

No. RW/33044/2/88-D.O. II

Dated the 6th September, 1988

To

The Chief Engineers of State PWDs UTs dealing with NHs and other Centrally Financed Schemes;
Director General (Works), C.P.W.D.; Director General Border Roads

Subject: Steps proposed for improvement in existing procedure for approval of designs of bridges.

In accordance with a decision taken at the meeting of Chief Engineers held at Hyderabad on 21.1.1987, a Group was constituted by this Ministry to suggest possible measures for improvement in the existing procedure for approval of designs of bridges.

2. The Group has examined the matter and come out with its report. They have approached the problem by categorising bridges into 3 types viz. those with small spans of length of 25 m or less; those with large spans where departmental designs are adopted; and those important major bridges where lumpsum tenders on the contractor's alternative designs are permitted. They have also considered the State PWD's according to their design capabilities as Category A States, which have well organised design infrastructure capable of handling bridge designs and Category B States which have inadequate or no design infrastructure and are incapable of handling any type of bridge designs. The particular category in which any State falls may be decided by the State Chief Engineer himself after considering the design infrastructure and capabilities available with the PWD and intimated to this Ministry.

3. The recommendations of the Group as given in their Report and accepted by the Ministry for implementation are given in Annexure I. It is felt that the adoption of these recommendations will go a long way in reducing the delays in approval of bridge designs. Necessary instructions may please be issued to all concerned in your Department that these recommendations may be adopted in future for all bridge works on National Highways and under other Centrally Sponsored Schemes.

4. The receipt of this letter may please be acknowledged.

Annexure I to Ministry's Technical Circular No. RW/33044/2/88-DO-II dated the 6-9-88

RECOMMENDATIONS

1. Bridges of Span 25 m or less

- 1.1 For bridges having span of 25 m or less with open foundations, the finalisation of designs, except for bridges having skew angle more than 20 or curve radius less than 200 m) may be left entirely to the State P.W.D. in case of Category A States. For bridges with other types of foundations, approval of sample design of pier and foundation may be obtained from the Ministry by these State PWDs and approval of the remaining designs of piers and foundations may be given by the State PWD however, the final designs of the foundations proposed to be adopted should be shown in the estimate sent to the Ministry for sanction.
- 1.2 In case of Category B States, the PWDs may appoint competent consultants for project preparation. The designs prepared by these consultants should however, be got approved by the Ministry. Consultants should be appointed by the State P.W.D. in accordance with para 4 post.

2. Bridges of Spans more than 25 m

- 2.1 For bridges with spans exceeding 25 m, where departmental design is proposed to be adopted, State PWDs of Category A States may get only sample calculations of substructure, foundations and super-structure approved from the Ministry at the time of submission of the estimate for sanction. Thereafter the designs and drawings for the remaining piers, foundations and superstructures may be approved by the State PWD without further reference to the Ministry. Copies of all such finally approved drawings should be sent to the Ministry, only for record. For effectively discharging this function, State PWDs should modernise their design offices and use computer aided designs to the maximum extent possible. However, standard drawings for foundations, substructures and superstructures issued by the Ministry which can be fitted in to meet the requirements of the particular case, can be straightway adopted without reference to the Ministry. At any rate the design and drawings should be finalised before the award of work.
- 2.2 In case of P.W.Ds of Category B States, competent consultants may be appointed for preparation of designs and drawings. All such designs and drawings will have to be got approved from the Ministry. The methodology of selecting these consultants should be as given in para 4 post. As and when standard drawings for all components become available, these should be adopted by the State PWDs and consultants need not be appointed.

3. Major Bridges

- 3.1 For important and major bridges where lumpsum tenders based on contractor's alternative design are called for PWDs of Category A States should completely scrutinise the design and drawings and send them alongwith their comments to the Ministry for final approval.
- 3.2 The following recommendations are made for cutting short the time of design scrutiny and approval:
 - (a) The designs and drawings of the contractor should be checked simultaneously by the PWD and the Ministry. The contracting agency should, therefore, send an advance copy of the design and drawings to the Ministry also. This will enable the

Ministry to apprise itself of the technical issues involved, so that quick decisions for approval of designs can be taken as soon as comments of the State PWDs are received.

