



University of  
**Strathclyde**  
Engineering

**Bicentenary of I.K. Brunel 1806-1859**  
**200 Years of Women Bridge**  
**Builders**

Dr Nina Baker  
Department of Architecture

# 1811 Sarah Guppy

Granted patent no. 3405 for “A new mode of construction and erecting bridges and railroads without arches or sterlings, whereby the danger of their being washed away by floods is avoided.”

**1806 Isambard  
Kingdom  
Brunel born,  
Portsmouth**



Sarah Guppy

---

Inventor

Lived here from  
1770 - 1852

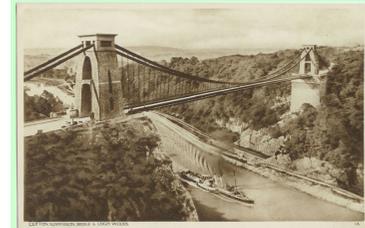
# Access to Education

1696 Education Act: Established universal primary education in Scotland

1833 Factory Act: First compulsory education for England.



**1831** Brunel designs his first bridge: **Clifton Bridge, Bristol.**



**1839**  
**Maidenhead**  
**Bridge opened.**

# Mrs Emily Roebling Engineer in charge, Brooklyn Bridge



1865 John Roebling designed Brooklyn Bridge.

1869 John Roebling died. His son, Washington  
Roebling, took over.

1872 Washington Roebling got caisson sickness.  
Emily took over.

1883 Brooklyn Bridge opened



**1845  
Hungerford  
Bridge opened.**

**1853 Tamar  
Bridge begun.**

**1859 Brunel  
dies.**

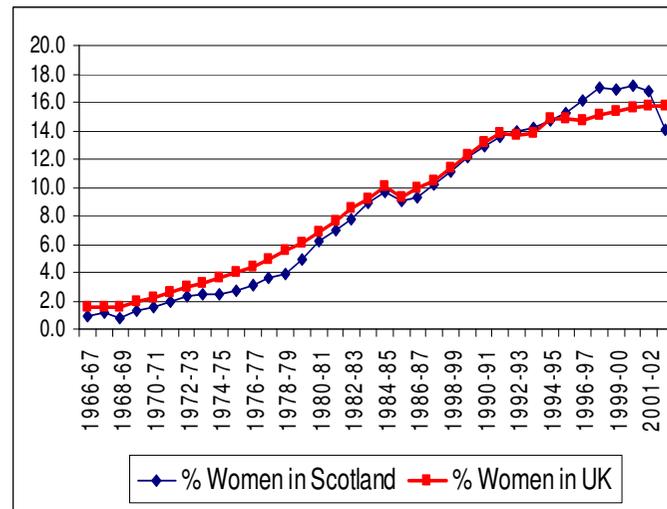
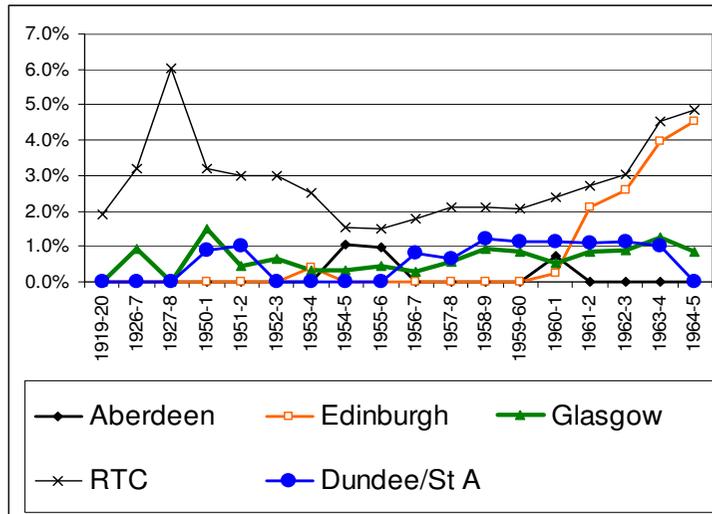


