This Section is presented in response to the Massachusetts Bay Transportation Authority’s Request for Proposal, Section B, Proposal Part B Tab I.3 – Past Performance and all Addenda.

I.3.a  Kawasaki’s Reliability Information

Kawasaki understands the Authority’s rationale for requesting the additional detail on vehicle and equipment reliability information which was added by Addendum 7, as a means of comparatively assessing the value provided by the proposers in terms of projected reliability, vehicle availability and the resulting reduction in life cycle costs for this project. Table I.3-1 illustrates Kawasaki’s reliability information for the past 10 years.

The Authority will note from this table, that Kawasaki’s cars invariably exhibit reliability that far exceeds the contractual requirements, which attests to Kawasaki’s excellent attention to design integrity, our rigorous focus on systems integration and our unparalleled control of quality, coupled with Kawasaki’s practice of selecting and working with the optimum subcontractors for the specific project.

I.3.b  Reliability of Proposed Major Subcontractors

In accordance with Addendum 7, Kawasaki has used our excellent working relationships with our proposed major subcontractors to provide the Authority with the requested subcontractor reliability data. As a result of this collaboration with our major subcontractors, Table I.3-2 illustrates the reliability of Kawasaki’s proposed major subcontractors for the past 10 years.

As the data collection process and raw data used by subcontractors is relatively similar throughout the North American transit industry, Kawasaki has provided representative information as illustrated by a sampling of four major subcontractors, in order to avoid unnecessary repetition. Refer to Appendix I.3-1.

It should also be noted that the requested customer concurrence letters were solicited by Kawasaki’s major subcontractors and due to the lack of response from these transit authorities, the only option that Kawasaki has is to refer the MBTA to the official point of contact for the various procurements.

I.3.c  Kawasaki’s Transportation Rail Car Contracts

Table I.3-3 provides project information for Kawasaki’s North American passenger transportation rail car contracts over the past 10 years.

The sheer volume of these major vehicle projects, coupled with the reputation of the transit authorities who saw fit to award these projects to Kawasaki, speaks volumes to Kawasaki’s established position in the US transit market, which is further highlighted by the number of repeat orders from these authorities. For details on Kawasaki’s US experience, including repeat orders, refer to Tab I.1.c.5 Carbody.
### TABLE I.3-1: KAWASAKI'S RELIABILITY INFORMATION

<table>
<thead>
<tr>
<th>Customer</th>
<th>Qty</th>
<th>Vendors</th>
<th>Description of Vehicle</th>
<th>Vehicle Type</th>
<th>Scope of Work</th>
<th>New or Existing Design?</th>
<th>Contractual Reliability Requirements</th>
<th>Actual Reliability Achieved (Current)</th>
<th>Actual Reliability Achieved (Warranty)</th>
<th>Reliability Met or Exceeded Req'nts?</th>
<th>Data Collection Process / Raw Data</th>
<th>Customer Concurrence Letter</th>
<th>Contract Details</th>
<th>Contract Duration</th>
<th>Status or Close Out Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Long Island Rail Road (LIRR)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James W. Allen</td>
<td>92</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M9 Project Manager Tel: 718-725-2625</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Washington Metropolitan Area Transit Authority (WMTA)</strong></td>
<td>528</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. David Ogunrinde Program Manager,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7000 Series Tel: 202-962-2347</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. New York City Transit (NYCT)</strong></td>
<td>506</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Kenneth Teu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director, Contract Administration, Car</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Engineering &amp; Technical Support Tel: 718-694-4481</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. New York City Transit (NYCT)</strong></td>
<td>660</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Kenneth Teu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Director, Contract Administration, Car</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Engineering &amp; Technical Support Tel: 718-694-4481</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Notes:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. New Orange and Red Line Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Kawasaki's reliability information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**New Orange and Red Line Vehicles RFP No. CAP 27-10**

**Part B – Technical Proposal**

**Tab I.3 Past Performance.doc**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro-North Railroad (MNR)</td>
<td>405</td>
<td>Kawasaki, Wabtec</td>
<td>L  W  H  Seats  Design Resp.  Vehicle Type  New or Existing Design?</td>
<td>85$  106&quot;  143&quot;  A-Car  111  B-Car  101  S-Car  114  In-house lead, not subcontracted  M-8 Electric Commuter Rail Car</td>
<td>150,000 miles MDBF</td>
<td>282,087 as of Dec 31, 2013</td>
<td>282,087 as of Dec 31, 2013</td>
<td>Yes  Field reporting / NA</td>
<td>N/A  In progress</td>
<td>Aug, 2006  In progress</td>
<td></td>
</tr>
<tr>
<td>Port Authority Trans-Hudson Corporation (PATH)</td>
<td>350</td>
<td>Kawasaki, Wabtec</td>
<td>51&quot;  93&quot;  11&quot;  A-Car  30  C-Car  34  PA-5 Rapid Transit Car</td>
<td>In-house lead, not subcontracted</td>
<td>180,000 miles MDBF</td>
<td>Not reported to Kawasaki</td>
<td>660,000 (12-month) as of Apr 30, 2013</td>
<td>Yes  Field reporting / NA</td>
<td>N/A  In progress</td>
<td>May, 2005  In progress</td>
<td></td>
</tr>
<tr>
<td>New York City Transit (NYCT)</td>
<td>600</td>
<td>Kawasaki, Wabtec</td>
<td>612.5&quot;  103.2&quot;  142.7&quot;  40  R142A &amp; R142S Subway Car</td>
<td>In-house lead, not subcontracted</td>
<td>100,000 miles MDBF</td>
<td>Not reported to Kawasaki</td>
<td>260,013 (12-month) as of Nov 30, 2005</td>
<td>Yes  Field reporting / NA</td>
<td>N/A  64 months</td>
<td>July, 1997  R142A  12/4/06  R142S  1/19/08</td>
<td></td>
</tr>
<tr>
<td>New York City Transit (NYCT)</td>
<td>212</td>
<td>Kawasaki, Wabtec</td>
<td>722.5&quot;  120&quot;  145.5&quot;  44  R143 Subway Car</td>
<td>In-house lead, not subcontracted</td>
<td>100,000 miles MDBF</td>
<td>Not reported to Kawasaki</td>
<td>250,303 (12-month) as of Dec 31, 2004</td>
<td>Yes  Field reporting / NA</td>
<td>N/A  55 months</td>
<td>Dec., 1998  1/10/08</td>
<td></td>
</tr>
<tr>
<td>Massachusetts Bay Transportation Authority (MBTA)</td>
<td>75</td>
<td>Kawasaki, Wabtec</td>
<td>1024&quot;  120&quot;  186.2&quot;  185  641</td>
<td>In-house lead, not subcontracted</td>
<td>None specified</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Field reporting / NA</td>
<td>N/A  38 months</td>
<td>April 2003  In progress</td>
<td></td>
</tr>
</tbody>
</table>

*Samples of the raw defect history data are included in Appendix I.3-1 to this section.*
<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Proposed Major Subcontractor</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vancouver; NTP 2006;</td>
<td>Mike Belyea, Vehicle Project Administrator</td>
<td>604-927-4452</td>
<td>MTBF: 2,000 hours</td>
<td>Not available (NA)</td>
<td>5,041 hours (as of January 2012)</td>
<td>Data collected from field site and car builder reports. Method of reliability calculation: MTBF = Mean Time Between Failures - components. MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: N/A</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>IGBT-based AC Propulsion System, Automated Rail Transit (ART) System (Linear Induction Motors)</td>
<td><a href="mailto:Mike.belyea@gov.bc.ca">Mike.belyea@gov.bc.ca</a></td>
<td></td>
<td>Definition of failures: Not known</td>
<td>Warranty period: 24 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kuala Lumpur; NTP 2007; IGBT-based AC Propulsion System, Automated Rail Transit (ART) System (Linear Induction Motors)</td>
<td>Khairani Mohamed, Chief Executive Officer</td>
<td>+603 7625 6822</td>
<td>MTBF: 5,000 hours</td>
<td>11,712 hours (as of November 2013)</td>
<td>5,524 hours (as of May 2013)</td>
<td>Data collected from field site and car builder reports. Method of reliability calculation: MTBF = Mean Time Between Failures - components. MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: N/A</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:Mike.belyea@gov.bc.ca">Mike.belyea@gov.bc.ca</a></td>
<td></td>
<td></td>
<td>Definition of failures: Not known</td>
<td>Warranty period: 24 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kuala Lumpur; NTP 2007; IGBT-based AC Propulsion System, Automated Rail Transit (ART) System (Linear Induction Motors)</td>
<td><a href="mailto:Mike.belyea@gov.bc.ca">Mike.belyea@gov.bc.ca</a></td>
<td></td>
<td>MTBF: 5,000 hours</td>
<td>11,712 hours (as of November 2013)</td>
<td>5,524 hours (as of May 2013)</td>
<td>Data collected from field site and car builder reports. Method of reliability calculation: MTBF = Mean Time Between Failures - components. MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: N/A</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>Kuala Lumpur; NTP 2007; IGBT-based AC Propulsion System, Automated Rail Transit (ART) System (Linear Induction Motors)</td>
<td><a href="mailto:Mike.belyea@gov.bc.ca">Mike.belyea@gov.bc.ca</a></td>
<td></td>
<td>MTBF: 5,000 hours</td>
<td>11,712 hours (as of November 2013)</td>
<td>5,524 hours (as of May 2013)</td>
<td>Data collected from field site and car builder reports. Method of reliability calculation: MTBF = Mean Time Between Failures - components. MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: N/A</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>Propulsion</td>
<td>Rocket; TTC; NTP 2007; IGBT-based AC Propulsion System, Heavy Rail Vehicles (HRV)</td>
<td>Mr. Kam T. Kwek</td>
<td>416-393-3608</td>
<td>MTBF: 3,800,000 miles (6,115,506 km)</td>
<td>2,094,819 km (as of February 2014)</td>
<td>Still in warranty</td>
<td>Data collected from field site and car builder reports. Method of reliability calculation: MTBF = Mean Distance Between Train Delay (5 min delay in service) MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: Only reliability failure at this point is a zero velocity relay outside of the propulsion system but supplied by BTPC. Each failure requires waiting for a technician.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>Bangkok; TRC; NTP 2010; IGBT-based AC Propulsion System, Heavy Rail (HRV)/Commuter Trains</td>
<td>Chui Y. C., Director – Rolling Stock Division</td>
<td>886-2-2893-0105 Ext. 8660</td>
<td>MTBF: 30,600 hours</td>
<td>34,850 hours</td>
<td>Still in warranty</td>
<td>Data collected from field site. Method of reliability calculation: MTBF = Mean Distance Between Train Delay - components. MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: N/A</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>Bangkok; TRC; NTP 2010; IGBT-based AC Propulsion System, Heavy Rail (HRV)/Commuter Trains</td>
<td>Chui Y. C., Director – Rolling Stock Division</td>
<td>886-2-2893-0105 Ext. 8660</td>
<td>MTBF: 30,600 hours</td>
<td>34,850 hours</td>
<td>Still in warranty</td>
<td>Data collected from field site. Method of reliability calculation: MTBF = Mean Distance Between Train Delay - components. MIL-STD 217F Notice 2/ MIL-STD 785 Sample of the raw defect history data: N/A</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>Metco</td>
<td>MNR M-7</td>
<td>LIRR/MNR Bombardier</td>
<td>Kevin Filippazzi, 450-441-3003</td>
<td>MDBCFC 200,000 miles</td>
<td>N/A</td>
<td>358,410 miles (as of Nov, 2013)</td>
<td>Provided by carbuilder (carbuilder monitors failure during revenue service)</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>MNR M-7</td>
<td>LIRR/MNR Bombardier</td>
<td>Kevin Filippazzi, 450-441-3003</td>
<td>MDBCFC 200,000 miles</td>
<td>N/A</td>
<td>358,410 miles (as of Nov, 2013)</td>
<td>Provided by carbuilder (carbuilder monitors failure during revenue service)</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>Kawasaki</td>
<td>Dan Alcantara, 914-376-4700</td>
<td></td>
<td>MDBCFC 200,000 miles</td>
<td>MDBCFC 500,000 miles (as of Nov, 2013)</td>
<td>NA (end of warranty period is 2019)</td>
<td>Provided by carbuilder (carbuilder monitors failure during revenue service)</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>System / Subsystem</td>
<td>Proposed Major Subcontractor</td>
<td>Project Name</td>
<td>Customer</td>
<td>Contractual Reliability Requirements</td>
<td>Reliability Achieved (Current)</td>
<td>Reliability Achieved (end of Warranty Period)</td>
<td>Data Collection Process / Raw Data*</td>
<td>Customer Concurrence</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>WMATA 5000</td>
<td></td>
<td>Ken Morford</td>
<td><a href="mailto:kmorford@wmata.com">kmorford@wmata.com</a></td>
<td></td>
<td>Achieved Reliability data is held by CAF and the transit authority, as part of the Failure Review Board. Knorr’s estimated MDBF, based on the contractual requirements, is: 46,724 miles Average speed: 10.8 mph</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>J Skonieczny</td>
<td>Toronto Rocket</td>
<td>Ken Morford</td>
<td><a href="mailto:kmorford@wmata.com">kmorford@wmata.com</a></td>
<td></td>
<td>Achieved Reliability data is held by Bombardier and the transit authority, as part of the Failure Review Board. Knorr’s estimated MBDTD, based on the contractual requirements, is: 2,540,843 miles Average speed: 10 mph</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>WMATA 6000</td>
<td></td>
<td>Ken Morford</td>
<td><a href="mailto:kmorford@wmata.com">kmorford@wmata.com</a></td>
<td></td>
<td>Achieved Reliability data is held by Alstom and the transit authority, as part of the Failure Review Board. Knorr’s estimated MDBF, based on the contractual requirements, is: 113,288 miles Average speed: 21.1 mph</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>NYCT R142</td>
<td></td>
<td>M. Wetherall, Chief Mechanical Officer</td>
<td>718-694-4460</td>
<td></td>
<td>Achieved Reliability data will be held by Kawasaki and the transit authority, as part of the Failure Review Board. Knorr’s estimated MDBCF, based on the contractual requirements, is: Friction Brake System: 179,893 miles Pneumatic System: 397,663 miles Average speed: 15 mph</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
</tbody>
</table>

