Data Summary: Truck Hunting

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Last Updated: September 2018

Synopsis

Purpose

The purpose of the Truck Hunting Data Summary is to allow car owners to view summarized performance measurements on their fleets. When not monitored, Hunting can escalate, causing additional wear to trucks, lading damage and can lead to some derailments.

Background

Hunting is condition where the freight car's trucks exhibit a dynamic instability. Truck Hunting is measured through the lateral strain gages on the wheel impact load detectors. The lateral forces and their frequency of occurrence are combined into a unitless measure called Truck Hunting Index (HI). AAR Field Manual Rule 46 defines the condemnable limits for HI. A single occurrence of a severe HI value or two occurrences of a moderate HI values are currently defined as condemnable conditions. The AAR's Equipment Engineering Committee (EEC) is author of Rule 46.

Data Summary Elements

	Element Name	Element Text	Element Description	Format	Aggregation Method	Action
HEADER	Type	Type		TEXT		
	Format Version	Format Version	Version of the format used to create the Data Summary	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	Earilest	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	Latest	Update every time data summary is updated
	DSType	Type of Data Summary	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 of the component			
	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 or Closed	TEXT		Update when data summary state changes

ELEMENTS

CNT_HNT_READS	Total truck hunting reads	Total number of truck hunting reads	NUMBER[0-999]	Sum	Update count for each read
MAX_HNT_IND	Maximum hunting index	Maximum hunting index	NUMBER [0.0 -]	Maximum	Update if hunting index > existing maximum hunting index
LAST_HNT_IND	Latest hunting index	Last hunting index	NUMBER [0.0 -]	Latest	Update each reading
LAST_HNT_IND_GE_PT2	Last timestamp where hunting index >= .2	Latest timestamp where hunting index >= .2 and < .3	TIMESTAMP	Latest	Update if hunting index >= .2 and < .3, move previous timestamp to NEXT_LAST_HNT_IND_GE_PT2
LAST_HNT_IND_GE_PT3	Last timestamp where hunting index >= .3	Latest timestamp where hunting index >= .3 and < .35	TIMESTAMP	Latest	Update if hunting index >= .3 and < 3.5, move previous timestamp to NEXT_LAST_HNT_IND_GE_PT3
LAST_HNT_IND_GE_PT35	Last timestamp where hunting index >= .35	Latest timestamp where hunting index >= .35 and < .4	TIMESTAMP	Latest	Update if hunting index >= .35 and < .4, move previous timestamp to NEXT_LAST_HNT_IND_GE_PT35
LAST_HNT_IND_GE_PT4	Last timestamp where hunting index >= .4	Latest timestamp where hunting index >= .4 and < .5	TIMESTAMP	Latest	Update if hunting index >= .4 and < .5, move previous timestamp to NEXT_LAST_HNT_IND_GE_PT4
LAST_HNT_IND_GE_PT5	Last timestamp where hunting index >= .5	Latest timestamp where hunting index >= .5 and < .55	TIMESTAMP	Latest	Update if hunting index >= .5 and < .55, move previous timestamp to NEXT_LAST_HNT_IND_GE_PT5
LAST_HNT_IND_GE_PT55	Last timestamp where hunting index >= .55	Latest timestamp where hunting index >= .55 and < .65	TIMESTAMP	Latest	Update if hunting index >= .55 and < .65
LAST_HNT_IND_GE_PT65	Last timestamp where hunting index >= .65	Latest timestamp where hunting index >= .65	TIMESTAMP	Latest	Update if hunting index >= .65

NEXT_LAST_HNT_IND_GE_PT2	Next to last timestamp where hunting index >= .2	Second latest timestamp where hunting index >= .2 and < .3	TIMESTAMP	Latest	Update if hunting index >= .2 and < .3 and LAST_HNT_IND_GE_PT2 is populated
NEXT_LAST_HNT_IND_GE_PT3	Next to last timestamp where hunting index >= .3	Second latest timestamp where hunting index >= .3 and < .35	TIMESTAMP	Latest	Update if hunting index >= .3 and < .35 and LAST_HNT_IND_GE_PT3 is populated
NEXT_LAST_HNT_IND_GE_PT35	Next to last timestamp where hunting index >= .35	Second latest timestamp where hunting index >= .35 and < .4	TIMESTAMP	Latest	Update if hunting index >= .35 and < .4 and LAST_HNT_IND_GE_PT35 is populated
NEXT_LAST_HNT_IND_GE_PT4	Next to last timestamp where hunting index >= .4	Second latest timestamp where hunting index >= .4 and < .5	TIMESTAMP	Latest	Update if hunting index >= .4 and < .5 and LAST_HNT_IND_GE_PT4 is populated
NEXT_LAST_HNT_IND_GE_PT5	Next to last timestamp where hunting index >= .5	Second latest timestamp where hunting index >= .5 and < .55	TIMESTAMP	Latest	Update if hunting index >= .5 and < .55 and LAST_HNT_IND_GE_PT5 is populated
CNT_CONSECUTIVE_READS_LT_PT09	Count of consecutive reads < .09	Count of consecutive reads where the hunting index < .09	INTEGER	Sum	Update if hunting index < .09. This field will be reset to 0 when LAST_TMST_WITH_PROBLEM is updated
CNT_HNT_IND_GE_PT35	Count of hunting index >= .35	Count of reads where the hunting index >= .35	INTEGER	Sum	Update if hunting index >= .35
CNT_HNT_IND_GE_PT2	Count of hunting index >= .2	Count of reads where the hunting index >= .2 and < .35	INTEGER	Sum	Update if hunting index >= .2 and < .35
TMST_1_GE_40TONS_LT_PT09	Timestamp of last good read	Timestamp of last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_2_GE_40TONS_LT_PT09	Timestamp of 2nd to last good read	Timestamp of 2nd to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_3_GE_40TONS_LT_PT09	Timestamp of 3rd to last good read	Timestamp of 3rd to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position

