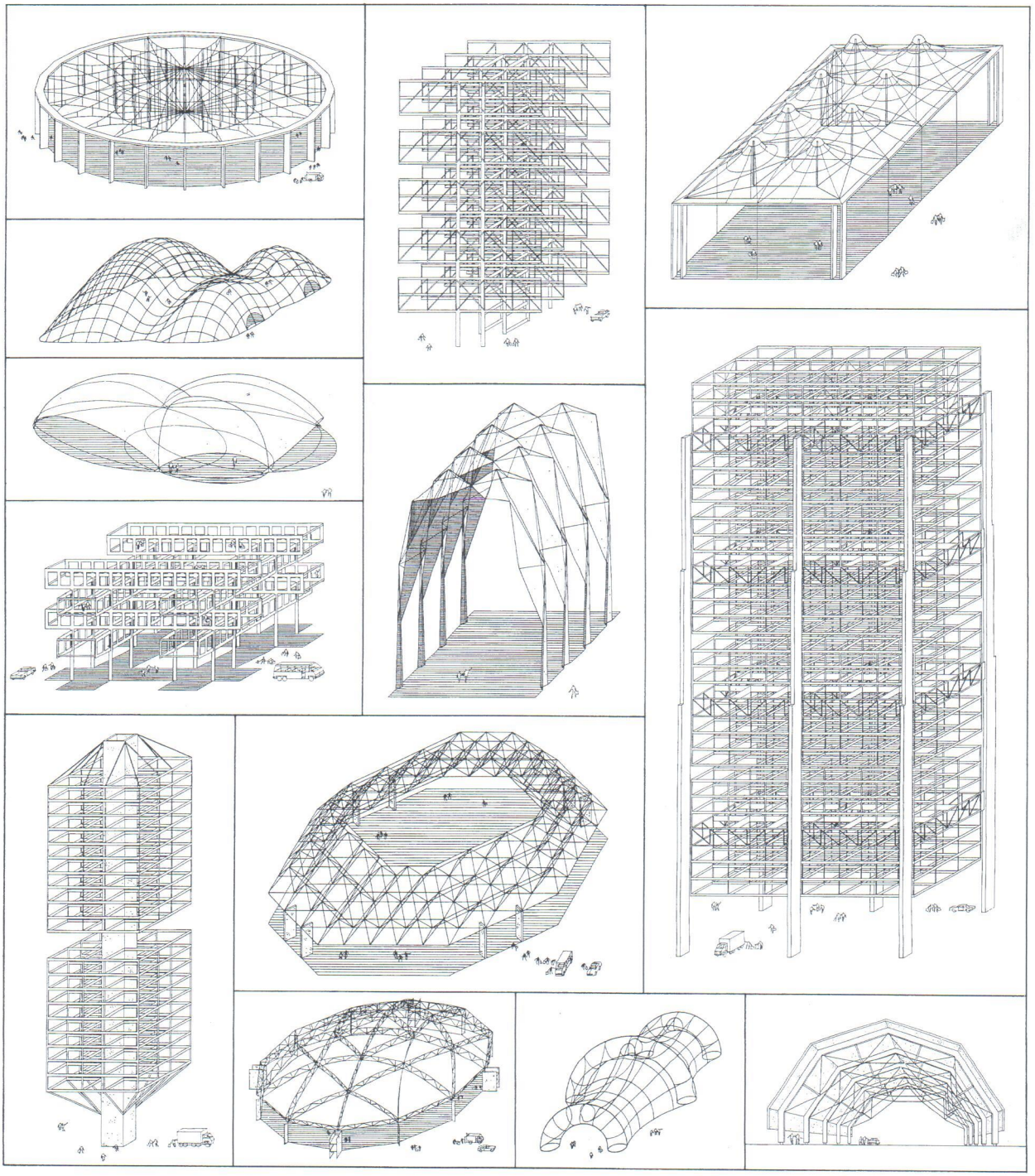
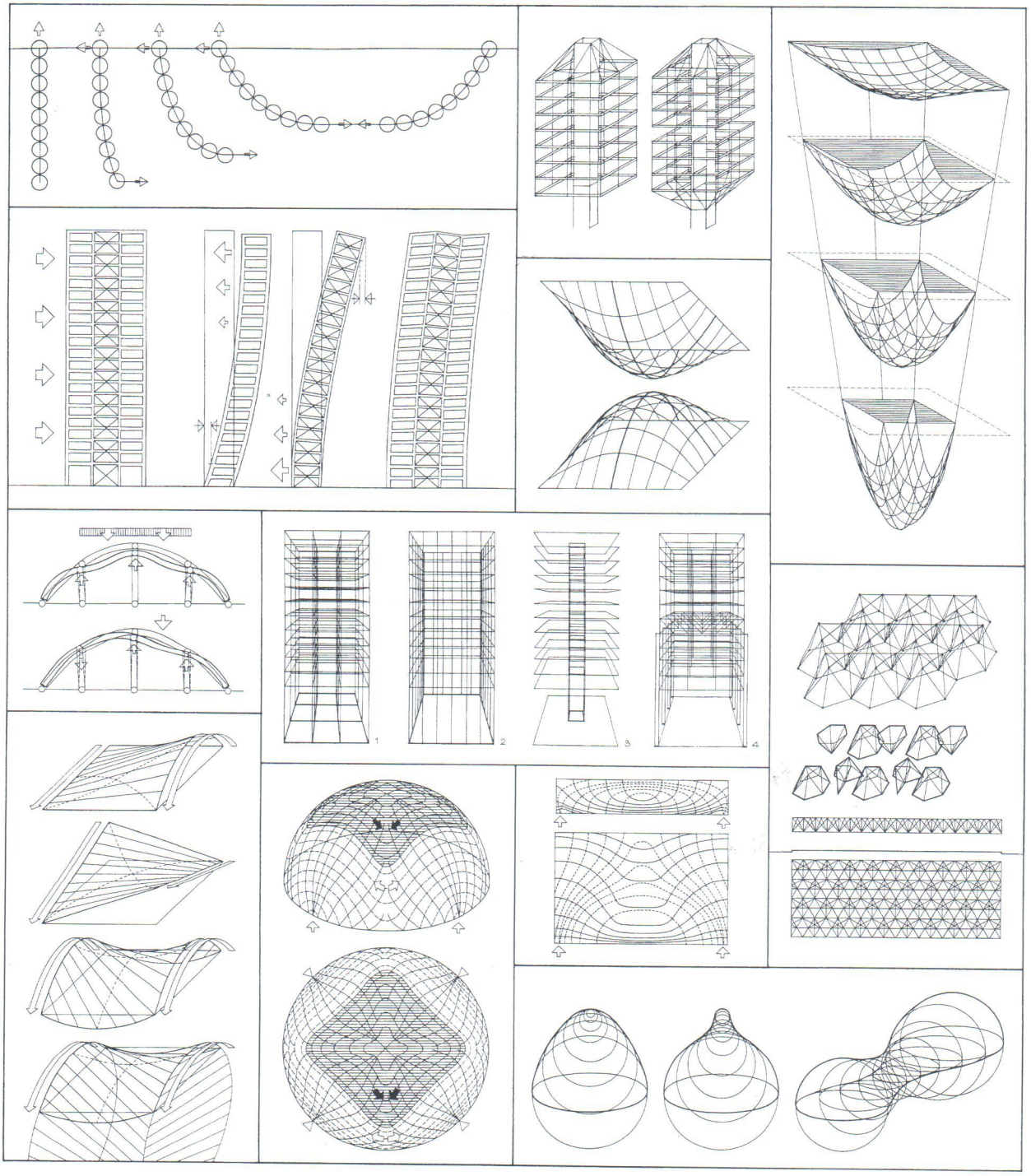
Tragsysteme Structure Systems

Heino Engel



Verlag Gerd Hatje

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9



Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

FORMAKTIVE TRAGSYSTEME

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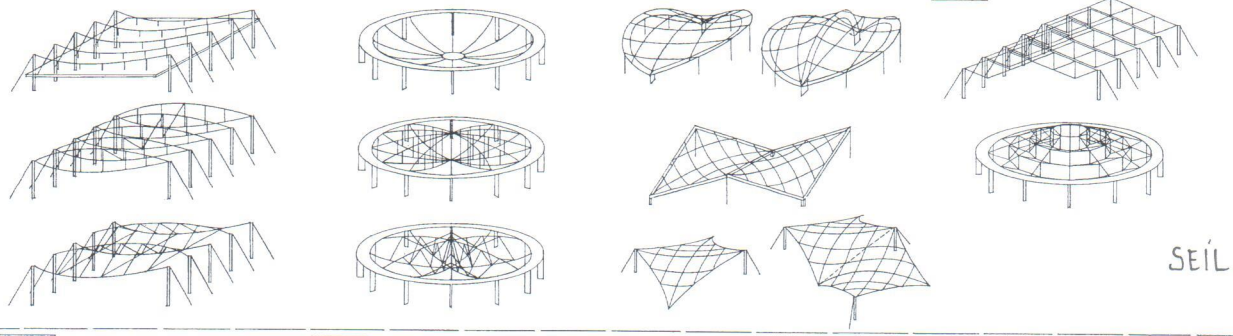

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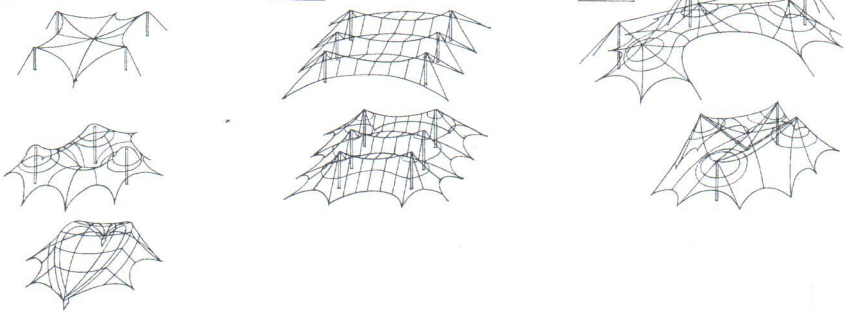

