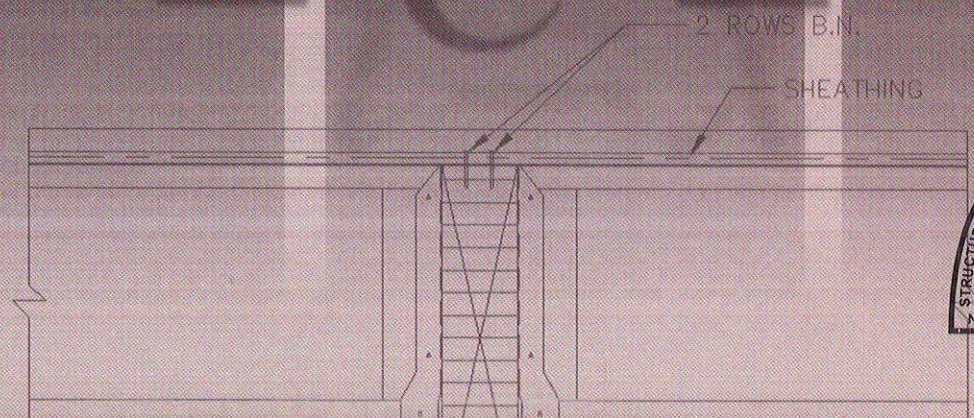
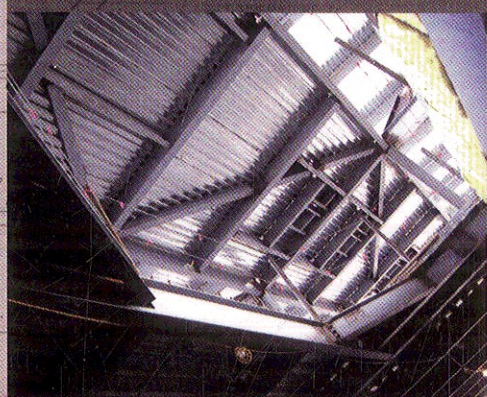


SHRINKAGE REINFORCE

# *Guide to the Design of Diaphragms, Chords and Collectors*

*Based on the 2006 IBC® and ASCE/SEI 7-05*





## **Table of Contents**

<b>Preface</b>	<b>iii</b>
<b>Acknowledgments</b>	<b>v</b>
<b>Comments and Suggestions</b>	<b>vii</b>
<b>Introduction to Diaphragms</b>	<b>1</b>
<b>Design Example 1: Concrete Diaphragm Design—Four-Story Building</b>	<b>11</b>
1. Determination of Diaphragm Demands for Seismic Design Category B.	19
2. Design of Diaphragm without Opening for Seismic Design Category B.	37
3. Design of Diaphragm with Opening for Seismic Design Category B.	39
4. Collector Design for Seismic Design Category B.	40
5. Brief Discussion of Seismic Design Categories C through F.	43
6. Determination of Diaphragm Demands for Seismic Design Category D.	44
7. Design of Diaphragm without Opening for Seismic Design Category D.	56
8. Design of Diaphragm with Opening for Seismic Design Category D.	57
9. Collector Design for Seismic Design Category D.	58
10. Design of Slab as Collector Element for Seismic Design Category D (Alternate Approach for Collector Design).	63
<b>Design Example 2: Wood Diaphragm (Flexible Diaphragm) for Seismic Design Category B, C &amp; D—Three-Story Building</b>	<b>77</b>
1. Determination of Diaphragm Demands for Seismic Design Category B.	80
2. Diaphragm Design without Opening for Seismic Design Category B.	86
3. Diaphragm Design with Opening for Seismic Design Category B.	93
4. Collector Design for Seismic Design Category B.	113
5. Brief Discussion on Seismic Design Category C, D, E and F.	128
6. Determination of Diaphragm Demands for Seismic Design Category D.	129
7. Diaphragm Design for Seismic Design Category D.	132

8.	Diaphragm Nailing for Seismic Design Category D.	139
9.	Collector Design for Seismic Design Category D.	144
10.	Collector Connection Design for Seismic Design Category D.	153
<b>Design Example 3: Steel Deck Diaphragm with Opening (Flexible Diaphragm) for Seismic Design Category D—Four-Story Building Example</b>		<b>157</b>
1.	Determination of Diaphragm Forces.	161
2.	Roof Diaphragm Analysis without Opening.	165
3.	Diaphragm Analysis at Opening.	175
4.	Collector Design.	176
5.	Collector Connection Design.	180
<b>Design Example 4: Steel Deck with Concrete Fill Diaphragm for Seismic Design Category D—Four-Story Building Example</b>		<b>187</b>
1.	Diaphragm Analysis.	189
2.	Determination of Chord Forces.	191
3.	Determination of Collector Forces.	193
4.	Diaphragm Design.	199
5.	Collector Design.	200
<b>About the Authors</b>		<b>205</b>