RAILINC

Data Summary: Line-Of-Road Failure – No Cause Found

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Last Updated: September 2018

Synopsis

Purpose

The Line-Of-Road Failure – No Cause Found (LORF-NCF) data summary provides information on equipment involved in trains that experience a line-of-road emergency brake application where no cause was identified.
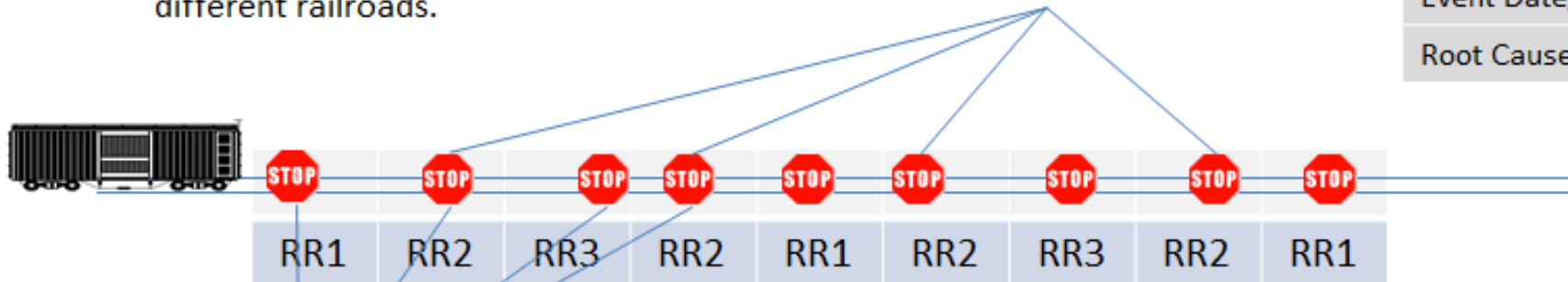
Background

A LORF-NCF event occurs when a train goes into emergency brake application that is not induced by the operator and where no cause can be identified.

When a LORF-NCF event occurs, the roads send the entire consist of the train, in sequence order, to the Railinc E-Train system. Here, an algorithm is run to calculate an index based on how many unique car groupings the individual cars have been in across all roads that have seen that car in an event. See Figure 1 – Bad Actor Identification below for reference. The higher the index, the greater the likelihood that a particular car is experiencing brake related issues that leads to a line-of-road emergency brake application.

Figure 1 – Bad Actor Identification

1 Trains experience multiple undesired emergency stops (UDEs) over time on different railroads.

2 Individual railroads (e.g., RR2 in the figure below) accumulate information over time to identify a specific car as a common cause.

Line of Road Failure Data
Train ID
Event Date/Time
Root Cause

STOP STOP STOP STOP STOP STOP STOP STOP STOP

| RR1 | RR2 | RR3 | RR2 | RR1 | RR2 | RR3 | RR2 | RR1 |

Consist Detail
Train ID
Equipment IDs
Equipment Sequence

3 **RAILINC**

Line of road failure data and consist details are shared with Railinc. Railinc identifies the common cause earlier avoiding future events.

Data Summary Elements

Element Name	Element Text	Element Description	Format	Aggregation Method	Correlation Based on	Action
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	LORF_NCF	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	BASE	TEXT			
ComponentName	Part of the component location	BASE	TEXT			
ComponentValue	Value for the component location		TEXT			
State	Data Summary state	Current status of Open	TEXT			

SCORE	Score	Equipment level metric derived from Group count to identify a potential Bad Actor(car)	NUMBER	MAX		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
RAW_CNT	Raw Count	Number of unique LORF-NCF events	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
TRAIN_CNT	Train Count	Based on unique Train Symbol and Train Origin Date	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.

ROAD_CNT	Road Count	Unique count of Roads	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
MANUAL_GROUP_CNT	Manual Group Count	Unique 5 car grouping of cars that have been collected from manually submitted LORF-NCF events	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
AUTOMATED_GROUP_CNT	Automated Group Count	Unique 5 car grouping of cars that have been collected from locomotive download LORF-NCF events.	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.

TOTAL_GROUP_CNT	Total Group count	Sum total of the Manual Group count and Automated Group count	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis
LOADED_CNT	Loaded Count	Count of events when car is loaded. The 'Unknown count' can be derived by Raw Count-(Loaded + Empty Counts)	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
EMPTY_CNT	Empty Count	Count of events when car is empty. The 'Unknown count' can be derived by Raw Count-(Loaded + Empty Counts)	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.

