



*Transportation Technology Center, Inc., a subsidiary of the Association of American Railroads*

**AAR**

**Current EEC Key Topics**

**On-line Publications**

**FCFTF Update**

**NGFT TF Update**

**Passenger Stds Update**

**David L. Cackovic**



*Transportation Technology Center, Inc., a subsidiary of the Association of American Railroads*

## **Key EEC Topics**

**David L. Cackovic**  
**Jon Hannafious**

# **Changes Related to DOT-117 Tank Car Regulations**

- ◆ **Retrofitted tank cars may have weight increases from:**
  - Jacketed and thermally insulated shells
  - Full-height half-inch-thick head shields
  - Rollover protection for top fittings
  - Possibly from safety appliance walkways
  
- ◆ **Increased weight will require many cars to undergo Rule 88 - Mechanical Requirements for Acceptance - “Increased Gross Rail Load” Process (IGRL)**



# Changes Related to DOT-117 Tank Car Regulations

## ◆ Rule 88 Minimum Mechanical Requirements Chart

- Wheelsets must comply with S-286 - Free/Unrestricted Interchange for 286,000 Lb. Gross Rail Load Cars:
- S-286 – Currently requires New Wheels and Axles

## ◆ ARCI Requested Waiver for the following

- Cars already equipped with 6 ½ x 9 bearing wheelsets, request was to leave them on the retrofitted car
  - ▲ EEC determined that a minimum of reconditioning would be required
- Requested the use of reconditioned wheels and axles as needed for any DOT-117 IGRL Cars



# Changes Related to DOT-117 Tank Car Regulations

- ◆ EEC/TSWC opted for edits to S-286 and Rule 88 (**Both in Progress**)
- ◆ S-286 Edits:
  - Bearings – No change. “New” was/is not mentioned, implies new or reconditioned
  - Axles – Removal of the statement that axles must be new.
  - Wheels - Removal of the word “new” for 36” and 38” wheels.

## 2.3 Bearings

The bearing size of  $6\frac{1}{2} \times 9$ ,  $7 \times 9$ , or  $7 \times 12$  is to be applied.

## 2.4 Axles

The axle size of  $6\frac{1}{2} \times 9$ ,  $7 \times 9$ , or  $7 \times 12$  is to be applied. ~~Axles shall be new.~~ Axles with machined grooves at the inboard seal wear ring/journal contact area shall not be used.

## 2.5 Wheels

Wheels are to be ~~new~~ 36-in. mounted on  $6\frac{1}{2} \times 9$  axles and bearings or ~~new~~ 38-in. mounted on  $7 \times 9$  or  $7 \times 12$  axles and bearings. Wheels are to be curved plate, ~~Class C.~~

↑ AAR Approved



# Changes Related to DOT-117 Tank Car Regulations

## ◆ Rule 88 Edits

- Rebuild, Increased Gross Rail Load, and Increased Life Status are being changed to allow reconditioned wheels and axles
- New cars must continue to use new wheels and axles
- New and reconditioned axles must be ultrasonically tested

CATEGORY	SPECIFICATIONS	RB	NW	MOD	EXS	IGRL	ILS
(21) Wheels and Axles	(a) Units must be equipped with heat-treated curved-plate wheels.	X	X	X	X	X	X
	(b) Units must be equipped with AAR-approved raised wheel seat design axles.	S	S	S	NCR	NCR	X
	(c) Units with 4-wheel trucks and a gross rail load greater than 268,000 pounds up to and including 286,000 pounds intended for free/unrestricted interchange must be equipped with wheels and axles in compliance with Standard S-286. <u>Axles must be ultrasonically tested in accordance with AAR specification M-101 (for new) and Specification S-659 (for reconditioned).</u>	<del>XR</del>	<del>XN</del>	WA	NCR	<del>XR</del>	<del>XR</del>





# ReflectORIZATION of Freight Cars ( & Locomotives)

- ◆ **Deadline of November 28, 2015 is approaching for initial application of reflective material. Application period began in 2005.**
- ◆ **Most recent AAR Announcements**
  - July 6, 2011 (C-11476):
    - ▲ All new and rebuilt must immediately have reflectorization reported, mandatory.
    - ▲ Cars built/rebuilt after Jan. 1, 2006 must be reported, mandatory on January 1, 2012.
    - ▲ Reminder that all cars must comply by November 28, 2015
  - Nov. 15, 2012 (C-11818): Rule 66 Modified to notify car owner when Umler Field is empty, and owner will be given 6 months to comply
  - July 17, 2013 (C-11990): Reminder of July 6, 2011 Circular
  - May 21, 2014 (C-12160): Solicitation of comments for Rule 66 edit to make initial application a Cause for Attention at any time. Rule released in July
  - Nov. 3, 2014 (MA-0152): Maintenance Advisory with a list of 315,000 cars with no reflectorization information in Umler
  - July 1, 2015 (EW-5299): Early Warning released with remaining 126,893 cars
- ◆ **November 28, 2015: Freight Cars without initial application of reflective material will not be in compliance with Federal Regulations and car owner would be subject to penalty**



# Reflectorization of Freight Cars (& Locomotives)

## ◆ Proposed Rule 66 – Reflective Sheeting

### RULE 66 – REFLECTIVE SHEETING

#### A. Wear Limits, Gaging, Cause For Renewal, Cause for Attention

##### 1. At any time

- a. Initial application of reflective sheeting (see E.13)
- b. When a Single Car Air Brake Test (SCABT) is performed on cars with reflective sheeting previously applied, reflective sheeting must be inspected for:
  1. Missing pieces of reflective sheeting
  2. Damaged or obscured reflective sheeting
  3. Fire or heat damage
  4. Improperly located or applied reflective sheeting
  5. Sheeting obscured with dirt or grime such that the reflective properties are diminished must be cleaned or replaced







