



LME:012: C

LOCOMOTIVE ENGINEERING DEPTT.

PURCHASE SPECIFICATION

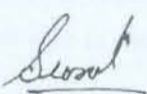
LME/PUR/3137
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SUBJECT:
PURCHASE SPECIFICATION FOR CONSULTANCY FOR RECTIFICATION OF BCM

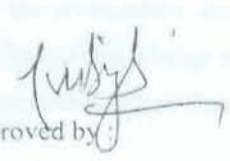
Enclosures:

1. Technical Specification of BCM (Annex-I)
2. List of Spares (Annex-II)
3. OGA of BCM (Annex-III)

Rev	Date	Prepared	Rev	Date	Prepared	Rev	Date	Prepared
		Approved			Approved			Approved
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I. GENERAL:

M/s BHEL has developed Ballast Cleaning Machine (BCM) in collaboration with M/s MTH Praha of Czech republic. As per the contract with Indian Railways, 2 No BCMs are to be manufactured & supplied in line with IR specification having ballast cleaning capacity on turnouts also. The BCM Machine is to be supplied to IR based on their specification. It was developed by BHEL in two parts i.e.; 1.) Power Unit 2.) Working Unit. The Power Unit has been completely designed by M/s BHEL. However, the working Unit has been designed by M/s MTH Praha. The major component of working unit has been supplied by M/s MTH. The assembly of Working unit has been done in BHEL Jhansi under the guidance of M/s MTH personnel. The machine has several electrical, hydraulic and pneumatic equipments mounted on the BCM.

Now, since M/s MTH has gone bankrupt, it is not possible for us to get any support from M/s MTH. Before the MTH went into the state of bankruptcy, both the machines were assembled. The in-house testing was done on one BCM. During that testing certain discrepancies were observed in the BCM. The most of them were that time attended but one major problem was left un-attended before the last team from MTH left BHEL Jhansi.

Since design of working unit is of M/s MTH, BHEL doesn't have any design details of hydraulic /electrical Controls /Systems/Components.

The consultant will study the mechanism & working of machine & will identify the areas where this BCM does not meet the IR spec requirements. One of the major issues presently in our knowledge is that these machines are not able to meet the requirement of cleaning the ballast on both left and right hand turnouts.

Consultant shall be required to analyze and furnish design details to attend the already identified problem i.e.; inability of machine to work on turn out & also to resolve the subsequent problems that may arise during modification, testing & inspection of machine.

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II. Description of the problem:**a.) Identified Problem in BCM Machine :**

According to the design specification the machine has to perform both on straight track as well as on Turn outs. BCM machine complete with power car and working unit was tested for ballast cleaning on straight plain track. The working of machine on plain track was found satisfactory. But the machine is not able to work on turn outs because the opening of hydraulic cylinders to enable the chute to open to reach the specified distance to cover turnout was not possible.

The ascending and descending chutes both along with their drive motor are connected to a frame which can adjust itself by moving up and down slightly while we open or close the chutes.

In presently manufactured machine it is not possible to open the chutes to the desired distance so that Machine can work on turnouts.

a.1) Expected work for above mentioned problem :

1. The capability of the chain, driving motor and other supporting structural parts needs to be examined for their capability as the power required to work on turn out may be more as compared to straight track. (**for Drawings of BCM Refer Annex – III**)
2. Modification in existing mechanism so that opening and closing the chute to cover the turnouts become feasible. Consultant shall furnish the design details for carrying out the modification.

b.) Further work to be done on BCMs :

b.1.) The consultant has to study the ballast cleaning machine and advise BHEL remedial course of action with design details to make the machine capable to meet the requirements as mentioned in IR specification for BCM ,(Refer Annexure –I). To mention a few , the Complete BCM machine should be able to perform following functions satisfactorily after incorporation the required modification(to be detailed by consultant) :-

i.) BCM has to be capable of excavating ballast bed up to a depth of 900mm below the rail top and entire width of ballast section. The width of the ballast section from mainline track centre may vary from 2700mm for plain track to 4800mm for turnouts.

ii.) The machine is supposed to deep screen both left hand / right hand turnouts when approached from either direction i.e. from the switch or the crossing side, depending upon the site conditions. No turning of machine should be required for this.

iii.) The machine should be capable to return the ballast sizes from 65mm maximum to 25mm minimum to the bed. The machine is required to be capable of cleaning, grading and profiling a minimum 550 cubic meter of ballast on plain track in an hour of working including hard, encrusted and caked ballast.