MANUAL_CNT	Manual Count	Count of manually collected events. The 'Both Count' can be derived by Raw Count – (Manual + Automated Counts)	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
AUTOMATED_CNT	Automated Count	Count of locomotive download events. The 'Both Count' can be derived by Raw Count – (Manual + Automated Counts)	NUMBER	SUM		Update every time data summary is updated, including when it is opened. Based on a window of time from current date to most recent data summary inspection reported or 90 day window. 90 day window can be changed based on continuing data analysis.
MAX_LIFETIME_SCORE	Max Lifetime Score	The maximum score the car reached in its lifetime	NUMBER	MAX		Update each time a new maximum score is reached for that car.
MAX_LIFETIME_SCORE_DT	Max Lifetime Score Date	The date on which the car reached the Max Lifetime Score	DATETIME	MAX		Update each time the Max score on the car is reached
LAST_LORF_NCF_INSPECT_DT	Last LORF-NCF Inspection Date	Date on which on the most recent Inspection was performed after an LORF-NCF event occurred.	DATE	LATEST		Update each time a LORF- NCF Inspection is performed on the car

LAST_LORF_NCF_INSPECT__REASON	Last LORF-NCF Inspection Reason	Last LORF-NCF inspection reason	STRING	LATEST		Update each time a LORF- NCF Inspection is performed on the car
LAST_LORF_NCF_INSPECT__REASON_CODE	Last LORF-NCF Inspection Reason Code	Last LORF-NCF Inspection Reason Code	STRING	LATEST		
EVENT_TS_1	Last Event Timestamp	Date and time of Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_1	Last Event Load/Empty Indicator	Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_1	Update each time a new LORF-NCF event occurs
MD-INDICATOR_1	Last Event Manual/Download Indicator	Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_1	Update each time a new LORF-NCF event occurs
EVENT_TS_2	2nd to Last Event Timestamp	Date and time of 2nd to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_2	2nd to Last Event Load/Empty Indicator	2nd to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_2	Update each time a new LORF-NCF event occurs
MD-INDICATOR_2	2nd to Last Event Manual/Download Indicator	2nd to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_2	Update each time a new LORF-NCF event occurs
EVENT_TS_3	3rd to Last Event Timestamp	Date and time of 3rd to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs

LE_INDICATOR_3	3rd to Last Event Load/Empty Indicator	3rd to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_3	Update each time a new LORF-NCF event occurs
MD-INDICATOR_3	3rd to Last Event Manual/Download Indicator	3rdto Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_3	Update each time a new LORF-NCF event occurs
EVENT_TS_4	4th to Last Event Timestamp	Date and time of 4th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_4	4th to Last Event Load/Empty Indicator	4th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_4	Update each time a new LORF-NCF event occurs
MD-INDICATOR_4	4th to Last Event Manual/Download Indicator	4th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_4	Update each time a new LORF-NCF event occurs
EVENT_TS_5	5th to Last Event Timestamp	Date and time of 5th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_5	5th to Last Event Load/Empty Indicator	5th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_5	Update each time a new LORF-NCF event occurs
MD-INDICATOR_5	5th to Last Event Manual/Download Indicator	5th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_5	Update each time a new LORF-NCF event occurs
EVENT_TS_6	6th to Last Event Timestamp	Date and time of 6th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs

LE_INDICATOR_6	6th to Last Event Load/Empty Indicator	6th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_6	Update each time a new LORF-NCF event occurs
MD-INDICATOR_6	6th to Last Event Manual/Download Indicator	6th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_6	Update each time a new LORF-NCF event occurs
EVENT_TS_7	7th to Last Event Timestamp	Date and time of 7th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_7	7th to Last Event Load/Empty Indicator	7th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_7	Update each time a new LORF-NCF event occurs
MD-INDICATOR_7	7th to Last Event Manual/Download Indicator	7th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_7	Update each time a new LORF-NCF event occurs
EVENT_TS_8	8th to Last Event Timestamp	Date and time of 8th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_8	8th to Last Event Load/Empty Indicator	8th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_8	Update each time a new LORF-NCF event occurs
MD-INDICATOR_8	8th to Last Event Manual/Download Indicator	8th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_8	Update each time a new LORF-NCF event occurs
EVENT_TS_9	9th to Last Event Timestamp	Date and time of 9th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs

