Architecture and Engineering: Gehry, Schlaich, Calatrava, Virlogeux

Methods of form finding in architecture and engineering
Invention with cables: Jorg Schlaich
Equilibrium and novel structural forms
Michel Virlogeux: Many forms many innovations
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Frank Gehry

1929 -
Jörg Schlaich
1934 -
Rosenstein I pedestrian bridge
1977
Santiago Calatrava

1951 -
Santiago Calatrava, Concert Hall (1999-2003), Tenerife, Spain. Courtesy Santiago Calatrava Archives

Oriente Station in Lisbon, photo by BWS.

proposed NY residential tower on South Street by Calatrava.
Michel Virlogeux 1946-

Designer & Engineer
In the last 10 or 15 years the design of more and more bridges has been given to architects with very diverse results. In most cases – especially after a design competition limited to architects – the bridge concept has been developed without any consideration for structural aspects; even the balance of loads and the flow of forces have been ignored, not to mention erection techniques.

-- Michel Virlogeux
“I think engineers must design structures that are rational, logical, and work in such a way that they make elegant structures based on the flow of forces. The greatest elegance is to design something which is slender and beautiful and well integrated with the site. There are some structures you see where you just cannot understand it — there is no logic in the shapes.”

-- Michel Virlogeux
“Structural mechanics is the basis of engineering. Yes, engineers must have more imagination, more creativity. They must go to concerts and exhibitions of paintings and engage in society and be inspired by all these things — but they must never lose mathematics and structural mechanics. If they lose that, they lose everything. They'll become under-architects.”

-- Michel Virlogeux
Major structures:
Girder Bridges
Wilson Bridge 1810, 1982
La Flèche Bridge 1983
Movable Bridges
Rouen 6th Bridge, or Gustave Flaubert Bridge 2008
Bacalan-Bastide Bridge 2010
Arch Bridges
Why might Virlogeux need fewer verticals than Maillart?
Cable Stayed Bridges
Describe the overall cable stay form here, cables/pylons
Térénz Bridge 2010
Millau Viaduct
The tallest pier is 343m - taller than the Eiffel tower.

**CARRIAGeway CROSS SECTION**

The two lane dual carriageway is suspended almost 250m above the River Tarn. The deck structure is designed to be light yet incredibly strong.
1. Hydraulic cylinders lift and push deck into place.
2. Deck sags as it moves between pylons. ‘Landing system’ pushes down and lifts deck onto next stage.
Who is Michel Virlogeux?
Current practitioners

- Gehry
- Calatrava
- Schlaich
- Virlogeux

- Architect
- Architect/Eng.
- Engineer
- Engineer

- Buildings
- Buildings/Bridges
- Bridges/Roofs
- Bridges