

Scope of Work

Washington Metropolitan Area Transit Authority

Project Title:

Off Track Flash Butt (78') Stringer Welding Services

PRN ID: CTRST17046

SOW ICE ID: SOW0000414

Attachment A

1.0 INTRODUCTION-

1.1 WMATA Track and Structures (TRST) requires the services of a qualified vendor to fabricate 390 foot continuous welded rail (CWR) stringers from 78-foot sections of rail, using the electric flash-butt welding method.

1.2 This Scope of Work provides for the assembly, welding, testing, and inspection of continuous welded rail stringers to be used for WMATA's Capital Rail Renewal Program.

2.0 CURRENT SCOPE OF WORK

2.1 The Contractor will convert 78 foot rail sections into 390 foot CWR stringers.

2.2 The Contractor will use the electric flash-butt welding method to fabricate the 390 foot CWR stringers.

2.3 The Contractor will perform assembly, welding, inspection, and testing as applicable.

2.4 Rail sticks for this work will be provided by WMATA. All other materials and equipment required for this work shall be the responsibility of the contractor.

3.0 DELIVERABLES

3.1 The contractor will assemble by welding 78 foot rail sections into 390 foot CWR stringers. The estimated quantity of welds are 1648 the first year and 848 in each option year.

4.0 PERFORMANCE AND ACCEPTANCE CRITERIA

4.1 Vendor will provide 390 foot CWR stringers in accordance with this Scope of Work and the technical specifications contained herein.

4.2. Vendor will complete all specified tests and inspections prior to delivery.

4.3. Vendor will allow the Contracting Officer's Technical Representative (COTR) access to assembly, welding, and test facilities, upon request.

4.4. Vendor will adhere to the Quality Assurance Program submitted with the proposal package. (See paragraph 6.3 below.)

5.0 TECHNICAL SPECIFICATIONS

5.1 Contractor's Responsibility

5.1.1 Contractor will provide flash-butt welding services to weld 78 foot rail sections into 390-foot rail stringers, as indicated in this Scope of Work.

5.1.2 All flash-butt welding plants and qualified welders will be provided by the contractor.

5.1.3 WMATA will provide78-foot running rail sections.

5.1.4 All other materials and equipment directly associated with the welding, assembly, and testing of rail stringers will be the responsibility of the Contractor.

5.1.5 WMATA will provide support personnel and equipment to move the 78-foot running rail in place for off-track flash-butt welding, and subsequent stacking of completed rail stringers.

5.2 Contract Deliverables Prior to Production Welding

5.2.1 Identification of welding plant to be used.

5.2.2 Standards of welding plant performance, as recommended by the welding plant manufacturer.

5.2.3 Oscillograph records of each qualification weld showing number and duration of preheat impulses, flashing time, upset current time, platen travel during flashing, and platen travel distance for upset cycle. Computer records can be substituted for oscillography records.

(See section 6.0 below).

5.2.4 Report of test results of each qualification weld.

5.3 Preparation for Welding

5.3.1 The welding plant will be set up on property as determined by WMATA.

5.3.2 Rail welding will be in accordance with the current AREMA Manual "Specification for Fabrication of Continuous Welded Rail", "Specification for the Quality Assurance of Electric Flash-butt Welding of Rail", and as specified in this scope of work.

5.3.3 Rail will be welded in accordance with a schedule recommended by the contractor's Quality Assurance Engineer and approved by WMATA's Contracting Officers Technical Representative (COTR). Rail stringers should not be significantly less than 390 feet in length, accounting for the loss of steel during the flash-butt welding process, and will be of only one rail type, consisting of 115 RE head hardened rail.

5.4 Rail Inspection Prior to Welding

5.4.1 Inspect each rail end prior to welding for deviations from the lateral line in either direction and for up sweep, down sweep, or droop.

5.4.2 Rail with up sweep, down sweep, or droop and rail failing to comply with the tolerances shown in Exhibit 05091-B will be cropped a sufficient distance to achieve the required alignment. Rails will be cut clean and within 1/32 inch of square by means of rail saws or abrasive cutting discs.