# ReflectORIZATION of Freight Cars ( & Locomotives )

- ◆ **Federal Regulations require replacement of all reflective material at time of the Single Car Air Brake Test (SCABT) subsequent to the material becoming 10 years old**
- ◆ **A waiver request has been submitted to the FRA requesting 3 years for AAR member railroads to do the following:**
  - Develop a standard for a comparative panel based method including evaluation procedures and a training program/materials
  - Inspect the retroreflective sheeting on rail cars at time of the SCABT
  - Inspect the retroreflective sheeting on locomotives at the annual inspection
  - Replace “grandfathered” material during the SCABT or annual locomotive inspection
  - When completed, AAR member railroads will provide training to their employees who will be conducting the tests and will make the training materials and records available to FRA upon request



- ◆ **EEC has developed a list of over 90 stencils/requirements to consider for removal**
  - Most of those being considered have fields in Umler
  
- ◆ **The following have been removed from the Rules, S-910 in Progress (Lettering and Marking of Cars)**
  - Consolidated stencils (white borders and black background)
  - Brake valve information
  - Tread Conditioning Brake Shoe (Removed in 2014, remains an option of the car owner)
  
- ◆ **The following are considered for removal next**
  - Truck Mounted Brake Cylinder – (Rules 4 and 80)
  - Truck Mounted Brake Cylinder Maintenance – (Rules 4 and 80)
  - Any remaining mention of stencils for Composition, High Friction Composition, and Tread Conditioning Brake Shoes – These are already in Umler (Standard S-910 and Rule 6)
  - Cushioning Device Stencil – Need Umler permissible values update





# Truck Performance for Rail Cars

- ◆ **EEC has approved a revision to M-1001 Design, Fabrication, and Construction of Freight Cars, Chapter 11 Service-worthiness Tests And Analyses For New Freight Cars**
  - Loaded Hunting is being added to the menu of items for testing
  
- ◆ **M-976 Truck Performance for Rail Cars will be edited to reference the Chapter 11 loaded hunting test as an option**
  
- ◆ **EEC is considering a new test to replace the resistance testing now conducted under M-976. Test has been termed “Traction Ratio Test”**
  - Proof of the concept is still underway at TTCI under the AAR’s Strategic Research Initiative program.
  - Requires the use of instrumented wheelsets to determine the “traction ratio”
  - Requires the use of a baseline truck for comparison
  - The new method hopes to overcome variables that occur in nature (wind, friction levels, etc.) and requires extra attention on variables that can be controlled.





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# **AAR On-line MSRP System, Other Work in Progress**

**David L. Cackovic**



# AAR On-line MSRP System, Other Work in Progress

## WELCOME TO THE AAR MSRP LIBRARY

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To get started Select the MSRP that you wish to review. From there you can download each MSRP, individual specifications and related documents.

This library is currently in beta and we would appreciate your feedback on the functionality and user experience of this library tool.

[Submit Feedback](#)

Select MSRP

A rectangular text input field with a thin blue border. The text 'Select MSRP' is displayed inside the field. To the right of the text is a small, grey, downward-pointing triangle icon, indicating a dropdown menu.

















# AAR On-line MSRP System, Other Work in Progress

## Select MSRP

MSRP-C II: Design, Fabrication, and Cons

### [MSRP-C II: Design, Fabrication, and Construction](#)

Design, Fabrication, and Construction of Freight Cars (04/13/2011)

DOC NO. ▼	IMPLEMENTED FILE	CIRCULAR	NOTES
M-1001 Ch 1	 M-1001 Chapter 1 - Administrative Provisions (04/13/2011)		-
M-1001 Ch 2	 M-1001 Chapter 2 - General Data (04/13/2011)		-
M-1001 Ch 3	 M-1001 Chapter 3 - Materials—Body Structure (04/13/2011)		-
M-1001 Ch 4	 M-1001 Chapter 4 - Design (04/13/2011)		-
M-1001 Ch 4_	 M-1001 Chapter 4 - Design PP.67-68 (02/2014)	 C-12109	-
M-1001 Ch 5	 M-1001 Chapter 5 - Fabrication and Construction (04/13/2011)		-
M-1001 Ch 5_	 M-1001 Chapter 5. Fabrication and Construction PP.83-88 (01/2015)	 C-12340	-
M-1001 Ch 6	 CHAPTER 6. GENERAL DESIGN AND TEST REQUIREMENTS—TANK CARS		-
M-1001 Ch 6_	 M-1001 Chapter 6. General Design and Test Requirements-Tank Cars pp.83-88 (04/2014)	 C-12169	-
M-1001 Ch 7	 M-1001 Chapter 7 - Fatigue Design of New Freight Cars (04/13/2011)		Also see C-11753.20120807 C-11740.20120726
M-1001 Ch 8	 M-1001 Chapter 8 - Design and Test Requirements for Trailer/Container Transport Cars (04/13/2011)		-



# AAR On-line MSRP System, Other Work in Progress

## AAR Manual of Standards and Recommended Practices Design, Fabrication, and Construction of Freight Cars

M-1001

CHAPTER 7.

### CHAPTER 7. FATIGUE DESIGN OF NEW FREIGHT CARS

#### 7.1 Administrative Provisions

##### 7.1.1 Purpose and Scope

###### 7.1.1.1 General

This specification is the requirement for fatigue analysis of freight cars and is not intended to supersede or make obsolete any existing AAR design requirement. In general, existing specifications are concerned with static and high-impact loads. However, when a member or connection is subjected to fluctuating stresses, failure can occur under stresses considerably lower than those that would cause failure under steady conditions. This specification gives the designer or analyst a method for estimating the fatigue life of a freight car or component when subjected to fluctuating stresses. The accuracy of fatigue analysis is, however, not as high as that of static stress analysis. While fatigue analysis methods give an indication of the adequacy of the design from a fatigue viewpoint, the actual life estimates must be utilized with caution. The intent of the specification is to ensure that all car builders uniformly utilize best practices for fatigue analysis.

