1C3 Design of bridges

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List of lectures

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 of the lecture 12

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

<table>
<thead>
<tr>
<th>Number of spans:</th>
<th>single span</th>
<th>multi span</th>
<th>spatial (curved)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Main load-bearing structure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>girder</td>
</tr>
<tr>
<td>truss</td>
</tr>
<tr>
<td>vierendeel</td>
</tr>
<tr>
<td>arch</td>
</tr>
<tr>
<td>cable stayed</td>
</tr>
<tr>
<td>suspension</td>
</tr>
</tbody>
</table>
Arrangement

Objectives

Types

Arrangement

ULS

SLS

Examples

Handrail

Main structure

Stringer

Cross beam

Deck cover

Deck
Arrangement

Types

Arrangement

ULS

SLS

Examples
Arrangement of cross section

Types
Arrangement
ULS
SLS
Examples

**FOOTWAY**

- **Minimum:** 2000
- **Recommended:** 3500
- **1100** (1150)
- **2500**

**CYCLE WAY**

- **Minimum:** 2000
- **Recommended:** 3500
- **1300** (1400)
- **2500**
Arrangement of cross section

Marked segregation

min. 1500 min. 1500

FOOTWAY CYCLE WAY
Ultimate limit states

Resistance of cross sections

Buckling resistance of members:
- compression members
- lateral-torsion
- interaction of M+N+V

Connections design
Serviceability limit states

- Deflection
- Stress
- Web breathing
- Visual impression
- Effect of wind
- Drainage
Examples of footbridges

Arch footbridge
Praha - Chodov
Examples of footbridges

Truss girder footbridge
Praha - Smíchov
Examples of footbridges

Cable stayed footbridge
Pasarela Atirantada La Rosa 2003
La Coruña, Spain, span 36 m, length 156 m
Examples of footbridges

Cable stayed footbridge
Millers Crossing Bridge, Devon, England
Length 54 m, width 3.0 m
Examples of footbridges

Ijburg, Netherland
Examples of footbridges

Rostock
Examples of footbridges

Gelsenkirchen
Examples of footbridges

Boudry, Suisse
Examples of footbridges

Emmeloord, Netherland
Thank you for your kind attention
Notes to users of the lecture

• 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.