STATEMENT OF WORK (SOW), ICN 3810E47601-A05

1. SCOPE OF WORK
   1. The purpose of this procurement is for the contractor to Accomplish Repair of Magnetic Minesweeping Gas Turbine Generator (MMGTG) Flywheel Shaft Bearing Journal. Provide all required labor, tools, materials, and equipment to accomplish this requirement.
      1. Accomplish initial baseline inspections of the MMGTG flywheel shaft.
      2. Accomplish base material preparation of MMGTG flywheel shaft.
      3. Accomplish repairs of MMGTG flywheel shaft.
      4. Accomplish final machining and inspections of MMGTG flywheel shaft.
      5. Accomplish balancing of repaired flywheel shaft.
      6. Deliver repaired flywheel shaft to SRF-JRMC Detachment Sasebo.
   2. Location of Work: Contractor’s Facility

1.3 The effective period of this order is stated at DELIVERY INFORMATION on SF 1449. Coordinate work schedule with the Government Technical POC. Service period is from 08 June 2022 through 08 July 2022. Complete other related works by the expiring date of this order.

1. REFERENCES
   1. S9074-AQ-GIB-010/248, REQUIREMENTS FOR WELDING AND BRAZING PROCEDURE AND PERFORMANCE QUALIFICATION
   2. S9074-AR-GIB-010/278, REQUIREMENTS FOR FABRICATION WELDING AND INSPECTION, AND CASTING INSPECTION AND REPAIR FOR MACHINERY, PIPING, AND PRESSURE VESSELS
   3. MIL-STD-2035, NONDESTRUCTIVE TESTING ACCEPTANCE CRITERIA
   4. DWG A-1200-173 PULSE FREQUENCY CHANGER (NON MAGNETIC) REV 5
   5. S9314-CS-MMA-010 NONMAGNETIC AC GENERATOR (PULSE FREQUENCY CHANGER), 550 KW, 435 VOLTS, 1,404 AMPS, 1,800 RPM, 3 PHASE, 420/362 HERTZ REV 2
   6. 4790.3 COMUSFLTFORCOMINST JFMM VOLUME V, CHAPTER 2, QUALITY MAINTENANCE
   7. QUALIFICATION AND PROCEDURAL REQUIRMENTS FOR LASER CLAD WELDING AND THERMAL SPRAY APPLICATION IN SUPPORT OF 3810E47601-A05
   8. FLYWHEEL SHAFT FINAL MACHINING DRAWING
   9. FLYWHEEL SHAFT MACHINE PREPARATION DRAWING
   10. T9074-AA-GIB-010/1687, THERMAL SPRAY PROCESSES FOR NAVAL SHIP MACHINERY APPLICATIONS AND NONSKID APPLICATIONS, DTD 12 JUNE 2017
   11. ASTM C633, STANDARD TEST METHOD FOR ADHESION OR COHESION STRENGTH OF THERMAL SPRAY COATINGS; DTD 2017
   12. MIL-STD-167, MECHANICAL VIBRATION OF SHIPBOARD EQUIPMENT (TYPE I- ENVIRONMENTAL AND TYPE II-INTERNAL EXCITED)
2. REQUIREMENTS

NOTE: All work described here is only authorized to be accomplished by a KTR that can meet and/or demonstrate the qualification and workmanship as detailed in reference 2.7. TECHNICAL POC shall review KTR qualification record Figure 7-18 of reference 2.1. Acceptance criteria for inspections of references 2.2 and 2.3 shall be met.

* 1. Initial Baseline Measurements of Flywheel Shaft

(V)(G) "VISUAL INSPECTION"

* + 1. Visually inspect the as arrived condition of the flywheel shaft, including condition of the existing belzona repairs. Notate any discrepancies, defects, damages using references 2.4 and 2.5 for guidance.

(V)(G) "VISUAL INSPECTION"

* + 1. Conduct a dimensional inspection (including the runout and concentricity) of the flywheel shaft in as arrived condition, including the belzona repairs. Flywheel shaft dimensions are per reference 2.8.

(I)(G) "HARDNESS TEST"

* + 1. Conduct hardness testing of the flywheel shaft for baseline measurements.
       1. Acceptance Criteria: 20 HRC minimum
    2. Submit one legible copy, in hard copy or approved transferrable media, of a report listing the results of 3.1 to the TECHNICAL POC.

NOTE: Step 3.1.4 must be completed and satisfactorily reviewed by SRF-JRMC Det. Sasebo PRIOR to continuing on to step 3.2. An engineering evaluation of the baseline shall be conducted PRIOR to any further repairs that are irreversible.