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b.2.) Following are the other terms w.r.t. work to be assigned to consultant:

- 1) The Consultant has to undertake the prime responsibility that rectified BCM, based on the rectification advised by them, will conform to the specification cited in Annexure -I & meet all the working requirement of BCM.
- 2) Consultant shall furnish design calculation, component drawings, specification for the rectification work.
- 3) The consultant will study the machine & its components & explore the sources for supply of spare items of BCM Machine. (List of spares enclosed as Annex -II)
- 4) Consultant shall supervise the rectification work at BHEL premises.
- 5) Consultant shall revise the spare parts list and O&M manual of BCM based on modifications, as advised by them.
- 6) Consultant shall provide at his own cost the service of an experienced Service Engineer for a total period of 16 weeks for satisfactory commissioning of Machines at Railways site.
- 7) Consultant shall arrange necessary spare parts after exploring its sources for operation & maintenance of Machine for 2 years.
- 8) Consultant shall also assist in field trials that will take place at IR sites. The responsibility of getting the machine accepted by RDSO lies with consultant.
- 9) Consultant is also needed to impart the training to IR personnel about working & mechanism based on rectification, as advised by them.
- 10) Consultant needs to furnish the performance guarantee for successful working of BCM.
- 11) Consultant shall also revise list of tools required by the operator in emergency & for normal working of the machine.
- 12) Consultant will associate with carry out all the tests as mentioned at Clause no 17 in IR spec (Annexure -I) so that machine can be dispatched from BHEL premises. The proving of machine shall be responsibility of consultant.

III. Document submission:

Consultant has to submit the following after having studied the machine.

- 1.) The drawings to carry out modification
- 2.) Revised spare parts manual
- 3.) Revised O & M manual
- 4.) Revised training manual

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Annexure-II

A **Recommended spare for 2 years of operation**

Sr.No.	Item Description	Qty.Nos
1	Steel Ropes/m/	2
2	Connection Blechert	10
3	Satellite Roller	1
4	Groose Nuts M 10 x 1	10
5	Hydraulic Lockers VTJ-10	1
6	Hydraulic Lockers VZD-10A3	1
7	Hydraulic Terminal	1
8	Electropneumatic Valve EV-58	1
9	Circuit Brakers	1
10	Control Buttons T6	10
11	Contactors	1
12	Relays	2
13	Other Electronic Component	1
14	Measurment System Sensors and Others (OPTIONAL)	0
15	Hydraulic Components others	1
16	Transport Roller	2

B **List of Consumbale spare for 2 years of operation**

Sr.No.	Item Description	Qty Nos
1	Excavating Chain	0
2	Teeth	400
3	Exeavating Chain Showel	10
4	Exeavating chain connecting pins	10
5	Steel Sheets	10
6	Teeth Clips	10
7	Chain Gear	1
8	Wearing plate Asc. Chute	2
9	Wearing plate Deso. Chute	2
10	End Wearing plate Asc. Chute	2
11	End Wearing plate Deso. Chute	2
12	Other wearing Plate	1
13	Wearing Plates Bolis Long	10
14	Wearing Plates Bolis Short	10
15	Nuts and Botls	10
16	Cutting Bar Long/Short	1
17	Swiveling End Left/Right	1

18	Chute Roller with Pin	1
19	Chain Gear Box Seal	1
20	Upper Screen	1
21	Lower Screen	1
22	Set of Connecting Material for Screen	1
23	Screen Coil springs	1
24	Lifting Equipment Roller Set	1
25	Lifting Equipment Roller	0
26	Lining Roller Set	1
27	Glue Set for Rubber Conveyors Bells	1
28	Brake Shoes	1 set
29	Traction Motor Fan	1
30	Brake cylinder seals set	1
31	Hydraulic Hoses set	1
32	Pneumatic Hoses set	1
33	Bulbs, Fuses etc.	1 set
34	Hydraulic Filters	1
35	Conveyor Belt	1 set of 20mm length of each size
36	Rubber Seals etc	1 set
37	Safety Glass Conex	1 set
38	Measurement System Spare Part	0

ANNEXURE -1

Activities		Payment Mode
1	Study of total mechanisms and working of the machine during running.	5%
2	Identify the areas, point by point, where existing machine does not meet the requirements of IR specifications.	
3	Preparation of detailed report, point by point, of deviations from IR specifications and preparation of action plan to carry out the rectification / modification work.	15%
4	Reverse engineering, preparation of conceptual drawings, preparation of detailed manufacturing drawings for modifications suggested, preparation of BOM as per BHEL.	
5	3D modeling for modified areas, design calculations and analysis.	
6	Vendor development and technical support to BHEL while manufacturing parts as per detailed drawings furnished by the consultant	15%
7	Technical support to BHEL in procuring bought out items as per BOM.	
8	Technical support and supervision during assembly of modified parts / new parts / bought out items by BHEL team.	
9	to prove the satisfactory operation of the machine.	
10	Providing services of experienced service engineer for a total period of 16 weeks for satisfactory commissioning of BCM at any one Railway site.	25%
11	Providing assistance, for a period of 2 weeks, in field trials at any one IR site.	
12	Providing training to IR personnel about working and its mechanisms based on rectifications carried out.	
13	Providing revised list of tools required by the operator in emergency and for normal working of the machine.	
12	Providing performance guarantee, for an amount of 10% of price, for 24 months after delivery of BCM at ultimate destination in India or 18 months from the date of commissioning & providing test of equipment at ultimate destination in India, whichever is earlier.	
15	Spare parts:	
15.1	Bought out items: Providing list with detailed specifications, make and source (BHEL shall procure the bought out items)	
15.2	Special manufactured spares: Providing list of detailed manufacturing drawings with material specifications (BHEL shall manufacture the parts as required)	40%
16	Providing revised spare parts list	
17	Providing revised O & M manual	
18	Providing revised training manual.	
19	Acceptance of BCM by Indian Railways	