**Definition of failures:** An event resulting in the inability to perform an intended function as designed or specified.

**Contractual Warranty period:** 2 years from car acceptance or 3 years from date equipment is shipped from Knorr Brake Company, whichever occurs first.

**Achieved Reliability data is held by CAF and the transit authority, as part of the Failure Review Board.**

**Data collected from Transit Authority Method of reliability calculation:** MIL-STD-756

**Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.**
<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Proposed Major Subcontractor</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
</table>
|                    |                               | NYCT R142A / R142S | NYCT | M. Wetherall, Chief Mechanical Officer 718-694-4460 | MDBC = 60,000 miles  
MDBF = 719,424 miles | N/A | Wabtec's Estimate:  
MDBC = 94,740 miles  
MDBF = 1,204,815 miles | N/A | Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided. |
|                    |                               | NYCT R143 | NYCT | M. Wetherall, Chief Mechanical Officer 718-694-4460 | MDBC = 71,840 miles  
MDBF = 719,424 miles | N/A | Wabtec's Estimate:  
MDBC = 103,020 miles  
MDBF = 1,197,767 miles | N/A | Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided. |
|                    |                               | NYCT R160 | NYCT | M. Wetherall, Chief Mechanical Officer 718-694-4460 | MDBC = 60,000 miles  
MDBF = N/A | N/A | MDBC = 151,864 miles  
N/Y | N/A | Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided. |
|                    | MBTA #5 Blue Line | MBTA | MBTA | S. Adkins, Chief Mechanical Officer sadkins@mbta.com, 617-293-4635 | MDBC = 60,000 miles  
MDBF = N/A | N/A | Wabtec's Estimate:  
MDBF = 94,925 miles |
|                    | PATH PA5 | PATH | PATH | D. Dreisbach Program Manager 973-350-2854 | MDBC = 60,000 miles  
MDBF = N/A | N/A | MDBC = 81,194 miles  
N/Y | N/A | Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided. |

**Fuji**

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Proposed Major Subcontractor</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
</table>
| Auxiliary Power System (including LVPS & Auxiliary Power Inverter) | 10kVA, Static Converter MNR M.7 | Carbuilder Bombardier | End customer: Long Island Rail Road (LIRR) | 180,000 miles | 1 181 106 miles  
(18h/day; 365 day/year; 35mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |
| SEPBA | 8kVA, Static Converter MNR M.7 | Carbuilder Bombardier | End customer: Long Island Rail Road (LIRR) | 180,000 miles | 1 041 456 miles  
(18h/day; 365 day/year; 35mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |
| | 10kVA, Static Converter MNR M.7 | Carbuilder Bombardier | End customer: Metro North, (MNR) | 180,000 miles | 2 127 428 miles  
(18h/day; 365 day/year; 35mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |
| | 8kVA, Static Converter MNR M.7 | Carbuilder Bombardier | End customer: Metro North, (MNR) | 180,000 miles | 3 204 221miles  
(18h/day; 365 day/year; 35mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |
| | 6.5kVA LVPS | Overhaul | End customer: NYCTA | 120,000 miles | 2 985 14 miles  
(20h/day/360day/year; 18mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |
| | 6.5kVA | Overhaul | End customer: NYCTA | 120,000 miles | 2,651,6330 miles  
(20h/day/360day/year; 18mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |
| | 54kVA PATH PA5 | Carbuilder KRC | End customer: PATH - Port Authority of NY & Nj | 75,000 miles | 814 766.35 miles  
(24/h/day;360/day/year15 mph) | N/A | SAP tool and W- G00059 procedure | Customer Concurrence Letter not available |