LE_INDICATOR_9	9th to Last Event Load/Empty Indicator	9th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_9	Update each time a new LORF-NCF event occurs
MD-INDICATOR_9	9th to Last Event Manual/Download Indicator	9th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_9	Update each time a new LORF-NCF event occurs
EVENT_TS_10	10th to Last Event Timestamp	Date and time of 10th to Last Event	DATETIME	DESCENDING		Update each time a new LORF-NCF event occurs
LE_INDICATOR_10	10th to Last Event Load/Empty Indicator	4th to Last Event Load/Empty Indicator	STRING	CORRELATED	EVENT_TS_10	Update each time a new LORF-NCF event occurs
MD-INDICATOR_10	10th to Last Event Manual/Download Indicator	4th to Last Event Manual/Download Indicator	STRING	CORRELATED	EVENT_TS_10	Update each time a new LORF-NCF event occurs

Data Summary Roll Up Example

Element Name	Aggregation	RR1	RR2	RR3
Type	DS	DS	DS	DS
Format Version	1	1	1	1
CreationTMST	2013-09-21T09:57:40-05:00	2014-08-15T09:57:40-05:00	2013-09-21T09:57:40-05:00	2013-11-07T09:57:40-05:00
RR_DB_Key		772762	657646	346545
LastUpdateTMST	2014-10-27T09:57:40-05:00	2014-09-18T09:57:40-05:00	2014-10-27T09:57:40-05:00	2014-10-21T09:57:40-05:00
DSType	LORF_NCF	LORF_NCF	LORF_NCF	LORF_NCF
DS_Owner/Reporting_System		RR1	RR2	RR3
EquipmentMark	CSXT,UP,BNSF	UP	CSXT	BNSF
EquipmentNumber	610555	610555	610555	610555
Location				
ComponentType	BASE	BASE	BASE	BASE
ComponentName	BASE	BASE	BASE	BASE
ComponentValue	BASE	BASE	BASE	BASE
State	O	O	O	O
SCORE	5.3	5.3	5.3	5.3
RAW_CNT	5	1	3	1
TRAIN_CNT	3	1	1	1
ROAD_CNT	3	1	1	1
MANUAL_GROUP_CNT	3	1	1	1
AUTOMATED_GROUP_CNT	4	2	1	1
TOTAL_GROUP_CNT	7	3	2	2
LOADED_CNT	3	2	1	0
EMPTY_CNT	2	1	0	1
MANUAL_CNT	2	0	1	1
AUTOMATED_CNT	3	3	0	0
MAX_LIFETIME_SCORE	6.0	6.0	6.0	6.0
MAX_LIFETIME_SCORE_DT	02-15-2014	02-15-2014	02-15-2014	02-15-2014
LAST_LORF_NCF_INSPECT_DT	04-20-2014	04-20-2014	04-20-2014	04-20-2014
LAST_LORF_NCF_INSPECT__REASON	LORF-NCF Inspected and Released	LORF-NCF Inspected and Released	LORF-NCF Inspected and Released	LORF-NCF Inspected and Released
LAST_LORF_NCF_INSPECT__REASON_CODE	LI	LI	LI	LI

(HEADER)

Element Name	Aggregation	RR1	RR2	RR3
EVENT_TS_1	2014-10-27T09:57:40-05:00	2014-09-18T09:57:40-05:00	2014-10-27T09:57:40-05:00	2014-10-21T09:57:40-05:00
LE_INDICATOR_1	L	L	L	E
MD-INDICATOR_1	M	A	M	M
EVENT_TS_2	2014-10-21T09:57:40-05:00	2014-08-27T09:57:40-05:00	2013-10-17T09:57:40-05:00	2014-03-29T09:57:40-05:00
LE_INDICATOR_2	E	L	E	L
MD-INDICATOR_2	M	A	M	M
EVENT_TS_3	2014-09-18T09:57:40-05:00	2014-08-15T09:57:40-05:00	2013-09-21T09:57:40-05:00	2014-01-11T09:57:40-05:00
LE_INDICATOR_3	L	E	L	E
MD-INDICATOR_3	A	A	M	M
EVENT_TS_4	2014-08-27T09:57:40-05:00			2013-11-07T09:57:40-05:00
LE_INDICATOR_4	L			L
MD-INDICATOR_4	A			M
EVENT_TS_5	2014-08-15T09:57:40-05:00			
LE_INDICATOR_5	E			
MD-INDICATOR_5	A			
EVENT_TS_6	2014-03-29T09:57:40-05:00			
LE_INDICATOR_6	L			
MD-INDICATOR_6	M			
EVENT_TS_7	2014-01-11T09:57:40-05:00			
LE_INDICATOR_7	E			
MD-INDICATOR_7	M			
EVENT_TS_8	2013-11-07T09:57:40-05:00			
LE_INDICATOR_8	L			
MD-INDICATOR_8	M			
EVENT_TS_9	2013-10-17T09:57:40-05:00			
LE_INDICATOR_9	E			
MD-INDICATOR_9	M			
EVENT_TS_10	2013-09-21T09:57:40-05:00			
LE_INDICATOR_10	L			
MD-INDICATOR_10	M			

Opening Criteria

A new LORF-NCF data summary will be created for equipment involved in a line-of-road emergency brake application where no cause is identified.

