

# 1C3 Design of bridges

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# List of lectures

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1. History and types of steel bridges
2. Fundamental terms
3. Basis of design
4. Bearings, expansion joint, bridge accessories
5. Bridge deck
6. Plate girder steel bridges 1
7. Plate girder steel bridges 2
8. Plate girder steel bridges 3
9. Composite steel-concrete bridges 1
10. Composite steel-concrete bridges 2
11. Truss girder bridges
12. Pedestrian footbridges
13. Examples of bridge structures



## Objectives

Types

Arrangement

ULS

SLS

Examples

# Objectives of the lecture 12

- types of footbridges
- construction arrangement
- ultimate limit states
- serviceability limit states
- examples



Objectives

Types

Arrangement

ULS

SLS

Examples

# Types

Number of spans:      single span  
                                 multi span  
                                 spatial (curved)

Main load-bearing structure:  
                                 girder  
                                 truss  
                                 viereendeel  
                                 arch  
                                 cable stayed  
                                 suspension



Objectives

Types

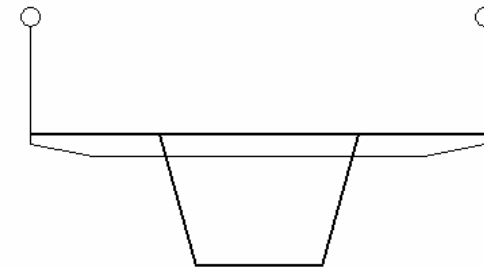
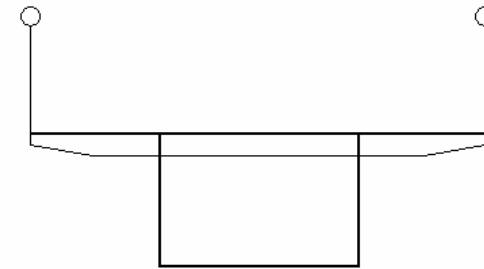
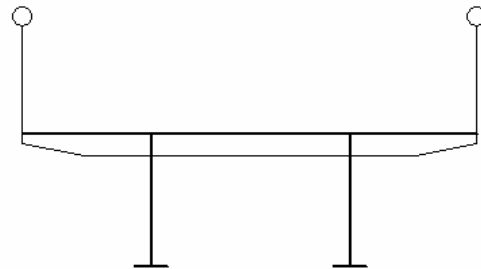
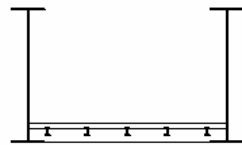
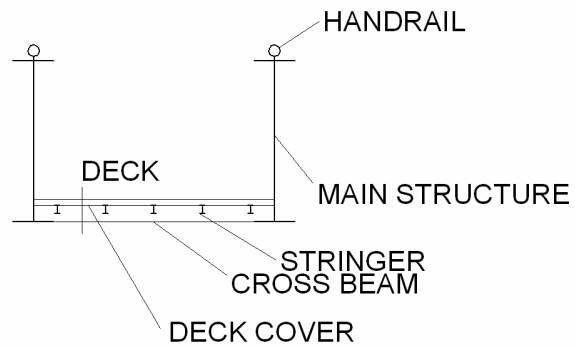
Arrangement

