Kafes Sistemler

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GİRİŞ

Basit kiriş ve kafes sistem

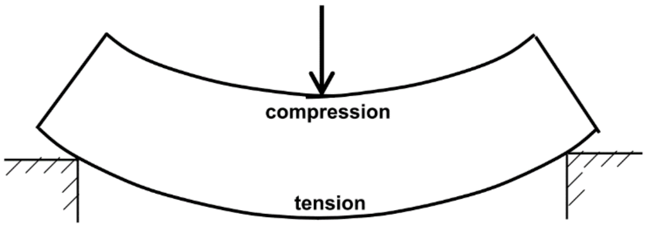
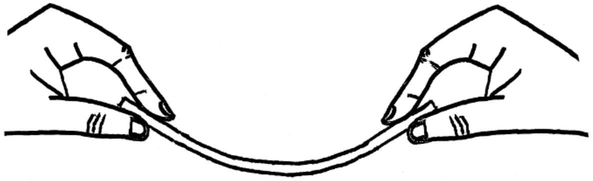
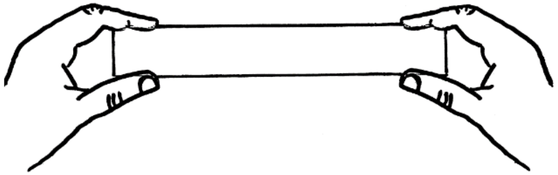


Fig. 12.1 Bending of beams.



(a) Ruler flat: easy to bend



(b) Ruler on edge: hard to bend

Fig. 12.2 Deeper beams are stronger.

- **Büyük açıklıkların geçilmesinde kafes sistem ekonomik bir çözüm.**
- **Düşey yük etkisindeki kafes sistem alt başlık elemanları çekmeye, üst başlık elemanları basınca çalışır.**

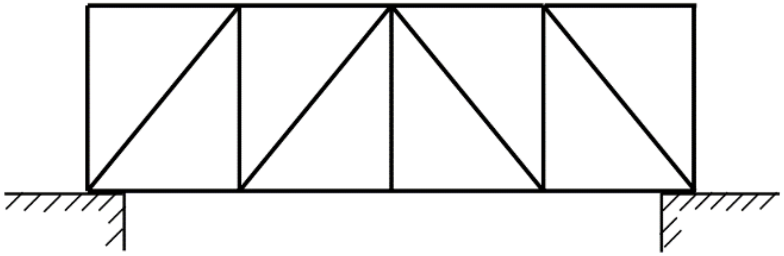
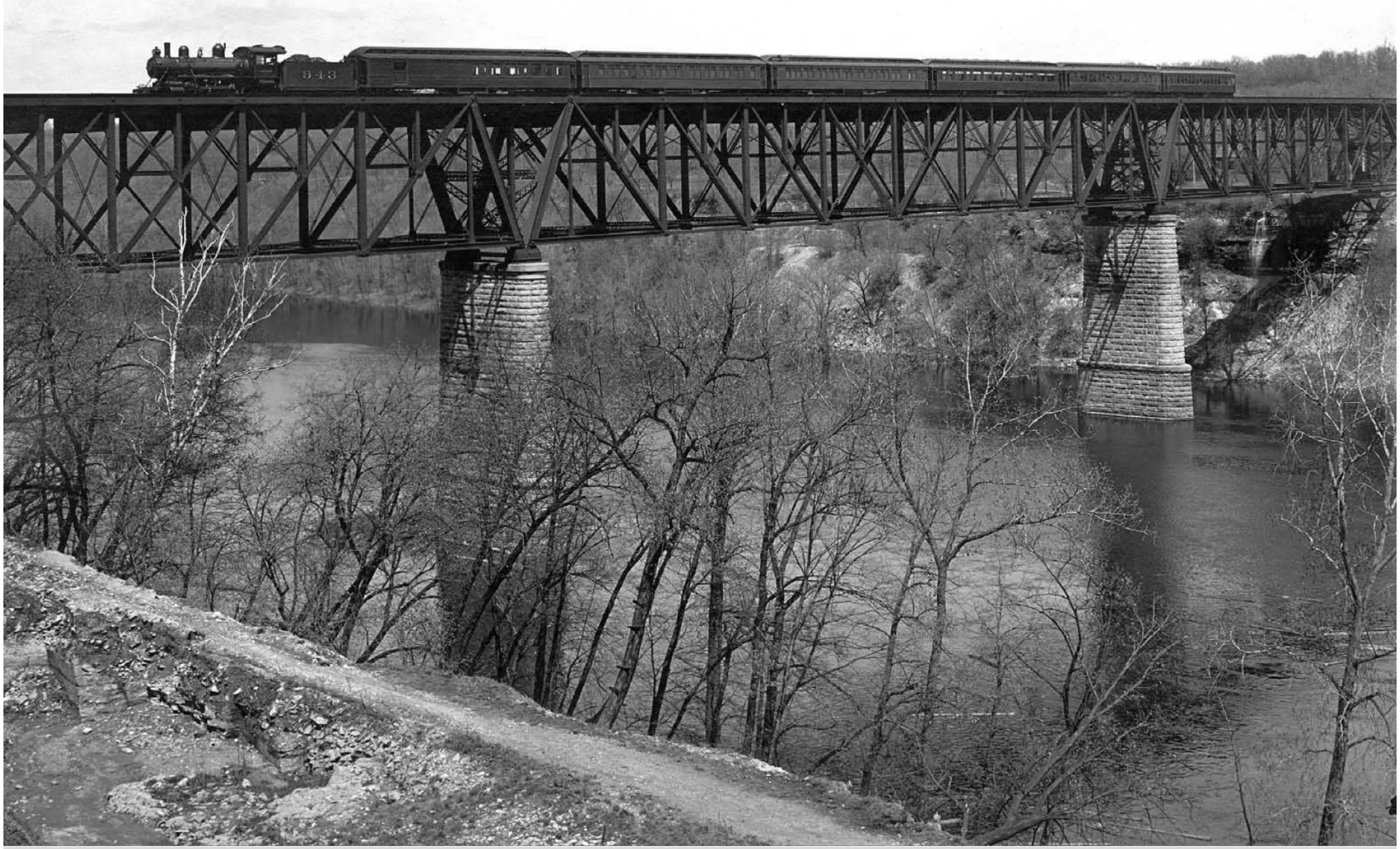
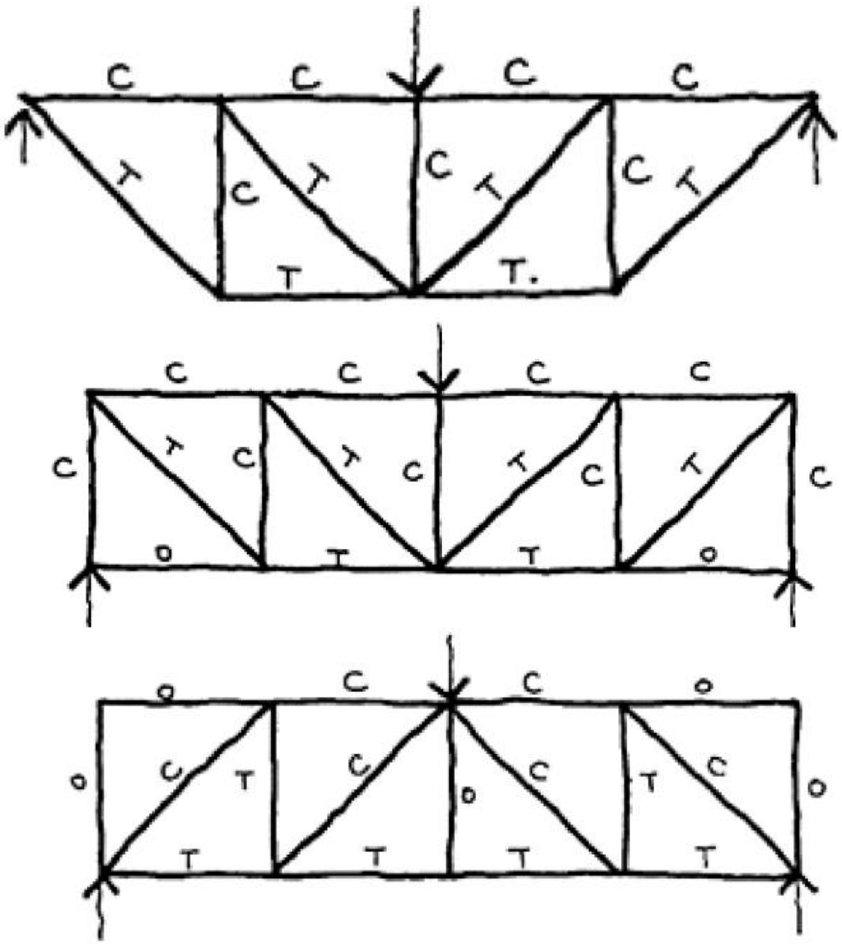


Fig. 12.3 A steel railway bridge.

