

ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ – ΤΜΗΜΑ ΑΡΧΙΤΕΚΤΟΝΩΝ ΜΗΧΑΝΙΚΩΝ
ΜΑΘΗΜΑ: ΟΙΚΟΔΟΜΙΚΗ ΤΕΧΝΟΛΟΓΙΑ 3

ΤΕΛΙΚΗ ΑΣΚΗΣΗ ΕΞΑΜΗΝΟΥ
ΜΕΛΕΤΗ ΠΕΖΟΓΕΦΥΡΑΣ



Π. Κουφόπουλος, καθηγητής

Formosa, Portugal, Ρωμαϊκή εξάτοξη γέφυρα

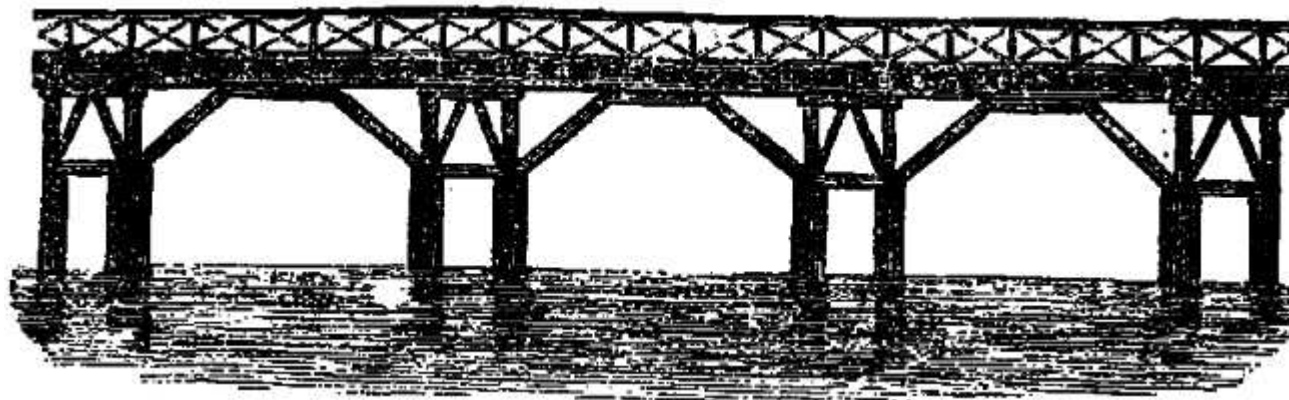




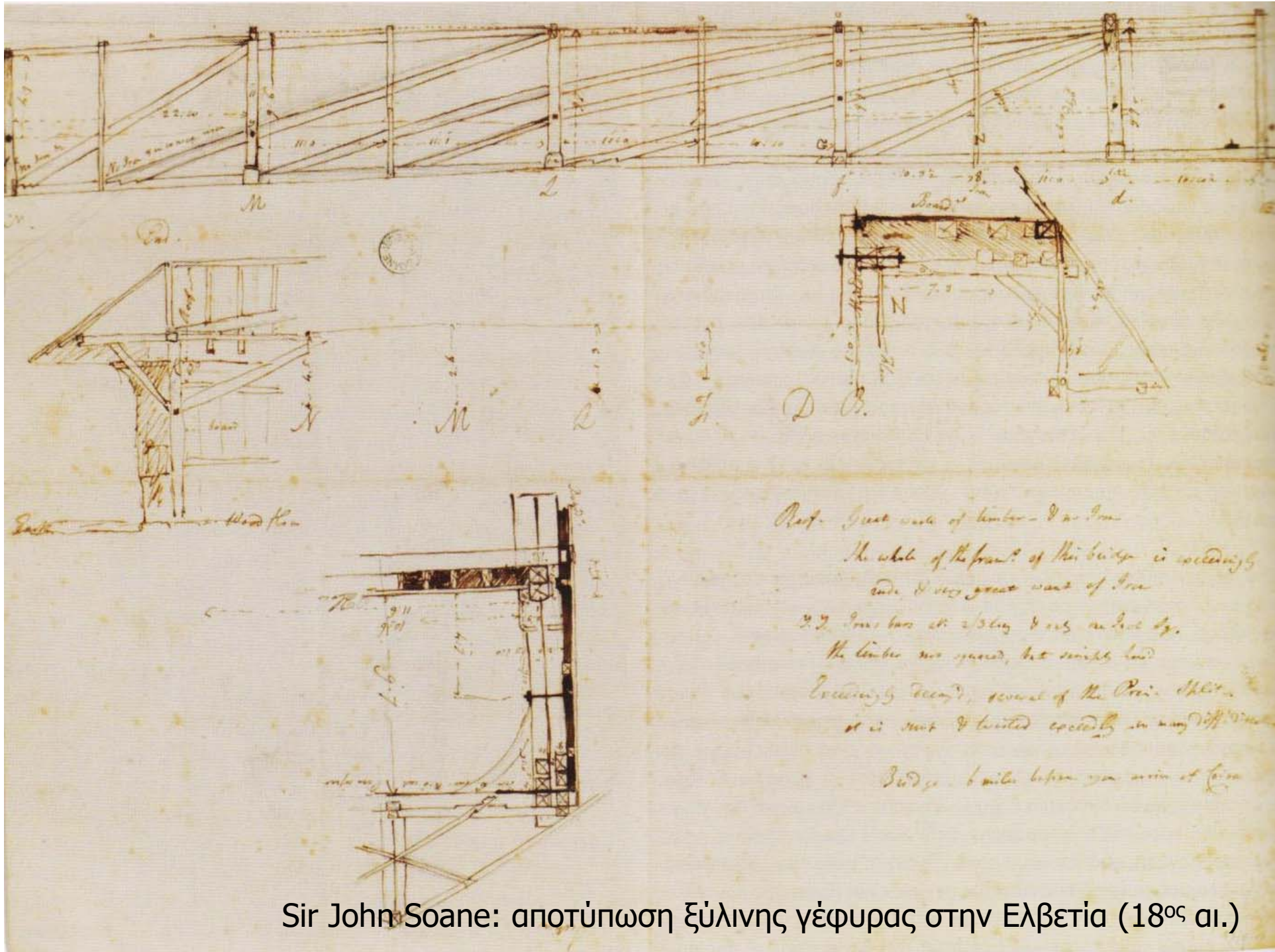
Ρωμαϊκή γέφυρα του Απολλοδώρου (ή του Τραιανού) στον Δούναβη, Σερβία



Κοβλεντ Γερμανία: αναπαράσταση της γέφυρας του Καίσαρα στον Ρήνο



Ρώμη, Τίβερης: παράσταση της γέφυρας Sublicius



Sir John Soane: αποτύπωση ξύλινης γέφυρας στην Ελβετία (18^{ος} αι.)

ΑΠΛΕΣ ΑΜΦΙΕΡΕΙΣΤΕΣ ΔΟΚΟΙ



Ένα μικρό άνοιγμα μπορεί να γεφυρωθεί
με απλές αμφιέριστες δοκούς (3 έως 50 μέτρα)

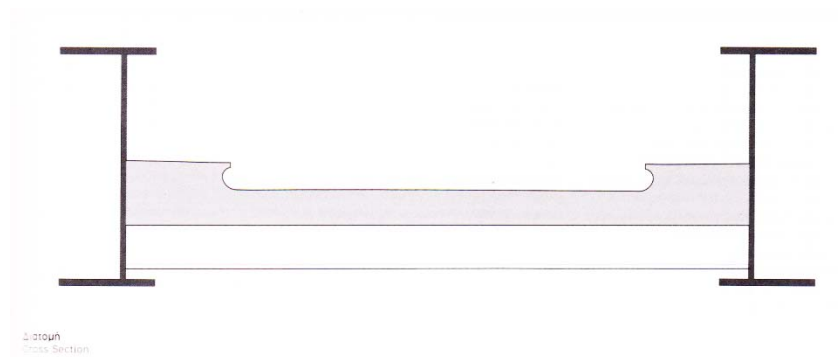
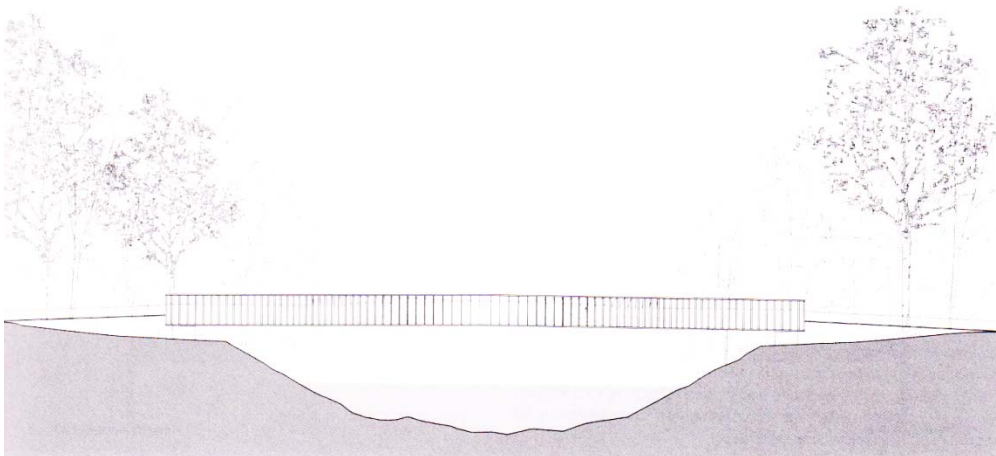




Derbyshire Peak Park, Matlock, UK: Γέφυρα στον ποταμό Derwent

Αρχιτέκτονες : Knight Architects (Μελέτη 2006)

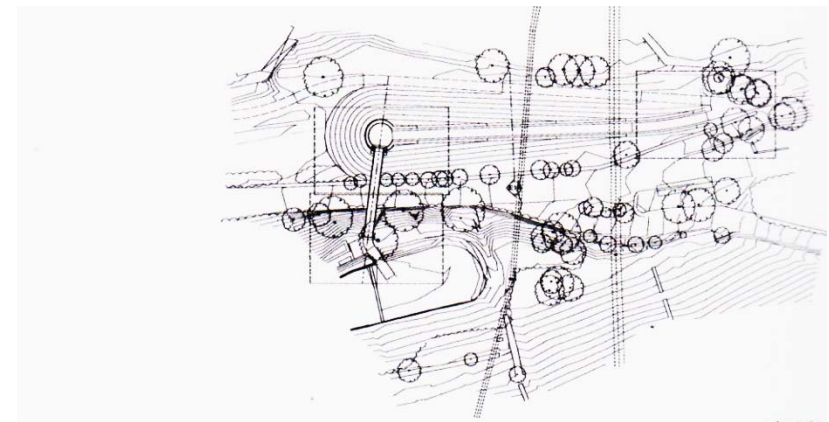
Στατικά: Grontmij (Μέγιστο άνοιγμα 44μ.)