5.4.3 Torch cutting of rail is prohibited. Abrasive saw cutting will occur at no additional cost to WMATA.

5.5 Rail End Preparation for Welding

5.5.1 Immediately prior to welding, all rail ends will be cleaned as needed to remove mill scale or other dirt which might hinder the flow of electric current.

5.6 Weld Machine Alignment

5.6.1 Alignment of the rail in the welding machine will be done on the head of the rail.

5.6.2 Vertical alignment will provide for a flat running surface within 0.060 inch between the abutting rail ends as shown on Exhibit 05091-C.

5.6.3 Horizontal alignment will distribute head width differences evenly between each side of the head. No horizontal offset will exceed 0.040 inch on either side of the head. No horizontal offset will

exceed 0.125 inch on either side of the base of the rail.

5.7 Welding Procedures Will Be In Accordance With The Following

5.7.1 Forge welds to point of no further plastic deformation with upset of 5/8 inch minimum.

5.7.2 Each weld will achieve full penetration, complete fusion, and be free of flaws and inclusions.

5.7.3 Record welding machine performance with an oscillograph recorder or computer printout.

5.7.4 Record platen movement and current impulses.

5.7.5 The oscillograph record will be compared with the approved procedure record from the qualification welds. If the record indicates performance which is not in conformance with the approved procedure, the weld will be rejected.

5.7.6 The recorder will be calibrated each day.

5.7.7 If flashing is interrupted with less than 1/2-inch of flashing distance remaining before upsetting, the rails will be re-clamped and flashing initiated again.

5.7.8 Grinding will be done immediately following welding at an elevated temperature.

5.8 Welds Will Be Ground To Meet The Following Finishing Tolerances

5.8.1 A finished deviation of not more than plus or minus 0.005 inch of the parent section of the rail head will be allowed.

5.8.2 The weld at the top and sides of the rail head will be finished to plus or minus 0.010 inch of the parent section.

5.8.3 The bottom and sides of rail base will be finished to within plus or minus 0.010 inch of the parent section.

5.8.4 The web zone, underside of head, web, top of base, both fillet each side, will be finished to within 1/8- inch of parent contour or closer, but will not be deeper than the parent section. Finishing will eliminate all cracks visible to the unaided eye.

5.8.5 All notches created by offset conditions or twisted rails will be eliminate by grinding to blend the variations on both sides of the head and base for a distance of 18 inches.

5.8.6 All fins on the weld due to grinding and/or shear drag will be removed prior to final inspection.

5.9 Applicable References

5.9.1 American Railway Engineering and Maintenance of Way Association (AREMA) Manual for Railway Engineering, Vol. I, Chapter 4, Specification for Fabrication of Continuous Welded Rail

5.9.2 ASTM E18: Standard Test Method for Rockwell Hardness of Metallic Materials

5.9.3 ASTM E709-08 (Replaced E109): Standard Gauge for Magnetic Particle Testing

5.9.4 ASTM E94 (Replaced E142-92): Method for Controlling Quality of Radiographic Testing

5.9.5 ASTM E164-08: Standard Practice for Contact Ultrasonic Testing of Weldment

5.9.6 American Welding Society (AWS) D1.1: Structural Welding Code

5.9.7 US Nuclear Regulatory Commission Rules and Regulations, Title 10, Atomic Energy, Part 20

5.9.8 American Society for Nondestructive Testing ASNT-TC-1A Recommended Guidelines for Qualification and Certification of Non-Destructive Testing Personnel

Qualification and Certification of Non-Destructive Testing Personnel

6.0 QUALITY ASSURANCE

6.1 The Contractor Will Submit Proof Of Welding Plant Qualification As Follows

6.1.1 Using the welding plant, personnel, and procedures proposed for production welding, complete three qualification welds at the start of each welding segment as scheduled in Section 8.0 below.

6.1.2 These qualification welds will occur in the presence of the Contractor Quality Assurance Engineer. WMATA will provide short sections of rail to complete the qualification welds.

6.1.3 Weld tests will provide sufficient detail to establish capability of the welding apparatus to meet specified welding requirements.

6.2 Production Weld Approval Will Be Based On These Items

6.2.1 Oscillograph records or computer records of production welds. The system response time for updating employee information cannot exceed 5 seconds.