* 1. Base Material Preparation of Flywheel Shaft
     1. Prepare the flywheel shaft by removing the existing belzona epoxy repairs, in addition to machine preparation of flywheel shaft base material. Flywheel shaft shall be machine prepared in accordance with reference 2.9.

(V)(G) "VISUAL INSPECTION"

* + 1. Accomplish visual and dimensional inspections including runout and concentricity of the flywheel shaft, after completion of the flywheel shaft machine preparation. Acceptable dimensions shall be in accordance with reference 2.9.
       1. Submit one legible copy, in hard copy or approved transferrable media, of a report listing the result 3.2.2 to the TECHNICAL POC.

NOTE: Step 3.2.2 must be completed and satisfactorily reviewed by SRF-JRMC Det. Sasebo PRIOR to continuing to step 3.3. An engineering evaluation of the baseline needs to be conducted PRIOR to any further repairs that are irreversible. Determination of final repair method shall be provided by the Technical POC PRIOR to continuing to step 3.3.

* 1. Perform repair of Flywheel Shaft after receipt of guidance from TECHNICAL POC to accomplish the repairs listed in 3.3.1 or 3.4.1 based on initial baseline measurement of shaft accomplished in 3.1.

NOTE: Primary repair method shall be laser clad welding. Submitted proposal shall account for both repair methods. A cost adjustment will be issued prior to completion of contract to descope the non-selected repair method.

* + 1. Accomplish laser clad welding in accordance with 3.2.4 of reference 2.7, as directed by the TECHNICAL POC. Area to be laser clad welded is identified in reference 2.9.
       1. Conduct continuous monitoring of shaft to identify any movement, bending, distortion of the flywheel shaft. If excessive movement is observed, stop work and contact TECHNICAL POC.
    2. Accomplish thermal spray repairs in accordance with paragraph 3.13.4 of reference 2.7, as directed by the TECHNICAL POC. Area to be thermal sprayed is per reference 2.9.
       1. Spray Material shall be Inconel 625 alloy wire per spray material code P7 per table 4-2 of reference 2.10.

(I)(G) “SURFACE PROFILE INSPECTION (THERMAL SPRAY ONLY)”

* + - 1. Inspect prepared surface prior to application of thermal spray for satisfactory anchor tooth-profile. Acceptance criteria shall be in accordance with manufacturer’s recommend profile.

(I)(G) “CLEANLINESS INSPECTION”

* + - 1. Accomplish cleanliness inspection of prepared surface. Acceptance criteria: free of oil, grit, moisture, or other contaminants.

(V)(G) “THERMAL SPRAY IN-PROCESS VERIFICATION (THERMAL SPRAY ONLY)”

* + - 1. Accomplish in-process verification during thermal spray application. Ensure blisters, cracks, chips, pits, or coating separation are not present during spraying; coating thickness per pass conforms to the procedure; and the coating manufacturer’s recommended temperature range is maintained.
      2. Submit one legible copy, in hard copy or approved transferrable media, of a report listing the results of 3.3.2.2 through 3.3.2.4 to the TECHNICAL POC. Report shall contain actual results with acceptance criteria.
  1. Accomplish final machining and inspections on Flywheel Shaft.
     1. Machine flywheel shaft, after completion of buildup, to final diameter of 129.999mm – 130.007mm (5.1181”-5.1184”) in accordance with reference 2.8.

(V)(G) "VISUAL INSPECTION"

* + 1. Accomplish visual and dimensional inspections of machined shaft. Acceptance criteria: final dimensions are in accordance with 2.8.
    2. Accomplish Non Destructive Testing (NDT) of final machined flywheel shaft.

(I)(G) "VISUAL INSPECTION (LASER CLAD ONLY)"

* + - 1. Accomplish visual inspection of laser clad welds as required per paragraph 10.3.6 of reference 2.2. Acceptance criteria is per reference (3) Class 2. Table XI of reference 2.2 refers.

(I)(G) "VISUAL INSPECTION (THERMAL SPRAY ONLY)"

* + - 1. Accomplish 10X visual inspection of post-machined thermal spray application. There shall be no cracks, blisters, chips, or loosely-adhering particles or other contaminants that bleed out though the coating, pits exposing the substrate or coating separation, spatter, or unmelted particles.

(I)(G) "LIQUID PENETRANT INSPECTION (LASER CLAD ONLY)”

* + - 1. Accomplish liquid penetrant (PT) inspection of laser clad welds only in accordance with paragraph 10.3.6 of reference 2.2. Acceptance criteria is per reference 2.3, class 2. Table XI of reference 2.2 refers.

(I)(G) "HARDNESS TEST"

* + 1. Accomplish hardness testing of the flywheel shaft in areas and adjacent areas repair. Acceptance Criteria: 20 HRC minimum.