ULS

SLS

Examples

# Arrangement



Objectives

Types

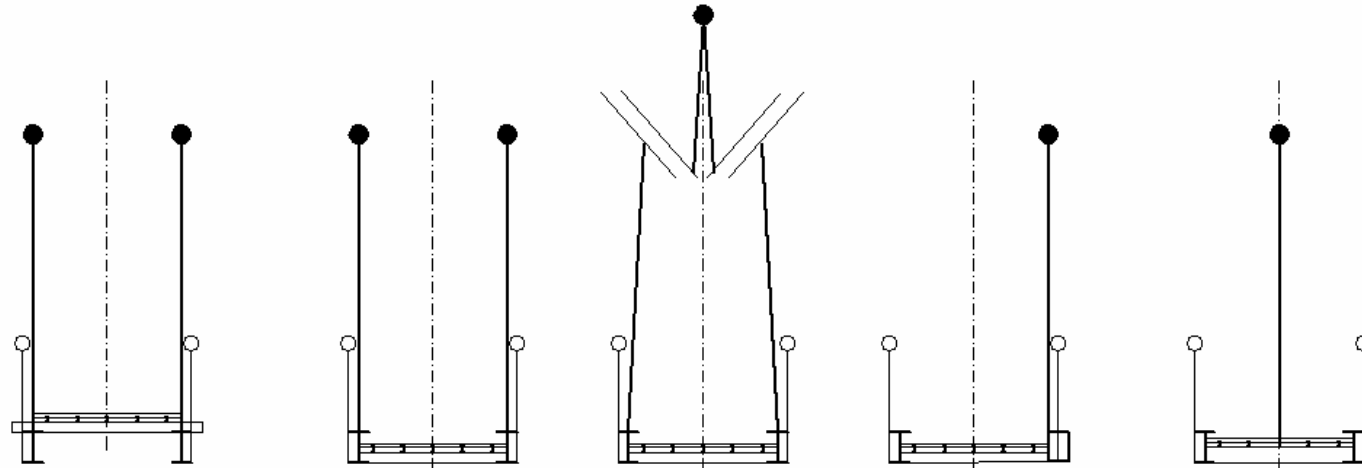
**Arrangement**

ULS

SLS

Examples

# Arrangement



Objectives

Types

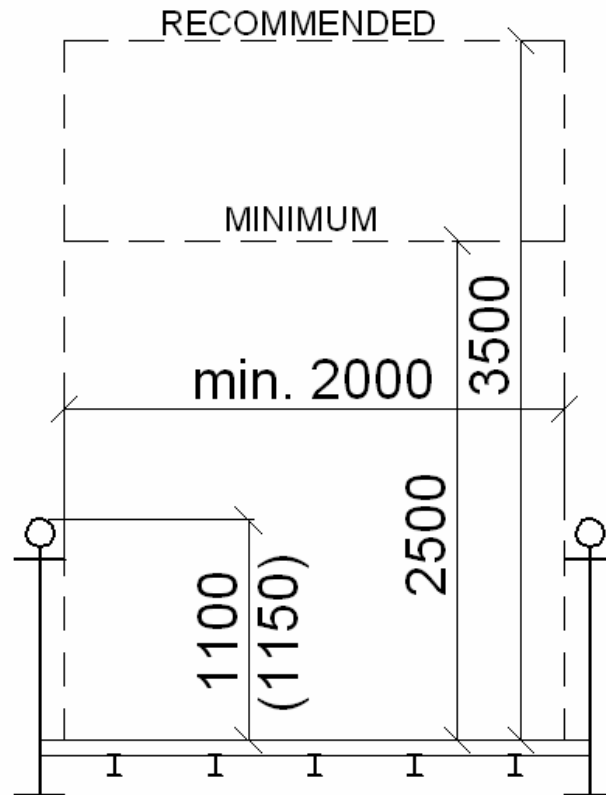
Arrangement

ULS

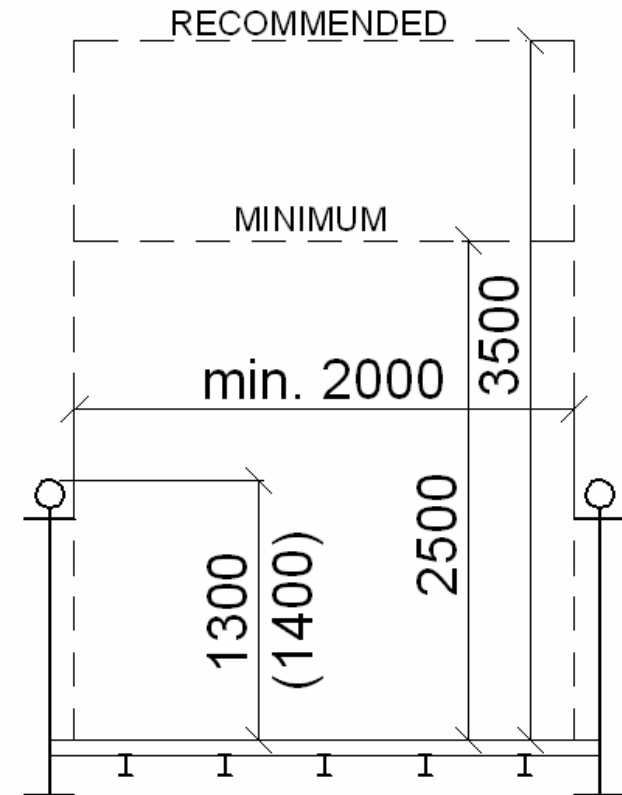
SLS

Examples

# Arrangement of cross section



FOOTWAY



CYCLE WAY

Objectives

Types

Arrangement

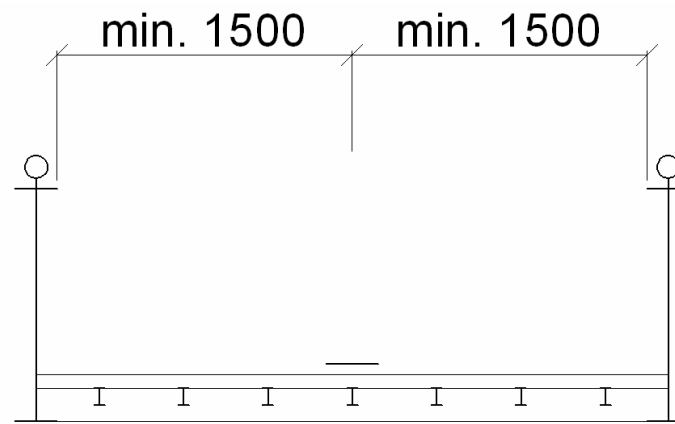
ULS

SLS

Examples

# Arrangement of cross section

Marked segregation



FOOTWAY

CYCLE WAY



Objectives

Types

Arrangement

**ULS**

SLS

Examples

# Ultimate limit states

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Resistance of cross sections

Buckling resistance of members:

- compression members
- lateral-torsion
- interaction of M+N+V

Connections design

Objectives

Types

Arrangement

ULS

**SLS**

Examples

# Serviceability limit states

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Deflection

Stress

Web breathing

Visual impression

Effect of wind

Drainage

Objectives

Types

Arrangement

ULS

SLS

**Examples**

# Examples of footbridges



Arch footbridge

Praha - Chodov



Objectives

Types

Arrangement

ULS

SLS

**Examples**

# Examples of footbridges

Truss girder footbridge

Praha - Smíchov



Objectives

Types

Arrangement

ULS

SLS

**Examples**

# Examples of footbridges

Cable stayed footbridge

Pasarela Atirantada La Rosa 2003

La Coruña, Spain, span 36 m, length 156 m



Objectives

Types

Arrangement

ULS

SLS

**Examples**

# Examples of footbridges

Cable stayed footbridge  
Millers Crossing Bridge, Devon, England  
Length 54 m, width 3,0 m



