JTG

Professional Standard of the People's Republic of China

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公路桥涵设计通用规范

General Code for Design of Highway Bridges and Culverts

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Contents

1 General

1.0.1 This code is formulated to unify the technical standards for design of highway bridges and culverts, implement the relevant laws/regulations and highway technology policies by the state and make the design of highway bridges and culverts meet the requirements on advanced technology, safety, reliability, applicability, durability, economy and rationality.

1.0.2 This code is formulated on the basis of the principles set forth in *Unified standard for reliability design of highway engineering structures* (GB/T 50283) and the relevant provisions set forth in *Highway Engineering Technique Standards* (JTG B01) by Ministry of Communications.

1.0.3 This code is applicable to the structural designs of newly-built and rebuilt highway bridges and culverts of all levels.

1.0.4 The line shapes of highway bridges and culverts shall harmonize the overall layout of the line.

1.0.5 Highway bridges and culverts shall be designed in considerations of the role, properties and future developing demands in the highway, which shall accord with the principles on beautiful appearance and favorable for environmental protection, other than the requirements contained in Article 1.0.1, and it shall also consider such factors as local conditions, local materials and convenience for constructions and maintenance, etc.

The bridges and culverts adopting standard span shall adopt prefabricated structure to facilitate mechanized and factory-oriented constructions.

1.0.6 **The design reference period of highway bridges and culverts shall be 100 years.**

1.0.7 Bridge and culvert structures shall be designed for bearing capacity limit state and normal service limited state.

1) Bearing capacity limit state: it corresponds to the deformation or displacement where bridge and culvert structure or its structural members have reached maximum bearing capacity or can bear no more load.
2) Normal service limited state: it corresponds to the state where bridge and culvert structure or its structural members have reached certain limit values for normal service or durability

   When conducting designs for abovementioned two kinds of limit states, it shall satisfy the requirements on structure and technique as well.

1.0.8 It shall consider following three design situations and conduct corresponding limit state designs based on different actions (or loads) of highway bridges and culverts, their effect to bridges and culverts and the environment in which bridges and culverts are allocated.

1) Persistent situation: it is a situation where bridges and culverts have to bear dead weight and vehicle loads, etc, for a long time after completion. Under this situation, it is necessary to conduct limit state designs for bearing capacity and limit state designs for normal service to bridges and culverts.
2) Transient situation: it is a situation where bridges and culverts shall bear temporary actions during constructions. Under such situation, it only needs to conduct the limit state design for bearing capacity, and the limit state design for normal service be conducted only when it is necessary.
3) Accidental situation: it is a situation casually occurred during the service of bridges and culverts. Under such situation, it only needs to conduct the limit state design for bearing capacity

1.0.9 When it is to conduct limit state design for bearing capacity based on persistent situation, the design safety of highway bridges and culverts shall be divided into three grades according to the severity degrees of consequence possible to produce from structural damage, which shall be no less than the stipulations set forth in Table 1.0.9.

Table 1.0.9 Design Safety Degrees for Highway Bridges and Culverts Structure

Design Safety Degrees	Bridges and Culverts Structure
Grade 1	grand bridge, material great bridge
Grade 2	great bridge, medium bridge, material small bridge
Grade 3	small bridge, culvert

Note: The grand, great and small bridges etc, listed in this table shall be determined by the single-opening spans given in Table 1.0.11 of this Code, for multi-span and unequal-span bridges, it shall be subject to the largest span among them; the great bridge and small bridge with 'material' in front refer to the bridges on expressways, first class highways, national defense highways and busy highways nearby cities.

For highway bridges and culverts with special requirements, their design safety grades may be determined according to actual situations.

The safety grades of structural members for a same bridge/culvert structure shall be the same as the overall structure, partial adjustment may be carried out if there are special requirements, but the grade difference after adjustment shall not exceed one grade.

1.0.10 It shall conduct landscape designs for special great bridges; the bridges over expressways and first class highways shall coordinate with the natural environment and landscapes.

1.0.11 Classifications for grand, great, medium and small bridges and culverts in terms of single-opening span or total length of multiple spans are given in Table 1.0.11.

Table 1.0.11 Classifications for Bridges and Culverts

Classifications for bridges and culverts	Total length of multi-opening spans L(m)	Single-opening span L_k(m)
Grand bridge	$L > 1000$	$L_k > 150$
Great bridge	$100 \le L \le 1000$	$40 \le L_k \le 150$
Medium bridge	$30 < L < 100$	$20 \le L_k < 40$
Small bridge	$8 \le L \le 30$	$5 \le L_k < 20$
Culvert	---	$L_k < 5$

Note: (1) Single-opening span means standard span;

(2) The total length of multi-opening spans for beam bridge and slab type bridge shall be the total length of multi-opening standard spans; the total length of arch bridge shall be the distance between arch spring lines within two abutments on two banks; the total length of other bridges the length of traffic lanes on deck;

(3) All pipe culverts and box culverts are called culverts regardless of pipe diameters or span or the number of holes;

(4) Standard span: beam bridge and slab bridge shall be subject to the length of center line between two piers or bridge center line length between pier center line and front edge line at back of abutment; arch bridge and culvert shall be subject to net span.

1.0.12 Other than strict implementation of relevant technical management system and quality control, highway bridges and culvert design shall also propose in design documents the corresponding requirements on structural design, characteristic of materials, structural durability, the fabrication or construction processes necessary to be specialized and service conditions of bridges and culverts, etc that are connected with engineering quality.

1.0.13 The designs of highway bridges and culverts shall accord with the stipulations of relevant national standards in force other than this Code.

Table 4.3.7-6 Resistance coefficient of bridge pier or tower k_1

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