- (b) The provisions relating to soil parameters to be adopted in the design, other design criteria for different components and any specific requirements not covered by codal provisions (for example, whether the pier cap should be designed as a cantilever or as a bracket) should be clearly spelt out in the tender documents. For this, sufficient time and attention should be given to the detailed and thorough drafting of the tender documents.
 - (c) Pre-tender conferences may be made compulsory so that the contracting firms get an opportunity for obtaining clarifications or suggesting their own points to the department.
 - (d) The general arrangement of the bridge with respect to the entire structural system and minimum dimensions, subject to their being found adequate at the detailed design stage, should be indicated by the tenderer in his bid. Once the General Arrangement Drawing (GAD) is approved by the Deptt. alongwith the bid, no change in the same shall be permitted thereafter.
 - (e) The contractor should submit alongwith his tender a note giving his design approach conforming to the basic requirements which should be approved by the authorities while awarding the work so as to eliminate the possibility of wholesale changes being required in the design at a later date.
 - (f) Any change in codal provisions or executive instructions issued by the Ministry/State PWD subsequent to the award of work should not be made applicable unless it is absolutely essential.
 - (g) For timely execution of bridge works, a schedule for submission of designs should form a part of the tender. The details may vary from project to project but in general, design activities should not go beyond 25% of the stipulated period of the contract. A suitable clause imposing appropriate/penalties should also be added to cover any delay in compliance of these provisions.
 - (h) The PWD in consultation with the Ministry should also draw up a time schedule for according approval to the designs, which will vary from case to case depending upon the nature of the project. The time for according approval should be reckoned only from the time the final and complete design is furnished by the contractor. In other words, if comments on the design and drawings originally submitted by the contractor are sent by the department for modification, the time shall be reckoned only from the date of submission of the modified design.
 - (i) Comments on the design of any component should not be sent to the contractor by the State PWD in stages but should be sent only once after obtaining the views of the Ministry.
 - (j) Technical issues once decided should not be re-opened because of change of personnel either in the State PWD or in the Ministry.
 - (k) Since bilateral correspondence between the State P.W.D. and the contractor and between the State PWD and the Ministry sometimes lead to delay, it would be desirable to thrash out various issues through tripartite discussions amongst the Ministry, State PWD and the contractor in review meetings held from time to time. The presence of the contractor's designer at these review meetings is mandatory and should be stipulated in the tender itself. It should also be ensured by the State PWD that once a decision about the approval of design/drawing of a component of the bridge has been taken, no delay occurs in communicating it to the contractor.
 - (l) For encouraging the contractor to furnish the design in time and to speedily attend to the compliance of comments on design given by approving authorities, a specific item may be included in the Billing Schedule for payment on submission and obtaining approval of design, which may be kept upto 10% of the contract amount. Out of this, 6% may be given on submission of final design and 4% on approval of the same. These percentages may be split among various components of the design. A general outline of the billing schedule is given in Appendix-I.
- 3.3 In case of PWDs of Category B States, proof consultants may be appointed by the State PWD for preparation of tender documents as well as to check the contractor's designs. These proof consultants should be available during the entire construction period to assist, the State PWD in preparation of revised designs, if required, due to variability in site conditions. For selection of such proof consultants also a procedure for prequalification should be observed by the State PWD on the same lines as mentioned in para 4 post.
- 3.4 Even Category 'A' States may engage a proof consultant for scrutiny of the design furnished by the contractor in case of an innovative or new type of structural system for which technical know-how for design as well as construction is not available with the department. Procedure for selection of such Proof Consultants shall, by and large, be in accordance with para 4 post except that international consultants may also be considered. In such cases, the departments cannot be expected to exercise any further check and the proof consultant should be made fully responsible for the total design including that for the construction stage.
- 3.5 In case the contracting firm does not have in-house design capability and proposes to engage separate consultants for preparation of design and drawings on their behalf, complete credentials as well as past experience of the consultant should be furnished alongwith their pre-qualification papers and only if the Department is fully satisfied with the competence and track record of the particular consultant proposed, should the contractor be prequalified. At tender stage or during execution, the contractor should not be permitted to change the consultant. A stipulation in this regard may be made in the tender and prequalification notice.
- 3.6 In case of major bridges, sometimes the Ministry and State PWD's refer computer-aided analysis and designs received from contractors to the I.I.Ts or Structural Engineering Research Centres for scrutiny. These organisations develop their own computer-programmes for checking the design. In such cases, it must be ensured while referring the designs to these Institutions, that the computer programmes developed by them should either be handed over to the Ministry/State PWD or should be available for repeated use at a pre-determined price.

4. Appointment of Consultants

- 4.1 Consultants should be appointed by the State PWD only from a pre-qualified panel which has been drawn up with the approval of the Ministry. In this connection letter No. NH-11065/10/88-NH III/DI dated 18.7.88 may be referred to.
- 4.2 For pre-qualification of consultants, the following points should be kept in view:

- (a) As in International practice, 75 per cent weightage should be given to the background and experience of the individuals who would actually be carrying out the design work on the project in question in the Consultancy firm. The remaining 25 per cent weightage should cover the other criteria of selection such as experience in design of similar work, managerial/financial/technical capacity and ability to complete in time and previous experience of dealing with the Ministry. No change of individuals whose names have been indicated earlier should be permitted after award of work.
 - (b) The headquarters or branch of the Consulting firm should be located either in the State where the work is being carried out or at Delhi to facilitate discussions and finalisation of designs with the State PWD/Ministry.
- 4.3 The tender document should clearly specify that the Department has the right to engage consultants for scrutiny of designs furnished by the contractor at any stage of the work.
- 4.4 Consultants engaged by the Department should not be permitted to work as consultants for the contracting firm to whom the work is awarded.

*Appendix I***Recommendations (Clause 3.2)****BILLING SCHEDULE**

	Percentage	On Submission	On approval
1.	Design of Foundations.		
	(a) Pier well		
	(b) Abut. well		
	(c) Pier & Abut. Well caps.		
2.	Design of Substructure		
	(a) Pier		
	(b) Pier cap		
	(c) Abut.		
	(d) Abut. cap & returns.		
	(e) Bearings.		
3.	Design of Superstructure		
	(a) Girders		
	(b) X-Beam/brackets		
	(c) Deck		
	(d) Footpath, railing, curb, wearing coat etc.		