TARİHSEL GELİŞİM (Demiryolu Köprüleri)



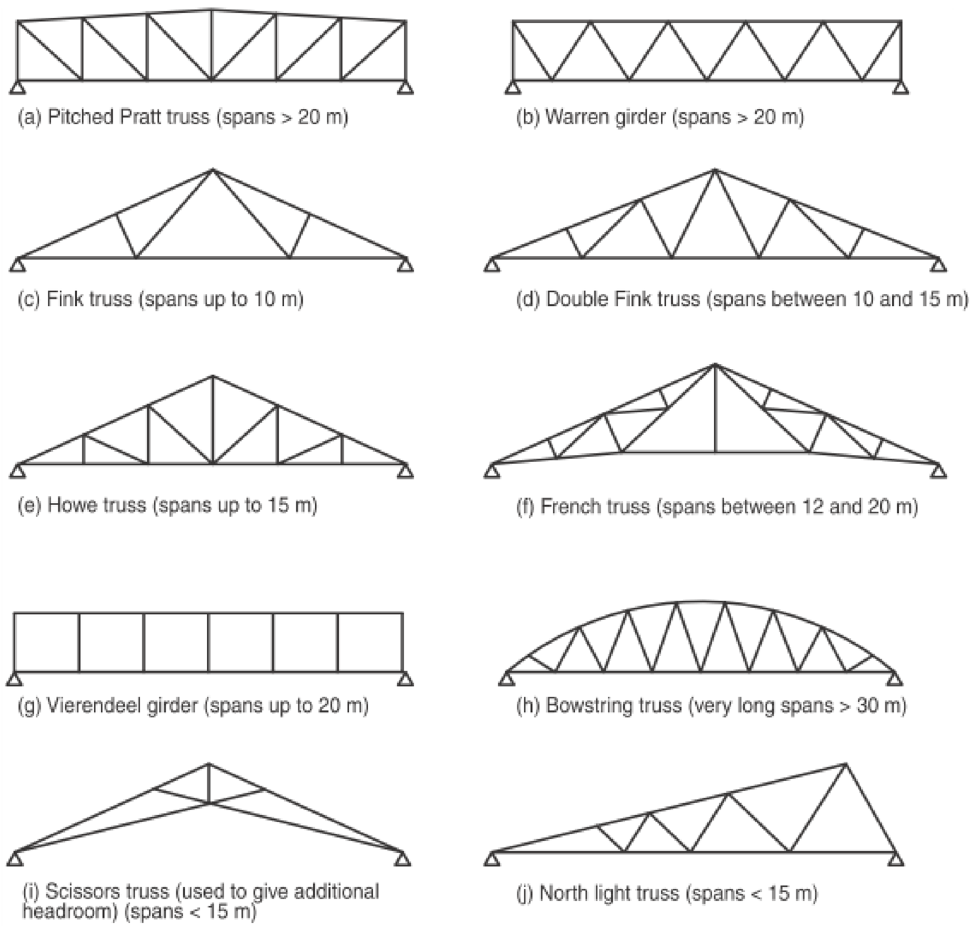
KAFES SİSTEMİN DÜŞEY YÜKLER ALTINDAKİ DAVRANIŞI



- **Üst başlık elemanları ve düşey elemanlar basınç (C), alt başlık elemanları ve diyagonaller çekme (T).**

- **Farklı diyagonal düzenlemesi, farklı kuvvetler oluşturabilir.**

KAFES SİSTEM TİPLERİ



4.30 Different forms of conventional roof trusses and lattice girders

KAFES SİSTEM UYGULAMALARI

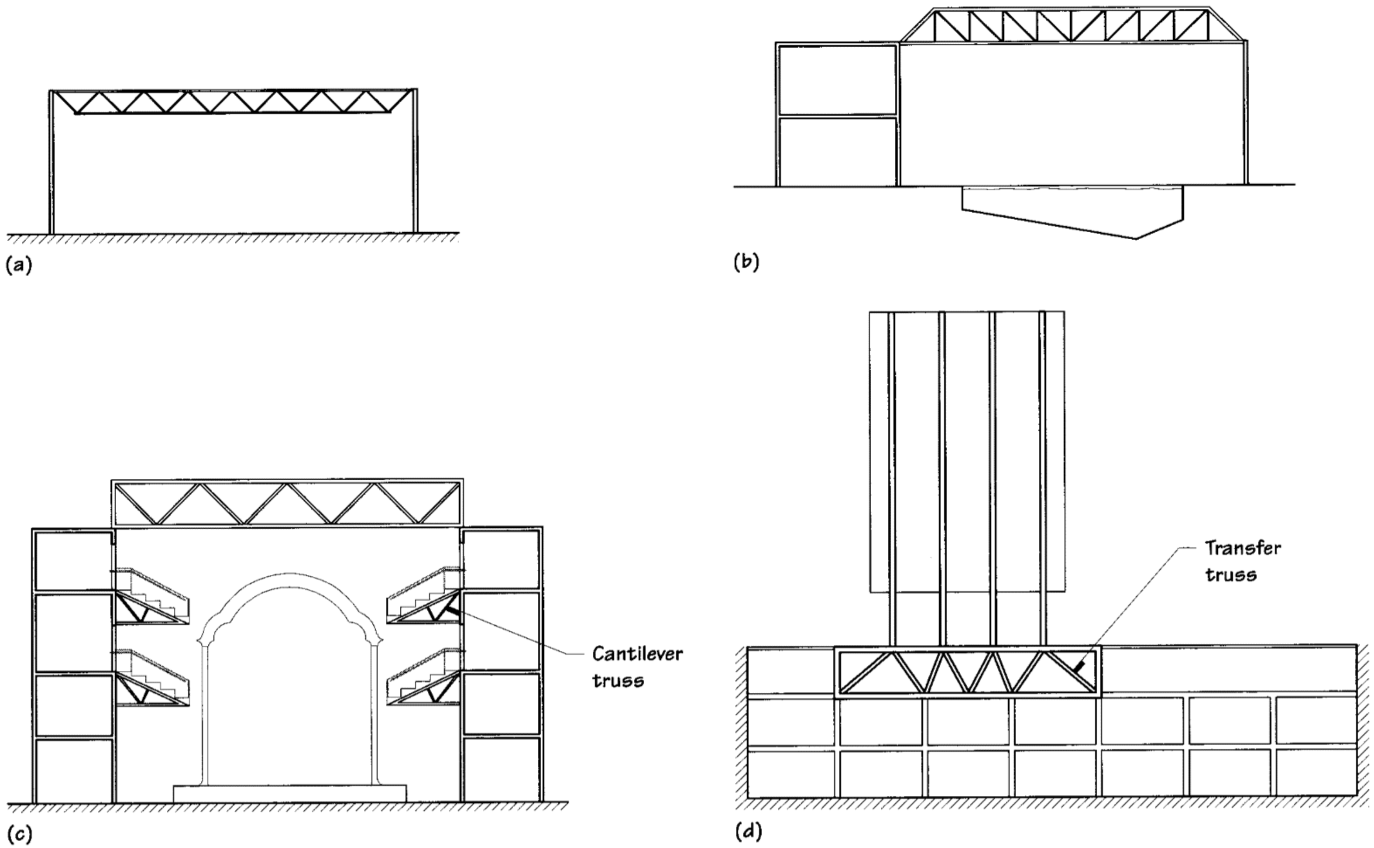


Figure 6.16 Sample uses of trusses in typical applications: (a) spanning over a warehousing area; (b) spanning over swimming and athletic areas; (c) an auditorium employs major Warren trusses for the roof span and cantilever trusses for the balconies; (d) a large building over a parking garage uses transfer trusses to mediate between the column spacing for the parking and that for the structure in the building above.