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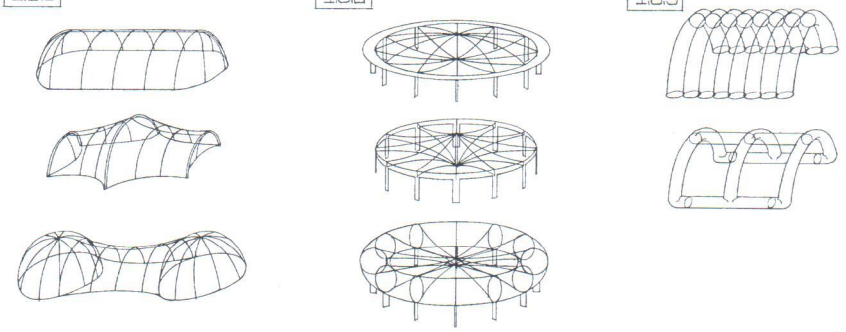

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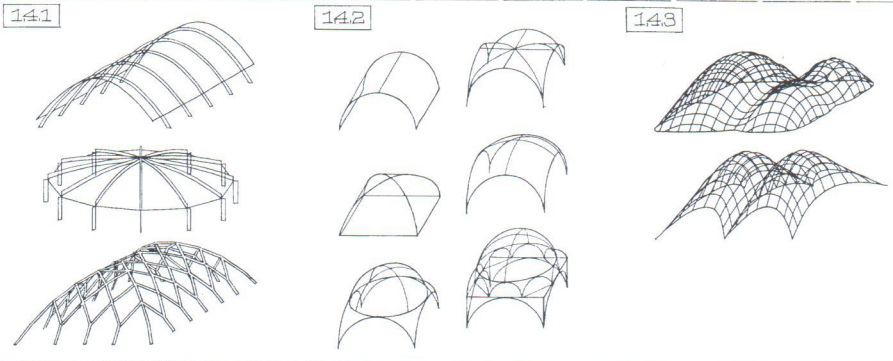

BOGEN

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VEKTORAKTIVE

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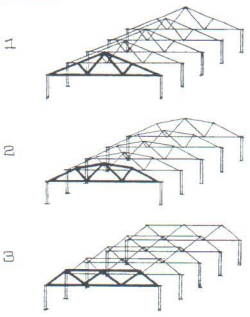

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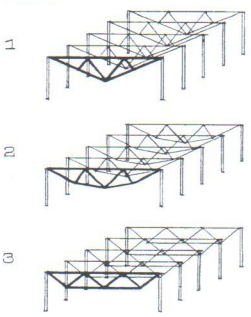

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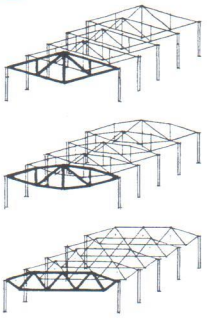

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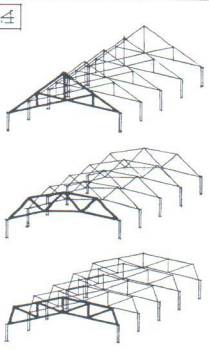

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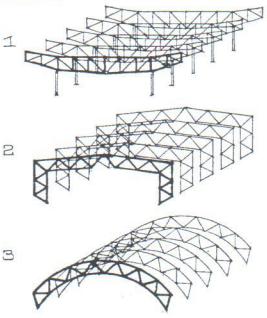

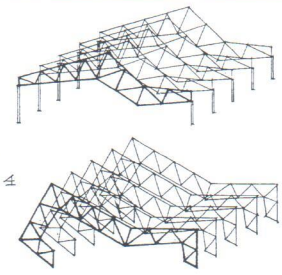

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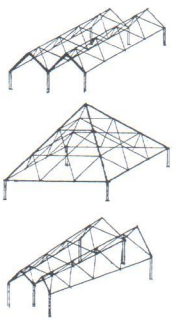

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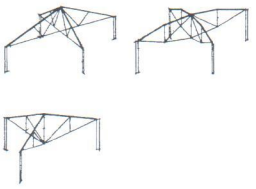

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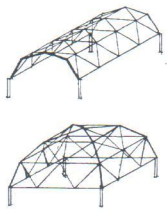

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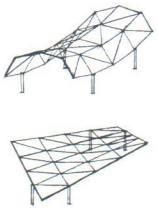

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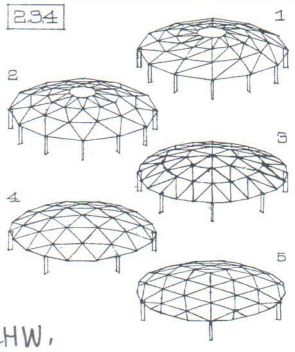

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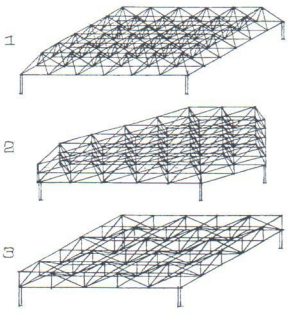

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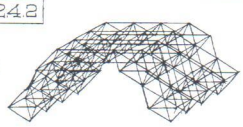

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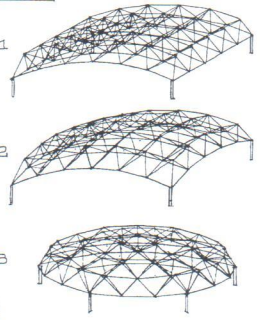

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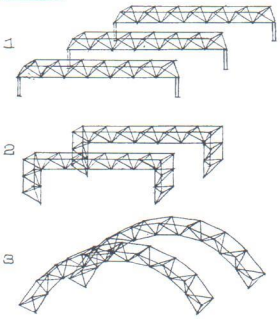

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SCHNITTAKTIVE TR.

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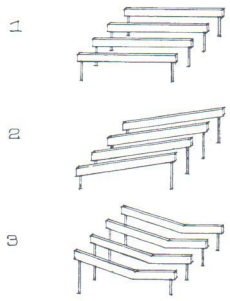

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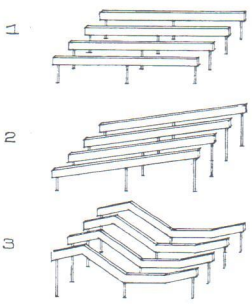

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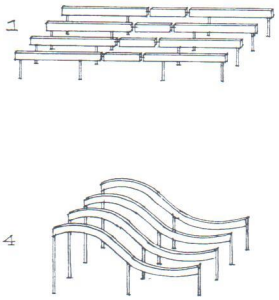

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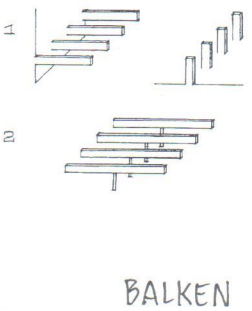

BALKEN

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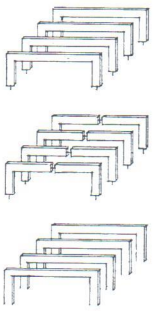

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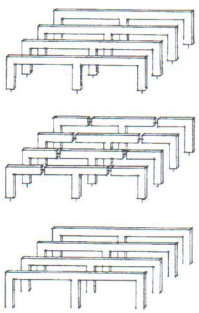

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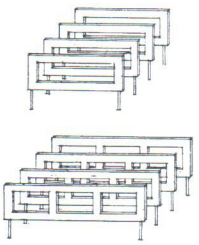

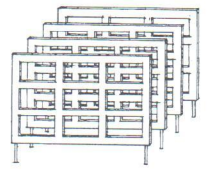

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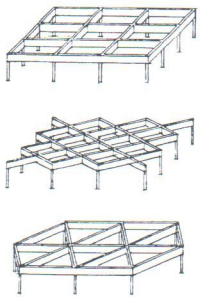

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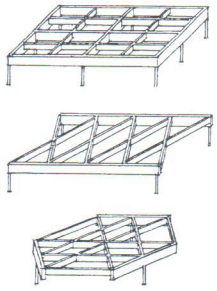

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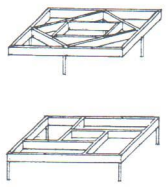

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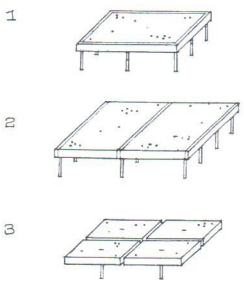

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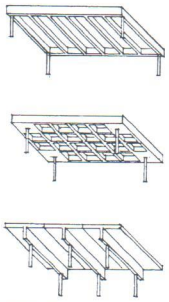

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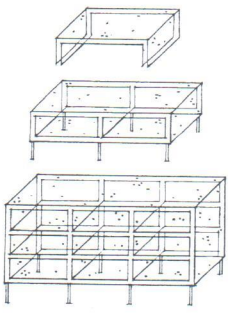

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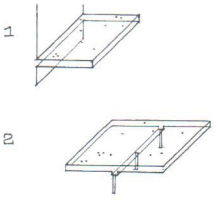

PLATTEN

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

FLÄCHENAKTIVE TR.

