

**SECTION 20**

**SUPPLEMENTAL DRAWINGS**

**SECTION 20**

**SUPPLEMENTAL DRAWINGS**

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### 20.1 STANDARD CONNECTORS

Listed below are the standard connectors used for wayside services and inter-car connections. Please note Part numbers and suppliers are for known parts and equivalents may be used if approved by the Engineer.

#### **Trainline Connectors and Jumpers**

HEP Receptacle 3/3 Pyle-National P/N: RPC17-84P/96C-SE1794

HEP Plug 3/3 Pyle-National P/N: RPC11-168/180C-SE1793

Loc Control 27 Pin Receptacle Pyle-National P/N: P-201452-KCY

Loc Control 27 Pin Plug/Jumper Pyle-National P/N: P-201453-KCY-80

Car Control 27 Pin Receptacle Pyle-National P/N: P-201452-AKCR

Car Control 27 Pin Plug/Jumper Pyle-National P/N: P-201453-AKCR-80SE1935

#### **Air Hose Connectors**

Brake Pipe Coupling FP5-1-1/4 FPT

Main Reservoir Coupling LS-4 Gladhand-3/4 FPT

#### **Wayside Water Fill Nozzles**

1 inch, 316 stainless steel, Female NPT quick connect fitting Swagelok P/N: SS-QF16-B-16PF

#### **Wayside Waste Dump Connector**

3 inch, GFR Polypropylene, cam and groove connector McMaster-Carr P/N: 5535K16

#### **Wayside Biocide Fill Nozzles**

3/4 inch, stainless steel, Female NPT quick connect fitting Parker-Hannifin P/N: SH6-63

## SUPPLEMENTAL DRAWINGS

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### 20.2 SCRRA RECOMMENDED CLEANING PRODUCTS

Below is a table of cleaning products used by SCRRA.

<b>Part number</b>	<b>Description</b>	<b>Supplier</b>
47-000-00020	Cleaner, Carpet Clean Action II	Hillyard
47-047-00012	Cleaner, Carpet S-12	Alco
47-474-00025	Cleaner, Misty ready-steam carpets	Southend
47-743-03302	Cleaner, Vinyl, Neleco, "E-Clean"	Neleco
47-474-00027	Cleaner/degreaser "Super 101"	Selig
47-060-00174	Deodorant, Santi-Pak, powder	Celests
47-000-00128	Fabuloso, cleaner/dedorizer	Southend
47-000-00015	Liquid Gum-go	Hillyard
24-024-00002	Lysol	Southend
47-743-03004	Remover, Graffiti, Ink & Marker	Neleco
47-045-04708	Wax, Flo-flex, floor	Southend
36-363-00022	Windex, Anti-bacterial	Southend
SCJ-4265	Believe <sup>®</sup> Mass Transit Vehicle Cleaner	S.C. Johnson

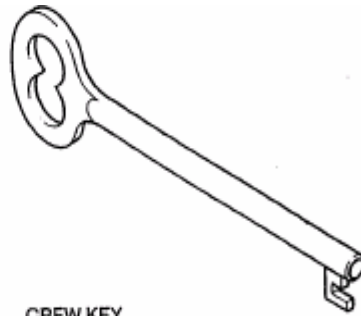
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### 20.3 SCRRA KEYS AND LOCATIONS

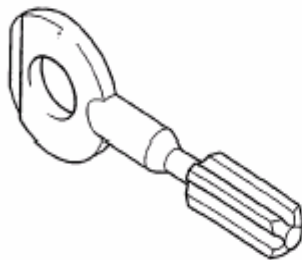
Shown below are key descriptions and locations at which they are used. For part number description, refer to Section 4.19.



- TOILET ROOM CONSUMABLES KEY**  
 TOILET SEAT LINER DISPENSER



- CREW KEY**  
 END DOORS  
 DOOR CONTROL STATIONS  
 CREW KEY SWITCHES INT/EXT



- MAINTENANCE/ACCESS KEY**
- A & B END A/C COMPARTMENTS
  - B END CB PANEL
  - A & B ENDS UPPER LEVEL RETURN AIR GRILLE
  - FIRE EXTINGUISHER COMPARTMENTS
  - DOOR CONTROL RELAY PANEL A END
  - B END A/C CONTROL PANEL
  - EMERGENCY EQUIPMENT LOCKERS
  - TOOLS, FIRE EXTINGUISHERS, FIRST AID KIT
  - DOOR OPERATOR LOCKERS
  - EMERGENCY BRAKE VALVE RESET LOCKERS
  - TOILET ROOM DOOR
  - BUILT-IN REFUSE CONTAINERS
  - PORTABLE END WARNING LIGHT LOCKER
  - TOILET ROOM INTERIOR ACCESS LOCKERS
  - PA AMPLIFIER LOCKER (UNDER TRIPLE SEATS)
  - EXTERIOR EMERGENCY BOX
  - DOOR

CONTRACT	STAFF KEY		MAINTENANCE		CUSTODIAL		CAB		TOILET	
	KEY	KEYHOLE	KEY	KEYHOLE	KEY	KEYHOLE	KEY	KEYHOLE	KEY	KEYHOLE
207 L.A.										

