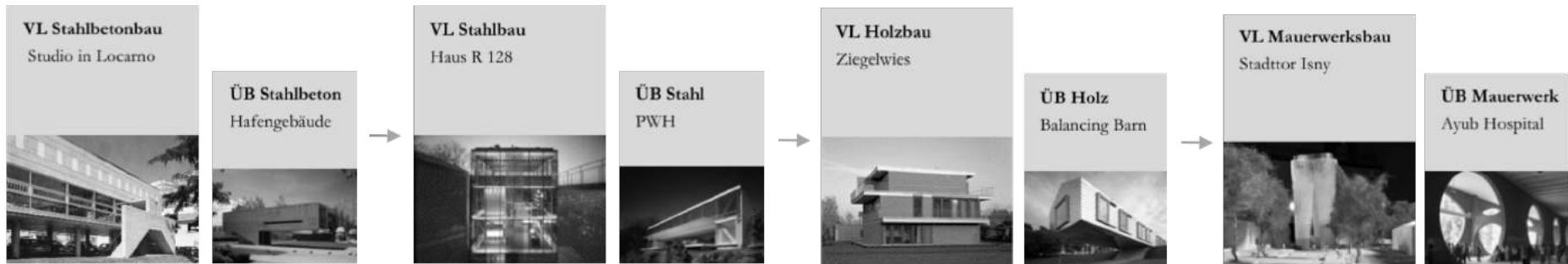


Tragwerksentwurf IV

Joseph Schwartz · Philippe Block

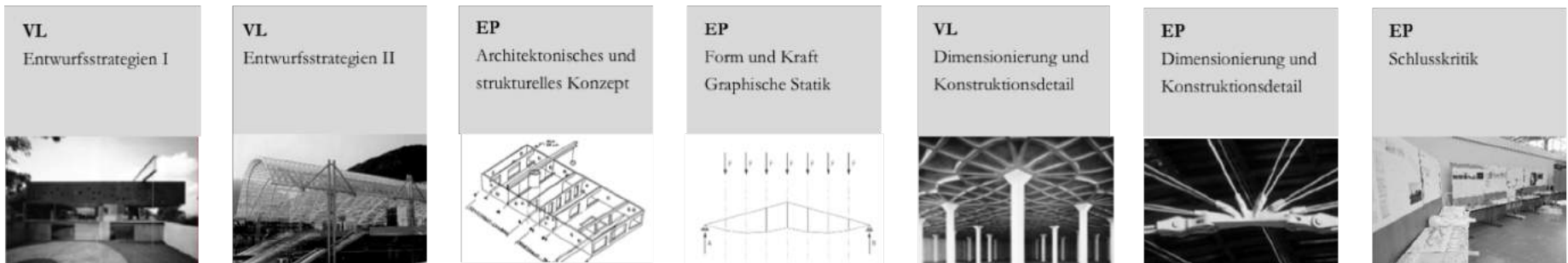
Tragwerksentwurf III: Kraft - Form - Material

Modellapplikation



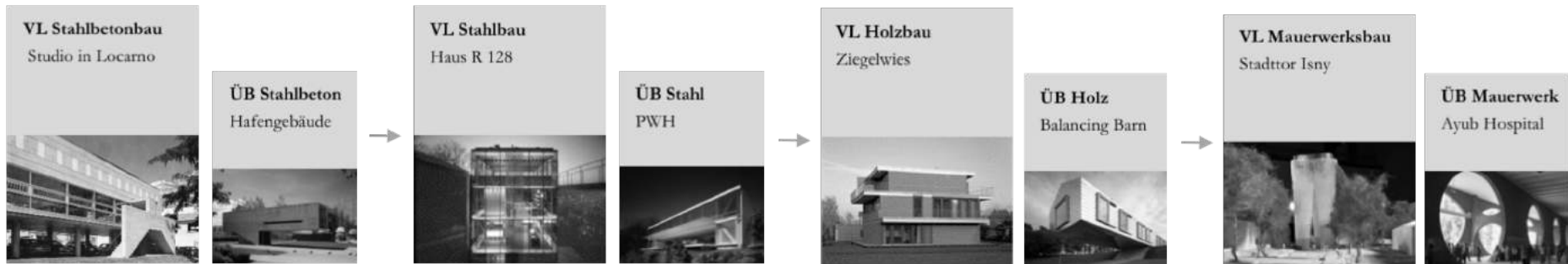
Tragwerksentwurf IV: physikalische Notwendigkeit ↔ gestalterische Freiheit

Entwurfsprojekt



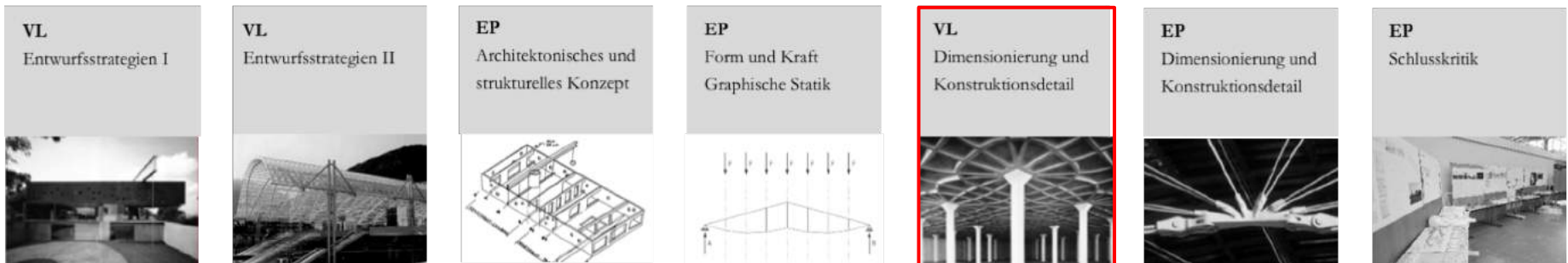
Tragwerksentwurf III: Kraft - Form - Material

Modellapplikation



Tragwerksentwurf IV: physikalische Notwendigkeit ↔ gestalterische Freiheit

Entwurfsprojekt



Konstruktionsdetails

Übersicht über Konstruktionsdetails

Normalkraftverbindungen

Gelenkige Verbindungen

Querkraftverbindungen

Biegesteife Verbindungen

Auflagerung von Bauteilen

Konstruktionsdetails

- Übersicht über Konstruktionsdetails

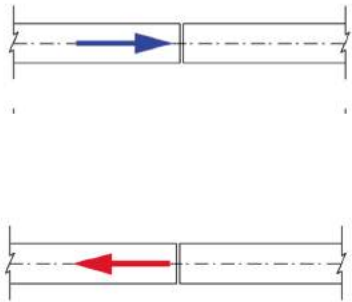
Normalkraftverbindungen

Gelenkige Verbindungen

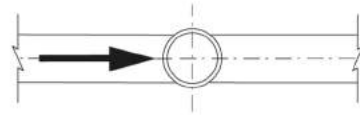
Querkraftverbindungen

Biegesteife Verbindungen

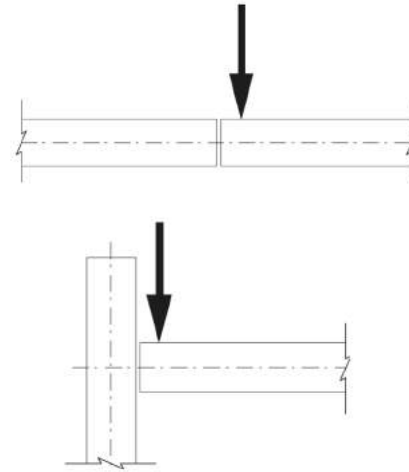
Auflagerung von Bauteilen



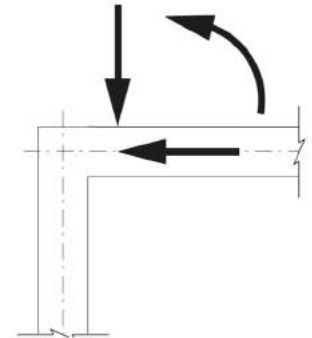
Normalkraftverbindungen
Druck (oben) /
Zug (unten)



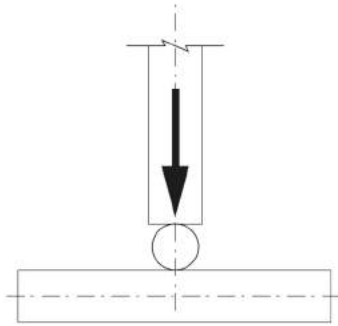
Gelenkige Verbindungen



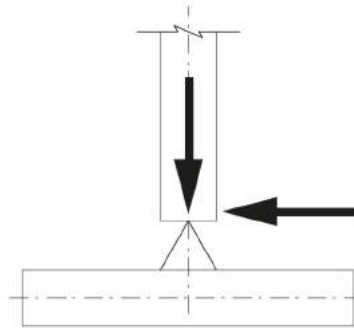
Querkraftverbindungen,
Achsen parallel (oben) /
orthogonal (unten)
zueinander



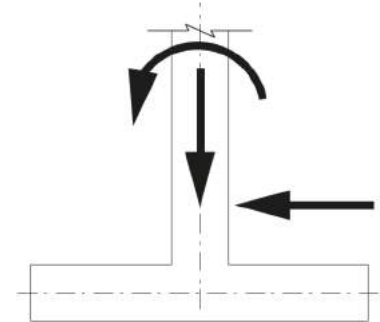
Biegesteife Verbindungen



Rollenlager



Kipplager

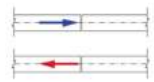


Einspannung

Konstruktionsdetails

Übersicht über Konstruktionsdetails

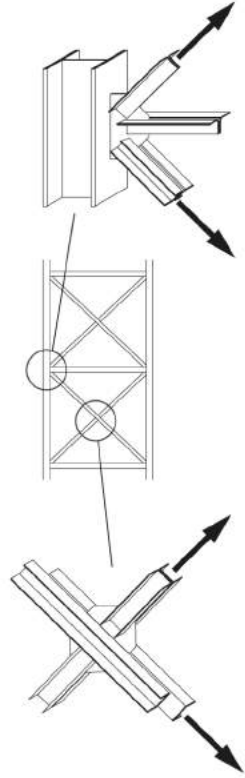
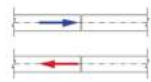
- Normalkraftverbindungen
- Gelenkige Verbindungen
- Querkraftverbindungen
- Biegesteife Verbindungen
- Auflagerung von Bauteilen



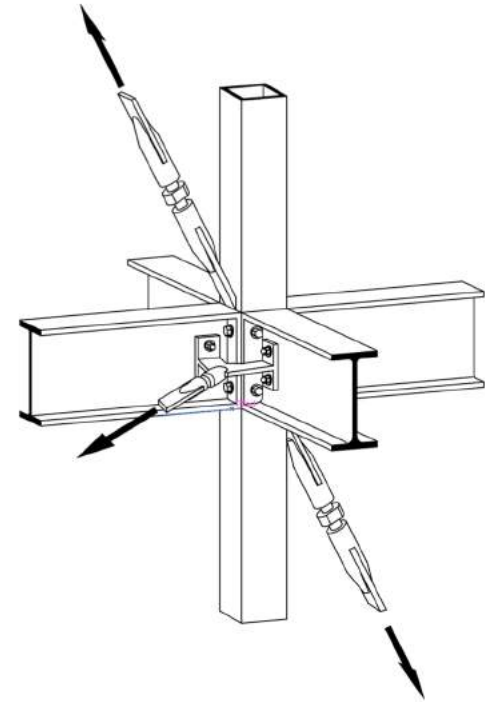
Schrauben



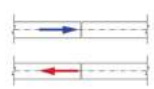
Schweissen



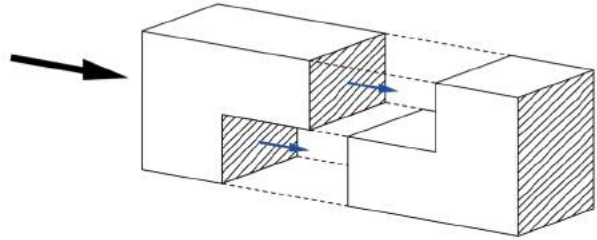
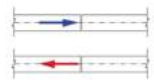
Knotenbleche bei Windverbänden



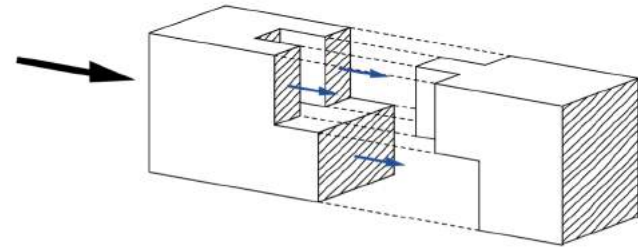
Variante Knotenblech



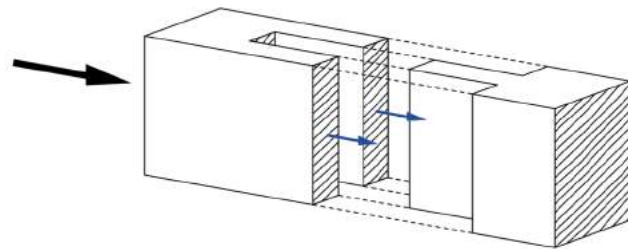
Verankerung von Zuggliedern im Stahlbau



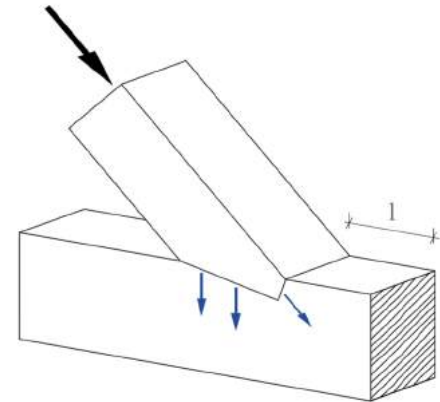
Blattstoss



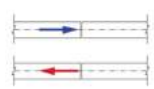
Blattstoss mit Zapfen

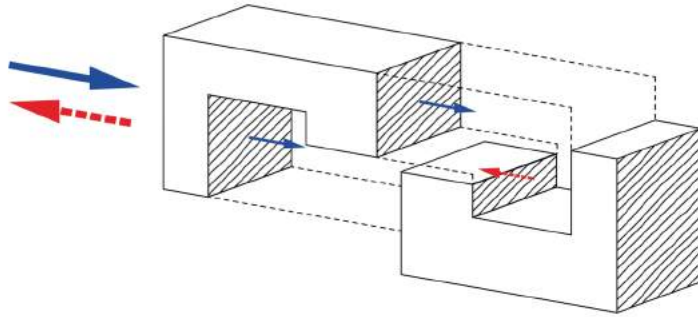
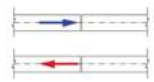


Zapfenstoss

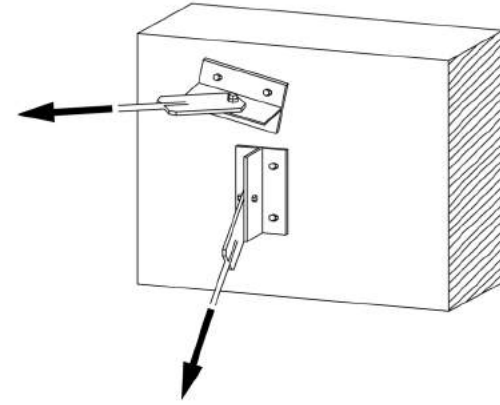


Versatz

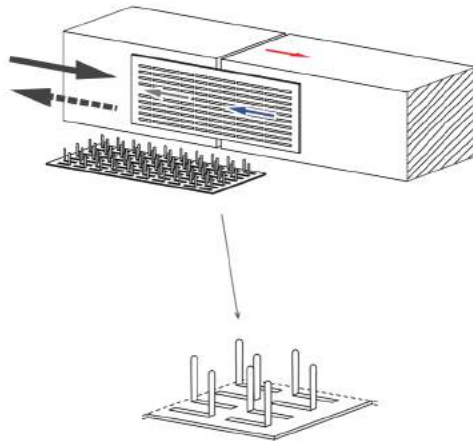




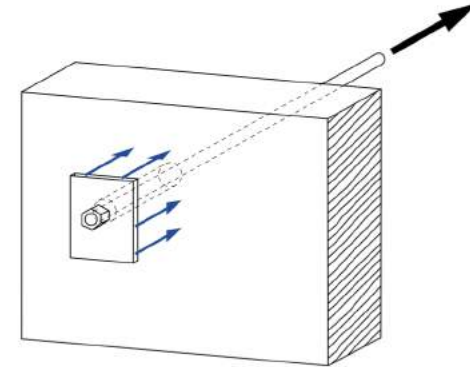
Hakenblatt



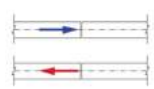
Stahllasche



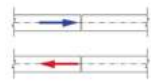
Nagelplatte



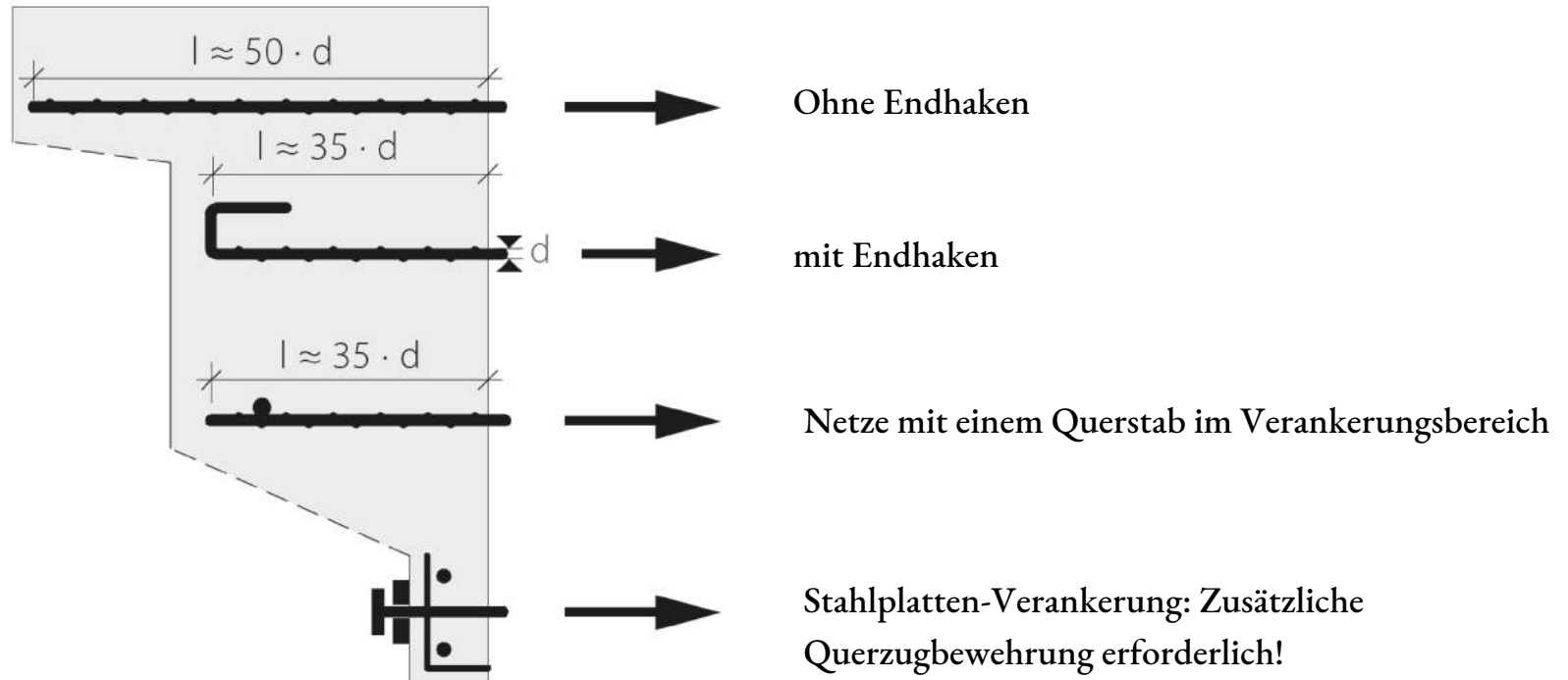
Ankerplatte

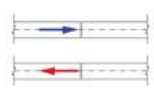


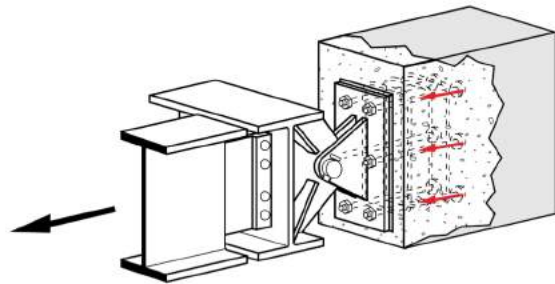
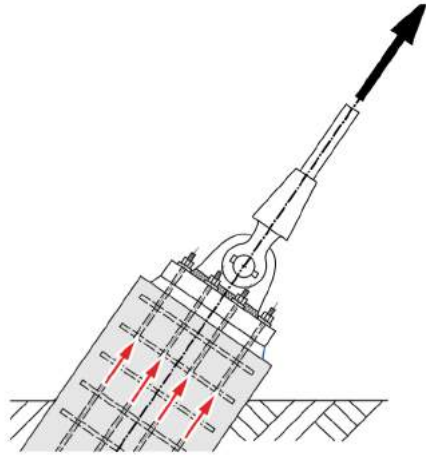
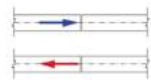
Zug- und Druckverbindungen im Holzbau



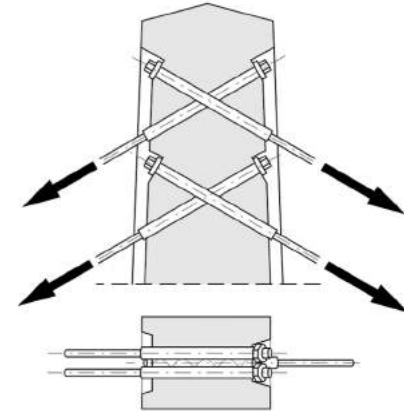
Überschlägige Richtwerte der Verankerungslängen l von Stabstahlbewehrung in Beton in Abhängigkeit von der Verankerungsart



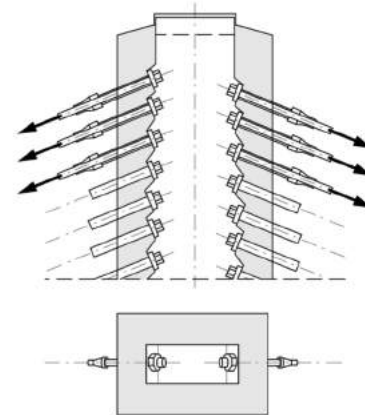




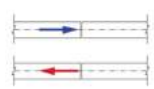
Verankerung an Stahlbetonbauteilen



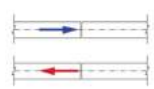
Pylonköpfe mit sichtbaren Ankerköpfen

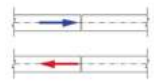


Pylonköpfe mit innenliegenden Ankerköpfen

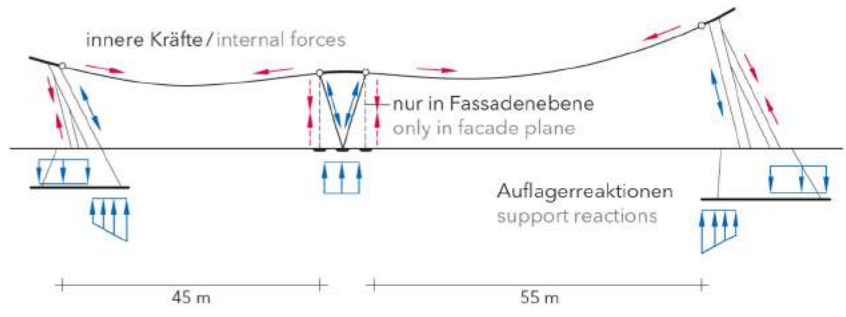
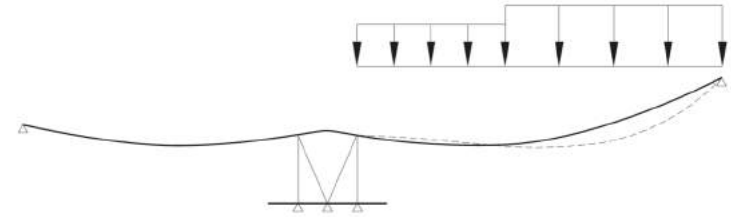
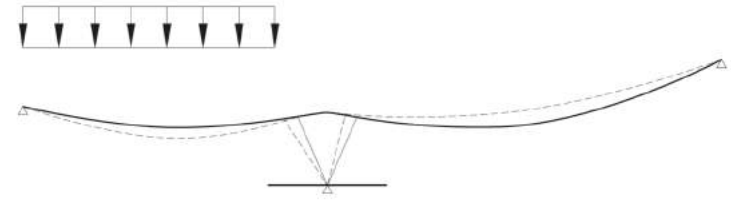
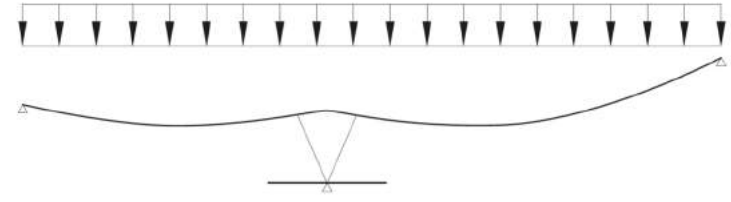
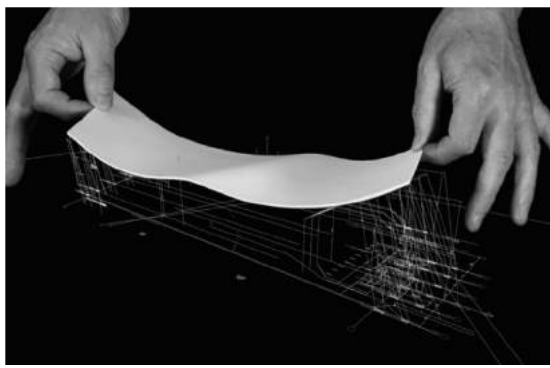
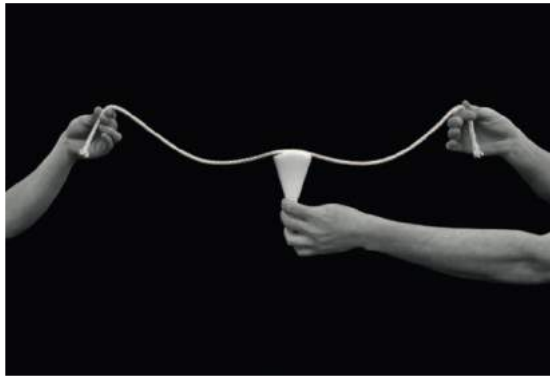
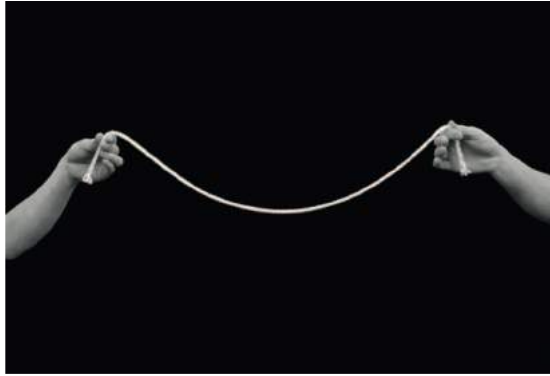