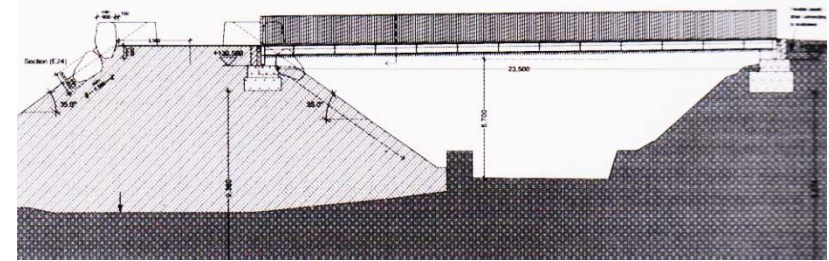


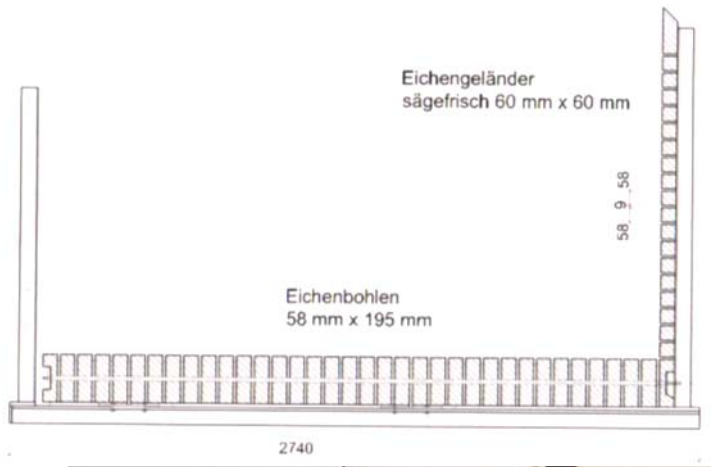


HIGHLY COMMENDED
BRIDGE, ST AUSTELL, CORNWALL, UK
ARCHITECT
DAVID SHEPPARD ARCHITECTS



site plan

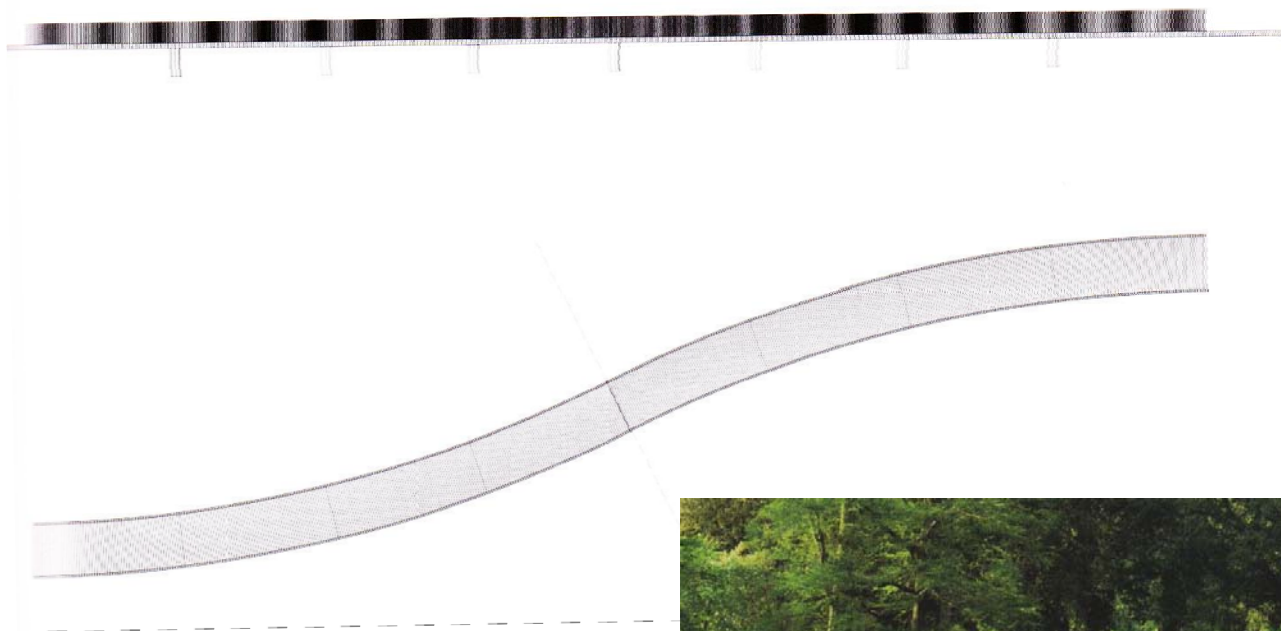


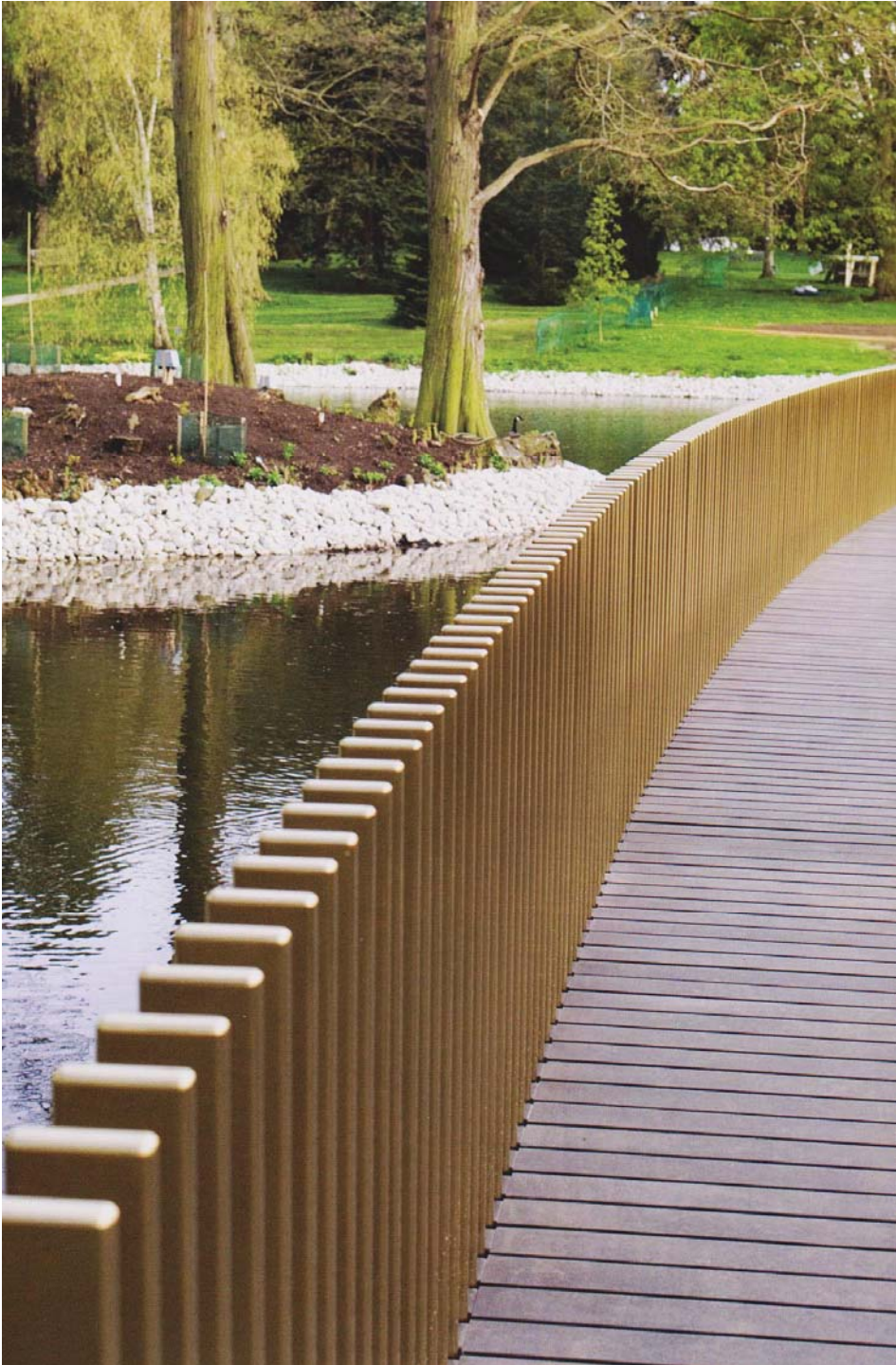


Λονδίνο: Διάβαση Sackler στους Βασιλικούς Βοτανικούς κήπους του Kew

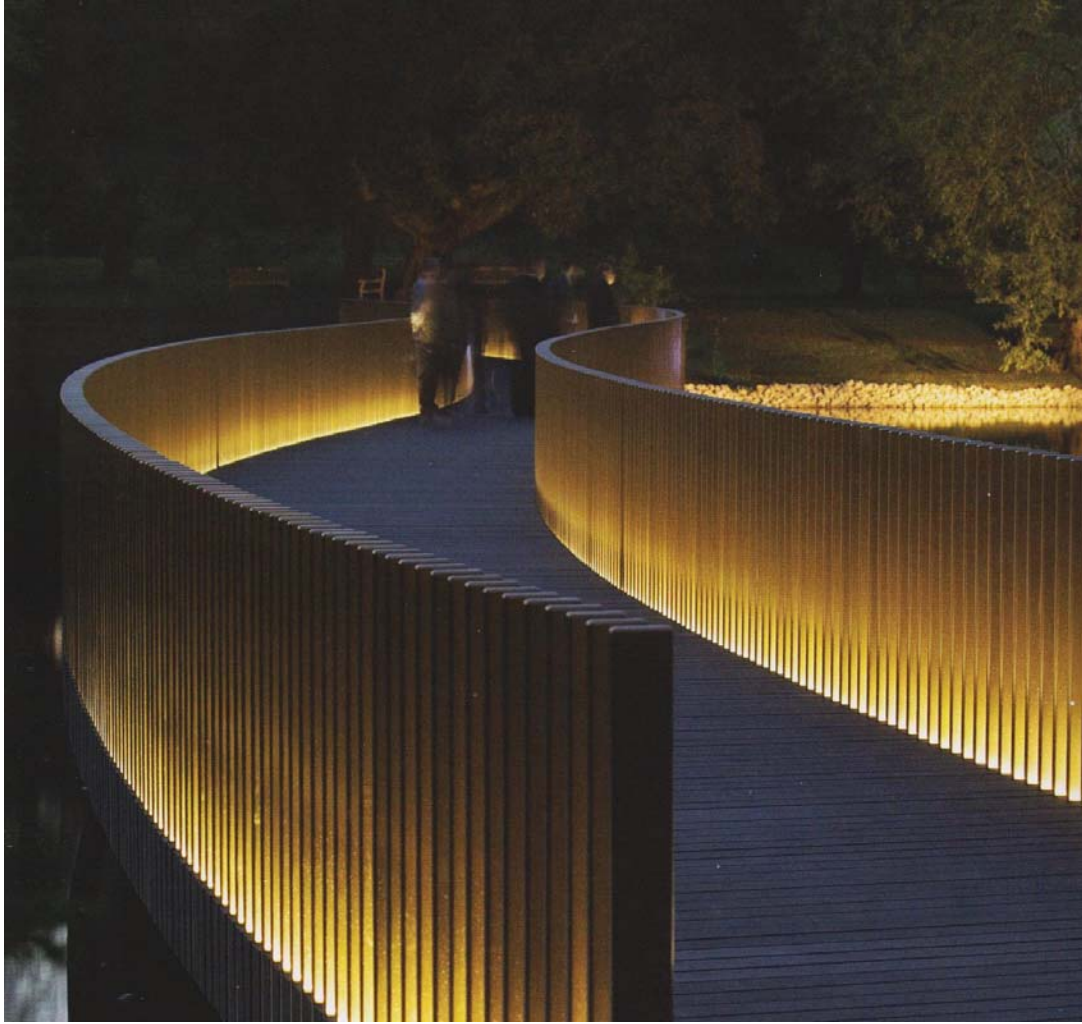
Αρχιτέκτονας : John Pawson (Κατασκευή 2006)

Στατικά: Buro Happold Ltd





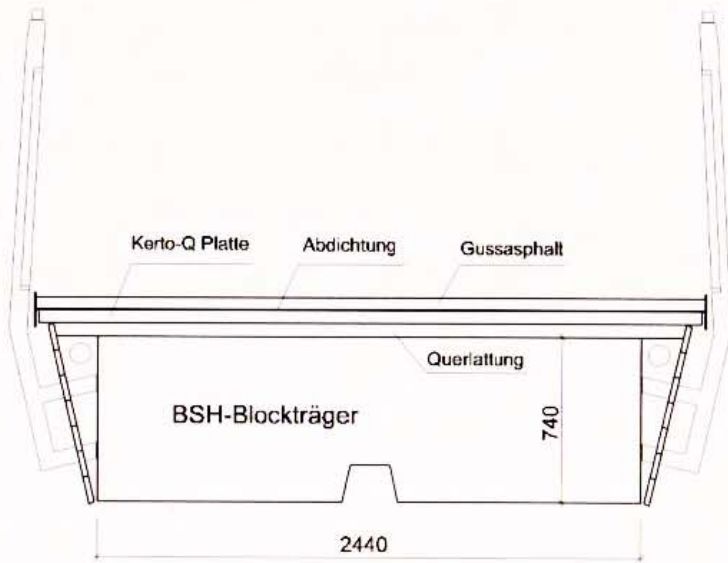


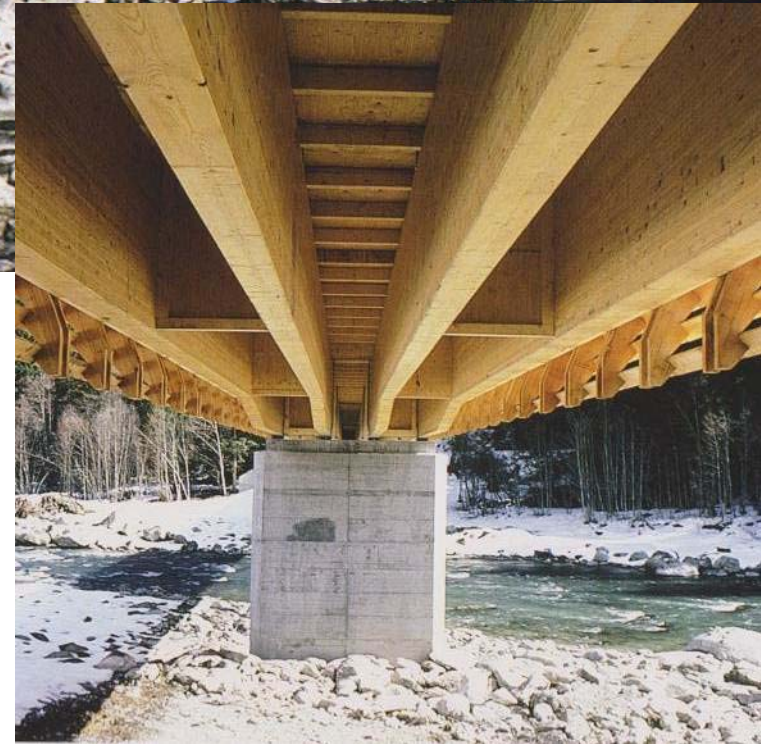




Planta baja: patio al nivel del acceso y lonja

Rehabilitación del Ayuntamiento de Morella (Castellón)



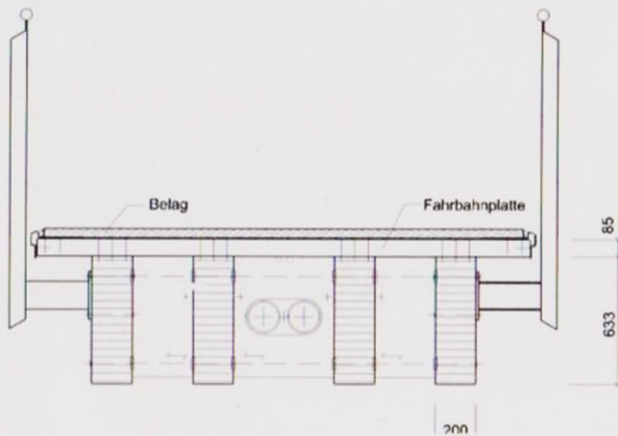


Ο φορέας μπορεί να είναι μια συστοιχία από παράλληλες δοκούς.

The tee-beam cross-sectional form of the Städtli Bridge, built in 1999 over the Reuss River in Mellingen (Aargau Canton), puts this structure in the category of deck bridges. The plywood carriageway slab fulfils diverse functions: in terms of statics, it is part of the slab-and-beam

structure; it also serves as both a horizontal slab and as a roof with a sealing layer. Furthermore, having some overhang on each side, it protects the main beam against the direct effects of weather. The beams are also impregnated on all sides and have been given two coats of

thick pigmented glazing. As the parapet supports beneath the slab are directly attached to the longitudinal beam, it was possible to seal the slab without leaving any perforations that might be susceptible to damage.



ΤΟΞΩΤΕΣ – ΚΑΜΠΥΛΕΣ ΔΟΚΟΙ





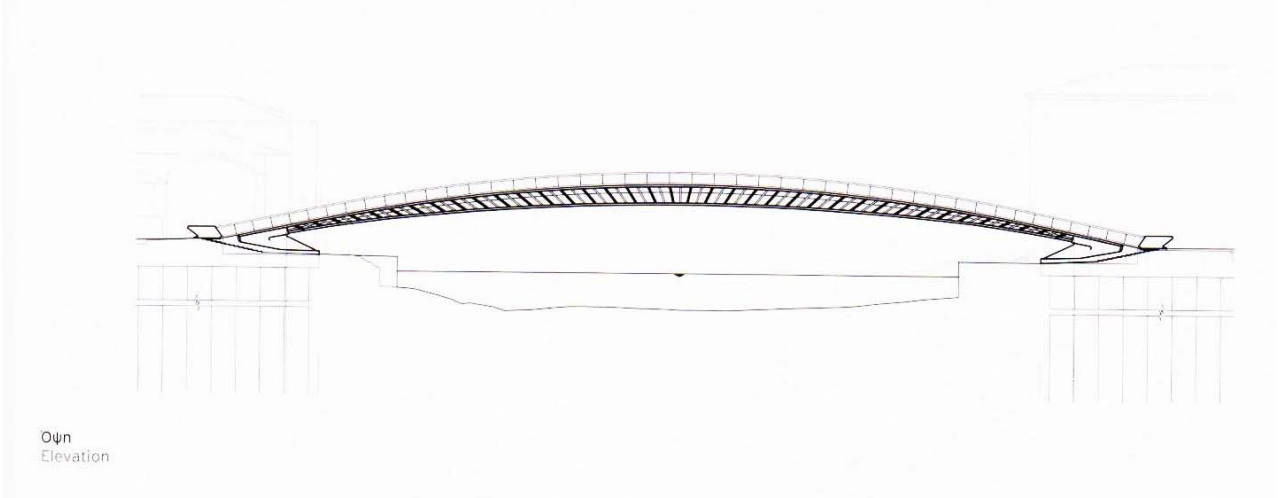


Βενετία – Η τέταρτη γέφυρα στο Canal Grande

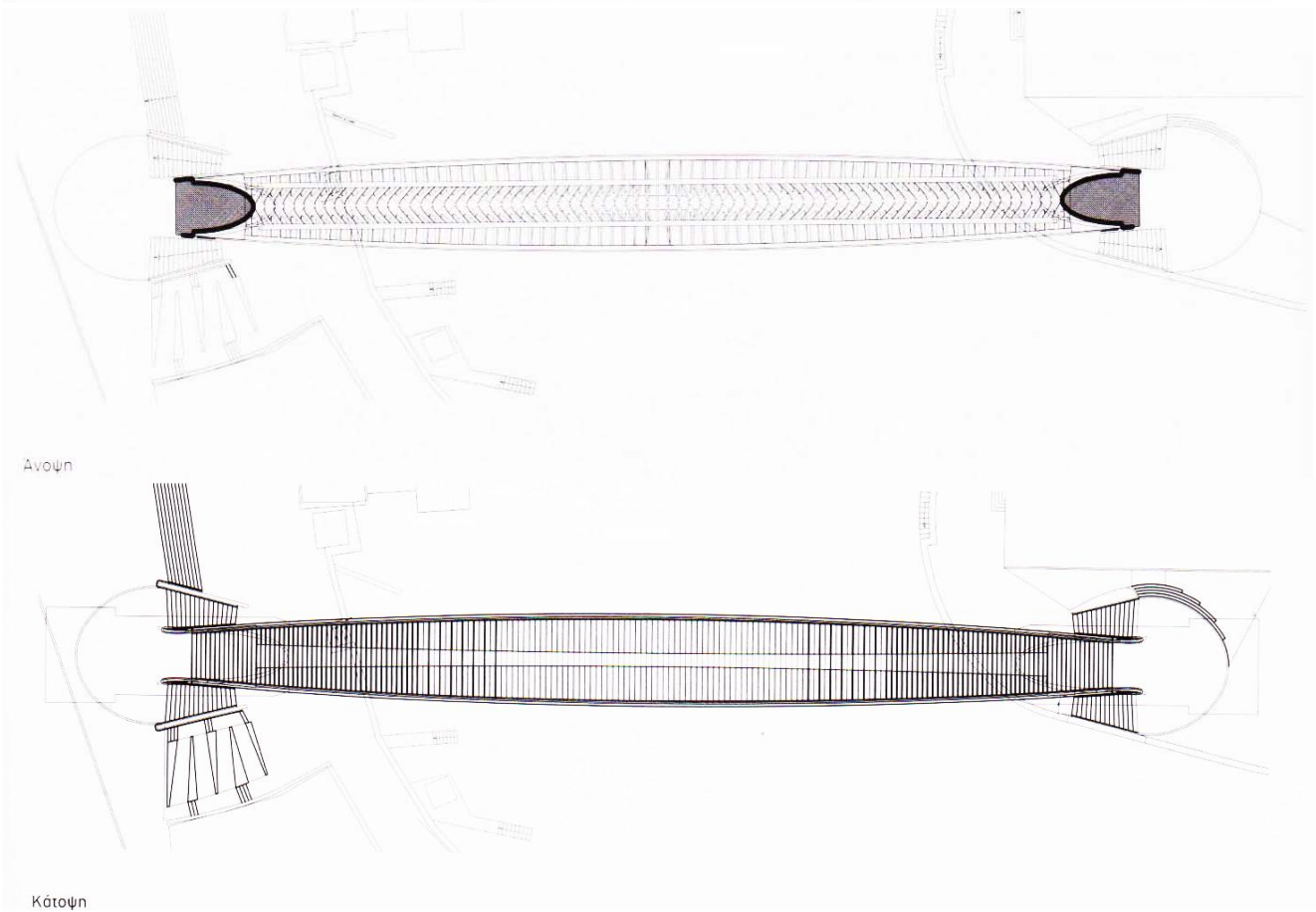
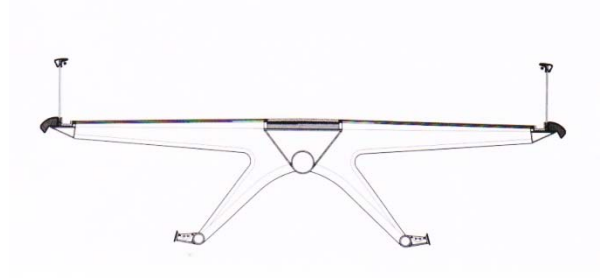
Αρχιτέκτων: Santiago Calatrava (Μελέτη 1999, Κατασκευή 2008)