## SUPPLEMENTAL DRAWINGS

20.4

### SCRRRA SPECIFICATION NO. SPEC 99-001 ISSUED 8/12/99 SPECIFICATION FOR MOUNTING OF WHEEL AND AXLE ASSEMBLIES -SCRRRA MULTI-LEVEL COMMUTER CARS



#### EQUIPMENT DEPARTMENT SPECIFICATION SPECIFICATION NO. SPEC 99-001

##### Specification for Mounting of Wheel and Axle Assemblies - SCRRRA Multi-Level Commuter Cars

#### 1.0 INTENT

This Specification describes the scope of work for the assembly of wheel-axle sets, less brake discs, for Multi-Level Commuter Cars.

#### 2.0 GENERAL REQUIREMENTS

All work shall be performed in an AAR certified wheel shop having status 8A and 9 approval. All work listed herein shall comply with the requirements of the AAR Wheel and Axle Manual, Volume G, Part II, latest issue, any additional requirements listed in this Specification, and with BOMBARDIER drawing 20-110-001721. In case of conflict, the following precedence applies:

- This Specification, latest issue.
- AAR Wheel and Axle Manual.
- The latest revision of BOMBARDIER drawings:

20-110-001721 - Wheel and Axle Assembly  
20-110-001770 - Axle  
20-110-001783 - Wheel - Non-Disc  
20-110-001784 - Wheel - Disc  
09-110-000005 - Timken Bearing Housing  
09-110-000006 - Timken Bearing

#### 3.0 WORK STATEMENT

##### 3.1 Preparation

- 3.1.1 All wheel and axle assembly material shall be inspected immediately prior to assembly. Components with dimensions or finishes not consistent with the drawings or this Specification or with any physical damage shall be set aside in a secure area and held for SCRRRA disposition.

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## SUPPLEMENTAL DRAWINGS

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5.1 Measure the wheel plane runout at positions (2d) and (2p) on the wheel rim by dial indicator affixed to the stand. The wheel plane runout shall not exceed 0.015 inches T.I.R. (Total Indicated Runout). Record on Figure 3.

5.2 Measure the wheel radial runout at the wheel tread at positions 1d and 1p. The wheel radial runout shall not exceed .030 inch T.I.R. Record on Figure 3.

5.3 Measure the back-to-back dimensions of the wheelset at four positions 90° apart, on the wheel rim. The back-to-back dimensions shall comply with the BOMBARDIER drawings 20-110-001721. These dimensions shall be recorded on Figure 3 per Section 8.0 of this Specification. If the back-to-back dimensions do not fall within the specified tolerances, the wheels and bearings shall be pressed off and the components remeasured. Components which do not conform to the specified dimensions shall be rejected and replaced. Rejected material shall be handled in accordance with Section 6.0 of this Specification.

5.4 Measure the axle run-out T.I.R. at position 3, as shown on Figure 3.

The axle run-out shall not exceed .015 inch T.I.R. Record on Figure 3.

If the axle run-out exceeds the specified limit, the wheels and bearings shall be pressed off and the axle shall be scrapped.

5.5 The outside hub of the wheel without the disc brake mounting holes shall be stamped per Rule 1E11.

### 6.0 NON-CONFORMANCE

All components which are rejected shall be marked with an inspection tag and removed from the work area. The tag shall record the serial number and reason(s) for rejection.

An inspection report shall be prepared for each non-conforming item listing serial number and reason(s) for rejection. Copies of all inspection reports shall be forwarded to SCRRA.

Non-conforming components and damaged components shall be set aside in a secure area and held for SCRRA disposition.

### 7.0 REMOUNTS

Components which require remount because mounting pressures were not attained shall be thoroughly inspected for galling, scratching and other physical damage prior to remounting.

All remounts shall meet all the original mounting requirements.

## SUPPLEMENTAL DRAWINGS

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### 8.0 DOCUMENTATION

The following documentation shall be provided for each axle assembly:

- 8.1 Fit pressing graphs for bearings and wheels. Each fit pressing graph shall be identified with its respective wheel serial number and the wheel and bearings shall be identified as disc end and plain end as viewed on Figure 2.
- 8.2 A data sheet similar to Figure 3 of this Specification.
- 8.3 Originals of all forms and records required by Rule 1E1 and by this Specification shall be kept on file by the Contractor for a period of five years, and shall be accessible to SCRRA on 24 hours notice.

Records of inspection of shop tools and equipment required by Rule 1J1 shall be kept on file by the Contractor for a period of two years, and shall be accessible to SCRRA on 24 hours notice.

### 9.0 PACKAGING AND PRESERVATION

Exposed axle surfaces, marked with letter "C" on Figure 2 of this Specification, shall be uniformly coated with Chromac 420 black rust preventative.

The assemblies shall be stored and shipped in accordance with AAR Volume G, Part II, Section 3B.

### 10.0 QUALITY ASSURANCE

The purpose of the quality assurance program is to prove by inspection, testing, analysis and demonstration that the system will comply with the requirements of this Specification. The supplier shall present to SCRRA complete documentation of the quality assurance program to be placed into operation to verify compliance of the product in accordance with requirements of this Specification. This program shall be in accordance with the requirements of AAR Specification M-1003.

## SUPPLEMENTAL DRAWINGS

### FORM 2

#### BEARING BORE AND BEARING SEAT MEASUREMENTS

The journal bearing interference fit shall be a minimum of .0030 inch, and a maximum of .0045 inch. At a minimum, bearing cone diameters and the corresponding diameters of the bearing seats shall be measured at three locations on their length and at 120° points on the diameter, and the interference fit shall be within limits at all measured locations.