The purpose of this fatigue design specification is to provide assurance that a proposed car design, or a current design with structural modifications not contemplated in the original design (and fatigue analysis), will meet the high utilization or full-interchange mileage criteria specified below.

In addition to the basic strength requirements for modifications or “new appurtenances” discussed in paragraph 1.2, a determination of satisfactory fatigue life of the modification is required. Gener-

04/13/2011





# AAR On-line MSRP System, Other Work in Progress

“My evaluation has been very favorable. Everything was worked fine and I made a point to open every standard. The only suggestion I have for improvement would be to have hyper links where references are throughout the standards. Although I know this would be labor intensive.”

“So far it seems to be working fine. This will be a big help to me. “

“I recommend you move that dropdown above the comments area.”

“I like the simplicity of the format and the fact that multiple documents can be open....“

“It may be my system, where I am operating by VPN through my company's server which is in another town, but the site crashed and immediately recovered several times.”

“I'm in favor of eliminating or reducing the top banner size.”

“I like the alternating row color; it is a good visual aide.”







# AAR On-line -- Other Work in Progress

## PATH FORWARD

- 1 Schedule bi-weekly Web Cast Meetings to continue progression
- 2 AAR to address how to pay for systems development
- 3 List of Publications Products and formats (where we want to go)

	DRM On-line Subscription	PDF Download	CD	Print Shop Paper	When changed
Field Manual	X	X		X	twice a year
Office Manual	X				twice a year
Price Matrix	X				four times a year
MSRP	X				any time
DPLS	?				
OTLR	?				
6000 BOE	X			X	four times a year
Circular Letters					

- 4 Get list of pub customer names to Railinc, to determine company name, ID, and type (needs to match)
  - For Tech Stds Customers
  - For BOE Customers
  - For DPLS Customers



# AAR On-line -- Other Work in Progress

## PATH FORWARD

5 FM/OM continue to develop (concept):					
	Four tiered approach for FM/OM				
	Class I Pro-Rata (xx% of FM/OM)		Shared pro-rata		
	All non-Class I Car Owners -- Car Count		Car Count		
	Running Repair Agents		CRB Activity		
	Contract Shops / Other		Flat Fee		
	Specials (i.e. Railway Education Bureau)		Special Fee		
	System to minimize and control number of hard copies				
	Develop DRM Needs				
6 MSRPs					
	Future calls come up with concepts				
	Continue to test online system				
	By Sept 2015, schedule call with beta testers				
7 BOE 6000, develop:					
	System to minimize and control number of hard copies				



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# **AAR Fatigue Task Force Update**

**David L. Cackovic**

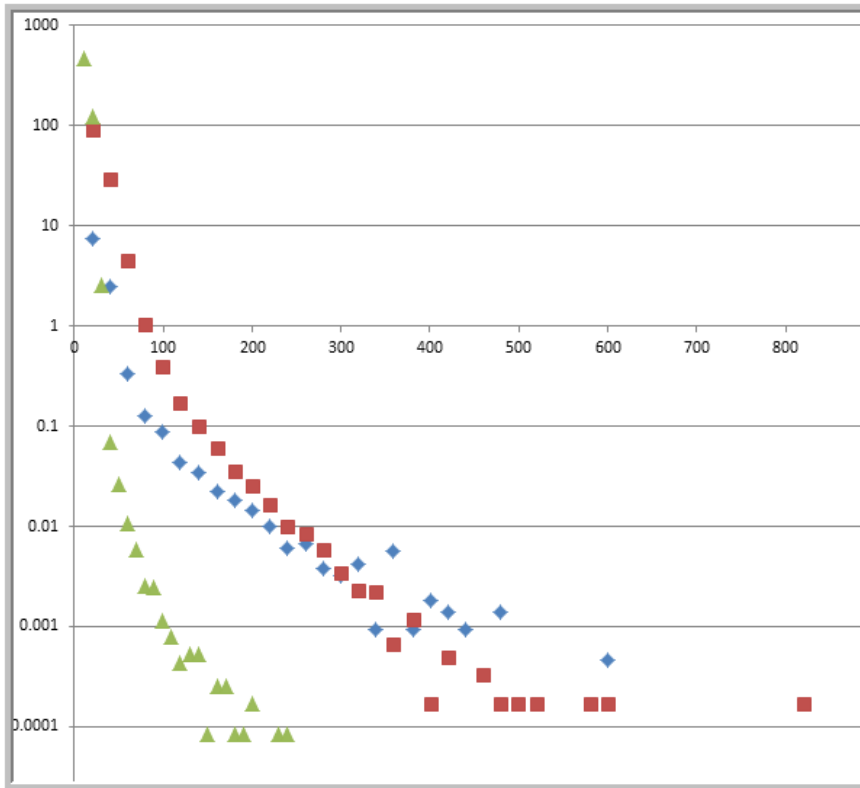
The FCFTF is Working with EEC:

1. New Well Car Data Approval to Publish
  1. Well Car Longitudinal Coupler Force
  2. 40-foot Tank Style Container Loads
2. Republish data removed in 2010
3. Next Field Test – Crude by Rail (CBR)
4. Coupon Testing