Objectives

Types

Arrangement

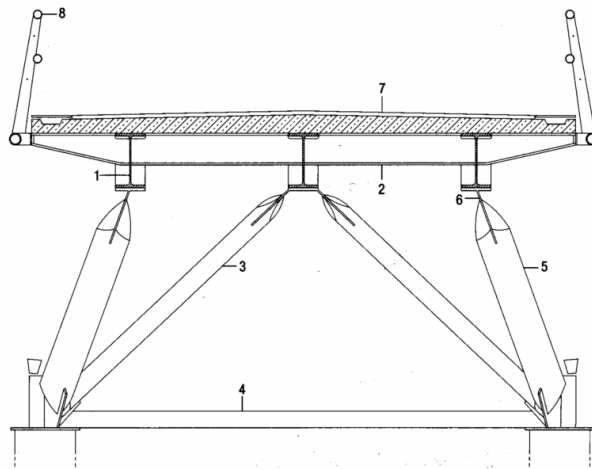
ULS

SLS

**Examples**

# Examples of footbridges

Ijburg, Netherland



Objectives

Types

Arrangement

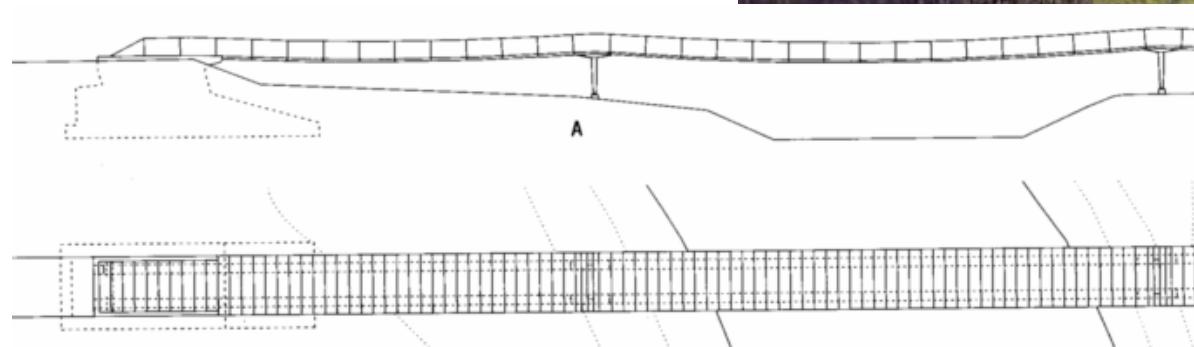
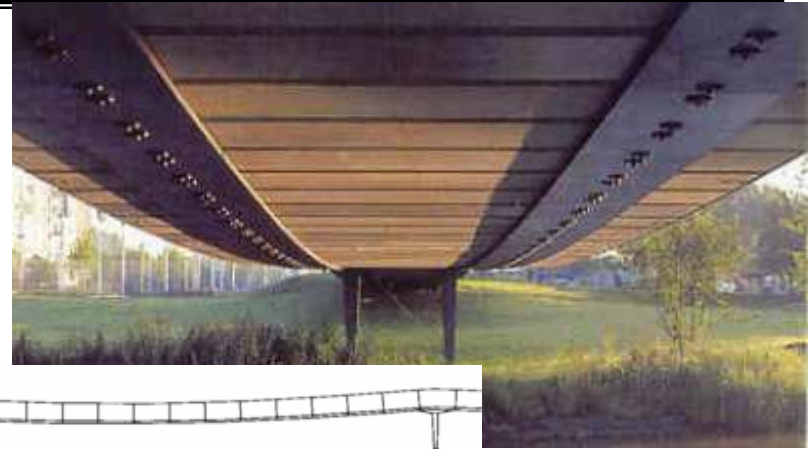
ULS

SLS

**Examples**

# Examples of footbridges

Rostock





Objectives

Types

Arrangement

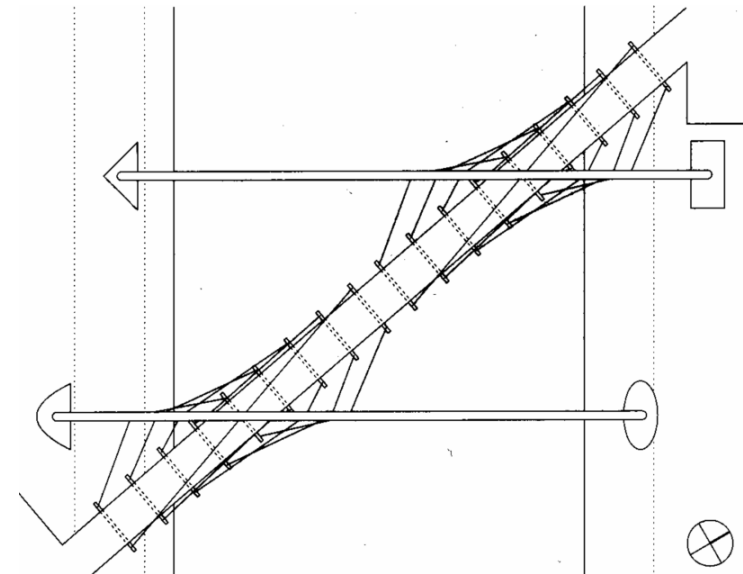
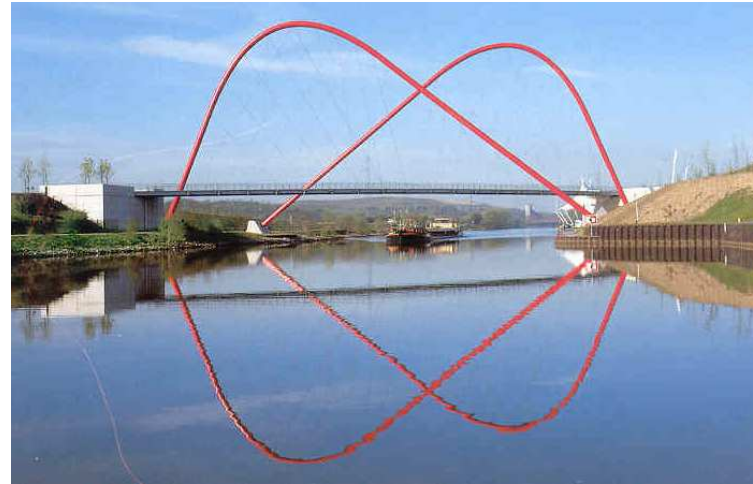
ULS