DISC SIDE	Bearing No. _____	Axle No. _____				
Bearing Bore	Diameter					
Location	1	2	3	4	5	6
0°	_____	_____	_____	_____	_____	_____
120°	_____	_____	_____	_____	_____	_____
240°	_____	_____	_____	_____	_____	_____
Bearing Seat	Diameter					
Location	1	2	3	4	5	6
0°	_____	_____	_____	_____	_____	_____
120°	_____	_____	_____	_____	_____	_____
240°	_____	_____	_____	_____	_____	_____
PLAIN SIDE	Bearing No. _____					
Bearing Bore	Diameter					
Location	1	2	3	4	5	6
0°	_____	_____	_____	_____	_____	_____
120°	_____	_____	_____	_____	_____	_____
240°	_____	_____	_____	_____	_____	_____

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# SUPPLEMENTAL DRAWINGS

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## FORM 2

Bearing Seat	Diameter					
Location	1	2	3	4	5	6
0°	_____	_____	_____	_____	_____	_____
120°	_____	_____	_____	_____	_____	_____
240°	_____	_____	_____	_____	_____	_____

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# SUPPLEMENTAL DRAWINGS

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## FORM 3

### WHEEL SEAT MEASUREMENTS

In accordance with Rule 1A7, the variation of any two of these measurements (on any one wheel) shall not exceed 0.002". If any taper does exist, the smaller diameter shall be at the outboard end of the wheel seat.

DISC WHEEL END                      Axle No. \_\_\_\_\_

Location	Diameter		
	Outboard	Midpoint	Inboard
0°	_____	_____	_____
180°	_____	_____	_____

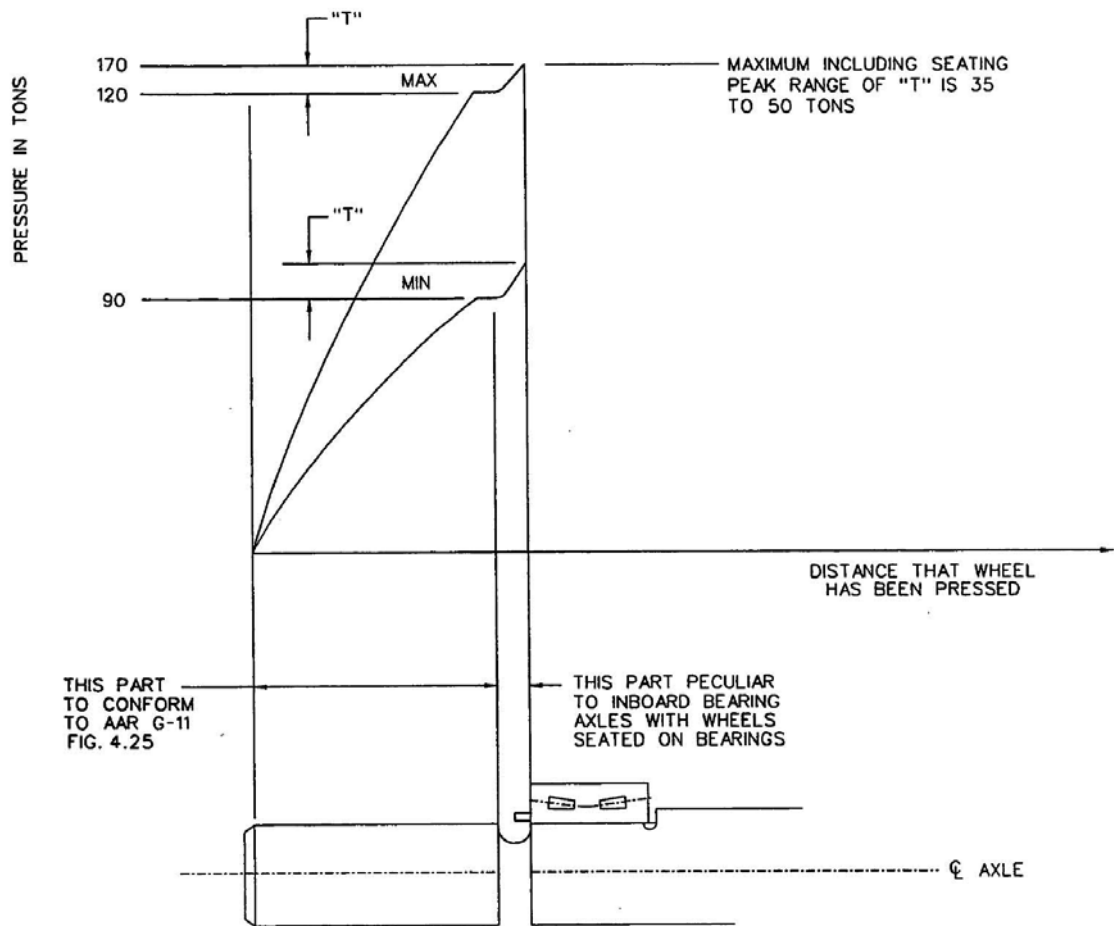
PLAIN WHEEL (SERIAL NO. STAMPING) END

Location	Diameter		
	Outboard	Midpoint	Inboard
0°	_____	_____	_____
180°	_____	_____	_____