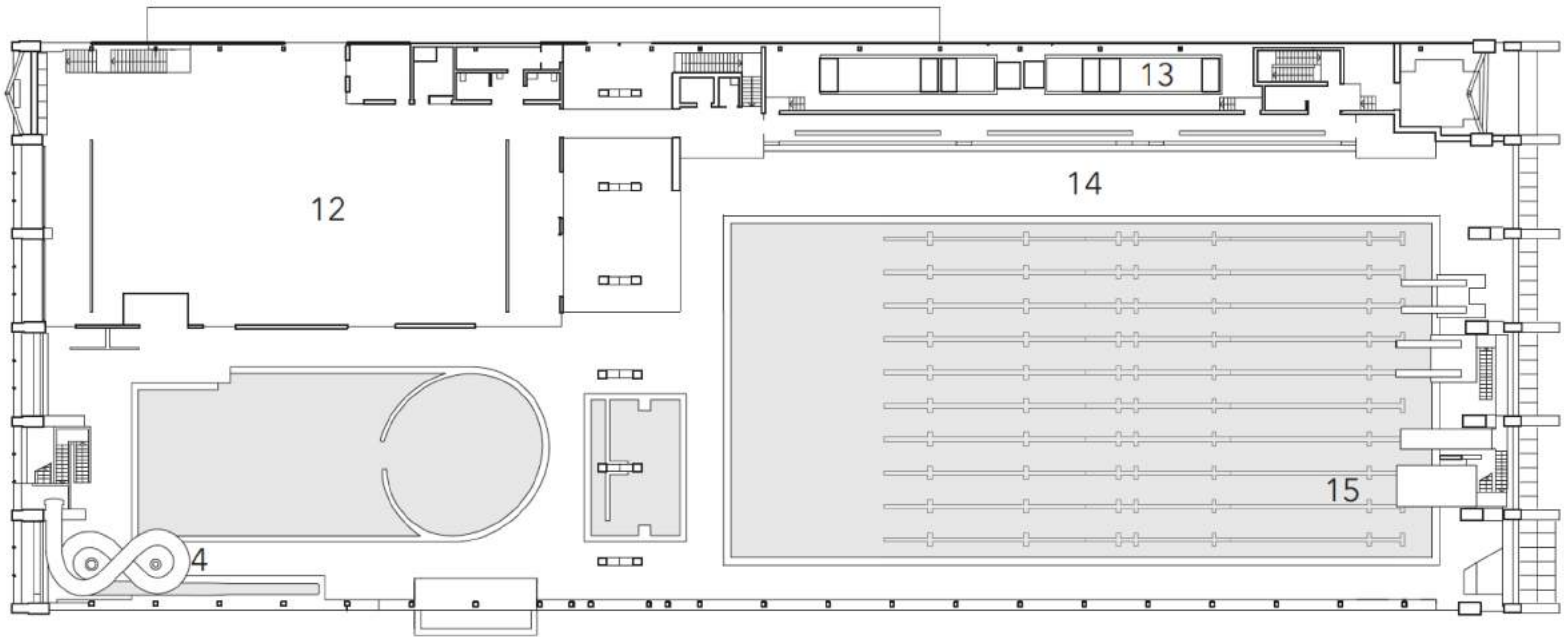
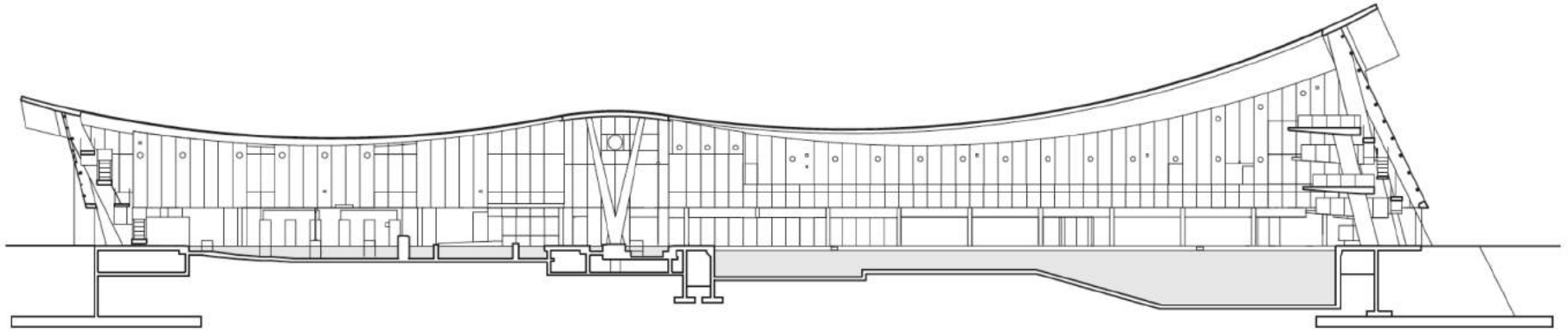
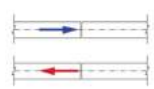
Verankerungen von Zuggliedern im Stahlbetonbau

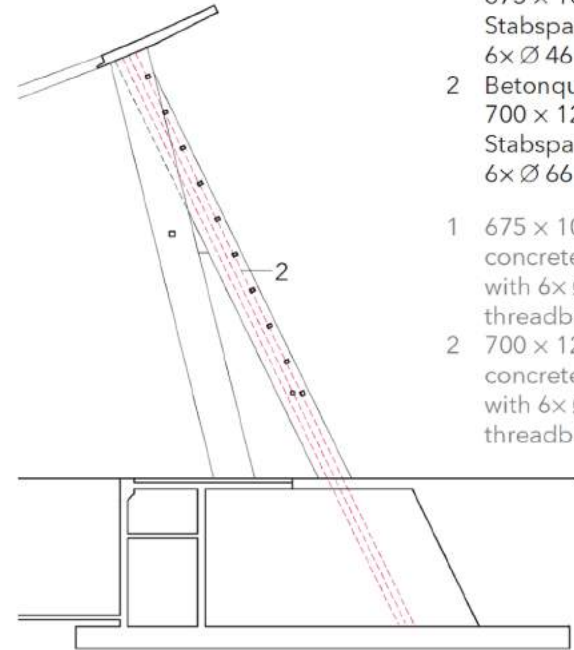
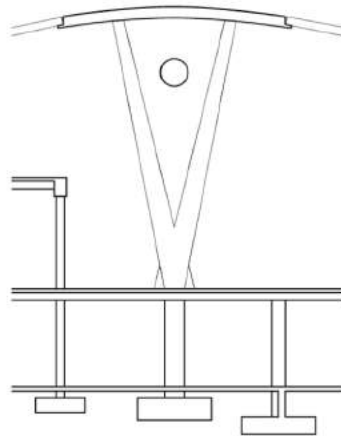
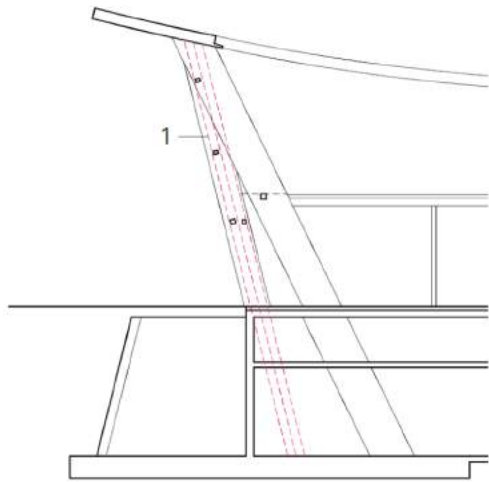
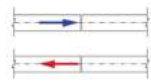




Normalkraftverbindungen

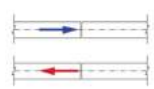




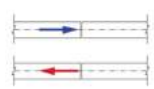


- 1 Betonquerschnitt
675 × 1000 mm mit
Stabspanngliedern
6 × Ø 46 mm
- 2 Betonquerschnitt
700 × 1200 mm mit
Stabspanngliedern
6 × Ø 66 mm

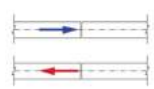
- 1 675 × 1000 mm
concrete cross-section
with 6 × Ø 46 mm
threadbars
- 2 700 × 1200 mm
concrete cross-section
with 6 × Ø 46 mm
threadbars



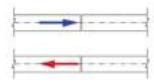
HCMA (Arch.), Fast+Epp (Ing.): Sport- und Freizeitbad, Surrey, Kanada



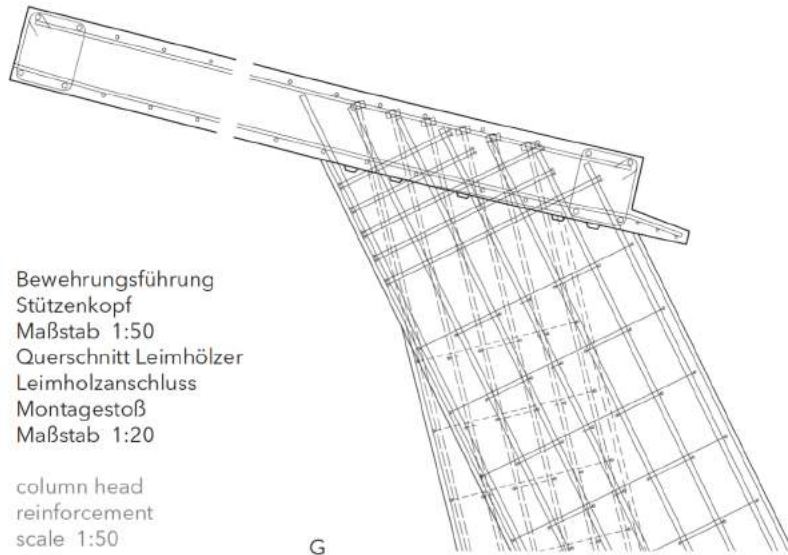
HCMA (Arch.), Fast+Epp (Ing.): Sport- und Freizeitbad, Surrey, Kanada



HCMA (Arch.), Fast+Epp (Ing.): Sport- und Freizeitbad, Surrey, Kanada



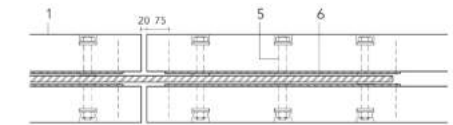
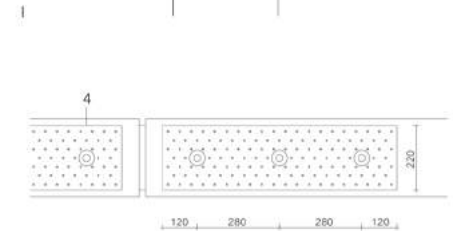
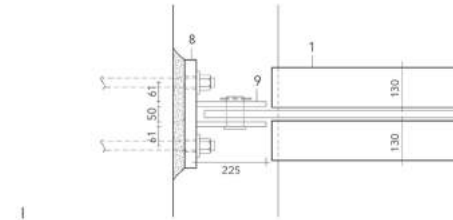
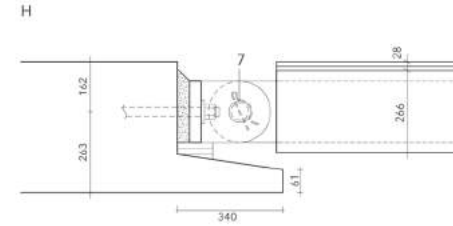
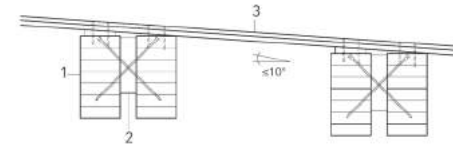
Normalkraftverbindungen



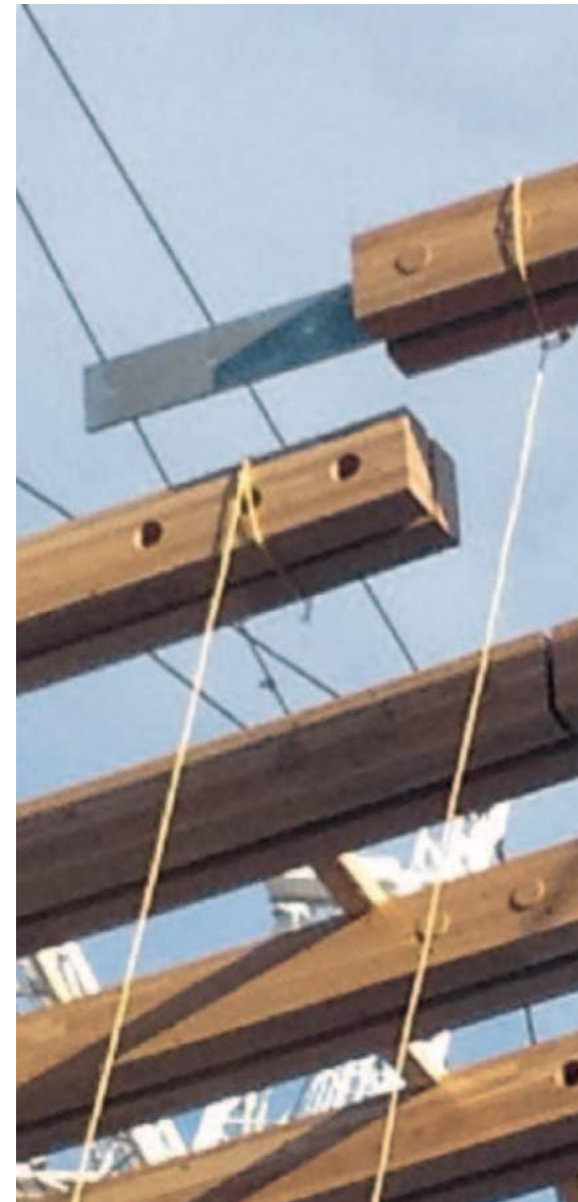
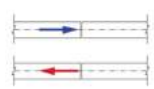
- G Bewehrungsführung
Stützenkopf
Maßstab 1:50
- H Querschnitt Leimhölzer
- I Leimholzanschluss
- J Montagestoß
Maßstab 1:20

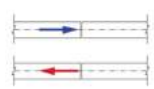
- G column head
reinforcement
scale 1:50
- H GLT cross-section
- I GLT connection
- J on-site connection
scale 1:20

G



J





HCMA (Arch.), Fast+Epp (Ing.): Sport- und Freizeitbad, Surrey, Kanada

Konstruktionsdetails

Übersicht über Konstruktionsdetails

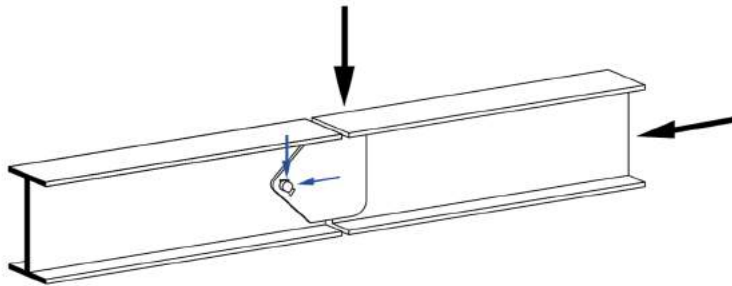
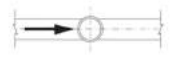
Normalkraftverbindungen

- Gelenkige Verbindungen

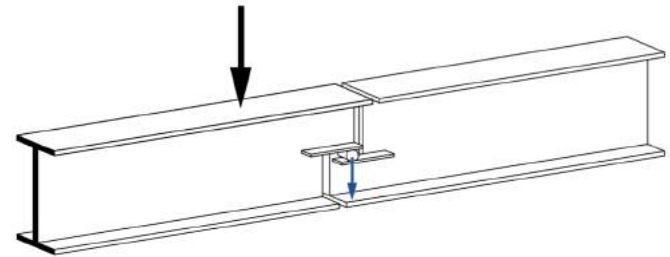
Querkraftverbindungen

Biegesteife Verbindungen

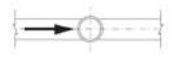
Auflagerung von Bauteilen



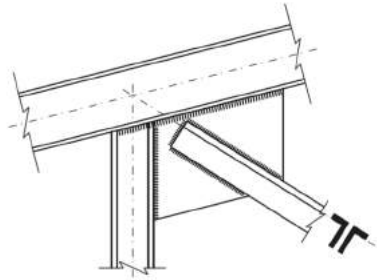
Steglasche



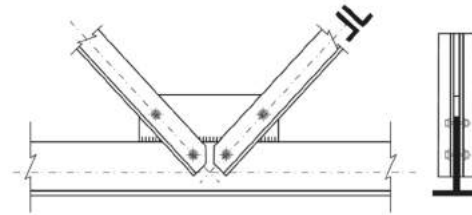
Konsole mit Rollenlager



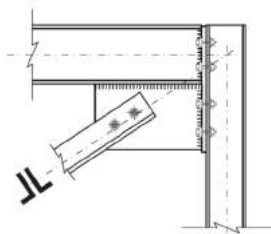
Gelenke im Stahlbau



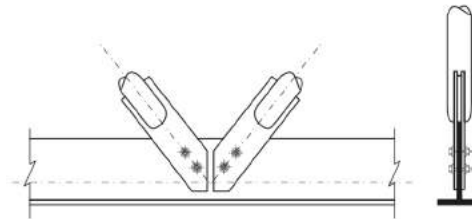
Geschweisstes Knotenblech



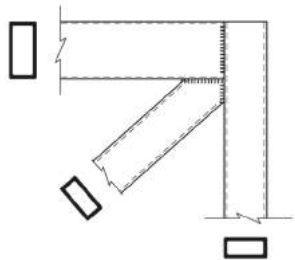
L - Profile mit geschweisstem Knotenblech



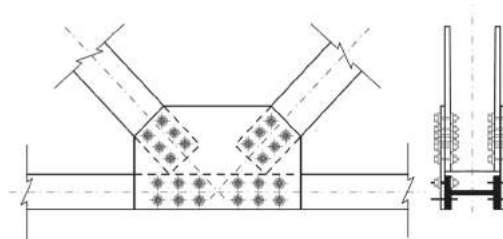
Geschweisstes und geschraubtes Knotenblech



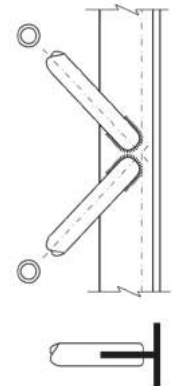
Geschlitzte Rohre mit geschraubten Knotenblechen



Geschweisster Hohlprofilknoten



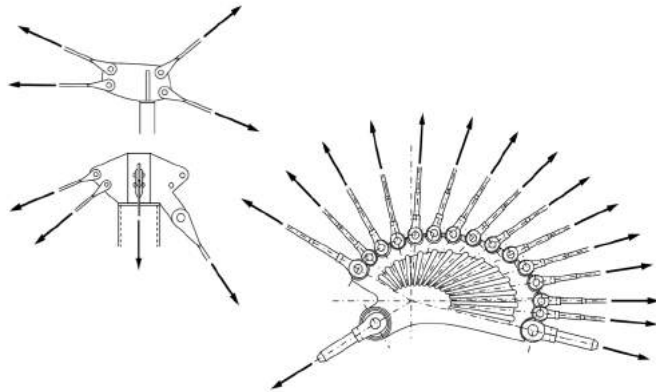
Doppel - T - Profil mit geschraubtem Knotenblech



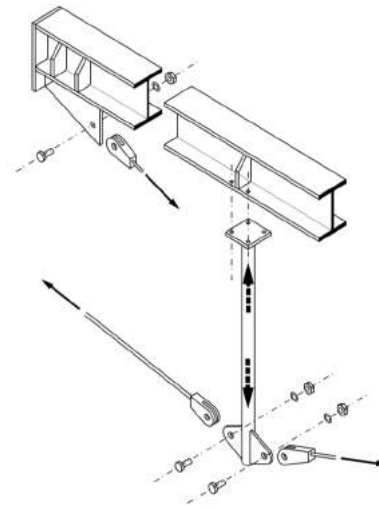
Geschlitzte und geschweisste Hohlprofile



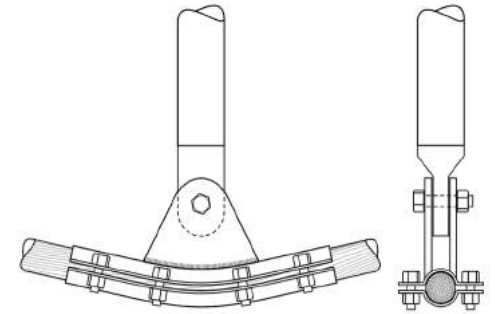
Fachwerkknoten im Stahlbau



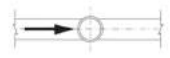
Seilverankerung an Knotenblechen



Seilendverankerung an Knotenblechen



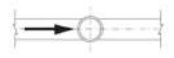
Umlenksattel



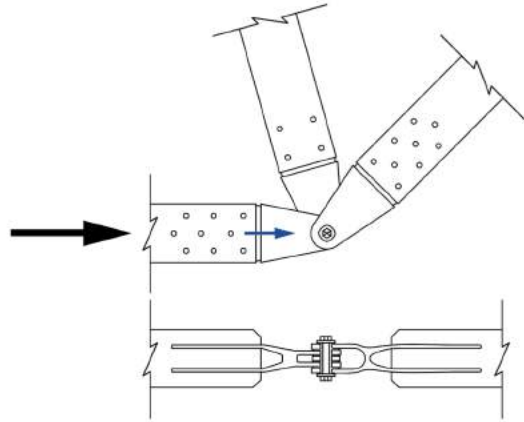
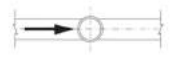
Umlenken von Seilkräften



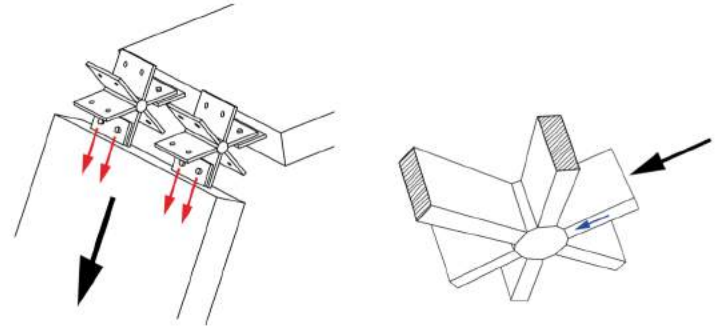
Umlenken von Seilkräften



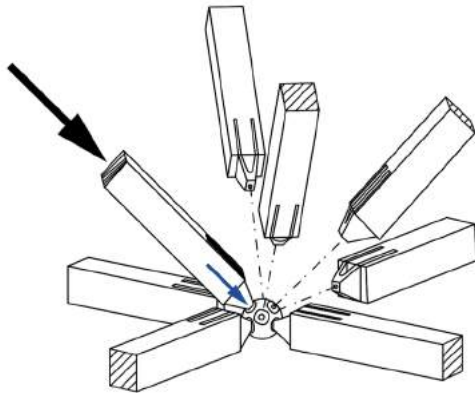
Umlenken von Seilkräften



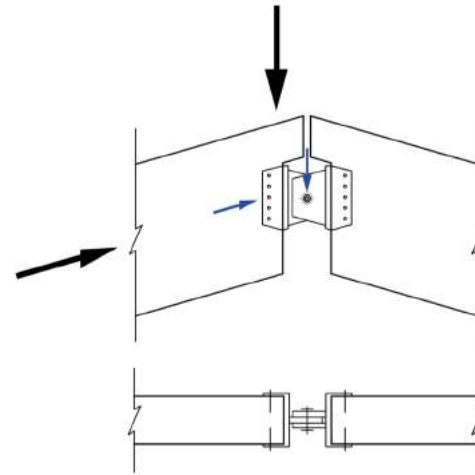
Gelenkausbildung mit
Stahlgussformteilen



Knoten aus Stahlformteilen



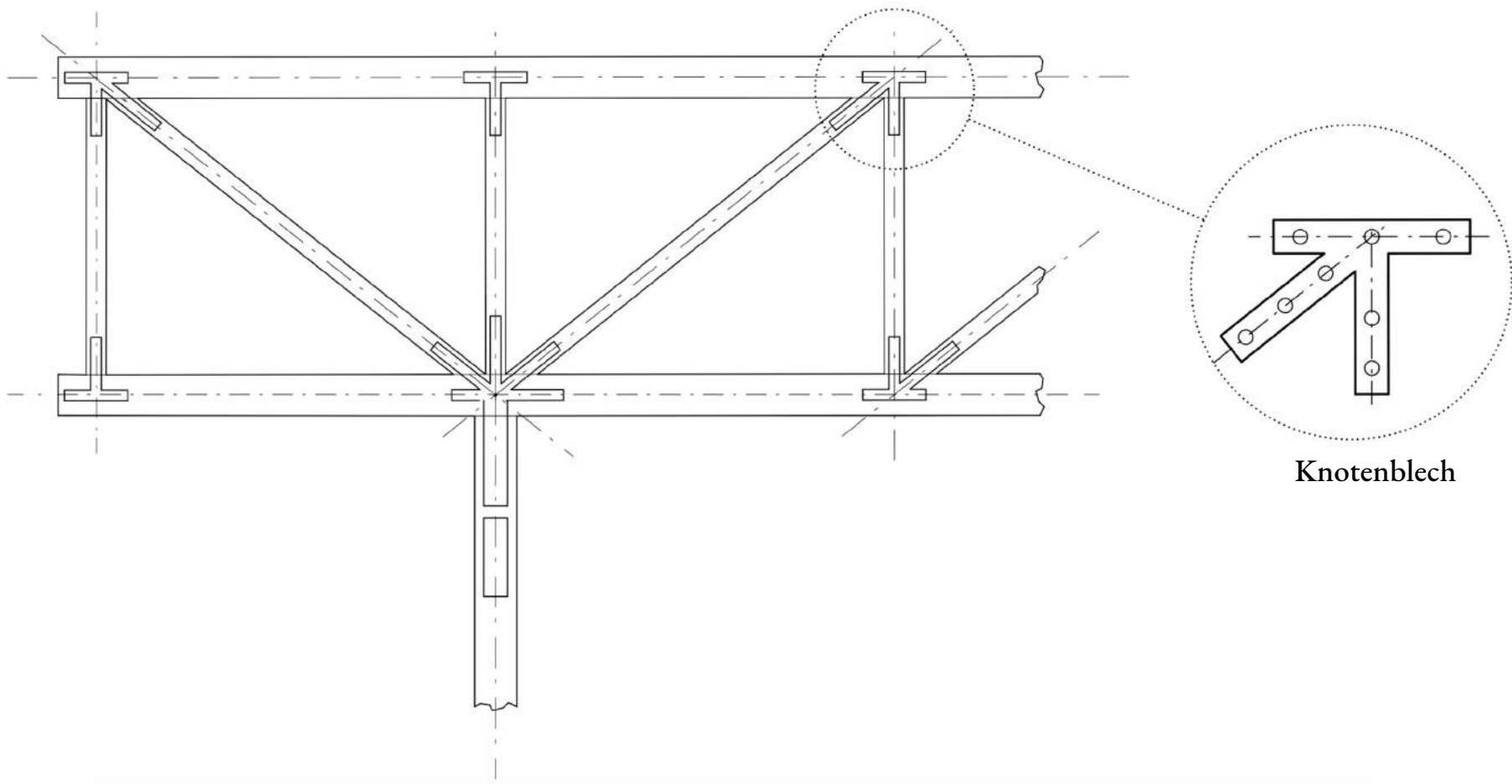
Stahlkugelnknoten



Firstrahmngelenk



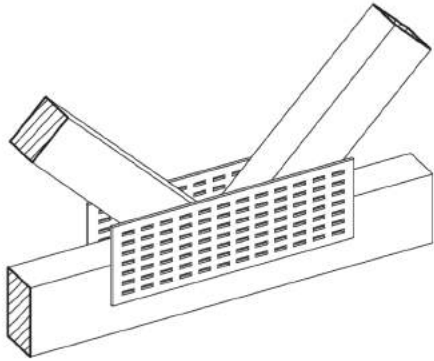
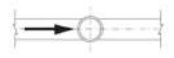
Gelenke im Holzbau