**SEPSA**

Data to follow later in the procurement process.
<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Proposed Major Subcontractor</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luminator</td>
<td>WMATA 7000</td>
<td>Kawasaki</td>
<td>Carlo Danesi, 914-376-4700</td>
<td>MDBF = 400,000 miles MDBD= 4,000,000 miles</td>
<td>MTBF (in hours) 6.256269E+04 MDBF (MTBF x avg 15 mps) in miles 9.384404E+05</td>
<td>Not yet in Warranty</td>
<td>Prediction performed by Luminator</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>Lighting (not including lamps)</td>
<td>Houston LRV</td>
<td>CAF</td>
<td>Lisa Brady, 607-737-3011</td>
<td>MDBCF 350,000 miles MDBTD 1,000,000 miles</td>
<td>MDBCF (MTBF x avg 25 mph in miles) 2.161155E+06 MTBF (in hours) 8.646196E+05</td>
<td>Not yet in Warranty</td>
<td>Prediction performed by Luminator</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>TDG</td>
<td>Metrolinx / GO Transit BiLevel, Bombardier Transportation, 2014, Supply of the Interior Lighting System</td>
<td>GO Transit Water Spear</td>
<td>416-253-1303 ext 4693 (Bombardier Transportation)</td>
<td>MDBCF ≥ 2,000,000 car miles MTBF ≥ 58,824 hours (based on average speed of 34 MPH) Definition of failures: Single component failure Warranty period: Two years, equipment replacement Failure analysis within 30 days Reliability demonstration program</td>
<td>No data – system not in service yet.</td>
<td>Not yet in Warranty</td>
<td>TDG records data when a field failure is reported to TDG. Use failure data of product with similar circuitry to determine MTBF. Apply MTBF value to specific system with specific instances of the core circuitry. No failures on similar circuitry to date.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>King Abdullah Financial District Monorail Project, Bombardier Transportation, 2012, Supply of the Interior and Exterior Lighting System</td>
<td>Bombardier Transportation Sol Donagi-Perez</td>
<td>613-384-3103 <a href="mailto:sol-donagi.perez-allende@mx.transport.bombardier.com">sol-donagi.perez-allende@mx.transport.bombardier.com</a></td>
<td>MDBF ≥ 4,000,000 km (based on average speed of 20 KPH) MTBF ≥ 200,000 car hours Definition of Failures: Failure which reduces light intensity below minimum. Warranty period: Two years, equipment replacement MTTR ≤ 0.5 hours Failure analysis as required.</td>
<td>No failures to date. MTBF calculated at 7,884,000 hours to date.</td>
<td>No failures to date.</td>
<td>TDG records data when a field failure is reported to TDG. Use failure data of product with similar circuitry to determine MTBF. Apply MTBF value to specific system with specific instances of the core circuitry. No failures on similar circuitry to date.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td></td>
<td>ART MK III Platform, Bombardier Transportation, 2011, Supply of the Interior and Exterior Lighting System</td>
<td>Bombardier Transportation Sol Donagi-Perez</td>
<td>613-384-3103 <a href="mailto:sol-donagi.perez-allende@mx.transport.bombardier.com">sol-donagi.perez-allende@mx.transport.bombardier.com</a></td>
<td>MDBF ≥ 8,000,000 km (based on average speed of 40 KPH) MTBF ≥ 200,000 car hours Definition of Failures: Failure which reduces light intensity below minimum. Warranty period: Two years, equipment replacement MTTR ≤ 0.5 hours Failure analysis as required.</td>
<td>No failures to date. MTBF calculated at 3,431,000 hours to date.</td>
<td>No failures to date.</td>
<td>TDG records data when a field failure is reported to TDG. Use failure data of product with similar circuitry to determine MTBF. Apply MTBF value to specific system with specific instances of the core circuitry. No failures on similar circuitry to date.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>System / Subsystem</td>
<td>Proposed Major Subcontractor</td>
<td>Project Name</td>
<td>Customer</td>
<td>Contractual Reliability Requirements</td>
<td>Reliability Achieved (Current)</td>
<td>Reliability Achieved (end of Warranty Period)</td>
<td>Data Collection Process / Raw Data*</td>
<td>Customer Concurrence Letter</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>HVAC System</td>
<td>Merak NA</td>
<td>WMATA 6000</td>
<td>Ken Morford <a href="mailto:kmorford@wmata.com">kmorford@wmata.com</a></td>
<td>MDBF: HVAC: 76,923 miles HVAC Controls: 156,250 miles Definition of failures: An event resulting in the inability to perform an intended function as designed or specified. Contractual Warranty period: 2 years from car acceptance or 3 years from date equipment is shipped from Knorr Brake Company, whichever occurs first.</td>
<td>Current (post warranty) achieved Reliability data is held by Alstom and the transit authority, as part of the Failure Review Board. Achieved Reliability data is held by CAF and the transit authority, as part of the Failure Review Board. Merak’s estimated MDBF, based on the contractual requirements, is: HVAC: 134,971 miles HVAC Controls: 174,520 miles Average speed: 10.8 mph.</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WMATA 6000</td>
<td>Ken Morford <a href="mailto:kmorford@wmata.com">kmorford@wmata.com</a></td>
<td>MDBF: HVAC: 76,923 miles HVAC Controls: 156,250 miles Definition of failures: An event resulting in the inability to perform an intended function as designed or specified. Contractual Warranty period: 2 years from car acceptance or 3 years from date equipment is shipped from Knorr Brake Company, whichever occurs first.</td>
<td>Current (post warranty) achieved Reliability data is held by Alstom and the transit authority, as part of the Failure Review Board. Achieved Reliability data is held by CAF and the transit authority, as part of the Failure Review Board. Merak’s estimated MDBF, based on the contractual requirements, is: HVAC: 211,345 miles HVAC Controls: 322,449 miles Average speed: 21.1 mph.</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WMATA 7000</td>
<td>Ken Morford <a href="mailto:kmorford@wmata.com">kmorford@wmata.com</a></td>
<td>MDBF: 200,000 Definition of failures: An event resulting in the inability to perform an intended function as designed or specified. Contractual Warranty period: 2 years from car acceptance or 3 years from date equipment is shipped from Knorr Brake Company, whichever occurs first.</td>
<td>These cars have not entered revenue service, as they are currently undergoing type testing.</td>
<td>Not Applicable</td>
<td>Data collected from Transit Authority Method of reliability calculation: MIL-STD-756</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided.</td>
</tr>
<tr>
<td>Melco</td>
<td>MNR M-5</td>
<td>Metro North Railroad</td>
<td>KRC</td>
<td>Dan Alcantara 914-376-4700</td>
<td>MDBC 200,000 Miles</td>
<td>MDBCF 358,410 Miles (as of November 2013)</td>
<td>NA (Warranty has not ended)</td>
<td>Official Information from Car-builder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New Jersey Transit Bombardier</td>
<td>NJT Multilevel</td>
<td></td>
<td>MDBC 320,000 Miles</td>
<td>MDBF 415,901 Miles (as of August 2011)</td>
<td>MDBF 415,901 Miles (as of August 2011)</td>
<td>Official Information from Car-builder</td>
</tr>
<tr>
<td>System / Subsystem</td>
<td>Proposed Major Subcontractor</td>
<td>Project Name</td>
<td>Customer</td>
<td>Contractual Reliability Requirements</td>
<td>Reliability Achieved (Current)</td>
<td>Reliability Achieved (end of Warranty Period)</td>
<td>Data Collection Process / Raw Data*</td>
<td>Customer Concurrence Letter</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------</td>
<td>--------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Doors and Door Controls</td>
<td>NYCT R142 / R142S</td>
<td>1030 Cars</td>
<td>Bruce Alexander, Director, Car Systems Engineering</td>
<td>MBDCF 60,000 miles MDF 320,000 miles</td>
<td>at end of warranty</td>
<td>1-year: Nov 2004 - Oct 2005 MDF 2,500,000 miles</td>
<td>Refer to Appendix I.3-3.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td></td>
<td>NYCT R143</td>
<td>212 Cars</td>
<td>Bruce Alexander, Director, Car Systems Engineering</td>
<td>MBDCF 45,000 miles MDF 240,000 miles</td>
<td>at end of warranty</td>
<td>1-year: Nov 2004 - Oct 2005 MDF 1,200,000 miles</td>
<td>Refer to Appendix I.3-3.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td></td>
<td>NYCT R140</td>
<td>1102 Cars</td>
<td>Bruce Alexander, Director, Car Systems Engineering</td>
<td>MBDCF 45,000 miles MDF 150,000 miles</td>
<td>1-year: Feb 2011 - Jan 2012 MDF 180,326 miles</td>
<td>Not at end of warranty</td>
<td>Refer to Appendix I.3-3.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td></td>
<td>LIRR M-7</td>
<td>906 Cars</td>
<td>John Gariti, Sr. Manager, MoE PM</td>
<td>MBDCF 140,000 miles MDF 2,000,000 miles MDF 4,000,000 miles</td>
<td>at end of warranty</td>
<td>1-year: Aug 2007 - July 2008 MDF 180,400 miles</td>
<td>Refer to Appendix I.3-3.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td></td>
<td>PATH</td>
<td>350 Cars</td>
<td>Mark Barberash, Project Manager</td>
<td>MBDCF 60,000 miles</td>
<td>1-year: Aug 2012 - July 2013 MDF 131,163 miles</td>
<td>Not at end of warranty</td>
<td>Refer to Appendix I.3-3.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td></td>
<td>CTA 5000</td>
<td>Robert Kielba, Chief Rail Equipment Engineer</td>
<td>none specified</td>
<td>1-year: Feb 2013 - Jan 2014</td>
<td>Not at end of warranty</td>
<td>Refer to Appendix I.3-3.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
<td></td>
</tr>
</tbody>
</table>

Fuji

Data to follow later in the procurement process.

Vapor

NYCT R142

Bruce Alexander, Director, Car Systems Engineering

718 694-4485

MBDCF 60,000 miles

MDF 320,000 miles

at end of warranty

1-year: Nov 2004 - Oct 2005 MDF 2,500,000 miles

Refer to Appendix I.3-3.

NYCT R142A / R142S

Bruce Alexander, Director, Car Systems Engineering

718 694-4485

MBDCF 60,000 miles

MDF 320,000 miles

at end of warranty

1-year: Nov 2004 - Oct 2005 MDF 1,200,000 miles

Refer to Appendix I.3-3.

NYCT R143

Bruce Alexander, Director, Car Systems Engineering

718 694-4485

MBDCF 45,000 miles

MDF 240,000 miles

at end of warranty

1-year: Nov 2004 - Oct 2005 MDF 675,000 miles

Refer to Appendix I.3-3.

NYCT R140

Bruce Alexander, Director, Car Systems Engineering

718 694-4485

MBDCF 45,000 miles

MDF 150,000 miles

1-year: Feb 2011 - Jan 2012 MDF 180,326 miles

Not at end of warranty

Refer to Appendix I.3-3.

LIRR M-7

John Gariti, Sr. Manager, MoE PM

718 558-4877

MBDCF 140,000 miles

MDF 2,000,000 miles

MDF 4,000,000 miles

at end of warranty

1-year: Aug 2007 - July 2008 MDF 180,400 miles

Refer to Appendix I.3-3.

PATH

Mark Barberash, Project Manager

973 350-2854

MBDCF 60,000 miles

1-year: Aug 2012 - July 2013 MDF 131,163 miles

Not at end of warranty

Refer to Appendix I.3-3.

CTA 5000

Robert Kielba, Chief Rail Equipment Engineer

none specified

1-year: Feb 2013 - Jan 2014

Not at end of warranty

Refer to Appendix I.3-3.

LIRR M-7

906 Cars

4 Doorways per Car

John Gariti, Sr. Manager, MoE PM

718 558-4877

MBDCF 140,000 miles

MDF 2,000,000 miles

MDF 4,000,000 miles

at end of warranty

1-year: Aug 2007 - July 2008 MDF 180,400 miles

Refer to Appendix I.3-3.

PATH

350 Cars

6 Doorways per Car

Mark Barberash, Project Manager

973 350-2854

MBDCF 60,000 miles

1-year: Aug 2012 - July 2013 MDF 131,163 miles

Not at end of warranty

Refer to Appendix I.3-3.

CTA 5000

Robert Kielba, Chief Rail Equipment Engineer

none specified

1-year: Feb 2013 - Jan 2014

Not at end of warranty

Refer to Appendix I.3-3.
<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Proposed Major Subcontractor</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>706 Cars 4 Doorways per Car</td>
<td></td>
<td>847 962-5164</td>
<td>MMBCF 60,879 miles</td>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td>Refer to Appendix I.3-3.</td>
</tr>
<tr>
<td>MNR M-8 405 Cars 4 Doorways per Car</td>
<td></td>
<td>Amir Rahimi, Project Manager 212 499-4408</td>
<td>MDBCF 140,000 miles MDBSF 2,000,000 miles MDBF 4,000,000 miles</td>
<td></td>
<td></td>
<td></td>
<td>Not at end of warranty</td>
<td></td>
</tr>
<tr>
<td>Cab Equipment and Controls</td>
<td>Kawasaki</td>
<td>PATH PA5</td>
<td>Mr. Thomas H. Rowbottom, Superintendent (973) 350-3913</td>
<td>Communication</td>
<td>MDBCF: 500,000 miles MDBSF: 5,000,000 miles MDBF: 5,000,000 miles</td>
<td>End of warranty</td>
<td>See attached: P007606-02 RCR.pdf P005594 RCR.pdf P0055910 RCR.pdf</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td>Axion</td>
<td></td>
<td>0821 M-7</td>
<td>Long Island Railroad / Metro-North Railroad (Bombardier) Yatin Khurana <a href="mailto:yatin.khurana@ca.transport.bombardier.com">yatin.khurana@ca.transport.bombardier.com</a></td>
<td>Communication</td>
<td>MDBCF: 500,000 miles MDBSF: 5,000,000 miles MDBF: 5,000,000 miles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0405 M-8</td>
<td>Metro-North Railroad (Kawasaki) Dan Alcantara <a href="mailto:alcantara@kawasakirailcar.com">alcantara@kawasakirailcar.com</a></td>
<td>Communication</td>
<td>MDBCF: 350,000 miles MDBSF: 3,000,000 miles</td>
<td>November 2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications (including signs, but not CCTV cameras &amp; recorders)</td>
<td>SEPAS</td>
<td>PIS Izmir</td>
<td>Metro Izmir - Turkey</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV Izmir</td>
<td>Metro Izmir - Turkey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIS Recife</td>
<td>Metro Recife - Brasil</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV Recife</td>
<td>Metro Recife - Brasil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIS – CPTM2 0</td>
<td>CPTM</td>
<td>25000km/train</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV – CPTM120</td>
<td>CPTM</td>
<td>20,000h</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIS – PPP5000</td>
<td>CPTM</td>
<td>72685km/train</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV – PPP5000</td>
<td>CPTM</td>
<td>2500h for overall cameras and 4000 for the rest of the CCTV equipment</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CESIS- MDE</td>
<td>RENFE</td>
<td>17 950h</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CESIS- 2008</td>
<td>RENFE</td>
<td>19 131.6h</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trainlines and Networks (includes coupler pins)</td>
<td>Kawasaki</td>
<td>PATH PA5</td>
<td>Mr. Thomas H. Rowbottom, Superintendent (973) 350-3913</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data Collection Process / Raw Data* indicates the methods used for collecting data and the availability of raw data.

