



Fall Arrest System

Scope of Work

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**Santa Barbara Metropolitan Transit District
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MTD FALL ARREST SYSTEM

PART 1 - GENERAL

1.01 OVERVIEW

- A. Contractor is required to design, manufacture, provide supporting material, install, and test, a Fall Arrest System (FAS), which is to consist of:
 - 1. Canopy Mounted Dual Rigid Rails: a fall arrest system with components and accessories for use when employees are working on top of a bus in a designated bay. System shall consist of two rigid lifeline / crane beams (no more than 75' long) over the bus bay, plus accessory items that adhere to the safety, design, and all other standards set forth in this IFB.
 - 2. Custom designed dual rigid beams for two ton monorail hoists that will be mounted to MTD's maintenance canopy.
 - 3. The beam attachments and design must be certified by a California registered professional engineer.

1.02 STANDARDS AND REGULATIONS

The MTD FAS must be designed, manufactured, and installed in compliance with all local, State, and Federal building and safety standards, including but not limited to:

- A. ANSI - America National Standards Institute:
 - 1. ANSI Z359.1-2007, A10.32. Requirements for harness: Self Retracting Lifeline (SRL) and drop lines for construction and industrial use.
- B. OSHA - Occupational Safety and Health Administration
 - 1. Title 29, Chapter XVII, Part 1910 and 1926
- C. AWS - American Welding Society
 - 1. AWS D1.1, Structural Welding Code—Steel.
- D. Cal/OSHA – Occupational Safety and Health Administration
 - 1. Construction Safety Orders, Title 8, Part 1670
- E. Cal/OSHA – Occupational Safety and Health Administration
 - 1. General Safety Orders, Title 8, Part 3210

1.03 QUALIFICATIONS OF CONTRACTOR

- A. Must be a reputable FAS vendor and manufacturer, having a minimum 10 years' documented experience in the design and manufacture of FAS systems and related equipment
- B. All proposed assembled components shall be manufactured by firm(s) having a minimum 5 years' documented experience in the manufacture of the component.

- C. Contractor shall provide written certification that products supplied meet the requirements of "Buy America."

1.04 SUBMITTALS

- A. Preliminary contractor data to be submitted prior to manufacture:
 - 1. Modifications to the building or building utilities resulting from changes to information supplied with the bid are the responsibility of the contractor.
- B. Shop drawings and product data for MTD's engineer approval shall include but not be limited to:
 - 2. Contractor's manufacture data as defined under "Quality Control" in Section 1.05.
 - 3. Location where fabrication assembly and testing operations are performed.
 - 4. Design calculations including but not limited to loads on columns and/or walls indicating compliance with cited standards and certified by a California registered professional engineer.
 - 5. The manufacturer shall submit to MTD's engineer the calculated maximum structural load when the rigid rail fall arrest system is restraining the maximum fall condition.
 - 6. Fall protection systems clearance drawing drawn to a scale of not less than 1/4 inch equals 1 foot and fully dimensioned showing fall arrest components (including but not limited to fall arrest track) elevation, required clearances from overhead and side obstructions, the rated load, splices and supports spacing, maximum loadings and approach limits, and end stop bumper.
 - 7. Catalog cuts for all components. Submit with drawings and calculations.
 - 8. Operating instructions. Submit with drawings and calculations.
 - 9. Manufacture installation instructions. Submit with drawings and calculations.
 - 10. Copy of system contractor's Warranty, on company letterhead
- D. Submit for approval the operation and maintenance manual(s). Submittal may be electronic (PDF). After approval, furnish two copies of the manual (or set of manuals), one separate set of full size prints of all drawings and diagrams, and one CD-ROM/DVD of all material in electronic (PDF) format.
- E. After approval, furnish two parts catalogs as adjuncts of the operation and maintenance manuals.
- F. Record Documents: Bind documents (drawings, manuals, parts catalogs, parts lists), unused, clean and legible, in heavy notebook covers, and deliver to MTD's engineer prior to request for Final Acceptance. Indicate the name and telephone number of the contractor, local representative, and the nearest source of service and parts, inside the front cover of each manual.

- G. Contractor's certification that proposed equipment meets or exceeds specification requirements submitted with shop drawings
- H. Submit proposed training program a minimum of 30 calendar days prior to installation and testing. Training program; description and duration, segmented by activity:
 - 1. Operating Personnel
 - 2. Maintenance Personnel