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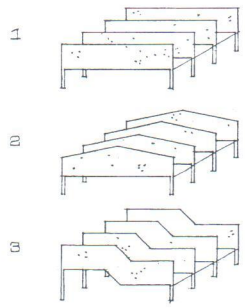

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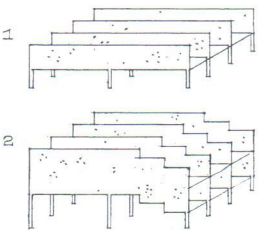

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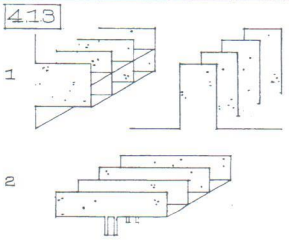

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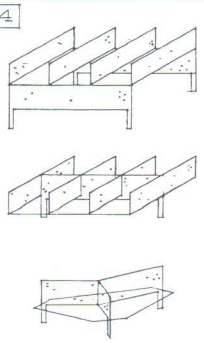

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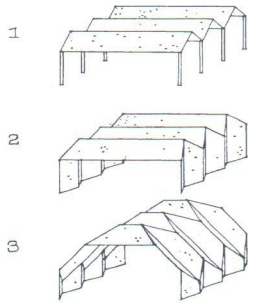

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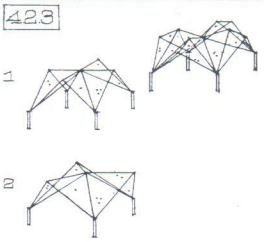

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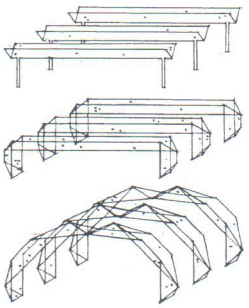

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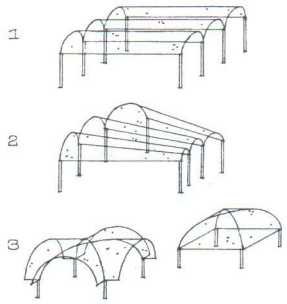

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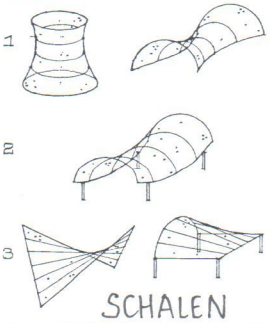

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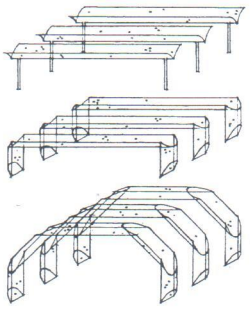

SCHALEN

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

HÖHENAKTIVE TR.

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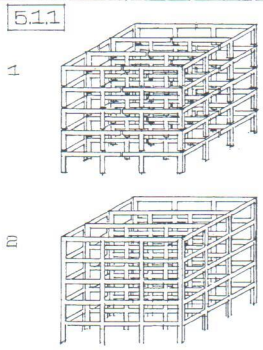

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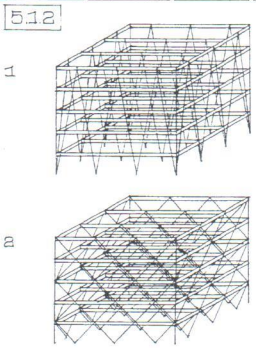

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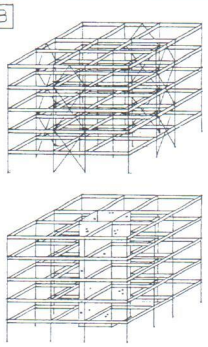

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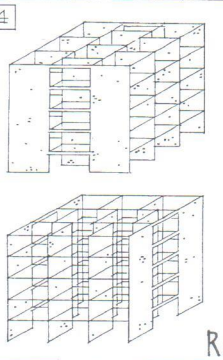

RASTER

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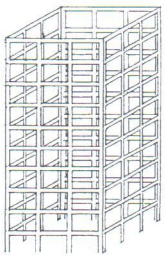

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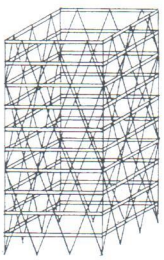

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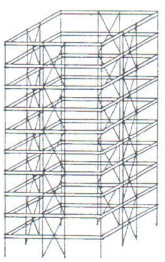

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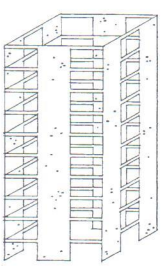

MANTEL

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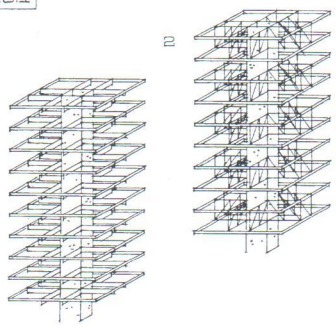

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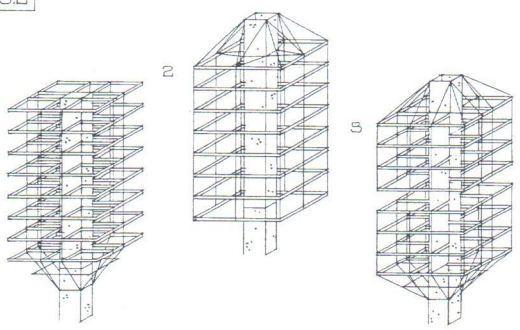
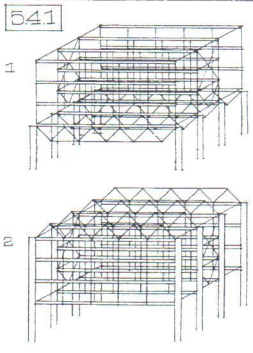


KERN

5.4.1



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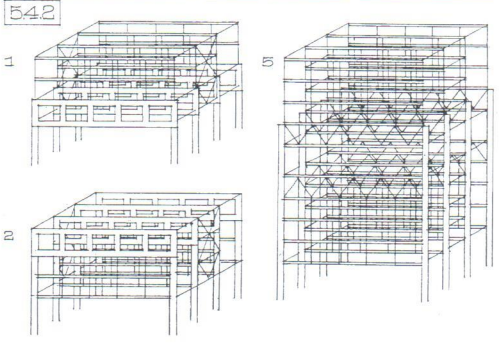

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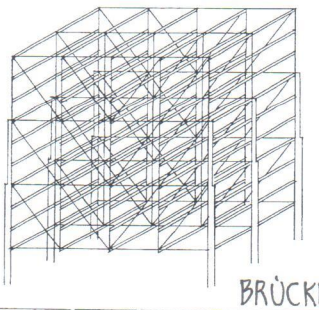
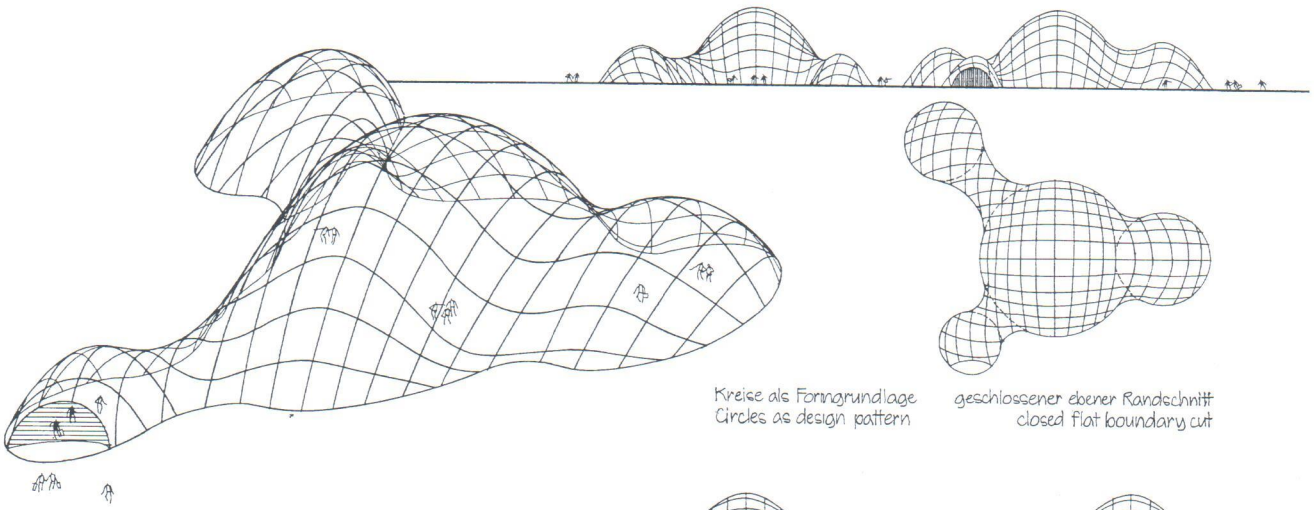