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# SUPPLEMENTAL DRAWINGS

FIGURE 1



SCRR 599-001

**SUPPLEMENTAL DRAWINGS**

**FIGURE 3**

P. O. _____		DATE SHIPPED: _____		
WHEEL NO. _____		AXLE NO. _____	WHEEL NO. _____	
BEARING NO. _____		BEARING NO. _____		
Radial Runout TIR	Plane Runout TIR	Axle Runout TIR	Plane Runout TIR	Radial Runout TIR
1d	2d	3	2p	1p
<u>Bearing</u> Press Tons: _____ Seat tons: _____ Lateral Play: _____		<u>Back to Back</u> Position 1: _____ Position 2: _____ Position 3: _____ Position 4: _____	<u>Bearing</u> Press Tons: _____ Seat tons: _____ Lateral Play: _____	
<u>Wheel</u> Tape: _____ Bore Dia: _____ Interference: _____ Press Tons: _____ Seat tons: _____			<u>Wheel</u> Tape: _____ Bore Dia: _____ Interference: _____ Press Tons: _____ Seat tons: _____	
Rev. Date: Nil.		Date Assembled:	Inspector:	
SCRRR S99-003				



# 7 | Bar Code Module Setup

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CHAPTER

If the Bar Code Module is installed, PRM automatically prints bar code patterns on documents such as work orders, part receipt labels, and part bin labels. You can also use the Query/Report Generator to generate bar codes for any data item in the PRM database, including employee IDs, direct and indirect time codes, repair task IDs, and PM service codes.

This chapter lists the bar code characters that you can include in PRM codes (whether or not the Bar Code Module is installed) and describes the steps required to configure bar code wedges. No additional setup is required to use mobile devices.

The main sections include:

- *Acceptable Bar Code Characters* on page 162.
- *Configuration of Bar Code Wedges* on page 162.



## Acceptable Bar Code Characters

Whether or not the Bar Code Module is installed, many PRM codes must contain only valid bar code characters. Acceptable characters are:

- A–Z
- 0–9
- Hyphen (-)
- Period (.)
- Space
- Dollar sign (\$)
- Plus (+)
- Percent (%)

## Configuration of Bar Code Wedges

This module supports bar code wedges, attached to workstations, that are capable of reading bar codes created by PRM or other software. This section explains how to set up the organization's bar code wedges for use with PRM.

- 1 Connect the wedge to a Windows computer.
- 2 Open a text editor, such as Notepad.

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**Important:** Do *not* use a DOS window.

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- 3 Reset the wedge options and macros by scanning the following bar codes in the order in which they appear.

## SUPPLEMENTAL DRAWINGS

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**Note:** There is no screen output when you scan the bar codes to reset the wedge options and macros. A series of beeps indicates that the scan was successful.



Reset Options



Reset Macros

- 4 Specify the wedge settings for PRM by scanning the following bar codes in the order in which they appear.

**Note:** The order in which you scan the bar codes is crucial. Do *not* scan the codes out of sequence. If you accidentally miss or repeat any scan, you must restart from step 3.



Configured for PC/AT, PS/2

**Note:** If you use a contact scanner (light pen), the direction of the scan (right to left or left to right) determines how the wedge interprets the following bar codes. Scan the bar codes in the direction indicated by the arrow on the bar code's label.

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### Peregrine Rail Management

If you use a laser scanner, successive scans of the same bar code toggle the options on and off. Check the screen output generated by each scan to verify that the scan of the bar code generated the correct setting in the wedge.



Code 39 Concatenation  
← Enabled



Return After Bar Code  
← Disabled



Special Keys  
← Enabled



Full ASCII Code 39  
← Enabled

The bar code wedge can now read bar codes generated by the Peregrine Rail Management Bar Code Module.

## SUPPLEMENTAL DRAWINGS

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### 20.6 SCRRRA FLEET STOP DISTANCE AND BRAKE RATE SUMMARY

Listed below are summary tables of stop distance and brake rate data for the SCRRRA Fleet. Generation 3 test train consisted of F59PH Locomotive, three (3) Generation 3 Trailer Cars and one (1) Generation 1 Cab Car. Generation 2 test train consisted of F59PH Locomotive and four (4) Generation 2 Cab Cars.

#### Generation 3 Trailer Cars @ AWO (Source Report No. 214-TPR-8109, Rev. 2)

Description	Average Cab/ Locomotive Brake Rate (mph/s)	Average Trailer Car Brake Rate (mph/s)	Average Stopping Distance (ft.)	Average Entry Velocity (mph)
40 Mph Blended Full Service Brake	1.55	1.93	696	42.8
40 Mph Blended Emergency Brake	2.09	2.53	536	43
60 Mph Blended Full Service Brake	1.44	2.07	1275	60
60 Mph Blended Emergency Brake	1.89	2.91	818	57
80 Mph Blended Full Service Brake	1.52	1.92	2726	84.5
80 Mph Blended Emergency Brake	1.79	2.48	1939	81

#### Generation 3 Trailer Cars @ 154,000 lbs. (Source Report No. 214-TPR-8109, Rev. 2)

Description	Average Cab/ Locomotive Brake Rate (mph/s)	Average Trailer Car Brake Rate (mph/s)	Average Stopping Distance (ft.)	Average Entry Velocity (mph)
40 Mph Blended Full Service Brake	1.55	2.02	625	41.5
40 Mph Blended Emergency Brake	2.09	2.73	430	40
50 Mph Blended Full Service Brake	1.51	1.87	1101	53
50 Mph Blended Emergency Brake	2.01	2.33	793	50.2
60 Mph Blended Full Service Brake	1.44	1.88	1427	60.5
60 Mph Blended Emergency Brake	1.89	2.78	827	56
70 Mph Blended Full Service Brake	1.54	1.80	2082	71.5
70 Mph Blended Emergency Brake	1.82	2.43	1499	70.5
80 Mph Blended Full Service Brake	1.52	1.84	2518	79.5
80 Mph Blended Emergency Brake	1.79	2.38	2046	81.5

