Data Summary: Truck Geometry

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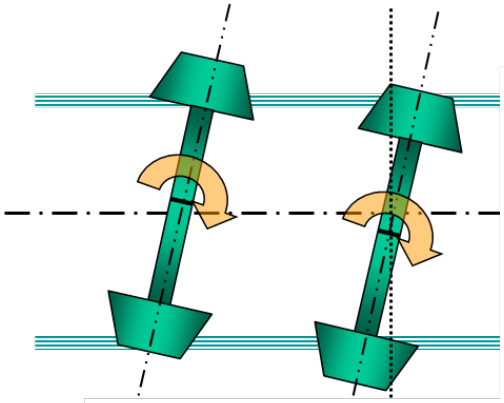
Synopsis

TRUCK GEOMETRY DETECTION is a laser-based system with cameras.

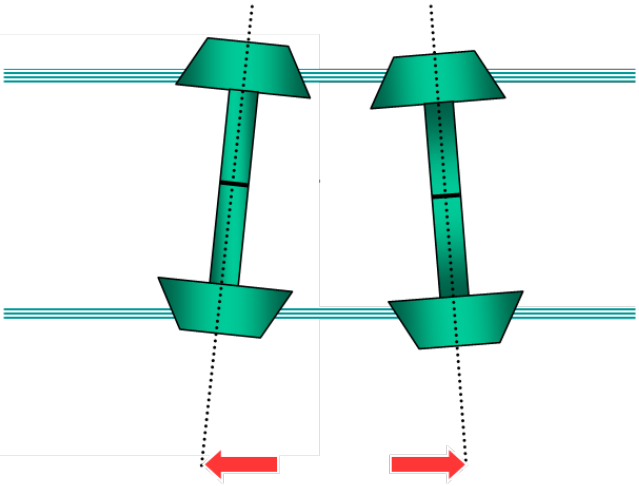
- Mounted on TANGENT track.
- It draws a laser line on the wheel plate.
- It then compares the angle and position of this line to the track and determines wheel angle (angle of attack) and distance (tracking position) with respect to the gauge side of the rail.

Measurements

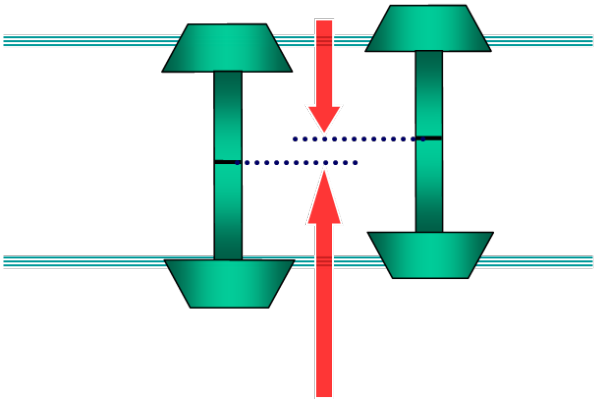
Truck Rotation



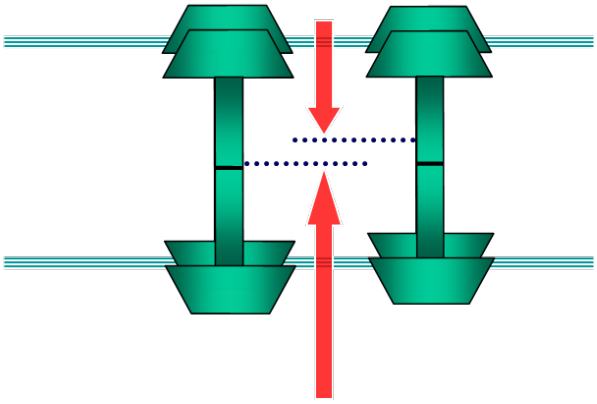
Interaxle Misalignment



Tracking Error (each wheel is flanging, but opposite rails)



Shift (both wheels flanging on same rail)



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	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
	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		TEXT		