BRÜCKEN

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

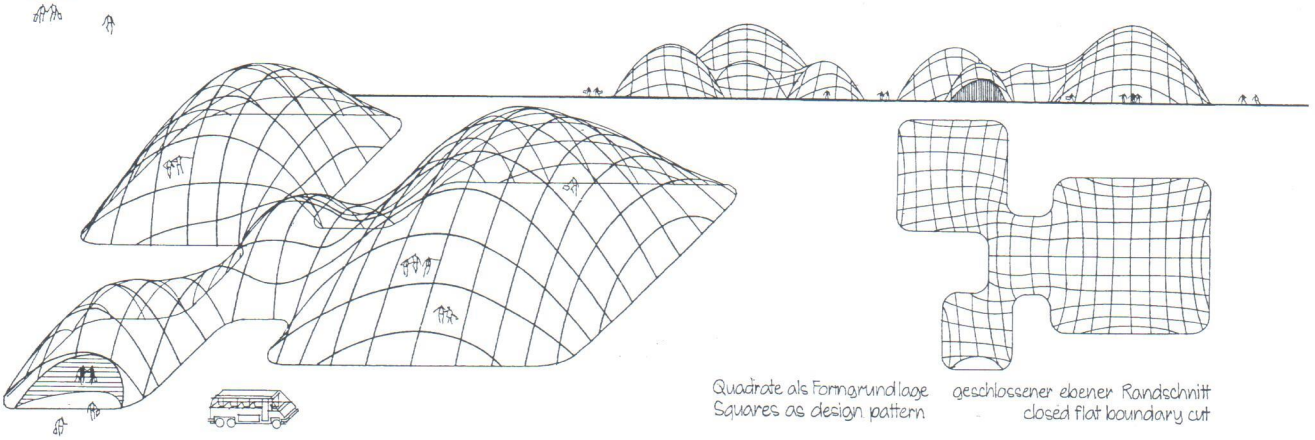
Stützgitter-Systeme für unregelmäßige Grundrißgestaltung

Thrust lattice for free-form design of floor plan



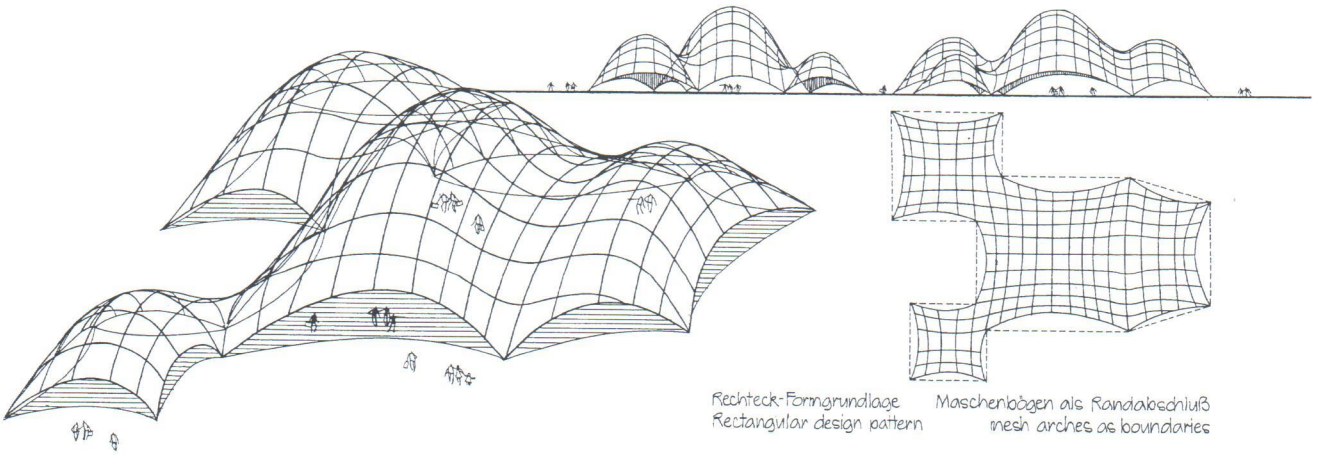
Kreise als Formgrundlage
Circles as design pattern

geschlossener ebener Randschnitt
closed flat boundary cut



Quadrate als Formgrundlage
Squares as design pattern

geschlossener ebener Randschnitt
closed flat boundary cut



Rechteck-Formgrundlage
Rectangular design pattern

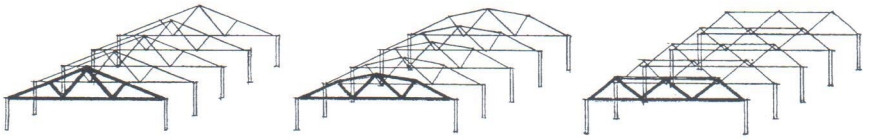
Maschenbögen als Randabschluß
mesh arches as boundaries

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

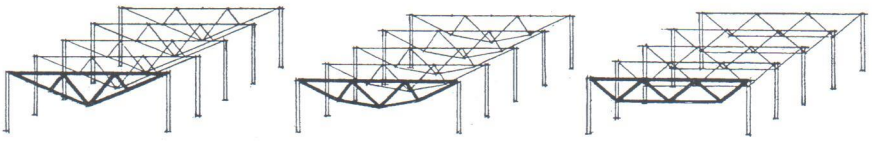
2 Vector-active
Structure Systems

2.1 Ebene Fachwerkbinder / Flat trusses

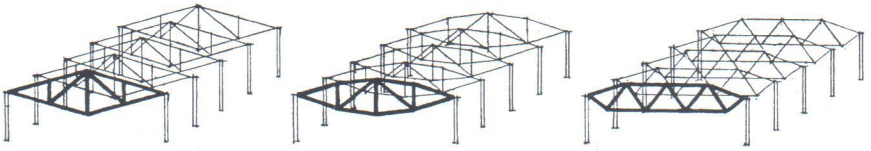
Obergurt-Systeme
Top chord systems



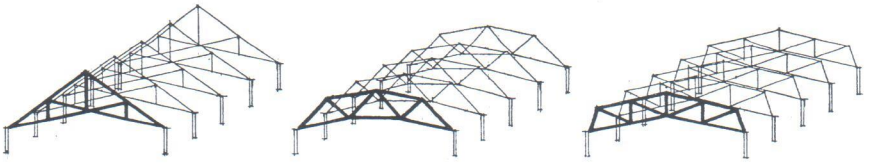
Untergurt-Systeme
Bottom chord systems



Zweigurt-Systeme
Two-chord systems

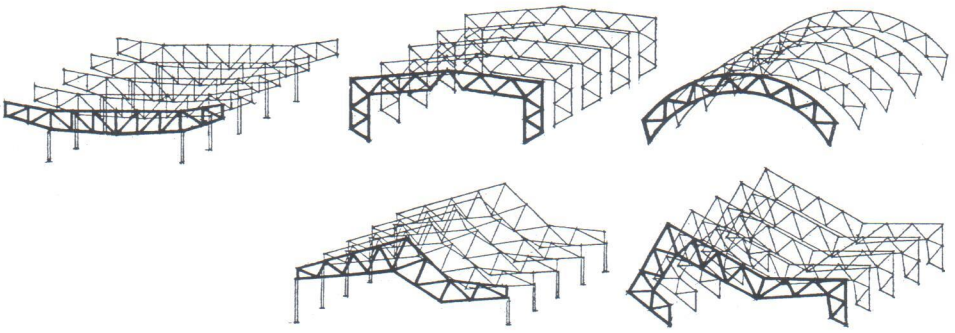


Überhöhte Systeme
Cambered systems

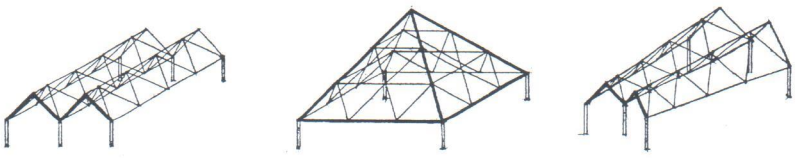


2.2 Übertragene ebene Fachwerke / Transmitted flat trusses

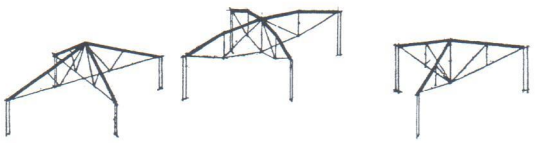
Lineare Systeme
Linear systems



Gefaltete Systeme
Folded systems



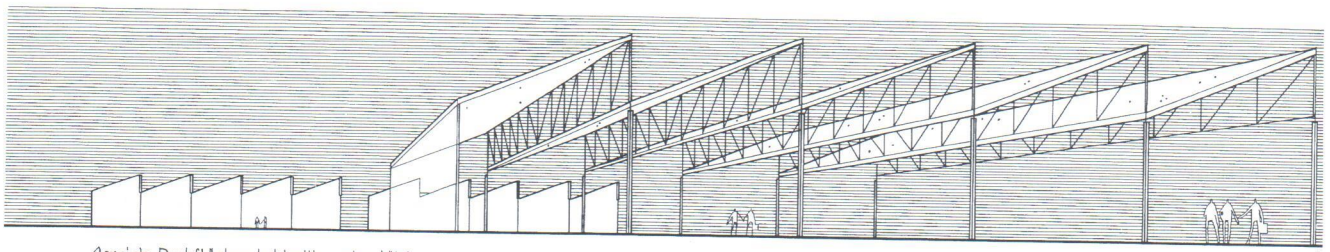
Durchdringungs-Systeme
Intersecting systems



Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

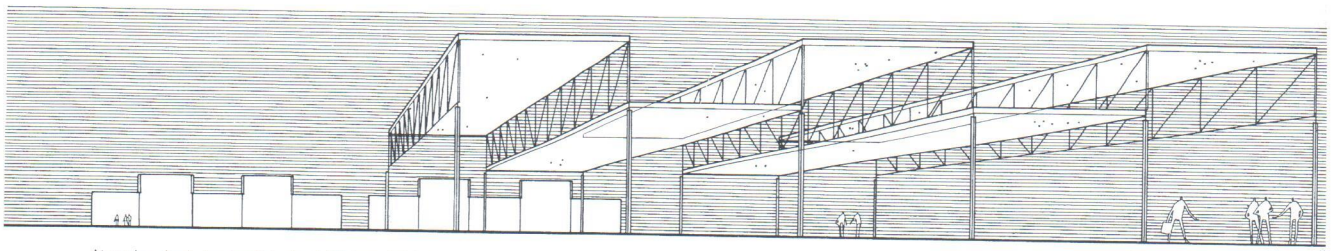
2 Vector-active
Structure Systems

Gestaltungsmöglichkeiten durch Dachflächendifferenzierung bei durchlaufenden Fachwerkträgern
design possibilities through differentiation of roof planes in continuous trusses