Data Collection Process:
- Field reporting
- See attached:
  - P007606-02 RCR.pdf
  - P005594 RCR.pdf
  - P0055910 RCR.pdf

Customer Concurrence Letter:
- Not available
- In lieu of letters agency point of contact is provided
- Provided

Customer Concurrence Letter Details:
- See attached:
  - P004449 RCR.pdf
  - P005593 RCR.pdf
  - P005512 RCR.pdf
<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Proposed Major Subcontractor</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="Kawasaki Logo" /></td>
<td>Massachusetts Bay Transportation Authority</td>
<td>New Orange and Red Line Vehicles</td>
<td>RFP No. CAP 27-10</td>
<td><img src="image" alt="Part B – Technical Proposal" /></td>
<td><img src="image" alt="Tab I.3 Past Performance.doc" /></td>
<td>12 of 18</td>
<td>May 15, 2014</td>
</tr>
<tr>
<td>System / Subsystem</td>
<td>Proposed Major Subcontractor</td>
<td>Project Name</td>
<td>Customer</td>
<td>Contractual Reliability Requirements</td>
<td>Reliability Achieved (Current)</td>
<td>Reliability Achieved (end of Warranty Period)</td>
<td>Data Collection Process / Raw Data*</td>
<td>Customer Concurrence Letter</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------</td>
<td>-----------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>MR-73 Vehicle Cab Signaling</td>
<td>STM Montreal</td>
<td>MDBF: 3,586,550 km/car MTBF: 12,456</td>
<td>N/A</td>
<td>N/A</td>
<td>Data Collection Process: FRCAP Method of Reliability Calculation: MIL-217</td>
<td>Customer Concurrence Letter not available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melco</td>
<td>MIN/COT Kawasaki Dan Alcantara 914-376-4700</td>
<td>MDBCF 200,000 miles MDBSF 5,000,000 miles</td>
<td>MDBCF: 1,209,633 miles MDBSF: 9,677,067 miles (as of Nov, 2013)</td>
<td>N/A (end of warranty period is 2019)</td>
<td>Provided by carbuilder (carbuilder monitors failure during revenue service)</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quester</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Monitoring System including Vehicle Monitoring Display</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Multilevel II Cars (100 Cars) Monitoring &amp; Diagnostic System</td>
<td>NJT (Bombardier) Dak Murthy Director, Quality Assurance (201) 955-5783</td>
<td>168,000 miles MDBF (Bombardier)</td>
<td>Estimated reliability: 545,000 miles MDBF</td>
<td>N/A - Still in warranty period</td>
<td>4 warranty failures for 100 Cars entering revenue service in one year (2013). Estimated hours of service: 50 cars average over 1 year @ 12hours/day = 216,000 hours Estimated fleet mileage @10mph = 2,160,000 miles</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detroit People Mover - HMU Replacement (12 Cars) Health Monitor Unit</td>
<td>Detroit People Mover Barbara Husman General Manager (313) 224-2190</td>
<td>No requirement (DPM)</td>
<td>No warranty repairs to date.</td>
<td>N/A- Still in warranty period</td>
<td>53 Cars in revenue service. No warranty repairs to date. Estimated hours of service: 53 cars average over 6 months. @ 12hours/day = 116,070 hours Refer to Appendix I.3-3</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Rapid Transit Cars (120 Cars) Central Diagnostic System</td>
<td>SEPTA (Hyundai Rotem) Charlie Tuzzo, Engineering Manager, Operations Division (215) 580-8624</td>
<td>No contractual requirement (SEPTA) Target: 400,000 Miles (Hyundai Rotem)</td>
<td>Estimated: 788,000 miles MDBF</td>
<td>N/A - Still in warranty period</td>
<td>10 warranty claim failures from start of warranty to last car entering revenue service (3 years), avg. =3 per yr. Estimated hours of operation: 60 cars average over 3 years @ 12hrs/day = 788,000 hrs Estimated fleet mileage @10mph = 7,884,000 miles</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Multilevel Cars (160 Cars)</td>
<td>AMT (Bombardier)</td>
<td>168,000 miles MDBF</td>
<td>Estimated:</td>
<td>Estimated:</td>
<td>15 warranty failures in last year of warranty (2012)</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Data Collection Process / Raw Data:
- FRCAP: Failure Reporting, Corrective Action, and Prevention
- FRACAS: Failure Reporting, Analysis, and Corrective Action System
### System / Subsystem

#### Monitoring & Diagnostic System
- **Project Name:** New Orange and Red Line Vehicles
- **Customer:** Massachusetts Bay Transportation Authority
- **Proposed Major Subcontractor:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>New Orange and Red Line Vehicles</td>
<td>Massachusetts Bay Transportation Authority</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>New BLV Vehicles</td>
<td>Massachusetts Bay Transportation Authority</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Trucks
- **Project Name:** PATH PAS
- **Customer:** Mr. Thomas H. Rowbottom, Superintendent

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>PATH PAS</td>
<td>Mr. Thomas H. Rowbottom, Superintendent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### NEWC
- **Project Name:** New Line Passenger Cars
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>New BLV Vehicles</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### New BLV Vehicles
- **Project Name:** New BLV Vehicles
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>New BLV Vehicles</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### NEWC
- **Project Name:** NEWC
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>NEWC</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### NEWC
- **Project Name:** NEWC
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>NEWC</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### NEWC
- **Project Name:** NEWC
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>NEWC</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### NEWC
- **Project Name:** NEWC
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>NEWC</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### NEWC
- **Project Name:** NEWC
- **Customer:** New BLV Vehicles

<table>
<thead>
<tr>
<th>System / Subsystem</th>
<th>Project Name</th>
<th>Customer</th>
<th>Contractual Reliability Requirements</th>
<th>Reliability Achieved (Current)</th>
<th>Reliability Achieved (end of Warranty Period)</th>
<th>Data Collection Process / Raw Data*</th>
<th>Customer Concurrence Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring &amp; Diagnostic System</td>
<td>NEWC</td>
<td>New BLV Vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System / Subsystem</td>
<td>Proposed Major Subcontractor</td>
<td>Project Name</td>
<td>Customer</td>
<td>Contractual Reliability Requirements</td>
<td>Reliability Achieved (Current)</td>
<td>Reliability Achieved (end of Warranty Period)</td>
<td>Data Collection Process / Raw Data*</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>---------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>NYCT R143</td>
<td>M. Wetherall, Chief Mechanical Officer 718-694-4460</td>
<td>MDBCF = N/A MDBF = N/A</td>
<td>N/A</td>
<td>Wabtec’s Estimate:MDBCF = 3,048,780 milesMDBF = 38,461,545 miles</td>
<td>N/A</td>
<td>NYCT R160 actual reliability information received directly from the carbuilder report. The data was last received for July 2011. Data may include NDF’s within the systems, and Wabtec was not involved in determining responsibility of the reported failures.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td>NYCT R160</td>
<td>M. Wetherall, Chief Mechanical Officer 718-694-4460</td>
<td>MDBSCF = N/A MDBF = N/A</td>
<td>N/A</td>
<td>MDBSCF = 1,877,587 miles</td>
<td>N/A</td>
<td>NYCT R160 actual reliability information received directly from the carbuilder report. The data was last received for July 2011. Data may include NDF’s within the systems, and Wabtec was not involved in determining responsibility of the reported failures.</td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
<tr>
<td>PATH P05</td>
<td>Mr. Thomas H. Rowbottom, Superintendent (973) 350-3913</td>
<td>MDBF = N/A</td>
<td>N/A</td>
<td>Wabtec’s Estimate:MDBF = 1,727,116 miles (A-Car)MDBF = 1,149,425 miles (C-Car)</td>
<td>N/A</td>
<td></td>
<td>Customer Concurrence Letter not available, in lieu of letters agency point of contact is provided</td>
</tr>
</tbody>
</table>

Whole Car Refer to Table I.3.1

*Samples of the raw defect history data are included in Appendix I.3-1 to this section.
<table>
<thead>
<tr>
<th>Contractual Schedule</th>
<th>Actual Schedule</th>
<th>Customer</th>
<th>Vehicle Type</th>
<th>Pilot Prod Manuals Spare Parts Special Tools Pilot Prod Manuals Spare Parts Special Tools</th>
<th>Delays? Liquidated Damages?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Long Island Rail Road (LIRR)</td>
<td>M-9 Electric Commuter Rail Car</td>
<td>11/15/2017 6/1/2018 Not applicable Not applicable Not applicable (ongoing) Not applicable (ongoing)</td>
<td>Not applicable Not applicable (ongoing) (ongoing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Washington Metropolitan Area Transit Authority (WMATA)</td>
<td>7000 Series Subway Car</td>
<td>8/15/2014 2/15/2014 Not applicable 8/15/2014</td>
<td>Not applicable (ongoing) (ongoing) Not applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New York City Transit (NYCT)</td>
<td>R188 Subway Car</td>
<td>No pilot cars required To be determined December, 2013</td>
<td>Not applicable (ongoing) Not applicable (ongoing) Not applicable December, 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metro-North Railroad (MNR)</td>
<td>M-8 Electric Commuter Rail Car</td>
<td>1/31/2010 6/30/2013 Not applicable Not applicable Not applicable 6/10/2011</td>
<td>Ongoing Ongoing Ongoing Ongoing</td>
</tr>
</tbody>
</table>

Due to Hurricane Sandy in October 2012, the qualification testing on the base R188 cars and the remaining option cars has been impacted and as a consequence, a new testing schedule is under discussion.

Although the issues currently being mitigated by Kawasaki and the Railroad on this project, in 2013 Kawasaki was awarded the M-9 contract, the next generation of this series of vehicles. Refer to item 1 above. This shows the continued confidence of the Railroad in Kawasaki's ability to deliver innovative vehicles of the highest quality. Commercial issues are still under discussion at the time of this proposal submission and the Contractual Schedule still may be changed.