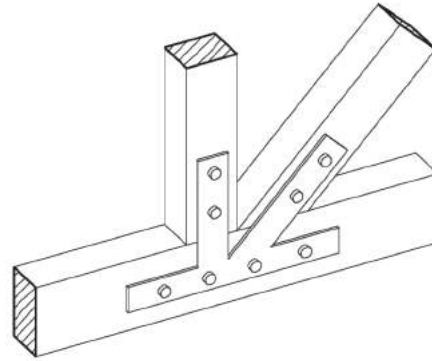
Knotenblech



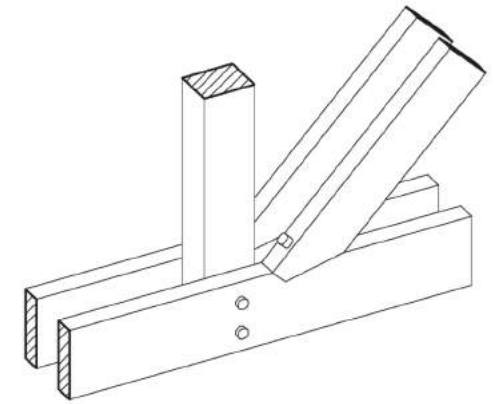
Ausschnitt Holzfachwerk



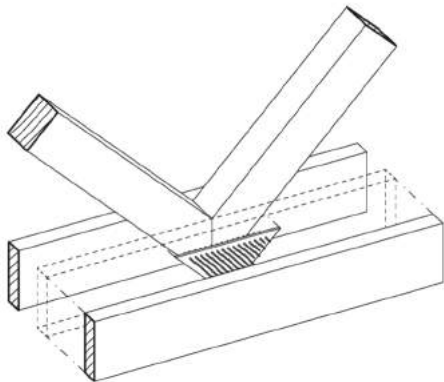
Nagelblech



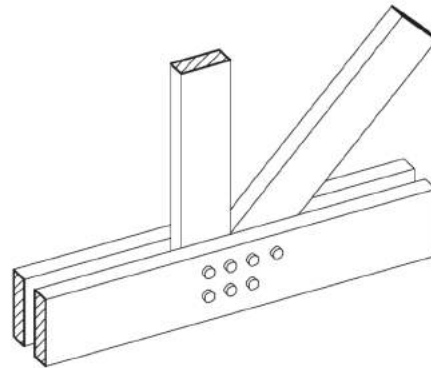
Aussenliegendes Knotenblech



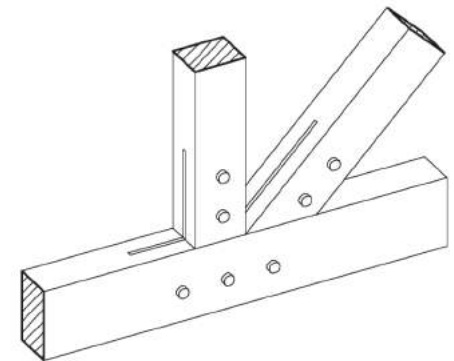
Kombination von verschraubtem und zimmermannsmässigem Knoten



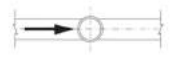
Innenliegende Nagelplatte



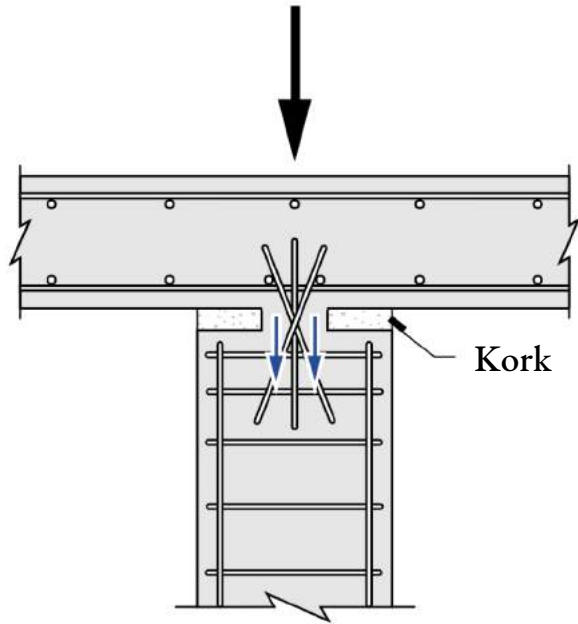
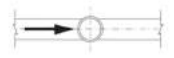
Schraubverbindung



Eingeschlitztes Knotenblech

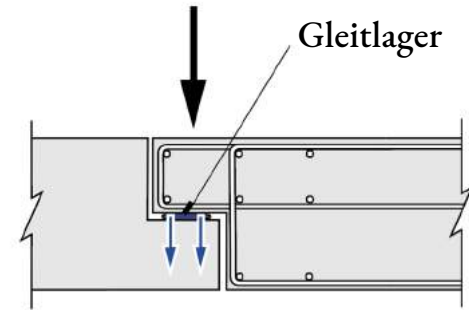


Fachwerkknoten im Holzbau



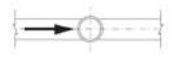
Kork

Betongelenk



Gleitlager

Gleitlager



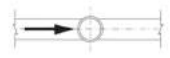
Gelenke im Stahlbetonbau



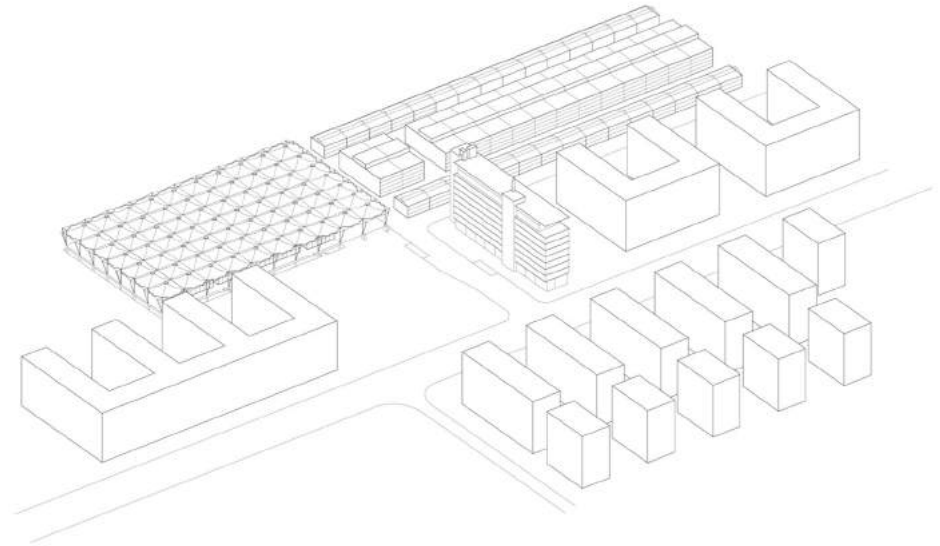
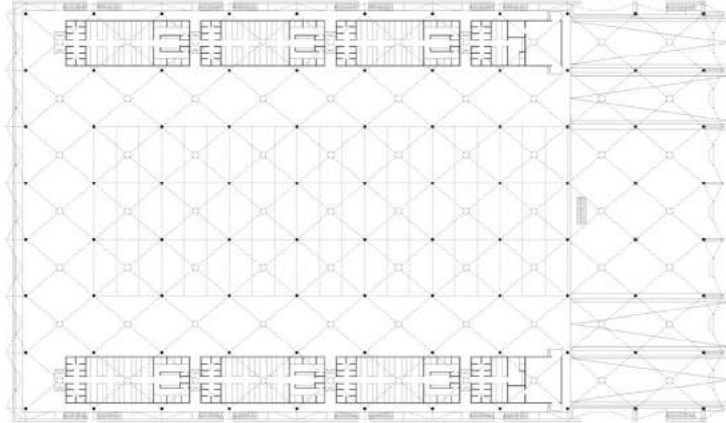
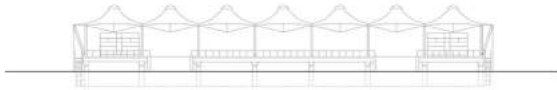
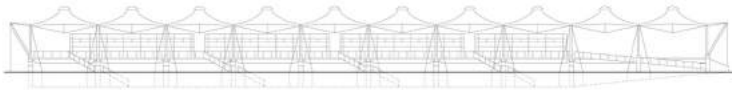
Ackermann und Partner (Arch.), Schlaich, Bergermann und Partner (Ing.): Amt für Abfallwirtschaft, München



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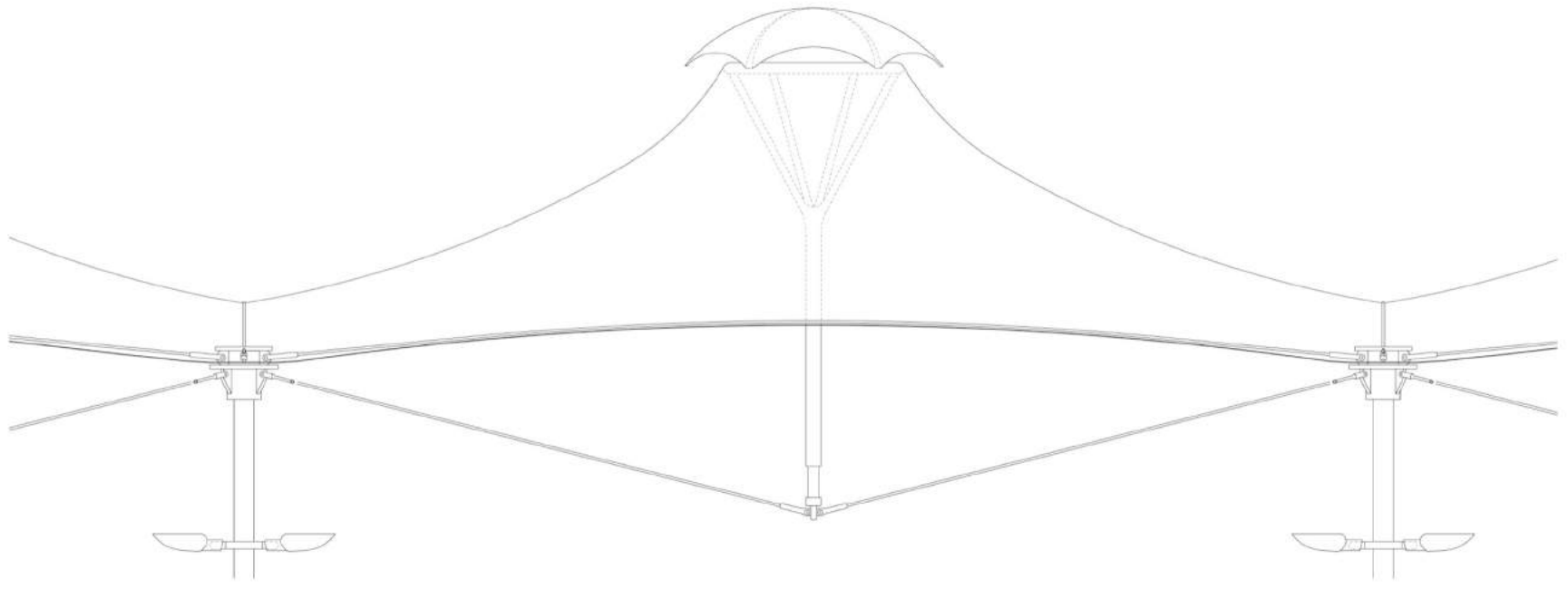


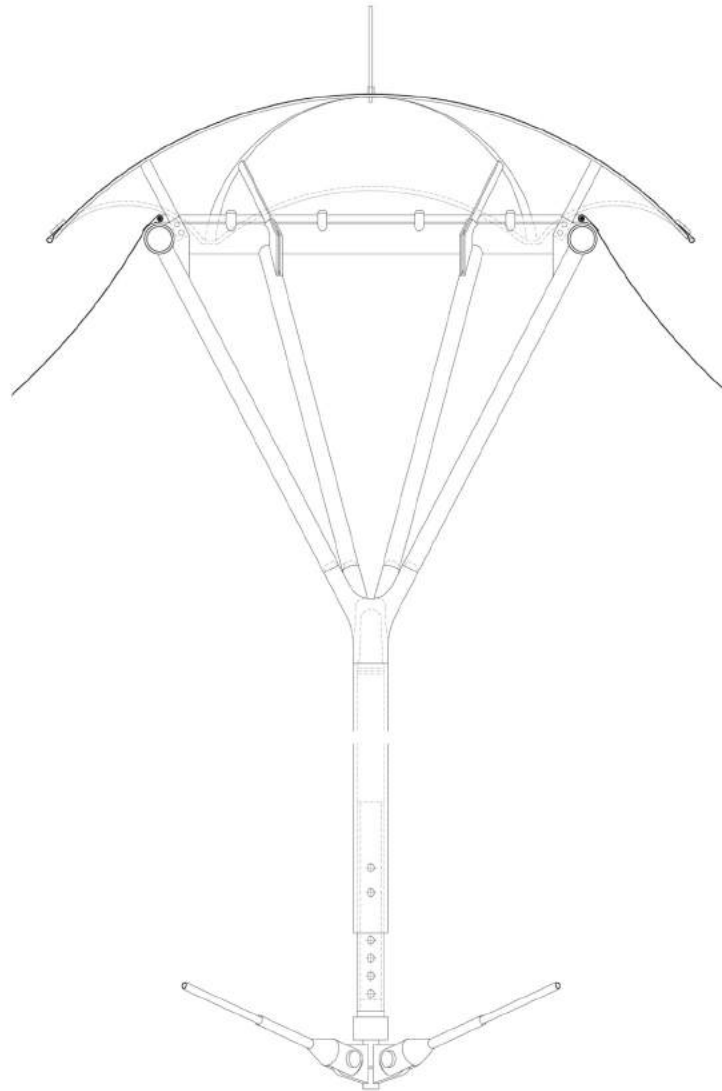
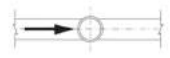


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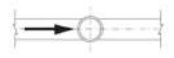




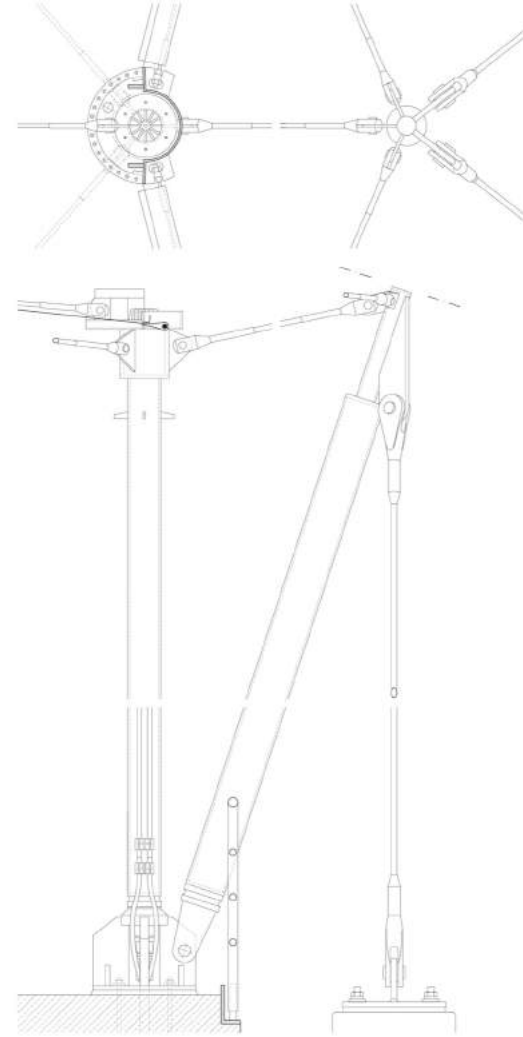
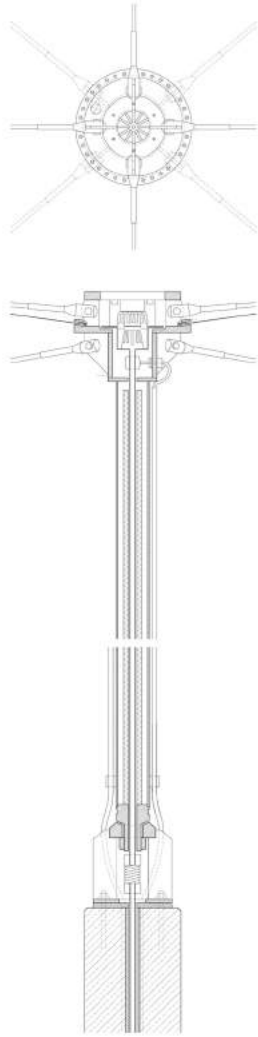
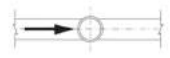
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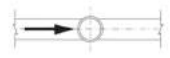


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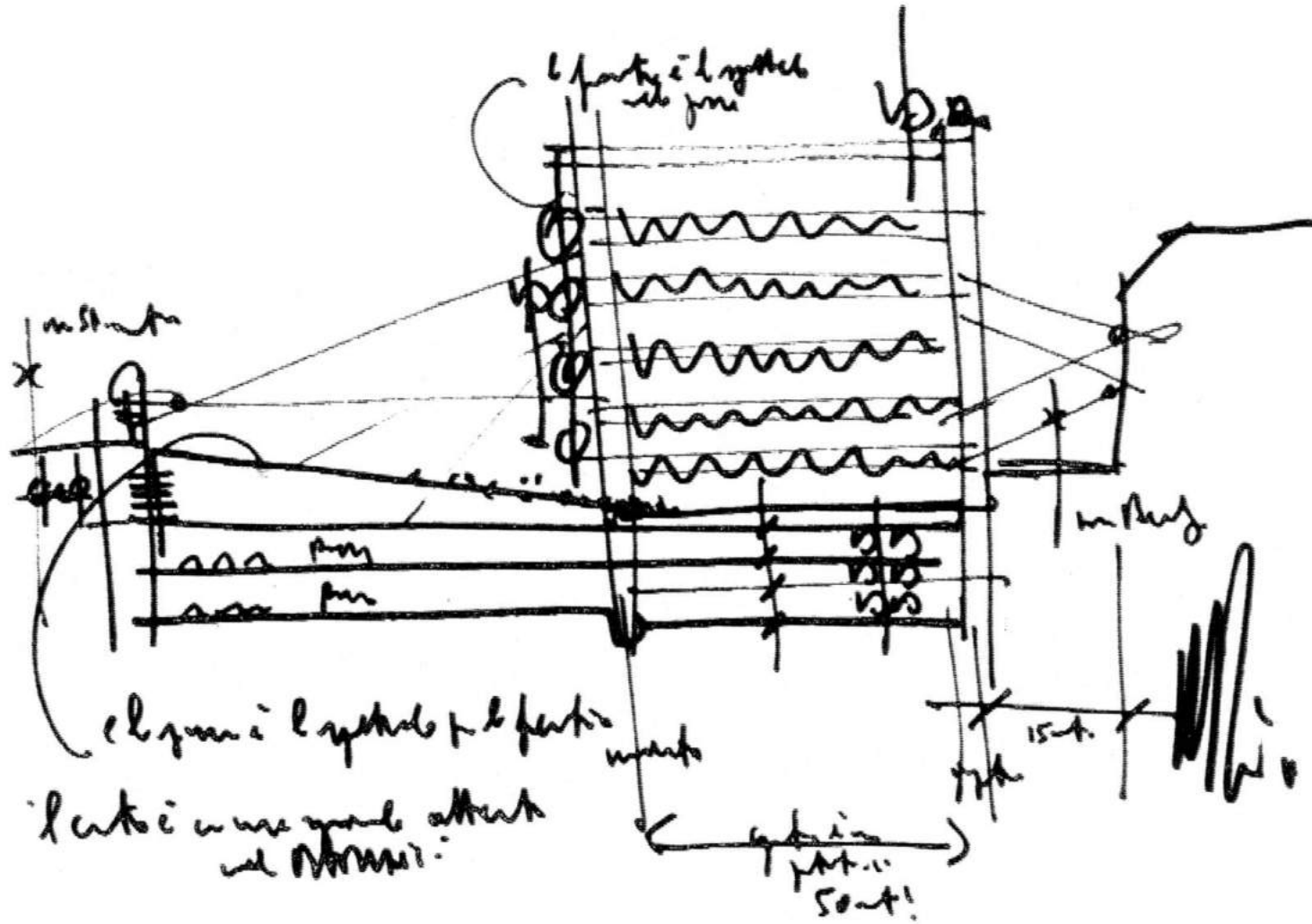


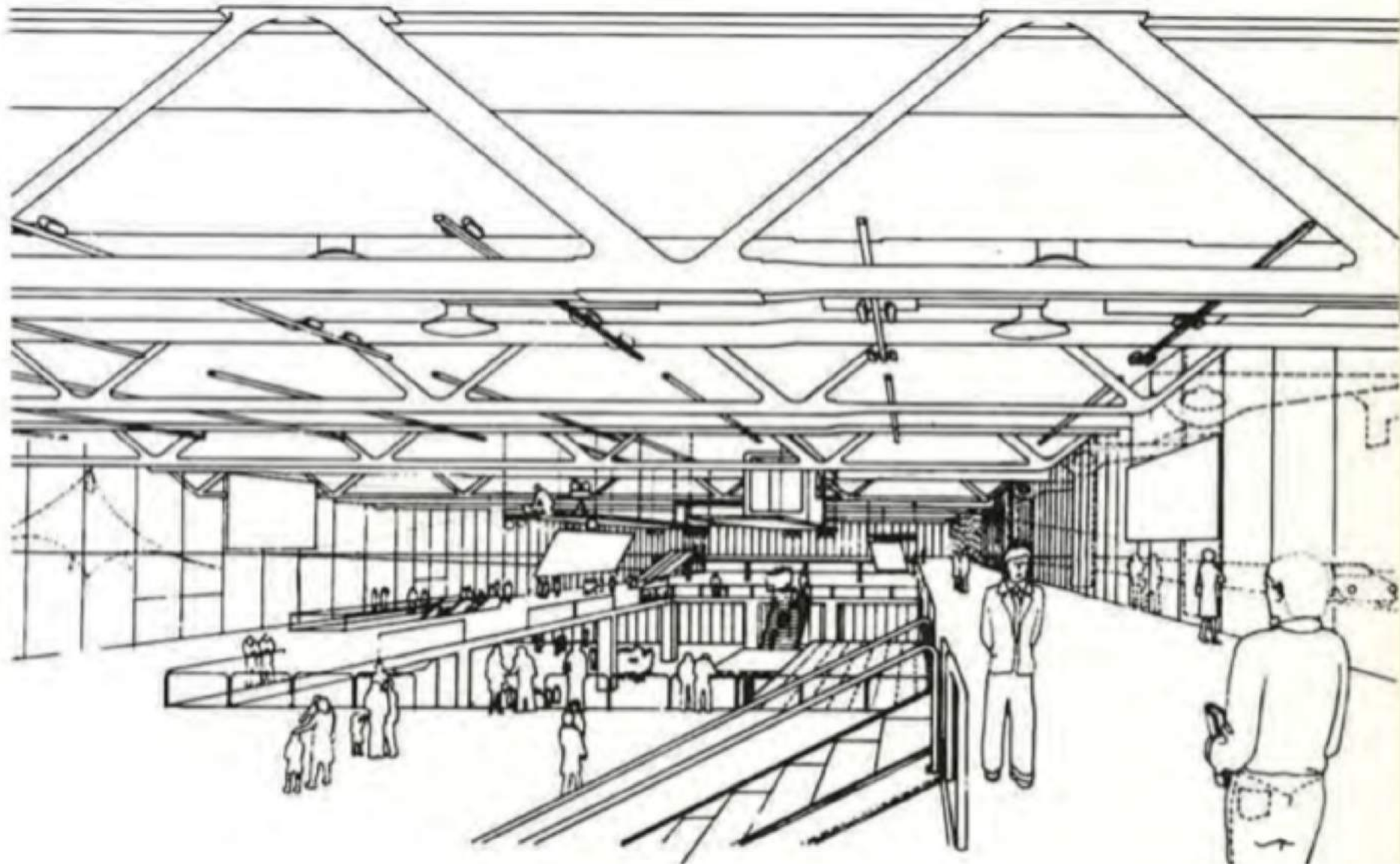
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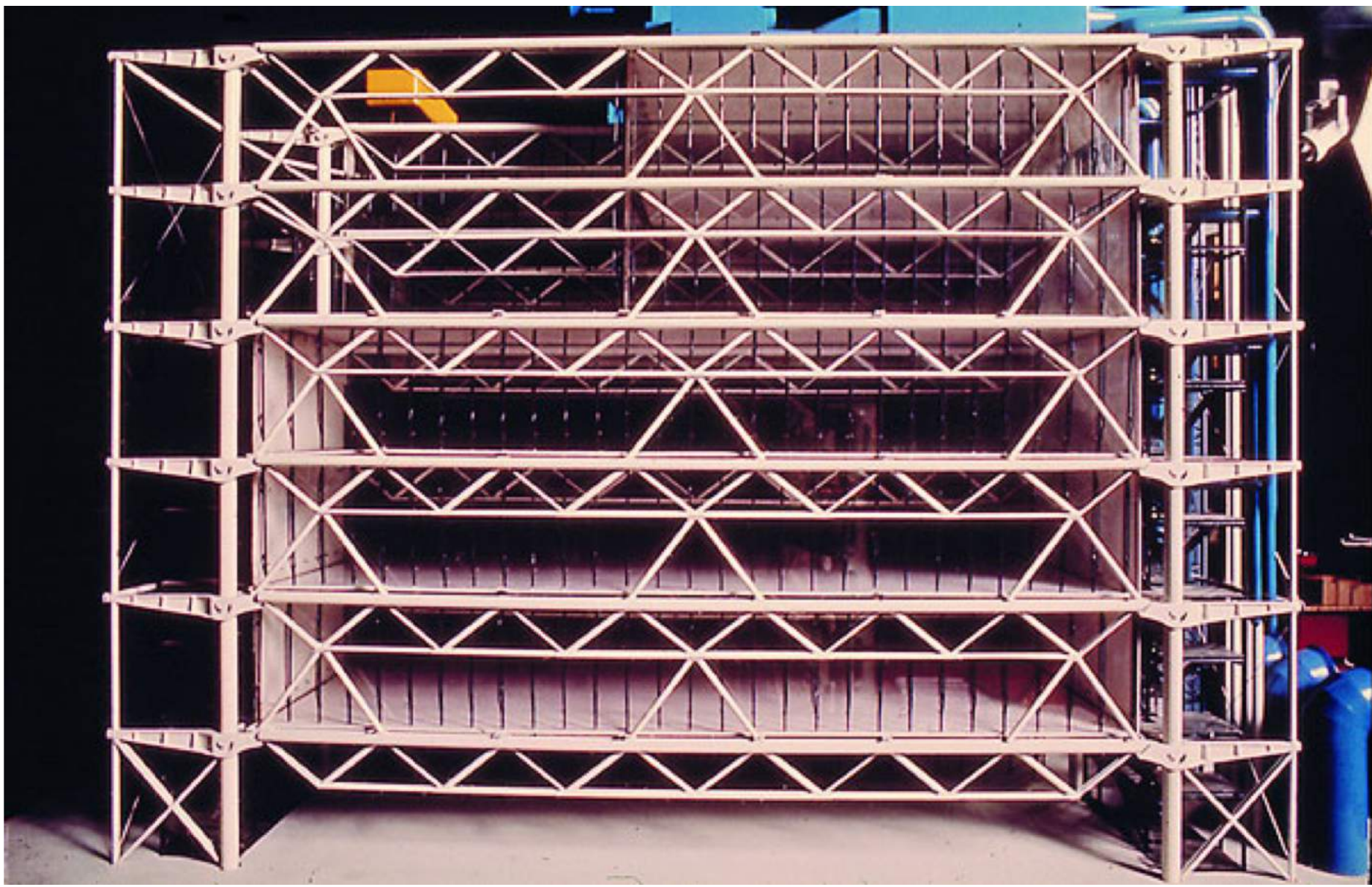


Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977

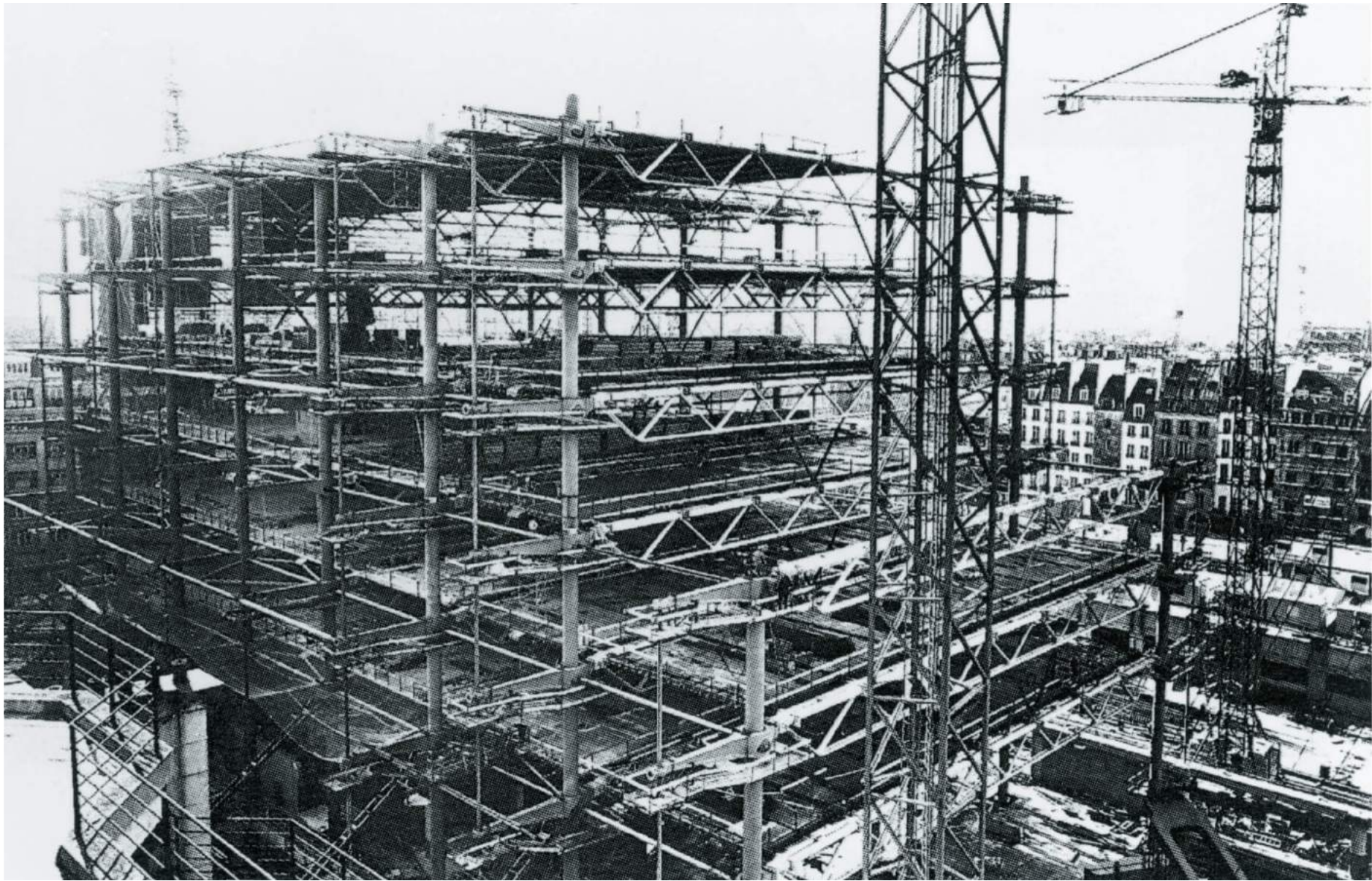
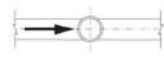




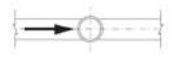
Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



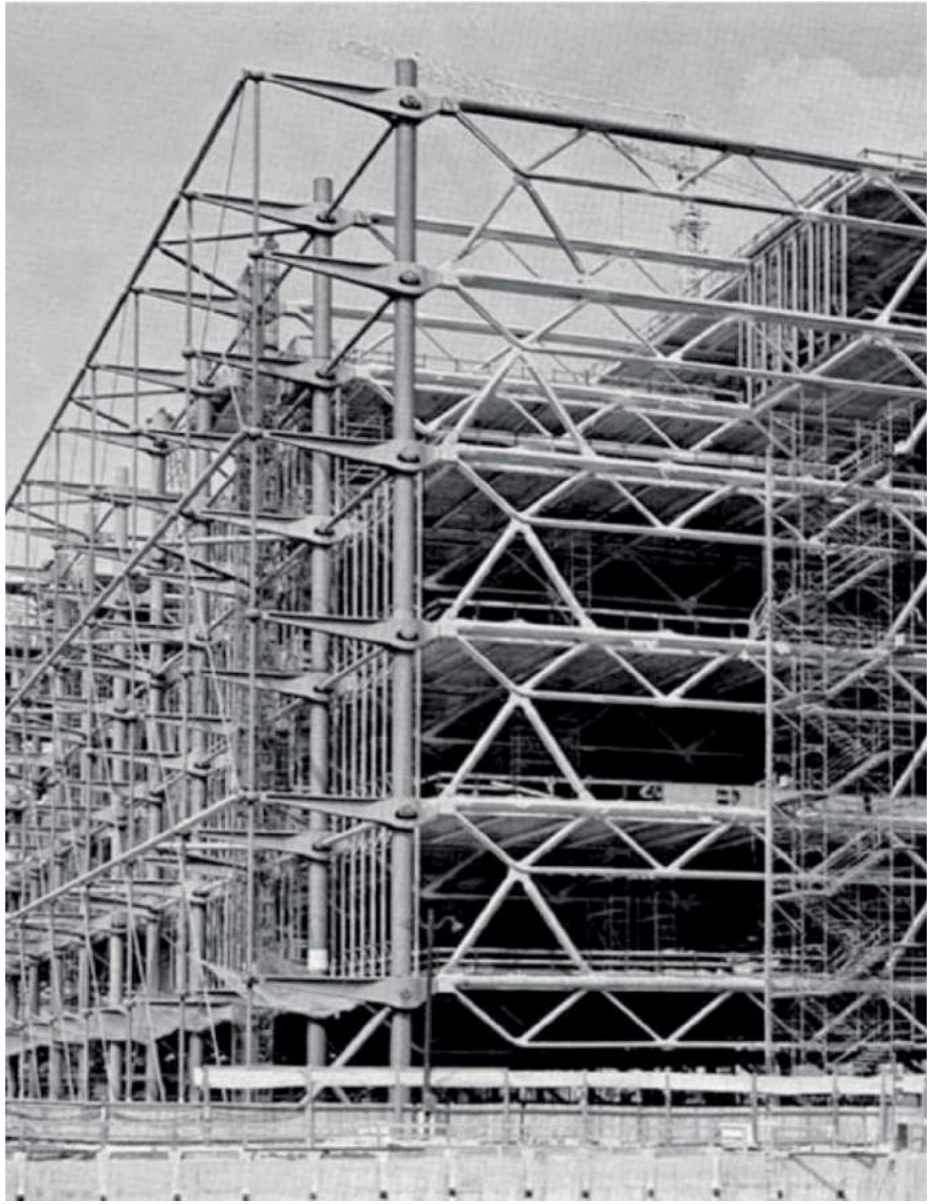
Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



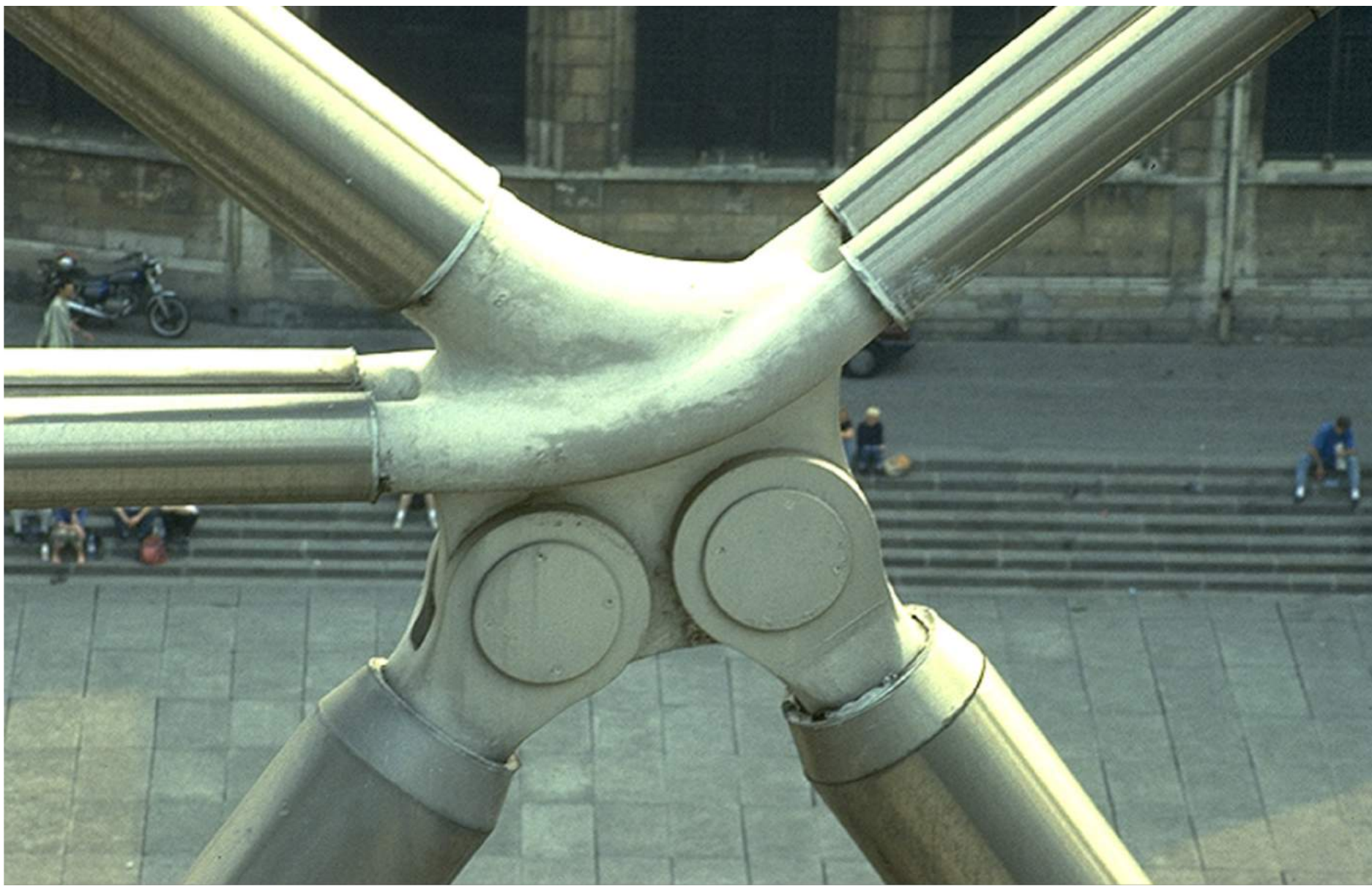
Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



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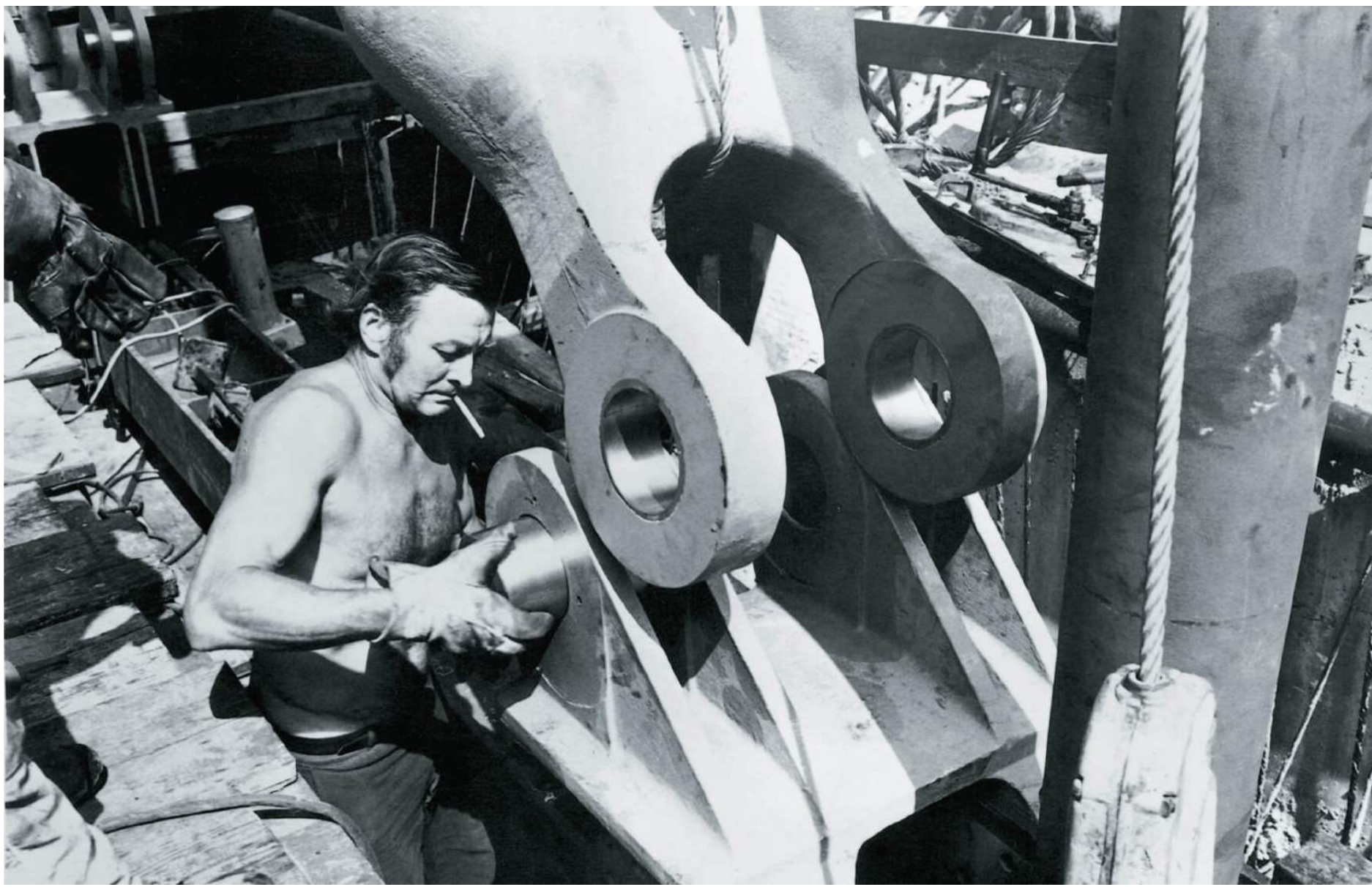
Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



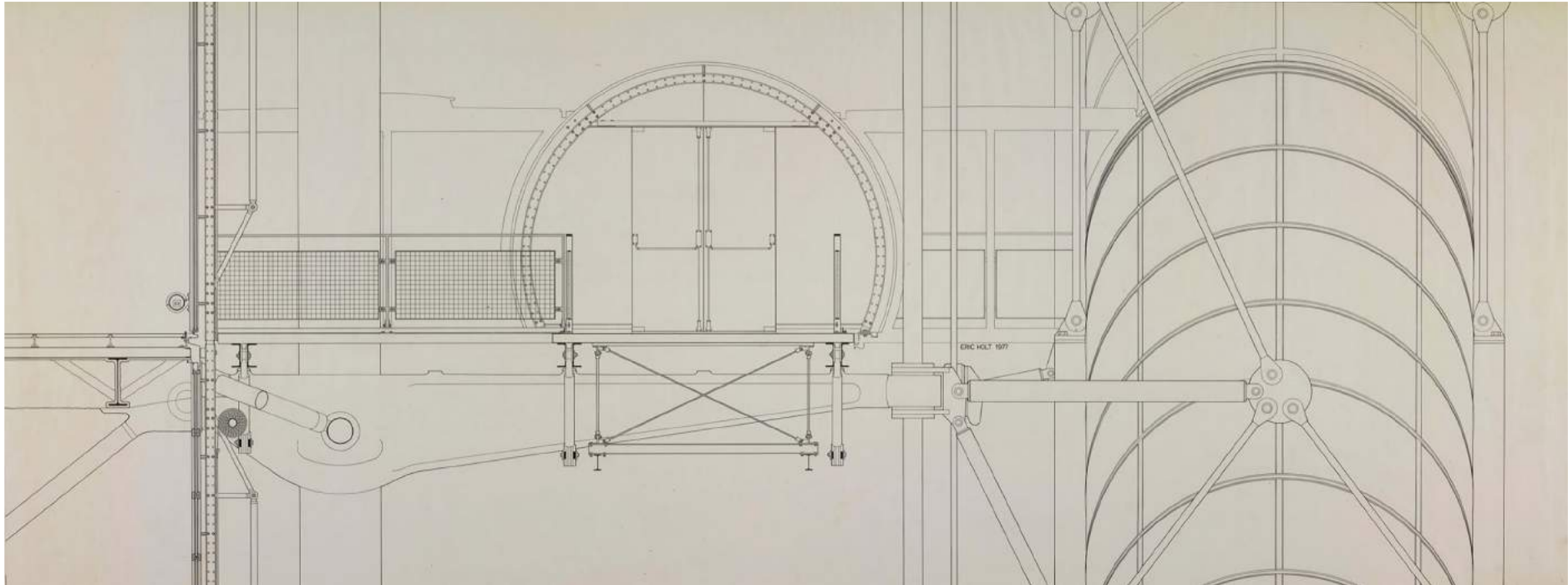
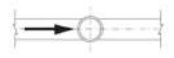
Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977

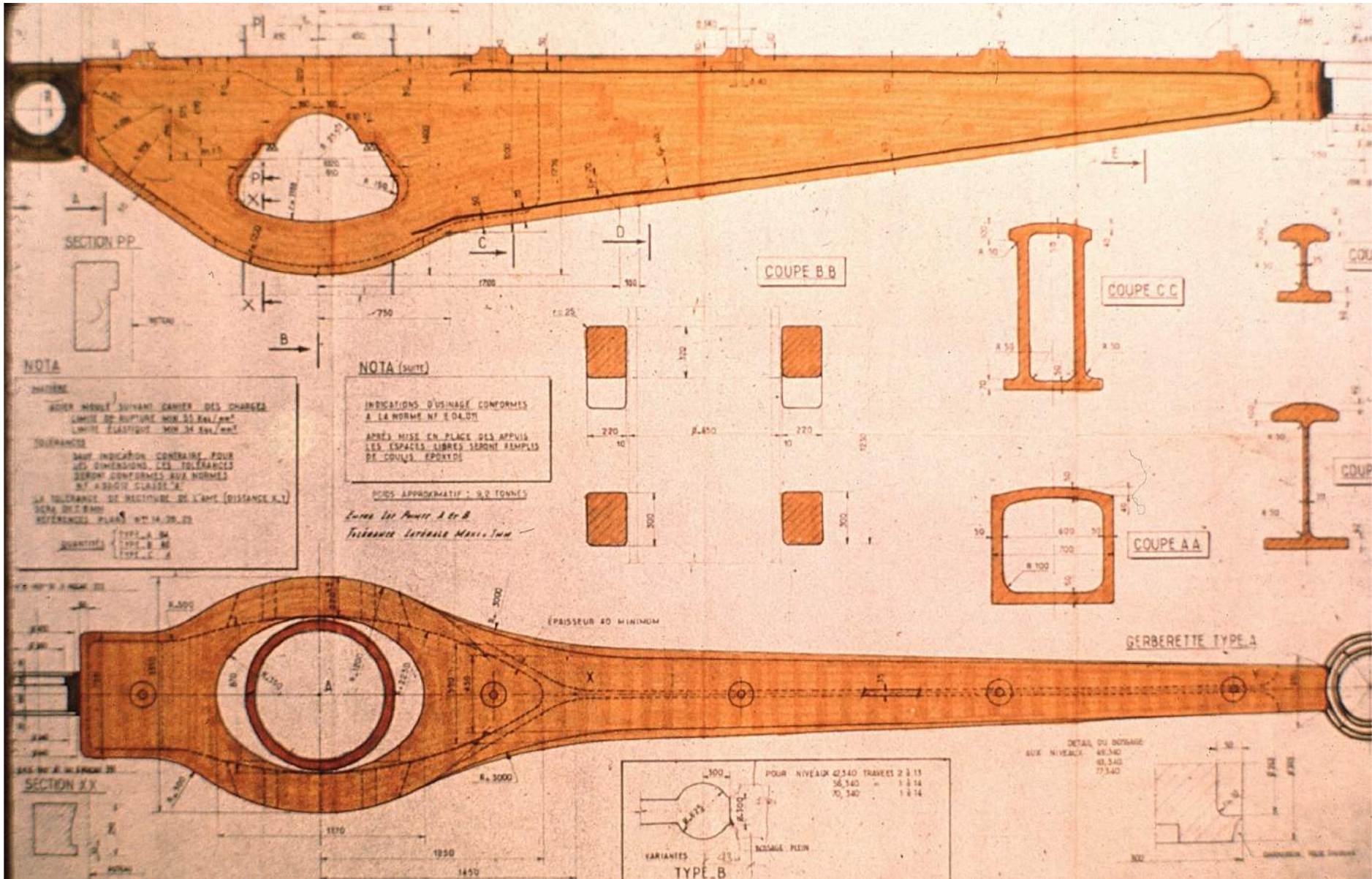


Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977



Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977





Renzo Piano, Richard Rogers, Peter Rice: Centre Pompidou, Paris, 1977

Konstruktionsdetails

Übersicht über Konstruktionsdetails

Normalkraftverbindungen

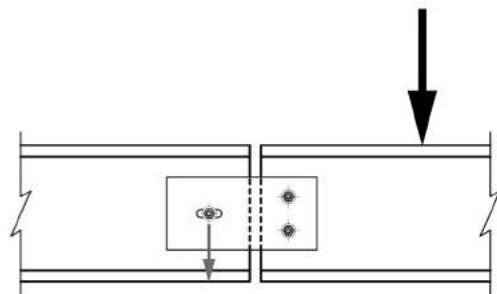
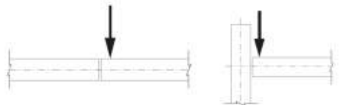
Gelenkige Verbindungen

