

No. RW/NH-33044/2/88-DO II

Dated the 28th June, 1989

To

The Chief Engineers of All State PWDs/UTs dealing with NHs and other centrally sponsored road works;
Director General (Works), C.P.W.D.; Director General Border Roads

Subject: Use of equipments in bridge construction on National Highways and under other centrally sponsored schemes.

Bridge construction is basically equipment-oriented and capital-intensive. The successful completion of bridge projects depends to a large extent on proper scientific planning of equipments and their deployment on the work. For achieving efficiency as well as quality in construction, certain minimum equipments are needed for different items of work keeping in view the type of bridge, span length, total bridge length, methods of construction and completion time. Such equipments alongwith their capacities and numbers for each type should be finalised at the project preparation stage and included in the tender documents suitably, making it mandatory for the successful tenderer to deploy them on the works. A list of essential equipments for various items of work has therefore been prepared in the Ministry and is enclosed as Appendix-I.

2. It is requested that the above should be kept in view during preparation of projects and tenders for bridge works on National Highways and other centrally sponsored schemes.

Appendix I

Ministry's Circular No. RW/NH-33044/2/88-DO II dated the 28-6-89

LIST OF ESSENTIAL EQUIPMENTS FOR VARIOUS ITEMS OF WORK IN BRIDGE CONSTRUCTION

1. Foundation

1.1 Well foundation - sinking

- (a) Crane with grab buckets - capacity 0.5 to 2.0 m³
and/or
Double drum powered winches with grab of minimum capacity 0.35 m³
- (b) Submersible pump.
- (c) Air compressor and air/lock, where pneumatic sinking of well is anticipated.
- (d) Chisels of appropriate sizes
- (e) Diving helmets, wherever needed.

1.2 Pile Driving

- (1) For precast driven piles and sheet piling
Pile driving rig having
 - (i) Diesel hammer-suitable for driving in medium hard conditions, or
 - (ii) Hydraulic hammer-generally suitable for driving in all soil strata, or
 - (iii) Vibrating hammer - mainly suitable for non-cohesive soils.

- (2) Bored and cast-in-situ piles (minimum diameter 1 Metre)

Power augers or power operated grabbing rigs with hydraulically or pneumatically operated casing oscillator or equivalent modern equipment, e.g. B.S.P. Casegrande, Calweld, Soilmec or the like, alongwith grabs, chisels and other excavate tools. The contractor shall certify regarding the adequacy of his equipment for the intended diameter of piles and actual site conditions, supported by manufacturer's literature.

2. Aggregate Projection

- (i) Wherever aggregates are procured from approved quarries having mechanical aggregate crushing plant, no separate crusher need be insisted upon.
- (ii) Where mechanically crushed aggregates are not available the contractor must have at least a mobile jaw crusher (16 x 10) and granulator.

3. Production of Concrete

- (1) For overall bridge length of less than 200 metres. Batch type concrete mixer (NT) - Diesel or electric operated having following specifications:
- (a) Minimum size 200 lits.
 - (b) Automatic water measuring system.
 - (c) Integral weigher (hydraulic/pneumatic type)
- (2) For overall bridge length of 200 meters or more
- Concrete Batching and Mixing Plant - fully automatic with capacity of 15 m³/hour with automatic batcher capable of accurate weigh-batching and proper mixing.

4. Concrete Transportation (As per requirements)

- (1) For overall bridge length of less than 200 metres
- (a) Concrete dumpers - minimum 2 tonne capacity.
 - (b) Powered hoist - minimum 0.5 tonne capacity.
 - (c) Chutes
- (2) For overall bridge length of more than 200 metres
- (a), (b), (c) same as sub para (1) above.
 - (d) Buckets handled by cranes.
 - (e) Transit truck mixer.
 - (f) Concrete pumps.
 - (g) Concrete distributor booms
 - (h) Belt conveyor.

5. Compaction of Concrete

- (a) Internal vibrators - size 25 mm and above.
- (b) Form vibrators - Minimum 500 watts.
- (c) Screed vibrators - full width of carriageway. (upto 2 lanes)

6. Preparation of Reinforcements

- (a) Bar cutting machines.
- (b) Bar bending machines.
- (c) Sand blasting machine or any suitable mechanical cleaning device.

7. Prestressed Concrete

- (a) Machine for sheath making unless fresh sheathing is brought from the supplier of the prestressing system.
- (b) Cable threading machine, where appropriate.
- (c) Prestressing equipment with electrically operated pumps and other accessories as recommended by the system of prestressing adopted.
- (d) Grout Agitator/mixer - electrically operated.
- (e) Grout pump of positive displacement type.

8. Other Equipments

- (i) Air compressor
- (ii) Water tanker
- (iii) Welding machine
- (iv) Water pump
- (v) Generators
- (vi) Cranes
- (vii) Levels
- (viii) Theodolite
- (ix) Distomat for bridges having spans of 50 m or more
- (x) Mechanical workshop for bridges having overall length of 200 m and above.

- (xi) Lab testing equipment
 - (a) set of sieves
 - (b) cube moulds
 - (c) compacting rods
 - (d) cube testing machine
 - (e) vicat apparatus

9. Handling Equipment (as per requirements)

- (i) Dump trucks
- (ii) Wheel loader
- (iii) Tower Cranes
- (iv) Winches - hand/power operated
- (v) Power boats
- (vi) Barges
- (vii) Launches and tugs

10. Special Construction Equipment (as per requirements)

- (i) Slip form
- (ii) Centering truss for cast-in-situ superstructure.
- (iii) Launching truss - for precast superstructure.
- (iv) Bridge builder or similar type of equipment for cantilever construction
- (v) Gantry
- (vi) Pontoon sets