	Element Name	Element Text	Element Description	Format	Aggregation Method	Action
	ComponentName	Part of the component location		TEXT		
	ComponentValue	Value for the component location		TEXT		
	State	Data Summary state	Current status of Open, Closed, Perpetual or Nullified	TEXT		Update when data summary state changes
ELEMENTS	CNT_TGD_READS	Count of detector reads		NUMBER	Sum	
	MAX_ROTATION	Maximum truck rotation		NUMBER	Max	
	MAX_TE	Maximum tracking error		NUMBER	Max	
	MAX_IAM	Maximum interaxle misalignment		NUMBER	Max	
	MAX_SHIFT	Maximum shift		NUMBER	Max	
			First Axle			
	AXLE_ONE_MAX_AOA	Maximum angle of attack		NUMBER	Max	
	AXLE_ONE_MAX_TP	Maximum tracking position		NUMBER	Max	
	AXLE_ONE_TIMESTAMP_1	Last pass timestamp		DATETIME	Descending	
	AXLE_ONE_AOA_1	Last pass angle of attack		NUMBER	Correlated	
	AXLE_ONE_TP_1	Last pass tracking position		NUMBER	Correlated	
	AXLE_ONE_HUNTING_P_1	Last pass hunting P		NUMBER	Correlated	
	AXLE_ONE_TIMESTAMP_2	Next to last pass timestamp		DATETIME	Descending	

Element Name	Element Text	Element Description	Format	Aggregation Method	Action
AXLE_ONE_AOA_2	Next to last pass angle of attack		NUMBER	Correlated	
AXLE_ONE_TP_2	Next to last pass tracking position		NUMBER	Correlated	
AXLE_ONE_HUNTING_P_2	Next to last pass hunting P		NUMBER	Correlated	
AXLE_ONE_TIMESTAMP_3	Third to last pass timestamp		DATETIME	Descending	
AXLE_ONE_AOA_3	Third to last pass angle of attack		NUMBER	Correlated	
AXLE_ONE_TP_3	Third to last pass tracking position		NUMBER	Correlated	
AXLE_ONE_HUNTING_P_3	Third to last pass hunting P		NUMBER	Correlated	
		AXLE TWO			
AXLE_TWO_MAX_AOA	Maximum angle of attack		NUMBER	Max	
AXLE_TWO_MAX_TP	Maximum tracking position		NUMBER	Max	
AXLE_TWO_TIMESTAMP_1	Last pass timestamp		DATETIME	Descending	
AXLE_TWO_AOA_1	Last pass angle of attack		NUMBER	Correlated	
AXLE_TWO_TP_1	Last pass tracking position		NUMBER	Correlated	
AXLE_TWO_HUNTING_P_1	Last pass hunting P		NUMBER	Correlated	
AXLE_TWO_TIMESTAMP_2	Next to last pass timestamp		DATETIME	Descending	
AXLE_TWO_AOA_2	Next to last pass angle of attack		NUMBER	Correlated	

Element Name	Element Text	Element Description	Format	Aggregation Method	Action
AXLE_TWO_TP_2	Next to last pass tracking position		NUMBER	Correlated	
AXLE_TWO_HUNTING_P_2	Next to last pass hunting P		NUMBER	Correlated	
AXLE_TWO_TIMESTAMP_3	Third to last pass timestamp		DATETIME	Descending	
AXLE_TWO_AOA_3	Third to last pass angle of attack		NUMBER	Correlated	
AXLE_TWO_TP_3	Third to last pass tracking position		NUMBER	Correlated	
AXLE_TWO_HUNTING_P_3	Third to last pass hunting P		NUMBER	Correlated	
LAST_TMST_AOA_GE_1_OR_TP_GE_10	Last timestamp with readings AOA>=1 or TP>=10		DATETIME		Max
TMST_1_AOA_LT_1_AND_TP_LT_10	Last timestamp with readings AOA<1 and TP<10		DATETIME		Autoclose
TMST_2_AOA_LT_1_AND_TP_LT_10	2nd to Last timestamp with readings AOA<1 and TP<10		DATETIME		Autoclose
TMST_3_AOA_LT_1_AND_TP_LT_10	3rd to Last timestamp with readings AOA<1 and TP<10		DATETIME		Autoclose