• Querkraftverbindungen

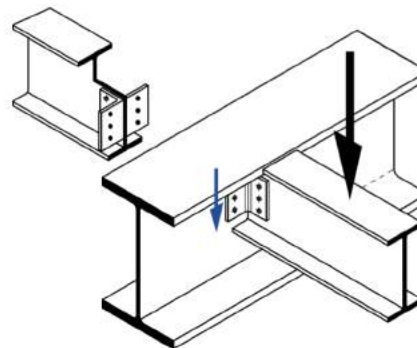
Biegesteife Verbindungen

Auflagerung von Bauteilen

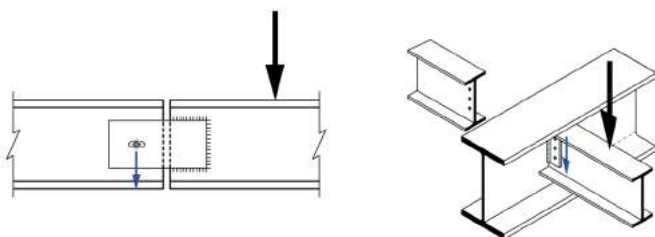
Querkraftverbindungen



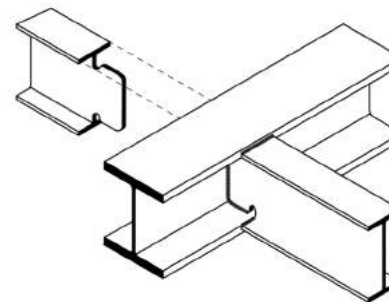
Geschraubter Laschenstoss



Ausgeklinkter Winkellaschenstoss



Geschweisster Laschenstösse



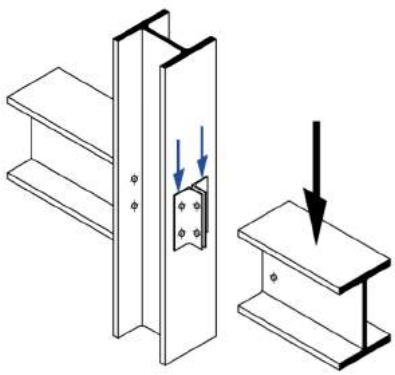
Ausgeklinkter geschweisster Anschluss

Querkraftverbindungen

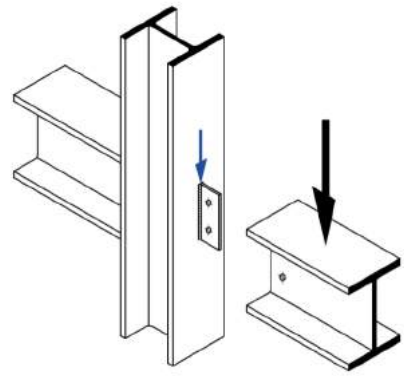


Querkraftverbindungen im Stahlbau Träger - Träger

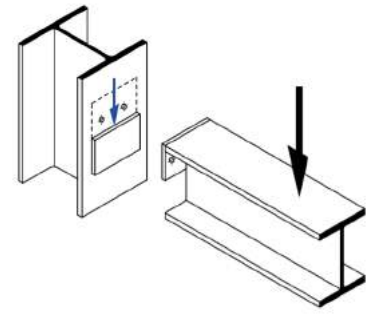
Querkraftverbindungen



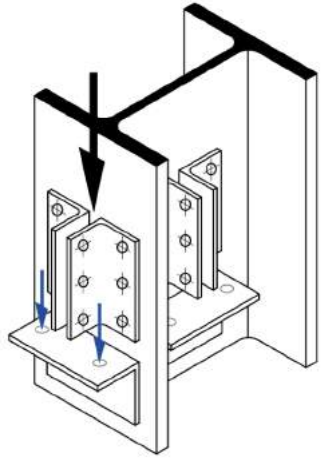
Geschraubter Doppelwinkel



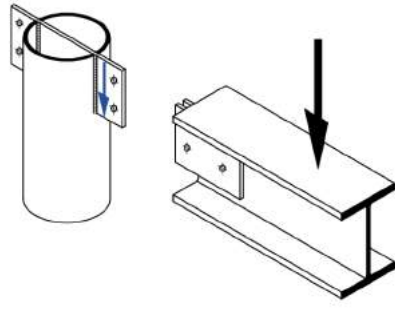
Geschweisste Lasche



Knagge



Konsole und Doppelwinkel



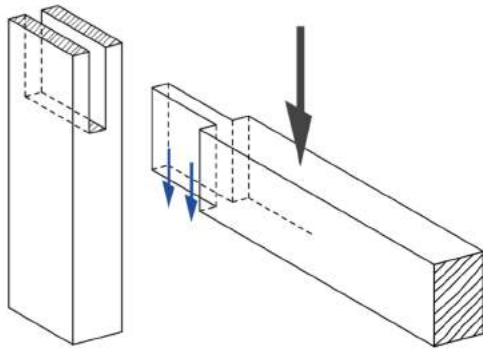
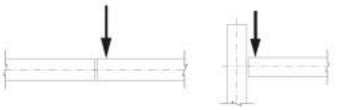
Durchgesteckte Lasche

Querkraftverbindungen

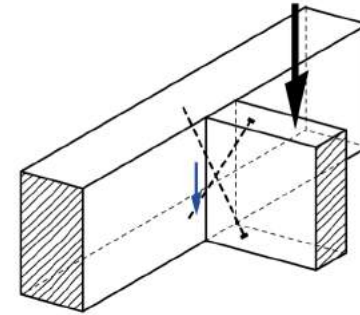


Querkraftverbindungen im Stahlbau Träger - Stütze

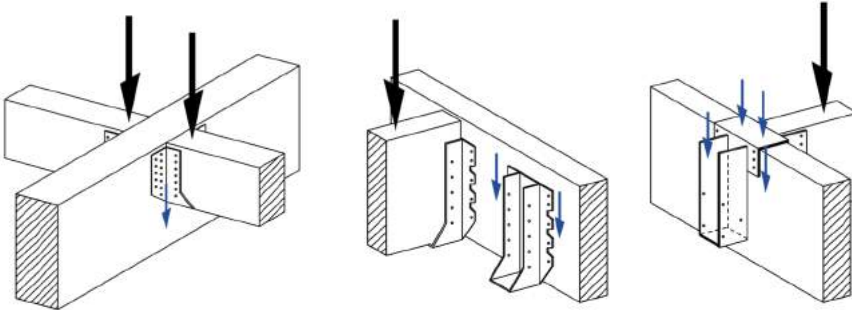
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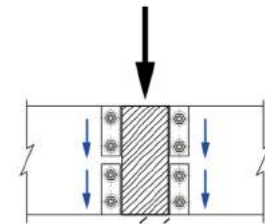
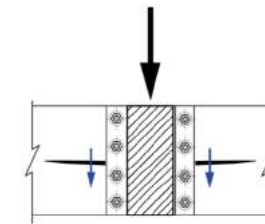
Scherzapfen



Vollgewindeholzschrauben

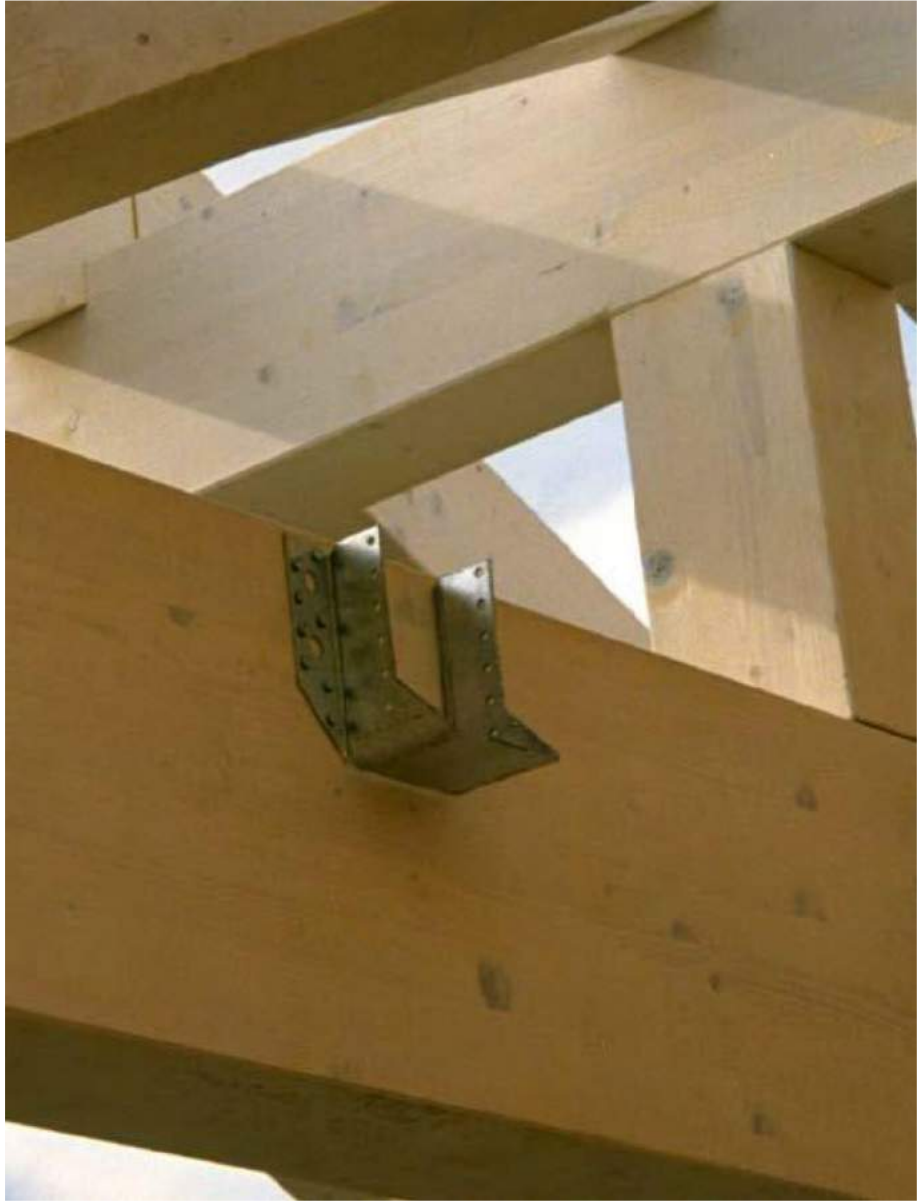


Balkenschuhe



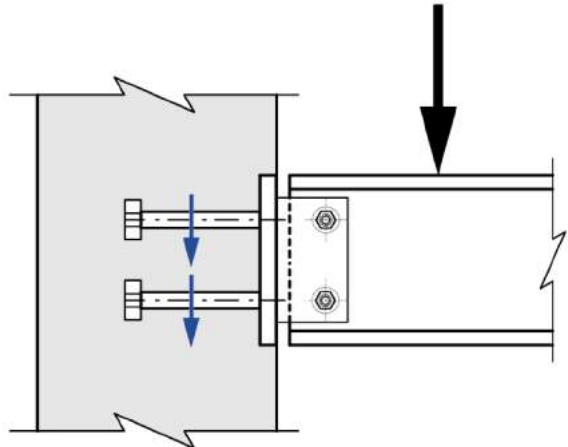
Anschlusswinkel

Querkraftverbindungen



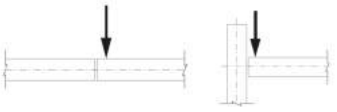
Querkraftverbindungen im Holzbau

Querkraftverbindungen



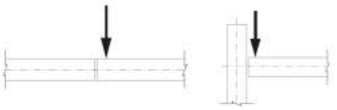
Kopfbolzenanker

Querkraftverbindungen



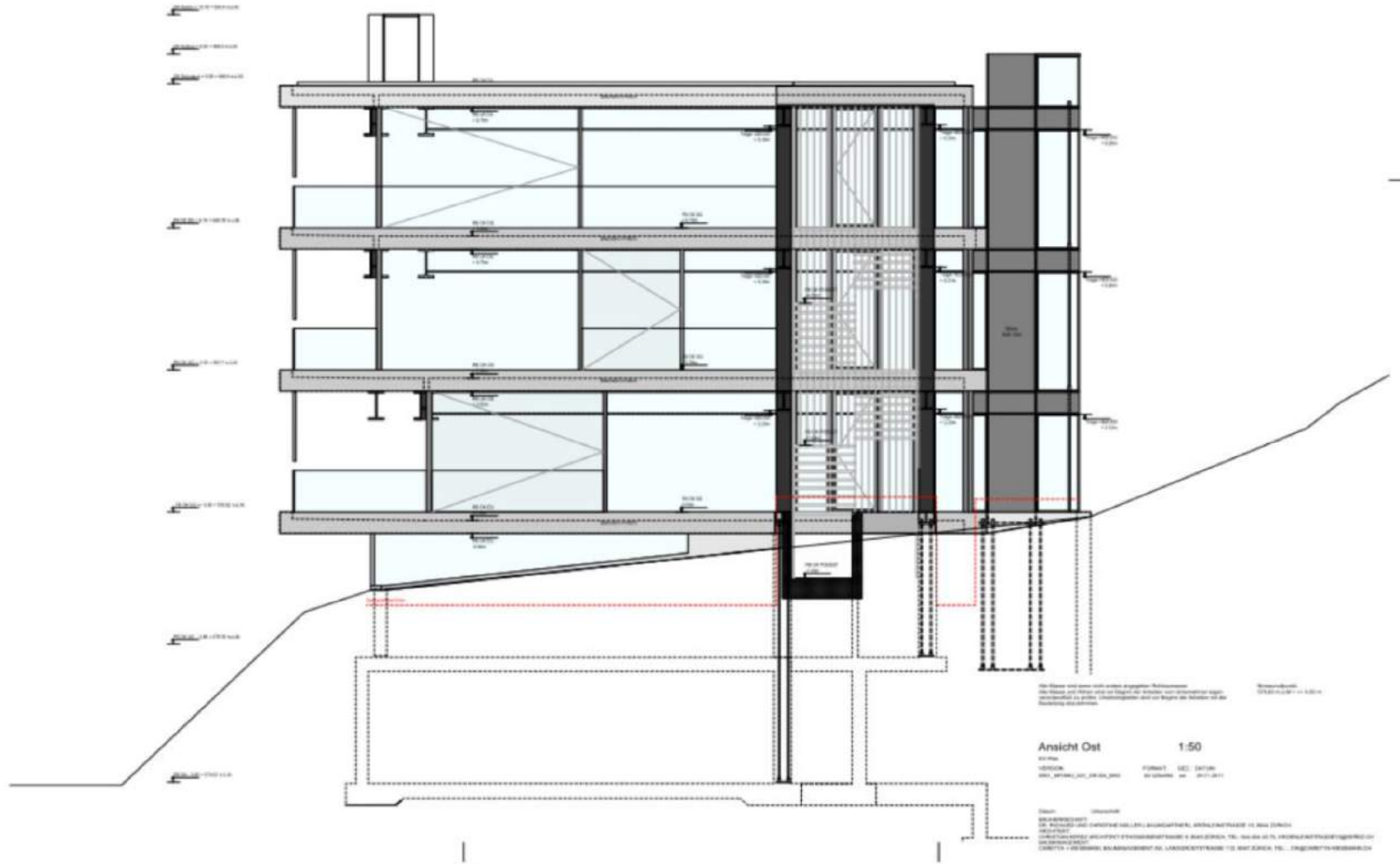
Querkraftverbindungen im Stahlbetonbau

Querkraftverbindungen

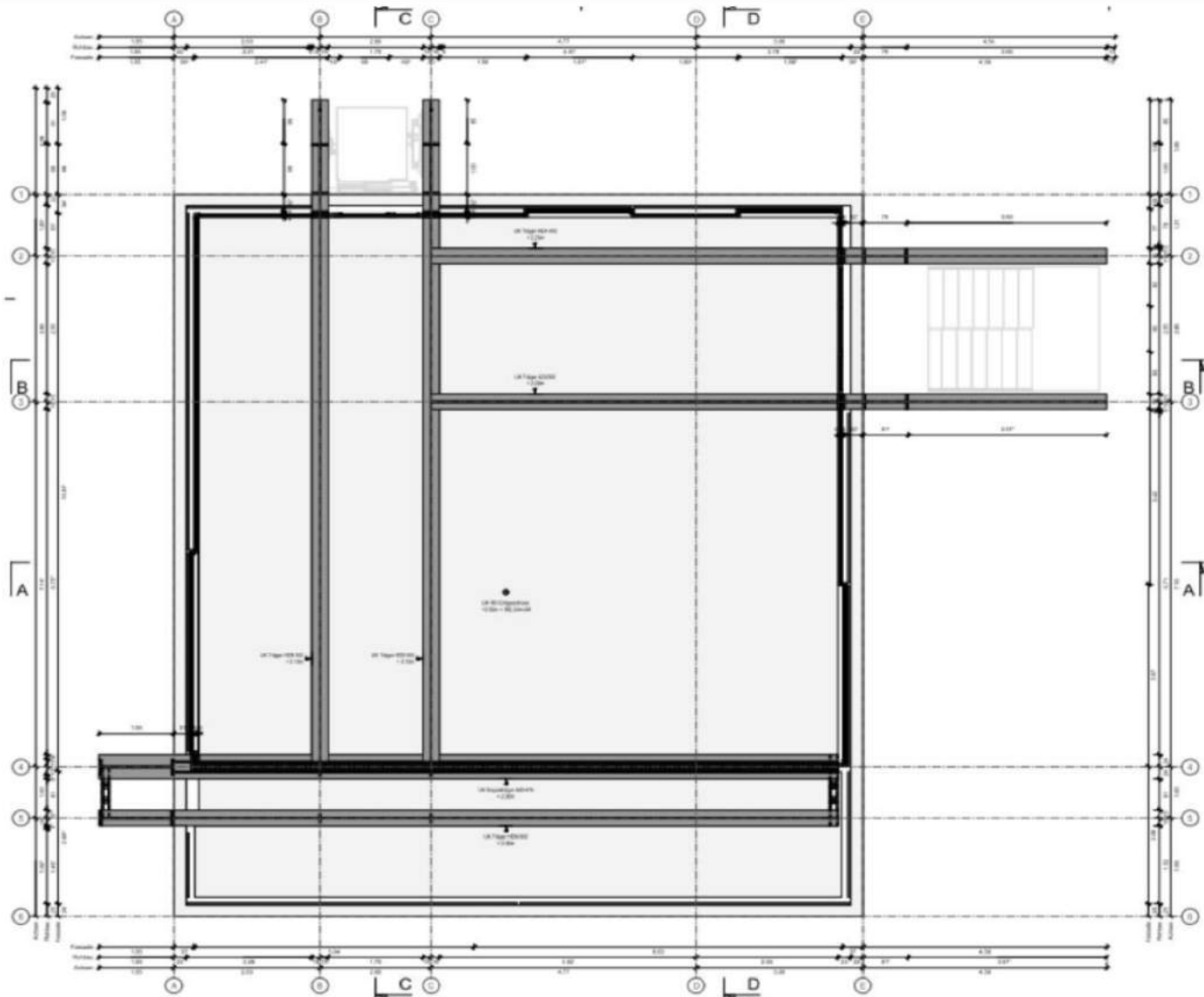


Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

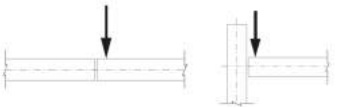
Querkraftverbindungen



Querkraftverbindungen

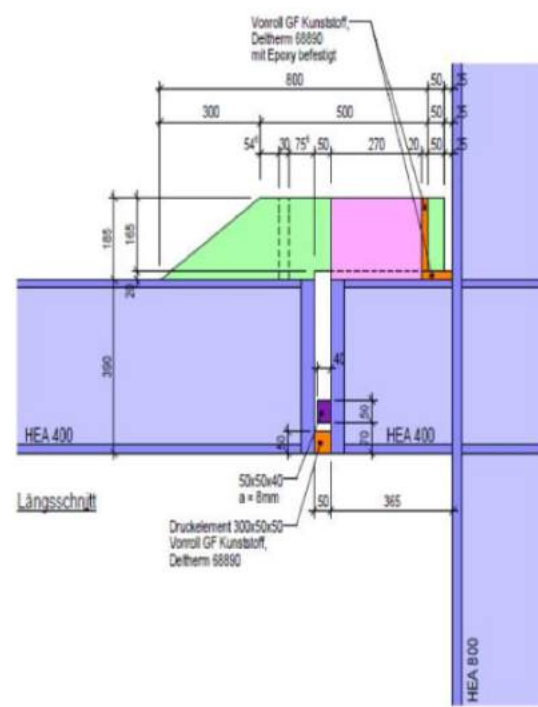
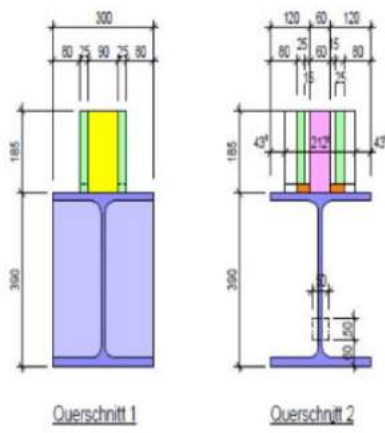
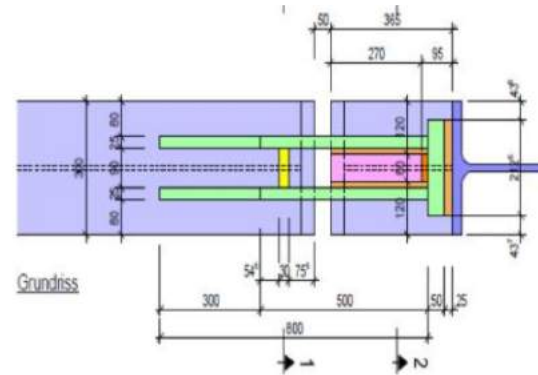
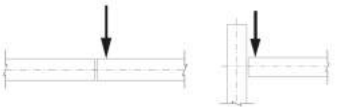


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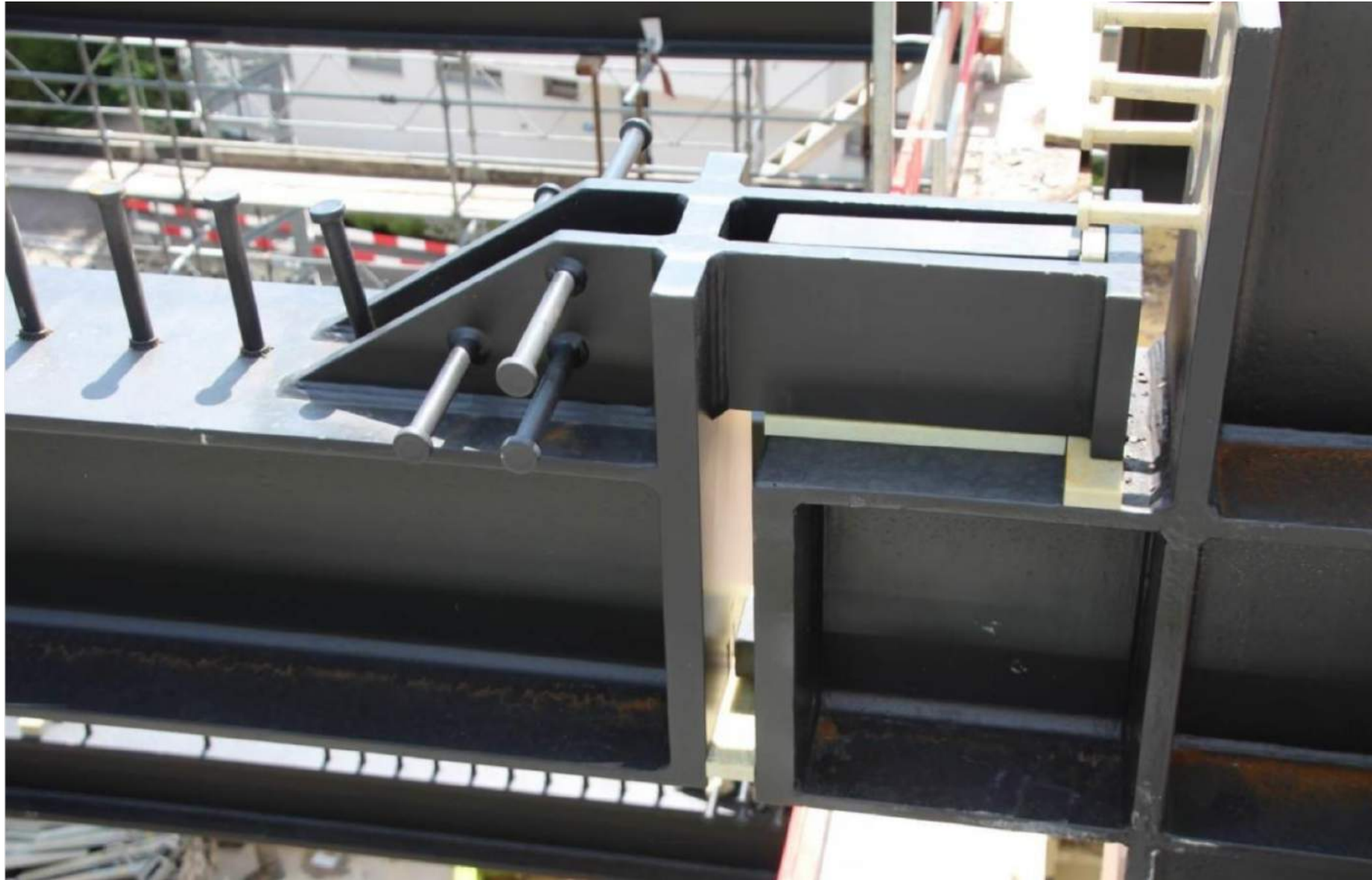
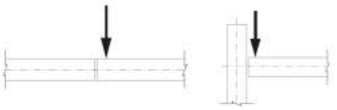


