



INDIAN INSTITUTE OF TECHNOLOGY MADRAS
Chennai 600 036

Telephone : [044] 2257 8356/8368

FAX : [044] 2257 0545/8366

E-mail: arpp@iitm.ac.in



Ref: OEC/07-08/082/NRBX/VGID

Date: 14.02.2013

Tender No.: OED/VGID/005/2013

N.E. Nagaraj
Special Officer (Project Purchase)
IC&SR, I.I.T. Madras

Due Date: 11.03.2013, 3:30pm

Dear Sirs,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of Multi Element wave maker control system conforming to the specifications given in Annexure.

I) Instructions to the Bidder

- (i) **Preparation of Bids:-** The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.
- (ii) **Delivery of the tender:-** The tender shall be sent to the below-mentioned addresses either by post or by courier so as to reach our office before the due date and time specified in our Schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule. The tender box is kept in the office of the "Special Officer, Project Purchase" IC & SR Building 2nd floor, I.I.T. Madras, Chennai – 600 036.
- (iii) **Opening of the tender:-** The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and it will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The financial offer/bid will be opened only for the offer/bids which technically meet all our requirements as per the specification. The bidders, if interested, may be present on the financial tender opening Day which will be communicated to you.
- (iv) **Prices:-** The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges to Various Institutions. The offer/bid

should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of tax & duties should be clearly indicated.

The price should be quoted without custom duty and excise duty, since I.I.T. Madras is exempt from payment of excise duty, and the custom duty will be paid at concessional rate against duty exemption certificate.

In case of import supply, the price should be quoted on FOB and CIF basis indicating the mode of shipment.

- (v) **Agency Commission:-** Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent.
- (vi) **Terms of Delivery:-** The item should be supplied to our Various Institutions as per Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.

Yours faithfully,

N.E. Nagaraj
Special Officer (Project Purchase)
IC&SR, I.I.T. Madras.

SCHEDULE

I) Important Conditions of the tender

1. The due date for the submission of the tender is **11.03.2013, 3:30pm.**
2. The offer/bids should be submitted in two bid systems (i.e.) Technical bid and Financial bid. The technical bid should consist of all technical details along with commercial terms and conditions. Financial bid should indicate item-wise price for the items mentioned in the technical bid. The Technical bid and the Financial bid should be put in separate covers and sealed. Both the sealed covers should be put into a bigger cover. The limited tender for supply of **“Multi Element wave maker control system”** should be written on the left side of the outer cover.
3. (i) EMD:- Two percent (2%) of the tender value quoted by the company. The EMD should be included in the Financial bid which will not be opened for Technical evaluation. **Enclosing the EMD in the Technical bid will automatically disqualify the tenderer.** EMD should be in the form of DD in favour of “The Registrar, Indian Institute of Technology Madras” and payable at Chennai. The tender without EMD would be considered as UNRESPONSIVE and REJECTED. Photo/FAX copies of the Demand Draft/Banker’s pay orders will not be accepted. The EMD will not be paid any interest and EMD shall be converted as a security deposit of the successful bidder and the same will be returned after the completion of the warranty period.

(ii) The Successful bidder should submit Performance Security an amount of 5% of the value of the contract. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from commercial bank will be an acceptable.

(iii) The Performance Security should be valid for the period of 12 months from the date of Installation.

(iv) The EMD (Bid Security) will be refunded to the Successful bidder on receipt of Performance Security.

4. If an Indian agent is involved, the following documents must be enclosed:
 - i) Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
 - ii) Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
 - iii) The enlistment of the Indian agent with Director General of Supplies & Disposals under the Compulsory Registration Scheme of Ministry of Finance.
5. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
6. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.
7. Documentary proof for the claimed position and repetition accuracies must be obtained from the principals and submitted along with the relevant pages of the standards.
8. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
9. **Delivery Schedule:-** The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.

10. **Risk Purchase Clause:-** In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.

11. **Payment:-** 7.0 Payment terms

- a. 10% payment after approval of concepts design and drawings.
- b. 60% payment by LC or direct ayment witnin India after the Shipemtn of goods.
- c. 10% after the successful demonstration of control system software.
- d. 15% payment after the installation, commissioning and handling over the system.
- e. 5% will be retained for ensuring performance guarantee and will be released after the warranty period.

12. **On-site Installation:-** The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at Institution of IIT Madras.

13. **Warranty/Guarantee:-** The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately.

14. **Late offer:-** The offers received after the due date and time will not be considered.