Στατικά: Santiago Calatrava



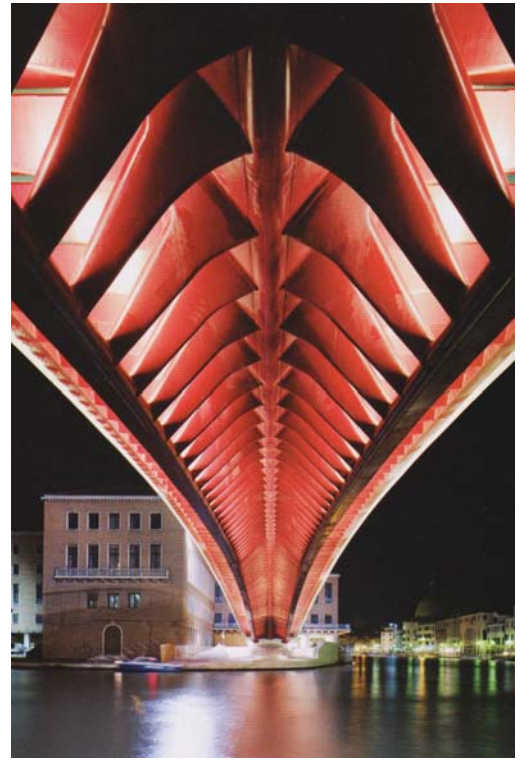


Όψη
Elevation



Άνοψη

Κότοψη









Can Gili Footbridge, Barcelona Spain
Designed by Alfa Polaris





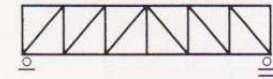
ΔΙΚΤΥΩΜΑΤΑ



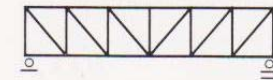
Ένα μεγαλύτερο άνοιγμα μπορεί να γεφρωθεί με δικτυώματα (8 έως 75 μέτρα)



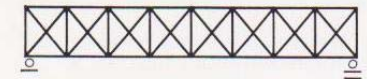
Πεζογέφυρα στη Μονή Ιβήρων Αγ. Όρους



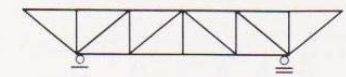
with posts plus diagonals in compression (Howe girder)



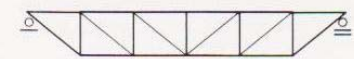
with posts plus diagonals in tension (Pratt girder)



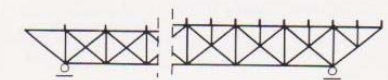
with posts and X-bracing



with cantilevers



upside-down



with intermediate posts for purlins



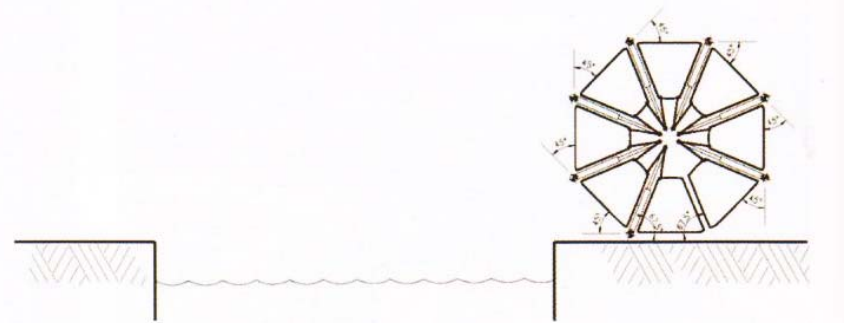
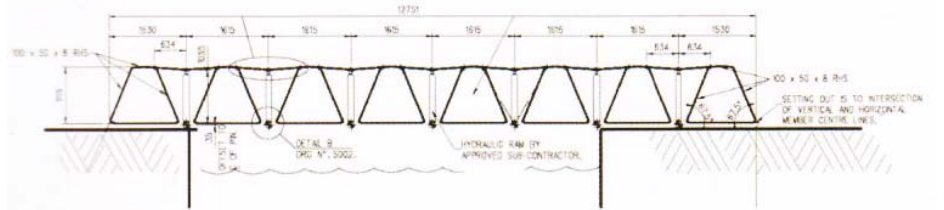


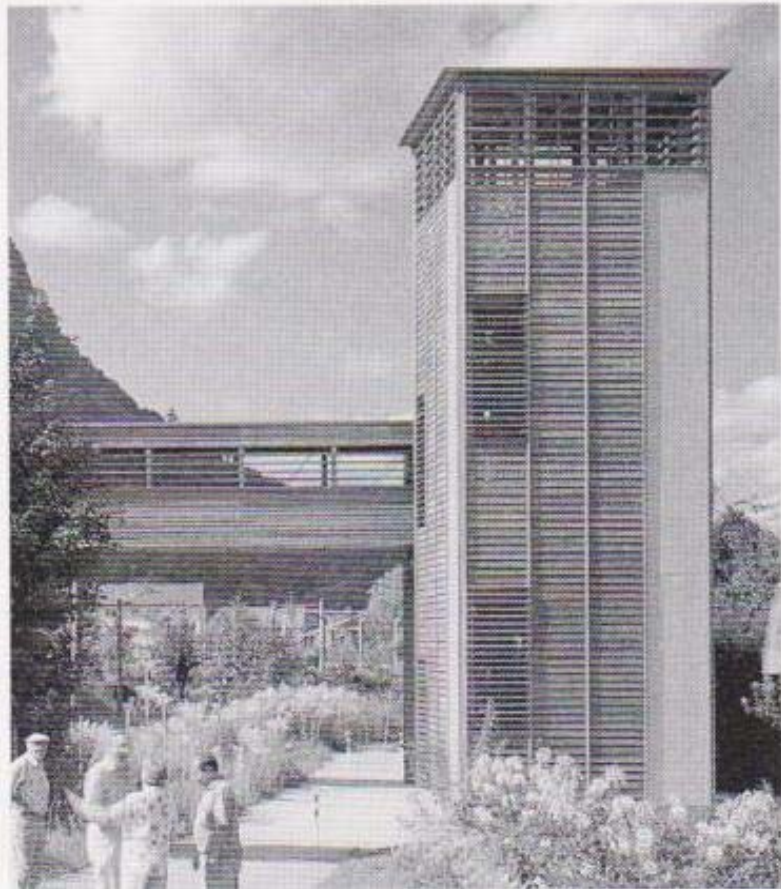
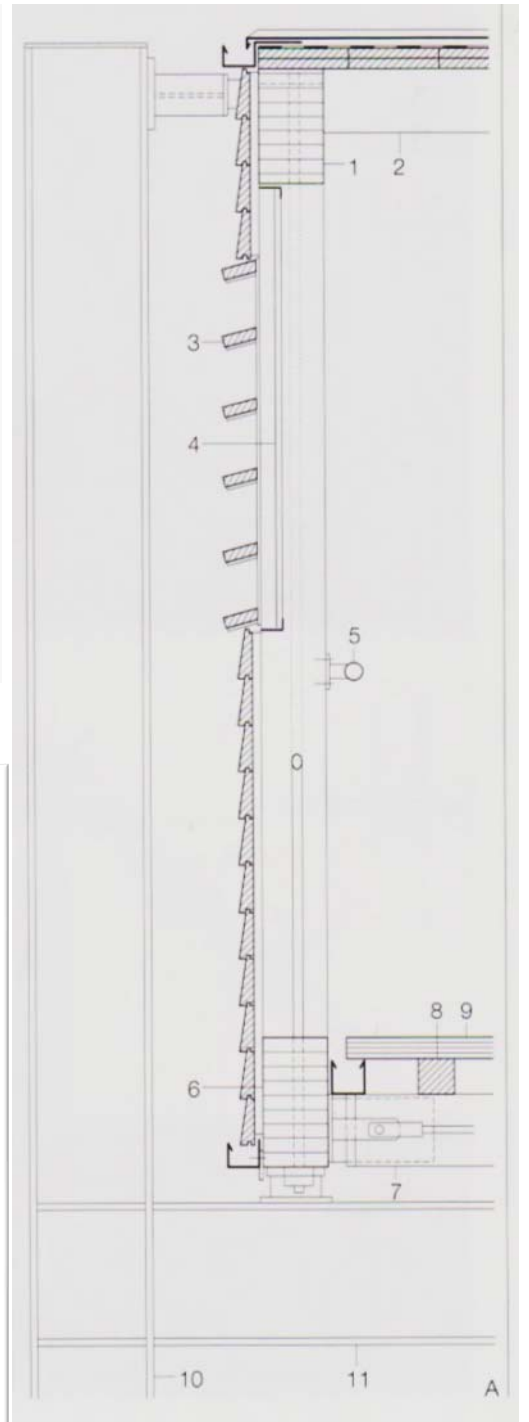
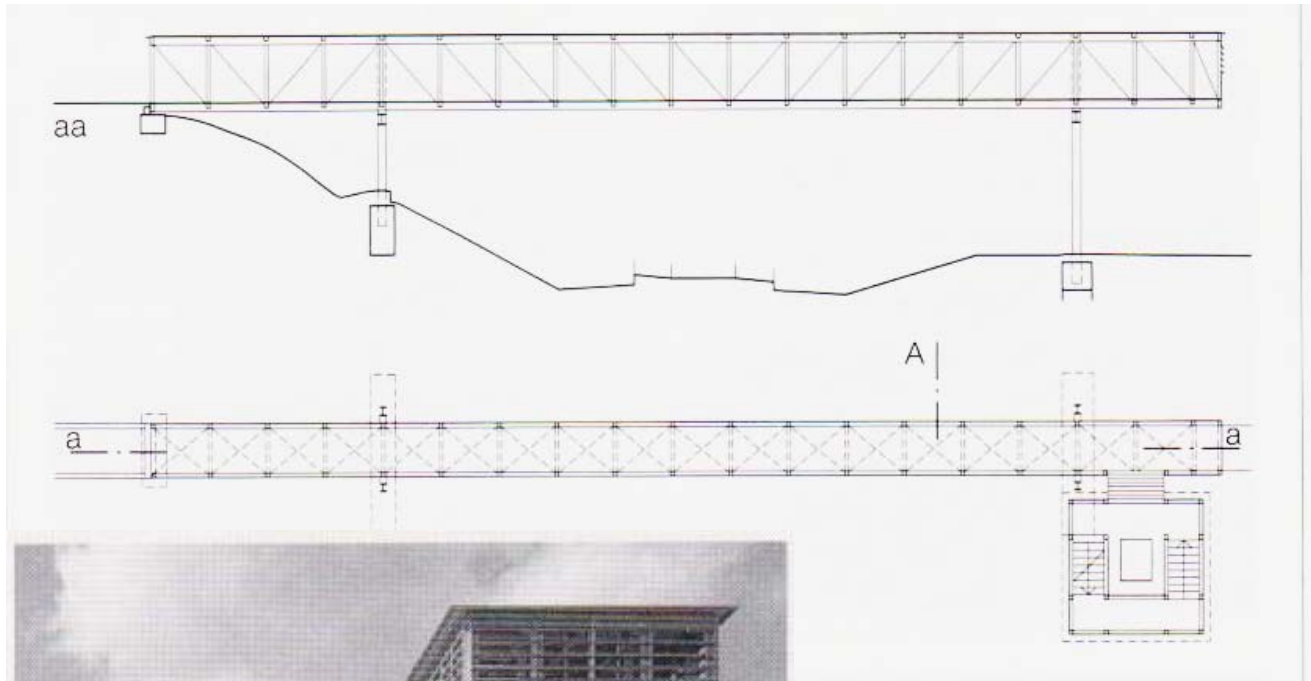
HIGHLY COMMENDED
ROLLING BRIDGE, PADDINGTON, LONDON
DESIGNER
THOMAS HEATHERWICK STUDIO





1.2.3
States of play: the bridge
is stable in any position,
as hydraulic rams push
and pull.

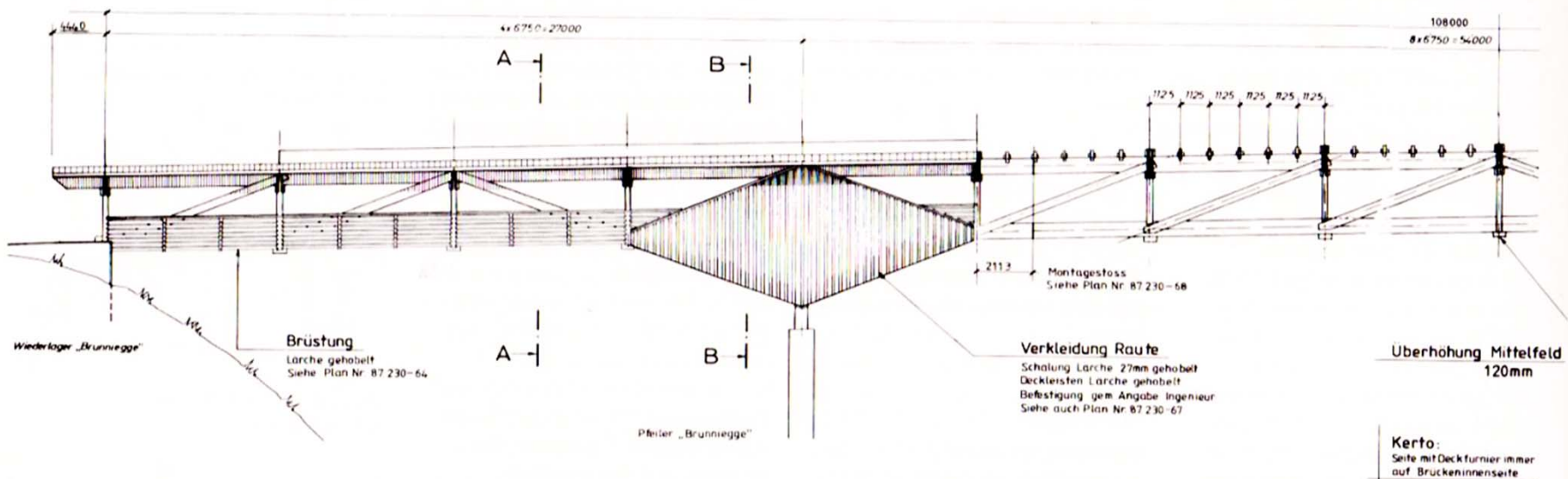




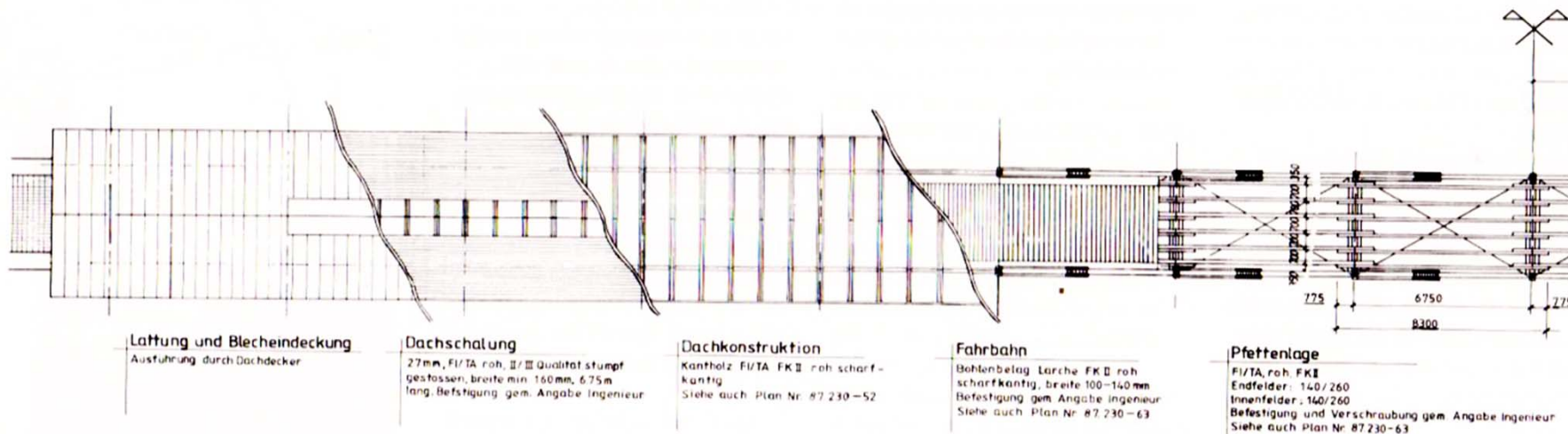


The bridge over the Sihl River in Sihlwald (Zurich Canton, constructed 1997) consists of two larch trusses bearing two spans of 15 and 33 meters respectively. Hinge-pin connections were used here. The curved pathway rising towards the middle of the bridge gives this structure its special character.