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Querkraftverbindungen

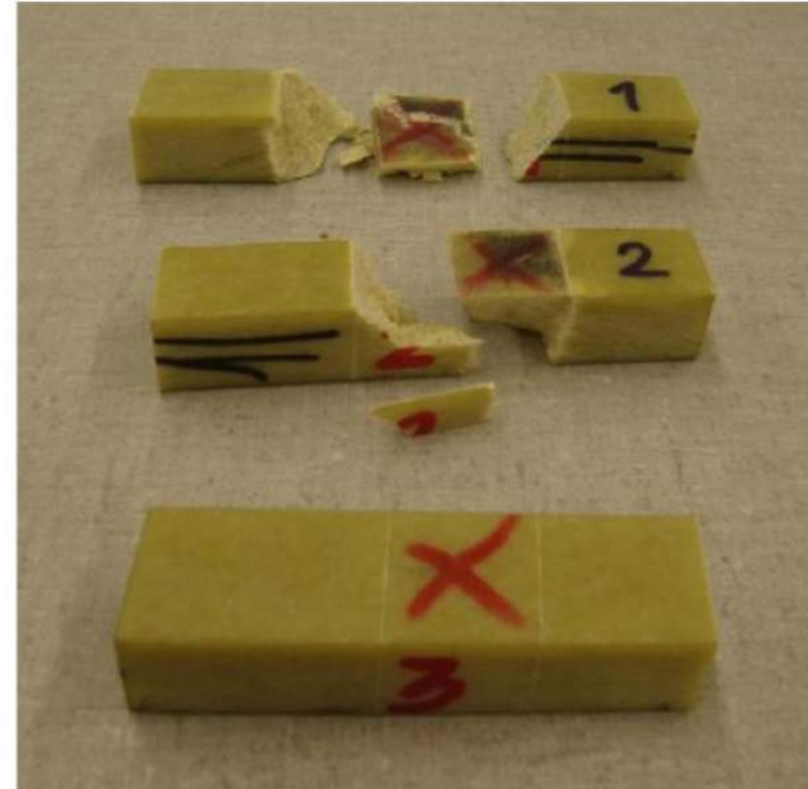
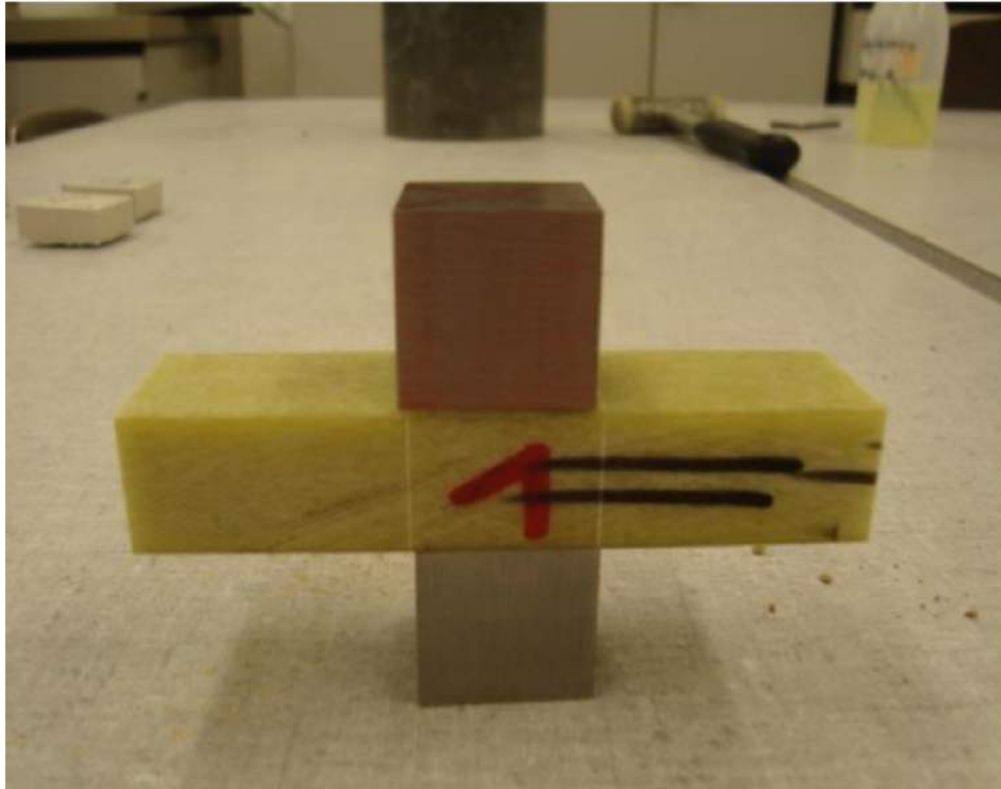
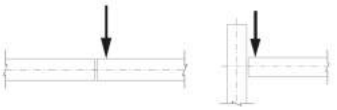


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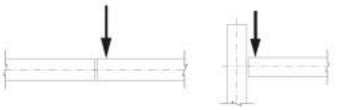


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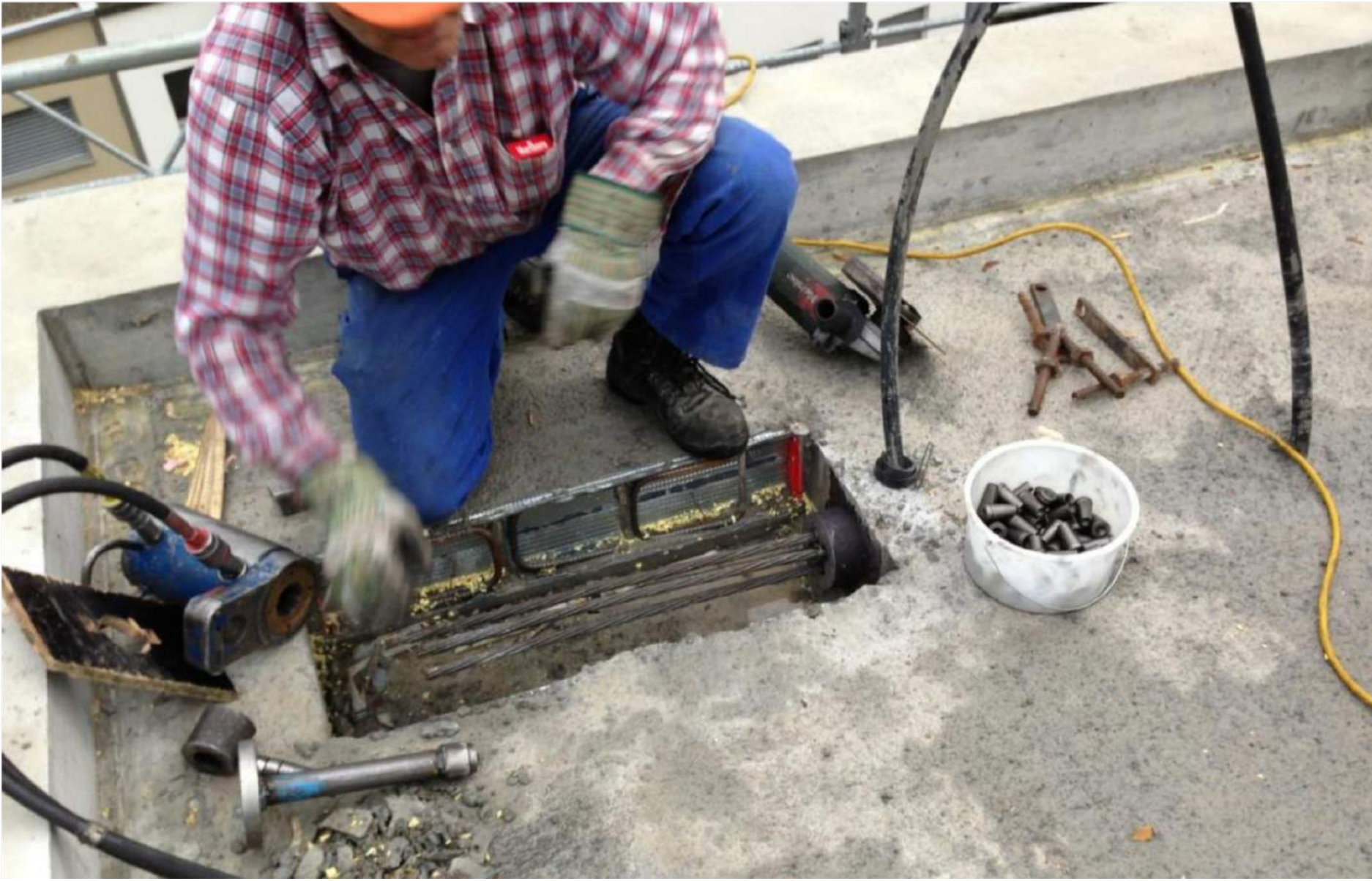
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Querkraftverbindungen

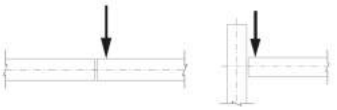


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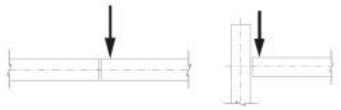
Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

Querkraftverbindungen



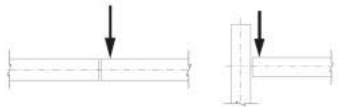
Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

Querkraftverbindungen



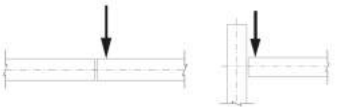
Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

Querkraftverbindungen



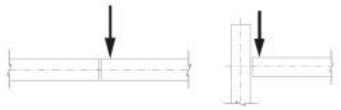
Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

Querkraftverbindungen



Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

Querkraftverbindungen



Christian Kerez (Arch.), Joseph Schwartz (Ing.): Haus Krönleinstrasse, Zürich

Konstruktionsdetails

Übersicht über Konstruktionsdetails

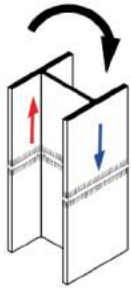
Normalkraftverbindungen

Gelenkige Verbindungen

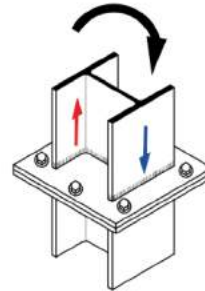
Querkraftverbindungen

● Biegesteife Verbindungen

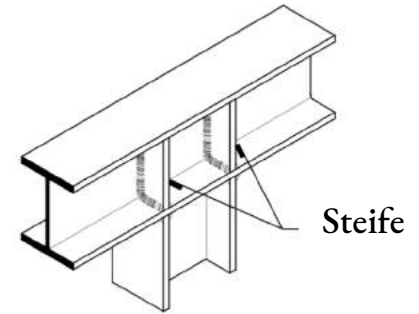
Auflagerung von Bauteilen



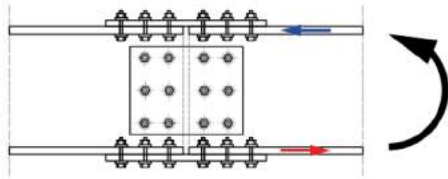
Geschweisster Stumpfstoss



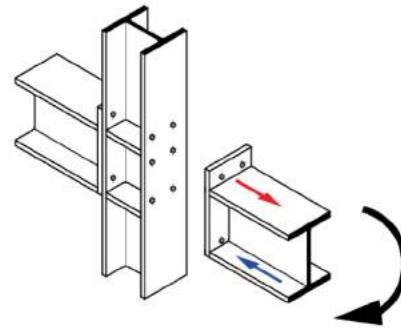
Überstehende Kopfplatte



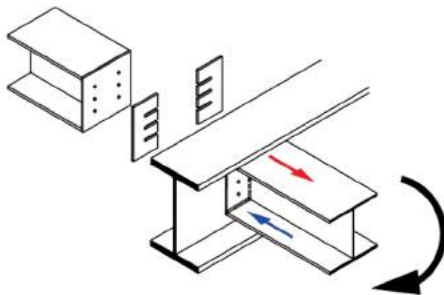
Geschweisster Stützen - Träger Anschluss mit Steifen



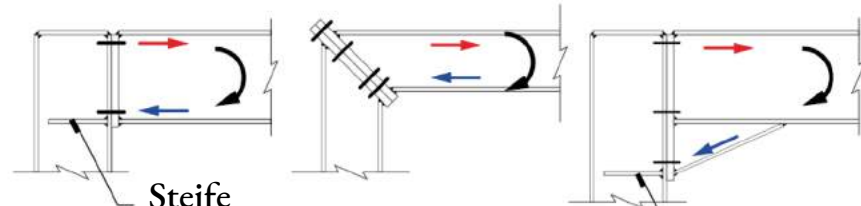
Geschraubter Laschenstoss



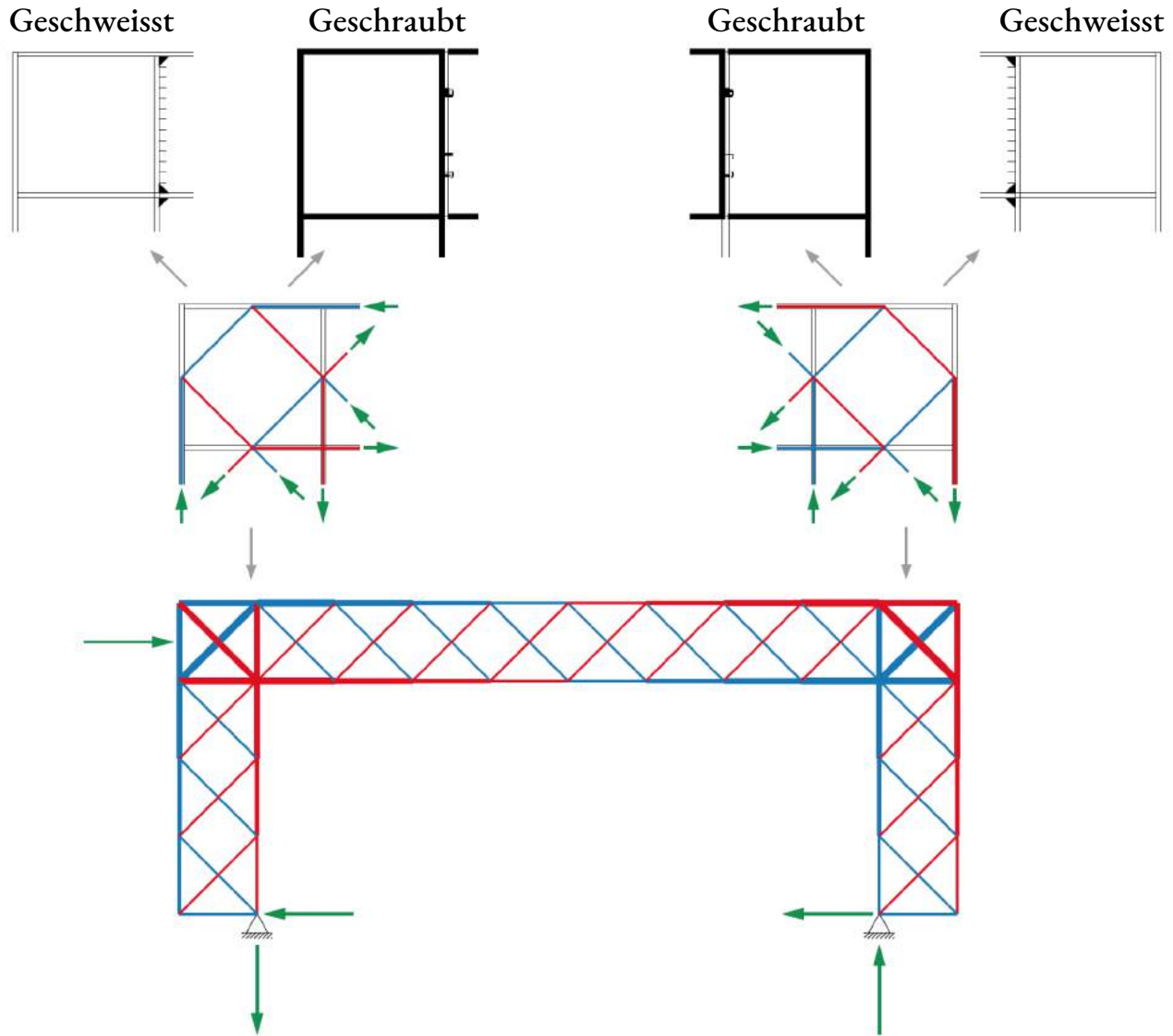
Überstehende Kopfplatte



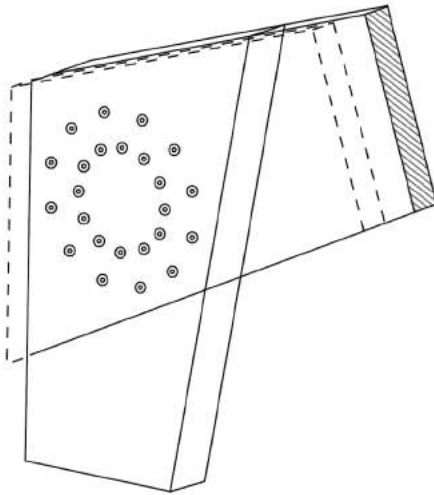
Geschraubte Kopfplatte



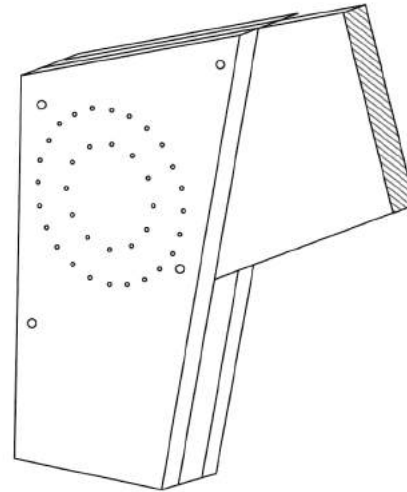
Geschraubte Rahmenecken



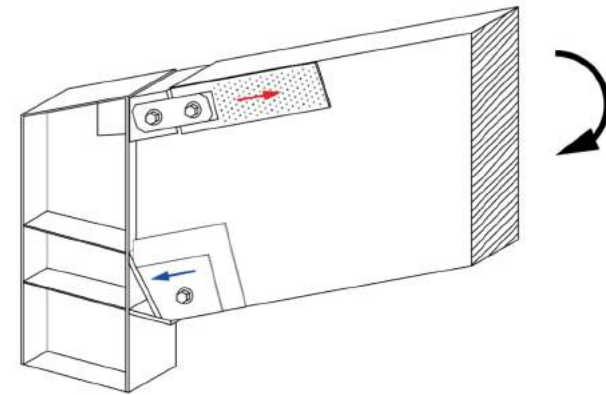




Rahmenecke Holz
(Einlassdübelkreis)



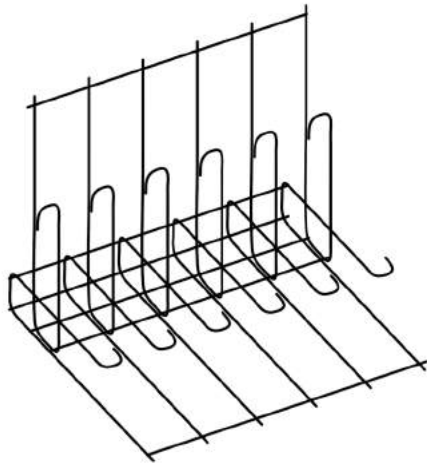
Rahmenecke Holz
(Stabdübelkreis)



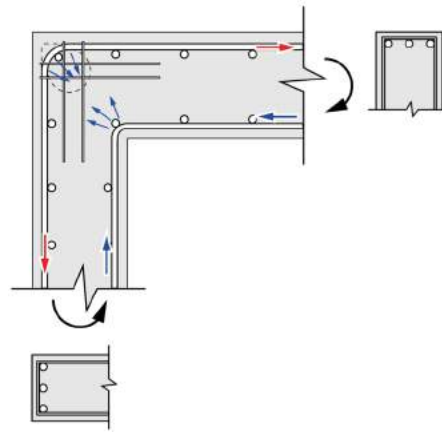
Rahmenecke Holz / Stahl



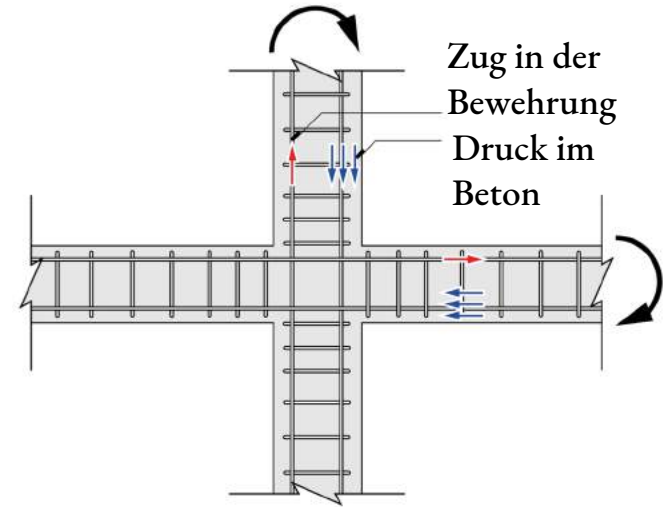
Biegesteife Verbindungen im Holzbau



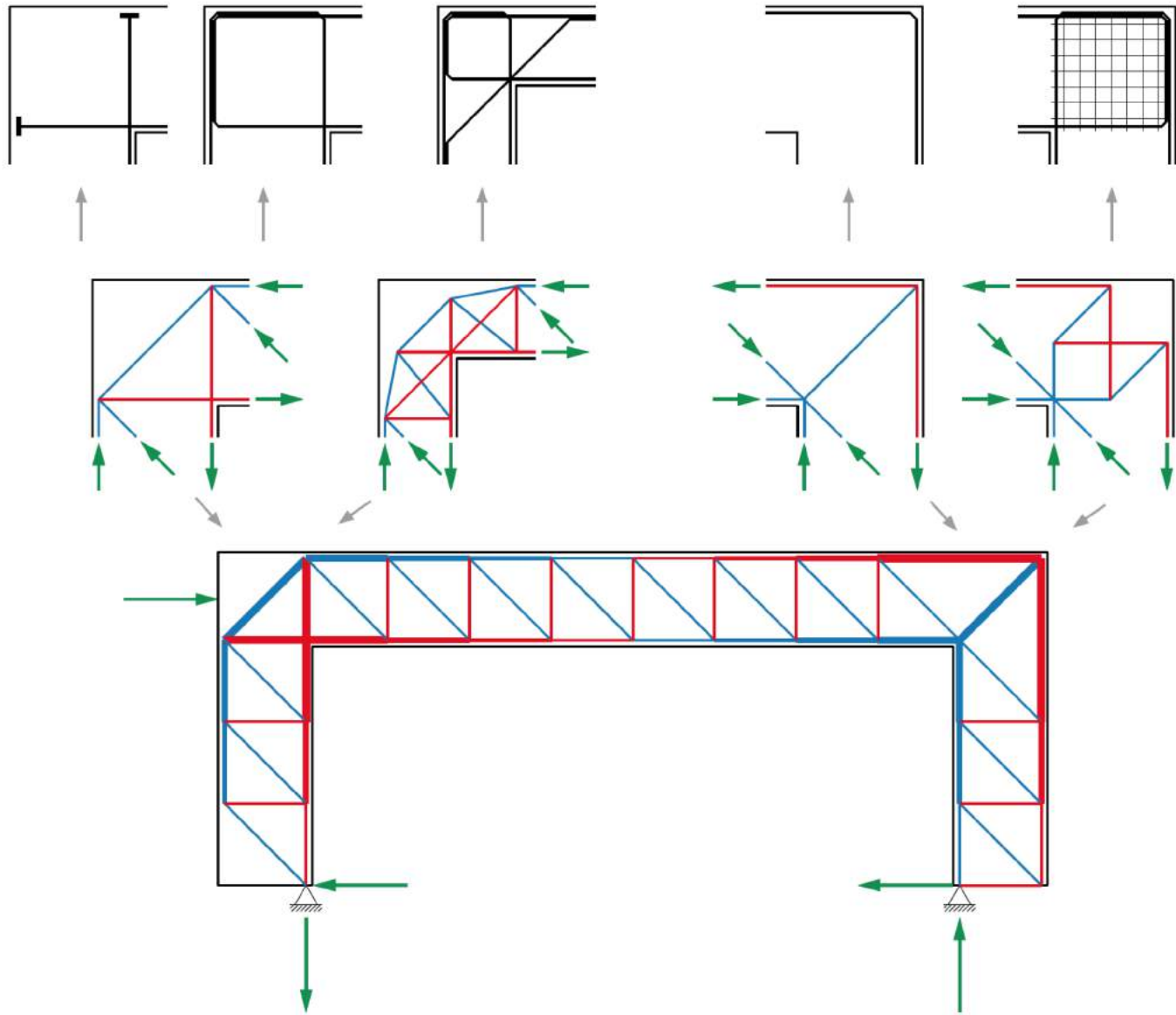
Vorgefertigter Betonstahl - Anschlusskorb (Bewehrung)



Stahlbetonrahmenecke



Durchlaufender, biegesteifer Anschluss Stütze - Decke

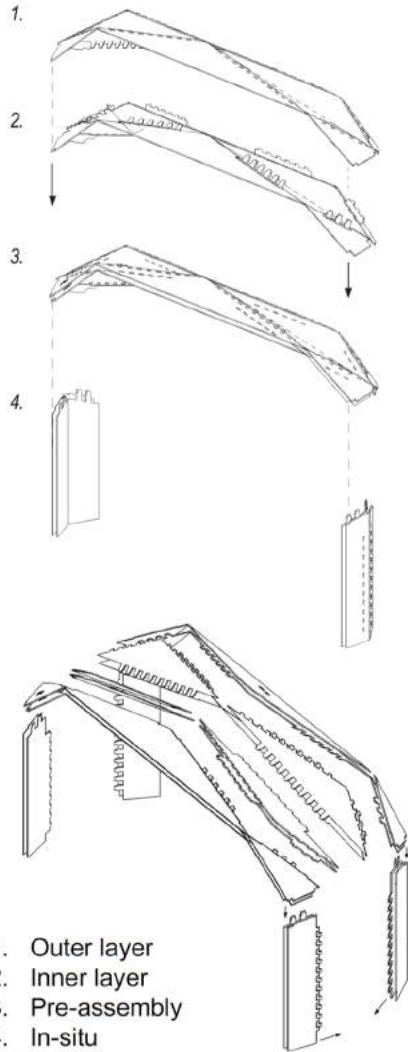




Biegesteife Verbindungen im Stahlbetonbau



Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017





Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017



Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017



Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017



Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017



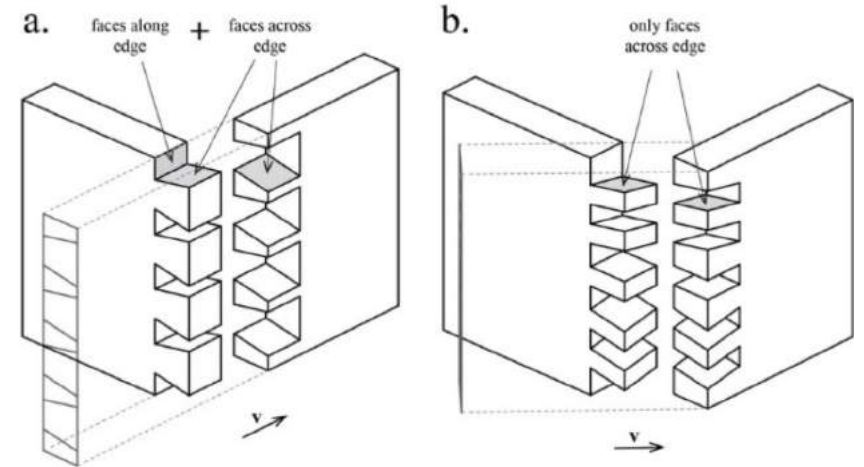
Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavillion, Lausanne, 2017



Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017



Yves Weinand (Arch.), Blumer Lehmann (Holzing.): New Vidy Theatre Pavilion, Lausanne, 2017