6.2.2 Production welding record.

6.2.3 A one-year warranty will be required for each weld, starting after each weld installation is complete. Weld certifications from the contractor will be required after welds are accepted by WMATA. These certifications are also to meet AREMA Standards.

6.3 Quality Assurance Program

Quality Assurance Program must be submitted to the Authority prior to contract award.

7.0 LOCATION OF WORK AND ANY CONSTRAINTS-

7.1 The primary work location for this contract will be:

Greenbelt Rail Facility

5801 Sunnyside Avenue

College Park, MD 20740

7.2 The contractor may be required to work in alternate locations in the rail system, per the direction of WMATA.

8.0 PERFORMANCE SCHEDULE

8.1 The welding schedule will be coordinated between WMATA and the contractor. The contractor should have the capability to perform approximately 45 welds/day.

8.2 Approximately 1648 welds are scheduled to be performed during the first contract year in roughly two equal segments with the first half to be started within two weeks of contract award, and the second half to be started approximately 4 to 6 months later.

8.3 Approximately 848 welds will be scheduled in subsequent contract years in coordination with delivery of 78 foot rail sections.

9.0 SAFETY/ENVIRONMENTAL REQUIREMENTS

9.1 Contractor will be responsible for ensuring compliance with all applicable Occupational Safety and Health Administration (OSHA) statutes and regulations, including those of the District of Columbia, state of Maryland, and Commonwealth of Virginia, and the local ordinances where the work is being performed.

9.2 Contractor must comply with the WMATA Construction Safety and Environmental Manuals, WMATA System Safety Program Plan, WMATA Metrorail Safety Rules and Procedures Handbook, National Institute for Occupational Safety and Health (NIOSH) guidelines, the American Conference of Governmental Industrial Hygienists (ACGIH) guidelines, the American National Standards Institute (ANSI) guidelines, and the U.S. Army Corps of Engineers Safety and Health Requirements Manual, and minimize potential for pollutant discharge to the environment.

9.3 Contractor will be responsible for compliance with applicable National Fire Protection Association (NFPA) Standards 13, 14, 24, 25, and 130.

9.4 Contractor will ensure that all methods of performing this task do not create unnecessary risk to employees, the public, or private property, whether or not these methods are cited or indicated in the contract documents.

9.5 Should violation of any of the above be issued to the contractor during the course of the work, a copy of each charge will be immediately forwarded to WMATA.

9.6 All contractor personnel will be required to have a background check and attend the 8-hour Roadway Worker Protection (RWP) training to access WMATA property.



Note: Not used for Thermite Rail Welding (only applicable for Electric Flash-Butt Welding)

2X0000 (09/14)

05091-28 of 34



Note: Applicable for both Electric Flash-Butt and Thermite Rail Welding

2X0000 (09/14)

05091-29 of 34



Note: Applicable for both Electric Flash-Butt and Thermite Rail Welding

2X0000 (09/14)

05091-30 of 34

VAIL TYPE:	STANDARD	HIGH STREN	GTH	_ (CHECK O	NE)		
TNISH STI	RING LENGTH (NEAREST	F00F)					
STAMPING	ON FIRST AND LAST R	AIL IN STRING:					
FIR	ST						
LAS	JT						
	VISUAL INSPECTION RESULTS						
WELD NO.	WELD MACHINE RECORD IDENTIFIER	MAGNETIC PARTICLE TEST RESULT	E MAD	MAXIMUM DIMENSION RECORDED			
			VERTICAL	ALIGNMENT	HORIZONTAL	ALIGNMENT	
1.							
2.							
3.							
4,							
5.			_				
b. 7							
8							
~						· · · · · · · · · · · · · · · · · · ·	
100000	1						
ENCLUS	Press of the second second second						
WACL	UNICTON VIET	DODOLITAN		CD A NICIT	ALITI	ODITY	
WASH	INGION MEI	ROPOLITAN	AREA	KANSI	AUTH	URITY	

Note: Applicable for both Electric Flash-Butt and Thermite Rail Welding

2X0000 (09/14)

05091-31 of 34