miles since last passing.
15	1 Threshold Hit	Last BPT failed and (only 1 failed BPT since last reset or only one failed BPT exists if no reset exists).
14	1 Threshold Hit Plus 1 passed BPT	Last BPT passed and (only 1 failed BPT since last reset or only one failed BPT exists if no reset exists).
13	1 Threshold Hit Plus 2 passed BPTs	Last two BPTs passed and (only 1 failed BPT since last reset or only one failed BPT exists if no reset exists).
12	1 Threshold Hit Plus 3 passed BPTs	Last three BPTs passed and (only 1 failed BPT since last reset or only one failed BPT exists if no reset exists).

BHI	Category	Description
11	1 Threshold Hit Plus 4 passed BPTs	Last four BPTs passed and (only 1 failed BPT since last reset or only one failed BPT exists if no reset exists)
25	2 Threshold Hit	Last BPT failed and (only 2 failed BPTs since last reset or only two failed BPTs exists if no reset exists)
24	2 Threshold Hit Plus 1 passed BPT	Last BPT passed and (only 2 failed BPTs since last reset or only two failed BPTs exists if no reset exists)
23	2 Threshold Hit Plus 2 passed BPTs	Last two BPTs passed and (only 2 failed BPTs since last reset or only two failed BPTs exists if no reset exists)
22	2 Threshold Hit Plus 3 passed BPTs	Last three BPTs passed and (only 2 failed BPTs since last reset or only two failed BPTs exists if no reset exists)
21	2 Threshold Hit Plus 4 passed BPTs	Last four BPTs passed and (only 2 failed BPT since last reset or only two failed BPTs exists if no reset exists)
35	3 Threshold Hit	Last BPT failed and (only 3 failed BPTs since last reset or only three failed BPTs exists if no reset exists)
34	3 Threshold Hit Plus 1 passed BPT	Last BPT passed and (only 3 failed BPTs since last reset or only three failed BPTs exists if no reset exists)
33	3 Threshold Hit Plus 2 passed BPTs	Last two BPTs passed and (only 3 failed BPTs since last reset or only three failed BPTs exists if no reset exists)
32	3 Threshold Hit Plus 3 passed BPTs	Last three BPTs passed and (only 3 failed BPTs since last reset or only three failed BPTs exists if no reset exists)
31	3 Threshold Hit Plus 4 passed BPTs	Last four BPTs passed and (only 3 failed BPT since last reset or only three failed BPTs exists if no reset exists)
45	4 Threshold Hit	Last BPT failed and (only 4 failed BPTs since last reset or only four failed BPTs exists if no reset exists)
44	4 Threshold Hit Plus 1 passed BPT	Last BPT passed and (only 4 failed BPTs since last reset or only four failed BPTs exists if no reset exists)
43	4 Threshold Hit Plus 2 passed BPTs	Last two BPTs passed and (only 4 failed BPTs since last reset or only four failed BPTs exists if no reset exists)
42	4 Threshold Hit Plus 3 passed BPTs	Last three BPTs passed and (only 4 failed BPTs since last reset or only four failed BPTs exists if no reset exists)
41	4 Threshold Hit Plus 4 passed BPTs	Last four BPTs passed and (only 4 failed BPT since last reset or only four failed BPTs exists if no reset exists)
55	5 Threshold Hit	Last BPT failed and (only 5 failed BPTs since last reset or only five failed BPTs exists if no reset exists)
54	5 Threshold Hit Plus 1 passed BPT	Last BPT passed and (only 5 failed BPTs since last reset or only five failed BPTs exists if no reset exists)

BHI	Category	Description
53	5 Threshold Hit Plus 2 passed BPTs	Last two BPTs passed and (only 5 failed BPTs since last reset or only five failed BPTs exists if no reset exists)
52	5 Threshold Hit Plus 3 passed BPTs	Last three BPTs passed and (only 5 failed BPTs since last reset or only five failed BPTs exists if no reset exists)
51	5 Threshold Hit Plus 4 passed BPTs	Last four BPTs passed and (only 5 failed BPT since last reset or only five failed BPTs exists if no reset exists)
65	6 Threshold Hit	Last BPT failed and (only 6 failed BPTs since last reset or only six failed BPTs exists if no reset exists)
64	6 Threshold Hit Plus 1 passed BPT	Last BPT passed and (only 6 failed BPTs since last reset or only six failed BPTs exists if no reset exists)
63	6 Threshold Hit Plus 2 passed BPTs	Last two BPTs passed and (only 6 failed BPTs since last reset or only six failed BPTs exists if no reset exists)
62	6 Threshold Hit Plus 3 passed BPTs	Last three BPTs passed and (only 6 failed BPTs since last reset or only six failed BPTs exists if no reset exists)
61	6 Threshold Hit Plus 4 passed BPTs	Last four BPTs passed and (only 6 failed BPT since last reset or only six failed BPTs exists if no reset exists)
99	Unknown	Does not meet any other BHI definition