

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

স্থানীয় সরকার প্রকৌশল অধিদপ্তর

আগারগাঁও, শের-ই-বাংলা নগর

ঢাকা-১২০৭।

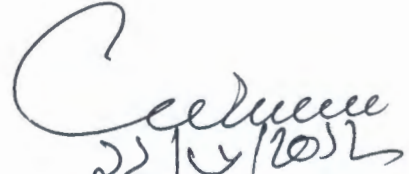
স্মারক নং-এলজিইডি/সিই/ডিঃইউঃ/ডি- ৯০/২০০৯/৭২৯

তারিখঃ ১১-০৬-২০১২ইং।

অফিস আদেশ

এতদ্বারা সংশ্লিষ্ট সকলের অবগতির জন্য জানানো যাচ্ছে যে, এলজিইডি কর্তৃক উপজেলা, ইউনিয়ন ও গ্রামীণ সড়কে বিভিন্ন দৈর্ঘ্যের ও ধরণের ব্রীজ নির্মাণ করা হচ্ছে। কিন্তু লক্ষ্য করা যাচ্ছে যে, কোন কোন প্রকল্পের আওতায় ডিজাইনকৃত ব্রীজের Geometry, Vehicle Loading, Material Properties সঠিক ভাবে অনুসরণ করা হচ্ছে না। এলজিইডি'র ব্রীজ ডিজাইন প্রণয়নে একই Standard অনুসরণ করার লক্ষ্যে **“Bridge Design Standards for LGED”** প্রস্তুত করা হয়েছে। উক্ত Standards এলজিইডি'র সকল ব্রীজ ডিজাইনের ক্ষেত্রে ব্যবহার করার জন্য অনুরোধ করা হলো।

সংযুক্তিঃ Bridge Design Standards for LGED.


(মোঃ এয়াহিদুর রহমান)
প্রধান প্রকৌশলী

জ্ঞাতার্থে :

- ১। অতিরিক্ত প্রধান প্রকৌশলী (সকল), -----, এলজিইডি সদর দপ্তর, ঢাকা।
- ২। অতিরিক্ত প্রধান প্রকৌশলী (সকল), এলজিইডি, ----- বিভাগ।
- ৩। তত্ত্বাবধায়ক প্রকৌশলী (সকল), -----, এলজিইডি সদর দপ্তর, ঢাকা।
- ৪। তত্ত্বাবধায়ক প্রকৌশলী (সকল), এলজিইডি, ----- অঞ্চল।

কার্যার্থে :

- ১। প্রকল্প পরিচালক (সকল), -----, এলজিইডি সদর দপ্তর, ঢাকা।
- ২। নির্বাহী প্রকৌশলী (সকল), এলজিইডি, ----- জেলা।
- ৩। নির্বাহী প্রকৌশলী, প্রাথমিক শিক্ষা ও প্রশিক্ষণ (সকল), এলজিইডি, ----- অঞ্চল।
- ৪। নির্বাহী প্রকৌশলী (MIS Unit), এলজিইডি'র ওয়েব সাইটে প্রচারের জন্য অনুরোধ করা হলো।

**Government of the Peoples Republic of Bangladesh
Local Government Engineering Department**

Bridge Design Standards for LGED

June 2012

Bridge Design Standards for LGED

01. Design Specification:

- AASHTO – Load & Resistance Factor Design (LRFD) Latest Edition will be used as Design Standard for LGED Bridge design.

02. Bridge Loading:

- Vehicular Live Loading : AASHTO HL-93 Loading shall be used as vehicular live load for the design of LGED bridges.
- Wind Loading : Wind load analysis shall be done as per AASHTO-LRFD but wind speed will be taken from latest BNBC.
- Seismic Loading: Analysis of seismic force shall be done as per AASHTO-LRFD but seismic zone coefficient will be taken from Latest BNBC.
- Other Loading: Other Loading shall be considered as per AASHTO-LRFD.

03. Deck Geometry:

Bridge deck geometry shall be made following the guide line of Planning Commission as follows:

- Carriage-way width shall be 5.50m for all bridges on UZR and total width shall be 7.30m including footway.
- However, for bridges on UZR nearer to district HQ, large growth centers, industrial area, densely populated urban area and longer bridges carriage-way width shall be 7.3m and total width shall be 9.80m including footway.
- For bridges on UNR Carriage-way width shall be 3.7m for bridge length less than 30m otherwise 5.5m.