SLS

**Examples**

# Examples of footbridges

Gelsenkirchen



Objectives

Types

Arrangement

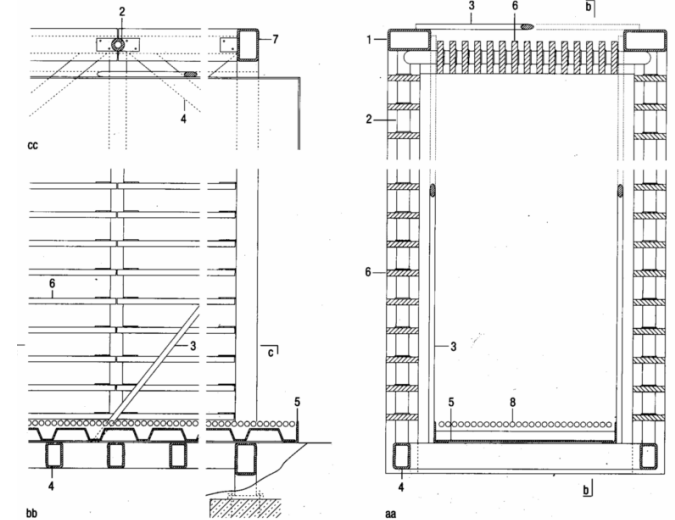
ULS

SLS

Examples

# Examples of footbridges

Boudry, Suisse



Objectives

Types

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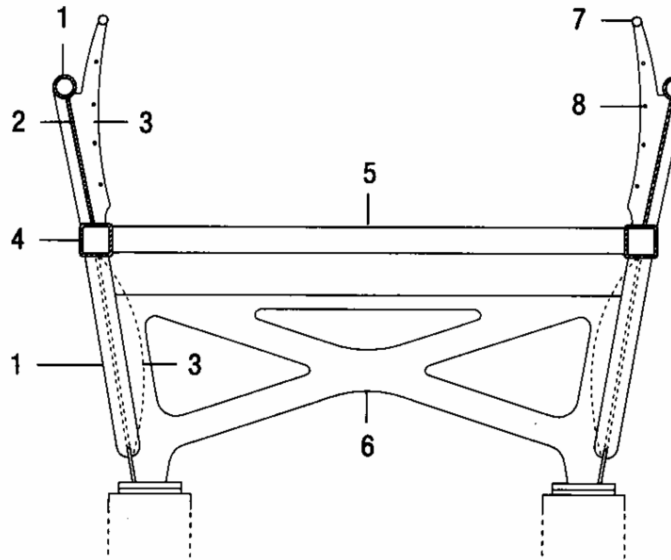
ULS

SLS

Examples

# Examples of footbridges

Emmeloord, Netherland



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**Thank you  
for your kind attention**

# Notes to users of the lecture

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- This session is a basic information about actions on bridges and requires about 60 min lecturing.
- The use of relevant standards of national standard institutions are strongly recommended.
- Keywords for the lecture:  
footbridge, truss, beam, stringer, cable stayed footbridge, suspension footbridge, Eurocodes.