# AAR Fatigue Task Force Update

## New Well Car Data Approval to Publish Well Car Longitudinal Coupler Force



2013 Data			2014 Data		
Intermodal 5 Pack			Intermodal 5 Pack		
2172 Miles			5999 Miles		
Range	Number of Cycles	Events/Mile	Range	Number of Cycles	Events/Mile
20	15890	7.315837937	20	541765	90.3092182
40	5268	2.425414365	40	174010	29.00650108
60	728	0.335174954	60	27037	4.50691782
80	266	0.122467772	80	6221	1.037006168
100	186	0.085635359	100	2321	0.386897816
120	95	0.04373849	120	1040	0.173362227
140	75	0.034530387	140	599	0.099849975
160	48	0.022099448	160	359	0.059843307
180	39	0.017955801	180	215	0.035839307
200	31	0.01427256	200	149	0.024837473
220	21	0.009668508	220	98	0.016336056
240	13	0.005985267	240	59	0.009834972
260	14	0.006445672	260	51	0.008501417
280	8	0.003683241	280	35	0.005834306
300	7	0.003222836	300	21	0.003500583
320	9	0.004143646	320	14	0.002333722
340	2	0.00092081	340	13	0.002167028
360	12	0.005524862	360	4	0.000666778
380	2	0.00092081	380	7	0.001166861
400	4	0.001841621	400	1	0.000166694
420	3	0.001381215	420	3	0.000500083
440	2	0.00092081	460	2	0.000333389
480	3	0.001381215	480	1	0.000166694



## New Well Car Data Approval to Publish 40-foot Tank Style Container Loads

### Force for four corners of a 40-foot tank style container

Q1SX, Quadrant 1 Longitudinal Force into Tank Container

Q2SX, Quadrant 2 Longitudinal Force into Tank Container

Q3SX, Quadrant 3 Longitudinal Force into Tank Container

Q4SX, Quadrant 4 Longitudinal Force into Tank Container

Q1SY, Quadrant 1 Lateral Force into Tank Container

Q2SY, Quadrant 2 Lateral Force into Tank Container

Q3SY, Quadrant 3 Lateral Force into Tank Container

Q4SY, Quadrant 4 Lateral Force into Tank Container

Q1SZ, Quadrant 1 Vertical Force into Tank Container

Q2SZ, Quadrant 2 Vertical Force into Tank Container

Q3SZ, Quadrant 3 Vertical Force into Tank Container

Q4SZ, Quadrant 4 Vertical Force into Tank Container



## Republish data removed in 2010

December 22, 2010, EEC issued C-11354

“Replacement of 19 fatigue spectra data files for gondola and hopper cars with 6 new data files obtained in the new test program. These data are more pertinent to today’s operations for hopper and gondola cars.

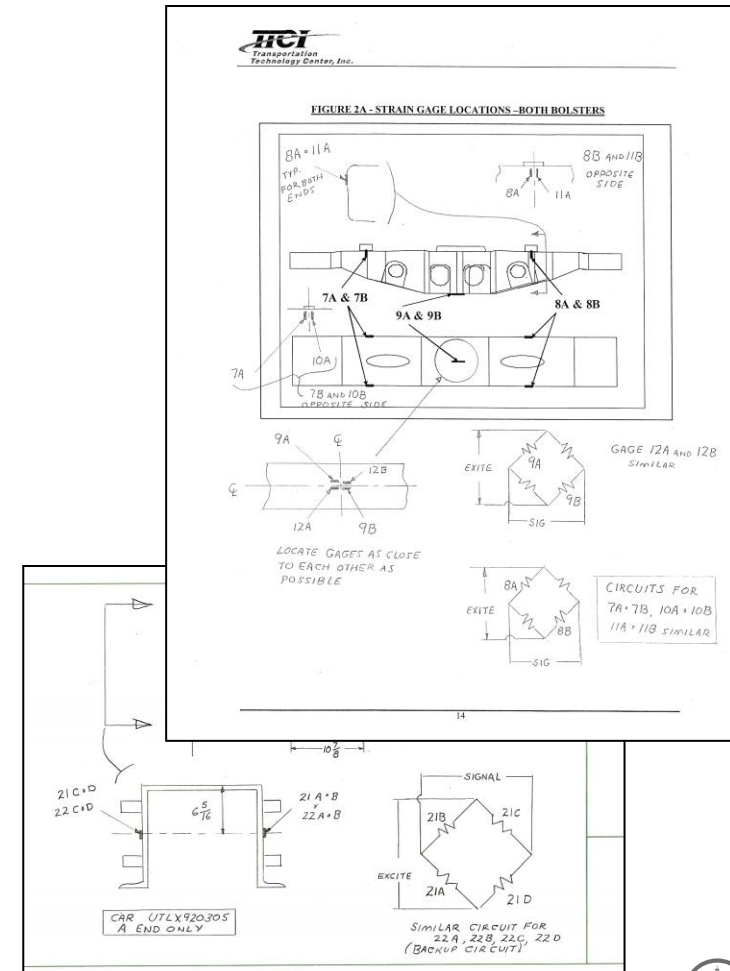
Replacement of 10 fatigue spectra data files for tank cars with 12 new data files obtained in the new test program. These data are more pertinent to today’s operations for tank cars.

Addition of 3 new fatigue spectra data files for 5-unit intermodal cars.”