Closing / Reset Criteria

A LORF-NCF data summary does not close from data reads. Once opened, the data summary will continue to aggregate event timestamps from subsequent line-of-road failures where no cause is detected.

A LORF-NCF data summary will reset its counts and scores for the following actions:
a) A LORF Inspection is reported to EHMS. The inspections are listed below.
   o LORF_NCF_INSPCT – Inspected and Released (LI)
   o LORF_NCF_REPAIR – Repaired and Released (LR)
b) A predetermined period of time passes without subsequent LORF events being reported. Currently this time period is 90 days.
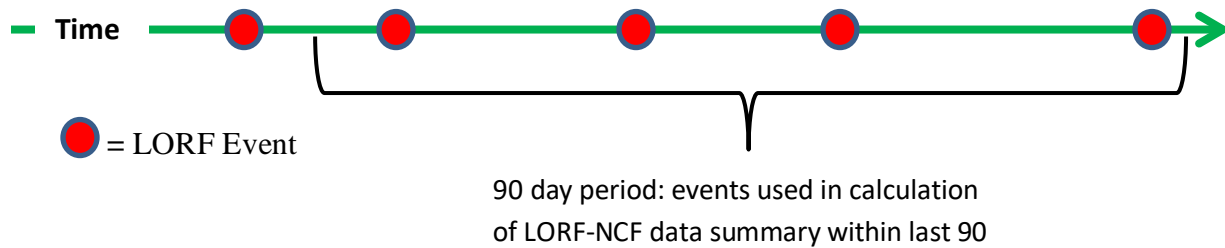
Additional Information

Note 1: EVENT_TS_n, LE_INDICATOR_n, and MD_INDICATOR_n are cascaded (when a more recent one is found, it takes #1 position and #1 moves to #2, etc.). Once all timestamps for a group are populated, the oldest timestamp for that group rolls off. Currently, the data summary allows for the 10 most recent events.
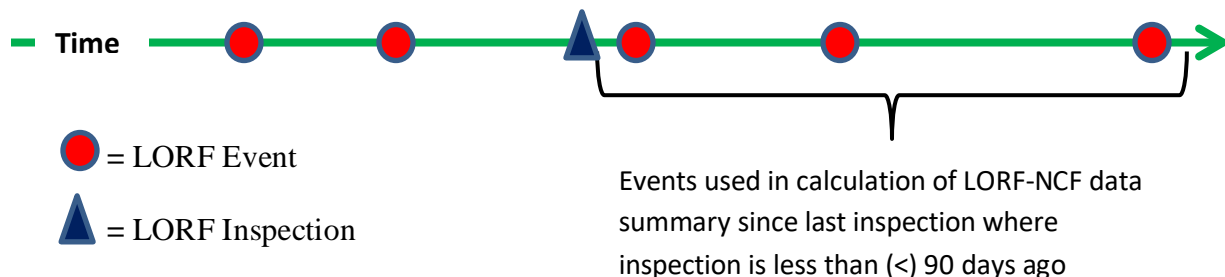
Note 2: Events that occur on the same day as a LORF-NCF Inspection will not be included in the counts or scoring algorithm.

Note 3: The scoring of a car may include more events than the number of events as described in Note 1 above. The scoring process will take into account all events within the shorter window of:

    1) 90 days (this can be configured, 90 days is the current configured timeframe)

●= LORF Event

90 day period: events used in calculation
of LORF-NCF data summary within last 90

    2) days since last LORF-NCF inspection (see Closing / Reset Criteria section above)

●= LORF Event

▲= LORF Inspection

Events used in calculation of LORF-NCF data
summary since last inspection where
inspection is less than (<) 90 days ago

Appendix A – EHMS Display Information

Opening Criteria Display Text
Any LORF-NCF event when train is in an emergency braking condition that was not operator induced and no cause was identified for the emergency braking.

Reset Display Text
A LORF-NCF data summary will always remain open.