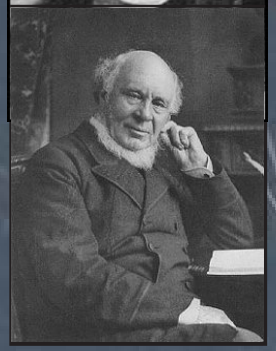



THE MEN WHO BUILT BRITAIN

THE MEN WHO BUILT BRITAIN

6 x1 Hour Documentary Series

Engineering as a historical subject remains underexploited for a mainstream audience. The Men Who Built Britain aims to recapture this incredibly significant chapter of Britain's rich history.

The series will tell the story of engineering in the British Isles during it's pioneering and formative years through the lives of the men who made it happen and the defining moments of their careers.

These visionary thinkers and rugged individualists changed the way in which we all live and work. They were the marvel workers of their day and the impact of their work was as potent and revolutionary as the creation of the world wide web is today. Each of their achievements were, in relative terms, of equal magnitude to the Channel Tunnel and their effects far more significant.

The series will manipulate the biography format in order to bring these incredible stories of engineering's pin up boys to life. Using a dramatic narrative drawn from the readily available and rich archives of diaries, diagrams, images, press reports and the still existing monuments themselves, each episode will focus on just one story from each engineering greats career that has had significant impact on the UK and the world.

These dramatisations will be enhanced by the key casting of artists who will bring something unique, exciting and definitive to the part, whether it is an Ian Richardson as George Stephenson or Thomas Telford as played by Stephen Fry.The artists talents will be enhanced with recreations of the

highlighted works using the most visually imaginative tools available. From low tech aerials along Telford's roads and night time shots off the bows of a yacht approaching the Smeaton Lighthouse; to high tech computer generated imagery of the great tunnelling devices boring into the earth to create the London Underground. The Series will recapture the wonder and awe that society held for these vibrant over-achievers and the sheer scale and importance of their work.

Placing their achievements in the proper historical and sociological framework will be further enhanced by the narrative skills of Joanna Lumley, who has a little known passion for the marvels of Britain's great engineering heritage providing an authored and counter-intuitive overview for the series.

Timeline

The First Lighthouse	1759
The First Major British Canal	1765
Building of the First Modernised Road	1815
The First Passenger Railway	1830
The First Sub-Aqueous Tunnel	1843
The First Underground Railway	1864

EPISODE 1
THE EDDYSTONE LIGHTHOUSE

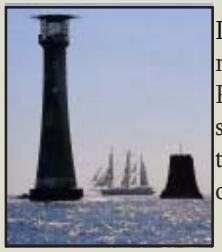
The First Stone Lighthouse (1755 - 1759)
Engineer: John Smeaton (1729 - 1792)

John Smeaton is generally regarded as the founder of the civil engineering profession in the British Isles. His most famous work was the Eddystone Lighthouse, which remains a symbol of the profession. He is affectionately known as "The Father of Civil Engineering", as such he was the first person to call himself a civil engineer and he developed the working practices and principles of modern engineering.

The Story of the Eddystone Lighthouses

The Eddystone Lighthouse is probably the most famous lighthouse in the world. Located 14 miles south of Plymouth Hoe on the notorious Eddystone reef that has witnessed many shipwrecks over the ages. In 1698 Henry Winstanley began building a succession of bizarre wooden lighthouses, he was so proud of his third lighthouse that he said he would like to be there 'during the greatest storm in history'. His wish came true in 1703 when the greatest storm in recorded history decimated southern England destroying the lighthouse and killing Winstanley.

Next came John Smeaton's Tower that was such a huge leap forward for technology and the very visible precursor of how much more would be possible in the future. He was an instrument maker from Yorkshire. He decided that the only way to beat the evil reef was to construct the tower of stone. This had never before been attempted on a rock in the middle of the sea and many people thought it was impossible. His model was based on an English oak tree that he considered to have been created by nature to best resist the forces of the wind. He decided to use the toughest granite he could find employing the skills of a cabinet maker to dovetail the stone of the tower into a single rock rather than with the wood he was used to. He also required special forms of cement that would not only dry quickly, but would resist the attack of seawater. He carried out many scientific experiments to decide upon the best formulation before adopting it in his construction. Next he designed some new forms of lifting gear and cranes. Each stone of his building was unique and crafted by skilled masons ashore. Each block, often weighing several tons, was then shipped to the reef where it had to be lifted out of a boat in rough seas and up onto the top of the construction. His newly designed cranes were a vital part of this process. These were just some of the new features and untried techniques that Smeaton worked out. His lighthouse was so successful it would have lasted there indefinitely, but unfortunately,the foundations upon which it stood became eroded over the years and caused the tower to shake violently when hit by a wave.