## Next Field Test – CBR

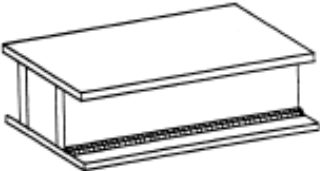
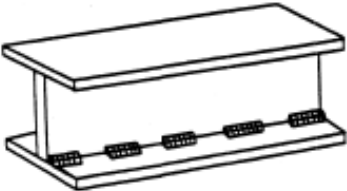

### The Next FCFTF Test will be to Obtain Load and Design Spectra for CBR Railcars

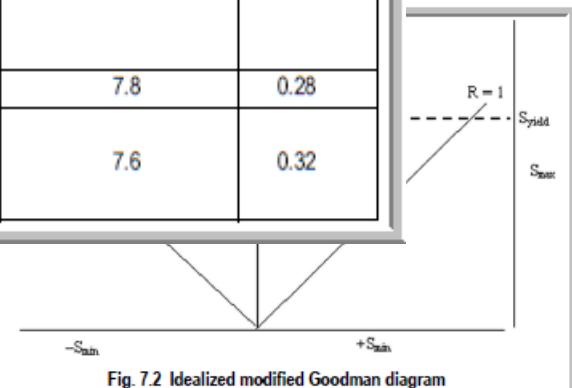
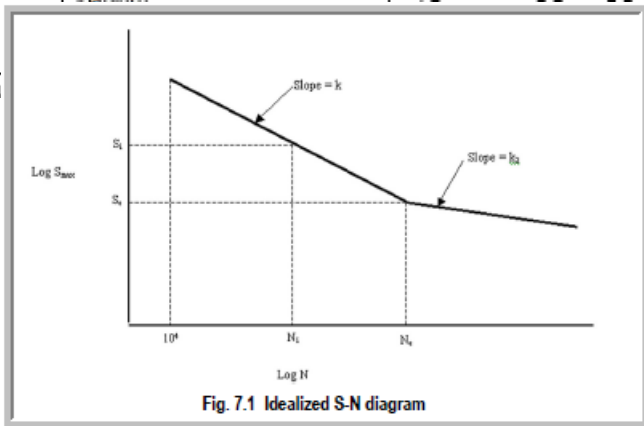
- 10,000 miles
- Unit train service
- Longitudinal and vertical coupler force
- Bolster, centerplate and side bearing forces into carbody structure





## Coupon Testing

Fig. No.	Description of Member	Member Details	Nom. Yield Stress (ksi)	Stress Range (ksi) at $2 \times 10^6$ cycles ( $S_e$ )	S-N Slope (k)
7.4.1.16	Continuous welded box beam (flexural loading)		50	17.1	0.29
7.4.1.17	Intermittent welded box beam or I-beam (flexural loading)		50	11.3	0.31
7.4.1.18	Continuous welded box beam with intermittent webs (flexural loading)		36	7.8	0.28
			50	7.6	0.32



Equation of MGD curve:

$$S_{max} = m S_{min} + b$$

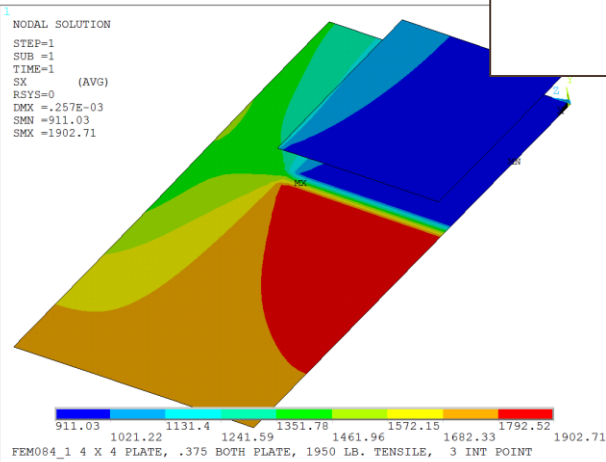
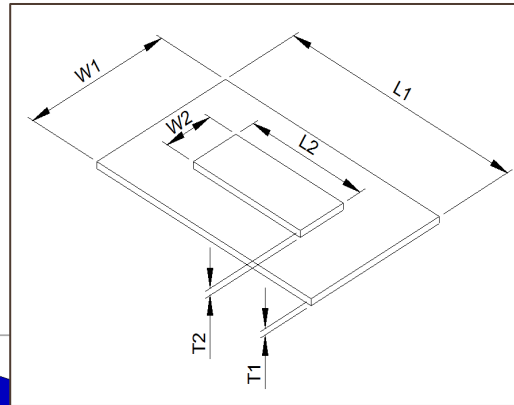
$$S_{min} = \frac{S_{max} - b}{m}$$





# Coupon Analysis – Pretest Analysis

The purpose of the analysis is to find out the most suitable plate dimensions for the potential experimental fatigue tests. Find out the effect of geometry on the stress distribution; this can be beneficial in developing standards/guidelines for finding the approximate location of stress sampling points when the analyst is looking for the nominal stresses in a complicated railcar structure.



	Test #	L1	L2	W1	W2	T1	T2
BASE CASE	1	12	4	6	4	0.375	0.375
(L1/L2) SENSITIVITY TESTS	2	12	5	6	4	0.375	0.375
	3	12	6	6	4	0.375	0.375
	4	12	3	6	4	0.375	0.375
(W1/W2) SENSITIVITY TESTS	5	12	4	6	2	0.375	0.375
	6	12	4	6	5	0.375	0.375
	7	12	4	6	6	0.375	0.375
(T1/T2) SENSITIVITY TESTS	8	12	4	6	4	0.375	0.75
	9	12	4	6	4	0.375	0.1875
	10	12	4	6	4	0.5625	0.1875