DÜZLEM ve UZAY KAFES SİSTEMLER

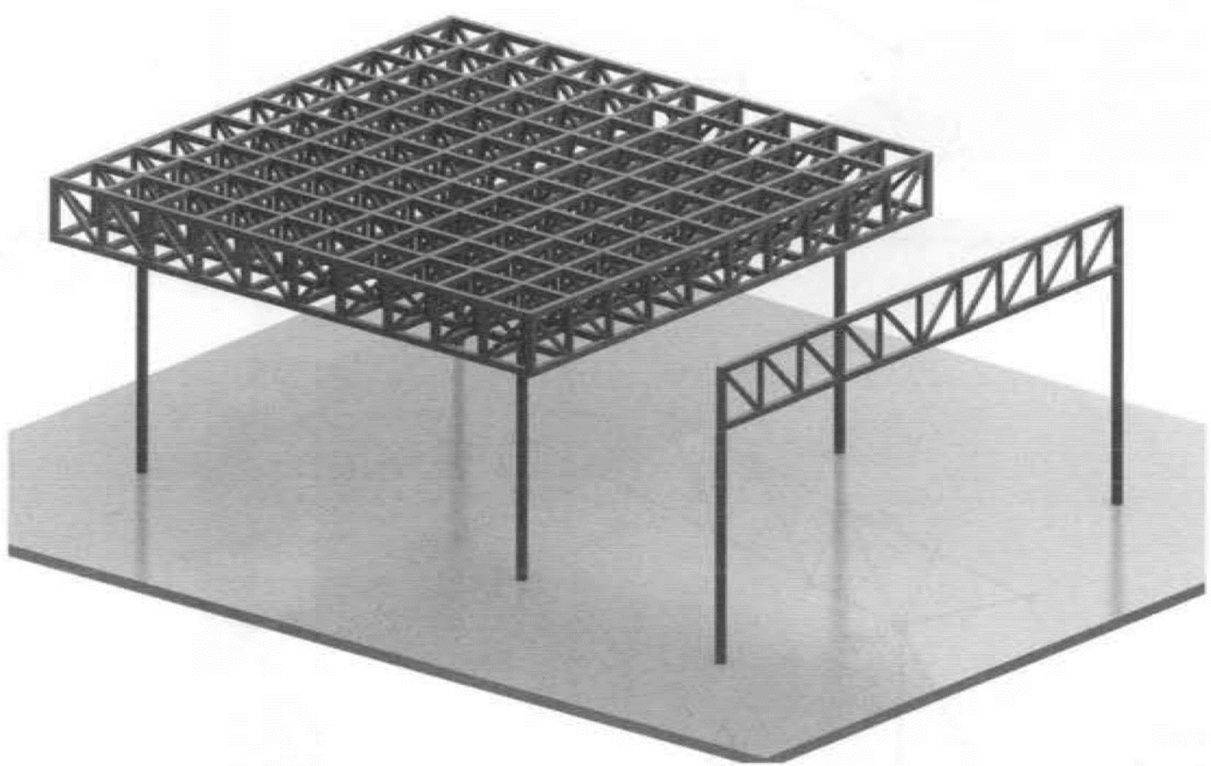
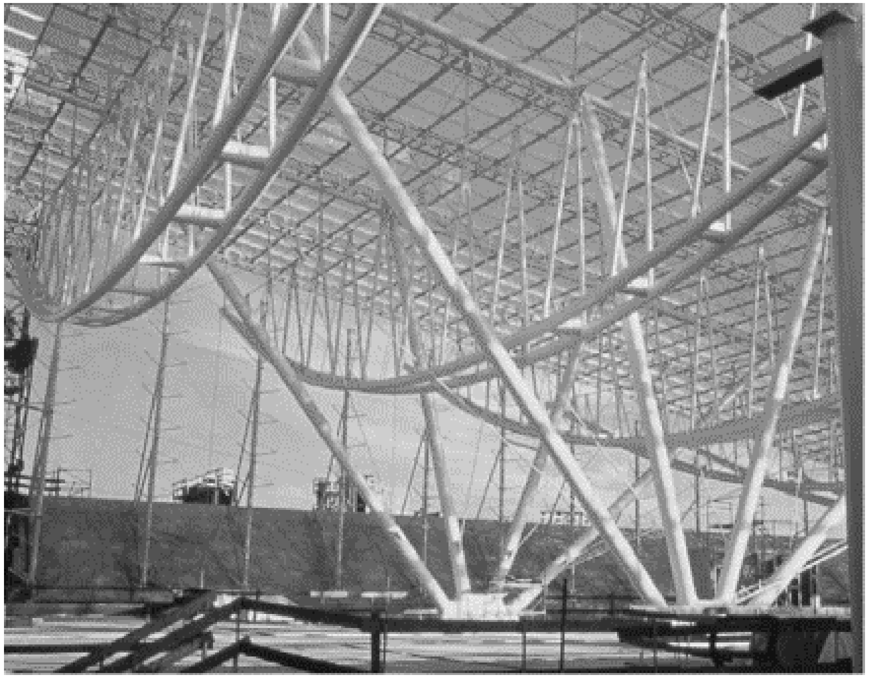


Figure 6.9 A three-dimensional space truss and a two-dimensional planar truss of similar configuration.

KAFES SİSTEM ÖRNEKLERİ

4.40 Stratford Market depot, London (architect: Wilkinson Eyre)



4.41 Deep curved roof trusses at the TGV terminal at Charles de Gaulle Airport, Paris (architect: Aeroports de Paris)

KAFES SİSTEM ÖRNEKLERİ

4.42 Triangular roof trusses at Hamburg Airport (architect: Von Gerkan Marg and Partners)

KAFES SİSTEM ÖRNEKLERİ

Fig. 12.6 Roof structure, Manchester Victoria station.

KAFES SİSTEM ÖRNEKLERİ

Fig. 12.4 Trussed bridge across River Spree, Berlin.

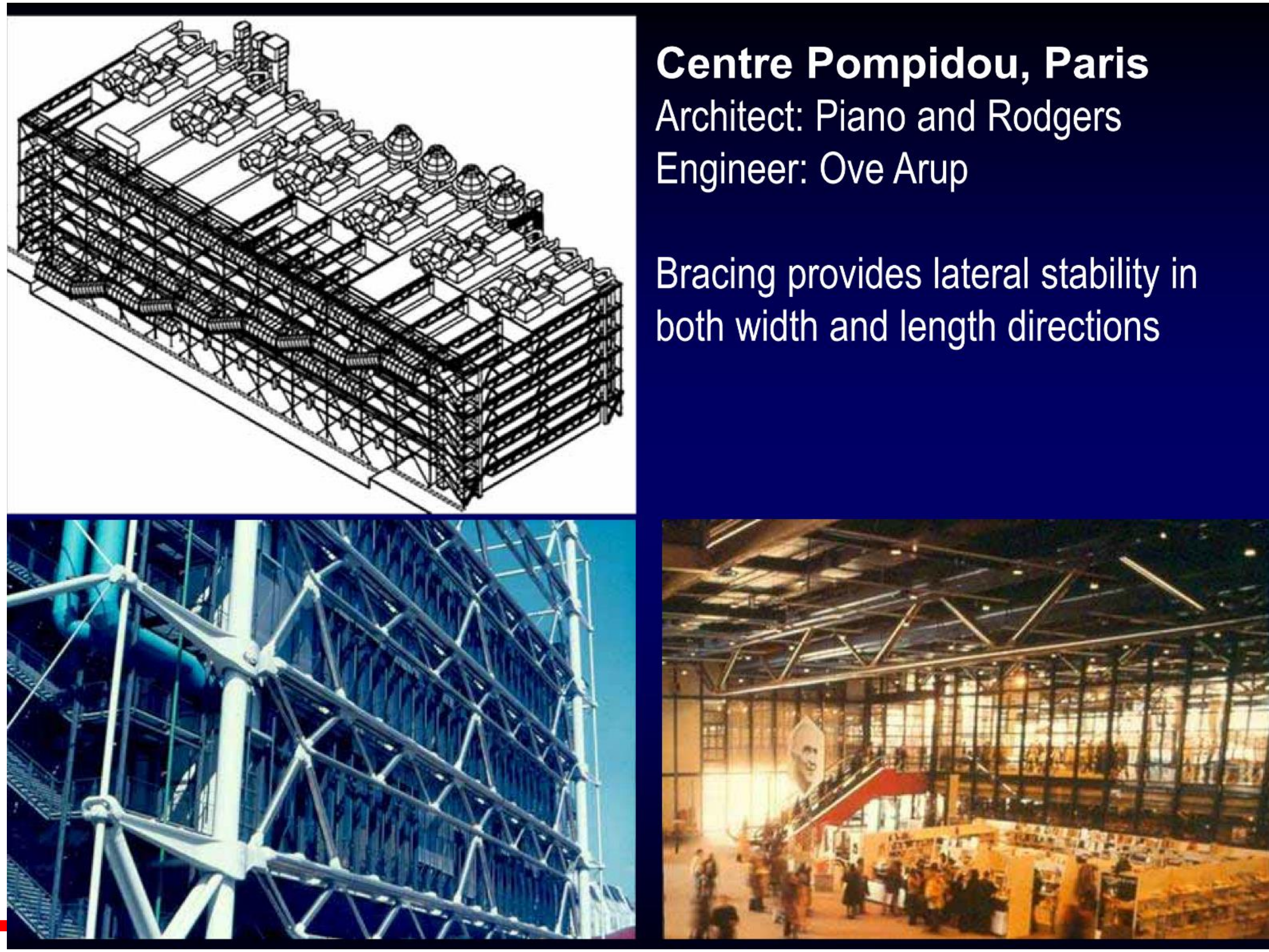
KAFES SİSTEM ÖRNEKLERİ

Fig. 12.5 Truss in façade, Sony Centre, Berlin.

