STAHLBAU-BREVIER
STEEL CONSTRUCTION BREVIARY
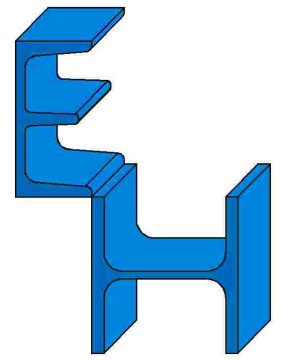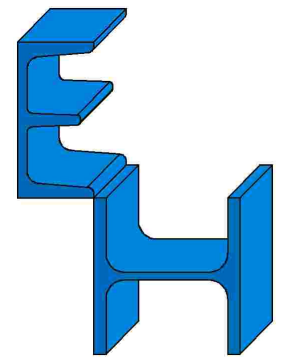
Table of contents – General overview

STAHLBAU-BREVIER
STEEL CONSTRUCTION BREVIARY

Additional remarks to the contents of bar

Chapter 0: Blanks, static formula etc. examples of calculation

0/1-0/66
- BAR page 0/1-0/10:   General blanks
- BAR page 0/11-0/22: Beam calculation of gantry cranes
- BAR page 0/23-0/26: Calculation of bucklinglength sky of single storeys according to DIN 4114
- BAR page 0/27-0/36: Overall stability, Buckling kd, buckling due to bending Bkd, laterial torsional buckling BdKd according to DIN 18800
- BAR page 0/37: Research thickness of solid ceiling made in ferro concrete
- BAR page 0/38-0/40: Cubic equation of bending moment according to Claperon
- BAR page 0/41-0/50: Static of civilengineering, loads for bending moments and moments of rigid moments, simply supperted beam withwth cantilever beam at one and on both sides fixed,deflection of a simply supported beam
- BAR page 051-0/63: Calculation of construction parts and sress detection according to theory of deformation
- BAR page 0/64-0/66:Calculation of deflection for single and mutible beams e.g. beam of crane girder

Chapter 1: Bolted connections

1/1-1/22
- BAR page 1/1-1/2: Ressistance and positioning of holes for bolts of grade 4.6 8.8 10.9=HV for $\alpha L=3$ and $\alpha L=2$
- BAR page 1/3-1/8: Designation of distances between bolts, sizes, presslength
- BAR page 1/9-1/17: Determination of presslength for short bolts, weight of bolts, female screw, washer, SI-screws
- BAR page 1/18-1/20: Bolts of grade 4.6 8.8 10.9=HV, ultimate limit force of shear- and bearing stress and positioning of holes for $\alpha L=3$ and $\alpha L=2$
- BAR page 1/21-1/22: Ultimate limit force of tensile and initial stress HV- and mechanical bolts grade 8.8 (DIN 931). Load capacity of shear force in thread is bigger (1.5) in a mechanical bolt as in a bolt (grade 4.6) used for steelconstruction. Due to presslength can be graduate every 10mm the assortment of bolts can be reduced of the half. The length of thread of mechanical bolts is longer than for a normal. On that account less mechanical bolts for normal connections are necessary. In consequence of low load capacity of bearing stress for $\alpha L=2$ smaller distances between bolts and border are necessary as for $\alpha L=3$.

STAHLBAU-BREVIER
STEEL CONSTRUCTION BREVIARY
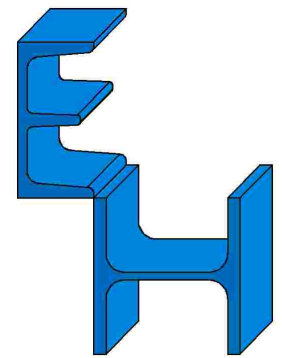
Chapter 2: Miscellaneous