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# **AAR NGFT Task Force**

**David L. Cackovic**



**Association of American  
Railroads**

Safety and Operations Department

Natural Gas Fuel Tender TAG

Draft M-1004 Specification for

**INTEROPERABLE NATURAL GAS FUEL TENDERS**

July 15, 2015



### 1.3 Organization of this Specification

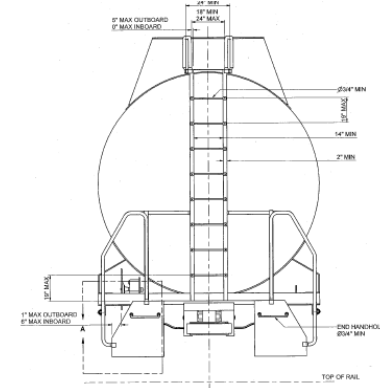
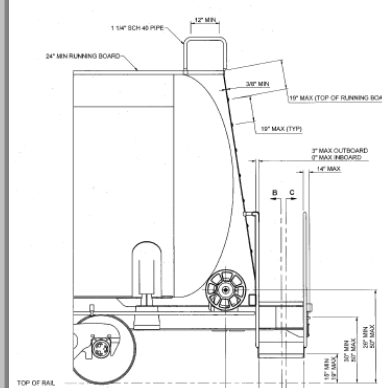
This Specification is organized into the following Chapters and Appendices:

#### Chapters

- 1.0 Introduction / General Requirements
- 2.0 LNG Fuel Tank Requirements
- 3.0 Reserved (CNG Fuel Tank)
- 4.0 Reserved (Other Alternate Fuel Tank)
- 5.0 Piping, Service Equipment, & Protective Housings
- 6.0 Tender Control Unit
- 7.0 Locomotive Interface
- 8.0 Fueling Station Interface
- 9.0 Structural Design Requirements
- 10.0 Dynamic Performance
- 11.0 Crashworthiness

#### Appendices

- A. Approval Process
- B. Basic Process and Instrumentation Diagram
- C. Locomotive End Plate Diagram
- D. Tender End Plate Diagram
- E. Fueling Interface Diagram
- F. Fueling Control Cable Details (FC-16)
- G. Drain & Purge Procedures (Tank and Hose Assemblies)
- H. Wiring
- I. Stenciling
- J. Qualification and Maintenance
- K. Documentation
- L. Back Office Requirements



## **1.4 APPROVAL**

### **1.4.1 Locomotive Committee**

The AAR Locomotive Committee has overall authority for this Specification. Additionally, the Locomotive Committee has specific authority for all aspects in Chapter 6 – TENDER CONTROL UNIT, Chapter 7 - LOCOMOTIVE INTERFACE, and Chapter 11 – CRASHWORTHINESS.

Proponents desiring alternative designs to this Specification shall appeal to the Locomotive Committee.

### **1.4.2 Tank Car Committee**

The Tank Car Committee has specific authority over all aspect of the requirements in Chapter 2 – LNG FUEL TANK REQUIREMENTS, Chapter 5 – PIPING & SERVICE EQUIPMENT, and Chapter 8 – FUELING STATION INTERFACE.

AAR Executive Director for Tank Car Safety will review and recommend to the Locomotive Committee, if appropriate, the proponent's designs meeting Chapters 2, 5 & 8.

### **1.4.3 Equipment Engineering Committee**

The AAR Equipment Engineering Committee has specific authority over all aspects of the underframe structure, supporting car body and running gear, the requirements which are outlined in Chapter 9 - STRUCTURAL DESIGN REQUIREMENTS and Chapter 10 - DYNAMIC PERFORMANCE.

The EEC will review and recommend to the Locomotive Committee, if appropriate, the proponent's designs meeting Chapters 9 & 10.