# Women's access to engineering education

1869 Watt Institution and School of Arts admits women

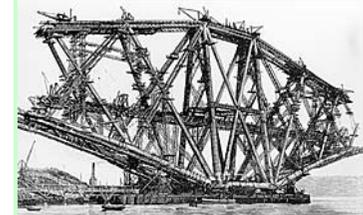
1876 University of London admits women

1892 Scottish Universities admit women



1890

**Forth Rail Bridge opened**



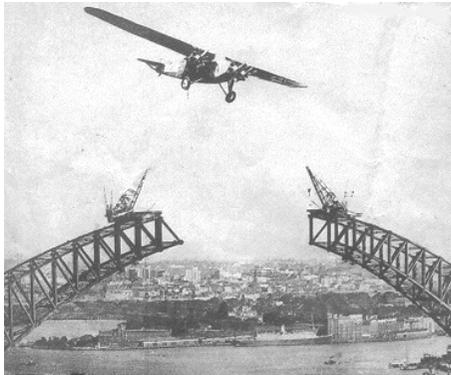
1894

**Tower Bridge opened.**



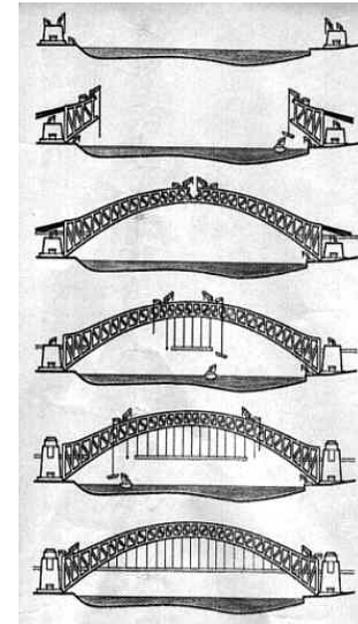
Women students as % of total undergraduate students attending engineering, applied chemistry, mining, metallurgy, architecture etc

Dorothy Donaldson  
Buchanan (Fleming)  
1899-1985  
Civil Engineer



1923 BSc Civil Engineering Edinburgh University  
1923-6 Worked for Sir Ralph Freeman on the  
Sydney Harbour Bridge.

1932  
Sydney  
Harbour  
Bridge opened.



# Then and now at Tacoma



1940, Tacoma Narrows Bridge opens and fails 4 months later



New Tacoma bridge to open 2007. 10% female workforce.





# Mary Isolen Fergusson OBE

Born Plymouth 28 April 1914 died  
London 30 November 1997

1936, BSc Hons. in Civil  
Engineering, University of  
Edinburgh

1936, Indentured trainee: Blyth  
and Blyth, Edinburgh

First female senior partner in a  
UK civil engineering firm: 1948



**1945**

**Women  
workers build  
Waterloo  
Bridge,  
London**



# Mary Isolen Fergusson OBE

Worked on civil engineering infrastructure projects including:

- Highland Bridges
- River Leven water purification scheme
- Markinch paper mills

First woman fellow Institution of Civil Engineering, 1957

Active in Scout Association, WES and Soroptimists

Retired 1979

OBE 1979

Honorary Doctorate of science, Heriot-Watt University, 1985, for her work in encouraging women to take up engineering careers





**Women bridge builders in the Greater Khingan Mountains in northeast China, 1969**



**1964**

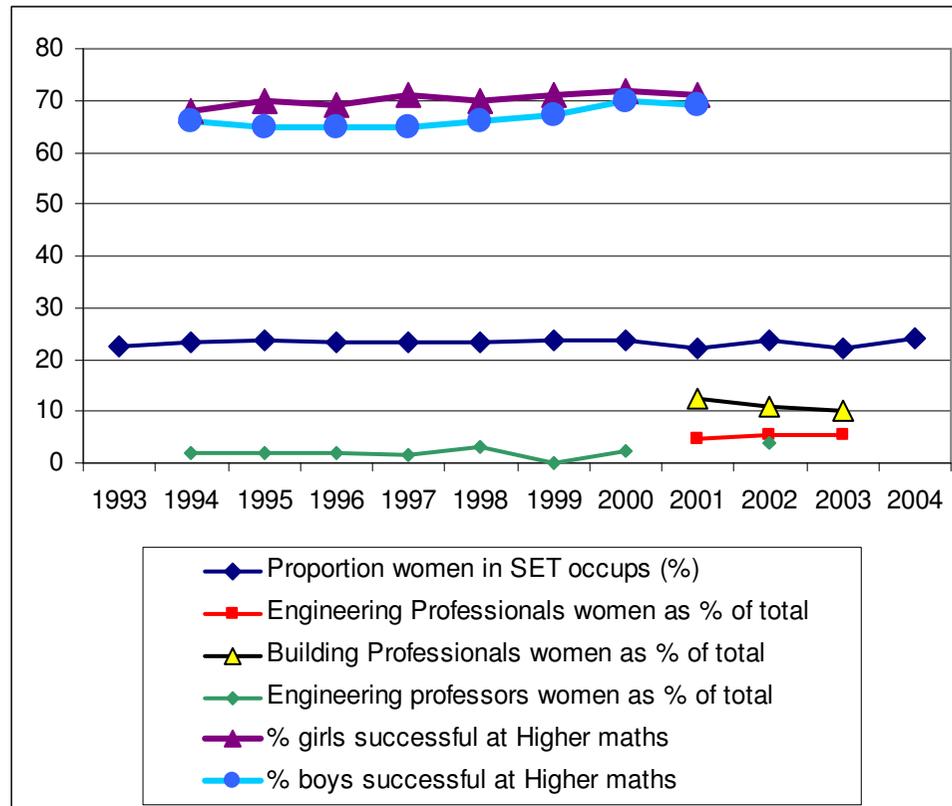
**Europe's first long-span suspension bridge, Firth of Forth road bridge, opens**

**1981**

**World's longest suspension span: Humber Bridge opens**



# Where are we now?



2000

London's  
Millennium  
Bridge



2004

Viaduc de  
Millau



## Questions for you to take away.....

Are bridges designed **for** men or **for** women?

Is a bridge different if it is designed **by** a woman?

Does it matter if women do not become engineers?