None None None None None
<table>
<thead>
<tr>
<th>Customer</th>
<th>Vehicle Type</th>
<th>Contractual</th>
<th>Schedule</th>
<th>Actual</th>
<th>Delays?</th>
<th>Liquidated Damages?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pilot Prod</td>
<td>Manuals</td>
<td>Spare Parts</td>
<td>Special Tools</td>
<td>Pilot Prod</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R142A 12/31/99</td>
</tr>
<tr>
<td>New York City Transit (NYCT)</td>
<td>R142A &amp; R142S Subway Car</td>
<td>R142A 12/31/99</td>
<td>R142A 8/30/02</td>
<td>R142S Not applicable</td>
<td>3/4/05</td>
<td>Final Drafts Delivery with 1st unit 12/31/99</td>
</tr>
<tr>
<td>New York City Transit (NYCT)</td>
<td>R143 Subway Car</td>
<td>2/21/01</td>
<td>6/13/02</td>
<td>Final Drafts Delivery with 1st unit 5/10/01</td>
<td>Approx. 1 year prior to acceptance of 1st unit</td>
<td>10/04</td>
</tr>
<tr>
<td>Massachusetts Bay Transportation Authority (MBTA)</td>
<td>FC451, FC633 &amp; FC641 Bi-Level Commuter Rail Coach</td>
<td>12/04</td>
<td>10/05</td>
<td>Complete drafts with delivery of the advance coaches and prior to maintenance training</td>
<td>10/04</td>
<td>Delivery of special tools to be made at one or more Boston area sites to be designated in future</td>
</tr>
</tbody>
</table>
APPENDIX I.3-1: RAW DEFECT HISTORY DATA SAMPLES

Refer to the attached samples provided by the following vendors:

- Axion
- Quester
- SEPSA
- Vapor
**Coût de réparation / Repair Cost**

<table>
<thead>
<tr>
<th>Nom client / Customer</th>
<th>Contact</th>
<th>Bon commande / Purchase order</th>
<th>Transporteur / Carrier</th>
<th>Numéro compte / Account number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bomb MNR Croton</td>
<td>N.SUAREZ</td>
<td>WO-20040</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># RMA</th>
<th>Numéro de pièce client / Serial number</th>
<th>Description</th>
<th>Numéro de pièce / Part number</th>
<th>Quantité / Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>P005512</td>
<td>957</td>
<td>0045 COMMUNICATION CONT PANEL</td>
<td>9000585</td>
<td>1</td>
</tr>
</tbody>
</table>

**Description du problème / Problem description**

IC/PA FUNCTION ON ENGINEERS SIDE NOT TRANSMITTING

**Réparations / Repairs**

None

**Modification et révision / Modification and revision**

None

**Réparations sous garantie / Repairs under warranty**

R/R DEFECTIVE MICROPHONE WITH NEW ONE, TESTED OK REV-F

<table>
<thead>
<tr>
<th># Pièce / Part #</th>
<th>Description</th>
<th>Quantité / Quantity</th>
<th>Coûts / Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0045 COMMUNICATION CONT PANEL</td>
<td>1</td>
<td>Main d’œuvre / Labor (h)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Commentaires / Comments**

**Accepté par / Accepted by**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tax Id</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fax: 1 (418) 856-5978 Courriel / E-mail : RMAResquest@axiontech.ca
Bon commande / Purchase order: 
Transporteur / Carrier: 
Numéro compte / Account number: 

Accepté par / Accepted by: 
Date: 
Tax Id: 

Bon réparation / PO for repair: 
RMNC client / Customer NCR: 

Unité unable to accept incoming PEI call

Réparations sous garantie / Repairs under warranty:
J-1 on the 8100951 BRD was not crimped properly; replaced J-1; tested; work as required; config - OK; unit at rev "F"
Coût de réparation / Repair Cost

Nom client / Customer: Bomb MNR Croton
# RMA: P007606-02
Numéro de pièce client / Customer part number: 84100153S
Description / Description: 045M COMMUNICAT CONT UNIT (B)

Contact / PEDRO MALDONADO
Bon original / Original PO
Numéro de série / Serial number: 1
RMNC client / Customer NCR: WO-78158

Responsabilité / Liability
Client / Customer: Axion Technologies

Description du problème / Problem description
PA/PEI SYSTEM ACTING ERRATICLY

Réparations / Repairs
None

Modification et révision / Modification and revision
None

Réparations sous garantie / Repairs under warranty
DONE DM-5525. TAKE CONFIG. TEST CCU AND FUNCTIONS ACCORDING TO TEST. REV = A

# Pièce / Part #: Description / Quantité / Quantity / Coûts / Cost ($) / Main d’œuvre / Labor (h)

Pièces / Parts: $0.00
Main d’œuvre / Labor: $0.00
Transport / Shipping: $0.00
Total: $0.00 USD

Compéter et retourner par fax ou par courriel / Complete and return by fax or by e-mail.
Fax: 1 (418) 856-5978 Courriel / E-mail: customerservice@pocatec.com
Coût de réparation / Repair Cost

Nom client / Customer: MTA Metro North Rail R. 
# RMA: PL004449 
Numéro de pièce / Part number: 9000595 
Numéro de pièce client / Customer part number: 24699033N 
Description: 0045 SIDE DESTINATION SIGN 
Bon réparation / PO for repair: 
RMNC client / Customer NCR: PCT#32729 
Responsabilité / Liability: Client / Customer

Description du problème / Problem description:
LED BLOCKS STAY ON WITH SYSTEM OFF. SEND ON OCT. 2011 UNDER RMA PL004296- MRV-14543

Réparations / Repairs:
The ribbon connectors have been replaced. Let the unit run under load for 2 hours with no failures. Took configuration. The sign tests good as per routine test procedure.

Modification et révision / Modification and revision:
None

Réparations sous garanti / Repairs under warranty:
None

# Pièce / Part # | Description | Quantité / Quantity | Coûts / Cost ($) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0045 SIDE DESTINATION SIGN</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Main d’œuvre / Labor (h) | Total |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.00</td>
<td>$0.00 USD</td>
</tr>
</tbody>
</table>

Bon commande / Purchase order: 
Transporteur / Carrier: 
Numéro compte / Account number: 

Compléter et retourner par fax ou par courriel / Complete and return by fax or by e-mail.
Coût de réparation / Repair Cost

Nom client / Customer : KAWASAKI
# RMA : PL005910
Numéro de pièce / Part number : 2101476
Numéro de pièce client / Customer part number : 24403-03577

Description / Description : CIRC 060 ANG P FC PK
PO for repair / Bon réparation : RMNC client / Customer NCR : M8-14-1801

Responsabilité / Liability : Axion Technologies

Description du problème / Problem description:
FAR REQUESTED: THIS PLUG KIT CAME IN WITH A BACKSHELL CLAMP BROKEN IN TWO.

Réparations / Repairs:
None

Modification et révision / Modification and revision:
None

Réparations sous garantie / Repairs under warranty:
CLAMP HAS BEEN REPLACED

# Pièce / Part # | Description | Quantité / Quantity | Coûts / Cost ($) |
--- | --- | --- | --- |
Main d'œuvre / Labor : $0.00
Main d'œuvre / Labor (h) |

Total : $0.00 USD

Compléter et retourner par fax ou par courriel / Complete and return by fax or by e-mail.
Fax: 1 (418) 856-5978 Courriel / E-mail : RMARequest@axiontech.ca
Coût de réparation / Repair Cost

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantité</th>
<th>Coûts / Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0821 SIDE DESTINATION SIGN</td>
<td>1</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

LOOSE HARDWARE THAT CANNOT BE TIGHTENED DOWN WITHOUT OPENING THE BACK OF THE UNIT.

Réparations / Repairs
None

Modification et révision / Modification and revision
None

Réparations sous garantie / Repairs under warranty
ADJUSTED LOWER CENTER 1/4 TURN BRACKET + UNIT TESTED AND FUNCTIONS AS PER ROUTINE TEST PROCEDURE + ALL 1/4 TURNS ARE GOOD + LOADED V 2.01+ NO CONFIGURATION CHANGE

<table>
<thead>
<tr>
<th># Pièce / Part #</th>
<th>Description</th>
<th>Quantité</th>
<th>Coûts / Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$0.00</td>
</tr>
</tbody>
</table>

Main d'oeuvre / Labor (h)

Client / Customer
KAWASAKI

# RMA PL005942
Numéro de pièce Part number 9001390
Customer part number 21304-03509

Description du problème / Problem description
LOOSE HARDWARE THAT CANNOT BE TIGHTENED DOWN WITHOUT OPENING THE BACK OF THE UNIT.

Responsabilité / Liability
Client / Customer
KAWASAKI

RMNC client Customer NCR M8-14-1549A

Tax Id:

Compléter et retourner par fax ou par courriel / Complete and return by fax or by e-mail.
Fax: 1 (418) 856-5978 Courriel / E-mail : RMARequest@axiontech.ca
<table>
<thead>
<tr>
<th>Month</th>
<th>Number of days</th>
<th>Mileage</th>
<th>Number of Cars in Service</th>
<th>Fleet operating time (hours)</th>
<th>CCP Relevant as per BTNA</th>
<th>CCU Relevant as per BTNA</th>
<th>PEI Relevant as per BTNA</th>
<th>RU Relevant as per BTNA</th>
<th>MFU Relevant as per BTNA</th>
<th>RCH Relevant as per BTNA</th>
<th>ANS Relevant as per BTNA</th>
<th>GPS Antenna</th>
<th>IMDSS Relevant as per BTNA</th>
<th>SBS Relevant as per BTNA</th>
<th>IMDDS Relevant as per BTNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun. 2007</td>
<td>30</td>
<td>6141584</td>
<td>1172</td>
<td>178484</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>31</td>
<td>6257488</td>
<td>1172</td>
<td>178344</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aug. 2007</td>
<td>31</td>
<td>6448543</td>
<td>1172</td>
<td>184244</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sep. 2007</td>
<td>30</td>
<td>5503760</td>
<td>1172</td>
<td>169880</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oct. 2007</td>
<td>31</td>
<td>6460391</td>
<td>1172</td>
<td>184583</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nov. 2007</td>
<td>30</td>
<td>6956867</td>
<td>1172</td>
<td>174162</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dec. 2007</td>
<td>31</td>
<td>6194835</td>
<td>1172</td>
<td>174712</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jan. 2008</td>
<td>31</td>
<td>6305947</td>
<td>1172</td>
<td>180587</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feb. 2008</td>
<td>29</td>
<td>5977645</td>
<td>1172</td>
<td>170790</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mar. 2008</td>
<td>31</td>
<td>6773261</td>
<td>1172</td>
<td>193151</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Apr. 2008</td>
<td>30</td>
<td>6287731</td>
<td>1172</td>
<td>183697</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>May. 2008</td>
<td>31</td>
<td>6922230</td>
<td>1172</td>
<td>197770</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jun. 2008</td>
<td>30</td>
<td>6617844</td>
<td>1172</td>
<td>190891</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jul. 2008</td>
<td>31</td>
<td>6935308</td>
<td>1172</td>
<td>193182</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>8978582</td>
<td>2585309</td>
<td></td>
<td>40</td>
<td>57</td>
<td>32</td>
<td>53</td>
<td>1</td>
<td>9</td>
<td>4</td>
<td>11</td>
<td>18</td>
<td>31</td>
<td>3</td>
</tr>
</tbody>
</table>
### Failure Analysis Report