**SUPPLEMENTAL DRAWINGS**

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**Generation 2 Cab Cars @ AWO (Source Report No. 207-TPP-314.01, Rev. Nil)**

Description	Average Cab/ Locomotive Brake Rate (mph/s)	Average Cab Car Brake Rate (mph/s)	Average Stopping Distance (ft.)	Average Entry Velocity (mph)
40 Mph Blended Full Service Brake	1.39	2.01	566	39.4
40 Mph Blended Emergency Brake	1.95	2.44	481	40.0
60 Mph Blended Full Service Brake	1.45	1.95	1191	56.3
60 Mph Blended Emergency Brake	1.92	2.33	1114	59.5
80 Mph Blended Full Service Brake	1.41	1.84	2455	78.5
80 Mph Blended Emergency Brake	1.55	2.2	2173	80.75

**Generation 2 Cab Cars @ 154,000 lbs. (Source Report No. 207-TPP-314.01, Rev. Nil)**

Description	Average Cab/ Locomotive Brake Rate (mph/s)	Average Trailer Car Brake Rate (mph/s)	Average Stopping Distance (ft.)	Average Entry Velocity (mph)
40 Mph Blended Full Service Brake	1.39	1.93	670	42
40 Mph Blended Emergency Brake	1.95	2.44	493	41.1
50 Mph Blended Full Service Brake	1.38	1.93	988	51
50 Mph Blended Emergency Brake	1.91	2.33	818	51
60 Mph Blended Full Service Brake	1.45	1.85	1426	60
60 Mph Blended Emergency Brake	1.92	2.24	1268	62.5
70 Mph Blended Full Service Brake	1.54	1.80	2024	70.5
70 Mph Blended Emergency Brake	1.82	2.19	1711	71.5
80 Mph Blended Full Service Brake	1.41	1.88	2470	79.6
80 Mph Blended Emergency Brake	1.55	2.41	1956	80.2

## SUPPLEMENTAL DRAWINGS

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### 20.7 CEM RESEARCH BIBLIOGRAPHY

Listed below is a bibliography of CEM related research papers prepared for the FRA by the Volpe Center. The papers are sorted by year with the most recent papers presented first. The Volpe Center papers document the testing and research that has been performed to develop CEM technology, but is not to be considered a comprehensive list of all CEM research completed to date. The list of these documents and other Volpe Center research papers that have been published and presented from 1999 to 2005 is also available on the Volpe Center website at <HTTP://WWW.VOLPE.DOT.GOV/LIBRARY/PUBS.HTML>.

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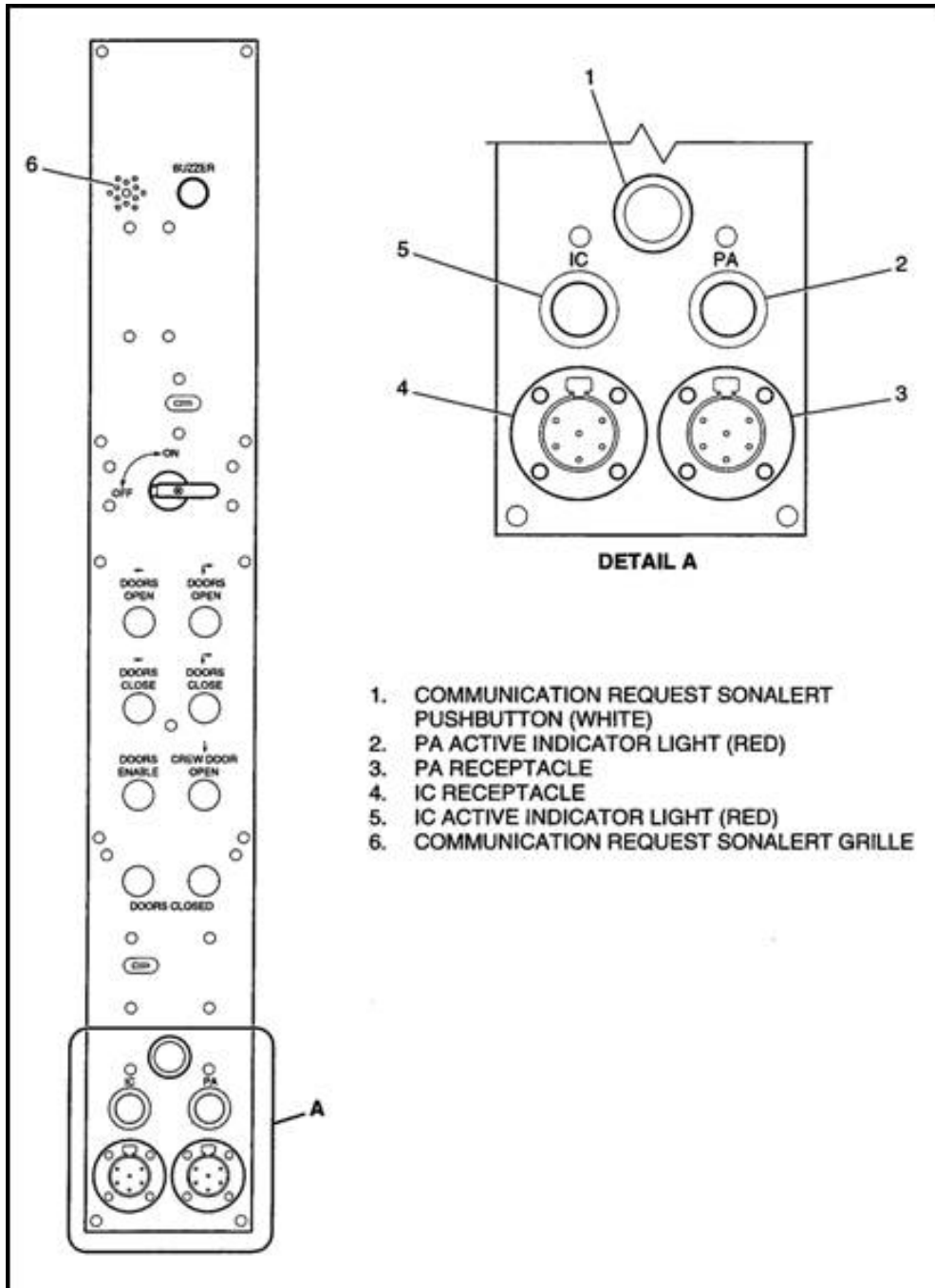
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SUPPLEMENTAL DRAWINGS

