

## Terms of Reference

### Research Project

on

### Study of Cutter Suction Dredge Components

**Sectional Committee** : **Inland Harbour Crafts and Fishing Vessels  
Sectional Committee, TED 18**  
**Division Council** : **Transport Engineering Division Council**  
**Duration** : **3 Months**

1. **TITLE** : Study of Cutter Suction Dredge Components

2. **BACKGROUND** :

**2.1** Dredging is the excavation of material from a water environment. Possible reasons for dredging may include improving existing water features, reshaping land and water features, navigability or recovering valuable mineral deposits or marine life. Dredging has significant environmental impacts. It can disturb marine sediments, leading to water pollution, destroy important seabed ecosystems, and can release toxins captured in the sediment and hence can significantly hurt marine wildlife populations, contaminate sources of drinking water or interrupt economic activities such as fishing.

**2.2** The cutter suction dredger is a stationary dredger equipped with a cutter device (cutter head) which excavate the soil before it is sucked up by the flow of the dredge pump(s). During operation the dredger moves around a spud pole by pulling and slacking on the two fore sideline wires. This type of dredger is capable to dredge all kind of material and is accurate due to their movement around the spud pole.

**2.3** Currently, following Indian Standards are available on the subject:

- a) IS 10854 (Part 1) : 1984 Specification for cutter suction dredge components  
Part 1 Cutter
- b) IS 10854 (Part 2) : 1984 Specification for cutter suction dredge components  
Part 2 Suction pipe
- c) IS 10854 (Part 3) : 1984 Specification for cutter suction dredge components  
Part 3 Ladder
- d) IS 10854 (Part 4) : 1984 Specification for cutter suction dredge components  
Part 4 Spuds
- e) IS 10854 (Part 5) : 1993 Inland vessels - Cutter suction dredge components  
Part 5 Cast spud point - General requirements
- f) IS 10854 (Part 6) : 1993 Inland vessels - Cutter suction dredge components  
Part 6 Cast spud cylinder - General requirements

**2.4** No Indian Standard is available on dredge pump and impeller which is used in the cutter suction dredge. Technical developments, in the field of cutter suction dredge, the components being used in it and their raw materials, might have also taken place.

**2.5** It is in this context that there is a need for in-depth, incisive study on cutter suction dredge components which are currently being used.

### **3. OBJECTIVE**

The objective of research and development project is to collect data, information and evidence from primary and secondary sources in respect of cutter suction dredge components which are currently being used.

### **4. SCOPE:**

**4.1** A thorough literature review on cutter suction dredge components, which are currently being used which will include existing international standards if any, research papers published on the subject, any studies conducted by industry bodies/ associations or any other literature which includes study of components covered in current Indian Standards and parameters specified for them.

**4.2** Visits to regulatory bodies, classification societies, shipyards and dredging companies for discussion on requirements covered under their rules/ regulations/ approval criterion. The regulations which are expected to be enforced in near future are also to be studied. Visits to different stakeholders shall be based on an agreed sampling plan at **5.1**.

**4.3** Collection of export and import data and applicability of technical regulations on the cutter suction dredge components.

**4.4** Identification of manufacturing base of the components in the country and visits to manufacturers of different components based on discussion.

**4.5** Identification of testing laboratories, especially NABL accredited labs, and testing facilities in the country for different components and visit different labs.

**4.6** Study and comparative analysis of components based on factors, but not limited to, power rating, production capacity, dredging depth, width of cut, type of soil and access to dredging site.

**4.7** A comprehensive report documenting work done as mentioned above, research findings, data collected and bibliography shall be prepared.

## **5. SAMPLING PLAN**

**5.1** Based on the identification of stakeholders, manufacturing and testing base, a sampling plan is required to be agreed upon for visits to different stakeholders and also for collection and testing of samples during the visit, if any.

**5.2** In case the manufacturing and testing infrastructure in the country is sufficiently available under large, medium and small scale, the proposer needs to submit a sampling plan to BIS for approval.

## **6. RESEARCH METHODOLOGY**

**6.1** Carry out thorough literature review as specified in **4.1** and **4.2**.

**6.2** After the literature review, there will be discussion with BIS to approve the sampling plan so that visits can be undertaken.

**6.3** Collect information from stakeholders through discussion, structured questionnaire as specified in **4.2** and **4.3** for the issues faced by them and factors considered in selection of cutter suction dredge components.

**6.4** Visits to dredging sites to witness the cutter suction dredge. A discussion on issues being faced by the field staff during the process and impact of factors, listed in **4.6**, on the components should be done with them.

**6.5** Visits to manufacturers facilities to witness the manufacturing process of different components and to collect the samples for testing. A focused discussion on raw materials being used, manufacturing process, in-process quality checks and testing facilities for different parameters and test methods should be done with quality personnel.

**6.6** Visits to testing laboratories, especially NABL accredited labs, to get the samples tested. Discussion should also be done with quality personnel on testing of different parameters, their testing methods and equipment being used for testing.

**6.7** Collect data and feedback from different users through circulation of questionnaire.

## **7. DELIVERABLES**

An analytical report, in soft and hard copy, covering all aspects mentioned in the scope shall be submitted. Details of visits to different dredging sites, component manufacturers, laboratories, discussions with dredging field staff, quality control personnel, questionnaire with exporters/ importers, feedback from users, research findings, data collected, test results, comparative analysis of components and bibliography of the literature covered shall be appended to the report.

**8. TIMELINE AND METHOD OF PROGRESS REVIEW:** A stage wise indicative timeline plan is provided below:

- a) Project timeline – 3 months from the date of award of project
- b) Primary source interaction time frame covering the review of the literatures – By the end of 20 days
- c) Secondary source interaction covering the discussion with regulatory bodies/ classification societies/ shipyards and existing stipulations, thereof – By the end of 45 days
- d) Visits to dredging sites, component manufacturers and laboratories and testing of collected samples – By end of 75 days.
- e) Final report covering all the aspects of the ToR – By end of 90 days.

**9. SUPPORT BIS WILL PROVIDE:**

**9.1** BIS will provide access to latest editions of available standards including international standards.

**9.2** BIS will provide information regarding licencees and recognized laboratories available.