**Project** | T111 AMT MNS | **FAR/RMA No** | 100512
---|---|---|---
**Client** | Bombardier Mt. Saint Hilaire | **Client FAR** | 17368
**Product** | AMT Trailer MCU | **Client NCR** | 
**Serial Number** | QTC MS12F00 Q15441 | **Client WO** | 8015812

**Client Description of Failure**

MCU Doesn’t display odometer value on MDU car 3041

**Receiving Inspection Comments**

No Visible Damage

**Rec’d Date:** 07-Jun-10

**Fault Diagnosis and Repair**

- Found receiver to be attenuated
- Replaced U46 serial receiver
- Executed Routine test: Pass

**Fault Code Legend**

1. No Fault Found
2. Client Damage
3. Component Failure
4. Design Issue
5. Manufacturing Defect
6. Other/Undefined
7. Upgrade

**Fault Code** | 3 | Repeateable | ✓

**Repair Type:** Warranty Repair

**Repair Date:** 14-Jun-2010

**Corrective Action**

Isolated Instance: None Needed

**Root Cause of Failure**

U46 serial port receiver partially failed

**Authorized By** | A. Clarke | **Auth Date** | 15-Jun-2010

**FAR Status** | Closed | **Auth Date** | 15-Jun-2010

**DQS-QSOF-1903-R03 QTFAR** | 2008-05-06
Failure Analysis Report

Project: T111 AMT MNS
Client: Bombardier Mont St. Hilaire
Product: AMT Maintenance Display
Serial Number: QTC DS08F01 Q14356

Client Description of Failure
Video has shaky output

Receiving Inspection Comments
Scratches on the bezel
Paint peeled off the handles

Initial Bench Test Results
Powered up unit in BTE mode
Ran the DU routine performance test
A prominent blue tint is observed in the background during the lazy dog test window.

Initial Bench Test By: HB  Initial Test Date: 27-Aug-2010

Fault Code: 3  Repeatable: No

Fault Diagnosis and Repair
Checked diode D5: Reading has slight variation when compared to a known good unit
Replaced D5: No change. Blue tint still visible
Replaced Differential Equalizer U19: Blue tint not prominent anymore
Compared the original U19 with a known good: Slight variation in resistance at the output of Voltage control and output gain pin
Executed DU routine performance test: Passes all test
Set up in train mode: Working as intended

Repaired By: HB  Repair Date: 08-Sep-2010

Root Cause of Failure
Component failure of differential equalizer U19 increased the output impedance of the voltage control and output gain pin.

Corrective Action
Isolated instance
None needed

Root Cause/Corrective Action by: HB  Date: 09-Sep-2010

Authorized By: A. Clarke  Auth Date: 09-Sep-2010

FAR Status: Closed
# Failure Analysis Report

**Project**: T111 AMT MNS

**Client**: Bombardier Lachine

**Product**: AMT Trailer MCU

**Serial Number**: QFG-MS12-0000 S/N Q15440

**FAR/RMA No**: 101038

**Car 3084**

**Reason**: Odometer Offline on MCU

**Swapped board AFM with other car. The issue follow the board. Need to change the MCU.**

## Client Description of Failure

**Client FAR**:  

**Client NCR**:  

**Client WO**: 8035236

## Receiving Inspection Comments

**Rec’d Date**: 04-Feb-13

**No Visual Damage**

## Initial Bench Test Results

**Set up unit on the BTE and powered ON;**

**Executed full performance routine test: Passes all test;**

**Initial Bench Test By**: L.Blanco  

**Initial Test Date**: 14-Feb-2013

**Fault Code**: 0  

**Repeatable**: No

## Fault Diagnosis and Repair

**Performed visual inspection on the PCB: No manufacturing defect observed;**

**Executed AFM board level tests using the BTE: Passes all test;**

**Odometer interface test: Passes**

**Executed full performance routine test: Passes all test;**

**Repaired By**: L.Blanco  

**Repair Date**: 18-Feb-2013

## Root Cause of Failure

**No Fault Found**

## Corrective Action

**NA**

**Root Cause/Corrective Action by**: L.Blanco  

**Date**: 18-Feb-2013

**Authorized By**: H.Bains  

**Auth Date**: 18-Feb-2013

**FAR Status**: Closed

**DQS-QSQF-1903-R03 QTFAR**  

**Date**: 2008-05-06
Technical Report
Chart Reliability for Past Performance
of SEPSA Systems
for
MBTA Orange and Red Line Vehicles
CONTROL OF EDITION AND MODIFICATIONS

00  Base edition

01  Section 7.1 updated

This information is property of SEPSA-SCI. All rights reserved
INDEX

1.- OBJECT ................................................................................................................................................ 3
2.- SCOPE 3
3.- DOCUMENT REFERENCES ................................................................................................................. 3
4.- DEFINITIONS AND ACRONYMS ........................................................................................................ 3
5.- RESPONSABILITIES .............................................................................................................................. 3
6.- SEPSA SCI SYSTEMS ............................................................................................................................ 3
   6.1.- Chart Reliability ........................................................................................................................ 4
   6.2.- Data Collection Process ........................................................................................................ 6
   6.3.- Examples for Service Reports ................................................................................................. 9
7.- SEPSA EDP SYSTEMS ......................................................................................................................... 11
   7.1.- Chart Reliability ........................................................................................................................ 12
   7.2.- Data Collection Process ........................................................................................................ 13
   7.3.- Examples for Service Reports ................................................................................................. 13

ANNEX A: Title of Annex A
1. OBJECT
The purpose of this document is to sum up the information about Past Performance of the SEPSA Systems which are similar to the systems that are offered for MBTA Orange and Red line vehicles.

2. SCOPE
This document is part of SEPSA offer for MBTA Orange and Red Line Vehicles.

3. DOCUMENT REFERENCES

4. DEFINITIONS AND ACRONYMS
CCTV  Closed Circuit TV
CESIS  SEPSA Event Recorder
CPTM  Companhia Paulista de Trens Metropolitanos de Sao Paulo
DNR  Defect Notification Report
MDE  Middle Distance Train for RENFE
PIS  Passenger Information System
RENFE  Spanish Railway Authority
TAS  Technical Assistance Service

5. RESPONSABILITIES
Not apply.

6. SEPSA SCI SYSTEMS
SEPSA SCI offered to MBTA for Orange and Red Line Vehicles, the following three systems:
CS – Communication System with Signs
CCTV – Video Surveillance System
EVR – Event Recorder

Communication System with Signs is similar to the SEPSA product Passenger Information System that was developed and installed in different trains of:
- Metro IZMIR
- Metro Recife
- CPTM

Also, SEPSA has developed a few Video Surveillance Systems for the following customers:
- Metro IZMIR
SEPSA Event Recorder also named CESIS is installed in different trains of RENFE (Spanish Railroad Authority) such as:

- Middle Distance train Units, series 449 and 599
- RENFE locomotives for passenger and merchandise transport.

### 6.1.- Chart Reliability

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PIS+CCTV</td>
<td>SEPSA HOLDING</td>
<td>PIS IZMIR</td>
<td>Metro Izmir - Turkey</td>
<td>4 680h</td>
<td>4 651.9h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV IZMIR</td>
<td>Metro Izmir - Turkey</td>
<td>1 960h</td>
<td>3 411.09h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIS RECIFE</td>
<td>Metro Recife - Brasil</td>
<td>4 100h</td>
<td>6 450h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV RECIFE</td>
<td>Metro Recife - Brasil</td>
<td>16 500h</td>
<td>18 321h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIS – CPTM320</td>
<td>CPTM</td>
<td>25000km/train</td>
<td>43 261km</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV – CPTM 320</td>
<td>CPTM</td>
<td>20 000h</td>
<td>32 256h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIS – PPP5000</td>
<td>CPTM</td>
<td>72685km/train</td>
<td>85624km/train</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCTV – PPP5000</td>
<td>CPTM</td>
<td>2500h for overall cameras and 4000 for the rest of the CCTV equipment</td>
<td>2564.10h for overall cameras and 9560.96 for the rest of the CCTV equipment</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CESIS-MDE</td>
<td>RENFE</td>
<td>17 950h</td>
<td>17 950.10h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------------------------</td>
<td>------------------------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CESIS-2008</td>
<td>RENFE</td>
<td>19 131.46h</td>
<td>19 131.46h</td>
<td>Still in warranty</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
</tbody>
</table>
6.2.- Data Collection Process

Data Collection Process is common for all SEPSA projects. It is based on general company procedures that regulate Technical Assistance Service and Non-Conformities control procedure (W-G00059).

The General Procedure flow diagram is the following:

![Diagram of the General Procedure for Technical Assistance Service]

When the failure, detected on the train, is been resolved by TAS personnel the Service Report is prepared and recorded on SEPSA informatics system (SAP System). If the problem solution includes material change then the failed material is identified by Defect Note Report. If the failed material is retrieved from the train by the client, it will be identified by RMA number and No Conformity Report and the Service Report will be open on SEPSA SAP System.

Figure 1. General procedure for Technical Assistance Service
When the failed material is sent back to SEPSA facilities, with the delivery note, the material entrance is recorded and linked to the corresponding Service Report. Once the material is repaired and tested, the repairing record is updated and closed.

The following is a template that is used for Service Report notice:
### INFORME DE TRABAJO
**Intervention Report**

<table>
<thead>
<tr>
<th>TECNICO/Technician</th>
<th>No. / Num:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOCALIDAD / Site</th>
<th>Nº Destac./Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aviso cliente / Customer Notify</th>
<th>Fecha / Date:</th>
<th>Hora / Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPO (Conv) - SISTEMA (Sist) / Equipment</th>
<th>CODIGO / PIN:</th>
<th>No. Ser. / Serial Nr:</th>
<th>UT / Train Nr:</th>
<th>COCHE / Car</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBCONJ. / Subassembly EQUIPO / Equipment</th>
<th>CÓDIGO / PIN:</th>
<th>Proyecto (Código PEP) / Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SÍNTOMA DE FALLO / Failure Description</th>
<th>AVERIA SISTÉMICA / Systematic Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### REVISION / REPARACIÓN / Repair

<table>
<thead>
<tr>
<th>Fecha / Date:</th>
<th>Hora / Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INTERVENCIÓN / Intervention

<table>
<thead>
<tr>
<th>Tiempo empleado / Working time</th>
<th>Tipo intervención / Intervention type</th>
<th>Clave intervención / Intervention key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Búsqueda / Search</th>
<th>Reparación / Repair</th>
<th>Verificación / Checking</th>
<th>Desplazamiento / Travel hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coste No Calidad / NQ</th>
<th>Reparado en Plazo / Repaired in time</th>
<th>Conoc. Cliente / Customer info</th>
<th>Garantía / Guarantee</th>
<th>Contrato / Contract</th>
<th>Cargo al Cliente / Charge to Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si / Yes ☐ No ☐</td>
<td>Si / Yes ☐ No ☐</td>
<td>Si / Yes ☐ No ☐</td>
<td>Si / Yes ☐ No ☐</td>
<td>Si / Yes ☐ No ☐</td>
<td>Si / Yes ☐ No ☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Código / Part Number</th>
<th>Denominación / Description</th>
<th>Nº almacen / Store Nr</th>
<th>Nº antiguo / Old PN</th>
<th>Nº nuevo / New PN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procede de / Coming from</th>
<th>Consigna de Cliente / Consignment</th>
<th>Repuestos Cliente / Customer Spare Parts</th>
<th>Repuesto propio / Brought by Technician</th>
<th>Repuesto de fábrica / SEPSA Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MATERIAL

| OBSERV
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### GASTOS

<table>
<thead>
<tr>
<th>Km</th>
<th>RECORRIDO / Route</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### POR EL CLIENTE / Client Representative: TECNICO / Technician:

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

1-Y00073, ed.00
Based on Service Report information and the failure classification the reliability reports are prepared periodically.

