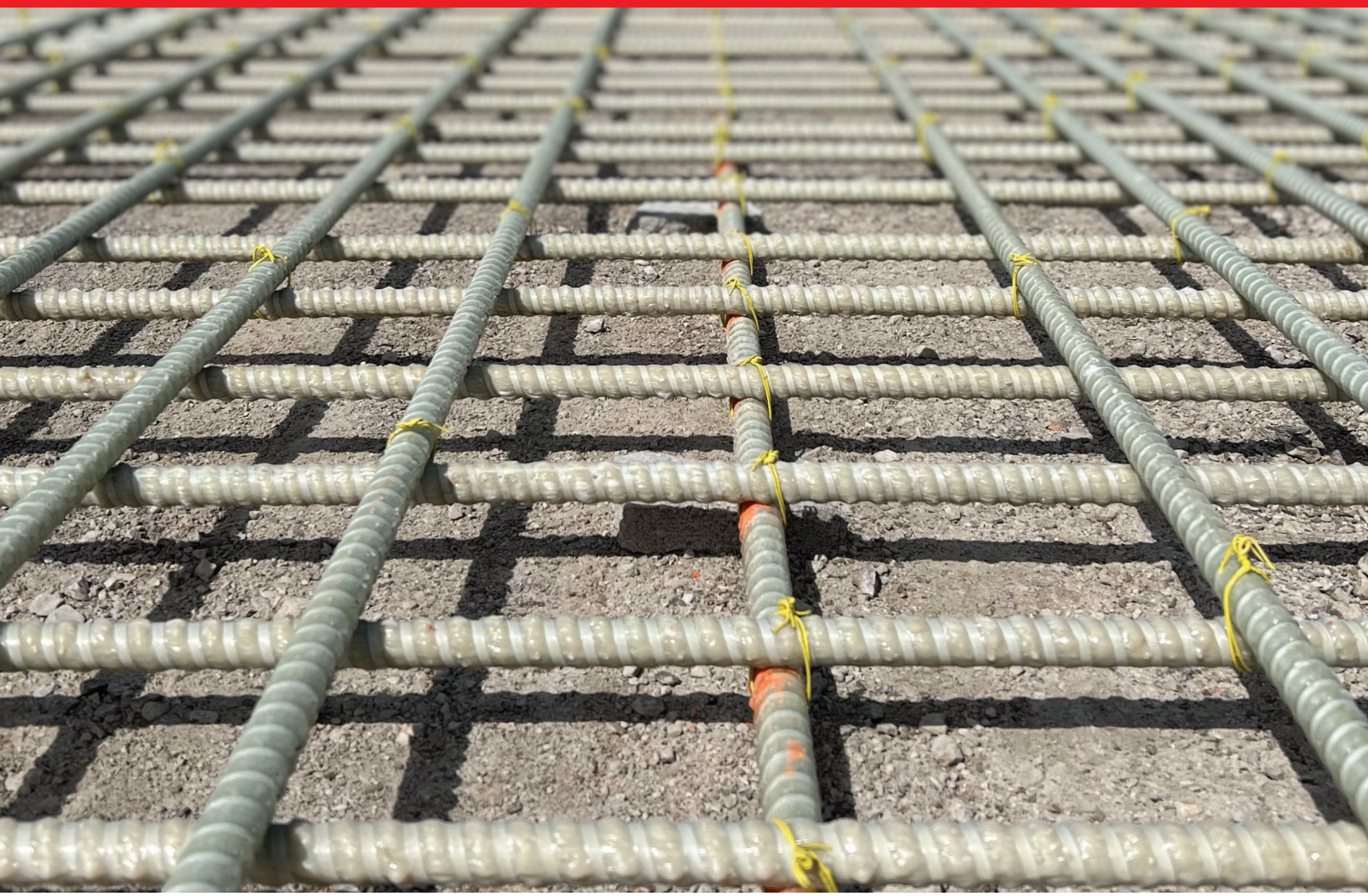


An ACI / NEx Manual

GFRP-Reinforced Concrete Design Handbook

A Companion to ACI CODE 440.11-22



MNL-7(23)

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GFRP-Reinforced Concrete Design Handbook

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CONTENTS

PREFACE 6

CHAPTER 1—INTRODUCTION 7
1.1—ACI CODE-440.11 format and scope 8
1.2—Format and scope of this manual 10
1.3—Example building floor plan and section 10
1.4—Example building loads 13
1.5—Example building material properties 13

CHAPTER 2—FRP MATERIALS 15
2.1—Constituent materials 15
2.2—Mechanical properties 16
2.3—Thermal properties 18
2.4—Long-term properties 19