Data Summary Rollup Example

	Element Name	RR1	RR2	RR3	Roll Up
HEADER	Type	DS	DS	DS	DS
	Format Version	1	1	1	1
	CreationTMST	2018-01-23T19:05:00-05:00	2018-01-24T20:05:00-05:00	2018-01-25T21:05:00-05:00	2018-01-23T19:05:00-05:00
	RR_DB_Key	771210	8765643	4567876	
	LastUpdateTMST	2018-01-23T19:05:00-05:00	2018-01-24T20:05:00-05:00	2018-01-25T21:05:00-05:00	2018-01-25T21:05:00-05:00
	DSType	TGD	TGD	TGD	TGD
	DS_Owner/Reporting_System	RR1	RR2	RR3	
	EquipmentMark	CSXT	CSXT	CSXT	CSXT
	EquipmentNumber	162010	162010	162010	162010
	Location				
	ComponentType	TRUCK	TRUCK	TRUCK	TRUCK
	ComponentName	AXLE	AXLE	AXLE	AXLE
	ComponentValue	4	4	4	4
	ComponentName	TRUCK	TRUCK	TRUCK	TRUCK
	ComponentValue	A	A	A	A
	State	O	O	O	O
ELEMENTS	CNT_TGD_READS	1	1	1	3
	MAX_ROTATION	0.0	1.2	2.4	2.4
	MAX_TE	0.63	8.4	14.9	14.9
	MAX_IAM	0.3	0.1	1.2	1.2
	MAX_SHIFT	9.9	5.6	7.7	9.9
	AXLE ONE				
	AXLE_ONE_MAX_AOA	3.1	0.2	0.3	3.1
	AXLE_ONE_MAX_TP	16	3.148	8.581	8.581
	AXLE_ONE_TIMESTAMP_1	2018-01-23T19:05:00-05:00	2018-01-24T20:05:00-05:00	2018-01-25T21:05:00-05:00	2018-01-25T21:05:00-05:00
	AXLE_ONE_AOA_1	3.1	0.2	0.3	0.3
	AXLE_ONE_TP_1	16	3.148	0.3	0.3
	AXLE_ONE_HUNTING_P_1	2.6	0.582	3.518	3.518
	AXLE_ONE_TIMESTAMP_2				2018-01-25T21:05:00-05:00

	AXLE_ONE_AOA_2				0.2
	AXLE_ONE_TP_2				3.148
	AXLE_ONE_HUNTING_P_2				0.582
	AXLE_ONE_TIMESTAMP_3				2018-01-23T19:05:00-05:00
	AXLE_ONE_AOA_3				3.1
	AXLE_ONE_TP_3				16
	AXLE_ONE_HUNTING_P_3				2.6
	AXLE TWO				
	AXLE_TWO_MAX_AOA	2.5	0.7	0.1	2.5
	AXLE_TWO_MAX_TP	10	2.314	5.568	10
	AXLE_TWO_TIMESTAMP_1	2018-01-23T19:05:00-05:00	2018-01-24T20:05:00-05:00	2018-01-25T21:05:00-05:00	2018-01-25T21:05:00-05:00
	AXLE_TWO_AOA_1	2.5	0.7	0.1	0.1
	AXLE_TWO_TP_1	10	2.314	5.568	5.568
	AXLE_TWO_HUNTING_P_1	2.6	0.582	3.518	3.518
	AXLE_TWO_TIMESTAMP_2				2018-01-25T21:05:00-05:00
	AXLE_TWO_AOA_2				0.7
	AXLE_TWO_TP_2				2.314
	AXLE_TWO_HUNTING_P_2				0.582
	AXLE_TWO_TIMESTAMP_3				2018-01-23T19:05:00-05:00
	AXLE_TWO_AOA_3				2.5
	AXLE_TWO_TP_3				10
	AXLE_TWO_HUNTING_P_3				2.6
	LAST_TMST_AOA_GE_1_OR_TP_GE_10	2018-01-23T19:05:00-05:00			2018-01-23T19:05:00-05:00
	TMST_1_AOA_LT_1_AND_TP_LT_10		2018-01-24T20:05:00-05:00	2018-01-25T21:05:00-05:00	2018-01-24T21:05:00-05:00
	TMST_2_AOA_LT_1_AND_TP_LT_10				2018-01-25T20:05:00-05:00
	TMST_3_AOA_LT_1_AND_TP_LT_10				

Opening Criteria

Data Summaries will be opened for Truck Geometry visits where any of the following occur:

a) Absolute value of angleOfAttack >= 3.0mrad **OR**
b) Absolute value of trackingPosition >= 15mm. **OR**
c) HUNTING_P>=7mm
d) An open DS exists that was created by another entity.

Note: When Hunting_P >=7, truck geometry measurements are discarded since Hunting_P >=7 indicates excessive hunting that makes the truck geometry measurements unreliable.

Closing Criteria

a) Auto Close logic: Three sequential TGD reads of absolute value of angleOfAttack < 1mrad **AND** absolute value of trackingPosition < 10mm.