KAFES SİSTEM ÖRNEKLERİ

3.14 Example of continuity achieved through a series of pinned connections, Centre Pompidou, Paris (architect: Renzo Piano and Richard Rogers)

KAFES SİSTEM ÖRNEKLERİ



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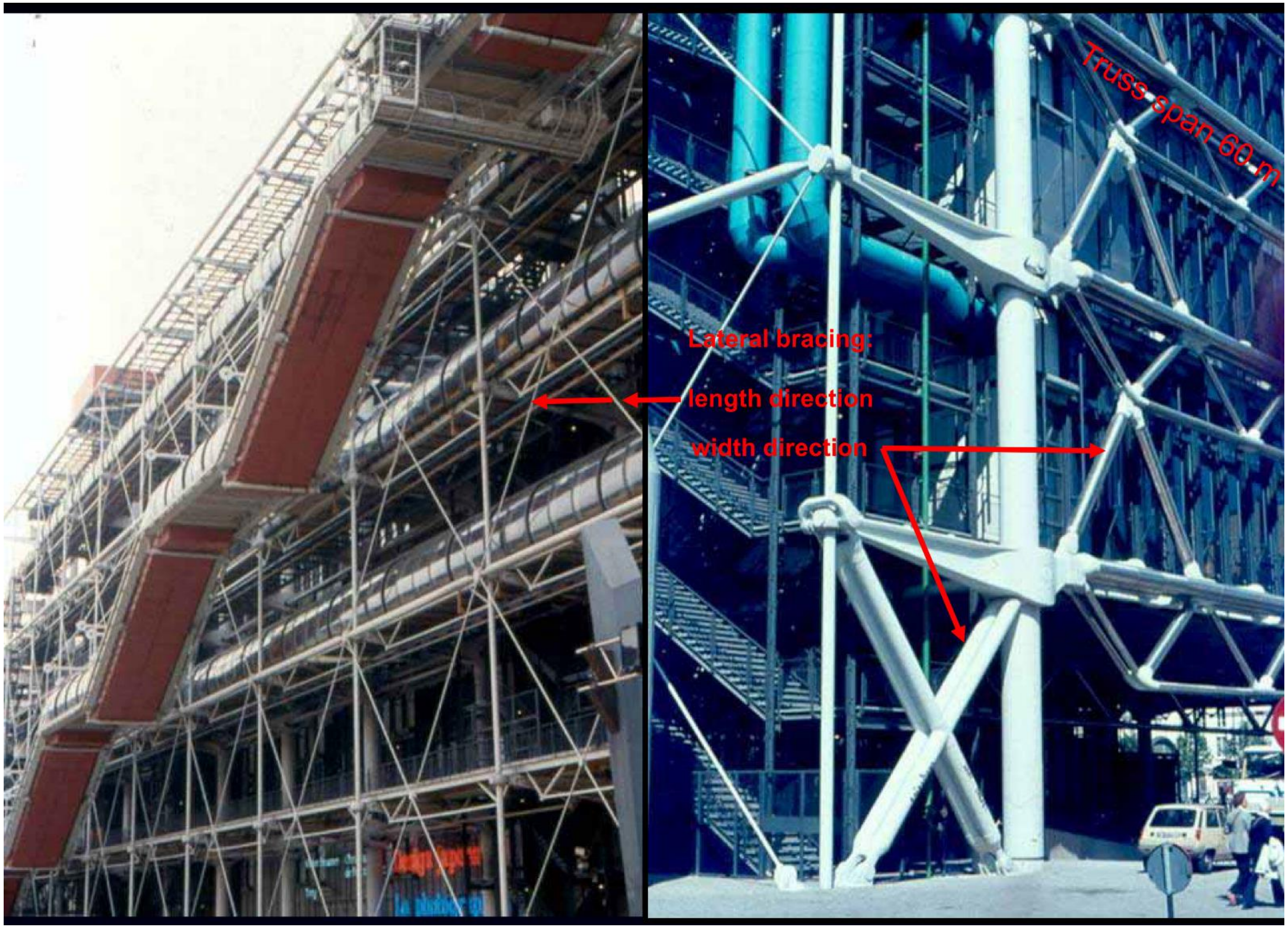

KAFES SİSTEM ÖRNEKLERİ

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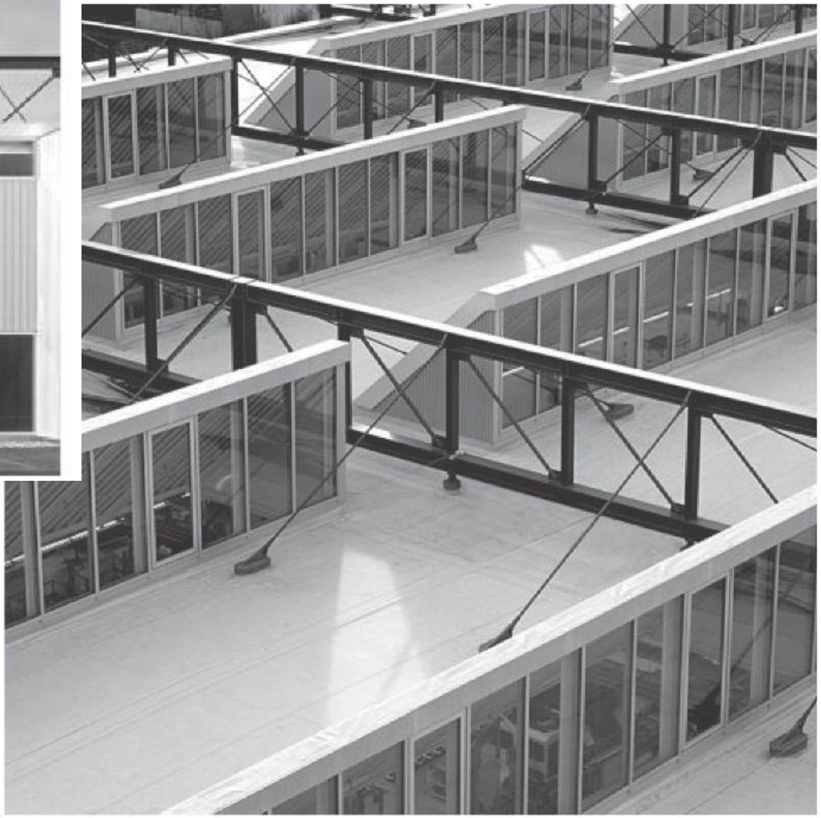

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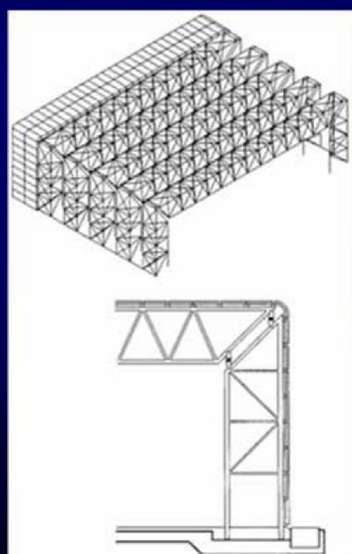
7 Valeo motors plant, Beitigheim-Bissingen, 2003
Architects: Ackermann & Partner
Structural engineer: Christoph Ackermann
8 View of roof as "fifth facade" with external lattice beams and self-supporting northlights for admitting daylight. This non-glare lighting arrangement is a reliable way of creating an optimum workplace quality and also improves the building's energy balance.
9 Longitudinal section, scale 1:250
10 Section through lattice beam showing suspended secondary beams, scale 1:250
11 Detail of lattice beam with solid round section diagonals welded to gusset plates, scale 1:20
12 Section through lattice beam showing connection of secondary beam hangers, scale 1:20

KAFES SİSTEM ÖRNEKLERİ

Sainsbury Center, UK, 1977
Architect: Norman Foster
Engineer: Anthony Hunt
http://www.fosterandpartners.com/Projects/0188/Default.aspx

Prismatic truss frame, 34 m span
Frame action resist gravity **and** lateral load
Prismatic cross section provides stability
to prevent lateral buckling and rotation