20.8

CREW COMMUNICATION STATION LAYOUT



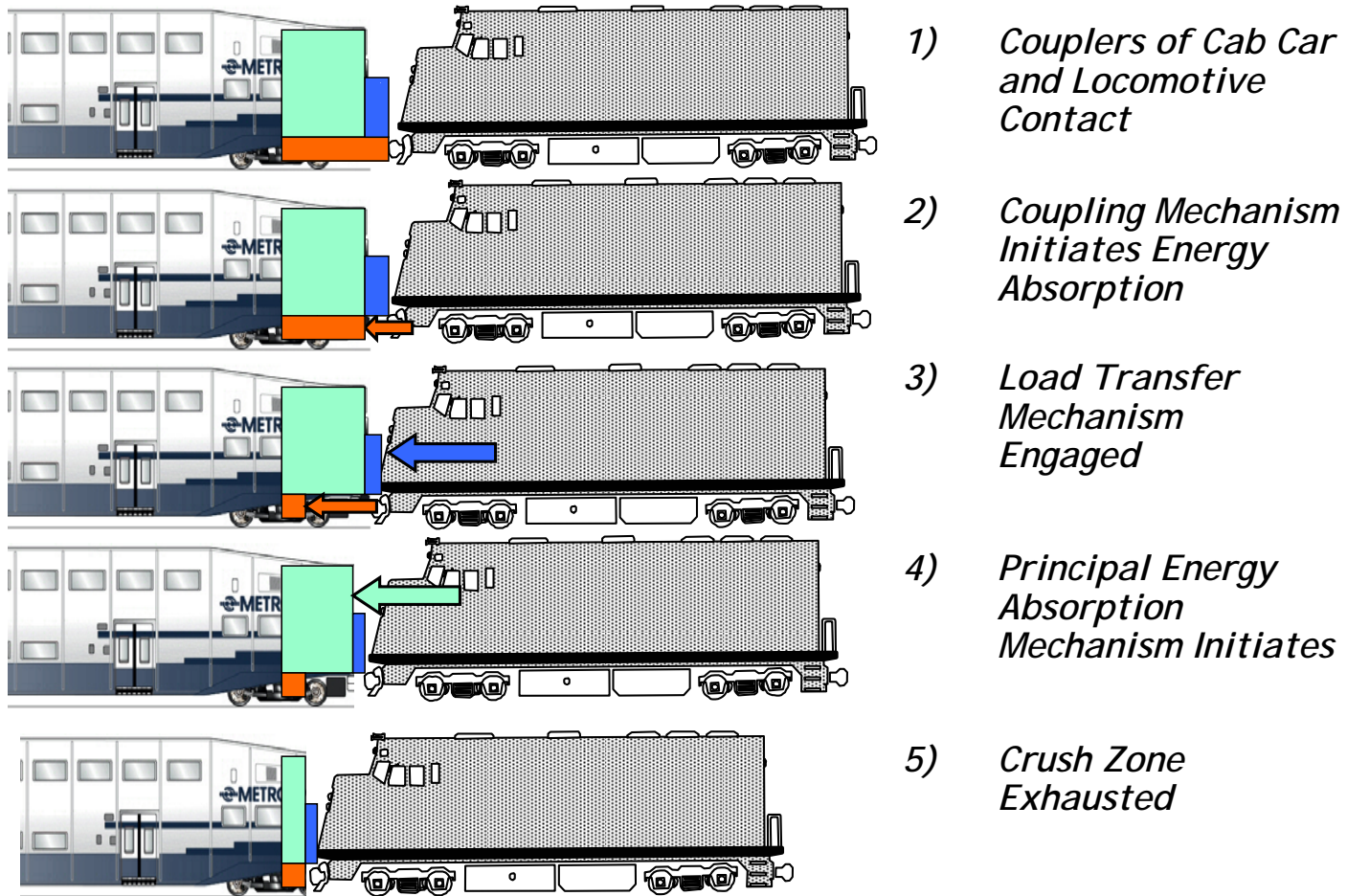
1. COMMUNICATION REQUEST SONALERT PUSHBUTTON (WHITE)
2. PA ACTIVE INDICATOR LIGHT (RED)
3. PA RECEPTACLE
4. IC RECEPTACLE
5. IC ACTIVE INDICATOR LIGHT (RED)
6. COMMUNICATION REQUEST SONALERT GRILLE