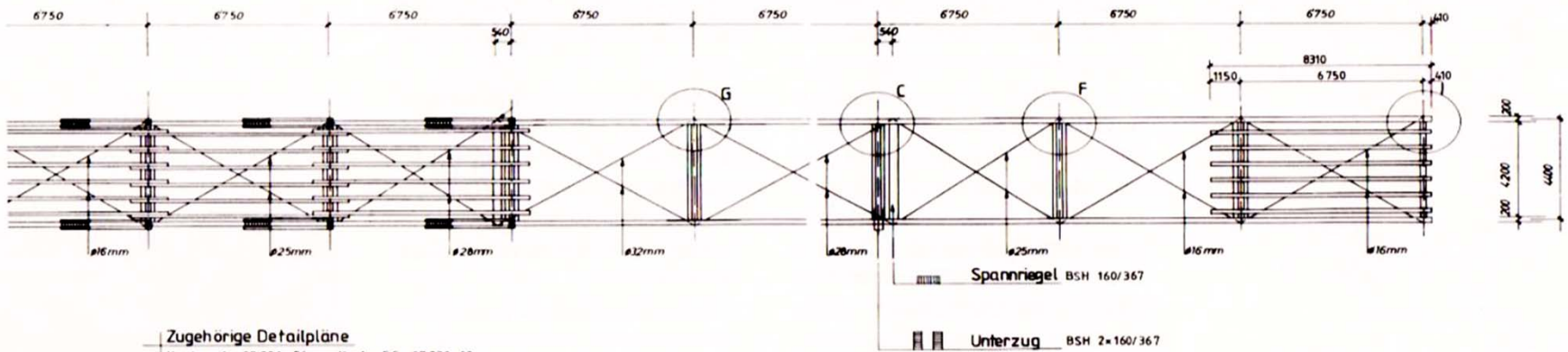
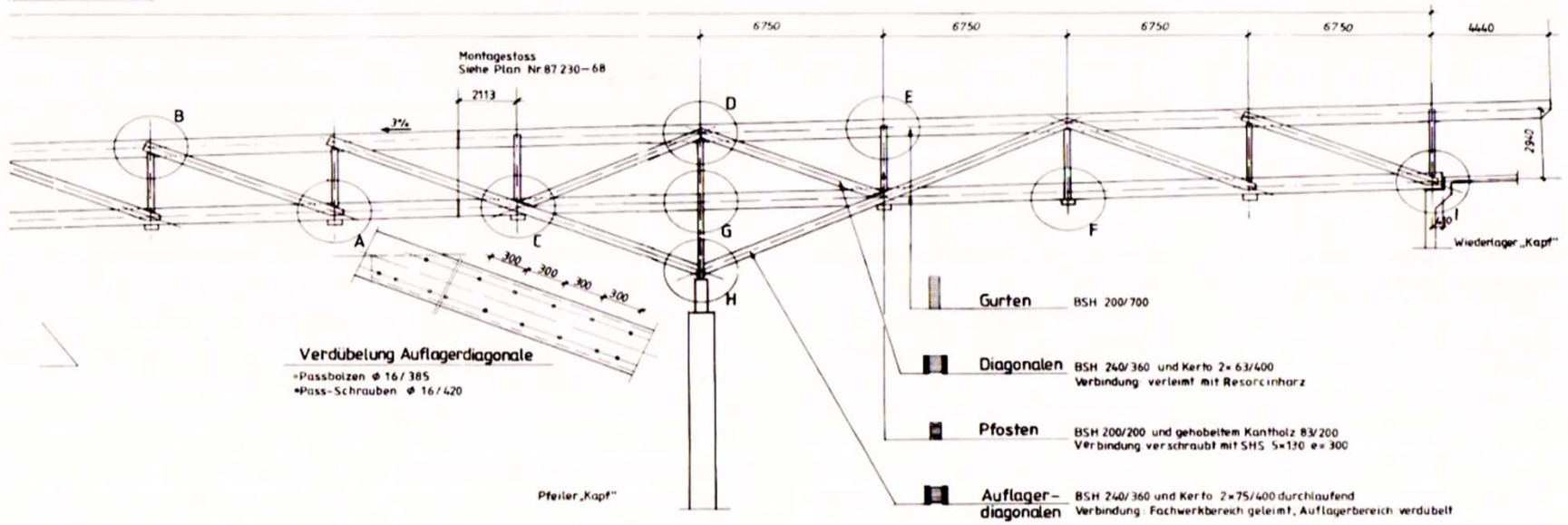
Draufsicht 1:100



Example of a structural drawing (extract, German original)

Δείγμα κατασκευαστικού σχεδίου

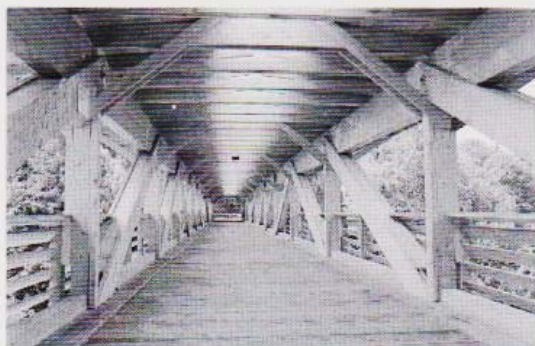
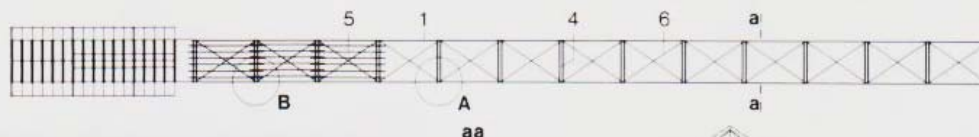
Ansicht 1:100



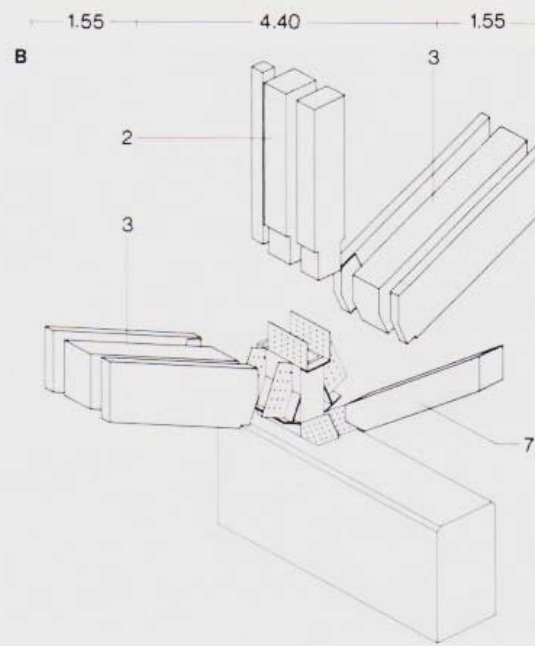
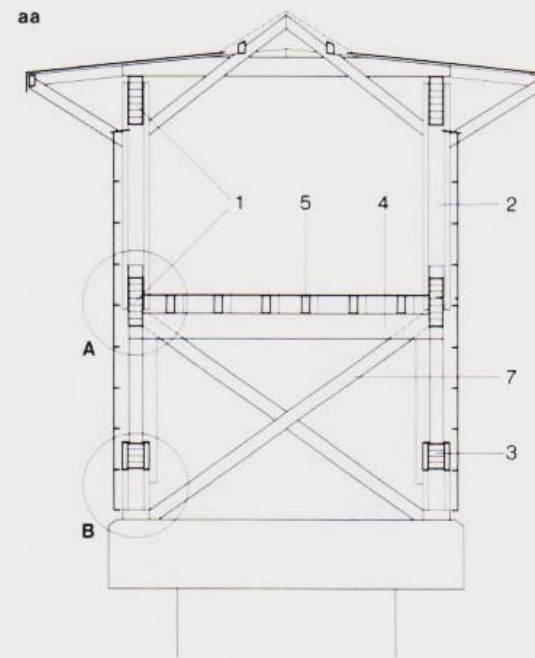
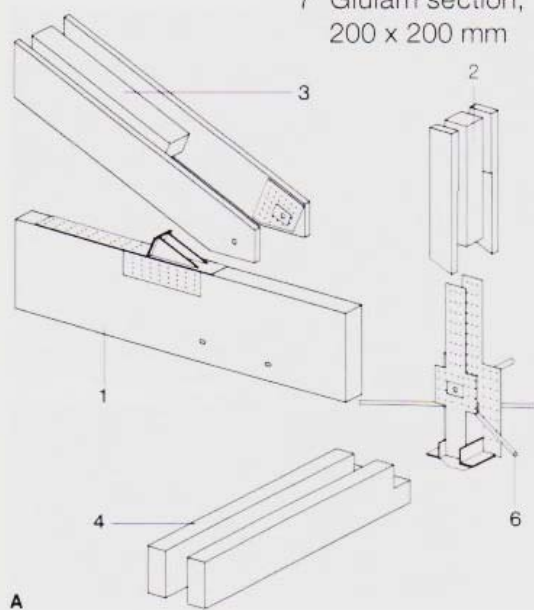
Zugehörige Detailplane

Knoten A 87.230-56	Knoten E,F 87.230-60
Knoten B 87.230-57	Knoten G 87.230-66
Knoten C 87.230-58	Knoten H 87.230-61
Knoten D 87.230-59	Knoten I 87.230-62

Δείγμα κατασκευαστικού σχεδίου



- | | |
|---|-------------------------------------|
| 1 Glulam section,
200 x 700 mm | 2 No. 75 x 400 mm
LVL sections |
| 2 200 x 200 mm glu-
lam section + 2
No. 80 x 200 soft-
wood sections | 4 Glulam section,
160 x 360 mm |
| 3 240 x 360 mm glu-
lam section + | 5 Spliced purlins,
120 x 260 mm |
| | 6 Round steel bar,
16-32 mm dia. |
| | 7 Glulam section,
200 x 200 mm |

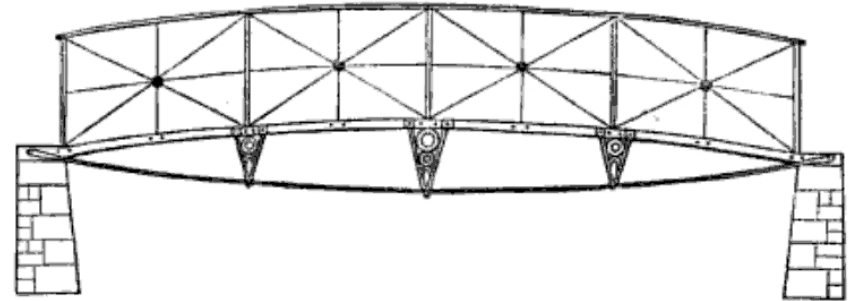


A

**ΔΟΚΟΙ ΕΝΙΣΧΥΜΕΝΟΙ
ΜΕ ΠΡΟΕΝΤΕΤΑΜΕΝΟΥΣ
ΕΛΚΥΣΤΗΡΕΣ**

Scottish Bridge: 41. Maryhill
House Footbridge, Elgin

STRONG WROUGHT-IRON TENSION BRIDGES,
For Foot Passengers, Carriages, &c.



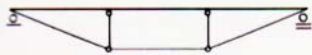








with one post



with two posts and beam in bending under asymmetric loading



with two posts and X-bracing

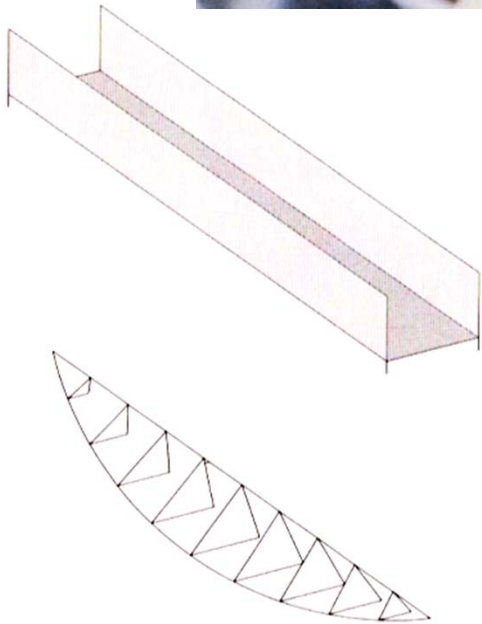


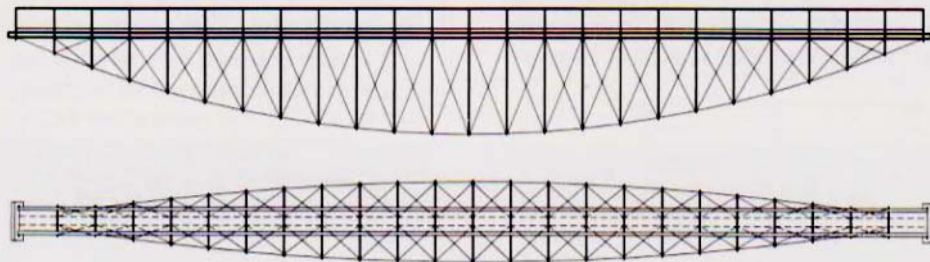
as fish-belly beam unsuitable for asymmetric loads



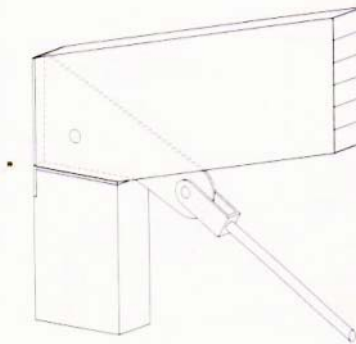
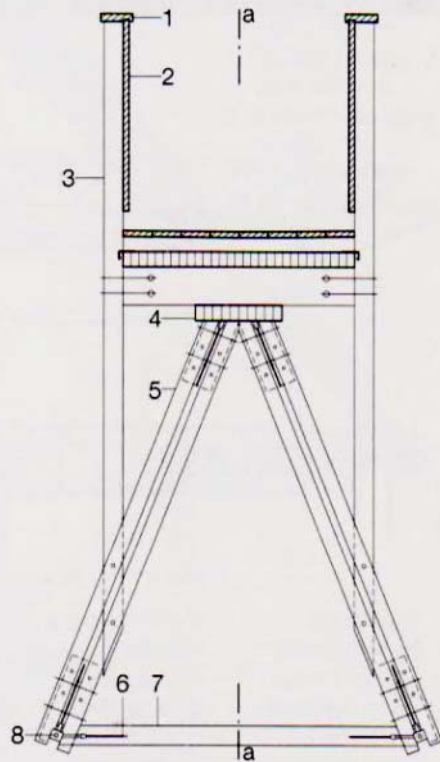
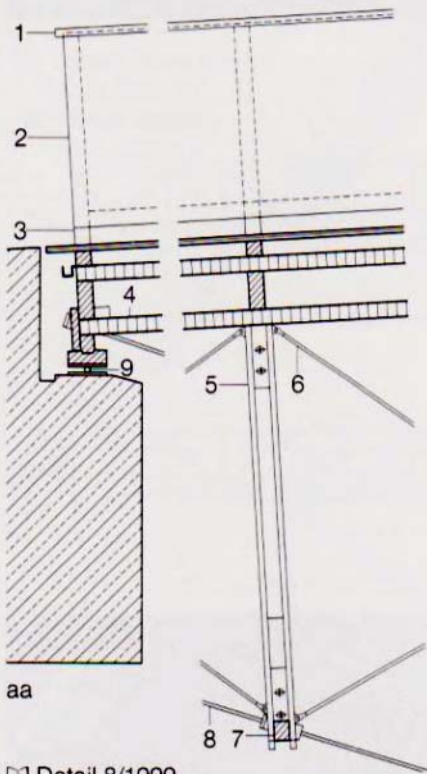
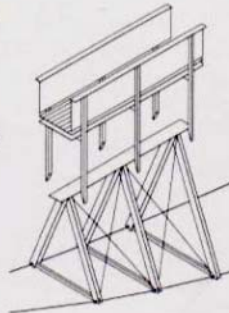