2/1 – 2/34
- BAR page 2/1 – 2/5: Tables of profiles and selection of materials
- BAR page 2/6 – 2/10: Function of circulation, increasement of solid and framework beams (parabolic)
- BAR page 2/1 – 2/5: Tables of profiles and selection of materials
- BAR page 2/6 – 2/10: Function of circulation, increasement of solid and framework beams (parabolic)
- BAR page 2/11 – 2/13: Coat of paintarea for profiles
- BAR page 2/14 – 2/16: Details of round openings in webs of pillars (support) and ceilingbeam for the rolledsteel joist (I-profiles)
- BAR page 2/17 – 2/22: Proof of tin-plate-thickness for bunkerwalls, table of resistance for matchwoodplates, calculation of beams (timber), of solid ceiling, of cover for platforms (corrugatet iron etc.)
- BAR page 2/33 – 2/29: Snow load DIN 1055 part 5 and addendum of July 2005
- BAR page 2/30 – 2/34: Wind load DIN 1055 part 4 August 1986, different kinds of concreteplates, specific weights, different kinds of supports
- BAR page 2/35: greek letters

Chapter 3: Joints (front), shearing forced, bolts M12, M16, M20,M24

3/1 – 3/57
- BAR page 3/1 – 3/5: Rules for shearing forces
- BAR page 3/6 – 3/45: Joints (Front), definitions and classification, ultimate limit force for shearing and bearing according to a thickness of 10 mm
  $F_{ARdL} = F_{ARdLEI} \times S_{vorh}$ (kN)
  Bolts M12, M16, M20, M24 grade 4.6, 8.8
  Bolts HVM20, HVM24 grade 10.9 length in flange
- BAR page 3/46 – 3/57: classification of bolts and joints

Chapter 4: Angles-joints (double), shearing force, beams with straight halved joint Bolts M12, M16, M20, M24 grade 4.6 and 8.8

4/1 – 4/31
- BAR page 4/1 – 4/9: Examples
- BAR page 4/10 – 4/17: Angles-joints (double), definitions and classification,
- ultimate limit force F_{ARd} for shearing and bearing according to a thickness of 10 mm,
  $F_{ARdL} = F_{ARdLEI} \times S_{vorh}$ (kN)
- BAR page 4/18 – 4/21: Classification of bolts and types of angles
- BAR page 4/22 – 4/25: For easy erection variation of angles-joints (double)
- BAR page 4/26 – 4/31: Positioning of holes e_1, control-formular for load-limit of bolt

STAHLBAU-BREVIER
STEEL CONSTRUCTION BREVIARY
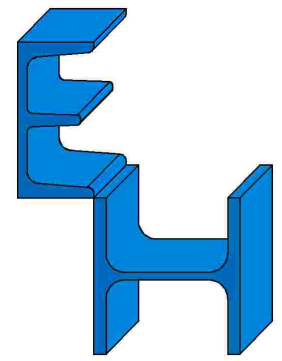
**Chapter 5: Angles-joints (double), shearing force, beams without straight halved joint,
Junction to IPE-beam, bolts M12, M16, M20, M24 grade 4.6 and 8.8**

5/1 – 5/15
- BAR page 5/1 – 5/8: Angles-joints (double), definitions and classification, ultimate limit force F_{ARd} for shearing and bearing according to a thickness of 10 mm,
  $F_{ARdL} = F_{ARdLEI} \times S_{vorh}$ (kN)
- BAR page 5/9 – 5/15: Classification of bolts and types of angles

Chapter 6: stiffener joints (vertical web), shearing force, bolts M12, M16, M20, M24 grade 4.6 and 8.8

6/1 – 6/13
- BAR page 6/1 – 6/13: Web-plates, definitions and classification, ultimate limit force F_{ARd} for shearing and bearing according to a thickness of 10 mm, $F_{ARdL} = F_{ARdLEI} \times S_{vorh}$ (kN) for simple erection

Chapter 7: Stiffeners S235 (St 37)

7/1 – 7/16
- BAR page: 7/1 – 7/5,1: Stiffeners (full and semifull) connected to profiles HEA, HEB, HEM, IPE; geometry and designation of stiffeners incl. thickness and welded connections
- BAR page 7/6 – 7/16: Admissible load F_z (kN) at downside girder (flange) of bending beam, without stiffeners
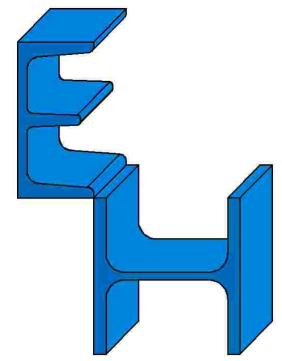