SUPPLEMENTAL DRAWINGS

20.9

CAB END INITIATION SEQUENCE

# Criterion: Prescribed Sequence



## SUPPLEMENTAL DRAWINGS

### 20.10 NON-CAB END INITIATION SEQUENCE

## Criterion: Prescribed Sequence



1) *Coupled Car Interaction*



2) *Coupling Mechanism Imitates Energy Absorption*



3) *End Frames Load Transfer Mechanism Engaged and Principal Energy Absorption Mechanism Initiates*



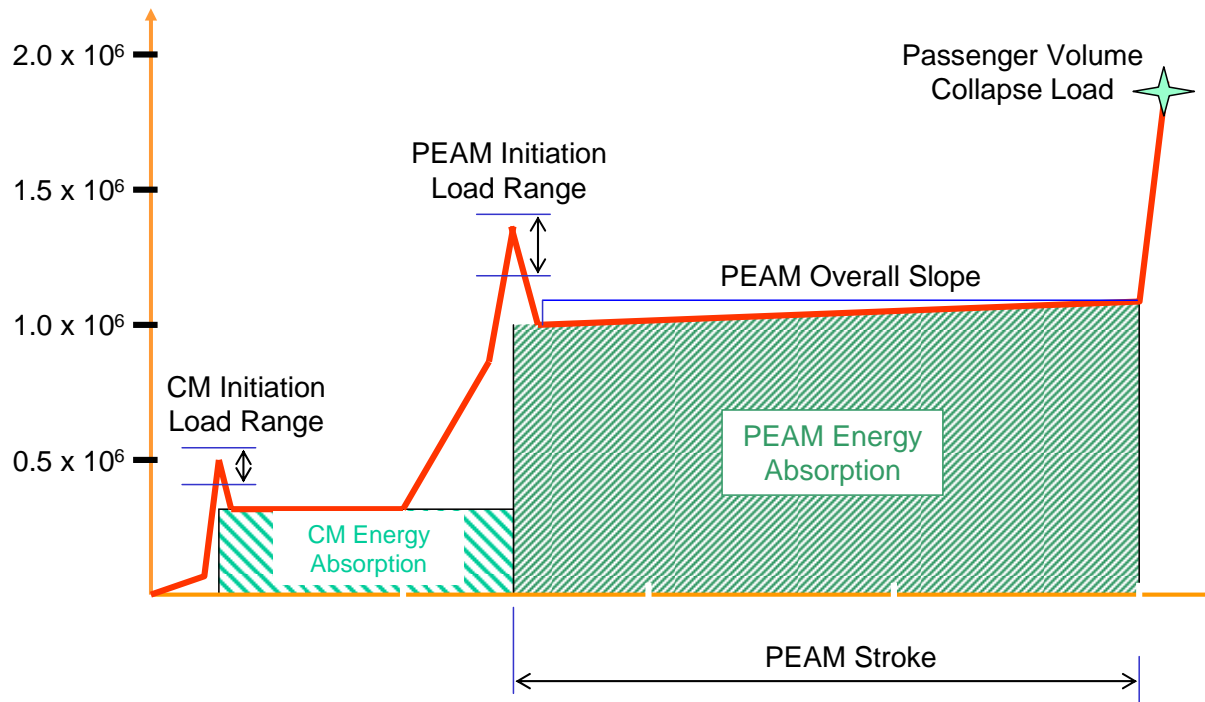
4) *Crush Zone Exhausted*

SUPPLEMENTAL DRAWINGS