1.05 QUALITY CONTROL REQUIREMENTS

- A. Fasteners manufactured in the U.S. shall comply with ANSI standards. Fasteners not manufactured in the U.S. shall comply with ISO standards. This includes but is not be limited to threads for nuts and bolts, heads for same, pipe, conduit, and electrical connectors. Mixing of metric and imperial (non-metric) standards on the same equipment is not permitted.
- B. Design Coordination:
 - 1. Coordinate the design of systems, sub-systems, and components with the building structure and in matters of building and life/safety
 - 2. Equipment shall be located within the spaces allocated for such equipment. Verify that all dimensions are adequate for the equipment.
 - 3. Design and furnish anchoring devices which must be built into the construction for installation of the system.
- C. Registration of Designer(s):
 - 1. Shop drawings and design calculations that pertain to the equipment to be provided under the work of this section shall be reviewed and sealed by a professional engineer qualified, registered, and licensed to practice in the State of California.
 - 2. The Professional Engineer shall have a minimum of five years documented experience in providing engineering services as required for this RFP.
- D. Qualification of Contractor:
 - 1. Contractor shall be a reputable firm, having a minimum 10 years documented experience in the design and manufacture of the equipment specified in this RFP.
 - 2. Assembled components shall be manufactured by firm(s) having a minimum of 5 years documented experience in the manufacture of said components.
- E. Contractor's Representative:
 - 1. Upon contract award, engage the services of a contractor's field service representative to supervise installation of equipment, to conduct acceptance testing, and to train MTD's personnel in the proper operation and maintenance of the equipment.
 - 2. The field service representative shall be a qualified supervisor employed by the contractor, having a minimum of 5 years' documented training and

experience in the installation of equipment being furnished; and who shall work with the contractor's specialists.

- F. Qualifications of Contractor's Installer:
 - 1. Experienced installer having minimum 3 years documented experience in the installation of this type of equipment.
 - 2. The Installer shall employ an adequate number of specialists who are skilled workmen and who are thoroughly trained and experienced in the methods and requirements necessary for the proper execution of the work under this section.
- G. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, Structural Welding Code—Steel.
 - 2. Contractor shall certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.06 VERIFICATION OF DIMENSIONS

- A. Coordinate and verify with equipment manufacturer dimensions, loads, clearances, and utility requirements relating to fabrication of the equipment and building construction.
- B. Coordinate installation and furnish anchor bolts, support plates, and incidental items installed on roof trusses, along with applicable drawings and instructions to be approved by MTD's engineer a minimum of 30 days prior to erection of equipment.

1.07 GENERAL DESIGN AND FABRICATION REQUIREMENTS

- A. The fall arrest system shall have the capacity to protect two workers in a non-simultaneous fall at each bus.
- B. The contractor shall design and certify the fall arrest system based on computer analysis and the requirements of this scope of work.

1.08 PAINTING

- A. The fall arrest systems including beams, plates and supports shall be painted safety yellow.
- B. Non-sliding or non-rotating non-stainless steel surfaces shall be given a primer coat of factory applied rust inhibiting paint to a dry film thickness of 1.5 mils. The primer paint shall meet the requirements of FS-TT-P.
- C. Two finish coats of enamel paint shall be factory applied over the primer coat.
- D. The color shall match OSHA Safety Yellow, Gloss.

PART 2 – PRODUCTS

2.01 EQUIPMENT

- A. The equipment shall be used to protect personnel working on the top of buses underneath the Maintenance Canopy.

2.02 MANUFACTURING

- A. The rigid rail fall arrest system shall be manufactured by the following or equal approved as a substitution:
 - 1. DBI-Sala (www.dbi-sala-safety.com)
 - 2. CAI Safety (www.caisafety.com)
- B. Basis of Design, as the standard of quality and performance for the fall arrest systems: DBI-Sala.

2.03 DESIGN REQUIREMENTS

- A. Fall arrest beam shall be installed as a new system.
- B. The required system shall be as follows:
 - 1. Defined as the beam and accessories over one work area, shall have the capacity to protect two workers in a non-simultaneous fall or two ton monorail hoist whichever is greater.
 - 2. The fall arrest system shall utilize a steel beam, not a wire rope/cable. Basis of design: DBI-Sala I-Beam Trolley (2103147), or approved equal.
 - C. The system shall be supported from the building structural steel. The support spacing shall be as required by OSHA and system requirements.
 - D. The system shall be manually operated by one worker.
 - E. The arrest beam shall be located over the center line of the bus bay.
 - F. The system shall include two energy shock absorbing lanyards each with an arresting force of 900 lbs. (900 MAF). The system shall have two personnel hoist trolleys with steel wheels to which the retractable lanyards will be attached by the users. Each personnel trolley shall travel smoothly and independently of the other (trolley) along the length of the fall arrest beam.
 - G. The beam system shall include two Double-Locking Connecting Devices, and two Self-Retracting Lifelines ("Deceleration Device").
 - A. Basis of Design: DBI-Sala (3504433) or approved equal.
 - H. The beam system shall include two new fall protection harnesses:
 - A. Weight Capacity for each harness: 310 lbs.
 - B. Washable, mesh-lined, with removable shoulder, hip and leg padding; lightweight polyester webbing.
 - C. Five-point adjustment system, with one-handed quick connect buckles, including torso buckles.