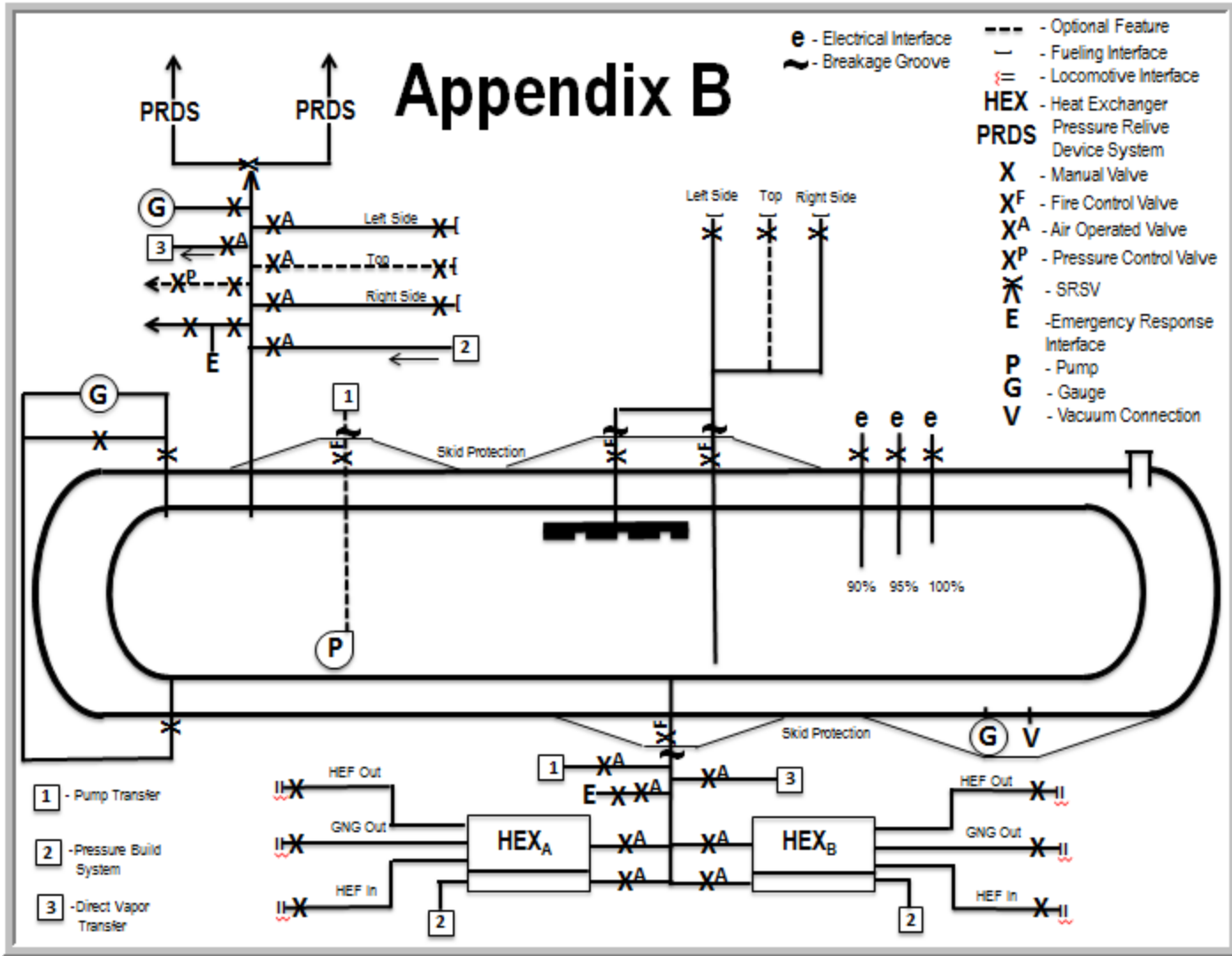


## 1.6 Abbreviations and Definitions

TERM	DEFINITION
<b>Adapter, Dry Quick Disconnect</b>	Male portion of a dry disconnect fitting.
<b>AOV</b>	Air Operated Valve (normally closed and opened by air pressure) is used for tender system controls downstream of any FCV.
<b>Approved</b>	As used in this Specification, "approved" means approval by the respective committees listed in paragraph 1.4.
<b>Cabinet</b>	An enclosed weather-tight housing not subject to crashworthiness requirements.
<b>Closures</b>	A device that closes an opening into the tank valve or fitting. Examples include but are not limited to pipe plugs, quick-disconnect caps, blind flanges, manway covers, outlet cap covers, and pipe caps
<b>CNG</b>	Compressed Natural Gas. Natural gas under pressures typically in excess of 3,000 psig.
<b>Coupler, Dry Quick Disconnect</b>	Female portion of a dry disconnect fitting that is attached to a hose.
<b>Crashworthiness</b>	Accident load cases that the tender must be capable of surviving.
<b>Design Maximum Fuel Level</b>	The maximum fuel level specified by fuel tank manufacturer.
<b>Dry Breakaway Fitting, Emergency</b>	A fitting designed to "break" or "pull apart" into separate parts automatically when a specified load is applied and with a <i>de minimis</i> amount of material released.
<b>Dry Quick Disconnect Fitting</b>	A fitting consisting of two parts, an adapter and a coupler, that allows flow when the two parts are joined and allows a <i>de minimis</i> amount of material to be released when the parts are manually disengaged.
<b>Dual Fuel Locomotive</b>	A locomotive designed to operate on both diesel and CNG at various



# Appendix B







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# **AAR Passenger Standards Group**

**David L. Cackovic**



# **AAR Passenger Car and Locomotive Acceptance TAG 2015**

## **Mission Statement**

**Develop an AAR Standard approach to address areas of concern including:**

- insuring operational safety,
- reducing risks, and
- improving operational efficiency

**regarding the introduction and operation of new-design passenger equipment (both passenger cars and passenger locomotives) on freight railroad track, particularly at typical freight railroad speeds (including low speeds).**

# AAR Passenger Car and Locomotive Acceptance TAG 2015

## ◆ A new standard(s) would be beneficial for:

- Safety (derailment prevention)
- New equipment waybill moves on revenue freight trains
- New equipment operated by psgr. operators on freight lines
  
- Mitigating network delays and interference with freight ops
- Growth in passenger operations on Class I Railroads



# AAR Passenger Car and Locomotive Acceptance TAG 2015 – VTI Subgroup

## Path Forward

- ◆ **Identify and prioritize issues for operating passenger equipment on North American freight railroads (up to 110 mph, but must include very low speeds below 15 mph) by:**
  - AAR Committee Meeting Approach
    - ▲ Class 1 Railroads
    - ▲ New Passenger Standards Technical Committee
    - ▲ Amtrak
    - ▲ APTA and Commuter RRs
    - ▲ FRA
    - ▲ AAR
  - Verbal input from meeting discussions, brainstorming, consensus
  - Background Research
    - ▲ Database searches on derailment causes (NTSB, FRA)
    - ▲ Current AAR Standards
    - ▲ Literature search of Government Agency Reports (US and Canada)





# AAR Passenger Car and Locomotive Acceptance TAG 2015

◆ The TAG met in June, and created six subtasks.

Major Topic	Existing FRA, PRIIA and APTA Stds	Access of Data	VTI Group -- Slow Speed Analysis, Testing, and TG Data for Compliance and Simulations	Shunt Testing	Interoperability	Roles in corridor testing of Class I's	Outreach
Description	Document current standards for completeness	Keeping the data propriety.	Chapter 11 testing, simulations, etc. needed beyond existing requirements for operating in freight track. <u>8/10/15 ADD TECHNICAL ASPECTS OF TRACK GEOMETRY DATA TO THIS GROUP'S TASKS</u>	Develop section for shunt testing -- static and dynamic	Shipping on C-I RR, Allign Control, PTC and Clearance, Brake Systems including handbrakes, CEM, Pushback Couplers, Canadian Regs.	When, how, what is the protocol for securing testing on freight railroads	Get the word out to passenger operators. Also need to contact Transport Canada and Via Rail.
Leader	<u>Gordon (FRA)</u>	<u>Gagarin (Interfleet)</u>	<u>Wilson (TTCI)</u>	<u>Cackovic (TTCI)</u>	<u>Bieber (STV)</u>	<u>Edgcumbe (Jacobs)</u>	<u>Schroeder (APTA)</u>