TMST_4_GE_40TONS_LT_PT09	Timestamp of 4th to last good read	Timestamp of 4th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_5_GE_40TONS_LT_PT09	Timestamp of 5th to last good read	Timestamp of 5th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_6_GE_40TONS_LT_PT09	Timestamp of 6th to last good read	Timestamp of 6th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_7_GE_40TONS_LT_PT09	Timestamp of 7th to last good read	Timestamp of 7th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_8_GE_40TONS_LT_PT09	Timestamp of 8th to last good read	Timestamp of 8th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_9_GE_40TONS_LT_PT09	Timestamp of 9th to last good read	Timestamp of 9th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_10_GE_40TONS_LT_PT09	Timestamp of 10th to last good read	Timestamp of 10th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_11_GE_40TONS_LT_PT09	Timestamp of 11th to last good read	Timestamp of 11th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_12_GE_40TONS_LT_PT09	Timestamp of 12th to last good read	Timestamp of 12th to last read where hunting index < .09	TIMESTAMP	Latest	Update date if hunting index < .09 and >= 40 tons; move other good reading timestamps down 1 position
TMST_1_LT_40TONS_LT_PT09	Timestamp of last good read for light loads	Timestamp of last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_2_LT_40TONS_LT_PT09	Timestamp of 2nd to last good read for light loads	Timestamp of 2nd to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_3_LT_40TONS_LT_PT09	Timestamp of 3rd to last good read for light loads	Timestamp of 3rd to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position

TMST_4_LT_40TONS_LT_PT09	Timestamp of 4th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_5_LT_40TONS_LT_PT09	Timestamp of 5th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_6_LT_40TONS_LT_PT09	Timestamp of 6th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_7_LT_40TONS_LT_PT09	Timestamp of 7th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_8_LT_40TONS_LT_PT09	Timestamp of 8th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_9_LT_40TONS_LT_PT09	Timestamp of 9th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_10_LT_40TONS_LT_PT09	Timestamp of 10th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_11_LT_40TONS_LT_PT09	Timestamp of 11th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
TMST_12_LT_40TONS_LT_PT09	Timestamp of 12th to last good read for light loads	Timestamp of 4th to last read where hunting index < .09, < 40 tons per truck	TIMESTAMP	Latest	Update date if hunting index < .09 and < 40 tons; move other good reading timestamps down 1 position
LAST_TMST_WITH_PROBLEM	Timestamp of last problem read	Timestamp of last read where hunting index >= .09	TIMESTAMP	Latest	Update date if hunting index >= .09

Data Summary Roll Up Example

	Element Name	Aggregation	RR1	RR2	RR3
HEADER	Type	DS	DS	DS	DS
	Format Version	1	1	1	1
	CreationTMST	2013-03-01T11:11:11-05:00	2013-01-01T11:11:11-05:00	2013-01-03T11:11:11-05:00	2013-03-01T11:11:11-05:00
	RR_DB_Key		772762	657646	346545
	LastUpdateTMST	2013-03-27T11:11:11-05:00	2013-02-27T11:11:11-05:00	2013-03-12T11:11:11-05:00	2013-03-27T11:11:11-05:00
	DSType	TRUCK_HTG	TRUCK_HTG	TRUCK_HTG	TRUCK_HTG
	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	CNT_HNT_READS	24	8	11	5
	MAX_HNT_IND	0.42	0.25	0.23	0.42
	LAST_HNT_IND	0.26	0.25	0.23	0.26
	LAST_HNT_IND_GE_PT2	2013-03-01T11:11:11-05:00	2013-01-01T11:11:11-05:00	2013-01-03T11:11:11-05:00	2013-03-01T11:11:11-05:00
	LAST_HNT_IND_GE_PT3				
	LAST_HNT_IND_GE_PT35	2013-03-18T11:11:11-05:00	2013-02-06T11:11:11-05:00		2013-03-18T11:11:11-05:00
	LAST_HNT_IND_GE_PT4	2013-02-03T11:11:11-05:00		2013-02-03T11:11:11-05:00	
	LAST_HNT_IND_GE_PT5	2013-02-27T11:11:11-05:00	2013-02-27T11:11:11-05:00	2013-02-23T11:11:11-05:00	
	LAST_HNT_IND_GE_PT55	2013-03-22T11:11:11-05:00			2013-03-22T11:11:11-05:00
	LAST_HNT_IND_GE_PT65	2013-03-12T11:11:11-05:00		2013-03-12T11:11:11-05:00	
	NEXT_LAST_HNT_IND_GE_PT2	2012-12-01T11:11:11-05:00	2012-11-01T11:11:11-05:00		2012-12-01T11:11:11-05:00
	NEXT_LAST_HNT_IND_GE_PT3	2013-03-02T11:11:11-05:00			