- D. Built-in belt loops
- E. Back D-Rings. Coated hardware for corrosion resistance.
- F. Meets or exceeds all applicable industry standards including OSHA and ANSI Z35.
- G. Basis of Design: DBI Sala ExoFit XP Harness or approved equal.
- I. The system shall be designed to allow the user to walk uninterrupted the entire length of the top of the bus without having to unhitch from the fall protection system to pass through intermediate support points.
- J. Each hoist trolley shall have a rotating eye assembly for attaching lanyards.
- K. The rotating eye shall allow 360 degrees free continuous movement to avoid tangling of the lanyard and harness.
- L. The assumed weight for each worker shall be 310 lbs.
- M. The system shall not allow a worker to fall more than 6 feet nor contact any lower level.
- N. The contractor shall design and certify the fall protection system based on computer analysis, and the requirements of this section.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Coordinate and verify with equipment manufacturer dimensions, loads, and clearances relating to fabrication of the equipment and building construction.
- B. Structure: Coordinate installation and furnish anchor bolts, support plates, and incidental items along with applicable drawings and instructions approved by MTD's engineer a minimum of 30 days prior to fabrication.

3.02 DELIVERY, STORAGE, AND HANDLING

- A. Pre-procured equipment or material may not be stored at the project site without prior permission from MTD. If approved, Contractor shall be wholly liable for equipment and material security on site.
- B. All materials shall be delivered to the site with their original manufacturer's markings and identification intact. Reject materials that are damaged, improperly identified or not in conformance with reviewed shop drawings and catalog cuts. MTD reserves the right to also reject such materials.
- C. Delivery of equipment and material must be coordinated with MTD Fleet Maintenance Manager to minimize disruption to maintenance work and/or fleet operations.

3.03 INSTALLATION

- A. Fit equipment and appurtenances to the space provided and make readily serviceable. Coordinate work with MTD Fleet Maintenance Manager to minimize work disruption.
- B. Furnish and install additional supports and hangers as may be required for the proper installation of equipment.
- C. The fall arrest system and the appurtenances shall be installed by the manufacturer or his authorized agent in accordance with drawings and approved manufacturer's instructions. Deliver all major components fully match marked.
- D. Protect all of the equipment and fixtures furnished under this specification from damage during construction.
- E. Field Touch-Up Painting: Touch up surfaces where the shop coat has been damaged, using the same paint film thickness as the original shop coat.

3.04 EQUIPMENT TEST AND CHECKOUT

- A. Submit a site installation acceptance testing program at least 30 calendar days prior to the test, allowing Engineer and MTD to witness the test, demonstrating how the manufacturer equipment's complies with all specified requirements. Provide material and manpower required for the program.
- B. After approval of the site test procedure notify MTD's engineer at least two weeks in advance of making the site test.
- C. Submit test results to MTD engineer.
- D. Submit six complete sets of test results.
- E. Test rigid beam system in accordance with the contractor's manufacture standard test, modified as necessary to include the following tests at a minimum:
 - 1. Ease of operation and set-up by one worker.
 - 2. Demonstrate short rip out or arresting fall distance and all safety clearances when there is a fall.
 - 3. Recovery of fallen worker.
 - 4. Range of worker mobility.
 - 5. Limit of systems' stops.

3.05 TRAINING

- A. Prior to installation, the contractor shall submit for review a program which shall adequately train MTD's personnel to correctly operate and maintain the

equipment. The contractor shall be responsible for supplying all materials required for the program.

- B. A complete operator's training class, comprised of both classroom and hands-on training. Provide minimum 3 hours' duration for rigid rail system.
- C. During training, all equipment functions must include classroom discussion and an opportunity for each of the individuals to perform actual equipment set-up and operation. The training shall include but not be limited to the following:
 - 1. Operation and set-up by one worker.
 - 2. Demonstrate short rip out or arresting fall distance and all safety clearances when there is a fall.
 - 3. Recovery of fallen worker.
 - 4. Range of worker mobility.
 - 5. Limit of systems' stops.
- D. A complete maintenance class, which shall be comprised of classroom discussion of all troubleshooting, running maintenance, and heavy maintenance and repairs. Hands-on performance of all running maintenance functions must be made by the maintenance technician.
- E. Following completion of training, manufacturer shall furnish the following to MTD:
 - 1. A letter attesting to the names of persons receiving instruction and the date's instruction took place.
 - 2. A minimum of two copies of all training materials.
 - 3. Two complete sets of DVD format materials conveying the information contained in the training sessions.
 - 4. A work plan for ongoing safety inspection and compliance requirements that MTD will be required to meet.

3.06 WARRANTY

- 1. The contractor shall state, in detail, their best standard warranty for the fall arrest system which shall meet or exceed MTD's minimum warranty period, stated below, including method of adjustment in case of defective workmanship or failure of component parts.
- 2. MTD will be provided with a copy of the system manufacture warranty, on company letterhead as part of the O&M Manual as described in Section 1.04F, Submittals, Record Documents.
- 3. Submit warranty signed by contractor and installer and executed by contractor for equipment, materials, and workmanship against defects agreeing to repair or replace equipment and materials and correct workmanship.
 - 1. Product Warranty Period: One year from the date of Final Acceptance.
 - 2. Workmanship Warranty Period: Three years from the date of Final Acceptance.

END OF SECTION