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Specifications for Design of Highway Subgrades

公路路基设计规范

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Specifications for Design of Highway Subgrades

公路路基设计规范

JTG D30—2004

Edited by: CCCC Second Highway Consultants Co., Ltd.

Approved by: The Ministry of Transport of the People's Republic of China

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The Ministry of Transport of the People's Republic of China
Public Notice

No. 67 [2011]

On Release the English version of *Specifications for Design of Highway Subgrades* (JTG D30—2004)

The English version of *Specifications for Design of Highway Subgrades* (JTG D30—2004) is hereby released for the very purpose of promoting international exchange of highway engineering industrial standards.

The Ministry of Transport of the People's Republic of China is responsible for management and interpretation of this English version while CCCC Second Highway Consultants Co., Ltd., the compilation unit of this specification, is for routine interpretation and management.

The Chinese version shall always prevail in case of any discrepancy of interpretation in English and Chinese version.

Comments and suggestions from users are welcome and shall be addressed timely to CCCC Second Highway Consultants Co., Ltd. (Address: No. 18, Chuangye Road, Wuhan Economic & Technological Development Zone, Wuhan, Postal Code: 430056, E-mail: wanphx@263.net).

The Ministry of Transport of the People's Republic of China

October 8, 2011

INTRODUCTORY NOTE TO ENGLISH EDITION

In order to fulfill international projects, as well as to further the international exchange in the field of highway technology and standardization, the English edition of the prevailing Chinese standards of highway construction is compiled and translated from the current Chinese edition under the authorization of the Ministry of Transport of the People's Republic of China and with the sponsorship of the Export-Import Bank of China and the China Communication Construction Company Limited(CCCC).

The work was launched by the Steering Committee jointly chaired by Mr. Li Shenglin, Minister of Transport and Mr. Li Ruogu, Chairman of the board and president of the Export-Import Bank of China. The coordination for the translation, compilation and other relevant works was carried out under the leadership of Mr. Zhou Jichang, Chairman of the board of CCCC. The primary English edition was provided by the Leading Editor of the Chinese edition. The review, final editing and overall compilation was assigned to the China Road and Bridge Corporation.

The final English edition of the *Specifications for Design of Highway Subgrades* (JTG D30—2004) was reviewed and compiled by Mr. Lu Yan, approved by Mr. Yao Haidong, and was published and issued by Standards Press of China.

Comments, suggestions and inquiries are welcome and shall be addressed to:

Leading Editor of Chinese Edition: CCCC Second Highway Consultants Co., Ltd. (Address: No. 18, Chuangye Road, Wuhan Economic & Technological Development Zone, Wuhan, Postal Code: 430056, E-mail: wanphx@263.net)

Leading Editor of English Edition: China Road and Bridge Corporation (Address: 88C Andingmenwai Dajie, Beijing, Postal Code: 100011, E-mail: crbc@crbc.com)

The Ministry of Transport of the People's Republic of China
Public Notice

No. 26

On Release the *Specifications for Design of Highway Subgrades* (JTG D30—2004)

It is hereby to issue the *Specifications for Design of Highway Subgrades* (JTG D30—2004) to go into effect on January 1, 2005, and the former *Specifications for Design of Highway Subgrades* (JTJ 013—95) shall be superseded on the same date.

Specifications for Design of Highway Subgrades (JTG D30—2004) is chiefly revised by CCCC Second Highway Consultants Co., Ltd., and is generally administrated and finally interpreted by the Ministry of Transport. The former will take responsibility for the specific interpretation and routine management of the specification.

Comments, suggestions and inquiries are welcome and shall be addressed to the Leading Editor: CCCC Second Highway Consultants Co., Ltd. (No. 498, Yingwu Avenue, Hanyang District, Wuhan, post code 430052). The feedbacks will be used as reference in future revisions.

The Ministry of Transport of the People's Republic of China

September 4, 2004

Foreword

Since the 1990s, China highway construction has stepped into a rapid growth period. To meet the needs of highway construction in the new era, the *Specifications for Design of Highway Subgrades* (JTJ 013—95) was published by the Ministry of Transport in 1996. The specification has played an important role in unifying technical requirements, improving design levels and ensuring the roadbed quality. In the past decade, some new problems in roadbed design have emerged. The Ministry of Transport and all administrative departments of transportation from each province, municipalities and autonomous region have conducted special studies on these relevant issues, to promote and apply new theories, new techniques, new materials and new technologies in highway construction. The applications have achieved good results while many accumulated experiences in design and construction, especially in mountainous areas, have provided a solid technical support for revision of the specification.