Element Name	Aggregation	RR1	RR2	RR3
NEXT_LAST_HNT_IND_GE_PT35	2013-03-16T11:11:11-05:00	2013-02-03T11:11:11-05:00		2013-03-17T11:11:11-05:00
NEXT_LAST_HNT_IND_GE_PT4	2013-03-19T11:11:11-05:00		2013-02-02T11:11:11-05:00	
NEXT_LAST_HNT_IND_GE_PT5	2013-03-21T11:11:11-05:00		2013-02-18T11:11:11-05:00	
CNT_CONSECUTIVE_READS_LT_PT09	6	3	3	0
CNT_HNT_IND_GE_PT35	13	3	7	3
CNT_HNT_IND_GE_PT2	5	2	1	2
TMST_1_GE_40TONS_LT_PT09	2013-04-23T11:11:11-05:00	2013-04-23T11:11:11-05:00	2013-04-10T11:11:11-05:00	
TMST_2_GE_40TONS_LT_PT09	2013-04-10T11:11:11-05:00	2013-03-23T11:11:11-05:00	2013-03-28T11:11:11-05:00	
TMST_3_GE_40TONS_LT_PT09	2013-03-28T11:11:11-05:00			
TMST_4_GE_40TONS_LT_PT09	2013-03-23T11:11:11-05:00			
TMST_5_GE_40TONS_LT_PT09				
TMST_6_GE_40TONS_LT_PT09				
TMST_7_GE_40TONS_LT_PT09				
TMST_8_GE_40TONS_LT_PT09				
TMST_9_GE_40TONS_LT_PT09				
TMST_10_GE_40TONS_LT_PT09				
TMST_11_GE_40TONS_LT_PT09				
TMST_12_GE_40TONS_LT_PT09				
TMST_1_LT_40TONS_LT_PT09	2013-04-30T11:11:11-05:00	2013-04-30T11:11:11-05:00	2013-04-15T11:11:11-05:00	
TMST_3_LT_40TONS_LT_PT09	2013-04-15T11:11:11-05:00			
TMST_3_LT_40TONS_LT_PT09				
TMST_4_LT_40TONS_LT_PT09				
TMST_5_LT_40TONS_LT_PT09				
TMST_6_LT_40TONS_LT_PT09				
TMST_7_LT_40TONS_LT_PT09				
TMST_8_LT_40TONS_LT_PT09				

	Element Name	Aggregation	RR1	RR2	RR3
	TMST_9_LT_40TONS_LT_PT09				
	TMST_10_LT_40TONS_LT_PT09				
	TMST_11_LT_40TONS_LT_PT09				
	TMST_12_LT_40TONS_LT_PT09				
	LAST_TMST_WITH_PROBLEM	2013-03-22T11:11:11-05:00	2013-02-27T11:11:11-05:00	2013-03-12T11:11:11-05:00	2013-03-22T11:11:11-05:00

Opening Criteria

If a data summary creator does not have an open data summary for the asset and location, a new data summary will be opened upon a THD passing if **either** of these conditions are met:

a) Truck Hunting Index is >= 0.20
b) Another data summary creator has an open data summary for that asset and location

Closing Criteria

a) 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.
b) Deleted in UMLER. Message must come from UMLER system.
c) Autoclose logic: 12 consecutive reads with truck hunting index readings less than 0.09. Four of the 12 passes must be with the truck less than 40 tons. If there exists 12 consecutive timestamps AFTER the last timestamp with problem, 4 passes with the truck less than 40 tons, a close message will be published effecting a close of all data summaries for that truck.

Additional Information

- Autoclose timestamps (e.g., TMST_n_GE_40TONS_LT_PT09 and TMST_n_LT_40TONS_LT_PT09) are reset to null when LAST_TMST_WITH_PROBLEM is greater. Autoclose timestamps (e.g., TMST_n_GE_40TONS_LT_PT09 and TMST_n_LT_40TONS_LT_PT09) are cascaded (when a more recent one is found, it takes #1 position and #1 moves to #2, etc.).
- CNT_CONSECUTIVE_READS_LT_PT09 is reset to 0 when LAST_TMST_WITH_PROBLEM is updated.

Appendix A - EHMS Display Information

Opening Criteria Display Text

Truck hunting index >= 0.20

Autoclose Display Text

12 consecutive truck hunting index reads < 0.09, four of which are lightly loaded < 40 tons