

SEATTLE CENTER MONORAIL

REQUEST FOR PROPOSAL

Replacement Monorail Train Current Collectors

Summary Scope of Project

Seattle Monorail Services is seeking proposals from qualified parties to assist in the design and manufacture of electrical current collector systems for the Monorail trains. Interested firms should be experienced in electrically powered transit rail vehicle current collector and cantenary system design and/or manufacture.

Background Information

Monorail trains first entered service in Seattle in 1962, operating on a one-mile dual beam guideway between downtown Seattle and the site of the Seattle World's Fair. The two trains, designated the Red Train and the Blue Train, have been in nearly continuous operation since then, each logging approximately 1,000,000 miles of use. Each train is comprised of four car body sections, designated A through D, each train totaling 118 feet in length.

The trains operate on 700 volt DC power supplied from two wayside substations. The electric power is transferred to the trains from two parallel conductor rails mounted to the sides of the concrete guideway beams. The conductor rails are Vahle, Inc. copperhead rails. Two current collector assemblies are installed in each train car, one to contact the positive power rail and one to contact the negative rail. The collectors are mounted to the train car body via electrical isolation mounts, and incorporate articulating arms so that the carbon shoe contact surface will remain in contact with the conductor rail throughout the complete dynamic operating envelope of the train. The existing current collector assemblies are of undetermined origin, and there is no design or engineering documentation for the units.

Seattle Monorail Services, LLC (SMS) currently operates and maintains the Seattle Monorail system, which is owned by the City of Seattle, under the terms of a 1994 Concession Agreement, as amended.

Project tasks

The specific tasks and requirements of the contractor selected for this project ideally will include the following:

1. Examine and evaluate the existing current collectors to determine, to the greatest extent feasible, the necessary operating characteristics and design constraints of the units.
2. Define the dynamic operating envelope of the train cars to determine the complete range of motion necessary for the current collector assembly articulation system. This range of motion will include the normal dynamic operating envelope as well as extreme lateral, vertical, and axial movement that may be encountered due to suspension component or tire failures, or variations of train speed from the design speed for super-elevated, curved guideway sections.

3. Prepare engineering designs for construction of replacement current collector assemblies. Several photographs of the existing positive and negative collector assemblies are included in Exhibit B for reference.
 - a. The new designs shall be compatible with the existing power rails. The existing power rail system consists of Vahle F45/100 and F45/200 steel bar with copper cap. The positive and negative bars are arranged along one side of the guideway, one facing upward and the other downward, and supported on insulated brackets. Cross section drawing of the conductor rail arrangement is included at Exhibit A for reference.
 - b. The positive and negative collector assemblies shall be designed to mount to the existing double insulated mounting structures, and shall fit within the existing collector enclosures with sufficient air gap between all elements of the collector and the enclosure to maintain electrical isolation.
 - c. The negative collector assembly shoe shall maintain constant contact with the negative conductor rail, by spring tension or other method. The tensioning system shall be adjustable, and shall maintain the adjusted tension within ten percent throughout the full range of the dynamic envelope.
 - d. The positive collector assembly shall incorporate a “fail-safe” isolation method separating the shoe from the conductor rail. The existing train systems provide 50psi pneumatic pressure to the collector assembly to hold the shoe against the rail, and the shoe is arranged such that gravity provides the force for separation of the shoe whenever pneumatic pressure is removed. The new collector may incorporate this system; if it does, contractor must supply electrically isolated pneumatic connection between pneumatic supply pipe and collector assembly.
 - e. The positive collector shall also incorporate a method of manually bringing the shoe into contact with the conductor rail, accessible from on board the train, for use in the event pneumatic pressure is low or unavailable.
 - f. The positive collector shall also incorporate a method of manually bringing the shoe into contact with the conductor rail from below the train, in the Seattle Center maintenance shop area, for use during train start-up procedures.
 - g. The positive collector shall also include an adjustable shoe tensioning system, which shall be adjustable independent of the pneumatic pressure supplied for the “fail-safe” shoe isolation system, and shall maintain the shoe tension within ten percent of the adjusted value throughout the full range of the dynamic envelope.
 - h. The positive and negative collector assembly contact tension, shoe size, and shoe/rail contact area, shall be designed with capacity to transfer up to 1000 amps at 700Vdc while minimizing shoe wear both during electrical transfer between rail and shoe, and without electrical transfer.
 - i. The positive and negative collectors must incorporate suitable electrical connection points for the existing positive and negative electrical cable lugs.
 - j. The positive and negative collector assemblies, shoes, and all connected parts, shall maintain a minimum of 1-inch air separation from the guideway beam, rail mounting brackets, hardware, insulators, and any other existing wayside obstructions throughout the full range of the train dynamic envelope.
 - k. To the greatest extent feasible, the positive and negative shall be constructed of common parts, which shall be interchangeable between the two type units.