Σύνθετες κατασκευές, φορέας από καλωδιωτό
χωροδικτύωμα

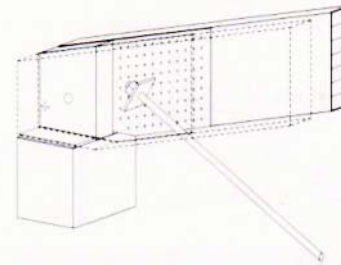




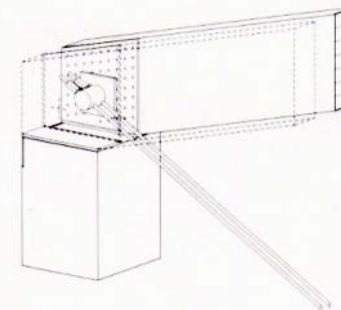
- | | |
|---|---|
| 1 Handrail, planed larch, 40 x 160 mm | 5 Diagonal strut, rough-sawn larch, 4 No. 30 x 80 mm |
| 2 Spandrel beam, rigid 3-ply core plywood, 26 mm Douglas fir | 6 Wind girder, galvanised round steel bar, 8 mm dia. |
| 3 Spandrel beam posts, rough-sawn larch, 80 x 100 mm | 7 Transverse member linking bottom chords, larch, 80 x 100 mm |
| 4 Straining plate, 120 x 445 mm glulam larch section with weatherproof glue | 8 Bottom chord, stainless steel cable, 24 mm dia. |
| | 9 Rocker bearing with 30 mm dia. steel pins |



with steel angle let into slit and braced against end grain



by means of plate welded to nail plate



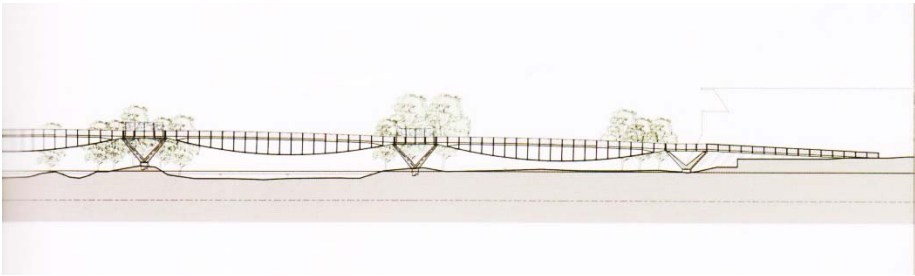
with hinge pin and reinforced nail plate

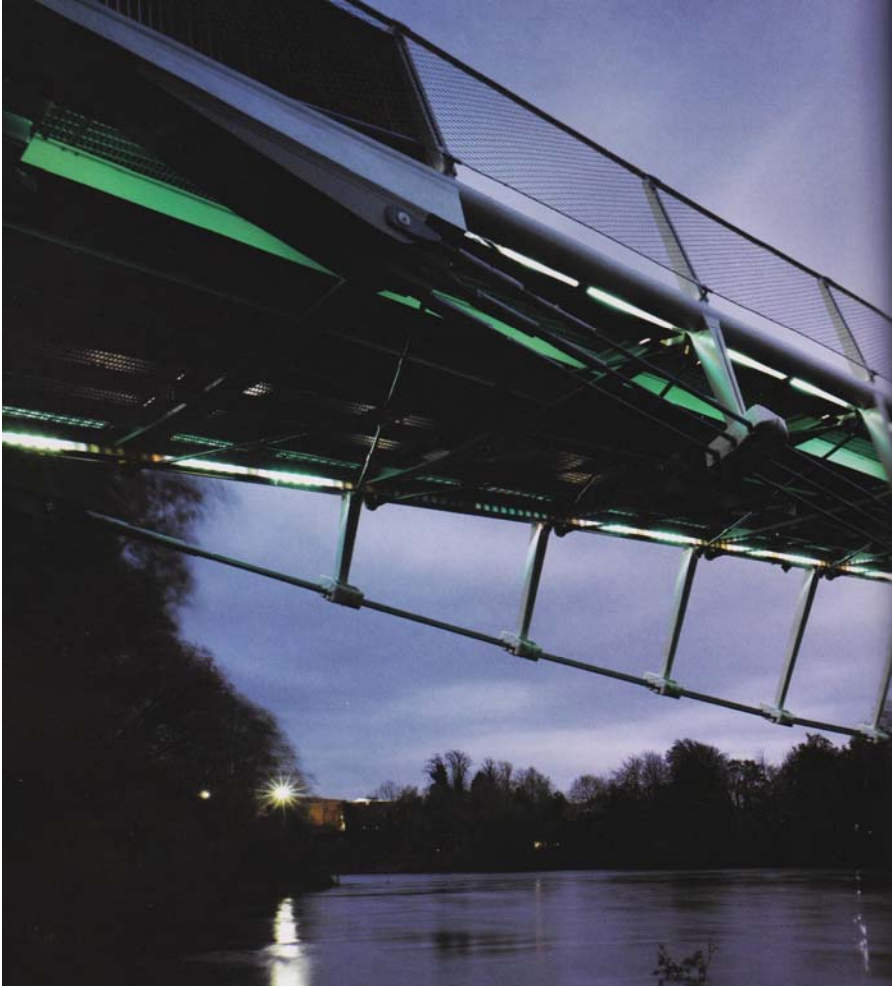
Limerick-Ιρλανδία: Γέφυρα στο Παν/μιο του Limerick – Living Bridge

Αρχιτέκτονες: Wilkinson Eyre Architects (Κατασκευή 2007)

Στατικά: Arup



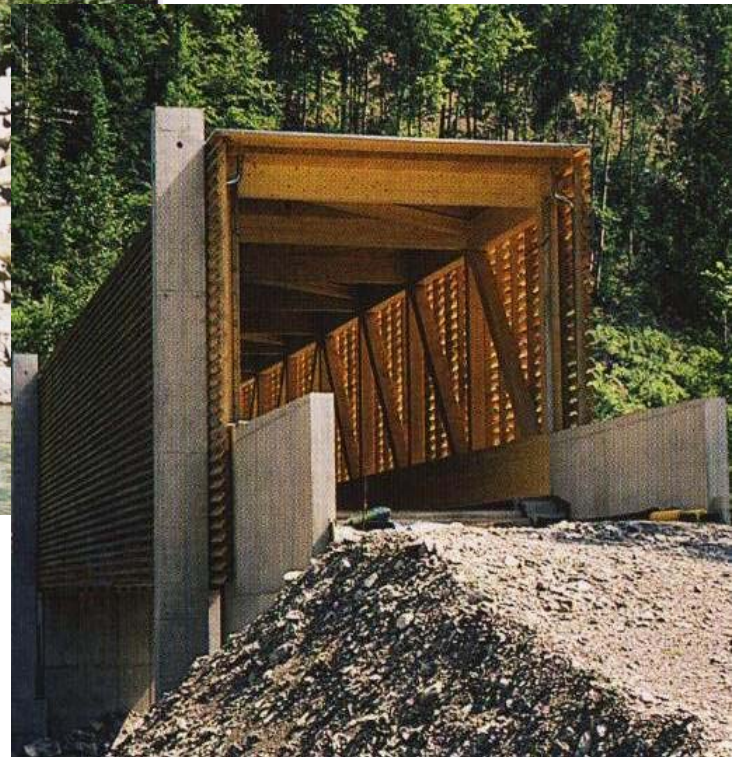


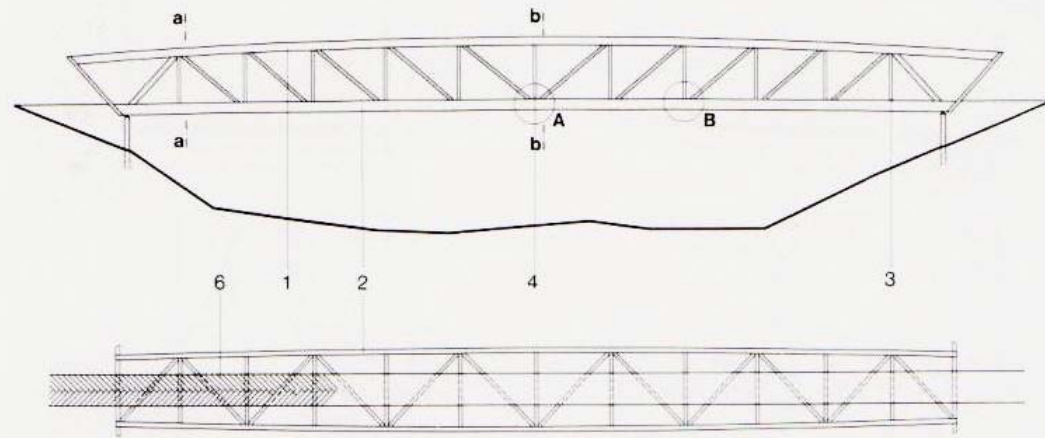


ΧΩΡΟΔΙΚΤΥΩΜΑΤΑ

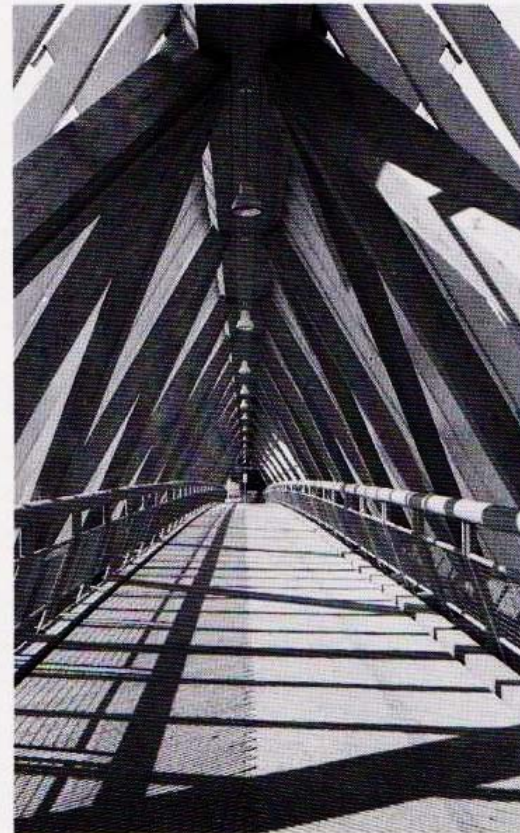
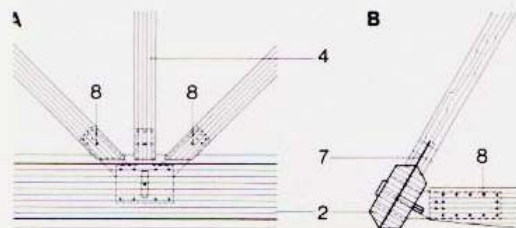
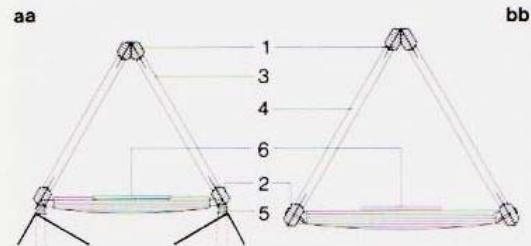


Ένα άνοιγμα μπορεί να γεφυρωθεί και με χωροδίκτυωμα (σαν μπούμα)





- | | |
|------------------------------|---|
| 1 Top chord | 6 Bridge deck |
| 2 Bottom chord | 7 Metal plate let into slits |
| 3 Glulam strut, 240 x 300 mm | 8 Steel dowel, 20 mm dia., and close tolerance bolt, 20 mm dia. |
| 4 Glulam strut, 300 x 300 mm | |
| 5 Roller bearing | |



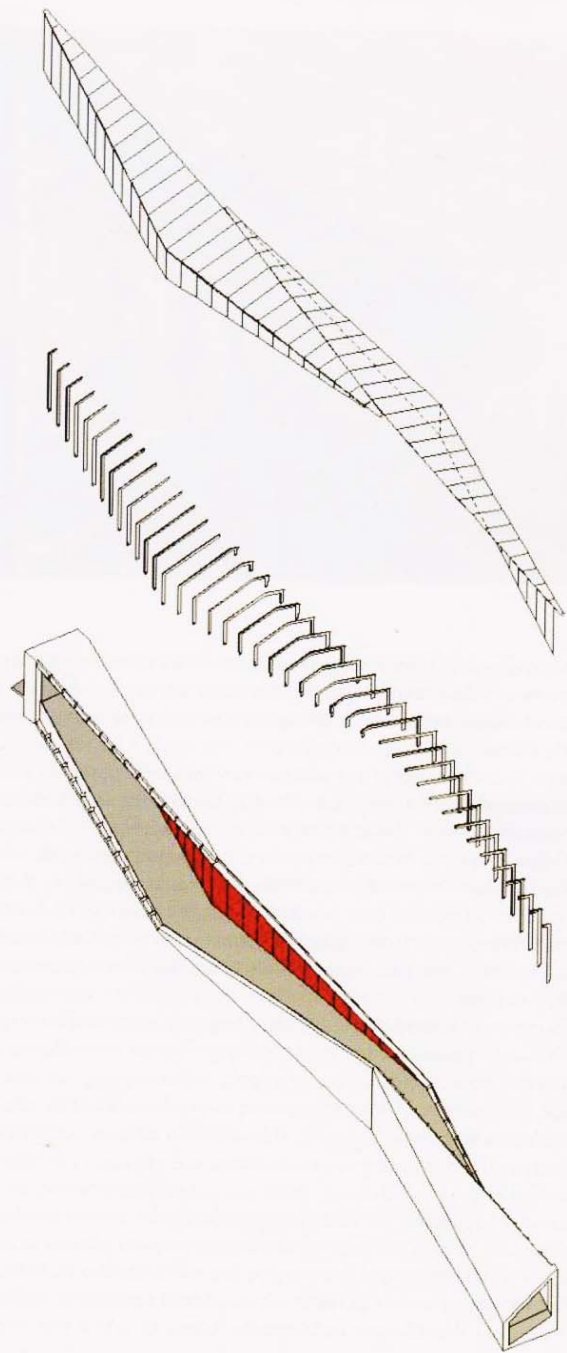
Liverpool, UK: Γέφυρα Paradise Street

Αρχιτέκτονες : Wilkinson Eyre Architects (Κατασκευή 2008)

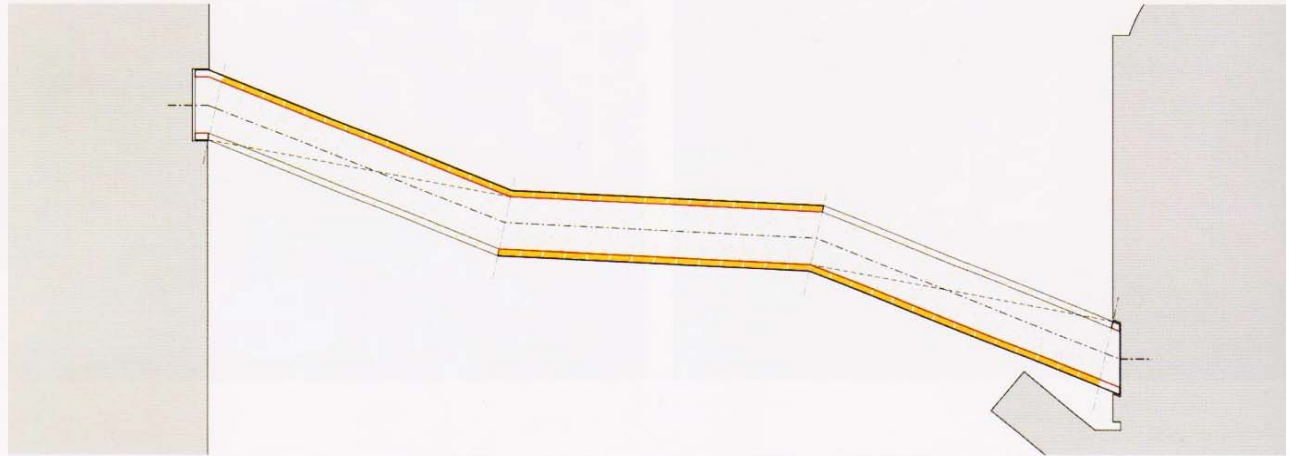
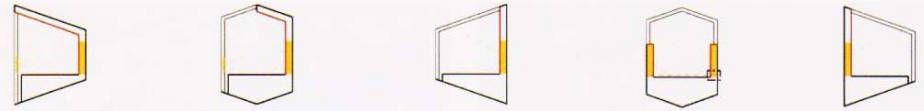
Στατικά: Arup