KAFES SİSTEM ÖRNEKLERİ

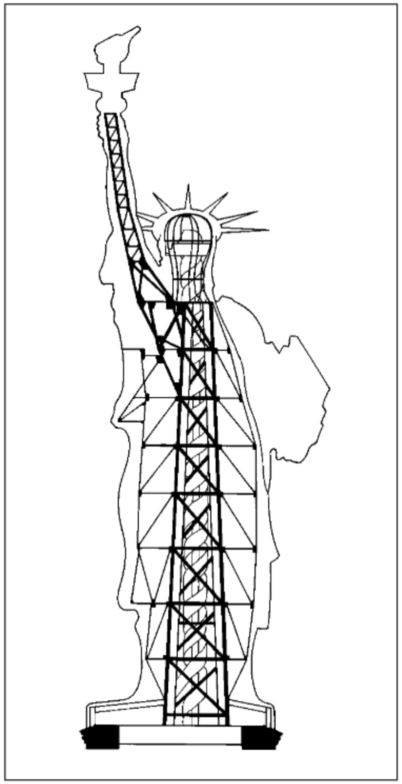
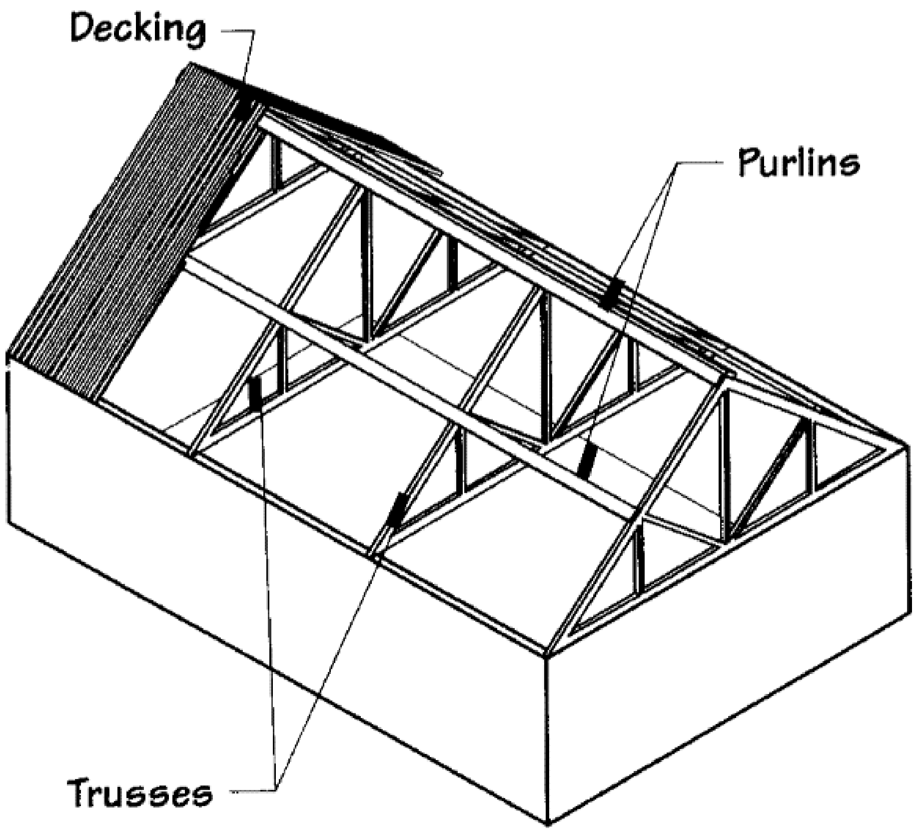


Fig. ii The thin external surface of the Statue of Liberty in New York Harbour, USA, is supported by a triangulated structural framework. The influence of structural considerations on the final version of the form was minimal.

Figure 6.10 The arch of the Bayonne Bridge is restrained from changing shape by its steel trussing, which allows the suspended deck to be very thin. The span is 1,675 ft (520 m). The bridge connects Bayonne, New Jersey, with Staten Island, New York. Engineers: Ammann and Dana.

Photo courtesy of the Port Authority of New York and New Jersey.

KAFES SİSTEM ELEMANLARI



(b) Roof decking on purlins

KAFES SİSTEM ELEMANLARI

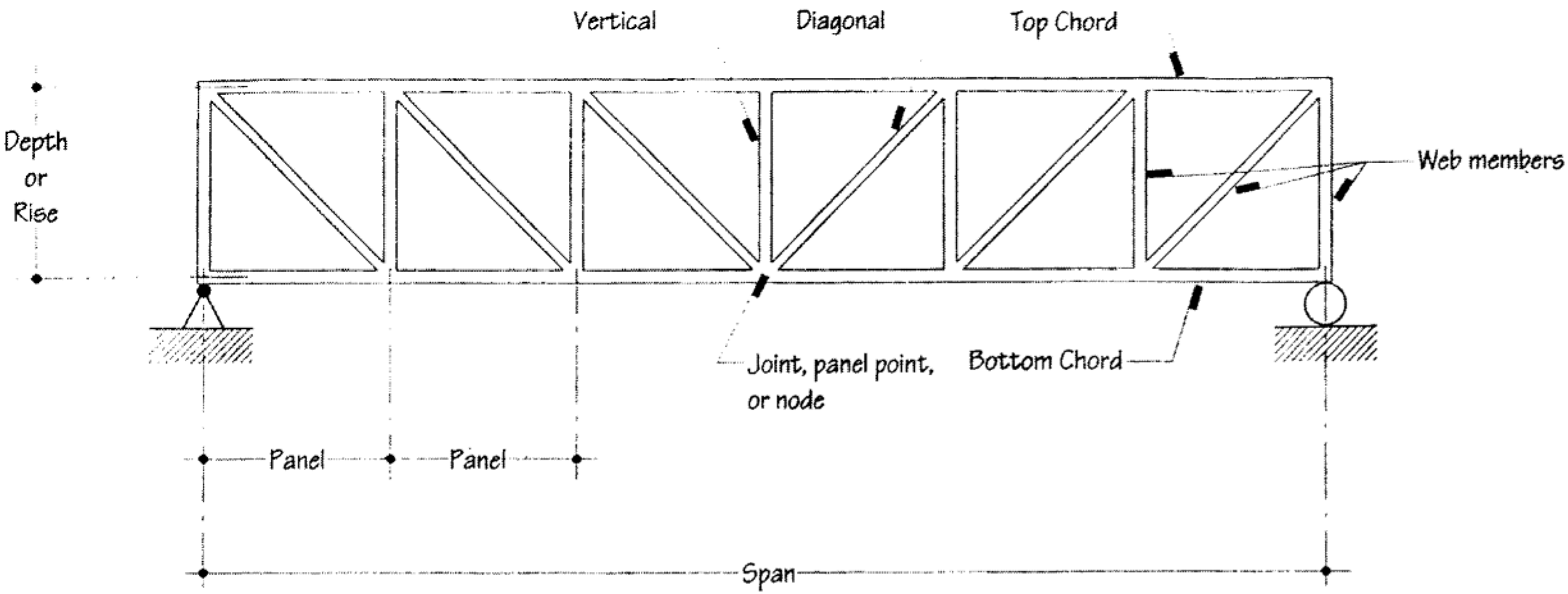


Figure 6.2 Terminology for trusses and their components.

KAFES SİSTEM BİRLEŞİM DETAYLARI

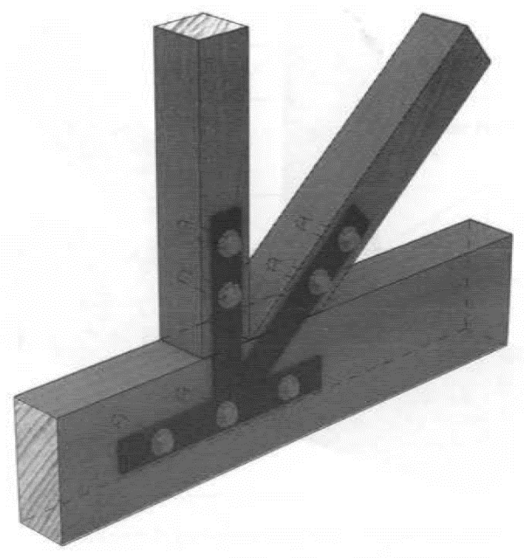
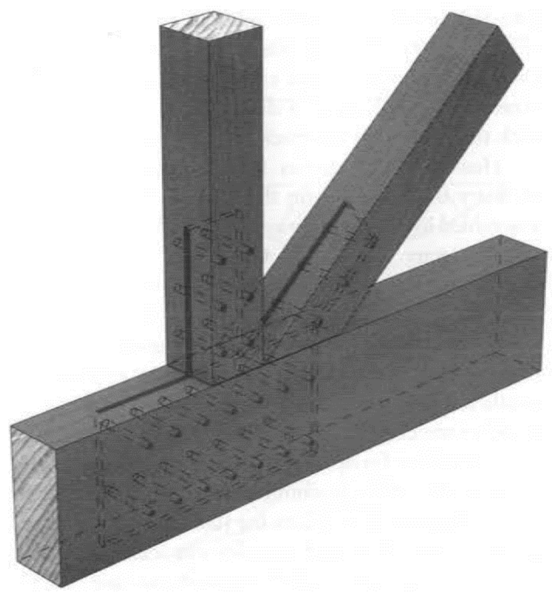
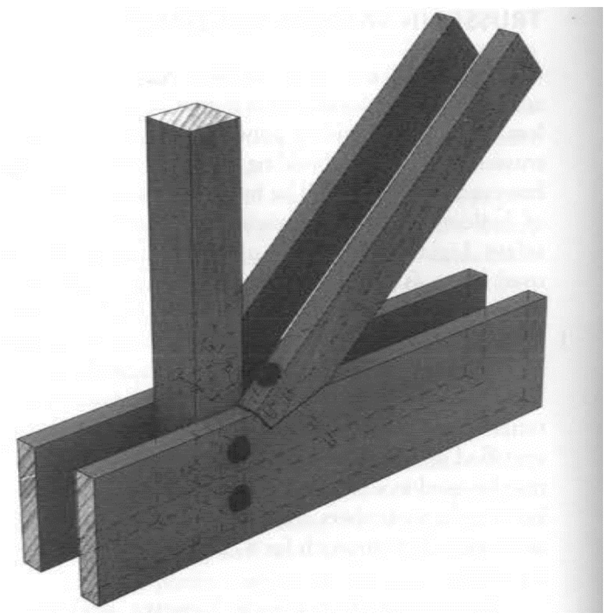