Wear components, such as bushings, bearings, springs, etc., shall be common industrial items available through multiple manufacturers.

1. The replaceable carbon shoe assembly material shall be specified to minimize the wear of the Vahle copper head rail. The shoe shall be replaceable without removal or disassembly of the collector. The positive and negative shoes shall be identical and interchangeable. The carbon shoe shall be designed to minimize production and procurement cost.
 - m. The carbon shoe shall be supported on a frangible mount system, so that in the event of shoe fouling with the conductor rail, the conductor rail shall not sustain damage. The shoe and frangible mount system shall not fall from the train, or come into contact with the car body, in the event of damage or breakage.
4. Supply replacement current collector assemblies, four positive and four negative units per train, plus four complete positive and four complete negative assemblies as spare units.
5. Provide on-site technical support for installation, testing, and acceptance of the replacement collector system.
6. Provide spare component listing for replacement wear and consumable components of the current collectors, including manufacturer's part numbers, and suggested sources of supply.
7. Provide written installation, removal, maintenance, servicing, and inspection instructions for the current collector assemblies.
8. Provide 12-month warranty against design, manufacturing, or material defects.
9. Provide final "as-built" engineering drawings of the current collector assemblies, including Professional Engineer's stamp and signature.
10. Provide shop production/engineering drawings of the current collector shoes, including Professional Engineer's stamp and signature, suitable for issue to multiple competing carbon shoe manufacturers when soliciting bids for replacement carbon shoes.
11. Provide engineering drawings depicting train dynamic operating envelope and maximum allowable car body movement relative the guideway beam: vertically, laterally, and axially.
12. Ensure compliance with all SMS, City of Seattle, and FTA contracting requirements.

Respondent's Submittal Instructions

Respondents to this request should submit two hard copies not exceeding ten pages, with the exception that resumes of the key personnel to be assigned to the project may be included in an appendix of up to five additional two-sided pages. Submittals must be received no later than 4:00 PM PDT, May 21, 2008. Submittals received after this deadline will not be considered. Please submit electronic and hard copies of your RFP response to:

Eno Yliniemi, Ph.D.
SMS Project Manager
370 Thomas St, Second Floor
Seattle, WA 98109

Selection Schedule

May 21, 2008 (4:00 PM PDT)	RFPs due
June 4, 2008	Evaluation of RFPs completed
June 11, 2008	Final Selection

Proposals submitted for consideration should include the following information:

- Qualifications, experience, and capabilities of the submitting firm(s), as related to design and manufacture of transit rail current collector and catenary systems.
- Qualifications, experience, and capabilities of the individual engineers and other staff that will be assigned to the project. Specifically identify the key project manager for the engagement.
- Examples of similar or related previous transit projects performed by respondent. Specifically point to projects where you met critical scheduling constraints and where you added value that lowered costs or ensured the project could be completed within budget.
- Identify the projects and roles played by the organization and relevant individuals in previous projects that contributed to your familiarity with current FTA contracting requirements and management of FTA-funded projects.
- Commitment that the key project manager and selected individuals and/or any sub-consultants will stay on the project until completion.
- Earliest dates that assigned individual engineers and staff can be made available to this project.

If additional information regarding the RFP is needed, SMS must receive the request in writing no later than 4:00 PM, May 21, 2008. A written response to all questions will be prepared and mailed to all persons who have obtained an RFP. For any additional information or clarification, please write to:

Dr. Eno Yliniemi at enoy@seattlemonorail.com

Subject: Current Collector, RFP

Submittal Evaluation and Selection Process

Proposals will be evaluated by a panel comprised of representatives of the City of Seattle, Seattle Center (monorail system owner) and Seattle Monorail Services (monorail system operator).

Evaluation criteria will include but may not be limited to the following:

- Consultant firm's previous experience with project of similar scope.
- Expertise and qualifications of key personnel that will be assigned to this project.
- Previous experience with rail transit, specifically monorail systems.
- Previous experience performing FTA grant funded projects and demonstration of cost consciousness and on-time-on-budget project delivery.

SMS and the Seattle Center for the City of Seattle anticipate selecting the successful contractor based on the written qualifications in relation to the evaluation criteria. SMS and the City, however, reserve the right to waive any irregularity in any response, to reject any and all responses, to re-advertise for proposals if desired, and to accept the response that is deemed by SMS and the City to be the most advantageous for the monorail system. All responses become the property of SMS and will not be returned. SMS and the City also reserve the right to conduct oral interviews with one or more of the respondents prior to selecting a contractor.

SMS and/or the City will not be liable for any costs incurred by responders in the preparation and presentation of responses submitted in response to the RFQ.

EXHIBIT B

Photographs of Existing Monorail Positive Current Collector



Positive Collector Assembly shown installed in collector compartment



Positive Collector Assembly removed from train to show detail



Negative Collector Assembly installed in collector compartment