System and components reliability is evaluated through MTBF and MKBF calculation having in mind mean distance, mean speed and fleet service time defined by customer.

6.3.- Examples for Service Reports

Service Report example for IZMIR project:
### Service Report Example for Event Recorder Project (CESIS-MDE):

#### Service Report 1

**General Information**
- **Detachment**: 1170.16
- **Worker**: 1003027, Martín González
- **Date**: 18.03.2014
- **Report**: 98588459

**Information of Intervention**
- **Client Prop**: 10003 CONST. Y AUX. DE FERROCARRILES, S.A.
- **Client Mantena**: 10003 CONST. Y AUX. DE FERROCARRILES, S.A.
- **Technical locatio**: 449-35.16
- **Car**: A1 A2
- **Locality**: FUCORRAL

**Equipment/Name**: 0900306 + Sistema CESIS-MDE

**Serial**: 35
**IMA Ir**: In

**Order Status**
- **GAR**: IN Contract
- **Project**: 90016.2.2.45.E.BAT

**Catal Inte**
- **SEPSA General Modifications**: 24
- **Interv**
- **Modifications**

**Hours**
- **Detection**: 0.0
- **Repair**: 6.5
- **Test**: 0.0

**Text**
- Se realiza 0.T05754 y se comprueba funcionamiento. Esta comisiones Iva

---

### Service Report 2

**General Information**
- **Detachment**: 1170.16
- **Worker**: 1003063, Axel Cames
- **Date**: 15.02.2014
- **Report**: 98587789

**Information of Intervention**
- **Client Prop**: 10002 CONST. Y AUX. DE FERROCARRILES, S.A.
- **Client Mantena**: 10002 CONST. Y AUX. DE FERROCARRILES, S.A.
- **Technical locatio**: 449-20.16
- **Car**: A2
- **Locality**: BARCELONA

**Equipment/Name**: 0900306 + Sistema CESIS-MDE

**Serial**: 28
**IMA Ir**: In

**Order Status**
- **GAR**: IN Contract
- **Project**: 90016.2.1.46.E.BAT

**Catal Inte**
- **AVE-CBET**: Cases Failures
- **Interv**: 19
- **DEAD MAN BOARD**

**Hours**
- **Detection**: 0.0
- **Repair**: 2.0
- **Test**: 9.0

**Text**
- Denuncian fallo de IM en A2, se cambia IM y OK.
Service Report Example for Event Recorder (CESIS -2008)

### SERVICE REPORT

<table>
<thead>
<tr>
<th>General Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Detachment</td>
<td>by / title</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Information of Intervention</td>
<td></td>
</tr>
<tr>
<td>Client Project</td>
<td>10189</td>
</tr>
<tr>
<td>Technical location</td>
<td>CESIS-2008 RN LOC 333_313_16</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment/name</td>
<td>OK0164 + Sistema CESIS2008R</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Order Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GAR</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cnt/Inter</td>
<td>ANT-CEST</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Orden PM de QT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Text</td>
<td>333-313 fallo tarjeta INV, no rema fin. Se sustituye.</td>
</tr>
</tbody>
</table>

### 7. SEPSA EDP SYSTEMS

SEPSA EDP (as a part of the SEPSA HOLDING) proposed for the MBTA:
- API – Auxiliary Power Inverter
- LVPS – Low Voltage Power Supply

SEPSA EDP has developed similar equipment for different customers such as:
- LIRR (Bombardier) – 101KVA Static Converter
- LIRR (Bombardier) – 85KVA Static Converter
- MNR (Bombardier) – 101KVA Static Converter
- MNR (Bombardier) – 85KVA Static Converter
- New York Metro (R62) – 6.5kW LVPS
- New York Metro (R68) – 6.5kW LVPS
- New York Metro (PATH) – 54kVA Static Converter
## 7.1.- Chart Reliability

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Power System (including LVPS &amp; Auxiliary Power Inverter)</td>
<td>SEPSA</td>
<td>101kVA Static Converter M/7</td>
<td>Carbuinde r Bombarde r End customer: Long Island Rail Road (LIRR)</td>
<td>180 000 miles</td>
<td>1 181 106 miles (18h/day; 356 day/year; 35mph)</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>85kVA Static Converter M/7</td>
<td>Carbuinde r Bombarde r End customer: Long Island Rail Road (LIRR)</td>
<td>180 000 miles</td>
<td>1 041 456 miles (18h/day; 356 day/year; 35mph)</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>101kVA Static Converter M/7</td>
<td>Carbuinde r Bombarde r End customer: Metro North. (MNR)</td>
<td>180 000 miles</td>
<td>2 127 428 miles (18h/day; 356 day/year; 35mph)</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>85kVA Static Converter M/7</td>
<td>Carbuinde r Bombarde r End customer: Metro North. (MNR)</td>
<td>180 000 miles</td>
<td>3 204 221 miles (18h/day; 356 day/year; 35mph)</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.5kVA LVPS R68</td>
<td>Overhaul End customer: NYCTA</td>
<td>120 000 miles</td>
<td>2 985 141 miles (20h/day/360day/year; 18mph)</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.5kWA R62</td>
<td>Overhaul End customer:</td>
<td>120 000 miles</td>
<td>2,651,6330 miles (20h/day/360day/year; 18mph)</td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
<td></td>
</tr>
</tbody>
</table>
| Chart Reliability  
SEPSA Systems | Document Edition Date | Page 13 of 14 |
|---------------|----------------------|--------------|

<table>
<thead>
<tr>
<th>NYCTA</th>
<th>Carbuilder KRC End customer: PATH - Port Authority of NY &amp; NJ.</th>
<th>54kVA PA5</th>
<th>SEPSA Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>75,000 miles</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>514,766.35 miles (24h/day; 360day/year/15 mph)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAP tool and W-G00059 procedure</td>
<td>Not Apply</td>
</tr>
</tbody>
</table>

### 7.2. Data Collection Process

Data Collection Process is common for all SEPSA projects. It is based on general company procedures that regulate Technical Assistance Service and Non-Conformities control procedure (W-G00059). See chapter 6.2.

### 7.3. Examples for Service Reports

Service Report Example for 101kVA Static Converter for LIRR.
Service Report Example for 101kVA Static Converter for MNR.
**ENGLISH**

**ENGINEERING WORK INSTRUCTION**

**Door System and Controls**

**Failure analysis processing procedure**

**FAR process**

<table>
<thead>
<tr>
<th>NOTICE</th>
<th>AVIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plans, specifications and engineering data submitted herewith or which may be submitted, remain the property of <strong>Vapor Stone Rail Systems</strong> and shall not be reproduced or altered or used in whole or in part except by express consent of <strong>VSRS</strong>.</td>
<td>Les plans, spécifications et données techniques soumis ci-joints, ou qui peuvent être soumis, restent la propriété de <strong>Vapor Stone Rail Systems</strong> et ne doivent pas être reproduits, altérés ou utilisés, totalement ou partiellement, sans le consentement express de <strong>VSRS</strong>.</td>
</tr>
</tbody>
</table>

**Prepared:**

Corinne Saint-Cyr  
FAR coordinator

**Approved:**

Michael P. Murphy  
Director Customer Service

Dean Chiappini  
Director Engineering

Rick Gardner  
Manager Quality Assurance

**Name / Title**

---

**Document No.** 13-WI-03  
**Revision** 02  
**Date** 2009-08-07

---

Work instruction 13-WI-03 Rev 2
## Revision List

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Description of changes</th>
<th>Page</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>General revision to accommodate Iris criteria</td>
<td>All</td>
<td>Aug. 07, 2009</td>
</tr>
<tr>
<td>1</td>
<td>Initial release</td>
<td>All</td>
<td>Nov. 02, 2002</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

1.1 Purpose

This section details the process followed at Vapor Rail to handle the return from the field of failed parts which require an FAR (Failure Analysis Report).

1.2 Applicability

This document is applicable to all personnel involved in the FAR process (FAR process annex A).

2. GENERAL DESCRIPTION OF THE PROCESS

This section encompasses the receiving of materiel from customers, the repair work, the failure analysis and the corrective action implementation (when required). The units requiring an FAR are a subset of the units returned under the Materiel Return & Repair (MRR) process.

3. RESPONSIBILITIES

3.1. FAR coordinator

The FAR coordinator:

- Keeps track of all units requiring an FAR. Saves and inventories all work orders received from the field and assigns an FAR number for each one.
- Provides weekly FAR summaries on FAR status to the project manager and the director customer service.
- Coordinates the transfer of parts to be repaired between Vapor's facilities and tracks parts movements.
- Builds and updates the Far database; ensures that the data is made available to the organization, specifically to the R.M.S. Engineer and the Project Managers.
- Assigns the FAR to be done by the Engineer and works with the Engineers (FAR, production, QA...) to identify a preventive / corrective action.
- Closes the FAR.
- Communicates the failure analysis and corrective action (if required) to the concerned departments, cells or persons.
- Reports new issues and failure trends to the Director of Customer Service and Engineering department.
- Performs quality audits to follow up on the implemented corrective actions.
- Provides training (as required) to various groups within VSRS.
3.2. Project Manager

The Project Manager is responsible for receiving new FAR letters from the Customer. The project Mgr passes these FAR requests/letters to the FAR coordinator and returns the completed FAR forms to the customer.

3.3. FAR Engineer

The FAR Engineer is responsible to complete the failure analysis form and to validate/confirm that the repair has corrected the reported problem. The FAR engineer may be required to validate the parts repair with the technician and to provide assistance to the FAR coordinator & production engineer in developing the corrective action strategy.

3.4. Repair/Production department

The Repair/Production department is responsible to perform the Routine Test Procedure (RTP) on failed parts and to execute the repair for known issues. The department has to report their findings before performing any repair related to the following cases:

a) New issues
b) No defect found
c) Any other issues communicated in advance by the FAR engineer.

When the repair is completed, the person who performed the repair has to complete the RMA forms in accordance with the RMA template (RMA template Annex B).