04. Railing Geometry:

Railing geometry shall be made as follows:

- Railing height above footpath = 1050mm
- Rail Post – 200mm x 200mm, (Champhered 20mm x 20mm).
- Rail Bar 3 Nos. – 150mm x 150mm (Champhered 20mm x 20mm).
- C/C Distance of Post is around 1500mm
- Rail bars shall be pre-cast concrete
- Reflector shall be provided in rail post
- Painting (red & white) shall be applied in all rail posts and bars as per current LGED maintenance guide line



05. Footway Geometry:

- Footway width at each side of bridge shall be 0.9m for 3.7m & 5.5m carriage width and 1.25m for 7.3m carriage width.
- Service Duct Provision: Service duct may be provided for all bridges nearer to district HQ, large growth centers, industrial area, densely populated urban area and longer bridges
- Kerb height shall be 250mm including wearing course from bridge deck

06. Girder Section:

- RC Girder Section: All RC Girder width in RC Girder bridge shall be 450mm
- Shape of PSC Girder Section:
 - Up to 40m (I/T girder)
 - 41-50m (T or box girder)
 - Above 50m (Box girder)
- Standard PSC Girder Section: I/T sections for PSC girder have been standardized for LGED bridges according to AASHTO Standard as shown in Appendix-I.

07. Girder Numbers:

Number of girder in each span of bridge for both RCC & PSC girder depending on the Carriage-way width shall be as follows:

- For 3.7m carriage width nos. of girder shall be 2(two)
- For 5.5m carriage width nos. of girder shall be 3(three)
- For 7.3m carriage width nos. of girder shall be 5(five)

08. Concrete Strength:

- Design Concrete Strength of PSC Girder : 35 Mpa (min.)
- Concrete Strength at the time of Stressing: 24 Mpa (min.)
- Age of PSC Girder at the time of Stressing: 14 days (min.)
- Concrete Strength of RCC Components of Bridge: 25 Mpa (min.)
- Reinforcing Steel minimum yield strength $f_y = 415$ Mpa (Grade 60).



09. Longitudinal Gradient:

Parabolic gradient varying from 2% to 5% shall be provided over the full length of bridge. However, the gradient of approach road shall be linear.

10. Deck Crossfall:

A minimum 2% cross slope shall be provided over the bridge deck. 50mm thick wearing course shall be provided uniformly over the deck slab.

11. Navigational Clearance:

The Navigational Clearance shall be in accordance with current BIWTA requirements. However, for waterways which have not been classified by BIWTA, consideration shall be given to the local requirements for passage of boats,

12. Pre-stressing Steel:

- Type & Grade of Pre-stressing Steel : 7 ply uncoated strand of 12.7mm dia with minimum UTS 1861 Mpa (270 Grade).
- Relaxation Type of HT Steel: Low relaxation.
- Anchorage Brand & System: Freyssinet or equivalent (Brand: Dynamic, Poston, Usha Martin etc) shall be used as anchorage system.
- Cable System: 12 T13 Cable System shall be used as standard cable system.
- Sheathing Duct: Galvanized corrugated metal sheet of internal diameter 75mm,

13. Design information to be provided in the drawings for PSC Girder:

- Minimum compressive strength of Concrete at 28 days
- Minimum UTS and type of Pre-stressing steel
- Nominal diameter and Area of Strand
- Area of cable system, Anchorage system, Duct size
- Nos. of strand in each cable
- Modulus of Elasticity of strand
- Anchorage slip length (as assumed in design)
- Design force prior to lock off
- Elongation of each individual cable
- Grip length of strand considered in elongation
- Instruction due to irregularities of elongation
- Stressing **stages and sequence**
- Stressing ends

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14. Expansion Joint & Bearing:

- Type of Expansion Joint: Provision of Strip Seal/Slab Seal expansion joint may be considered for longer span Bridges (span ≥ 25 meter). Otherwise angle plate type joint may be used
- Also provision of high quality Rain Water down pipes may be considered.
- Type of Bearing : Elastomeric Neoprene Bearing shall be provided. Provision shall be made in BOQ for one extra Elastomeric Neoprene Bearing for testing.

15. Standard Drawings of Bridge:

The following drawings shall be provided as standard drawing

- General Notes for RCC Components
- General Notes for Pre-stressed Concrete
- Guide line for Cast-in-situ bored piles
- Sub-soil Bore log
- Topographical Survey and Bridge Lay-out Plan .
- General Plan and Elevation.
- Bridge Deck Profile
- Pile Lay-out Plan.
- Details of Bridge Deck
- Details of RC Girders (Long & Cross sections)
- Details of Pre-stressed Concrete Girders
- Details of Abutments
- Details of Abutment Piles
- Details of Pier
- Details of Pier Pile
- Details of Railings
- Details of Bearing on abutment and Pier
- Expansion Joints
- Protective Works around Abutment & Approach road
- Details of Guard Post
- Approach road cross-section & Alignment plan
- Electrical installation & circuit diagram
- Long & cross drain of Approach road

16. Standard Drawings of PSC Girder:

- Dimensional details of PC girder including Plan, Elevation, mid-section & end section,
- Cables lay-out in Plan, Elevation,
- Mid-section & End-section,
- Emergence angle.
- Cable profile in both plan and elevation @ 1.0m interval.
- End block section including cable inclination angle at end.

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- Details of standard anchorage system
- Start and end of parabolic profile for individual cable including co-axial length.
- Details of shear reinforcement in section and in elevation of girder
- Reinforcement in anchorage block

17. Survey Profile :

- Sub-soil Profile & Topo Survey Map: Sub-soil profile and Topo Survey Map with RL (PWD/SOB) shall be included in bridge drawing. All survey works must be based on PWD/SOB BM.