15. **Acceptance and Rejection:-** I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

16. **Disputes and Jurisdiction:-** Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

17. **Acknowledgement:-** It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE.**

DEPARTMENT OF OCEAN ENGINEERING IIT, MADRAS

Ref: OED/13/01/MEWM

CALL FOR TECHNICAL AND COMMERCIAL PROPOSALS

FOR

Upgradation of Wave Generation Control Hardware and Software with integrated Data Acquisition system for Multi Element Wave Maker installed and functioning in a wave basin

1. Introduction

The Department of Ocean Engineering, Indian Institute of Technology Madras (IITM) has unique wave generation facilities for the simulation of ocean waves in the laboratory. One such facility is housed in a large **wave basin** of size, 30m x 30m with a water depth of 3m. This wave basin has a snake wave making system that consists of 52 paddles that can operate in different phases to produce oblique and short crested waves. At present, the wave generation is achieved through DOS operating system that was installed during early nineties. The intention of the present upgradation process is to replace the control and Data Acquisition hardware part alone with a dedicated newly developed software that is compatible with present day advanced operating system. The integrated package, in addition to necessary hardware, shall include suitable software modules for wave generation and data acquisition. The software solution shall be modular and be suited for long term sustainable operation and maintenance. It is preferable to have a 'WINDOWS 7 or 8' based front end GUI irrespective of the operating system adopted for the control system.

2. Scope of Work

The scope of the work includes,

1. Evaluation of the present wave generation system and its hardware
2. Identification, design, supply and commissioning of total system with necessary control hardware to generate and control waves as mentioned in section 6. The hardware should be compatible with the existing hydraulic power pack and Moog servo valves.
3. Suitable software for wave generation must be developed and supplied. (Refer Section 2.1)
4. Suitable data acquisition system has to be supplied as specified in section 2.1.

The software for wave generation and data acquisition has to be integrated and work as a single application seamlessly.

2.1 Details

The integrated software package should have the following:

1. Development of Graphic User Interface (GUI) based wave generation and data acquisition software package to replace the present DOS version.

2. The software shall be in modular form, as DLLs or other equivalent, and shall satisfy the following requirements.
 - a) It shall be developed on any of the commonly available industry standard platform and of the industry standard languages. Source code along with the licensed development platform of the software shall be supplied and will be subsequently owned by IITM.
 - b) The links and calls of the main supervisory application to other modules / libraries shall be clearly identified along with the calling methods and protocols.
 - c) The flow of data and ownership within the wave generation software module shall be identified and documented.
 - d) IITM shall have the right and be able to modify any of the modules, such as wave generation, data acquisition, data analysis, GUI etc. The necessary information and guidelines shall be provided in the form of 'manuals'. This manual shall be different from a separate 'user manual' which will be used by a common user.
3. Design of suitable hardware system for the replacement of existing Digital Servo Control (DSC) Cards for the 52 paddles.
4. Design of suitable hardware system for multiple 16 / 32 Channel Data acquisition System (Required number of channels is 64 with a minimum resolution of 16bit with a minimum sampling rate of 1kHz for each channel. 64 channels MUST be simultaneously sampled).
5. The export and import of data, acquired by the data acquisition system should be feasible both in binary and ASCII formats.
6. The vendor must supply and integrate the new hardware modules with the existing servo actuators powered by the existing Hydraulic Power pack system, Integrate the developed software, Test and Calibrate the total system functions.
7. The vendor should install and Commission the new wave generation facility so that the upgraded facility passes all the conditions mentioned in the acceptance criteria. Complete and exhaustive documentation on the hardware and software supplied must be provided.
8. Professional training on Operation and Maintenance of the system at IITM must be imparted to IITM personnel.

3.0 Available resources

- 3.1. 52 paddle MULTI ELEMENT WAVE MAKERS, each 0.5m wide and operated using 52 Hydraulic servo drives. The Host PC is interfaced with,
- 3.2. Hydraulic Power pack with PLC controlled system
- 3.3. 52 numbers of Digital Servo controller Cards with a closed feedback control system.
- 3.4. 32 channel data acquisition system to collect test data which communicates with the sensors / transducers with the standard protocol.

Note: It is envisaged to replace only required items mentioned in 3.3 and 3.4 and retain the hydraulic power pack.

Vendor shall identify and qualify components that need replacement.

3.1 Other resources

- a) Any additional requirement (such as temporary hardware or personal computers for testing purposes/ expected assistance during the testing phase) for the development, installation and testing **MUST** be spelt out in the technical part of the bid. IIT Madras may or may not accept to provide the additional requirements.

- b) Vendor can maximize the utilization of the existing system for the present development but without any constraint on its use by IITM. Any additional hardware or other items considered necessary can be proposed under this package.

The MEWM system (hydraulic and control system) in the present stage will be handed over to the vendor on the day of work order / Letter of Acceptance in working condition. During the course of upgradation, if some of the components which are not the part of the proposed upgradation (but still required for the upgraded system to function) fails due to negligence/ accident on the vendors part, the vendor shall repair and replace the part free of cost. If the failure is due to normal wear and tear, then vendor should take the responsibility to rectify the fault or replace such components. IIT Madras will make the payment only to the vendor as per actual expenditure on proof of service / purchase by the vendor on mutually agreeable claim. This applies to all the components of the system including hydraulic components, servo valves and feedback displacement transducers (LVDT).