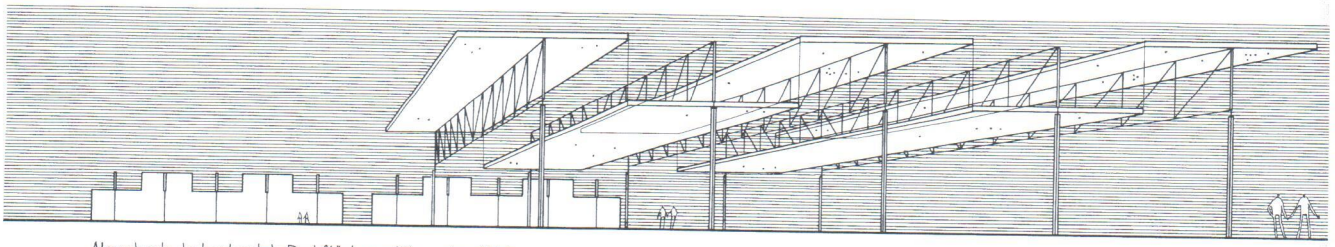
Geneigte Dachflächen beidseitig unterstützt

inclined roof planes with both ends supported



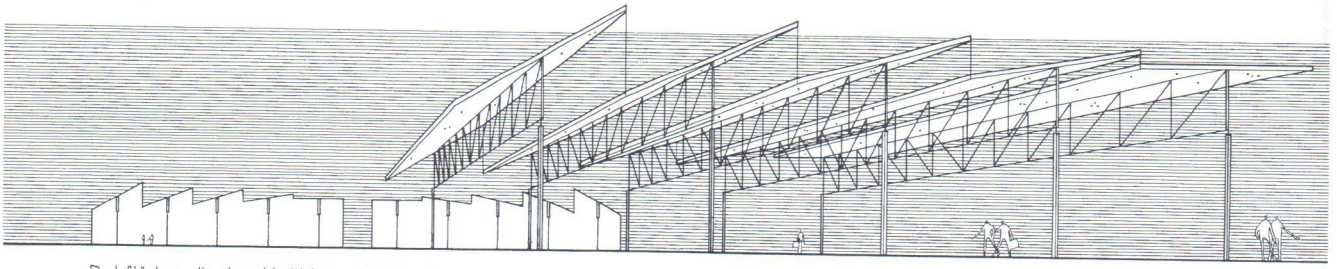
Abwechselnde horizontale Dachflächen beidseitig unterstützt

alternating horizontal roof planes with both ends supported



Abwechselnde horizontale Dachflächen mittig unterstützt

alternating horizontal roof planes centrally supported



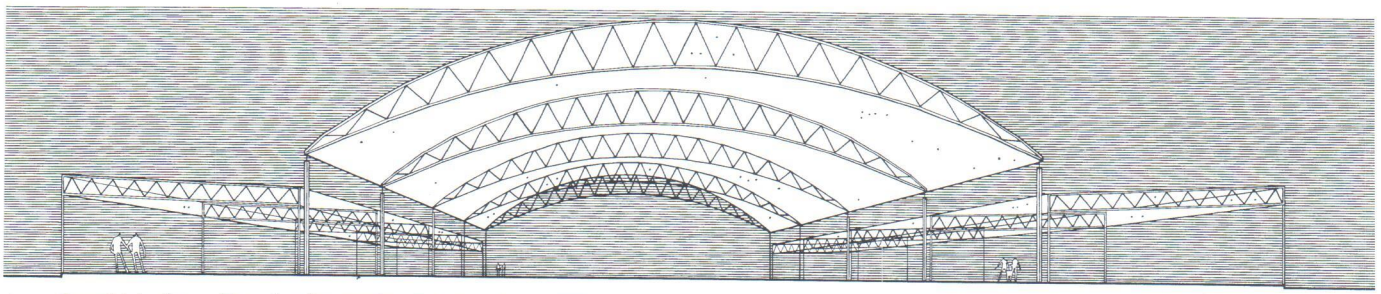
Dachflächen mit unterschiedlicher Neigung mittig unterstützt

roof planes with differing inclination centrally supported

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

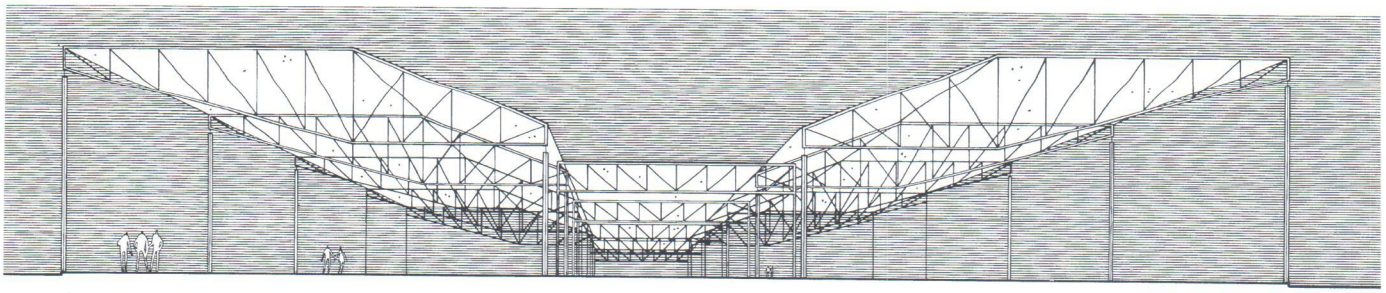
Komposition von weitgespannten und nahgespannten Fachwerkträgern

composition of long-span and short-span trusses



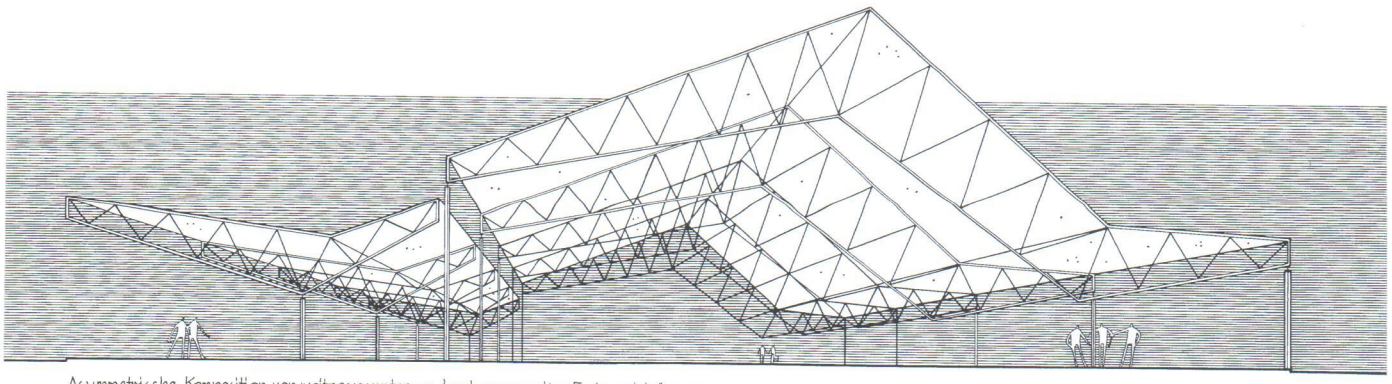
Symmetrische Komposition mit weitgespannten Fachwerkträgern in Mitte

symmetrical composition with long-spann truss in center



Symmetrische Komposition mit weitgespannten Fachwerkträgern an den Seiten

symmetrical composition with long-span trusses at the sides



Asymmetrische Komposition von weitgespannten und nahgespannten Fachwerkträgern

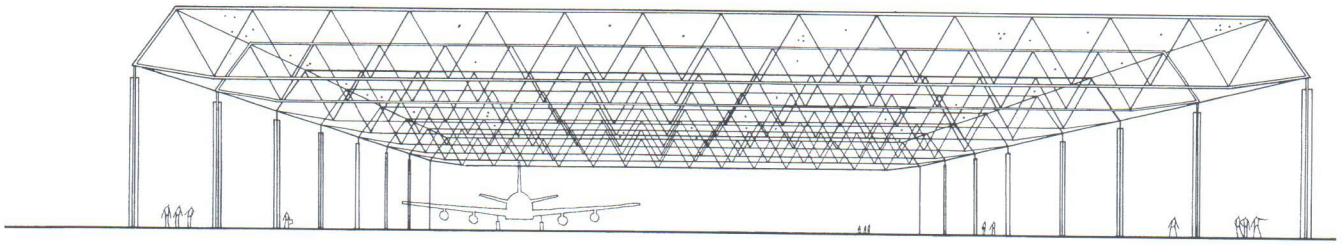
asymmetrical composition of long-span and short-span trusses