3.5. Manufacturing / QA engineer

The manufacturing engineer and/or the QA engineer has to provide a corrective action to address the problem raised in the FAR and has to ensure that the corrective action is implemented properly.

3.6. RMS engineer

The RMS engineer is responsible to provide quarterly updates on the status of failures and field issues to the Q/A manager, who will follow up to ensure corrective actions are implemented.
4. PROCEDURE

4.1. The field technician is called on the site to verify the reported problem, investigate and troubleshoot the failed part.

4.2. The field technician fills a work order with the details of the part and the reported problem.

4.3. Material is returned from the field by the field service technician or the customer and an RMA number is issued by two different ways:

    a) By the technician in the field
    b) By the MRR coordinator

4.4. The FAR coordinator assigns an FAR number to the RMA and updates the FAR database with the information required: FAR number, part number and name, RMA number, reason of return, date when the FAR was opened by the customer, etc.

4.5. The repair technician inspects and tests the unit. If it is a regular repair, the technician performs the repair and completes the RMA form, but in case of an NDF, a repeater or a known/special issue raised by engineering, the repair technician has to report his finding to the FAR Engineer prior to perform any repairs.

4.6. The FAR Coordinator advises the FAR Engineer when an FAR is ready to be filled with failure analysis and corrective action information (FAR template Annex C).

4.7. The FAR Engineer determines the root cause of the failure and completes the FAR with the failure analysis information.

4.8. The FAR coordinator completes the FAR with a corrective action. If the failure analysis is related to a production or quality issue, the FAR coordinator must report his findings to the manufacturer/QA engineer who will determine a proper corrective to address the problem described in the FAR. The FAR coordinator must ensure that the corrective action is implemented prior to submitting the FAR to the customer. If the root cause of the failure is related to a supplier issue, the defective part should be sent by purchasing to the supplier for failure analysis and corrective action.

4.9. The FAR coordinator closes the FAR and updates the FAR database. If a defective part was sent to the supplier for failure analysis, a preliminary FAR is filled out with available
information and sent to the customer in the interim. The FAR remains open until the supplier failure analysis of the defective part is received from the manufacturer.

4.10. The FAR coordinator sends the completed FAR to the project manager.

4.11. The project manager writes a letter to the customer and submits the FAR package, along with this letter, to the customer.

4.12. Once the FAR is submitted, the FAR coordinator updates the FAR database with the date of submission, letter number and comments.

4.13. For parts which require further analysis (specific problem, repeater, NDF), the FAR coordinator coordinates shipment to the supplier with purchasing and ensures a follow up in collaboration with the Project manager and Purchasing.

4.14. Once the failure analysis of the part is received from the supplier, a second version of the FAR is submitted to the customer.

4.15. When required, the FAR coordinator reports his findings to the Engineering department to reinforce corrective action implementation process and follow up.

**Records:**
All the work orders received from the field are kept for the life of the contract.
ANNEX A: FAR PROCESS MAP

ID: FAR-PM-01
For reference only, use latest revision
### Process Name: FAR Process Map

**Ref.:** 13-WI-03  
**ID:** FAR-PM-01  
**Rev.:** 3  

<table>
<thead>
<tr>
<th>Function</th>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td></td>
</tr>
<tr>
<td>Field technician</td>
<td></td>
</tr>
<tr>
<td>Production/repair dept.</td>
<td></td>
</tr>
<tr>
<td>FAR coordinator</td>
<td>Send RMA package to purchasing → Scan copy of the FAR → Send FAR to project mgr. → Update FAR database → Send 2nd FAR version to project mgr. → Update FAR database → FAR database</td>
</tr>
<tr>
<td>Eng. support</td>
<td>A → Yes → Part need to be sent to supplier? / No → FAR database</td>
</tr>
<tr>
<td>Purchasing</td>
<td>Request RMA from supplier → Send RMA package to supplier → Wait to get RMA from supplier → Send supplier RMA to FAR coord. → Submit FAR to customer</td>
</tr>
<tr>
<td>Project manager</td>
<td>Write VPIAL letter → Submit FAR package to customer</td>
</tr>
<tr>
<td>Production/QA engineer</td>
<td>Write VPIAL letter → Submit FAR package to customer</td>
</tr>
</tbody>
</table>
ANNEX B: RMA FORM "HOW TO COMPLETE THE FORM"

Oracle MRR/RMA Form
For reference only, use latest revision
WABCO TRANSIT DIVISION/VAPOR/STONE AIR
RETURN MATERIAL AUTHORIZATION REPORT

1. MATERIAL IDENTIFICATION
   CUSTOMER/CONTRACT: ____________________
   ORIGINAL ORDER NO: ____________________
   CUST. RETURN NO: ____________________
   CUST. ORDER NO: ____________________
   PART NO: ____________________ QTY: 1
   DESCRIPTION: Select
   SERIAL NO(S): ____________________
   CAR NO: ____________________
   CUSTOMER PART NO: ____________________
   RETURNED FOR (SEE CODE ON BACK) ____________________
   Overage ☐ Customer Repair ☐ Warranty ☐ Pre-service ☐ In-service
   Repeat Return ☐ Far Required Mileage/Time

DESCRIPTION OF PROBLEM:
Reported problem: description of the problem. Was the problem replicated? Was a door adjustment performed? Was any log recorded at the time of the incident/failure? (if yes, which log and which verification was performed to verify the log)
Who did the work? Was the customer present during the trouble shooting? Did customer request a part change? Action taken to fix the problem. (Was any working spare supplied?)

SHIP REPLACEMENT TO: Wabtec Transit Division; 4 Warehouse Lane, Elmsford NY 10523

REPLACEMENT/REPAIR ORDER NO: ____________________

CUSTOMER WILL DEBIT MEMO RENDER CREDIT
DEBIT: ____________________ NUMBER: ____________________ MEMO: ____________________

Select...

SELECT ORIGINATOR

2. DATE RECEIVED: __________ CARRIER: __________ SENT TO: __________

3. ANALYSIS

DESCRIPTION OF TESTING/INVESTIGATION PERFORMED (TEST RESULTS)
Which test was performed on the part? → Details of investigation.

SIGNATURE/DATE: Select...

ANALYSIS OF PROBLEM
Failed step matches reported problem?
Logs matches problems? → Event #.
How did component fail? → Input, Output, short, low voltage, measured voltage, signals, etc.

SIGNATURE/DATE: Select...

REPAIR REPORT
What repair has been done to fix the problem? Which part is replaced? (Pn, location)
All reported problems fixed?
Additional testing done if NDF? → details, extra-cycling, extra burn-in.

SIGNATURE/DATE: Select...

RESPONSIBILITY
☐ WABCO TRANSIT GROUP  ☐ CUSTOMER
☐ NO DEFECT FOUND  ☐ NOT DETERMINED

3.1.-Rma form (Default)
ANNEX C: FAR FORM “HOW TO COMPLETE THE FORM”

FORM # 13-WI-03-002
For reference only, use latest revision
### F.A.R. Failure Analysis Report

<table>
<thead>
<tr>
<th>1. SYSTEM:</th>
<th>2. PART NO.:</th>
<th>3. SUPPLIER:</th>
<th>4. CONTRACT NO.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door</td>
<td>select</td>
<td>Vapor Rail</td>
<td>R160 4094</td>
</tr>
</tbody>
</table>

5. PART DESCRIPTION:  
Select

6. PROBLEM DESCRIPTION:  
Reported problem: description of the problem. Was the problem replicated? Was a door adjustment performed? Was any log recorded at the time of the incident/failure? (if yes, which log and which verification was performed to verify the log)  
Who did the work? Was the customer present during the trouble shooting? Did customer request a part change? Action taken to fix the problem. (Was any working spare supplied?)

7. LOCATION:  
8. OPENED BY:  
Anton Tucci

9. DATE OPENED:  

10. SERIAL NO:  
11. RMA:  
RMA#

12. WO:  
13. PO-DC:  
14. REFERENCES:

15. REPAIR REPORT:  
Which test was performed on the part? → Details of investigation.  
Which step of the test failed? → Brief description of failed test step. Failed step matches reported problem?  
Logs matches problems? → Event #.  
How did component fail? → Input, Output, short, low voltage, measured voltage, signals, etc. What repair has been done to fix the problem / Which part is replaced. (Pn., location)  
All reported problems fixed?  
Additional testing done if NDF? → details. extra-cycling, extra burn-in.

16. NAME (PRINT):  
17. DATE:  

18. FAILURE ANALYSIS:  
Description of tests / investigation on the part.  
Is investigation consistent with the repair?  
Root cause of the failure.  
Explanation of root cause.  

19. NAME (PRINT):  
20. DATE:  

21. CORRECTIVE ACTION & IMPLEMENTATION:  
Actions implemented in production cell to prevent this kind of failure. (if applicable)  
Corrective action implemented in the field to correct the problem. (if applicable)  
Will the defective part be sent to the manufacturer for further analysis.

22. CLOSED BY:  
23. DATE CLOSED:  
24. F.A.R.NO:  

FAR #

25. CarBuilder Pn:  
26. FSR:  
27. Discrepancy:  

13-WI-03-002
2. **(Vapor) Description of the data collection process, and the method of reliability calculation**

Attached is the VSRS general procedure 13-WI-03 which governs how Vapor gets raw failure data from the failure field and how it communicates the Field Reliability review to internal departments and the customer. It contains sample data sheets for Field Data repair sheets and post repair data sheets. Below is a brief narrative which details how the raw failure data is put together and analyzed to determine corrective actions needed to achieve the target reliability.

**Definition**

Typically the definition of annual failure rate for a LLRU is the ratio of chargeable relevant failures to the product of average cars and LLRU per car.

Typically the MDBCF of the door system is the ratio of the total operating distance accumulated by the total population of cars to the total number of chargeable relevant failures occurring for that population within each specified system of the cars during a specified length of time, generally 6 or 12 months.

**Data Gathering**

Vapor receives failure information from the Vapor field service team, the Vapor material and return process, and directly from the Carbuilder or Customer.

Vapor receives the car fleet information regarding the number of cars in service and the mileage run from the Carbuilder.

Vapor receives the initial relevant failures assigned by the Carbuilder.

Relevant information is recorded into an electronic form which is compatible with the RAMS database.

**Data Analysis**

This information is reviewed and categorized by a reliability engineer. The reliability engineer will cross check the in service failure information with the internal repair information.

The failures and repairs are categorized in the FRACAS RAMS database.

The Carbuilder relevant failures are reviewed and either accepted as part of the Vapor door scope or assigned a categorization of Carbuilder responsibility or of passenger responsibility.

The failures are then reviewed with the Carbuilder’s reliability engineer for data consolidation and confirmation.

A review of the data over time will typically yield a door system reliability performance curve and a Vapor responsibility reliability performance curve.

These performance curves are compared to the Contractual reliability requirement.

If the reliability is below the Contractual reliability requirement, trends are analyzed and areas of improvement are identified to the Vapor project team for improvement resolution and communication to the customer.