- The relatively simple tasks are almost drafts – i.e. one pagers for the standard for:
  - ▲ Existing FRA, PRIIA and APTA standards
  - ▲ Access of Track Geometry Data
  - ▲ Roles in Corridor Testing on Class I Railroads
  
- The difficult three tasks are below, and there is a lot of work to do:
  - ▲ Vehicle/Track Interaction – Slow Speed Testing Analysis
  - ▲ Loss of Shunt Performance Test Requirements
  - ▲ Interoperability Requirements

# AAR Passenger Car and Locomotive Acceptance TAG 2015 – VTI Subgroup

## ◆ Vehicle/Track Interaction – Testing and Analysis

- Identify testing and/or simulations required to demonstrate safe performance on FRA track classes 1 – 5 (up to 90 mph)
  - ▲ Any vehicle in passenger service excluding locomotives
  - ▲ Identify limiting VTI performance envelope
    - allow unrestricted movement on Freight RRs
    - identify track and/or operating conditions that limit performance and could restrict movements
- Operation on Track Classes 6 and up covered by FRA 213 Subpart G Track Standards (90 mph and faster)
- Reference existing passenger standards where ever possible
  - ▲ Avoid duplication and rework
  - ▲ Minimize burden on vehicle suppliers, vehicle owners and operators
  - ▲ APTA, FRA, FTA, and others (see also Slide 6)



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## ◆ Review of existing standards

- **FRA Vehicle/Track System Qualification requirements (previous slide) including Minimally Compliant Analytical Track (MCAT)**
  - ▲ 49 CFR Part 213.57(d) & 213.329(d) (lean test)
  - ▲ APTA SS-M-014-06 (wheel load equalization)
- **FRA low speed derailment advisory (Class 1 track issues)**
- **APTA Standards: enforcement is currently only by reference from other standards, car design/procurement specifications, etc.**
  - ▲ Mostly address performance below 20 mph (Class 1 track)
  - ▲ APTA SS-M-014-06 (wheel load equalization)
  - ▲ APTA PR-M-RP-009-98 (New Truck Design)
  - ▲ APTA SS-M-015-06 and SS-M-017-016 (wheel flange angle and tread taper)
  - ▲ Curving Safety Performance (under development by APTA PRESS)
- **There may be gaps in existing standards for operation at speeds 20 – 90 mph (FRA Track Classes 2 – 5)**
  - ▲ AAR Ch 11, M-976, S-2043 standards: what could be adapted to fill gaps?
  - ▲ Review derailment history to identify problem areas



# AAR Passenger Car and Locomotive Acceptance TAG 2015 – VTI Subgroup

## ◆ Review of Derailment Databases

- Identify significant problem areas
- TTCI reviewing NTSB and FRA data bases back to early 1980s
  - ▲ Identify derailments attributable to VTI issues
  - ▲ Review derailment reports
  - ▲ Databases likely to exclude some derailments
    - Below injury, damage and/or cost thresholds for required reporting
- APTA (Martin Schroeder) to ask members for input

## ◆ Use derailment information to help identify required tests and/or simulations

- Standard should also address other common/likely operational conditions





# AAR Passenger Car and Locomotive Acceptance TAG 2015 – VTI Subgroup

## ◆ Next steps

- Continue review of derailment data bases
  - ▲ Use information to help identify required tests and/or simulations for new AAR standard
- TTCI participation in APTA PRESS Curving Safety Performance Development
  - ▲ AAR passenger standard likely to reference it
- TTCI participation in FRA RSAC VTI meeting 11/20/15
- Begin drafting VTI test and/or simulation analysis requirements for Class 1-5 tracks up to 90 mph
  - ▲ Reference other standards where possible
  - ▲ Take information from past derailment history but also include other common/likely operational conditions



# AAR Freight VTI Performance Standards: Chapter 11 Performance Criteria

- ◆ Ch. 11 Criteria are similar to 49CFR Part 213.333
- ◆ S-2043 Criteria are more conservative than CH. 11

Table 11.1 Criteria for assessing the requirements for field service

Regime	Paragraph	Criterion	Limiting Value
Hunting (empty)	11.7.2	maximum lateral acceleration (g)	1.5 <sup>a/</sup>
		standard deviation of lateral acceleration (G)	0.13
Constant curving (empty and loaded)	11.7.3	95th percentile maximum wheel L/V	0.8
		95th percentile maximum axle sum L/V	1.5
Spiral (empty and loaded)	11.7.4	minimum vertical load (%)	10 <sup>b/</sup>
		maximum wheel L/V	1.0 <sup>c/</sup>
		maximum axle sum L/V	1.5 <sup>c/</sup>
Twist, roll (empty and loaded)	11.8.2	maximum roll (deg) <sup>a/</sup>	6
		maximum axle sum L/V	1.5 <sup>c/</sup>
		minimum vertical load (%)	10 <sup>b/</sup>
		dynamic augment acceleration (G)	1.0
		loaded spring capacity maximum (%)	95
Pitch, bounce (loaded) (empty at EEC discretion)	11.8.3	minimum vertical load (%)	10 <sup>b/</sup>
		dynamic augment acceleration (G)	1.0
		loaded spring capacity maximum (%)	95
Yaw, sway (loaded)	11.8.4	maximum L/V truck side	0.6 <sup>d/</sup>
		maximum axle sum L/V	1.5 <sup>c/</sup>
Dynamic curving (empty and loaded)	11.8.5	maximum wheel L/V	1.0 <sup>c/</sup>
		maximum axle sum L/V	1.5 <sup>c/</sup>
		maximum roll (deg) <sup>a/</sup>	6
		minimum vertical load (%)	10 <sup>c/</sup>





**THANK YOU**