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

2 Vector-active
Structure Systems

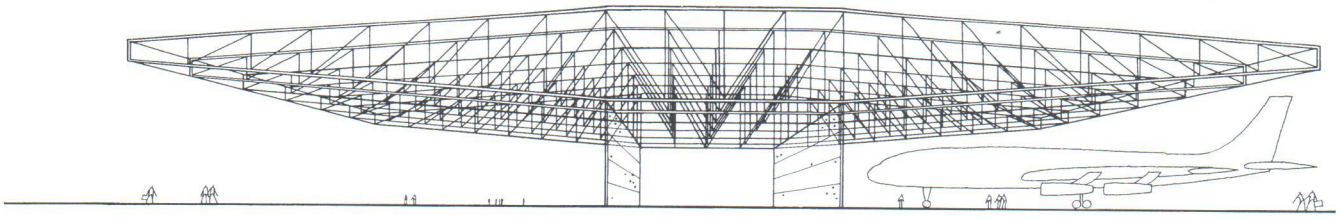
Weitgespannte Fachwerkträger mit verschiedenen Auflagerbedingungen

longspan trusses with different support conditions



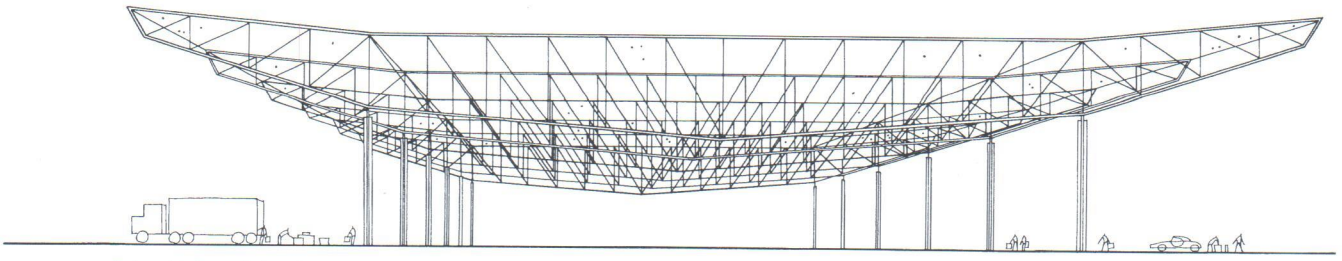
Fachwerkträger an beiden Enden unterstützt: Freispann-Tragwerk

trusses supported at both ends: free-span structure



Fachwerkträger mit zweifacher Stütze in Mitte: Kragspann-Tragwerk

trusses doubly supported in center: cantilevered structure



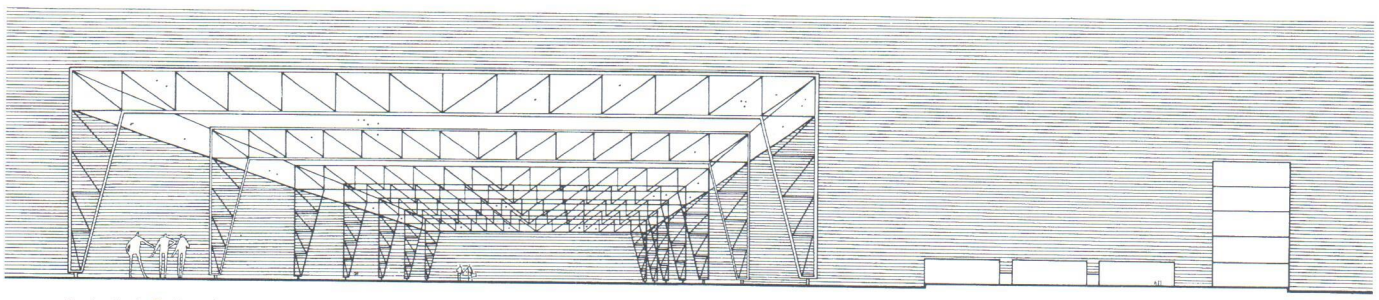
Fachwerkträger mit überkragenden Enden: auskragendes Freispann-Tragwerk

trusses with cantilevered ends: cantilevered free-span structure

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

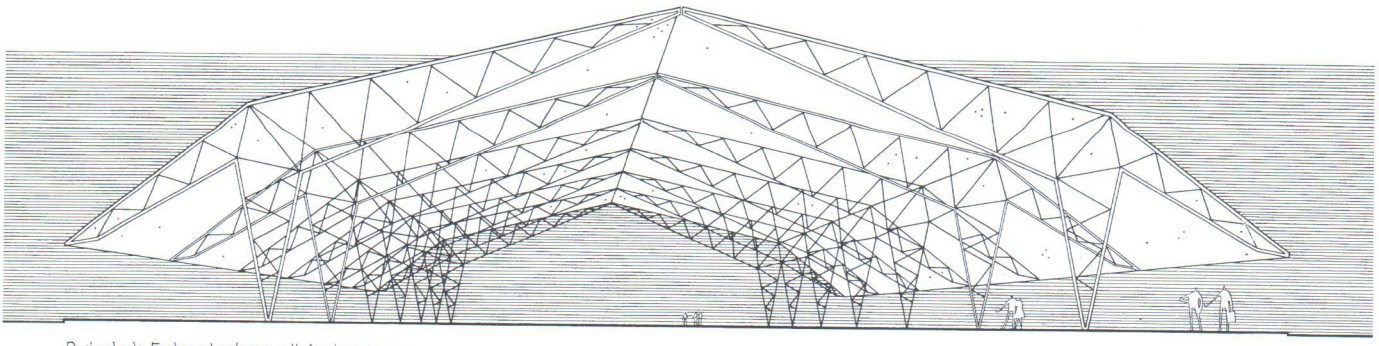
Anwendung des Fachwerkmechanismus für andere Tragsysteme