Chapter 8: Welded connections

8/1 – 8/14
- BAR page 8/1 – 8/8: Notation, rules of load capacity and other details according to DIN 18800 part 7
- BAR page 8/9 – 8/14: Workmanship, geometry and dimensions, material and weld thickness and rough estimate for welding time

STAHLBAU-BREVIER
STEEL CONSTRUCTION BREVIARY

Chapter 9: Pillar (pinned connection)

9/1 – 9/
- BAR page 9/1 – 9/8: Anchorage of pillar with round bars dia. 20 and 24 mm in channels (anchorage like a walking-stick)
- BAR page 9/9-: Anchorage with dowel made by HILTI (M10, M12, M16, M20, M24) split- anchor (HTS) and combined-anchor (HVZ)
- BAR page 9/ - : Anchorage with plates and suspension tackle bolt dia. 22 x 150

Chapter 10: Supporting pillars (rigid connection), HEA-, HEB- and IPE-Profiles

10/1 – 10/13
- BAR page 10/1 – 10/3: Erectionassistance of fixed pillars
- BAR page 10/4 – 10/7: Fixlength E_{erf} for pillar-profile HEA 200 – 1000, HEB 200 – 1000 and IPE 200 – 600
- BAR page 10/8 – 10/13: Thickness of the shoe d_p, binding with pressure (centre)

Chapter 11: Notches for HEA-, HEB- and IPE-Profiles, unilateral and bilateral

11/1 – 11/24
- BAR page 11/1 – 11/8: geometrical and static statements
- BAR page 11/9 – 11/16: Notches (uni- and bilaterial) made by automatic cutting, geometry an ultimate limit forces
- BAR page 11/17 – 11/24:Notches (uni- and bilaterial) made by manual cutting,
  geometry an ultimate limit forces

Chapter 12: Workshop cranes

12/1 – 12/35
- BAR page 12/1 – 12/7: Brackets: Geometry and ultimate limit forces $F_{PK,Rd}$, HEA/HEB 200 – 1000, IPE 240 – 600
- BAR page 12/8 – 12/13: Buffer (HEB 160-280), crane rail joints
- BAR page 12/14: Crane rails made from flat bars S 355 (St 52)
- BAR page 12/15 – 12/20: Crane girder and sections
- BAR page 12/21 – 12/35: Crane and crane rails: Technical datas, saftety-distance, lifting classification and group of requirement, admissible deflections and tolerance of erection, overall stability and durability, pinned connection for crane girder

STAHLBAU-BREVIER
STEEL CONSTRUCTION BREVIARY
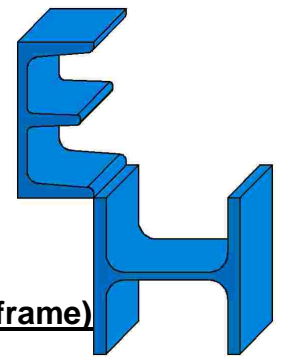
Chapter 13: Rigid connection (HV) for beams and frames (corner of frame)

13/1 – 13/52
- BAR page 13/1 – 13/13: Technical details and examples
- BAR page 13/14 – 13/23: Rigid girder connection HEA/HEB 120 – 1000, IPE 200 – 600,
- BAR page 13/24 – 13/49: Rigid frame-corners, HEA/HEB 120 – 1000, IPE 200 – 600,
- geometry, ultimate limit force, welds, additional stiffenerplates in framecorner
- BAR page 13/5 – 13/52: Dimension, covering plate for frame-corner, design of welds

Chapter 14: Construction of frame-corners

14/1 – 14/24
- BAR page 14/1 – 14/24: Examples, variants, performance (welded and bolted), conclusions, overall stability, single frame

Chapter 15: Distribution of force, endsupport of beams and crossing of beams

15/1 – 15/7
- BAR page 15/1 – 15/4: Computation, determination of coefficients
- BAR page 15/5 – 15/7: Geometry and ultimate limit forces $F_{EA,Rd}$, endsupport $F_{K,Rd}$, crossing of beams

Chapter 16: Supply of material, loading, transportation by lorry to site and roadcondition

16/1 – 16/14
- BAR page 16/1 – 16/14