Referring to the document [2000] No. 722 issued by Highway Department of the Ministry of Transport—"Notice on work plan in year 2000 to establish or revise standards, specifications and quotas on highway engineering", and the document [2002] No. 288 issued by the Highway Department of the Ministry of Transport—"Highway Engineering System of Technical Code, Standard, Specification", the specification has been revised. This revision covers relevant contents of other specifications, such as the *Technical Specifications for Design and Construction for Fly ash Embankment* (JTJ 016—93), *Technical Specifications for Design and Construction of Highway Embankment on Soft Ground* (JTJ 017—96), *Specifications of Drainage Design for Highways* (JTJ 018—96), *Technical Specifications for Application of Geosynthetics in Highway* (JTJ 019—98) and so on. Based on the original one, the revision puts more weight on highlighted problems in current roadbed design, such as the limits and principles of high-fill and deep-cut, slope protection, roadbed compaction standards and special roadbed design, etc. The philosophy of the systematic design of highway roadbed and the design principles for ecological conservation, environmental protection and landscape coordinating design are highlighted. Great emphasis is made on questions like the geological and hydrological investigation, integrity of overall foundation treatment, selecting filling material, strength and stability of roadbed, slope protection, drainage systems, and construction technology on hardship situations and so on. The following is a list of revisions made:

1. The requirements concerning the degree of compaction and roadbed strength (CBR) have been complemented and improved in the revision, which adds some technical requirements for the design in Chapter 3 including treatment of joints between the embankment and structures such as bridges and culverts, treatment of boundary region between excavation and embankment, embankment with high and steep slope, high slope in cut, rockfill embankment, fly ash embankment, etc.

2. The contents and technical requirements for construction monitoring and dynamic designing are proposed in the roadbed design with high slope, ground treatment and roadbed disease treatment.

3. In the revision, the drainage system design requirements of highway roadbeds have been improved and an oil-water separation tank, drainage pumping station, oblique drainage holes, supported sewer and other drainage facilities have been added. In addition, the integrated design of roadbed drainage and slope protection has been strengthened.

4. The title of Chapter 5 "Roadbed Protection" has been replaced by "Roadbed Protection and Retaining", in which new contents and technical requirements have been added for retaining walls, slope anchoring, soil nailing, anti-slide piles and other supporting and retaining structures.

5. Chapter 6 "Roadbed Widening and Reconstruction" in the revision is a new chapter, in which more contents are supplemented, such as existing roadbed evaluation methods and standards and some technical design requirements about roadbed widening and renovation at Expressway, Class 2 highway and lower class highway.

6. Chapter 6 "Special Roadbed" of the original specifications has been revised and moved into Chapter 7 in the new revision. In this section, technical requirements of special roadbed design treatment such as soft soil roadbeds, red clay and high liquid limit soil roadbed, roadbed subjected to rockfall, coastal roadbed, reservoir area roadbed are supplemented so that the technical requirements involving landslide, rock fall, mud-rock flow, karst, permafrost soil, loess, expansive soil, saline soil, blown sand, snow hazard, drift ice, etc. are improved.

The specification and its explanations are revised based on recent scientific achievements, relevant domestic and abroad information and experiences on engineering practices. But comments, suggestions and inquiries are still welcome for future revisions, which should be addressed to the chief editor: CCCC Second Highway Consultants Co., Ltd. (No. 498, Yingwu Avenue, Hanyang District, Wuhan, post code 430052).

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Contents

1 General Provisions

1.0.1 This Specification is prepared with the purpose of unifying the technical standards of highway engineering roadbed design and making roadbed engineering design and technology meet the requirements of safety, usability, economy and rationality.

1.0.2 This Specification is applicable to the roadbed designing of construction and reconstruction of all classified highways.

1.0.3 Roadbed shall have sufficient strength, stability and durability.

1.0.4 Roadbed design shall meet environmental protection requirements, prevent geological disasters, and reduce adverse impact on the ecological environment.

1.0.5 Engineering geological surveys shall be carefully performed before roadbed design, so as to ascertain the hydrogeological and engineering geological conditions and obtain the needed geotechnical mechanical parameters for design.

1.0.6 An integrated design involving foundation treatment, fill material selection, strength and stability of roadbed, slope protection, drainage systems as well as construction technology in key parts shall be done in roadbed design.

1.0.7 High embankment and deep cutting should be avoided in roadbed design. When the center height of the embankment exceeds 20m or the center excavation is deeper than 30m, the best option of bridges, tunnels and separated roadbed should be selected through comparison in view of the road alignment options.

1.0.8 The edge elevation of flooded roadbed shall not be less than the total height of the designed flood level in specific frequency, plus value of water rising level and 0.5m security height. The designed flood frequency of subgrade at all classified highways shall be in accordance with those specified in Table 1.0.8.

Table 1.0.8 Design Flood Frequency of Subgrade

Highway classification	Expressway	Class-1 highway	Class-2 highway	Class-3 highway	Class-4 highway
Design flood frequency of subgrade	1/100	1/100	1/50	1/25	Determined by the specific conditions

1.0.9 In poor hydrological and hydrogeological conditions, the minimum design fill height of embankment in the design shall not be lower than the critical height of the subgrade in a moderate moist state. When the designed elevation of roadbed is restricted, soil treatment shall be done in the wet soil roadbed and excessive wet soil subgrade and the resilience modulus of the treated roadbed shall be no less than the requirements stipulated in pavement specifications.

1.0.10 The dynamic design method is appropriate for high slope embankment, steep slope embankment, excavation high slope, landslide and soft soil roadbed in Expressway and Class-1

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