application of truss mechanism for other structure systems



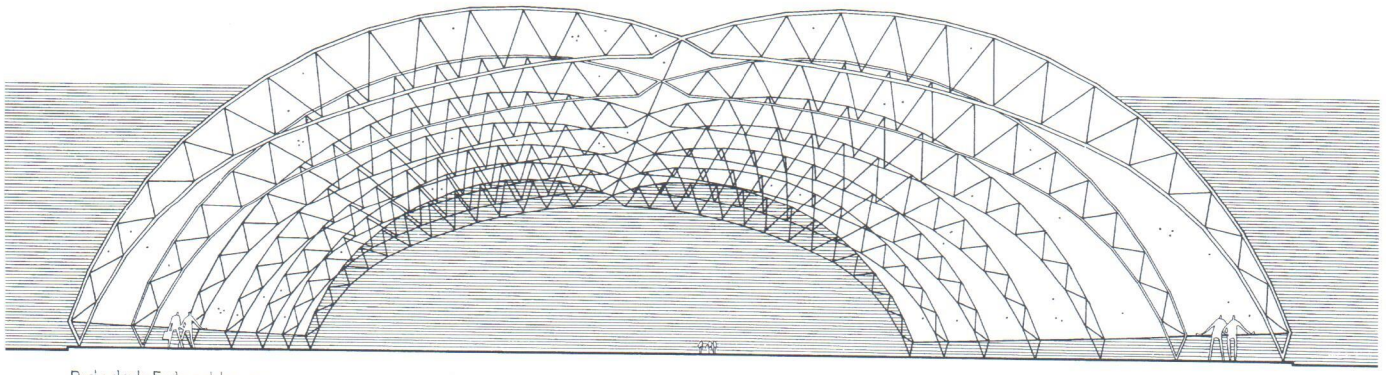
Zweigelenk-Fachwerkrahmen

trussed two-hinged frame



Dreigelenk-Fachwerkrahmen mit Auskragungen

trussed three-hinged frame with cantilevers



Dreigelenk-Fachwerkbogen

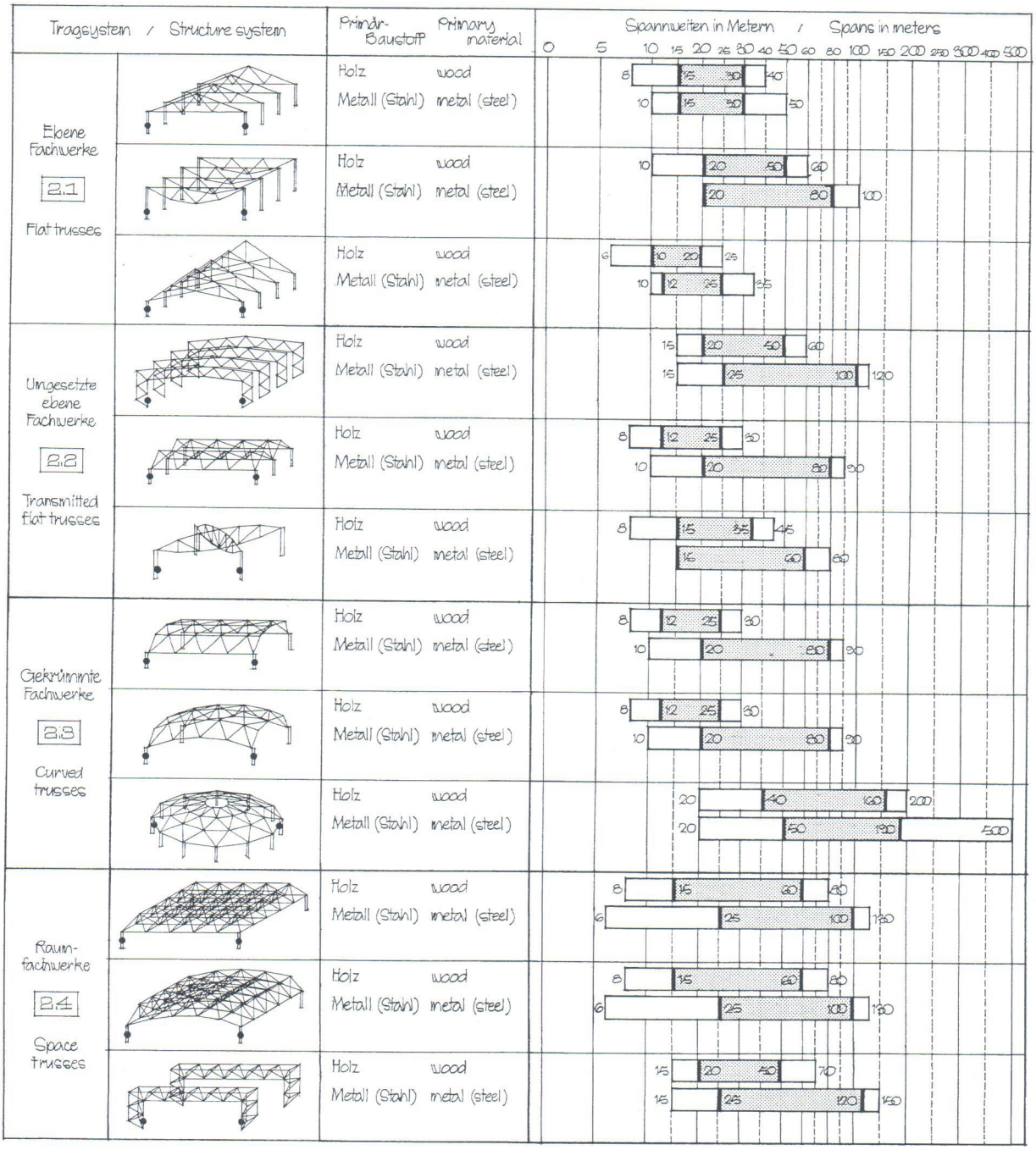
trussed three-hinged arch

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

2 Vector-active
Structure Systems

Anwendungen: Tragsystem - Baustoff - Spannweite

Applications: structure system - material - span



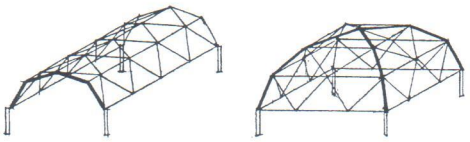
Jeden Tragwerk-Typ ist ein spezifischer Spannungszustand seiner Tragglieder zu eigen. Hieraus ergeben sich für den Entwurf zwangsläufige Bindungen in der Wahl des Primär-Baustoffes und in der Zuordnung von Spannweiten

To each structure type a specific stress condition of its members is inherent. This essential trait submits the design of structures to rational affiliations in the choice of primary structural fabric and in the attribution of span capacity.

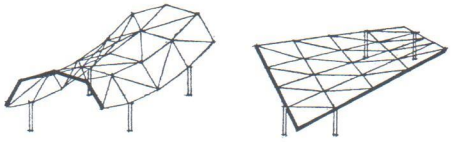
Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

2.3 Gekrümmte Fachwerke / Curved trusses

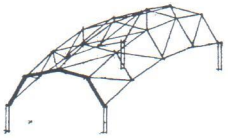
Einfach gekrümmte Systeme
Singly curved systems



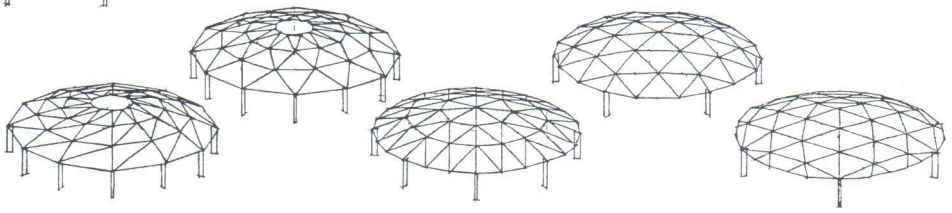
Sattelförmige Systeme
Saddle-shape systems



Kuppelförmige Systeme
Dome-shape systems

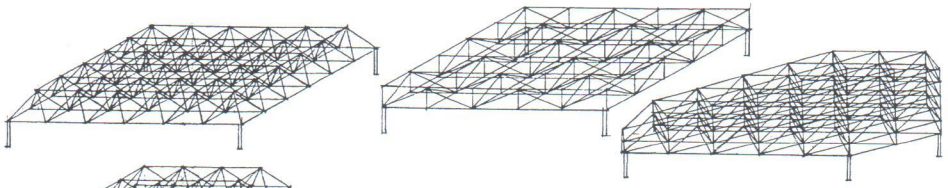


Sphärische Systeme
Spherical systems

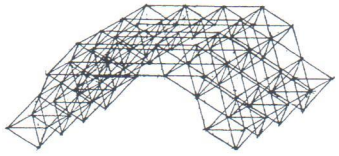


2.4 Raumfachwerke / Space trusses

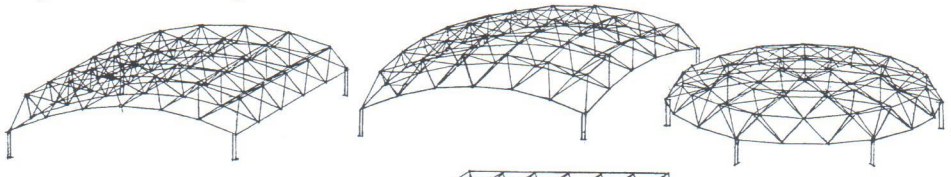
Ebene Systeme
Flat systems



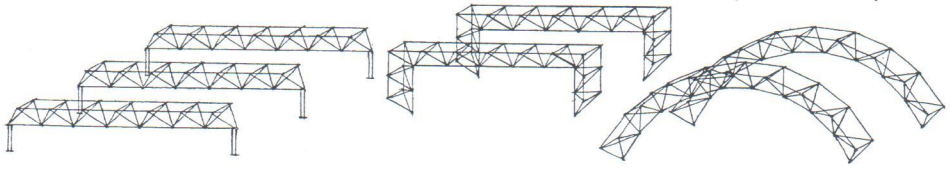
Gefaltete Systeme
Folded systems



Gekrümmte Systeme
Curved systems



Lineare Systeme
Linear systems

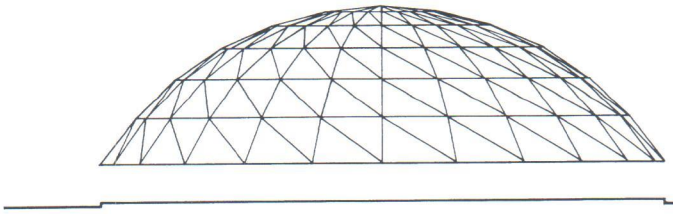


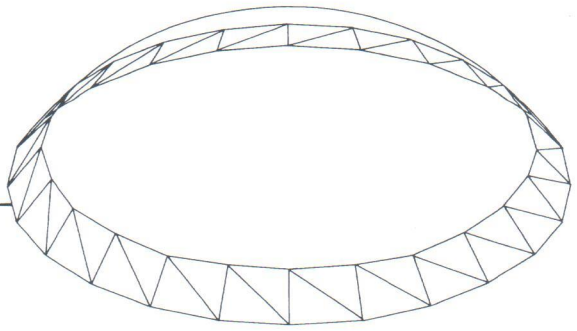
Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

2 Vector-active
Structure Systems

Fachwerksysteme für Kugelflächen

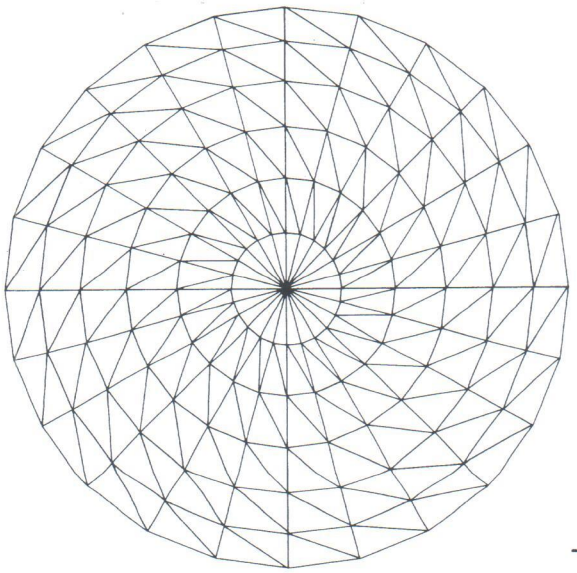
truss systems for spherical planes

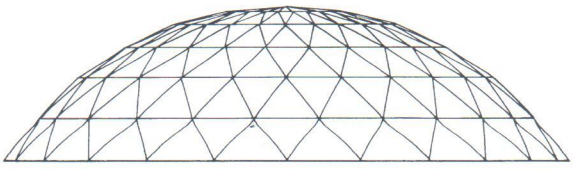




Kugelringe mit links-diagonaler Fachwerkteilung
sphere rings with left-diagonal trussing