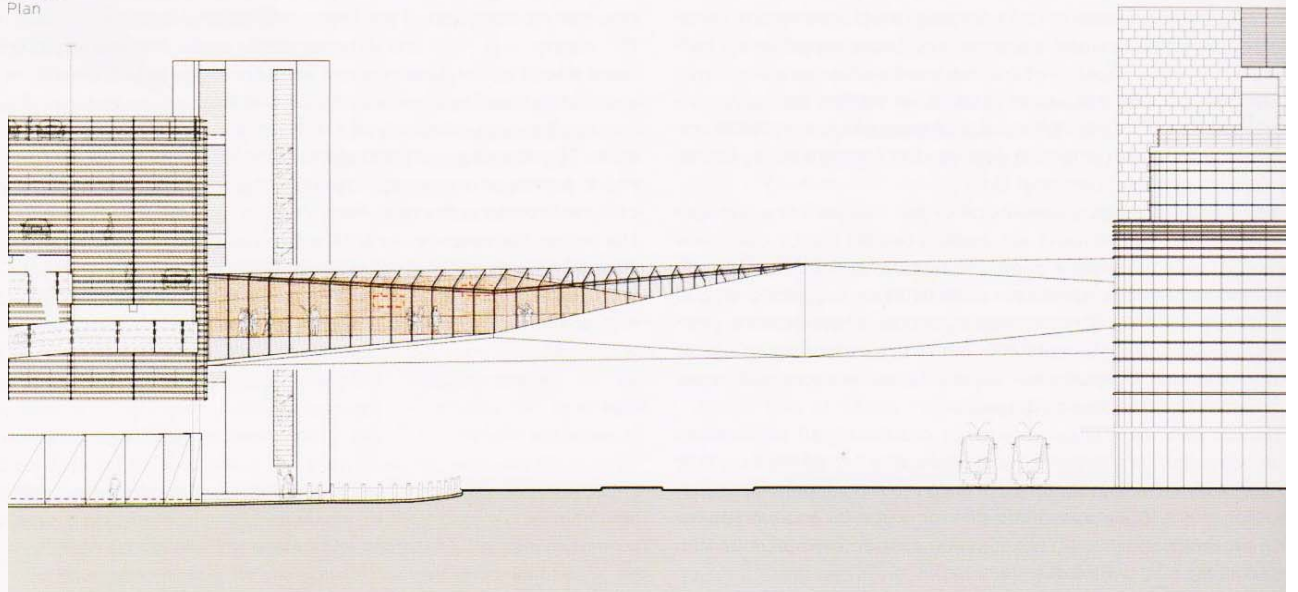




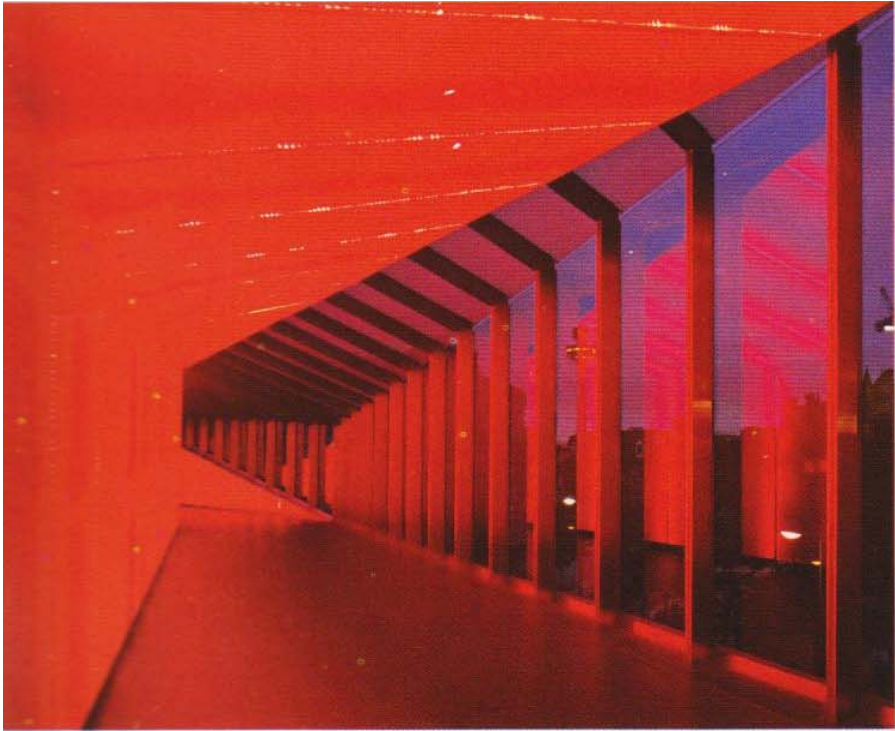
Εγκάρσιες τομές
Cross Sections



Κάτοψη
Plan







ΑΝΑΡΤΗΜΕΝΑ ΚΑΤΑΣΤΡΩΜΑΤΑ



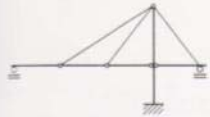
Uncovered footbridges have various forms:

This 24-meter footbridge, built in 1989, spans the expressway in Ballaigues (Waadt Canton). Its load-bearing structure is anchored with steel reinforcing rods. The actual bridge elements comprise pressure-impregnated lumber.

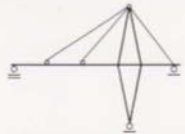


The Japanese artist Tadashi Kawamata made this wooden bridge to the Felsenbad Castell rock pool in Zuoz (Graubünden Canton) in 1997. He used simple boards and planks to create a unique ambience, modulating between landscape and architecture, the past and the present ... The emphasis is primarily on impact and less on durability.

Ένα άνοιγμα μπορεί να γεφυρωθεί και με ανηρτημένο κατάστρωμα (δοκοί ή δικτυώματα)



Cable-stayed bridge with single pylon tied back to end support



Cable-stayed pinned beams with triangulated pylon



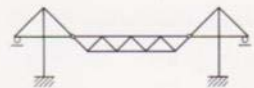
Cable-stayed bridge with single, raking pylon



A-frame pylon as three-legged trestle

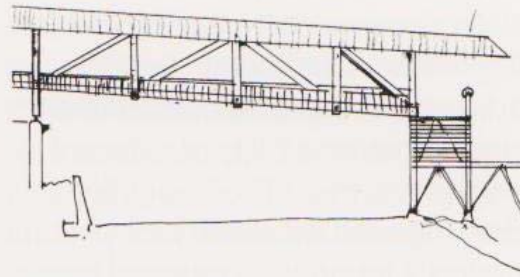


Cable-stayed bridge tied back to intermediate support

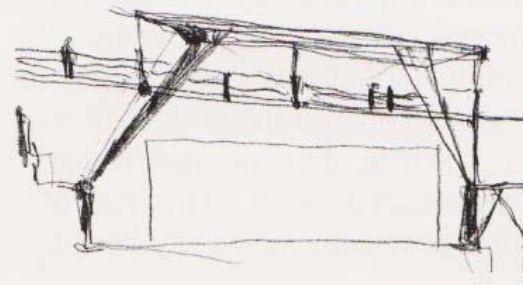


Cable-stayed bridge with central lattice beam

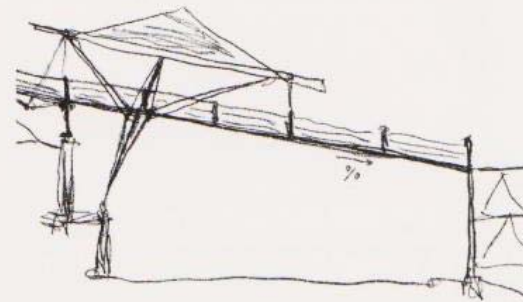
The engineer's sketches for a bridge



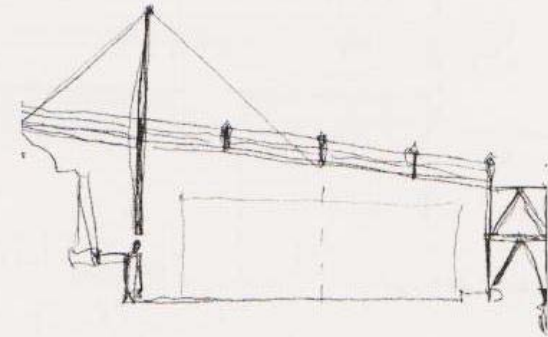
Lattice girder with roof



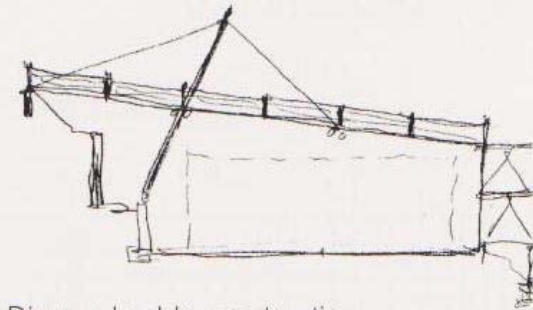
Frame with partial roof



Canopy with suspended construction and partial roof



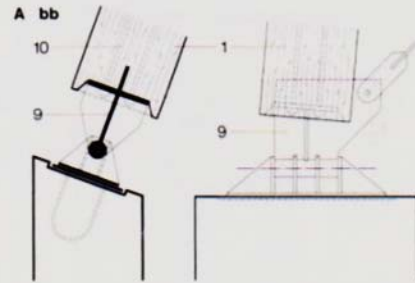
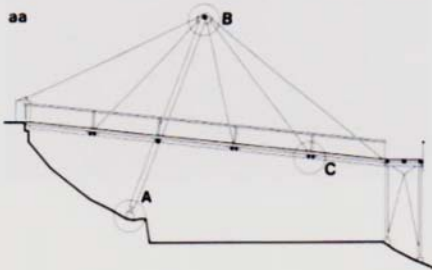
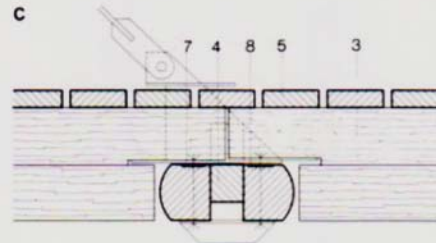
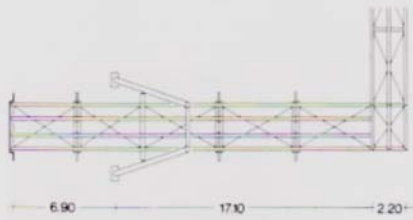
Diagonal cable construction with vertical pylon



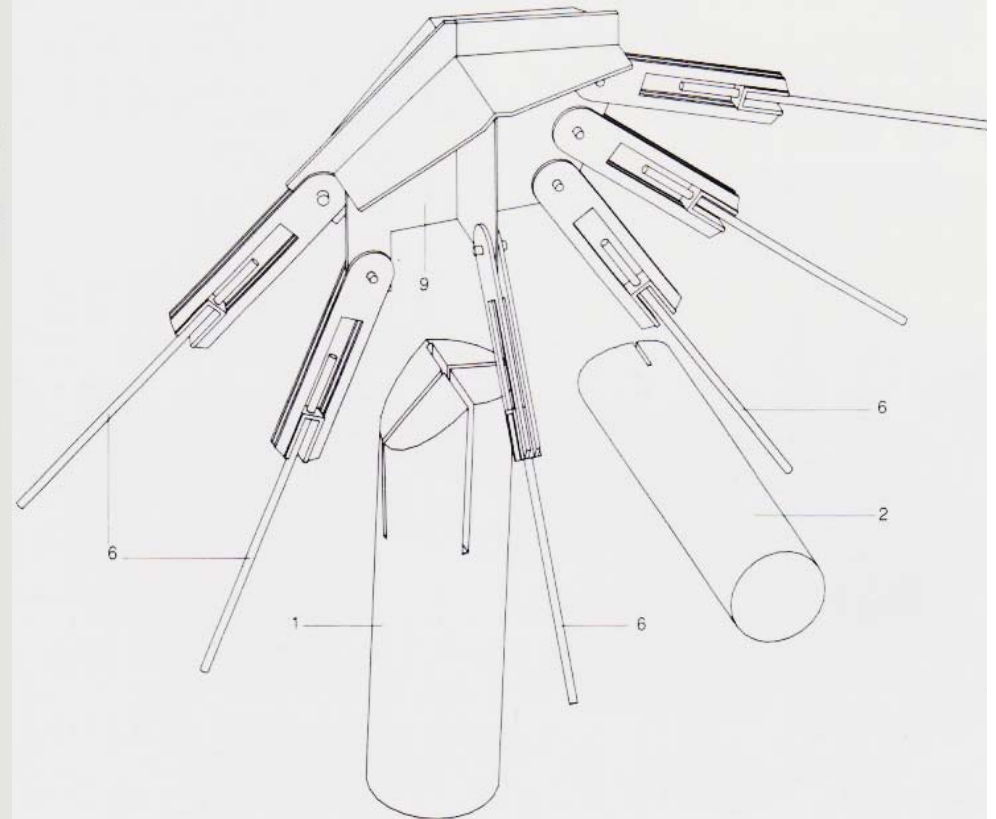
Diagonal cable construction with raking pylon

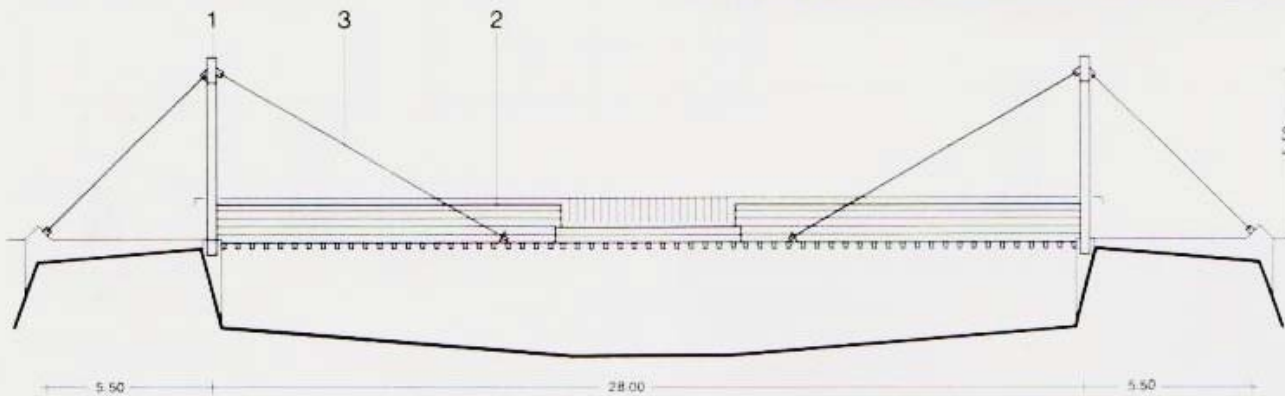
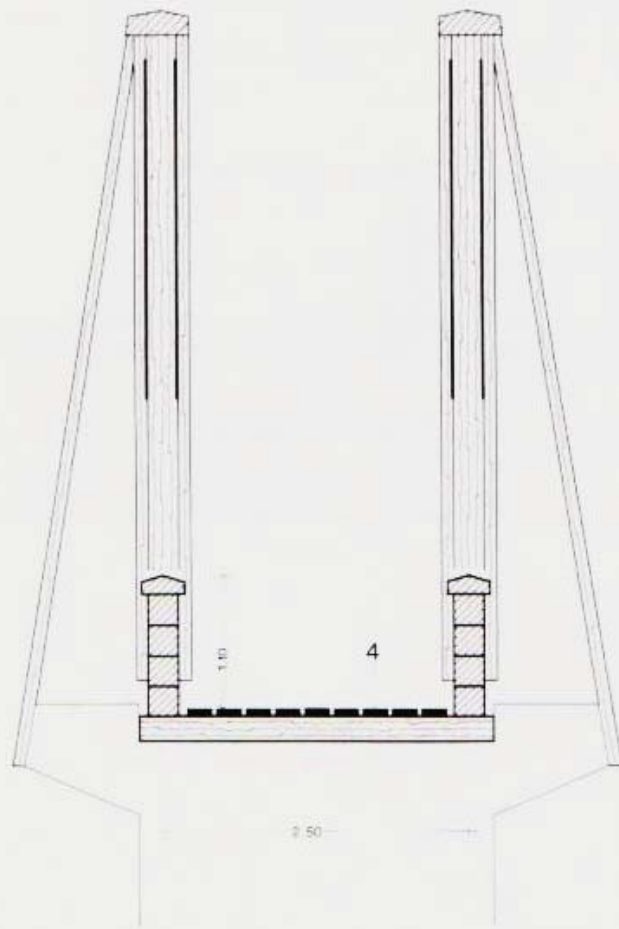