CHAPTER 3—BENEFITS AND USE 21
3.1—Introduction 21
3.2—Noncorrosive 21
3.3—Lightweight 22
3.4—Easily cut 23
3.5—Nonmagnetic 24
3.6—Nonconductive 25
3.7—Low thermal conductivity 25

CHAPTER 4—CODES AND STANDARDS 27
4.1—Material tests and standards 27
4.2—Construction standards 29
4.3—Scope of ACI CODE-440.11 29
4.4—ACI CODE-440.11 and the International Building Code 30

CHAPTER 5—APPLICATIONS 33

CHAPTER 6—FIRE 37
6.1—Fire resistance in ACI CODE-440.11 37
6.2—Other fire protection strategies 40

CHAPTER 7—ONE-WAY SLABS 41

ONE-WAY SLAB EXAMPLE—FIVE SPAN CONTINUOUS SLAB 42
STEP 1—MATERIAL REQUIREMENTS 42
STEP 2—SLAB GEOMETRY 43
STEP 3—LOADS AND LOAD PATTERNS 44
STEP 4—ANALYSIS 44
STEP 5—FLEXURAL DESIGN FOR CRACK CONTROL 45
STEP 6—CHECK DEFLECTIONS 48
STEP 7—CHECK SUSTAINED STRESS LIMIT 53
STEP 8—CHECK MOMENT CAPACITY 53
STEP 9—CHECK SHEAR CAPACITY 55
STEP 10—CHECK GFRP REINFORCEMENT LIMITS 57
STEP 11—DEVELOPMENT LENGTH AND SPLICES 57
STEP 12—FINAL DESIGN AND DETAILING 58

CHAPTER 8—TWO-WAY SLABS 59

TWO-WAY SLAB EXAMPLE—DIRECT DESIGN METHOD 60
STEP 1—MATERIAL REQUIREMENTS 60
STEP 2—SLAB GEOMETRY 61
STEP 3—LOADS AND LOAD PATTERNS 61
STEP 4—ANALYSIS 62
STEP 5—FLEXURAL DESIGN FOR SERVICEABILITY 66
STEP 6—CHECK DEFLECTIONS 69
STEP 7—CHECK SUSTAINED STRESS LIMIT 72
STEP 8—CHECK MOMENT CAPACITY 72
STEP 9—ONE-WAY SHEAR STRENGTH 73
STEP 10—TWO-WAY SHEAR STRENGTH 74
STEP 11—DEVELOPMENT LENGTH AND SPLICES 75
STEP 12—FINAL DESIGN AND DETAILING 76

CHAPTER 9—BEAMS 77

BEAM EXAMPLE 1—CONTINUOUS INTERIOR T-BEAM 80
STEP 1—MATERIAL PROPERTIES 80
STEP 2—BEAM GEOMETRY 81
STEP 3—LOADS AND PATTERNS 82
STEP 4—ANALYSIS 83
STEP 5—FLEXURAL DESIGN FOR SERVICEABILITY 83
STEP 6—CHECK SPACING REQUIREMENTS 88
STEP 7—CHECK CREEP RUPTURE STRESS LIMIT 92
STEP 8—CHECK FLEXURAL STRENGTH 93
STEP 9—DEVELOPMENT LENGTHS, HOOKS, AND SPLICES 95
STEP 10—DETAIL THE BOTTOM REINFORCEMENT 96
STEP 11—SKIN REINFORCEMENT 101

BEAM EXAMPLE 2—CONTINUOUS INTERIOR T-BEAM AT FIRST INTERIOR SUPPORT 104
STEP 1—MATERIAL REQUIREMENTS 104
STEP 2—BEAM GEOMETRY 105
STEP 3—FLEXURAL DESIGN FOR SERVICEABILITY 105
STEP 4—CHECK CREEP RUPTURE STRESS LIMIT 111
STEP 5—CHECK FLEXURAL STRENGTH 111
STEP 6—CONSIDER IMPACT ON MIDSPAN DEFLECTION 114
STEP 7—DEVELOPMENT LENGTH AND SPLICES 114
STEP 8—DETAIL THE TOP REINFORCEMENT 115
STEP 9—SKIN REINFORCEMENT 116

BEAM EXAMPLE 3—CONTINUOUS INTERIOR T-BEAM AT EXTERIOR SUPPORT 118
STEP 1—MATERIAL REQUIREMENTS 118
STEP 2—BEAM GEOMETRY 119
STEP 3—FLEXURAL DESIGN FOR SERVICEABILITY 119
STEP 4—CHECK CREEP RUPTURE STRESS LIMIT 122
STEP 5—CHECK FLEXURAL STRENGTH 122
STEP 6—DEVELOPMENT LENGTH AND HOOKS 124
STEP 7—DETAIL THE TOP REINFORCEMENT 126
STEP 9—SKIN REINFORCEMENT 127