Konstruktionsdetails

Übersicht über Konstruktionsdetails

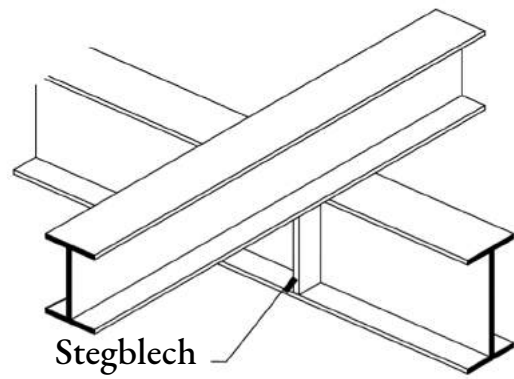
Normalkraftverbindungen

Gelenkige Verbindungen

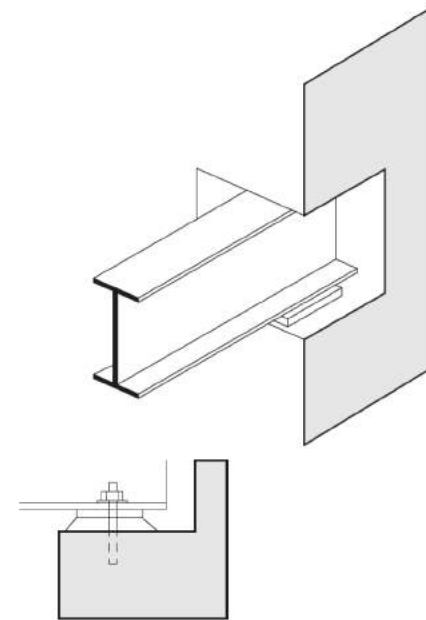
Querkraftverbindungen

Biegesteife Verbindungen

- Auflagerung von Bauteilen

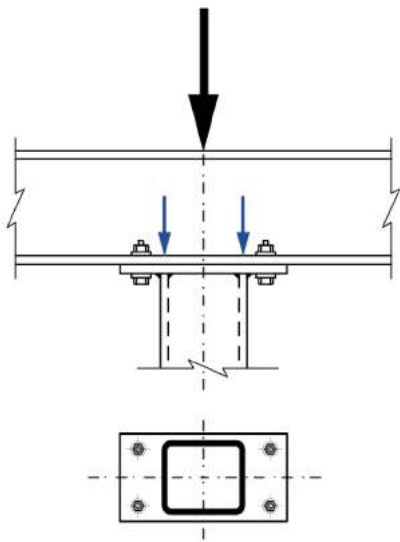


Lagerung Stahlträger auf Stahlträger

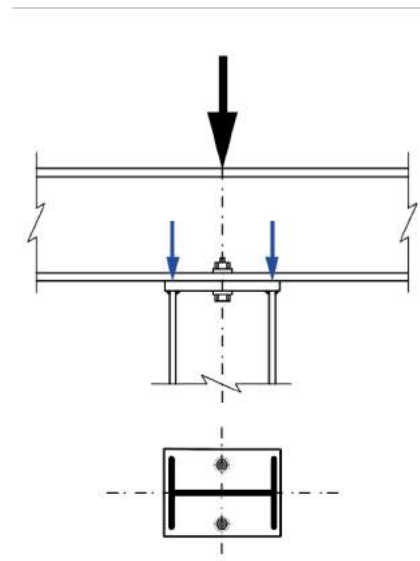


Lagerung Stahlträger auf Beton

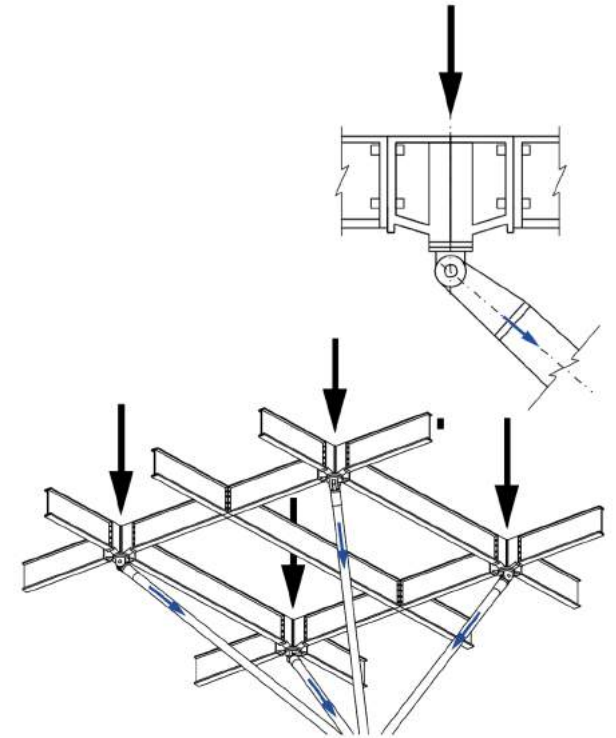




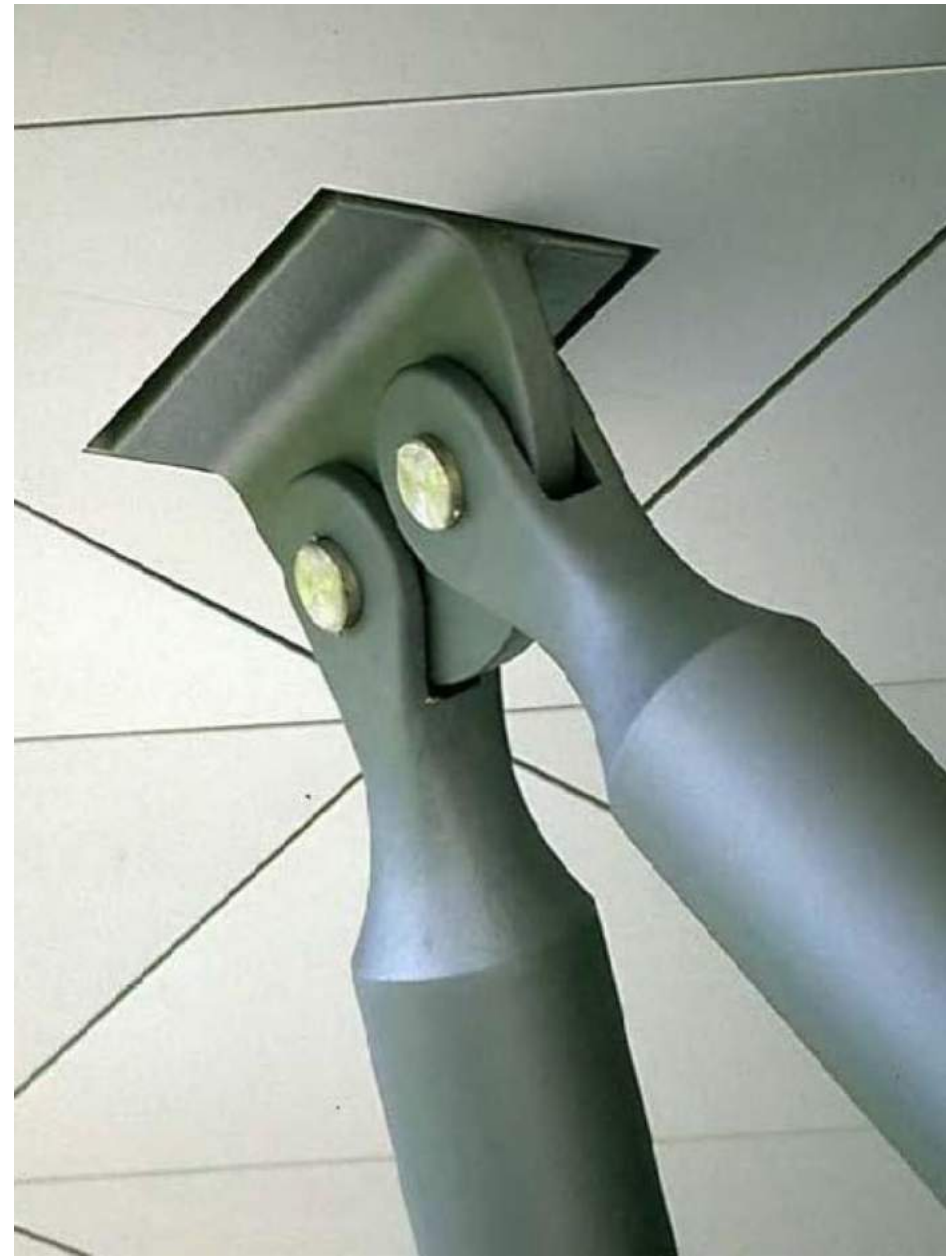
Hohlprofil mit überstehender Kopfplatte und aussen liegenden Schrauben

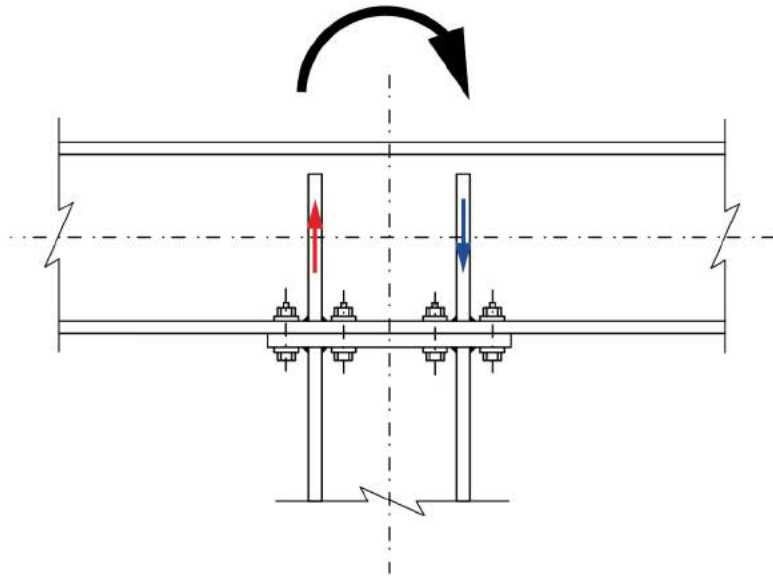


Doppel T-Profil mit bündiger Kopfplatte und innen liegenden Schrauben

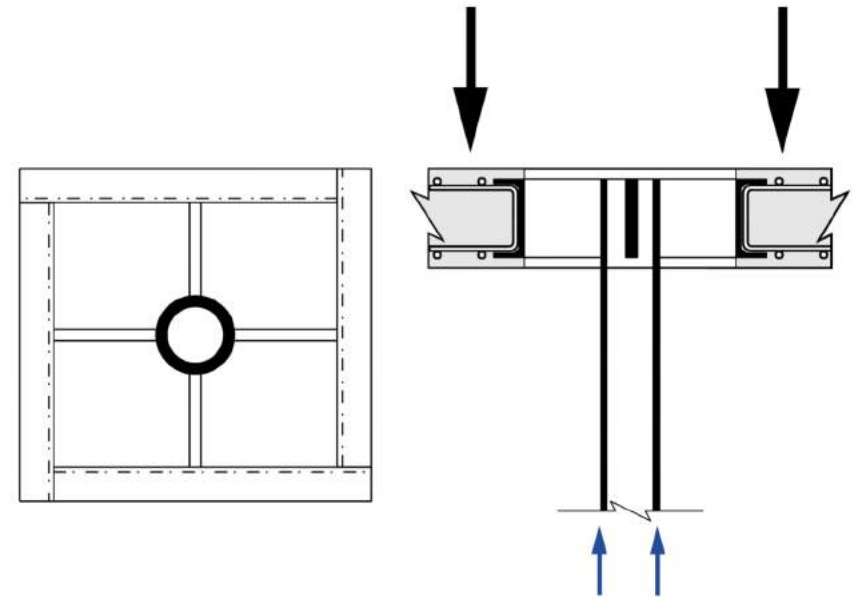


Baumstütze mit ideal ausgebildeten Gelenken





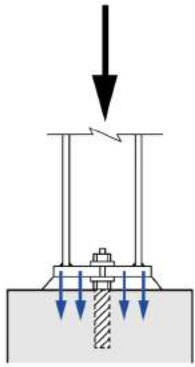
Anschluss Stahlstütze - Träger



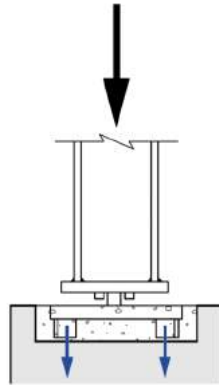
Punktgestützte Stahlbetonplatte mit
Stahlkranz und Stahlstütze



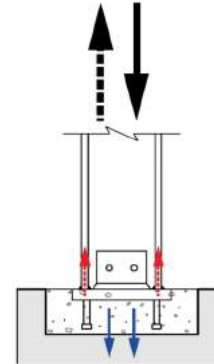
Biegesteifer Stützenkopf im Stahlbau



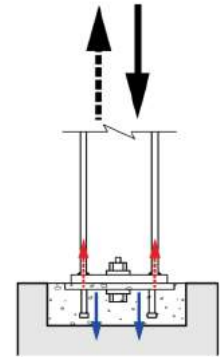
Fussplatte auf Mörtelbett



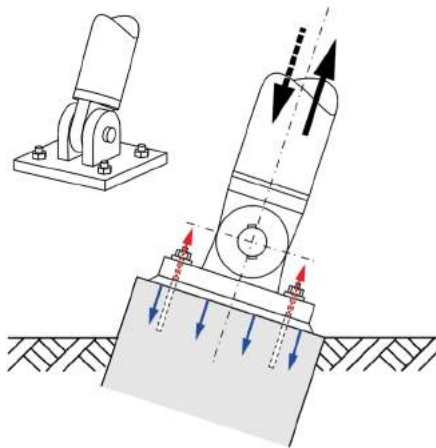
Fussplatte mit Zentrierdorn



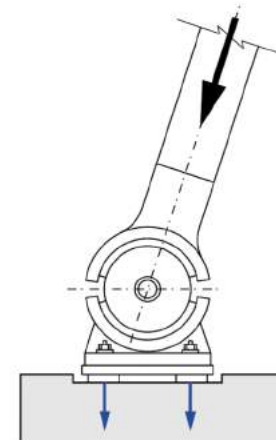
Fussplatte mit Lasche



Verschraubte Fussplatte



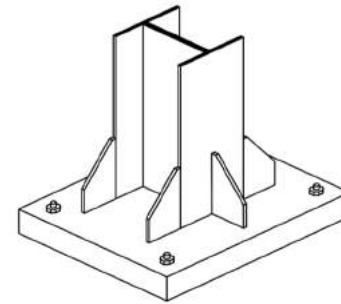
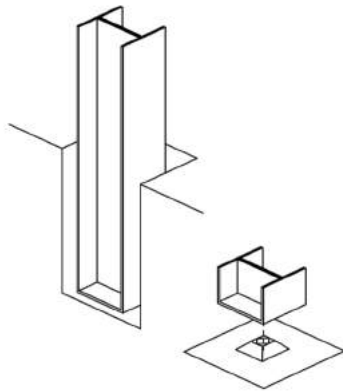
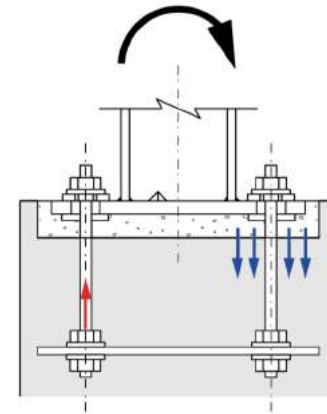
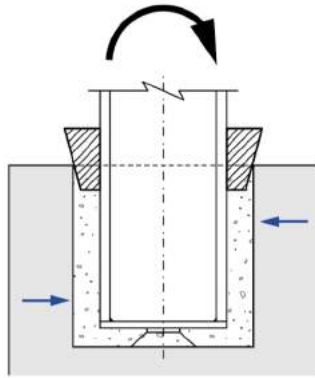
Stahlstützenfuss mit Gelenkbolzen



Gelenk mit Stahlzylinder



Gelenkige Stützenfüsse im Stahlbau

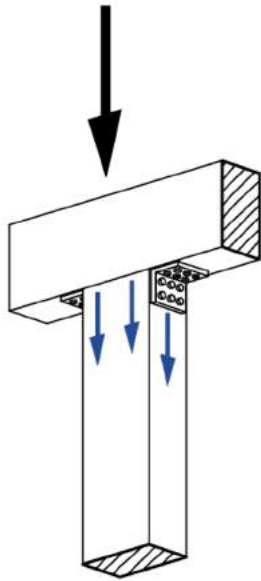


Stahlstütze in Köcherfundament

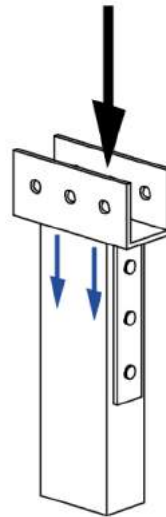
Stahlstütze mit Fussplatte und Gewindestangen



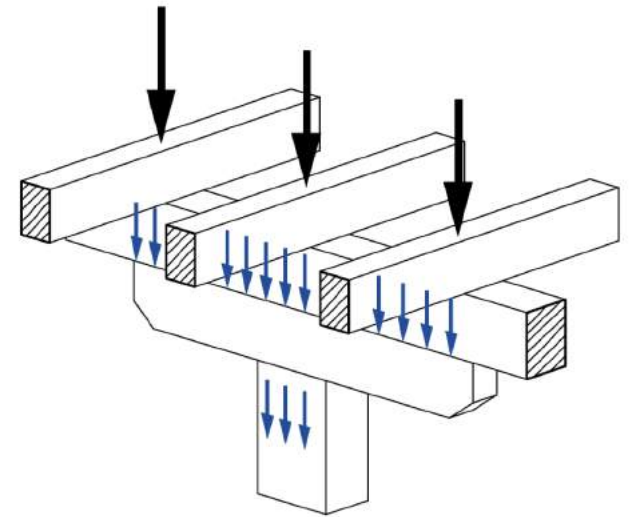
Biegesteifer Stützenfuß im Stahlbau



Verschraubte Stahlwinkel



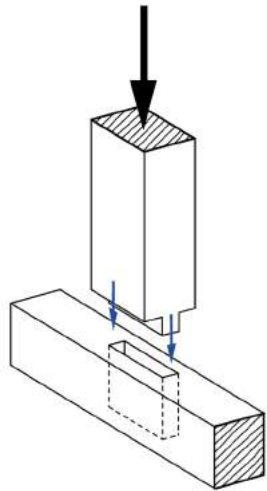
Stahlformteil



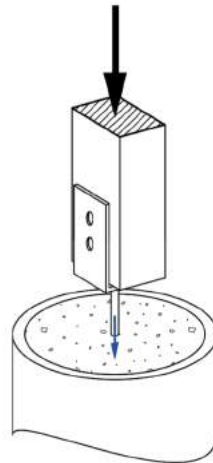
Sattelholz



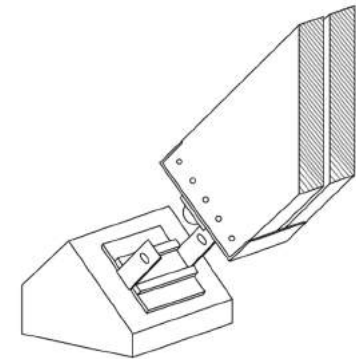
Stützenköpfe im Holzbau



Zimmermannsmässiger Stützenfuss



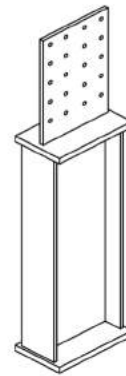
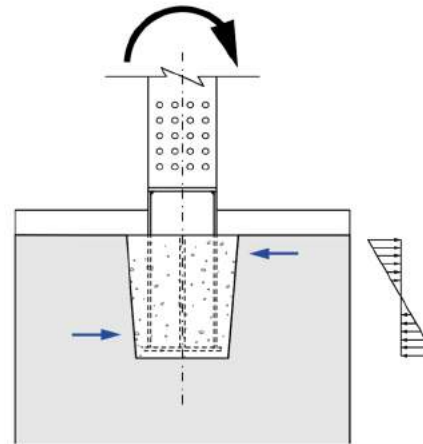
Stützenfuss mit Stahlformteil



Kippleiste



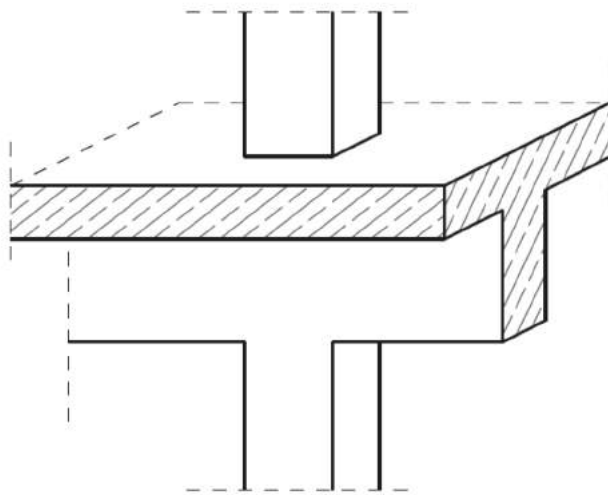
Gelenkige Stützenfüsse im Holzbau



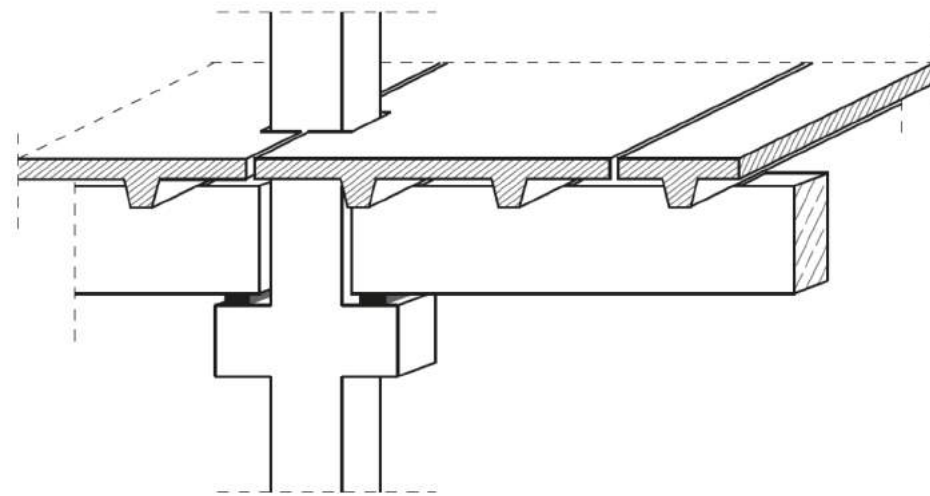
Holzstütze mit eingeschlitzztem Stahlformteil



Eingespannter Stützenfuss im Holzbau



Ortbetonbauweise: Stütze – Träger – Decke

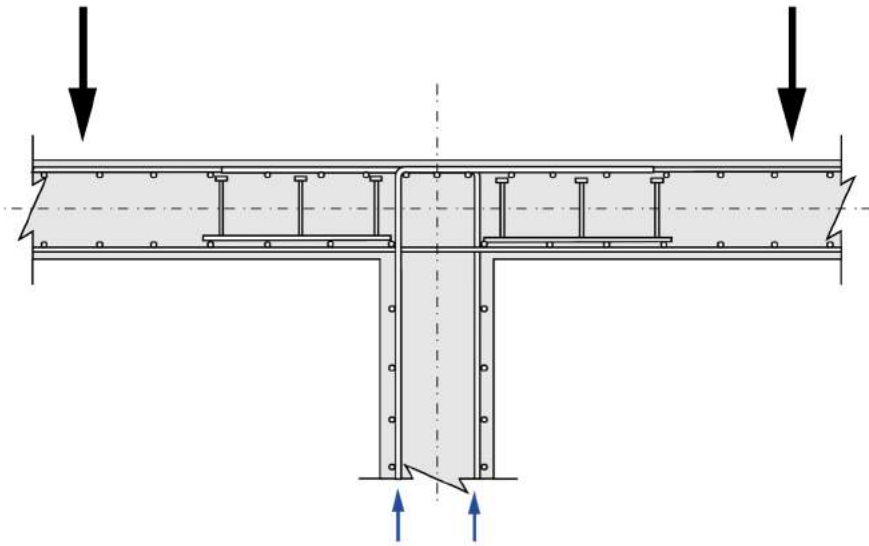


Fertigteilbauweise: Stütze – Träger – Decke

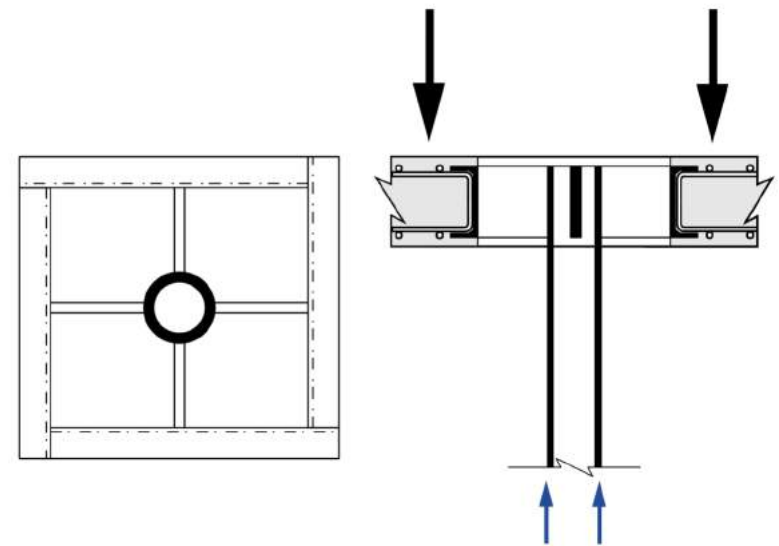
Unterschiedliche Auflagerungen in Abhängigkeit der Bauweise des Stahlbetonbaus



Unterschiedliche Auflagerungen in Abhängigkeit der Bauweise des Stahlbetonbaus

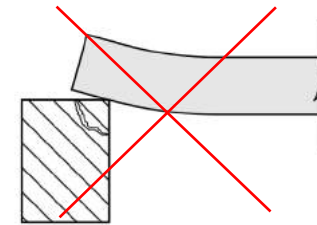
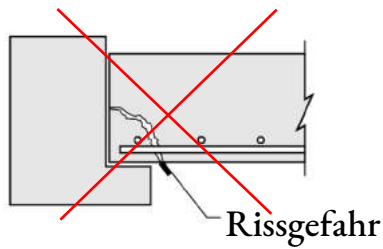
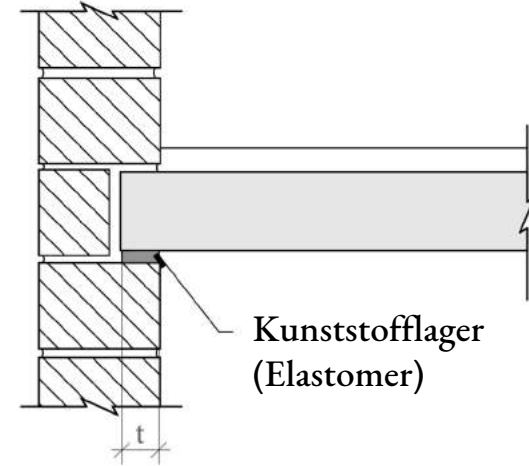
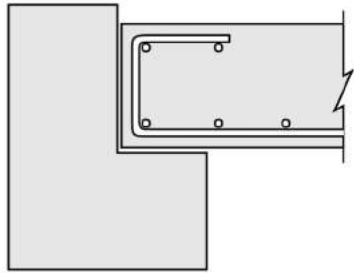