Photo of the finished project



- | | |
|-------------------------------------|---|
| 1 Log, 360 mm dia. | 7 Steel bracket, 5 mm thk |
| 2 Log, 300 mm dia. | 8 Toothed-plate connector |
| 3 Log, 2 No. 240 mm dia. | 9 Metal plate let into slits, 15 mm thk |
| 4 Squared section, 120 x 140-280 mm | 10 Bonded-in threaded bar |
| 5 Bridge deck, 60 x 200 mm | |
| 6 Threaded tie | |

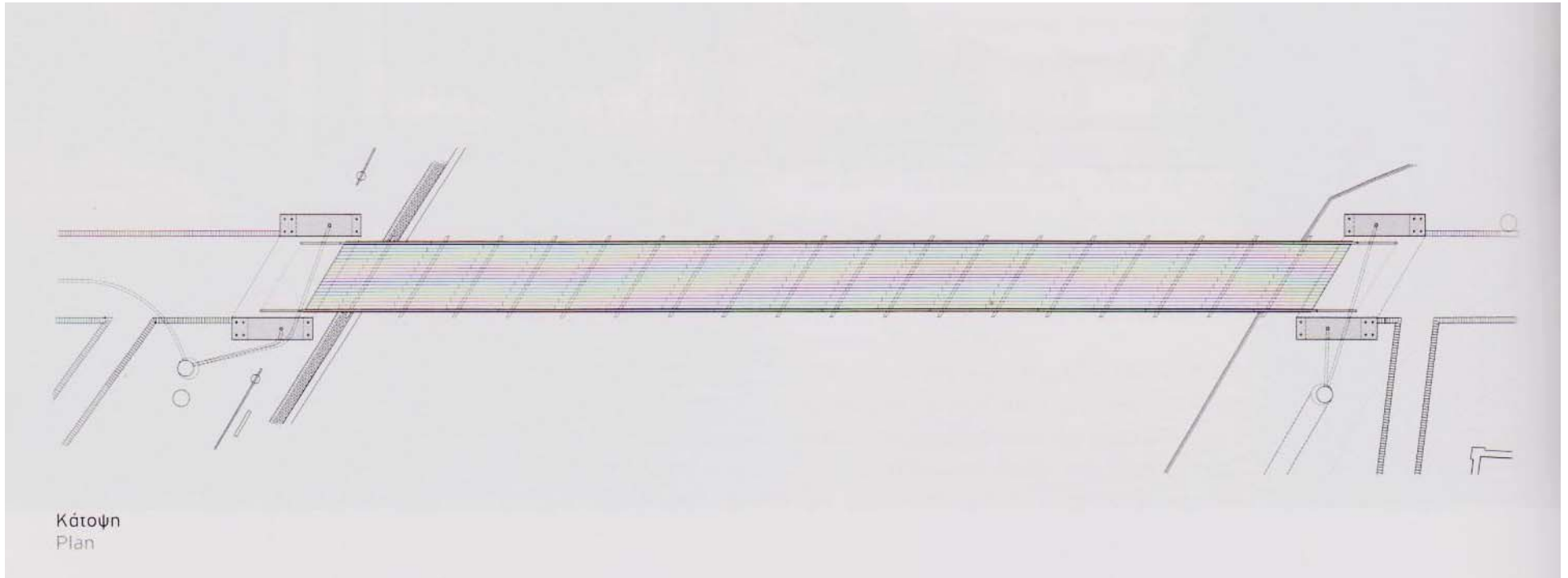


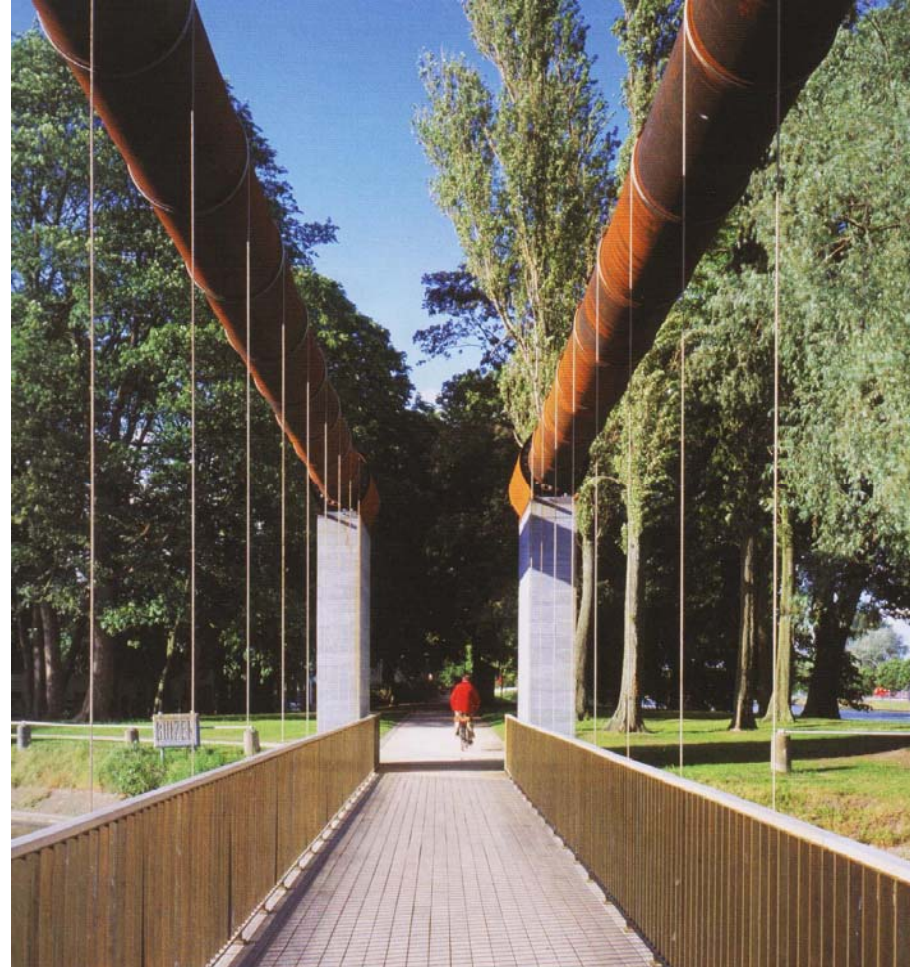
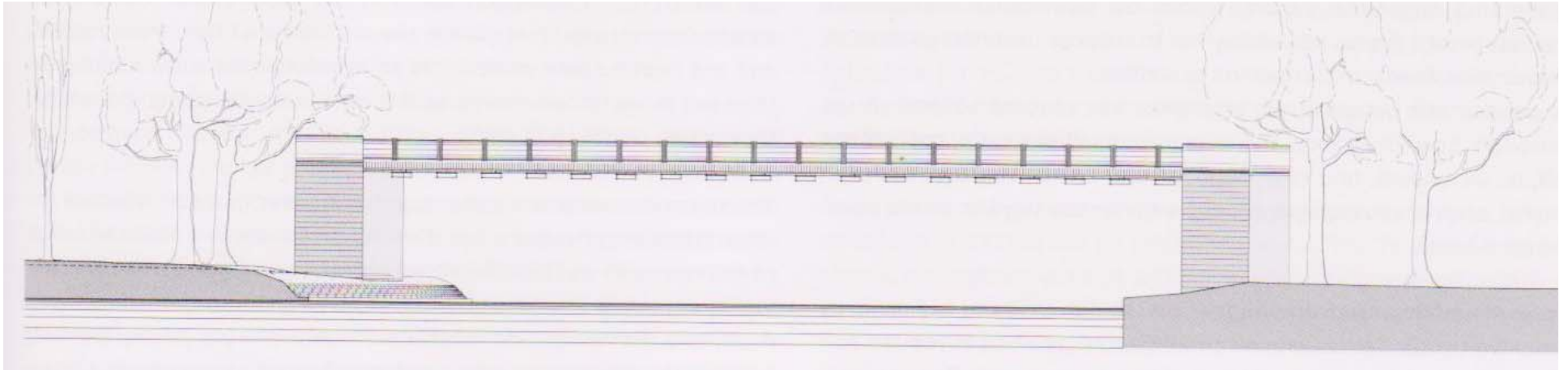




Βέλγιο, Μπρυζ: Πεζογέφυρα Coupre

Αρχιτέκτονες : Conzett, Bronzini, Gartmann AG
(Κατασκευή 2000-2002)









London Embankment – Golden Jubilee Bridge: Ζεύγος πεζογεφυρών πάνω από τον Τάμεση

Αρχιτέκτονες: Lifschutz Davidson Sandilands, (Μελέτη 1996, Κατασκευή 1999-2003)
Πολιτικοί Μηχανικοί: WSP Group & Gifford consulting engineers











ΚΑΛΩΔΙΩΤΕΣ
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ΚΡΕΜΑΣΤΕΣ

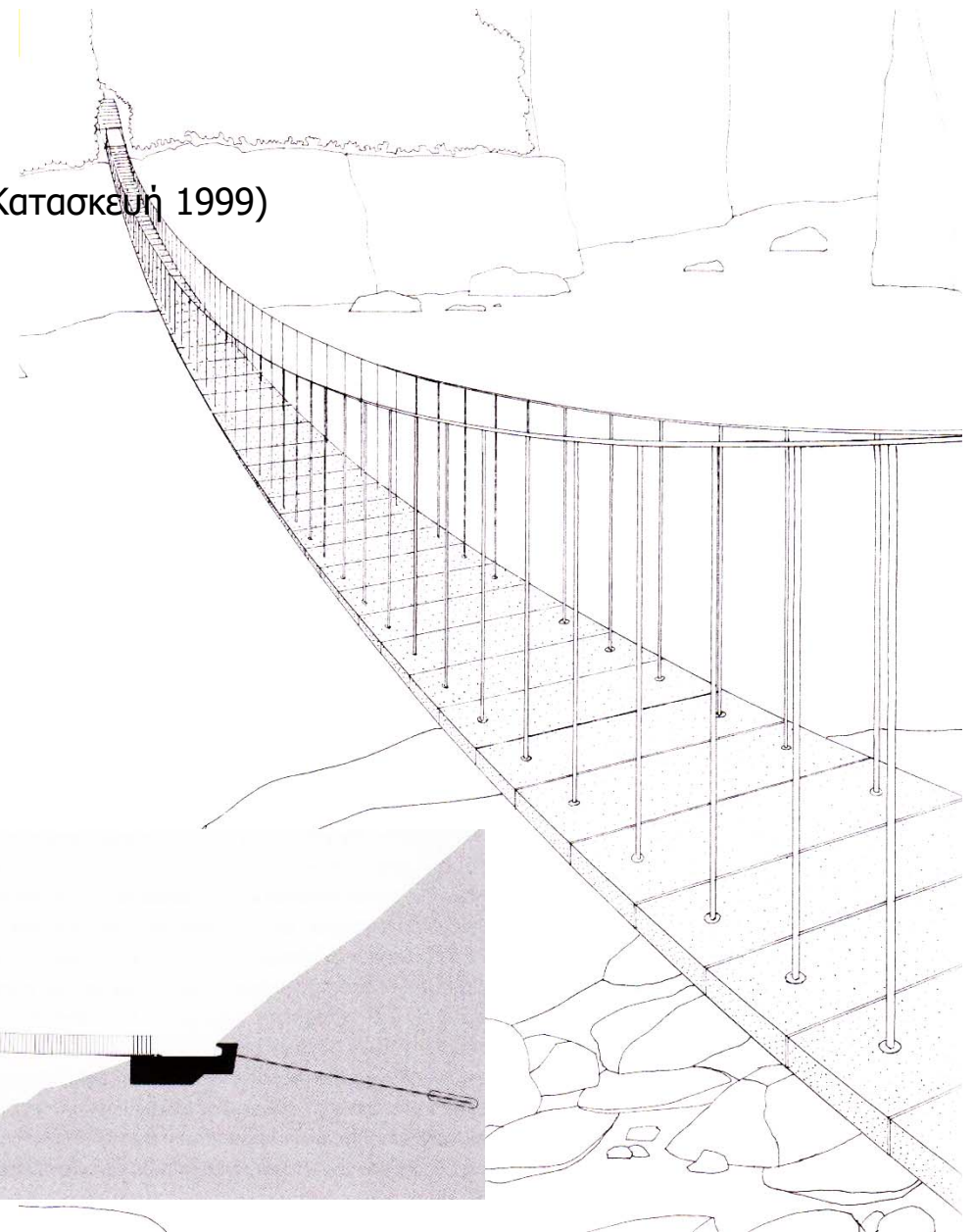
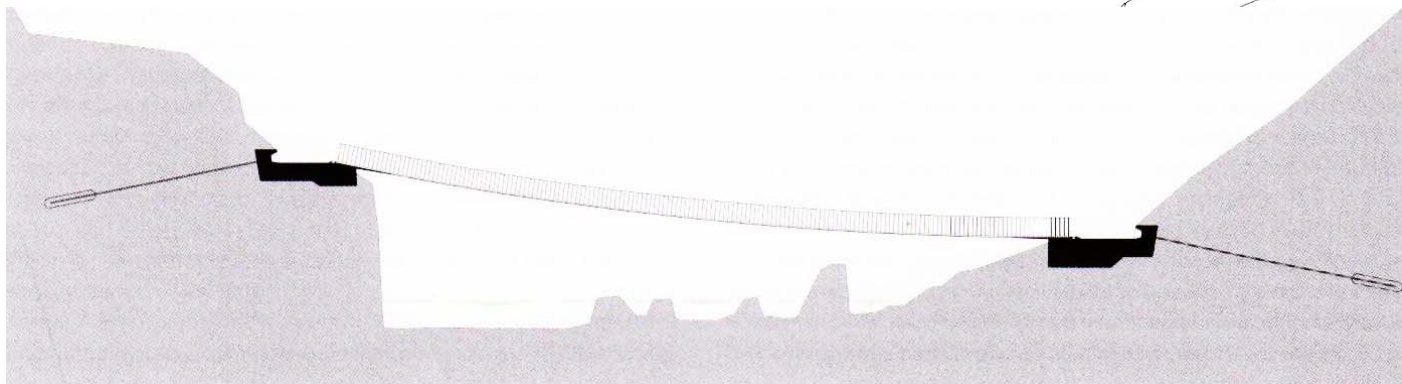
Κρεμαστές - καλωδιωτές πεζογέφυρες



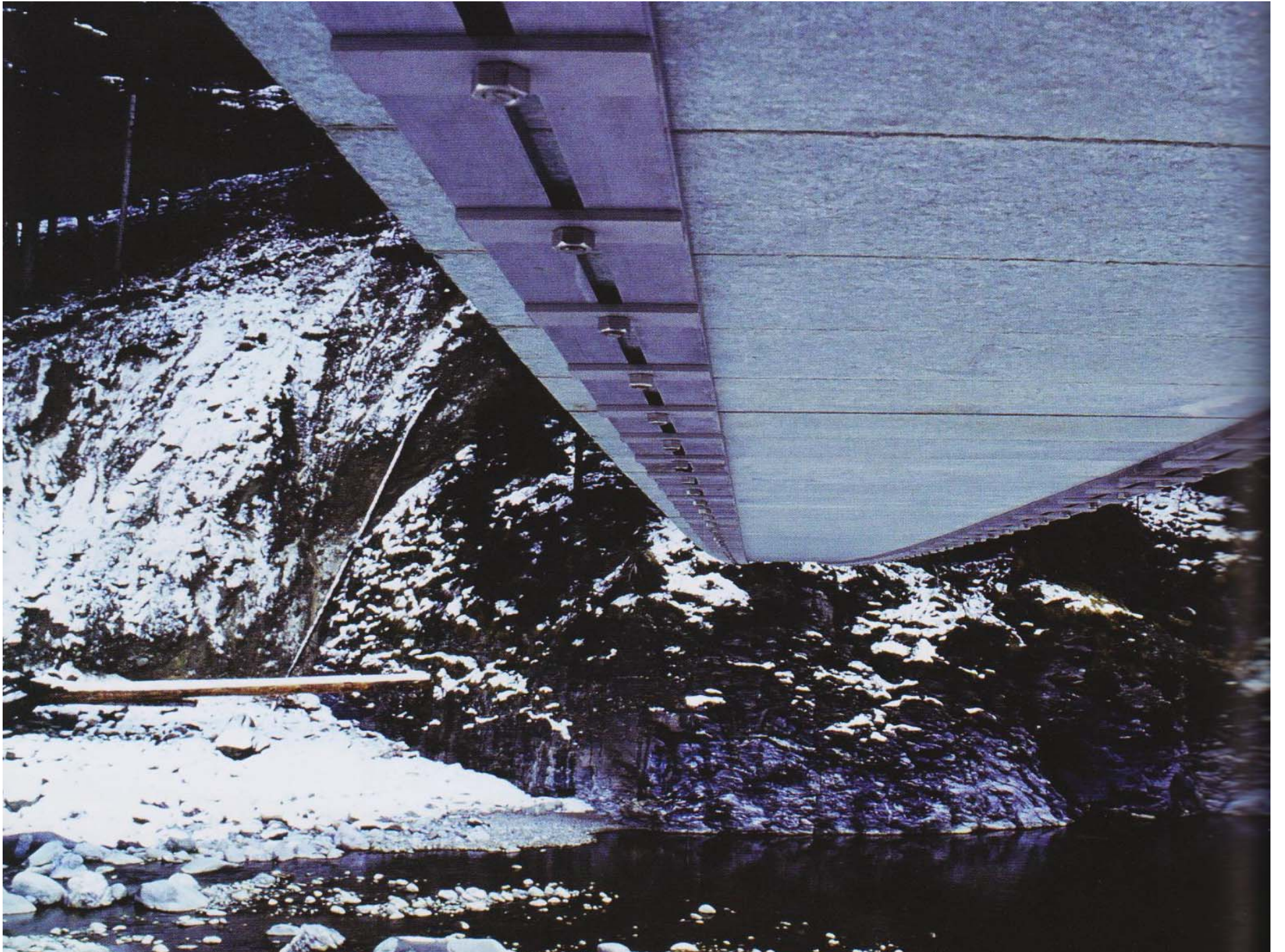


Ελβετία, Viamala Gorge, The Alps: Πεζογέφυρα Punt da Sarasuns

Αρχιτέκτονες : : Conzett, Bronzini, Gartmann AG (Κατασκευή 1999)
Μήκος 40 μ.



