Contents

1 Engineering Structure-Related Stable Equilibrium and Deformation Compatibility Control Method 1
1.1 Compatibility of Engineering Structure System and Mechanics Analysis 2
1.1.1 Deformation Compatibility Control Problems According to Past Engineering Structure Cases 2
1.1.2 Implied Deformation Compatibility Control Condition in the Application of Newtonian Mechanics and Experimental Mechanics 4
1.2 Three Problems Identified in the Safe State of Engineering Structure 12
1.2.1 Problem in the Conversion of Structure Equilibrium 12
1.2.2 Problem in Branch Point Stability 16
1.2.3 Problem in Structure Deformation Compatibility 19
1.3 Approaches to Solving Different Engineering Problems and Their Concepts 22
1.3.1 Solution to the "Apple and Leaf" Problems 23
1.3.2 Engineering Mechanical Analysis of Steady-State and Nonsteady-State Structures 24
1.4 Deformation Incompatibility of Engineering Structure Inducing Damage Concentration on Weak Parts of the Structure 25
1.5 Deformation Compatibility Control Method for Engineering Structures 28

2 Engineering Deformation Compatibility Control Method and Structural Safety Management 37
2.1 Effect of Deformation Compatibility Control on the Transmission or Transfer of Force in Structural Systems 38

2.2 Application Effectiveness of Deformation Compatibility Control Method in Bridge Structures 41
2.2.1 Comparison of Damage Accumulation on Simple Support Bridge Before and After Bridge Reinforcement 42
2.2.2 Accumulated Damage Test on Bowstring Arch Bridge Structures. 49
2.2.3 Deformation Compatibility Control Problems in Bridge Expansion Device and Deck Paving 52
2.2.4 Deformation Compatibility Control Problem Associated with Bridge Safety in Mountain Areas 56
2.3 Application Effectiveness of Deformation Compatibility Control Method in Tunnel Structure 61
2.3.1 Deformation Compatibility Control Measures for Mountain Tunnel 62
2.3.2 Deformation Compatibility Control Measures for Shield Tunneling 64
2.3.3 Application Effectiveness of Deformation Compatibility Control Method in Metastable Tunnel Construction 69
2.3.4 Application Effectiveness of Deformation Compatibility Control Method in the Construction of Soft Plastic-Flow Soil Tunnel 73
2.4 Application Effectiveness of Deformation Compatibility Control Method in the Management of "Bump at Bridgehead" on Soft Soil Road Foundation 88
2.4.1 Uneven Subsidence of Soft Soil Road Foundation 89
2.4.2 Comparison Test and Calculation Analysis of Integrity and Friability of Bridge-Head Soft Soil Road Foundation 91
2.4.3 Comparison of Soft Soil Foundation Strength and Rheological Properties in Tests 95
2.4.4 Basic Law and Design Method for Soft Soil Foundation 98
2.4.5 Introduction to Successful Management of Soft Soil Road Foundations 100

Comments from Sun Jun 103

Afterword 111

Bibliography 115

http://www.springer.com/978-981-10-1892-3

Deformation Compatibility Control for Engineering Structures
Methods and Applications
Zhu, H.; Zhou, Z.; Chen, M.; Deng, J.
2017, XII, 116 p. 84 illus., 45 illus. in color., Hardcover
ISBN: 978-981-10-1892-3