4.0 Call for Technical and Commercial proposal

Based on vendor's expertise in understanding the system to be upgraded, vendor is invited to submit the Technical and Commercial proposals before the tender closure date. Vendor is required to submit the technical and commercial proposals in two separate sealed covers and both of the above covers should be placed inside another cover, sealed and submitted. The commercial bid shall indicate break-up of the costs as per items identified under Scope of work. An unpriced commercial bid (Commercial bid identical to the one placed in the sealed commercial bid cover without the prices indicated herein) should be placed. The vendor must provide clarifications sought by the technical team at IIT Madras before opening the commercial bid. Only the commercial bids of bidders who are found to technically qualified by the technical committee of IIT Madras will be opened with intimation to the bidders.

Under optional requirements, vendor is required to include a cooling system for 'Hydraulic oil' to sustain the wave maker operation for a sufficiently longer duration under tropical temperatures in Chennai (The maximum ambient temperature would rise up to 45°C and the relative humidity rises up to 95%).

Vendor is advised to add any number of additional optional items that are required for efficient running of the system.

Vendor should ensure that all the proposed hardware components should be of high quality and software supplied is robust.

The bidder has to present the technical merits of the proposal to the Technical Committee of IIT Madras and clarify queries.

4.1 Warranty clause

The vendor should provide comprehensive warranty for the continued operation and free replacement guarantee for the supplied components for 24 months from the date of successful handover of a completely working wave generation and data acquisition system.

In addition, vendor should provide pricing for continuing the warranty and guarantee for succeeding 36 months in the form of annual maintenance contract. The Annual Maintenance Contract (AMC) should cover replacement of supplied and existing components (which are not replaced under this contract) on a chargeable basis.

It is the responsibility of the successful vendor to provide an upgraded system to pass the acceptability criteria listed below before handing over. If only part of the system is upgraded (depending on the approved bid), it is still the responsibility of the vendor to make the entire system to run coherently to produce waves as per the acceptability criteria given below. IIT Madras will not accept failure to deliver for the sake of malfunctioning of one of the existing components.

In addition, the vendor has to supply a list of additional spares including control cards required for the need of day-to-day operations with a forecast period of 10 years. The total cost of such spares should be quoted separately in the commercial bid.

5.0 Prerequisite

The vendor has to submit proof of documents for the installation of similar control system for the generation of multi directional waves using hydraulic power pack. In addition, the proof of documents for successful completion of at least two projects of similar nature should be submitted.

6.0 Acceptability criteria

- a. To generate regular harmonic waves of smaller amplitude with wave period, 0.8 s, 1.2 s, 1.6 s, 2.0 s and 2.5 s for a duration of 30min each continuously.
- b. To generate a regular harmonic wave with the wave height of 50 cm and period of 1.6s.
- c. The measurement of wave height (an average computed over 5 wave cycles immediately following the transient wave) will be made using resistance type wave gauges. The

maximum acceptable deviation between input and measured wave heights is 5% for both (a) and (b).

- d. The generation of uni-directional random waves and multi directional random waves needs to be demonstrated. The reproduction of such waves will be tested with the ensemble wave parameters: significant wave height, peak wave period and mean wave direction. The maximum acceptable deviation between input and measured parameter is 5 %.

7.0 Payment terms

- a. 10 % payment after approval of concept design and drawings.
- b. 60 % payment by LC or direct payment within India after the Shipment of goods
- c. 10 % after the successful demonstration of control system software.
- d. 15 % payment after the installation, commissioning and handing over the system.
- e. 5 % will be retained for ensuring performance guarantee and will be released after the warranty period.

8.0 Terms and conditions

Please quote the rate with the following details.

1. Quotation validity minimum 180 days.
2. Submission of Concept design/drawings, Delivery, installation and commissioning periods.
Tax details.
3. Please note IIT Madras is exempted from Excise Duty.
4. The technical and commercial quotations should be sealed in separate covers and identified clearly by suitable written statements on the covers. Both the envelopes containing the technical details and the commercial bids must be placed in another envelope which should also be sealed and submitted on or before the tender closure date.
5. The technical bid will be opened and scrutinized by a technical committee of IITM, which will qualify the bidders for their technical suitability. Commercial bids of only qualified companies satisfying the prerequisite criteria (Refer section 5.0) will be considered for further processing.

9.0 Force majeure

Neither the Agency nor the owner shall be considered in default in performance of its obligations hereunder if such performance is prevented or delayed for any causes beyond the reasonable control of the party affected, such as war, hostilities, revolution, riots, civil commotion, epidemic, major fires, explosions, floods, earthquakes or because of any law, order, proclamatory regulations or ordinance of Government, provided notice in writing of such cause with necessary evidence that the obligation under the Contract is thereby affected or prevented or delayed, is given within 14 days from the happening of the event and in any case it is not possible to serve the notice within the said 14 days period, then within the shortest possible period without delay.

As soon as the cause of Force Majeure has been removed, the party whose ability to perform its obligation has been affected shall notify the other party the actual delay occurred on account of such activities.

Although the time for completion of work shall be suitably extended (not exceeding the period during which the work was stopped on account of Force Majeure clause), such extension shall not result in any financial claim by the Agency against the Owner on any account of such a delay for any other reason whatsoever.