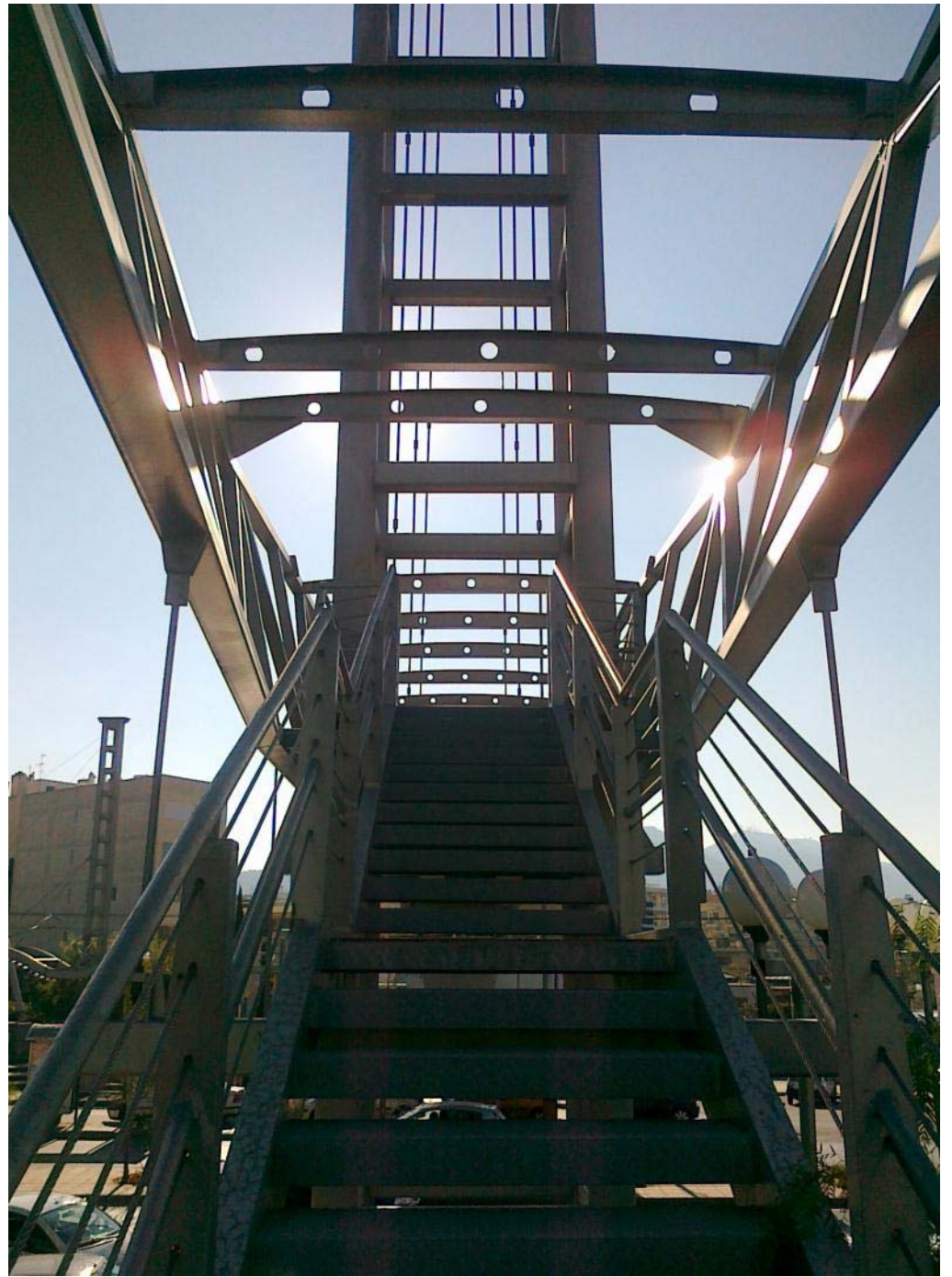


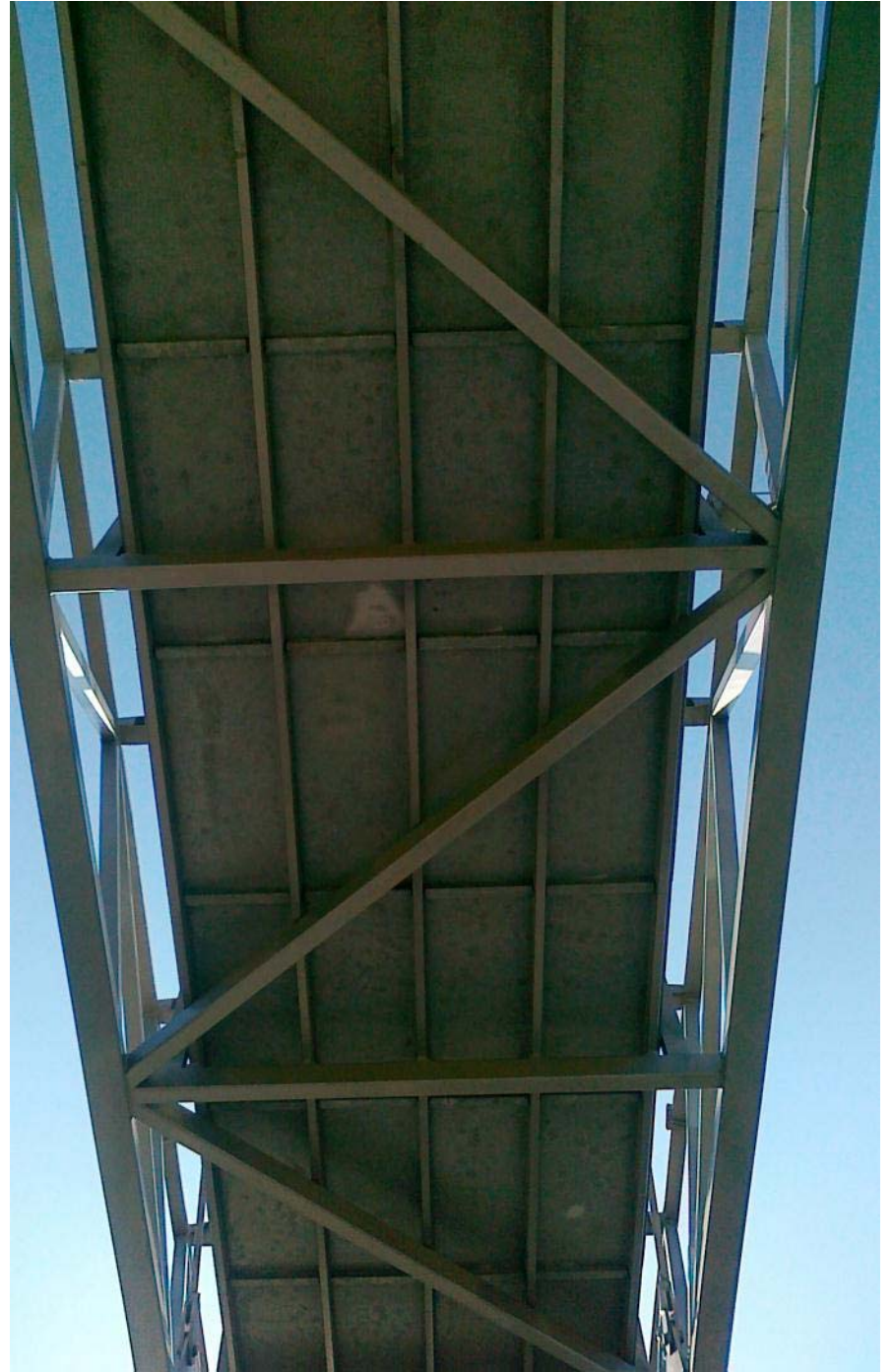


ΣΥΝΘΕΤΑ ΣΥΣΤΗΜΑΤΑ

Σύνθετες πεζογέφυρες: Διάβαση πεζών στο σταθμό Μετρό Χαλάνδρι, Αθήνα.

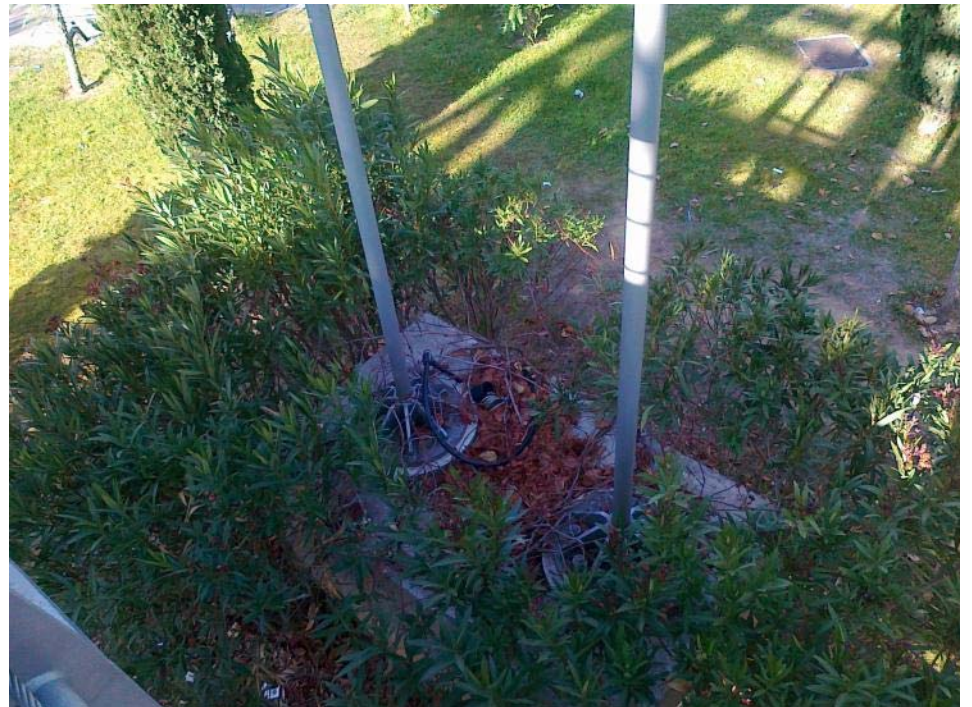










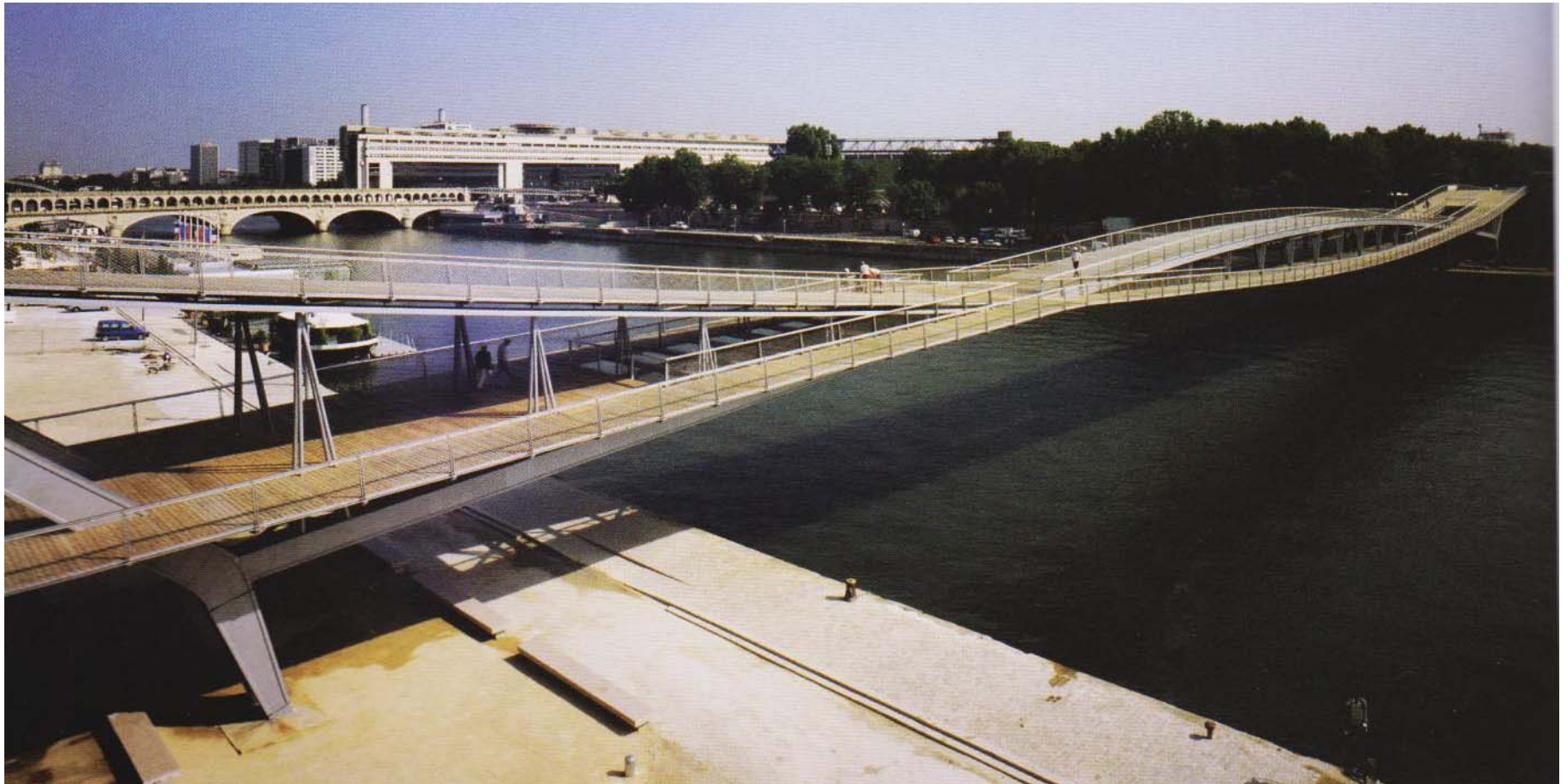


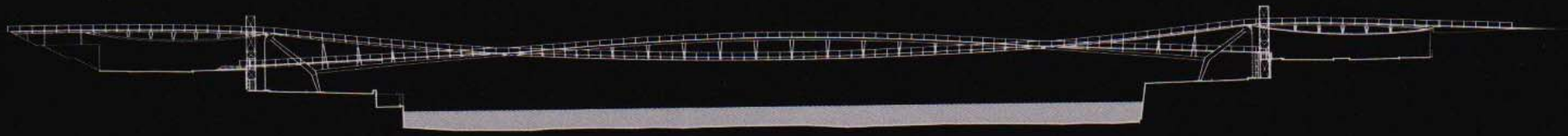


Παρίσι: Πεζογέφυρα Simone de Beauvoir

Αρχιτέκτων: Feichtinger (Μελέτη 1999, Κατασκευή 2004-6)

Στατικά: RFR Engineers (Μέγιστο άνοιγμα 194μ. Μήκος 304 μ.)





0ψn
Elevation

