



TECHNOLOGY DEVELOPMENT FUND (TDF) SCHEME

TITLE: DEVELOPMENT OF WIRE ARC MANUFACTURING TECHNOLOGY FOR NAVAL PROPELLER

1. Objective:

To develop an advanced Wire Arc Manufacturing (WAM) technology for naval propellers, ensuring cost-effective, high-precision, and sustainable maintenance of critical maritime components.

2. Background:

Naval propellers are critical components exposed to extreme operational conditions, leading to wear, erosion, and damage over time. Traditional repair methods involve significant downtime, high costs, and the need for specialized infrastructure. Wire Arc Manufacturing (WAM) offers a cutting-edge additive manufacturing approach to repair and refurbish damaged propellers, restoring their structural and operational integrity while reducing lead time and costs.

3. Problem Statement:

Current repair and refurbishment techniques for naval propellers are resource-intensive, time-consuming, and lack precision, often requiring complete replacement in severe cases. An innovative WAM-based solution is needed to repair damaged sections effectively, reduce material wastage, and extend the operational life of propellers.

4. Proposed Solution:

- 1. Development of WAM Technology:** Design a robust Wire Arc Manufacturing process tailored for repairing naval propeller materials, including advanced alloys.
- 2. Precision and Reliability:** Ensure high accuracy in deposition, minimal thermal distortion, and structural integrity equivalent to or exceeding the original material.
- 3. Cost Efficiency:** Reduce costs by eliminating the need for replacement and minimizing downtime.
- 4. Validation:** Test and validate the technology under operational conditions to ensure compliance with naval standards and performance requirements.

5. Expected Outcome:

1. A fully functional WAM technology for precision repair and refurbishment of naval propellers.
2. Significant cost and time savings compared to traditional repair or replacement methods.

3. Prolonged service life and enhanced performance of repaired propellers.

6. Key Deliverables:

1. Functional prototypes demonstrating WAM-based repair of propeller sections.
2. Validation reports on repaired propellers under simulated and real-world conditions.
3. Documentation and guidelines for integrating WAM into existing repair workflows.
4. Scalable manufacturing framework for broader adoption.

7. Strategic Relevance:

The development of WAM technology for naval propeller repair aligns with the objectives of operational readiness and cost optimization. It supports the indigenization of critical maritime technologies, reducing dependency on foreign suppliers, and enhancing self-reliance in defense manufacturing. Additionally, the technology has the potential for adaptation in other industrial applications, fostering innovation in India's manufacturing ecosystem.

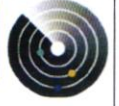
8. Future Expectations:

The WAM technology will enhance operational readiness by enabling quick and cost-effective repair of naval propellers, reducing downtime significantly. It will promote sustainability by minimizing material wastage and extending the life of critical components. The technology's scalability allows for adaptation across industries like aerospace and automotive, fostering broader applications. Additionally, it strengthens India's self-reliance in advanced manufacturing while opening avenues for global export opportunities.

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FEASIBILITY CUM RFI RESPONSE FOR THE PROJECT REQUIREMENT UNDER TDF SCHEME (PROFORMA)

1. **Name of the Institute** (Industry/Academia):
2. **Contact details:**
 - a. Email
 - b. PoC
 - c. Address
3. **Title of the project requirement:**
4. **Project Description** (Define broad understanding of the project requirement and proposed solution under the project).
5. **Briefly detail the proposed technical solution in terms of subsystem/submodule levels.**
6. **Road map for achieving the proposed outcome (Development Plan Phase wise -Max 5 phases).**
7. **Development and production Estimates:**
 - i. Estimated time required for development of the proposed technology /product (In Months).
 - ii. Estimated cost required for the for development of the proposed technology /product (BQs of submodules/subsystems if any pls attach).
 - iii. Estimated production cost of the end product after successful development (per unit or batch cost).
 - iv. Whether the industry has already done any Suo moto design and development of the proposed product/technology at Technology Readiness Level – Yes/No
 - v. Details of Suo moto design and development done if marked Yes in previous question (within 250 words).
 - vi. Essential infrastructure required for development of the proposed product/technology for which funding is required.
8. **Technical strength in terms of manpower.**
9. **Relevant Work Experience.**
10. **Any other relevant information**

Queries if any and the reply in PDF FORMAT to be submitted online addressing to;

TO,

THE DIRECTOR TDF, DRDO

DRDO BHAWAN, RAJAJI MARG, NEW DELHI 110011

Email to, arjunk.hqr@gov.in, CC to dir.tdf-drdo@gov.in.