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Specification for Design of Highway Asphalt Pavement

**公路沥青路面设计规范**

**Issued on October 10, 2006**

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中华人民共和国行业标准

**Specifications for Design of Highway Asphalt Pavement**  
**公路沥青路面设计规范**  
**JTG D50-2006**

Edited by: CCCC Highway Consultant Co., Ltd.

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

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Public Notice**

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**On Release the English version of *Specifications for Design of Highway Asphalt  
Pavement (JTG D50—2006)***

The English version of *Specifications for Design of Highway Asphalt Pavement (JTG D50—2006)* 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 Highway Consultants Co., Ltd., the compilation unit of this specification, is for routine interpretation and management.

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Comments and suggestions from users are welcome and shall be addressed timely to CCCC Highway Consultants Co., Ltd. (Address: 85 Deshengmenwai Dajie, Beijing, Postal Code: 100088, E-mail: sssohpdi@163.com).

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 Asphalt Pavement (JTG D50—2006)* was reviewed and compiled by Mr. Zhang Qinghong, 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:

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

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### On Release the *Specifications for Design of Highway Asphalt Pavement*

(JTG D50—2006)

It is hereby to issue the *Specifications for Design of Highway Asphalt Pavement* (JTG D50—2006). to go into effect on January 1st,2007. The former *Code for Design of Highway Asphalt Pavement* (JTJ 014—97 ) shall be superseded from the same date. The general administration and final interpretation of the specification belong to the Ministry of Transport. The Chief Development Organization. CCCC Highway Consultants CO. , Ltd. is responsible for particular interpretation for application and routine administration

Comments, suggestions and inquiries are welcome and shall be addressed to the Leading Editor: CCCC Highway Consultants CO. , Ltd. (No. 33, Qianchaomian Hutong. Dongsu. Beijing, post code: 100010; Tel: 010-65237331). The feedbacks will be used as reference in future revisions.

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

October 10. 2006

## Foreword

Since its issuance and implementation, the *Code for Design of Highway Asphalt Pavement* (JTJ 014—97) has played a major role in improving the quality of asphalt pavement design. But with the continuous development of highway construction and advancement of asphalt pavement technology, parts of the Code are unable to meet the actual requirements, further revision and improvement is needed. According to the requirements for code revisions by the Ministry of Transport, a revision panel chaired by CCCC Highway Consultants CO., Ltd and included related universities, research institutes, and design institutes, was formed. The revision panel summarized the recent practical engineering experience and research results and performed extensive research and investigation. After repeated reviews and considerations, the *Specifications for Design of Highway Asphalt Pavement* (JTG D50—2006) has been finalized to supersede the former "Code".

This Specification consists of 11 Chapters and 7 Appendices. The major revisions compared to the former code include:

1. Emphasis on traffic load analysis and forecast according to the actual situation and the concept of life cycle costs for pavement design:
2. Took technical measures to prevent early damage, strengthened the requirements for the material, mixture and combination design of pavement structure, and added design elements for flexible base and lean concrete base;
3. Subdivided the mixture gradation type of semi-rigid base course, adjusted aggregate gradation range, and added the frost resistance design requirements for fly-ash and lime stabilized aggregate:
4. Improvements were made in parameters' value-taking for pavement thickness calculation and the formula for existing road strengthening:
5. Increased the design content of asphalt surfacing on existing cement concrete pavement:
6. Added design content of asphalt pavement on concrete bridge deck, etc.

Comments, suggestions and inquiries are welcome and shall be addressed to the chief editor (address: 33 Qianchaomei Hutong, Dongsu District, Beijing, post code: 100010; Tel: 010-65237331, E-mail: sso@hpdi.com.cn) so that they can be used as references in future revisions.

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## **1 General**

**1.0.1** This Specification is prepared with the purpose of meeting the development of highway construction, making the asphalt pavement meet service requirements, guaranteeing the quality of pavement, and improving the durability of pavement.

**1.0.2** This Specification is applicable for the asphalt pavement design in the construction and reconstruction of all classified highways. Accommodation highway can use this Specification as a reference.

**1.0.3** Asphalt pavement design consists of works of the survey, analysis and forecast of traffic volume, material selection, mixture design, test and determination of design parameters, combination design of the pavement structure and thickness calculation, design of pavement drainage system, and the design of other pavement engineering, and the work of providing the recommended scheme based on comprehensive comparison of technology and economy of pavement structure schemes.

**1.0.4** The asphalt pavement of Expressway and Class-1 highways should not be constructed in stages. Sections of highway which may possibly have significant settlement such as soft soil area, high fill subgrade, loess collapsibility area, and highway with low traffic volume at the early stage can be "designed entirely and constructed by stages".

**1.0.5** Asphalt pavement design shall follow the following principles:

- 1 Survey and collect on-site information, analyze and predict traffic loads, and design the pavement based on the concept of life cycle cost.
- 2 Survey and master subgrade characteristics along the route, soil quality, and wetness type of subgrade. Perform the integrated design of the subgrade and pavement after consideration of the soil improvement for sections with poor geologic conditions.
- 3 Follow the principles of adjusting measures to local conditions , selecting the material, and saving the resources: choose the pavement structure scheme that has advanced technology, reasonable economy, reliable safety, and is convenient to construct.
- 4 Consider the local conditions, actively and circumspectly promote new techniques, structure, materials and new technologies, and carefully pave the test road, summarize the experience, make improvements continuously, and promote the achievements step by step.
- 5 The related provisions of the national environmental protection should be followed, the safety and health of the related personnel must be protected; attentions should be paid to the recycle of materials and handling of wasted materials.

**1.0.6** The index and parameters in the Specifications have certain prerequisites and application conditions, which should be applied rationally in specific designs with considerations of engineering practice to ensure the quality of the projects.

**1.0.7** For the pavement structure in special areas like perennially frozen soil, desert, saline soil, expansive soil, and so forth, pavement should be designed according to the provisions in this Specification and in combination with practical experience, giving consideration to factors such as local climate, hydrology, soil property, materials, and so forth.

**1.0.8** The design of pavement should conform to not only this code, but also to current relevant national and industrial standards and specifications.

## **2 Terms and Symbols**

### **2.1 Terms**

#### **2.1.1 Asphalt pavement**

The pavement structure paved with asphalt surface course.

#### **2.1.2 Semi-rigid base**

The base paved by aggregate or earth materials, which were stabilized by inorganic binding agent.

#### **2.1.3 Rigid base**

The base paved by the materials of common concrete, roller compacted concrete, lean concrete, reinforced concrete, continuously reinforced concrete, and so forth.

#### **2.1.4 Flexible base**

The base paved by hot or cold mixed asphalt mixture, asphalt penetration crushed stone and granular materials without any hinder. Granular materials include graded crushed stone, graded gravel, natural granule which complies with gradation, graded crushed gravels which are made by crushed gravels mixed with natural gravels, clay-bound macadam, marl-bound macadam and gap choked crushed stone, etc.

#### **2.1.5 Axle load spectrum**

Probability distribution of different axle loads of various vehicles.

#### **2.1.6 Equivalent effect numbers of single axle loads**

Based on the principle of deflection equivalent or tension stress equivalent, different effect numbers of axle loads from different types of vehicles are converted into equivalent effect numbers of single axle loads with the standard axle load 100kN.

#### **2.1.7 Equivalent effect numbers of cumulative axle loads**

The total equivalent effect numbers of axle loads of one lane within the design period, after

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