Figure 6.21 A single-layer heavy timber truss with side plates





KAFES SİSTEM BİRLEŞİM DETAYLARI

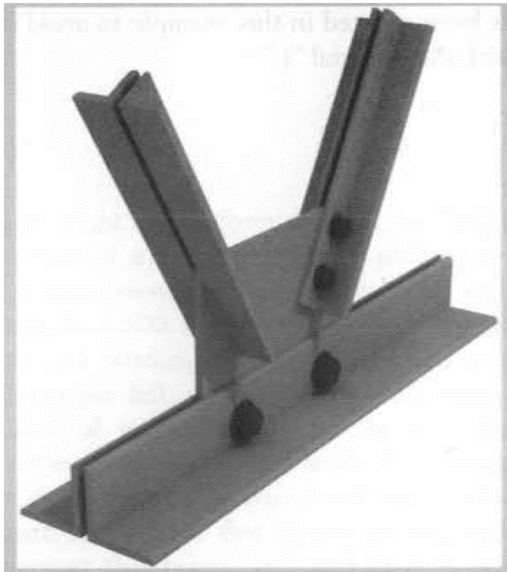


Figure A Sandwiched steel angle connection with gusset plate.

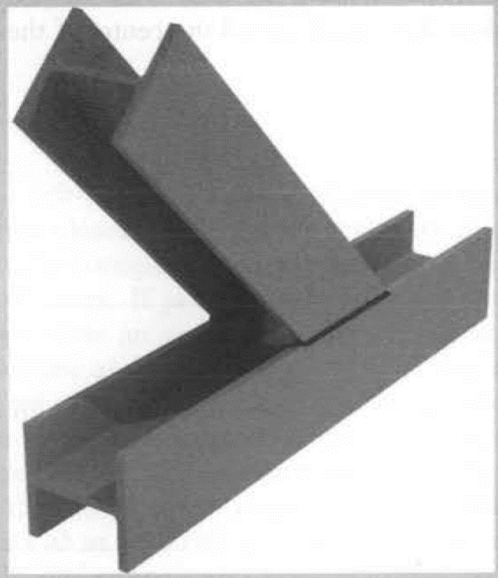


Figure C Welded steel connection.

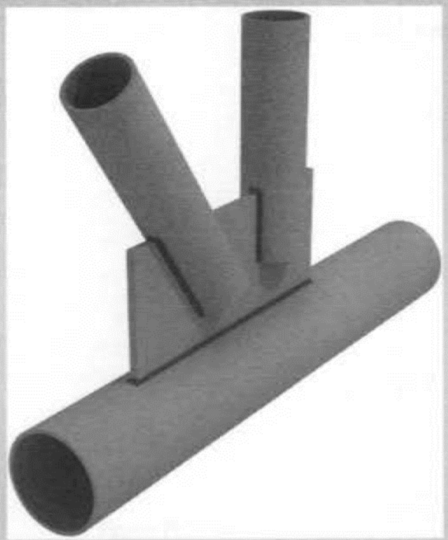


Figure E Steel tube connection with gusset plate.

DÜĞÜM NOKTALARINA YÜK AKTARIMI

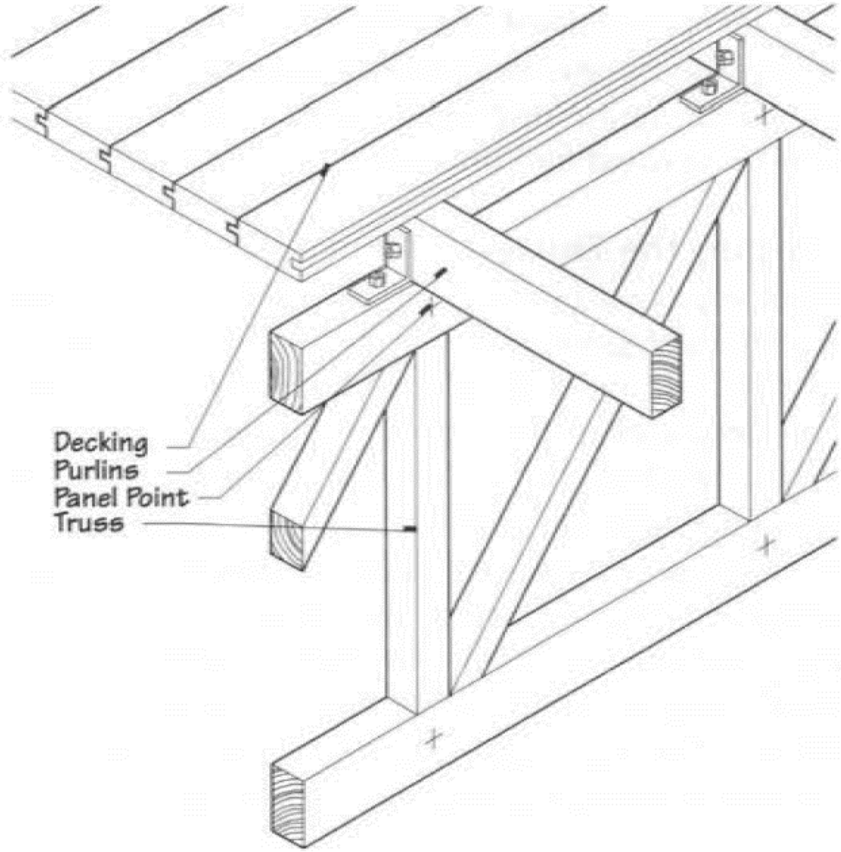


Figure 6.5 Purlins transfer loads from the decking to panel points of the truss.