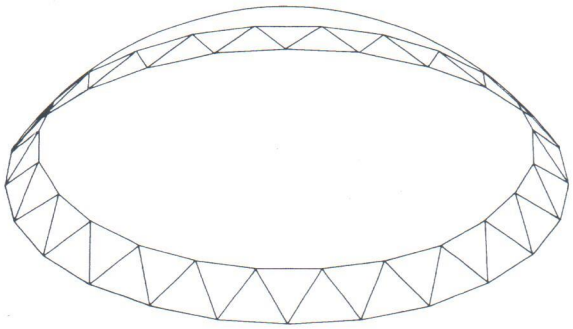
Schwedler Kuppel
Schwedler dome

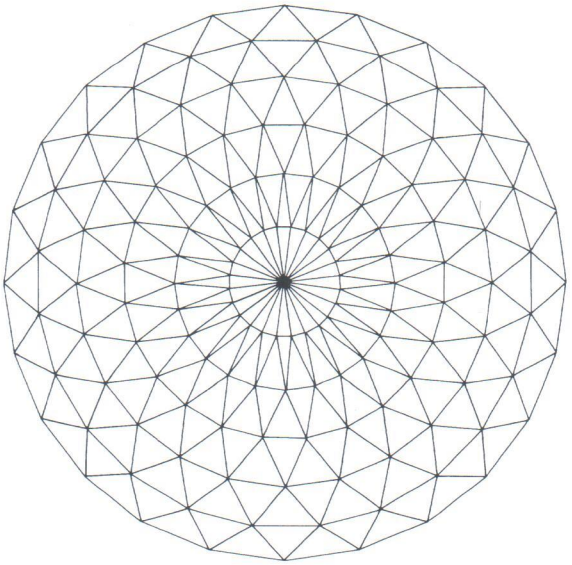




Kugelringe mit beidseitig-diagonaler Fachwerkteilung:
sphere rings with two-way diagonal trussing:

Gitterkuppel
lattice dome

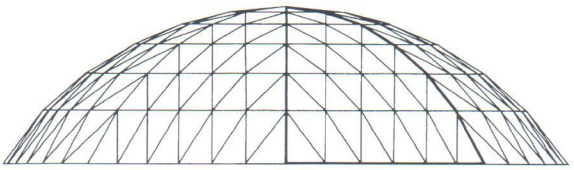


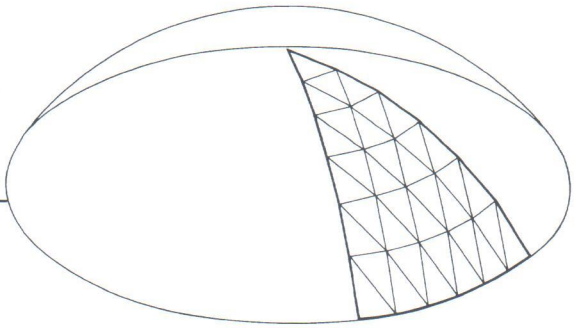


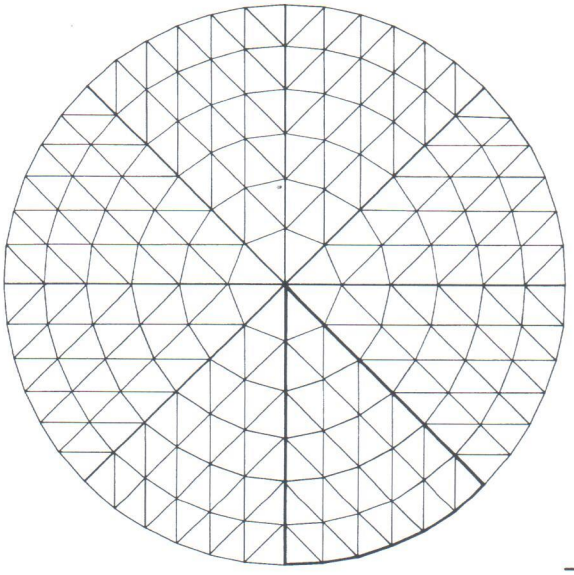
Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

Fachwerksysteme für Kugelflächen

truss systems for spherical planes

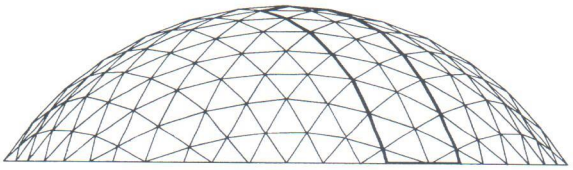






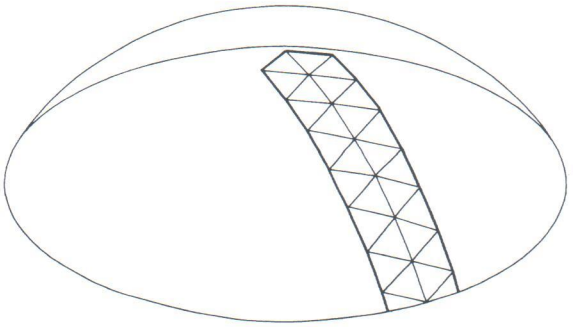
Kugelsegmente mit paralleler Fachwerkteilung
spherical segments with parallel trussing

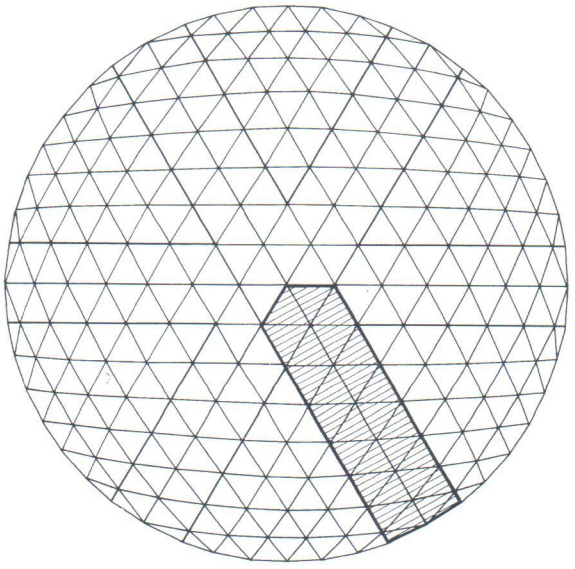
Parallelgitter-Kuppel
parallel lattice dome



Kugelstreifen mit hexagonaler Fachwerkteilung
spherical strips with hexagonal trussing

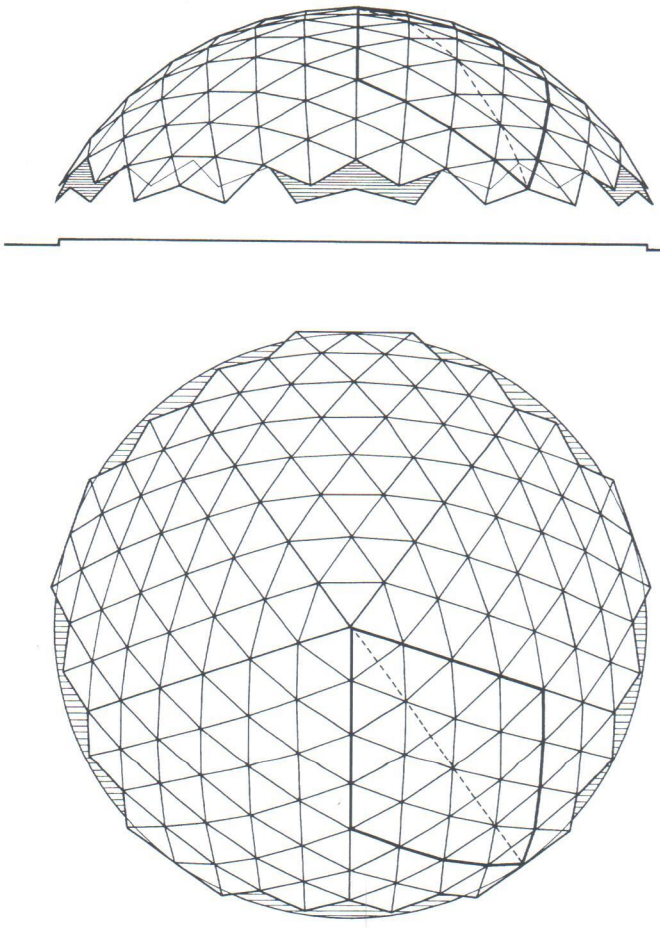
hexagonale Lamellenkuppel
hexagonal lamella dome

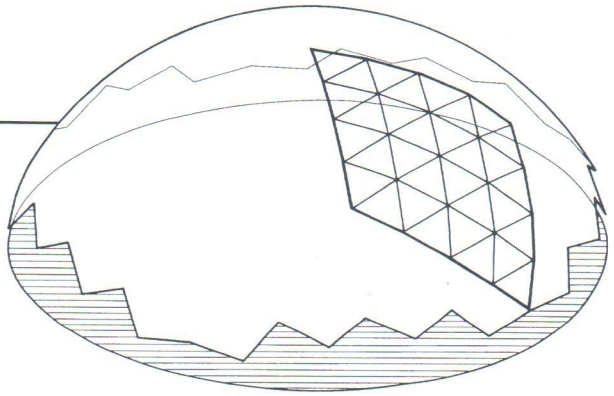




Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

Fachwerksysteme für Kugelflächen Sphärische Raumfachwerke truss systems for spherical planes





Kugel-Ikosaeder mit dreieckiger Fachwerkteilung
spherical icosahedron with triangular trussing

geodätische Kuppel
geodesic dome

Literaturquelle: Engel Heino, Tragsysteme, Structure Systems, Verlag Gerd Hatje, 1997, Obertshausen, ISBN 3-7757-0706-9

Geodätische Kuppel

Du brauchst Zeitungspapier Grossformat, am besten in 2 Farben (z.B. Standard und Presse, für die weißen eignen sich besser Frankfurter Allgemeine oder Süddeutsche Zeitung, da sie etwas größer sind), mindestens 130 Doppelseiten pro Farbe. Die Zeitungen bekommst du z.B. in Büchereien, aber rechtzeitig nachfragen! Musterbeutel- bzw Rundkopfklammern mindestens Größe 5, Rundstäbe Ø 10mm, Maßband, Bürolocher, Klebeband und eine Schere.
Außerdem: ein paar Freunde, Teamgeist, Fantasie und ein bisschen Geduld.