20.11

CAB END IDEALIZED FORCE-CRUSH CHARACTERISTIC CURVE

## Example Criteria Values: Force-Crush Characteristic

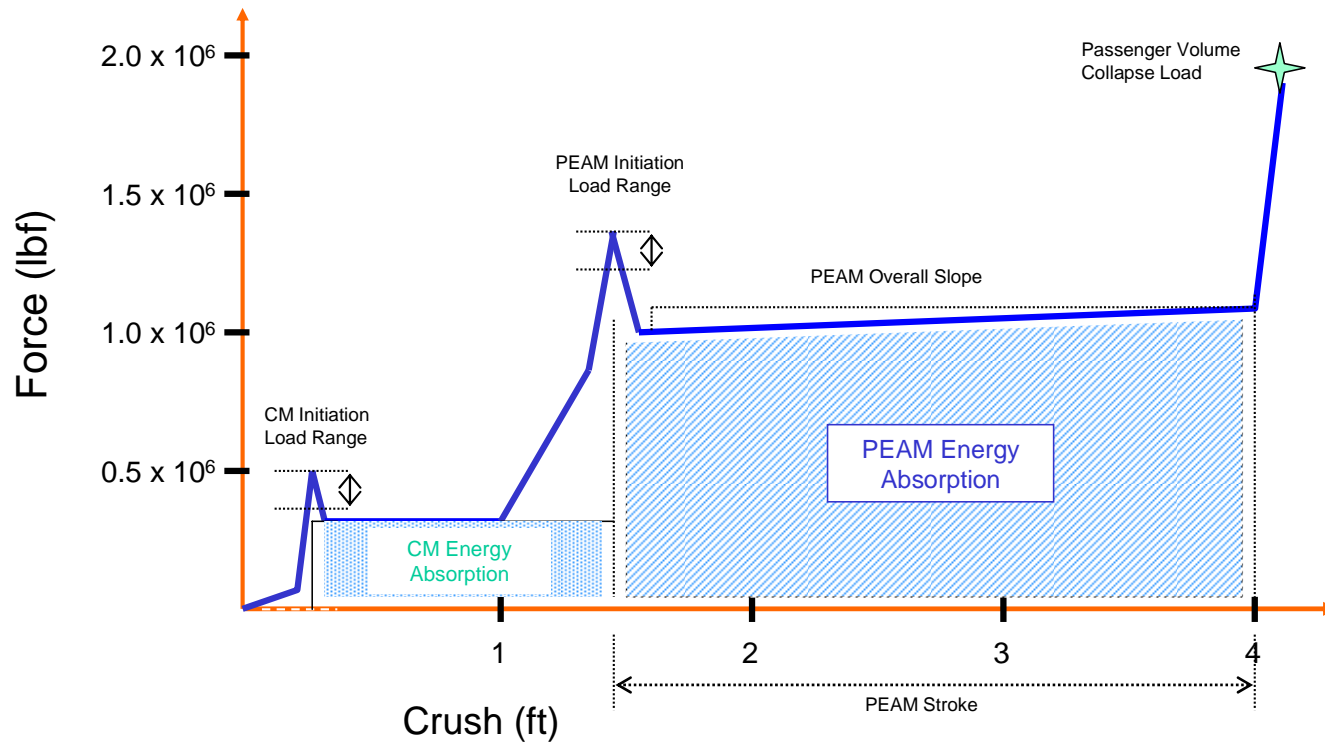


SUPPLEMENTAL DRAWINGS

20.12

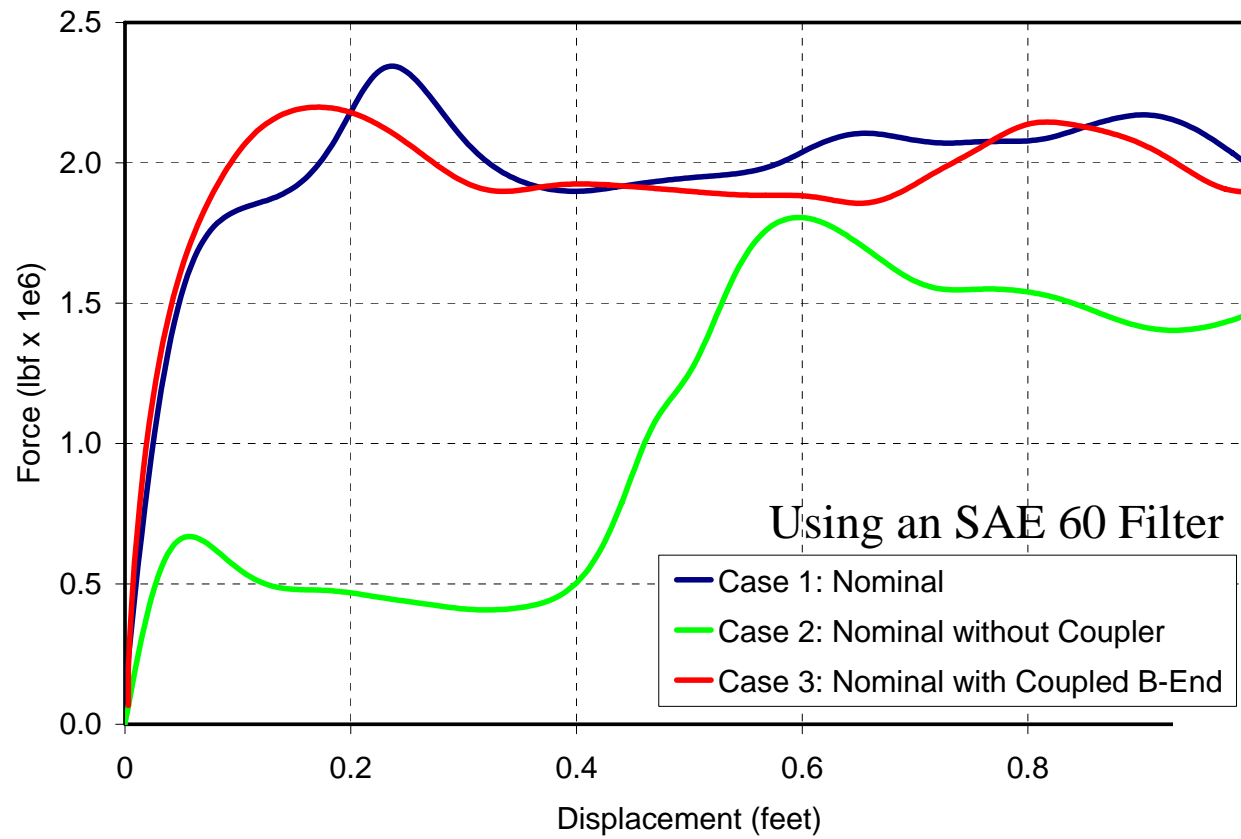
NON-CAB END IDEALIZED FORCE-CRUSH CHARACTERISTIC CURVE

# Target Force-Crush Characteristic: Non-Cab End





### Three Cases of Existing Fleet



SUPPLEMENTAL DRAWINGS

20.14 PROTECTED OPERATOR CAB SPACE

Criterion: Operator Volume