KAFES SİSTEM FARKLI DİYAGONAL DÜZENLEMESİ

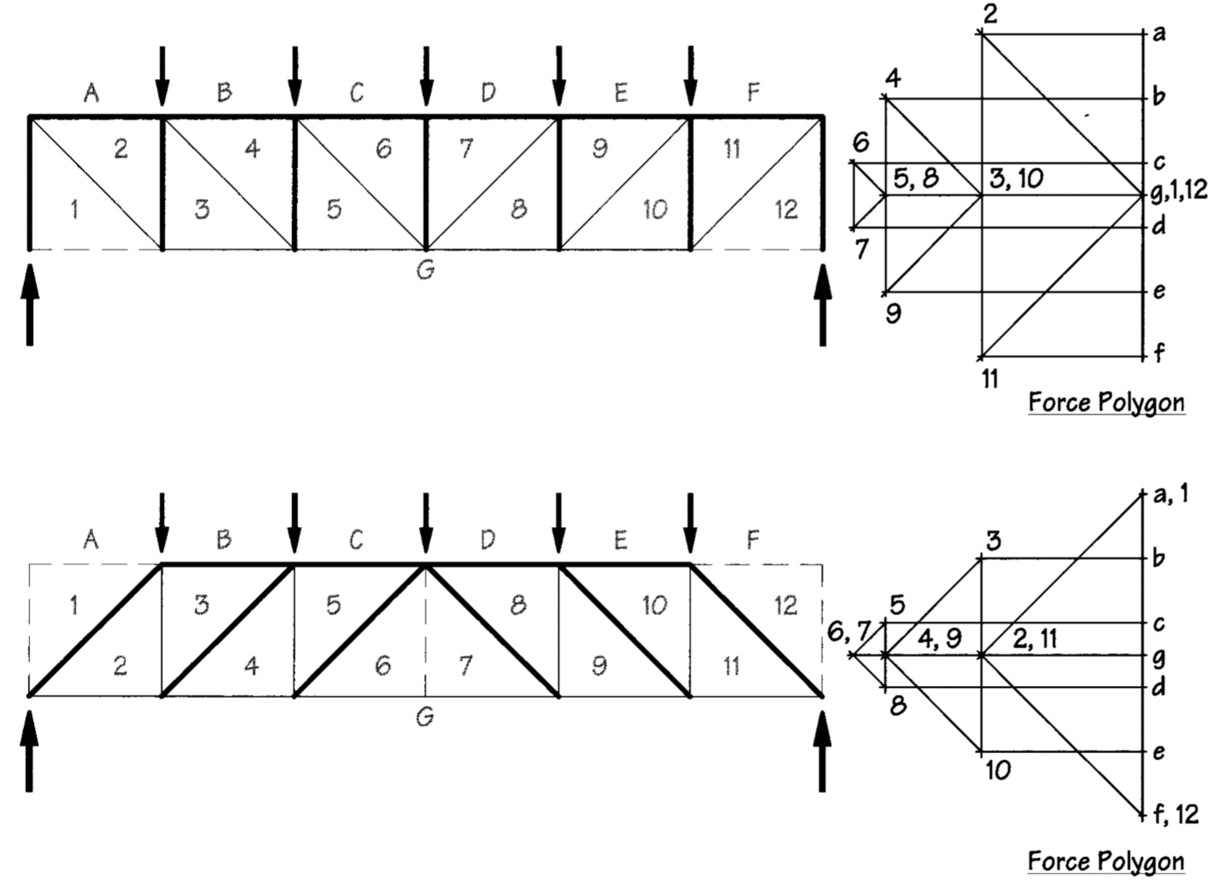


Figure 6.33 Reversing the direction of the diagonal members: a flat Pratt truss above, a flat Howe truss below.

KAFES SİSTEMLERDE KONSTRÜKSİYON YÜKSEKLİĞİ DEĞİŞİMİNİN ETKİSİ

İdeal Konstrüksiyon Yüksekliği
(Ekonomik Bir Kafes Sistem)

h=L/10 (Dikdörtgen Kafes Kiriş)
H=L/6 (Üçgen Kafes Kiriş)

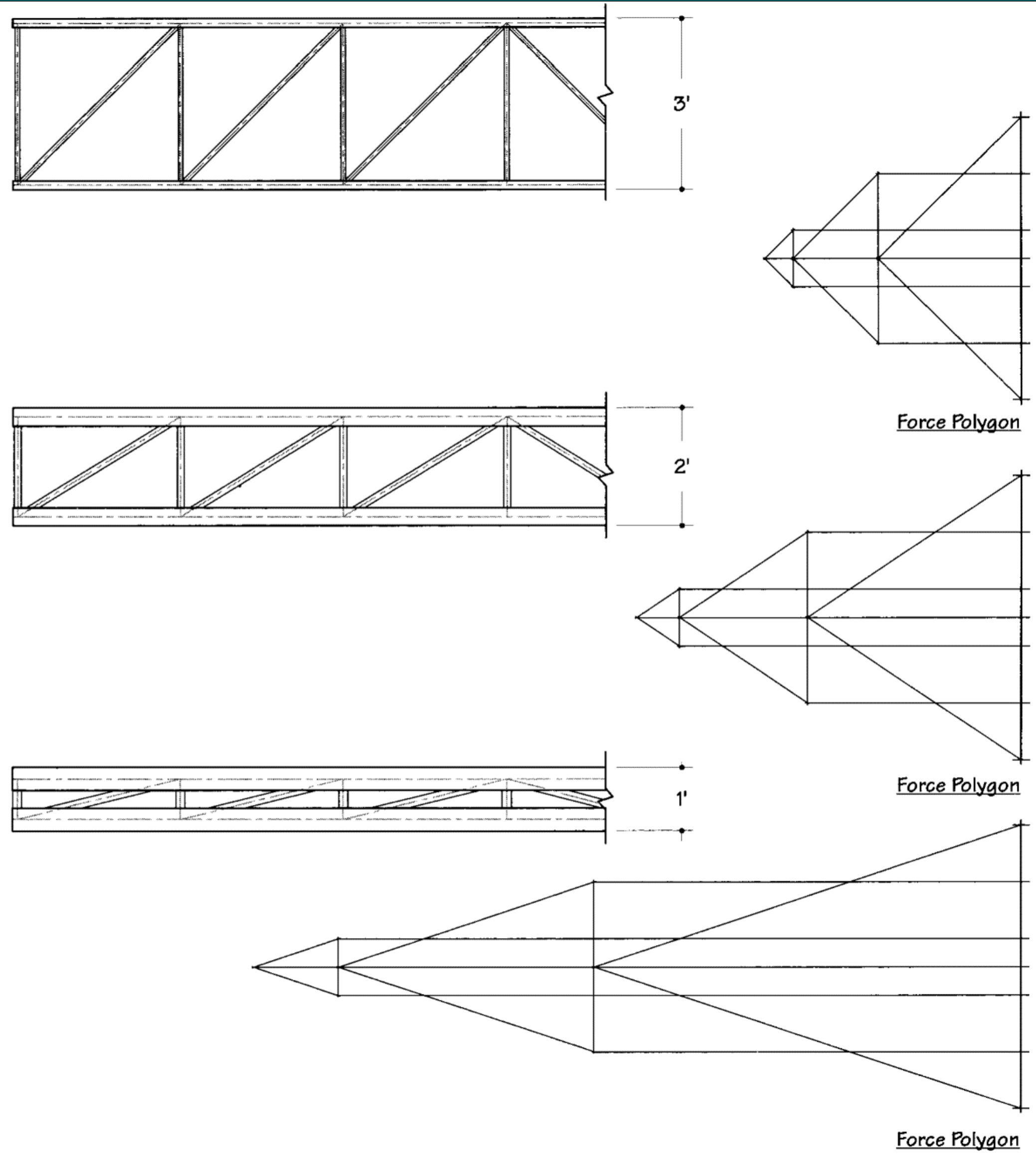
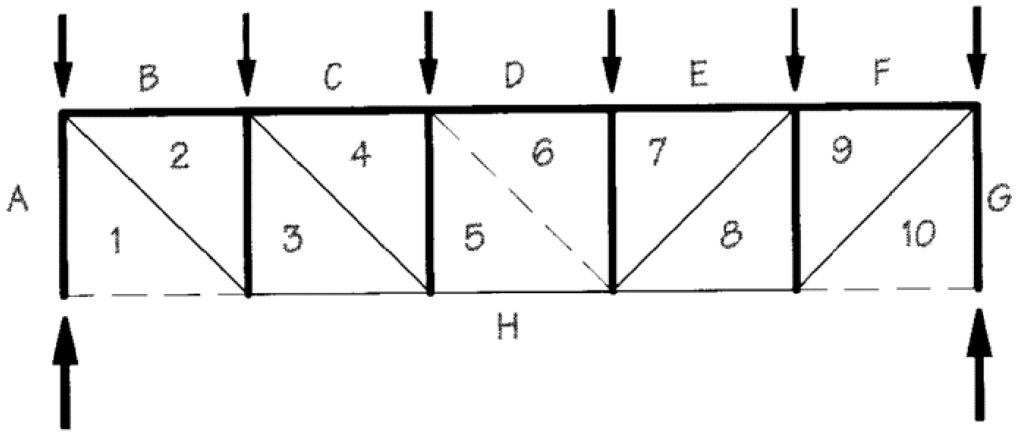
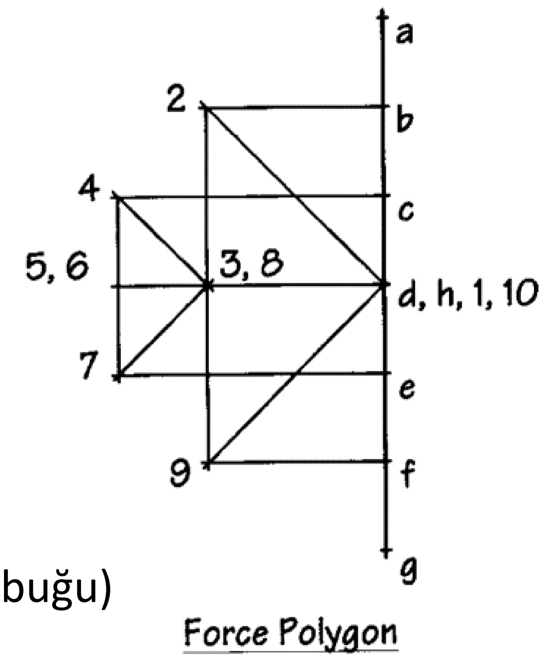


Figure 6.35 Reducing the depth of a truss increases member forces; the relative magnitudes of the trusses may be read at a glanc from their force polygons.

KAFES SİSTEMDE TEK SAYIDA GÖZ





Ortadaki gözde geçiş boşluğu oluşturulabilir (Sıfır Çubuğu)

Figure 6.36 A truss with an odd number of panels.