BEAM EXAMPLE 4—SHEAR DESIGN OF FIRST INTERIOR BEAM 130
STEP 1—MATERIAL PROPERTIES 130
STEP 2—BEAM GEOMETRY AND LOADS 131
STEP 3—BEAM SHEAR CONTRIBUTION 132
STEP 4—DETERMINE SPACING OF GFRP STIRRUPS 134
STEP 5—CHECK SHEAR AT BAR CUTOFF LOCATIONS 136
STEP 6—FINAL STIRRUP PLACEMENT 137
STEP 7—FINAL STIRRUP DETAILING 138

BEAM EXAMPLE 5—CONTINUOUS EXTERIOR L-BEAM 139
STEP 1—MATERIAL PROPERTIES 139
STEP 2—BEAM GEOMETRY 141
STEP 3—LOADS AND PATTERNS 141
STEP 4—ANALYSIS 142
STEP 5—FLEXURAL DESIGN AT MIDSPAN 143
STEP 6—DETAIL THE BOTTOM REINFORCEMENT 151
STEP 7—NEGATIVE MOMENT REINFORCEMENT 154
STEP 8—SKIN REINFORCEMENT 158
STEP 9—SHEAR REINFORCEMENT REQUIREMENTS 159
STEP 9—TORSION REINFORCEMENT REQUIREMENTS 161
STEP 10—CHECK FLEXURAL STRENGTH IN THE NEGATIVE MOMENT REGION 168
STEP 11—DETAILING LONGITUDINAL REINFORCEMENT 169

CHAPTER 10—COLUMNS 176

COLUMN EXAMPLE 1—INTERIOR COLUMN ANALYSIS 179
STEP 1—DETERMINE COLUMN SIZE 180
STEP 2—EVALUATE SLENDERNESS 182
STEP 3—SWAY OR NONSWAY MOMENT FRAME 184
STEP 4—DETERMINE SECOND-ORDER ($P\Delta$) EFFECTS FOR SWAY 185
STEP 5—SUMMARY 186

COLUMN EXAMPLE 2—INTERIOR COLUMN DESIGN 187
STEP 1—LONGITUDINAL REINFORCEMENT MATERIAL PROPERTIES 187
STEP 2—INITIAL DESIGN OF LONGITUDINAL REINFORCEMENT 187
STEP 3—AXIAL LOAD-MOMENT INTERACTION DIAGRAM 188
STEP 4—TRANSVERSE REINFORCEMENT MATERIAL PROPERTIES 193
STEP 5—DETAILING TRANSVERSE REINFORCEMENT 194
STEP 6—REINFORCEMENT THROUGH THE JOINT AT LEVEL 2 196
STEP 7—DETAIL THE COLUMN SPLICE AT JOINT AT LEVEL 2 196
STEP 8—SUMMARY 198

REFERENCES 199
Authored documents 200

APPENDIX 203

PREFACE

The *GFRP Reinforced Concrete Design Handbook* is a vital reference for professionals interested in the use of non-metallic GFRP reinforcement for concrete structures. It is meant to provide valuable insight to structural engineers on understanding and utilizing the provisions of "Building Code Requirements for Structural Concrete Reinforced with Glass Fiber Reinforced Polymer (GFRP) Bars" (ACI CODE 440.11).

The *GFRP Reinforced Concrete Design Handbook* provides several engineering design examples for various concrete members reinforced with GFRP bars including beams, one-way slabs, two-way slabs, and slender columns. The examples help illustrate the provisions of ACI CODE 440.11 as they pertain to serviceability, flexural strength, shear strength, torsional strength, axial strength, stability, and structural analysis. Many of the examples are based on a fictious four-story GFRP reinforced concrete building to illustrate how the design provisions work together in a full building design. These examples are also closely related to the example problems presented in the *ACI Reinforced Concrete Design Handbook* (ACI MNL-17) to allow for comparison to the steel reinforced concrete members presented in MNL-17. Each example starts with a brief problem statement and then presents a full set of design calculations that reference the appropriate provisions in ACI CODE 440.11 (red highlighted text next to equations) to arrive at a solution. Detailed explanations of the design calculations are provided throughout.
In addition to the example problems, this handbook provides general information and guidance about the appropriate use of GFRP reinforcement, its material and durability characteristics, typical applications, and considerations for fire resistance. It also highlights key differences between designing GFRP reinforced concrete versus traditional steel reinforced concrete.

The appendix to this handbook provides additional detailed information from FRP bar manufactures on commercially available products and solutions.

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