Steelwork design guide to BS5950-1:2000

Synopsis:

This book takes into account the revisions of the code of practice of steel structures by enhancing the previous BS 5950:1990 with the updated code of BS 5950:2000 Part 1. The specification or code changes have affected the design of the members in steel structures. Most of the text and worked examples relate to the most commonly encountered design situations have been addressed in this book. Therefore, the procedures for design at the cross–sectional member and frame level for various situations are explained in great details. This book needs to be read together with BS 5950:2000 Part 1 so that the details of the explanations on the use of code can be understood clearly. Although this book has been prepared to integrate the use of BS 5950:2000 Part 1, the basic principle of analysis and design described in this book can also be applied to other code of practice such as Euro–code 3.

Steelwork design guide to BS5950-1:2000
Table Of Content:
Foreword
CHAPTER 1 INTRODUCTION
Advantages and Disadvantages of Using Steel
Structural Steel Design
Limit States Concepts in Design
Partial Safety Factors
Design Strength
Design Procedure
Design Code: BS 5950–1:2000
Loading
Load Combinations
Load Distribution
Structural Steel Elements
The Properties of Steel
Design Strength
Other Properties of Steel
Steel Section
CHAPTER 2 LOCAL BUCKLING AND SECTION CLASSIFICATION

Introduction

Section Classification

Class 1 Plastic Class 2 Compact Class 3 Semi-compact Class 4 Slender Stress Block **Internal and Outstand Elements** Limiting Width-to-Thickness Ratios in Table II BS 5950-1:2000 Stress Ratios for I– and H–sections with Equal Flanges Effective Modulus and Effective Area Effective Elastic Modulus Effective Area Worked Example for Section Classification **Problems** CHAPTER 3 DESIGN OF RESTRAINED BEAMS Introduction **Restraint Conditions** Design Criteria **Shear Capacity** Moment Capacity Web Bearing or Crushing Stiff Bearing Length Bearing Capacity of an Unstiffened Web Web Buckling Buckling Capacity of an Unstiffened Web Deflection

## **Problems**

## CHAPTER 4 DESIGN OF UNRESTRAINED BEAMS

Introduction

**Design Considerations** 

Design Procedures of an Unrestrained Beam

Determination of Equivalent Slenderness ?LT

Determination Effective Length LE and Equivalent Segment Length LLT

Equivalent Uniform Moment mLT

Design Flowchart of an Unrestrained Beam

Work Example for Unrestrained Beam

Simple Beam without Intermediate Restraint with 3 Point Loads

Beam with Intermediate Lateral Restraint at Mind Span

Beam with No Intermediate Lateral Restraint with One Point Load at Mid Span

Beam with Two Intermediate Lateral Restraint

**Problems** 

## **CHAPTER 5 DESIGN OF COLUMNS**

Introduction

Euler's Column Theory

Segment Length

Effective Length of a Column

Compressive Strength, pc

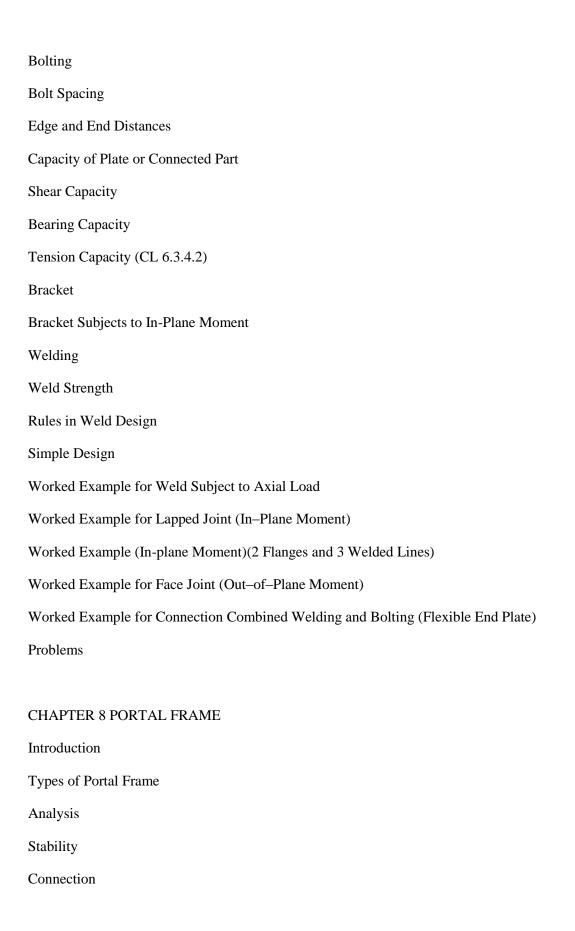
Compression Resistance

Design of Axially Loaded Column

Example 1: Axially Loaded Column with Pinned End

Example 2: Axially Loaded Column with Fixed End
Example 3: Axially Loaded Column with Pinned End and Restrained at Minor Axis
Example 4: Axially Loaded Column UB Section with Pinned End and Restrained at Minor
Beam-Column
Column in Simple Structures
Example 5: Continuous Column in Simple Structures (CI. 4.7.7)
Column with Moment
Problems
CHAPTER 6 DESIGN OF TRUSSES AND LATTICE GIRDERS
Introduction
Terminology of Trusses
Typical Member Sections
Loading
Analysis of Truss
Primary Forces
Secondary Stresses
Purlins and Truss Members
Design of Purlins
Design of Truss Members
Design of Tension Members
Design of Compression Members
Problems
CHAPTER 7 CONNECTIONS

Introduction



Deflection
Bracing
Elastic Design of Portal Frame
General Design Concepts
Elastic Analysis of Portal Frame
Example – Pinned base without Haunch
Plastic Design of Portal Frame
Conditions for plastic design
Plastic Analysis
Plastic Analysis of Portal Frame with Vertical Load Only
Example – Fixed Base without Haunch
Haunch
Design Example of Pinned Base Portal Frame with Haunch
Stability Check
In–Plane Frame Stability
Out-of-Plane Frame Stability
In–Plane Member Stability
Out-of-Plane Member Stability
Member
Connection
Types of Connections
Distribution of Forces
Design Capacity Check
Worked Example
Bibliography
Index