18. Test requirement for HT Strand.

The following tests are needed to be performed for HT Strand prior to use in the PC girder.

- Ultimate Tensile Strength,
- Yield Strength,
- Unit Weight/Cross sectional area,
- Modulus of Elasticity and
- % of Elongation at Rupture.

19. Test requirement for Anchorage:

Anchorage efficiency test must be carried out from approved laboratory to confirm the quality and capacity of post tensioning anchorage.

20. Approach Road Design Section:

Full width black top pavement should be provided within the wing walls of abutment and gradually reduced to actual road pavement width.

21. Test requirement for Bearing Pad:

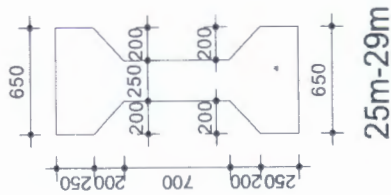
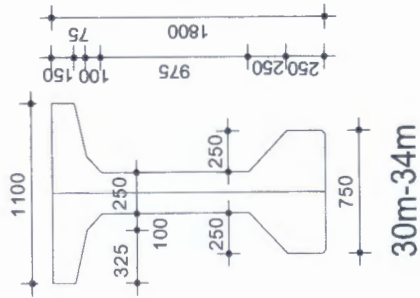
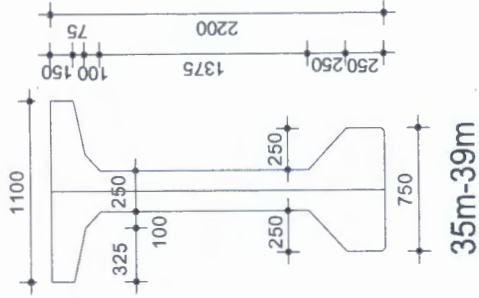
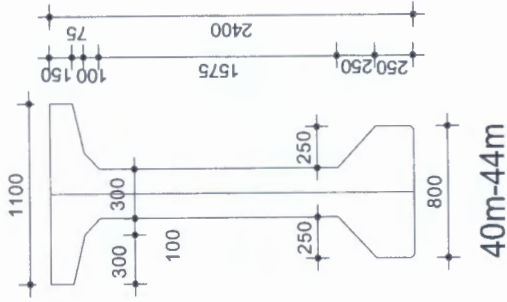
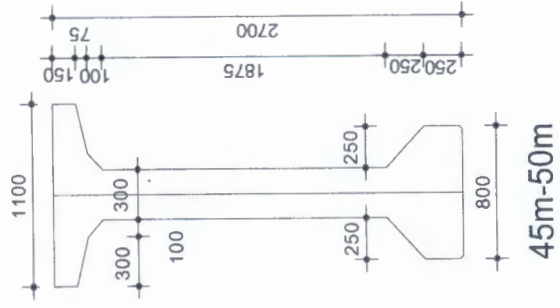
The following tests are needed to be performed for elastomeric bearing pad.

- Hardness,
- Compression set,
- Ash Content,
- Neoprene content
- Shear modulus.

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APPENDIX-I

Standard PSC Girder Sections for LGED



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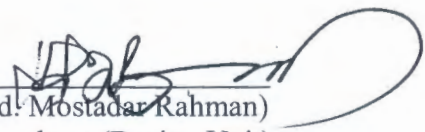
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Recommendation of Technical Sub-Committee

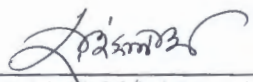
Local Government Engineering Department (LGED) is involved in the construction of bridges of various length on Union and Upazila roads of Bangladesh. To harmonize the bridge geometry, vehicular loading, material properties, drawings etc. Design Unit of LGED, with the participation of all bridge design consultants of LGED, prepared a Bridge Design Standards for LGED. Later on the Design Standard was presented in the 4th Inter Unit Co-ordination Committee (IUCC) meeting of LGED held on 20th March, 2012. As per decision of IUCC, Chief Engineer, LGED formed a technical sub-committee to examine and finalize the Design Standard. Accordingly, the sub-committee reviewed and finalized the Bridge Design Standards for LGED. The Design Standard shall be used for the design of all bridges to be constructed all over the country under LGED.



(Mr. Nani Bushan Roy)
Consultant (Design Unit)
Member

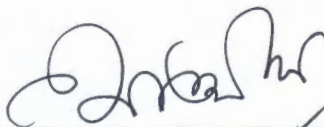

(Md. Moksad Alam)
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Member


Syed ~~Abd.~~ Abdur Rahim)
Executive Engineer
(Maintenance)
Member


(Md. Zahidul Islam)
Executive Engineer,
Design Unit
Member-Secretary


(Md. Abul Bashar)
Executive Engineer (QC)
Member


(Md. Abul Kalam Azad)
SE (Design & QC)
Convener