(V)(G) “MAGNETIC PERMEABILITY TEST”

* + 1. Accomplish magnetic permeability testing. Acceptance criteria: all metallic material (except material required to be magnetic due to its function and authorized by NAVSEA) shall have a magnetic permeability of 2.0 or less after fabrication.
    2. Submit one legible copy, in hard copy or approved transferrable media, of a report listing the results of all tests and inspections accomplished in 3.4 to the TECHNICAL POC.

(V)(G) “BALANCING”

* 1. Accomplish balancing of repaired flywheel using references 2.4, 2.5, and 2.12 for guidance.
     1. The repaired MMGTG flywheel shall meet the balancing requirements of reference 2.12.
     2. Submit one legible copy, in hard copy or approved transferrable media, of a report listing the result 3.5 to the TECHNICAL POC.
  2. Ship repaired flywheel to originator.
     1. Inspect provided crate used to receive flywheel for damage. Ensure crate is suitable for reuse.
     2. Crate repaired flywheel, ensuring item is adequately protected to prevent damage to repaired and existing surfaces.
     3. Ship crated flywheel prepaid to: SRF/JRMC Sasebo Japan Tategami-cho Sasebo-city, Nagasaki prefecture, Japan Bldg #480/1F, 857-0063.
     4. Submit one legible copy, in hard copy or approved transferrable media, of the shipping document to the SUPERVISOR.

4. GOVERNMENT FURNISHED

4.1 MATERIAL (GFM): None.

4.2 EQUIPMENT (GFE): None.

4.3 SERVICE: None.

5. NOTES:

5.1 The Government POC:

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| --- | --- |
| Technical POC | Contracting POC |
| Name: Mr. Brandon Bauser  Title: Project Manager  Command: SRF-JRMC Det Sasebo  TEL: 080-9058-9629  E-Mail: brandon.bauser@srf.navy.mil | Name: Ms. Junko Nakashima  Title: Purchasing and Contract Specialist  Command: NAVSUP FLC Sasebo Contracts Div.  TEL: 0956-50-2850  E-Mail: Junko.Nakashima.JA@fe.navy.mil |

5.1.1 Only the Government TECHNICAL POC has authority to coordinate schedule with the contractor within terms and conditions of this contract. The Government TECHNICAL POC will coordinate base access and provide escorts for the contractor if escorts are required for personnel entering, departing, and working in required areas.

5.1.2 Only the Contracting Officer and/or designated Contracting POC have authority to change any terms and conditions of this contract. Report any conditions, discrepancies, and/or finding to the Contracting POC via the Government TECHNICAL POC.

5.1.3 All metallic material (except material required to be magnetic due to its function and authorized by NAVSEA) shall have a magnetic permeability of 2.0 or less after fabrication.

5.1.4 Notify the TECHNICAL POC at least 72 hours, but not more than 96 hours, prior to commencing (G)-Points at contractor's/subcontractor's plants located in excess of 50 miles by the most direct roadway nearest to the place of performance of the contract. Document the date, time, and identification of the TECHNICAL POC notified. Following the required notification, the requirements in the paragraph annotated with the symbol (G) may proceed prior to the scheduled time as approved by the TECHNICAL POC. Notify the TECHNICAL POC to cancel a scheduled test or inspection as soon as known, but no later than one hour prior to the scheduled event. In accordance with reference 2.6, symbols are defined as:

5.1.4.1 (I) inspections require verification and documentation by a separate individual, other than the person who has accomplished the work, who is qualified as an inspector and currently certified.

5.1.4.2 (V) inspections require verification by either the qualified tradesperson, trade supervisor, or inspector.

5.1.4.3 (G) is a symbol inserted to establish a point in the sequence of accomplishment of work at which time the TECHNICAL POC shall be notified to permit observation of a specific inspection or test by the Government.

5.1.5 Proceed with the test or inspection if the TECHNICAL POC is not present, provided the required advance notice has been furnished to the TECHNICAL POC and the contractor has completed and documented the preceding tests and inspections. TEST AND INSPECTIONS ACCOMPLISHED WITHOUT THE TECHNICAL POC OR HIS REPRESENTATIVE PRESENT, WHEN ADVANCE NOTICE HAS NOT BEEN PROVIDED, WILL NOT BE ACCEPTED AS VALID.

5.1.6 Known provider of laser clad welding process that meets the requirements of this specification:

5.1.7.1 Tocalo Co., Ltd.; 4-4, 6-Chome, Minatojima Minamachi, Chuo-ku, Kobe, 650-0047, Japan; Phone: +81 78-303-3436; Fax: +81 78-303-3465; Email: migitayuka@tocalo.co.jp

5.1.7 Contractor shall be responsible for shipping of flywheel between repair activities, if work requires multiple locations to accomplish.

(End of Statement of Work)