KAFES SİSTEMLERDE OLUŞAN ÇUBUK KUVVETLERİ

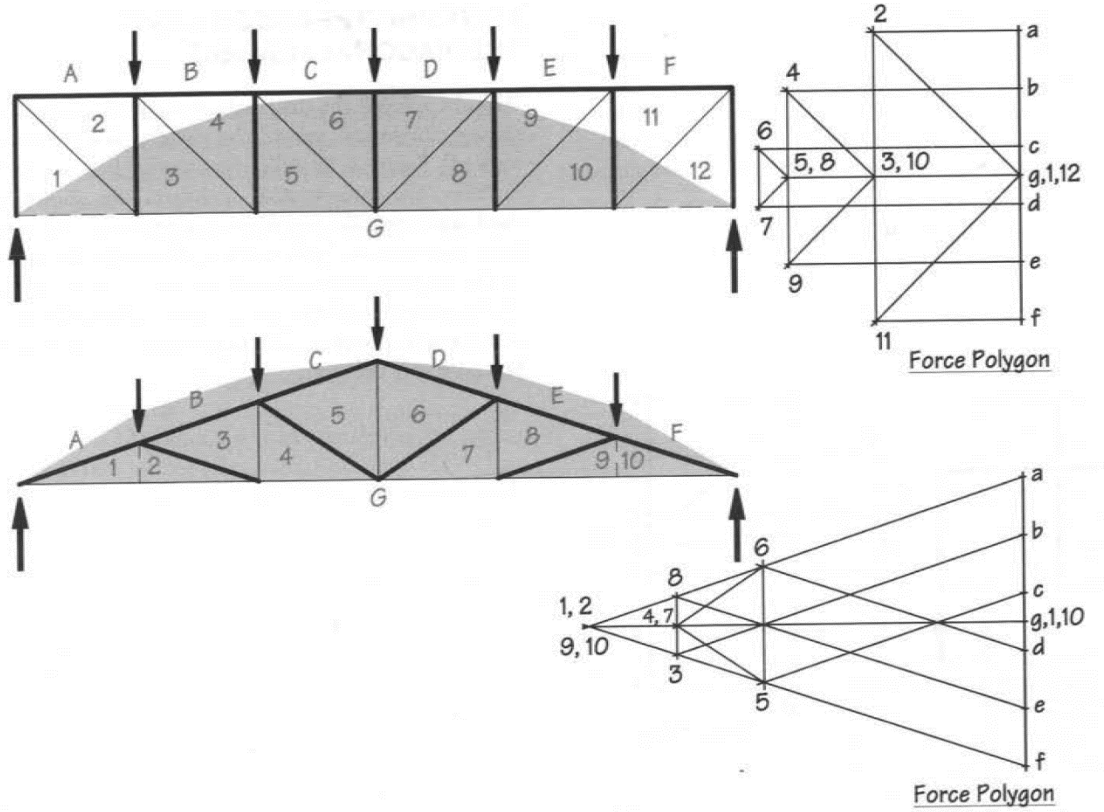
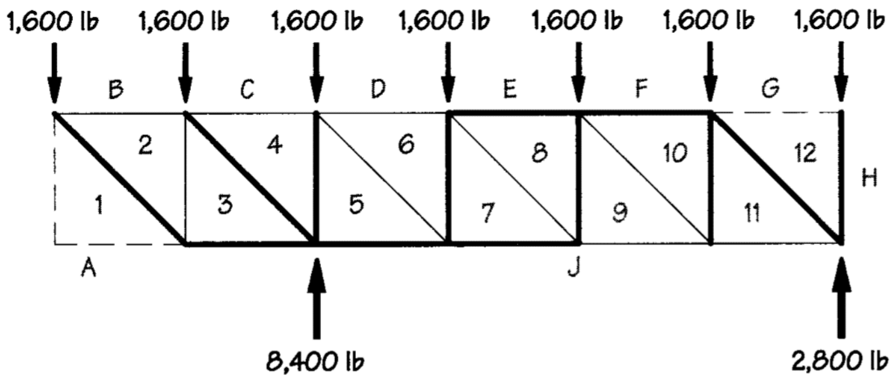
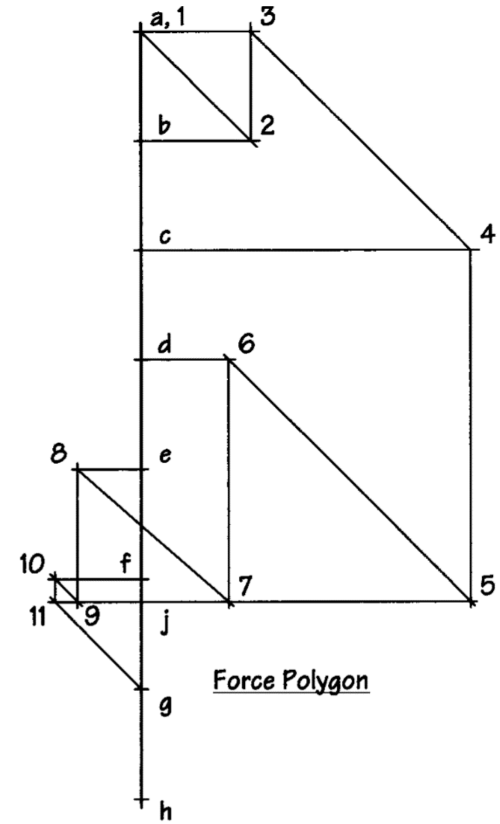


Figure 6.34 Comparing the actions and magnitudes of forces in flat and triangular trusses. The shaded area is a funicular shape for this loading. The direction of the web forces depends on whether the truss shape goes outside this area or not.

KAFES SİSTEMLERDE OLUŞAN ÇUBUK KUVVETLERİ

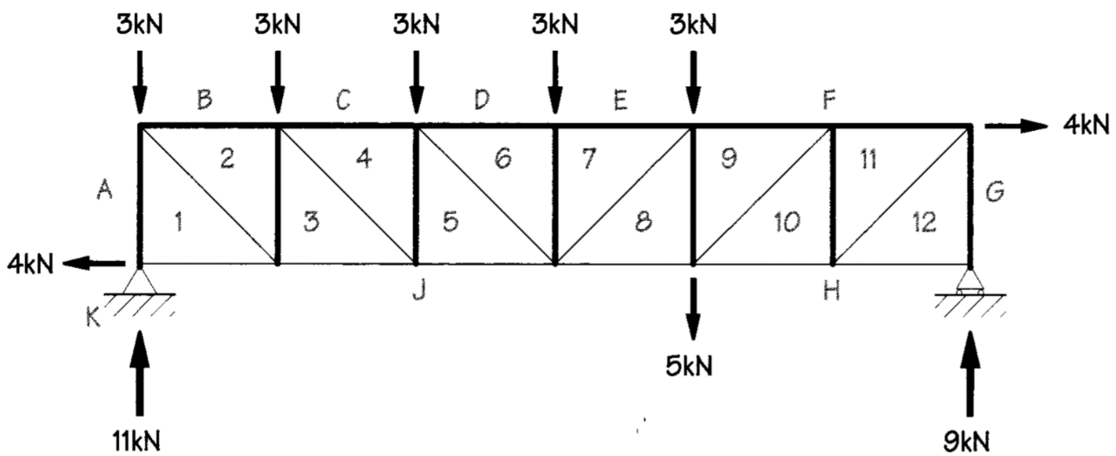




Çıkmalı Kafes Kirişte Çekme ve Basınç Kuvvetleri

Figure 6.40 An example of an overhanging truss. We show compressive members in thick lines and tensile members in thin lines.

KAFES SİSTEMLERDE OLUŞAN ÇUBUK KUVVETLERİ



Asimetrik Yükleme Durumunda Cremona Planı Şekli

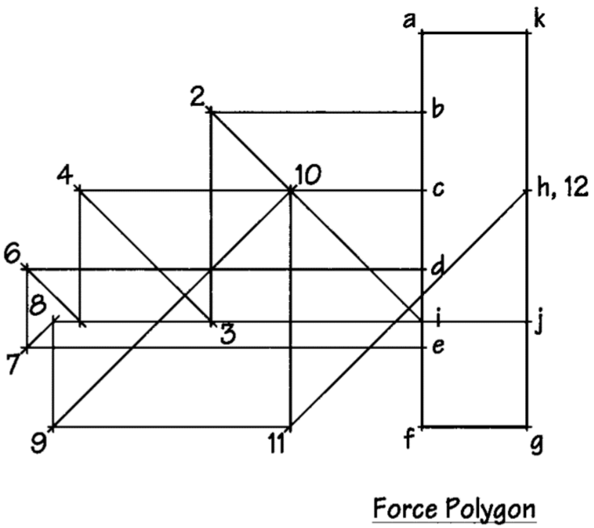


Figure 6.37 A truss with asymmetrical loading.