

Internationell svetskonstruktör, IWSD - Kursprogram

Module 5: DESIGN OF WELDED PLATE STRUCTURES Modul 5: Utformning av svetsade plåtkonstruktioner

5.1 Plates and shells/Plattor och skal, 8 tim

Objective:

The students will have a basic understanding of plate buckling and design requirements to avoid buckling.

Scope:

Plate buckling
Modified slenderness
Effective width
Stiffeners
Buckling coefficient

Expected result at comprehensive level:

Explain the buckling of plate type structures and the buckling coefficient.

Illustrate the critical buckling stress vs. slenderness for plates.

Review the concept of cross section class and its relationship with relative slenderness.

Compute effective width for a slender flange under compression.

Illustrate an example of stiffener design based on standard equations.

As appropriate, a suitable design guidance document, e.g., EN 1993 Eurocode 3-part 1-5: Design of Steel Structures: Supplementary rules for planar plated structures without transverse loading, may be used.

5.2 Beam and column structures/Balkar och pelare, 8 tim

Objective:

The students will have a basic understanding of design methods for beam structures and beam / column structures to avoid buckling.

Scope:

Beam and column profiles
Cross section classes
Local and global stability
Plastic design
Longitudinal stiffeners
Design of slender webs
Shape factors for beam profiles

Expected result at comprehensive level:

Explain the combined effect of axial / bending loads.

Illustrate proper placement of longitudinal stiffeners for beams subject to bending.

Illustrate proper design methods for stiffening of wide flanges.

Review buckling of beam webs subject to shear loads.

Illustrate optimal design of beam elements for stiffness / bending resistance.

Compute bending resistance of a beam with slender or semi-compact webs.

As appropriate, a suitable design guidance document, e.g., EN 1993 Eurocode 3-part 1-5: Design of Steel Structures: Supplementary rules for planar plated structures without transverse loading, may be used.

5.3 Design considerations for welding residual stresses and distortion / Utformning med hänsyn till svetsegenspänningar, svetsdeformationer, 9 tim

Objective:

The students will understand the theoretical background of residual stresses and distortion and can use simplified estimation methods.

Scope:

Welding induced residual stresses
Welding induced distortion
Classification of distortions
Weld sequence effects and residual stresses
Effect of residual stress on structural behaviour
Lamellar tearing

Expected result at comprehensive level:

Illustrate the formation of longitudinal and transverse welding residual stresses.

Explain the influence of constraint on residual stress formation.
Illustrate the difference between single and multipass welding on residual stress formation.
Compute approximate residual deformation due to welding.
Illustrate the influence of residual stresses on the ultimate strength of a structural member.
Explain possible influences of residual stress on lamellar tearing and fatigue.
Illustrate proper selection of weld order to minimise residual stresses.