Punktgestützte Stahlbetonplatte mit Dübelleisten als Durchstanzbewehrung



Punktgestützte Stahlbetonplatte mit Stahlkranz und Stahlstütze





Lagerung einer Betonplatte

Lagerung Betonplatte auf Mauerwerk

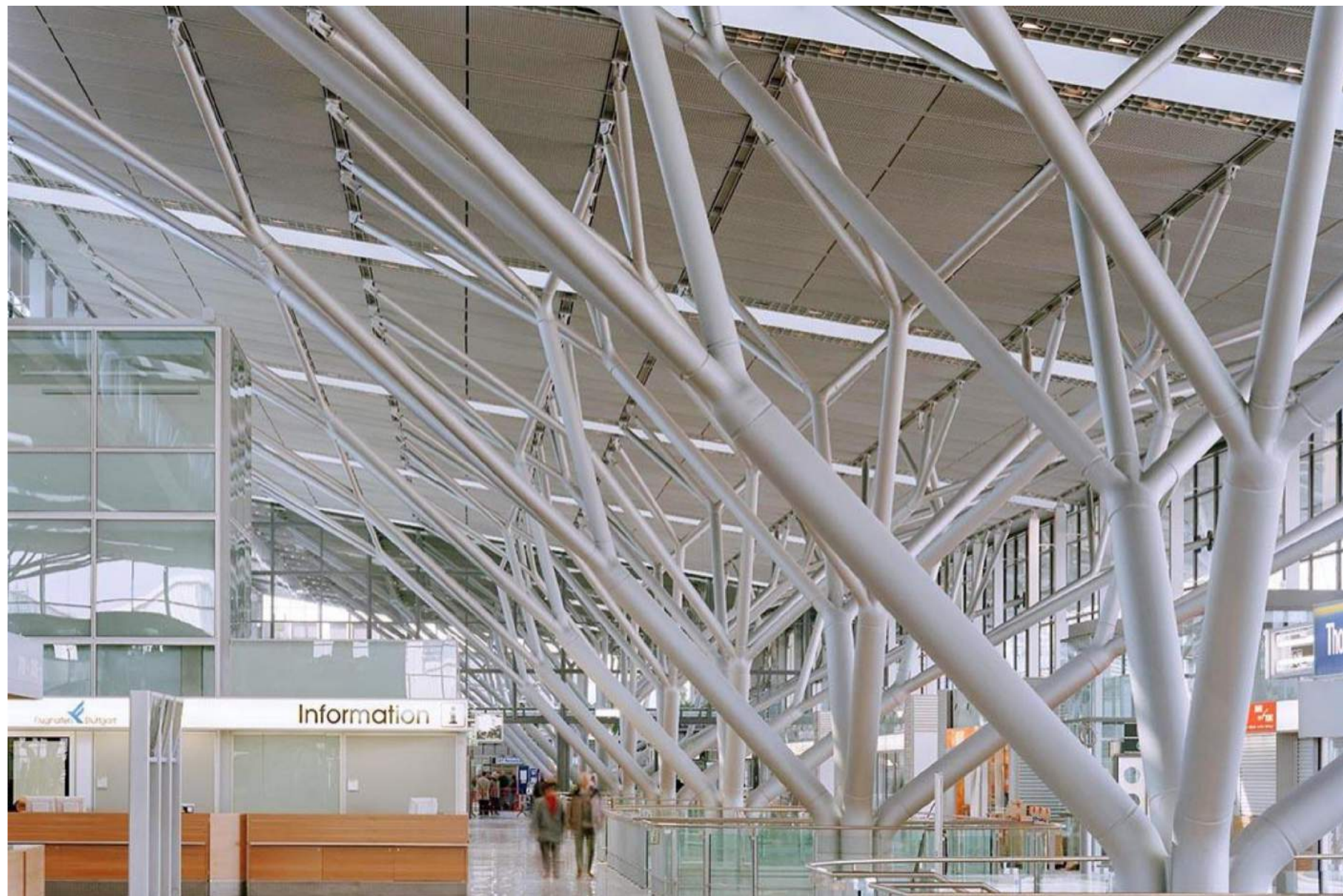




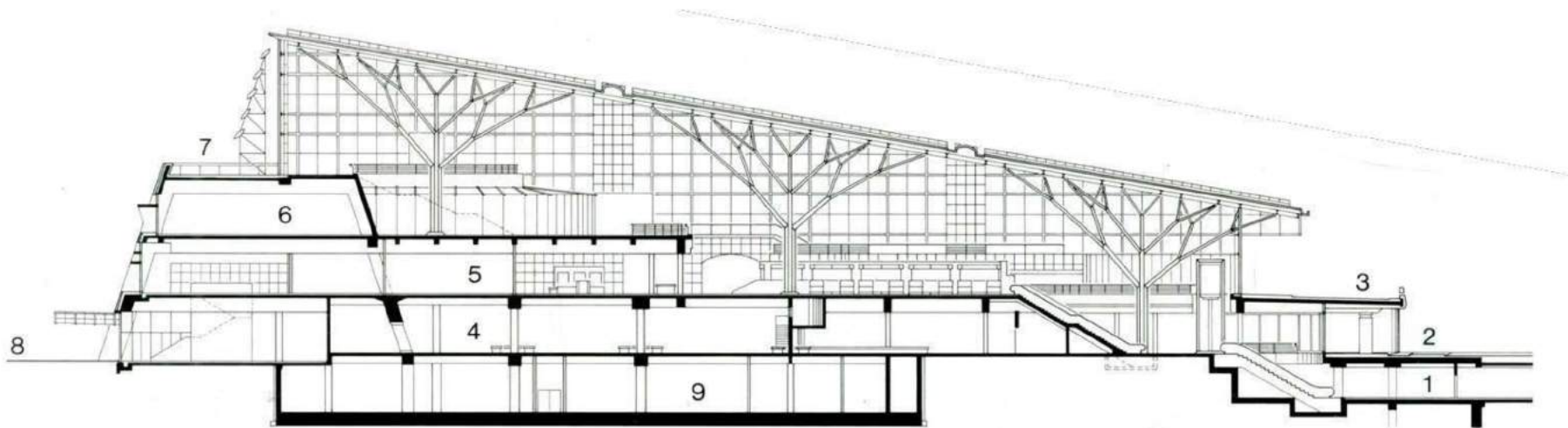
Gerkan, Mark & Partner, Schlaich Bergermann: Stuttgart Airport Terminal 3, 2004

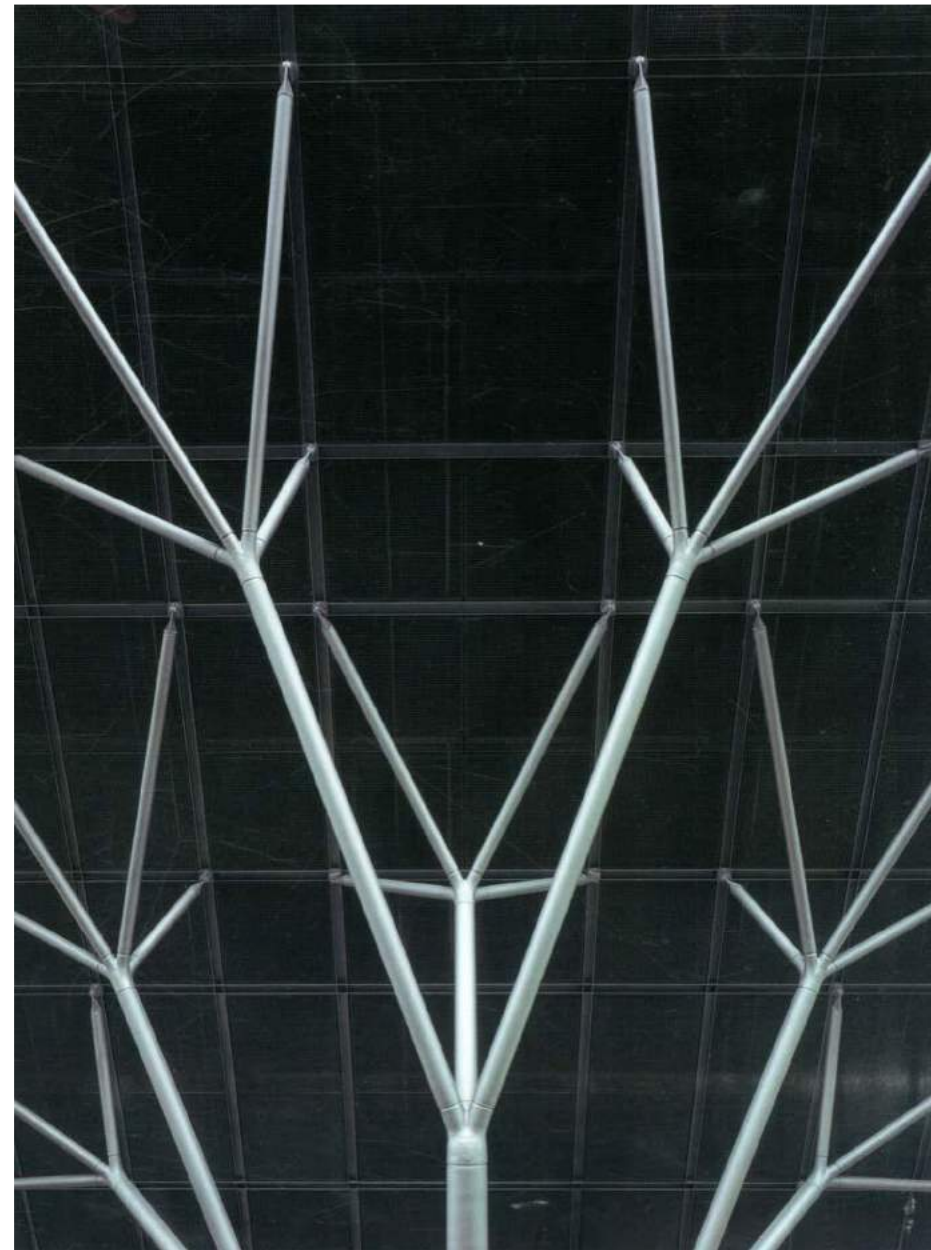


Gerkan, Mark & Partner, Schlaich Bergemann: Stuttgart Airport Terminal 3, 2004

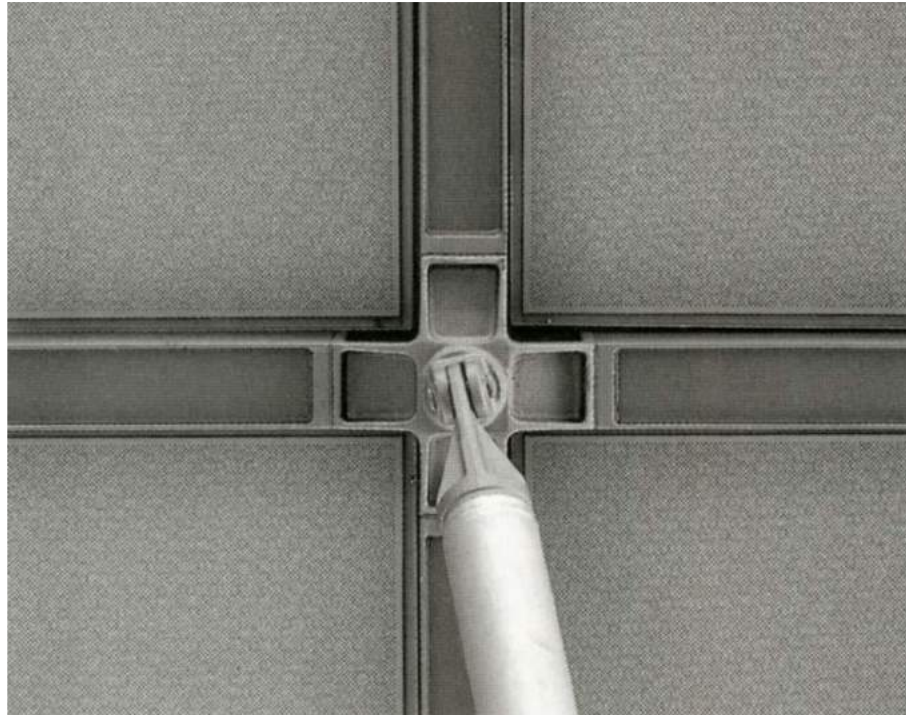


Gerkan, Mark & Partner, Schlaich Bergemann: Stuttgart Airport Terminal 3, 2004



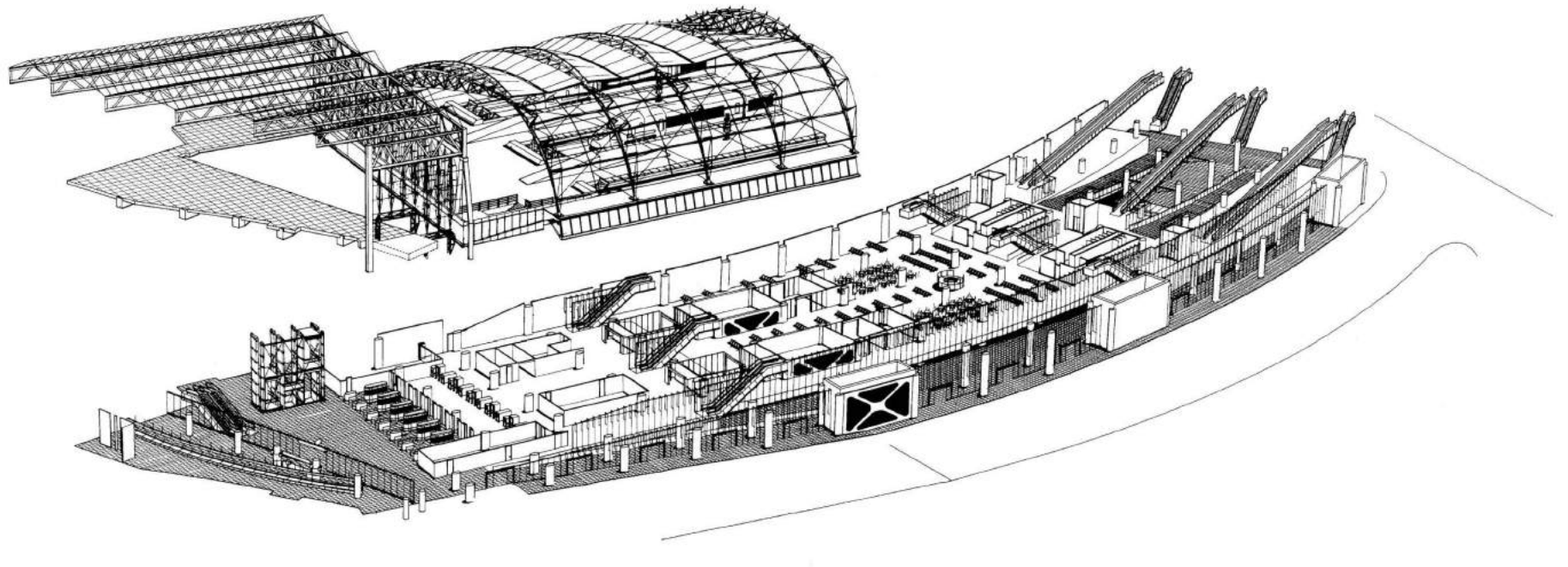


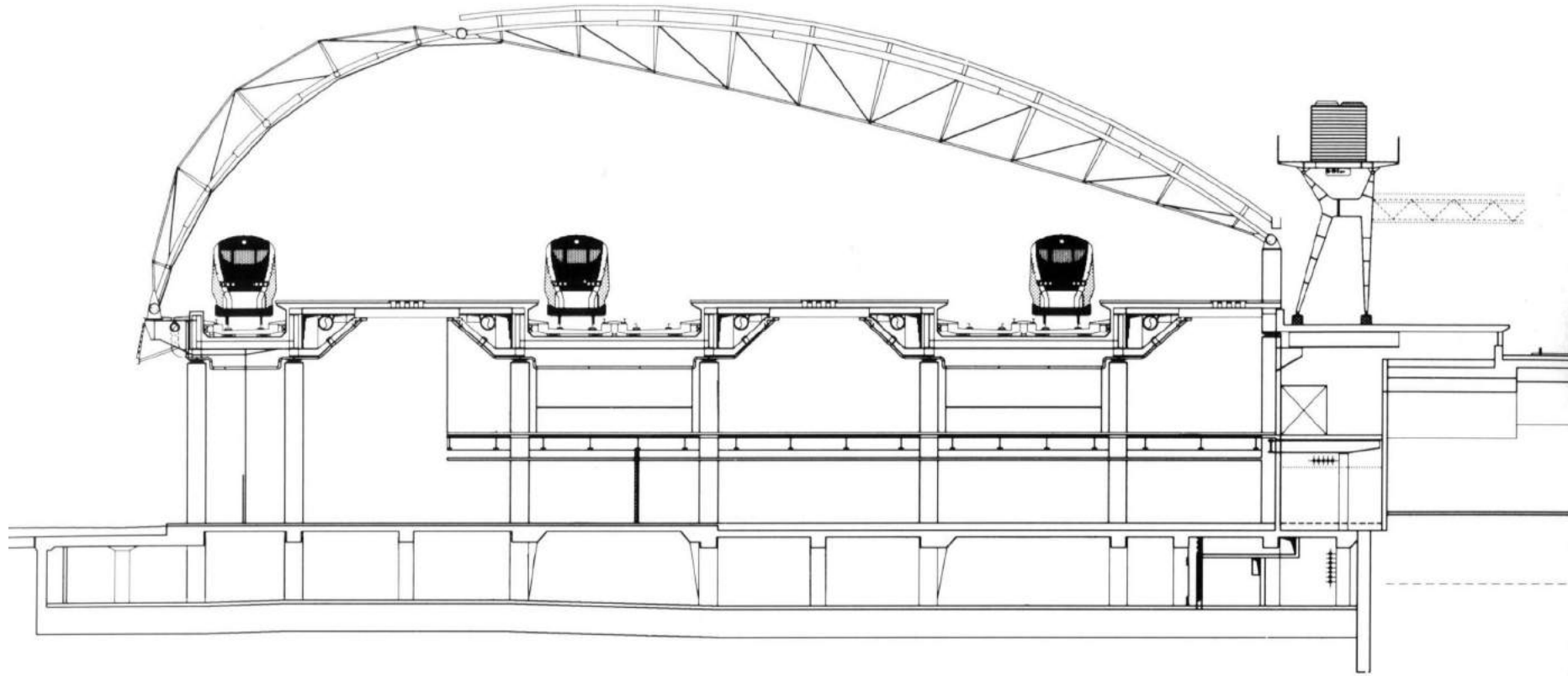
Gerkan, Mark & Partner, Schlaich Bergermann: Stuttgart Airport Terminal 3, 2004





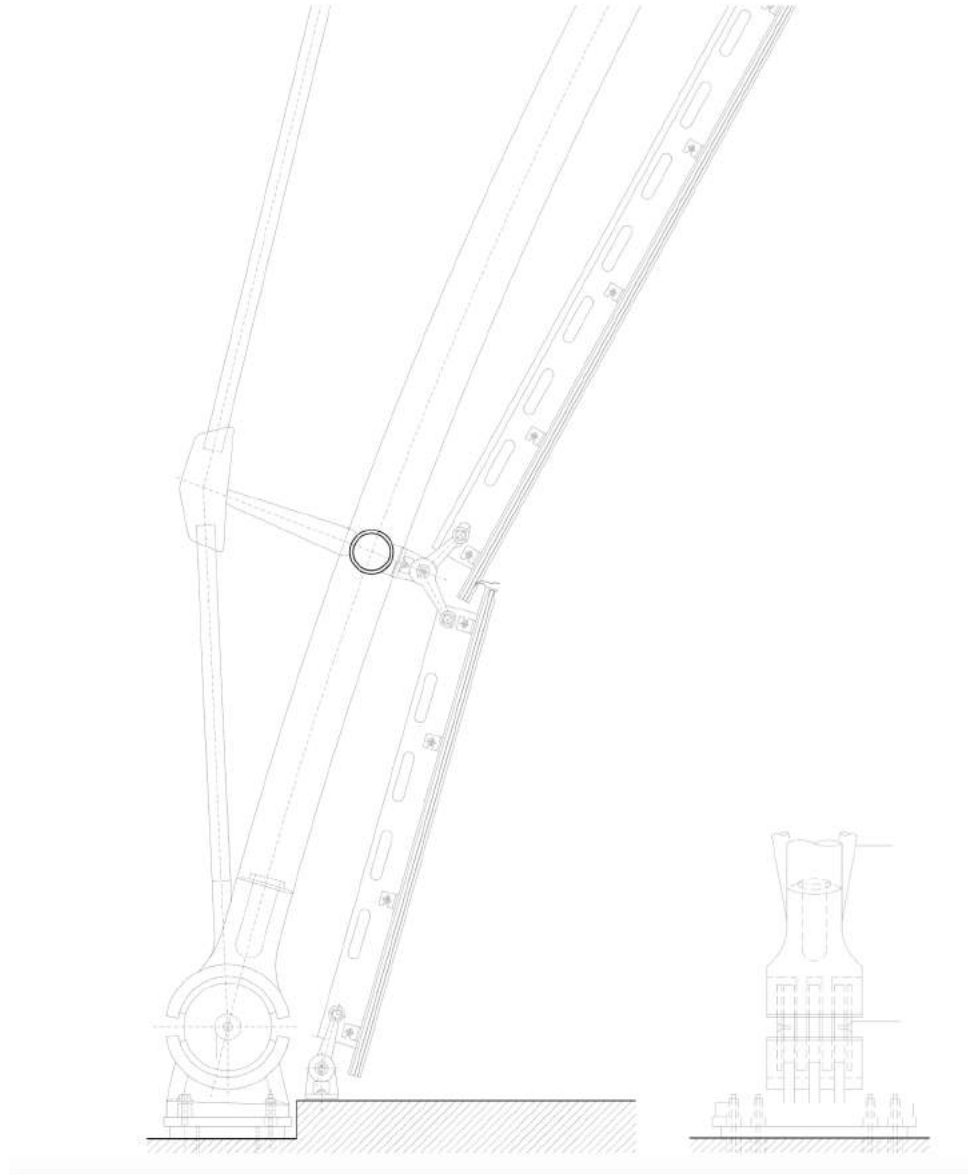
Sir Nicholas Grimshaw (Arch.), Anthony Hunt (Eng.): Waterloo International Terminal, London UK, 1993

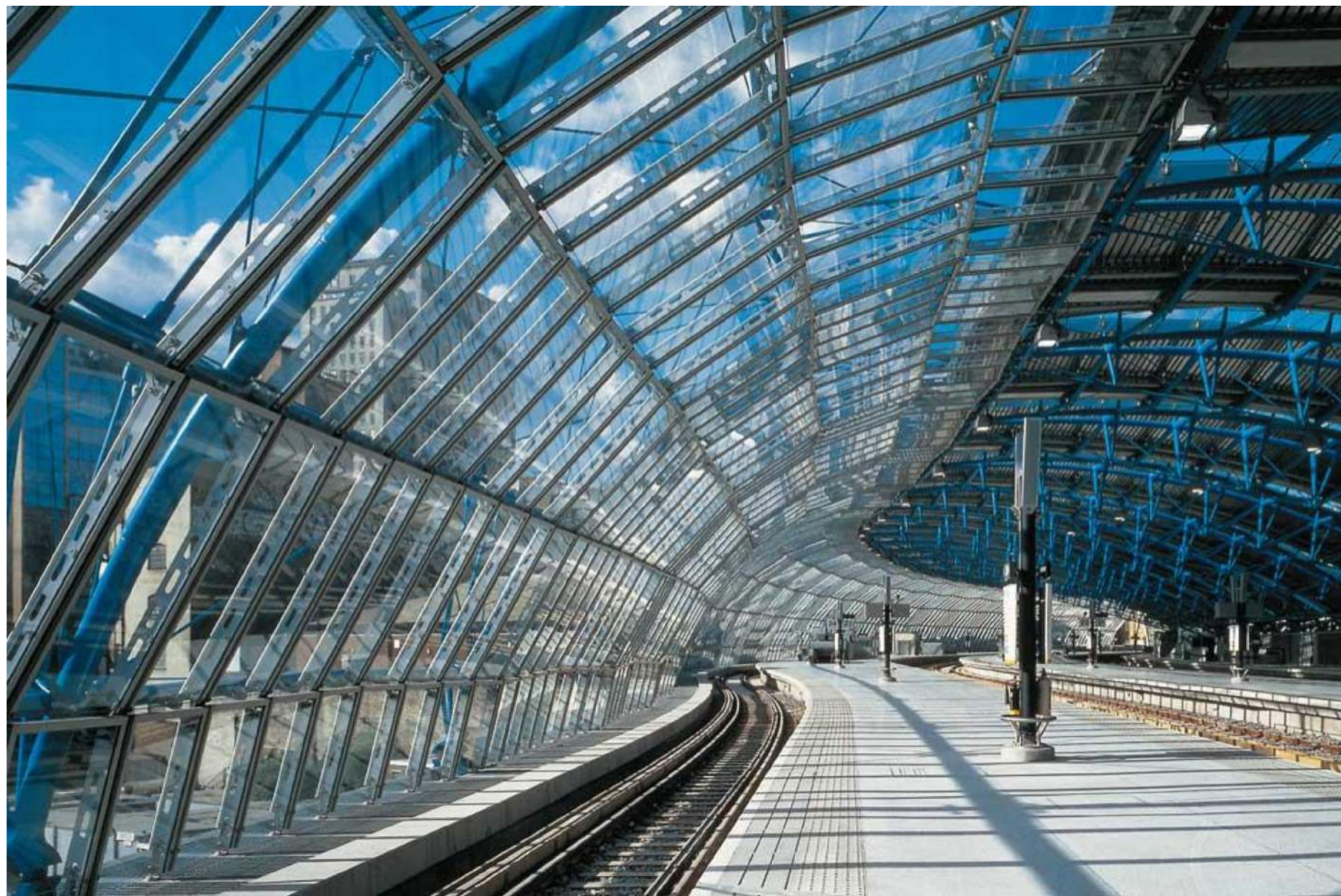






Sir Nicholas Grimshaw (Arch.), Anthony Hunt (Eng.): Waterloo International Terminal, London UK, 1993





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