In the 1870's Smeaton's tower was moved stone by stone to Plymouth Hoe where it still stands as a monument to one of the greatest feats of engineering of all time.

EPISODE 2
THE BRIDGEWATER CANAL

The First Major British Canal (1759 -1765)
Engineer: James Brindley (1716-1772)

The Bridgewater Canal ushered in the industrial age and lit the fuse on Britain's canal mania, revolutionising inland transport in the UK and speeding up the onset of the industrial revolution. It was commissioned by the handsome Duke of Bridgewater "The Father of Canals" who retreated to the country to avoid sexual scandal in London. He then concentrated his energies on making his coalfields as profitable as possible, for this he needed canals. He brought in James Brindley, an illiterate millwright with a reputation for engineering ingenuity to oversee the project. Great controversy surrounded the canals eventual success. Primarily because of the Duke's continual bankruptcy but also because of the class angst towards Brindley and this workaholic pauper's high social status that resulted from their success. Unable to read, he was known to walk 50 miles and back to visually memorise complete structures in order to find solutions for his own engineering problems. He eventually became affectionately known as the "Midwife of Canals".

There were controversies and scenes worthy of dramatic narrative throughout the project. From the nights spent drinking in pubs trying to figure out how they could raise money to pay the men, to Brindley's first theatre visit during a trip to Parliament, where he was encouraged to "invest in a set of new and fashionable clothes". The play "disturbed his ideas, and rendered him unfit for business", he declared that he would never go and see another play on any account.

EPISODE 3
LONDON TO HOLYHEAD ROAD

The First Modern Road (1815 - 1830)
Engineer: Thomas Telford (1757-1834)

The name of Thomas Telford, from Westerkirk, Dumfries, is held in awe whenever road engineering and bridge building is discussed as his contributions to the art and science of crossing mountains and rivers in the most efficient, economical and speediest ways possible are legend. The London to Holyhead Road exemplified this, which at the time significantly improved the speed with which goods could be transported from the US and Ireland. The current A45 still follows his original route traversing some of the roughest terrain in the country culminating in the Menai Bridge, which at the time was the longest suspension bridge in the World.

Shortly before Telford was born, a cartoon depicts a sailor with a wooden leg beside a stagecoach. Asked whether he wants a lift, he replies, "No, I am in a hurry." This is indicative of the appalling state of the roads at the time. The significance of Telford's achievements is that he managed to move road building technology on from essentially Roman techniques that had changed little over the preceding 2000 years.Telford's building methods were more expensive but more durable than his contemporaries whose systems relied on Roman methods employing slave and convict labour. Telford obviously had to pay his work force, so the additional cost of incorporating mortar to strengthen the road, as done by the Romans, was prohibitive. His new techniques were remarkable for the time and allowed coaches to travel at the grand speed of eight to ten miles per hour, an incredible achievement in this "rugged and mountainous district, across rocky precipices, and across inlets of the sea."

EPISODE 4
THE LIVERPOOL AND MANCHESTER RAILWAY

The First Track of the Railway Age (1829 - 1830)
Engineer: George Stephenson (1781 - 1845)

The self taught Stephenson is regarded as the "prime author of the railway revolution", having been involved in many of the major lines that came to be built during the speculative mania of the railway age. By his retirement he was shocked and disgusted by the amount of profiteering and wasteful railway schemes that his successes had inspired.

Although tiny, yards long industrial lines had been built before this one, it was the ground-breaking success of this, the first passenger line that created the railway revolution and acceptance of the technology by the contemporary society.

The paradigm shift this created was quite remarkable. The thinking behind railways at the the time was as stark as the difference, centuries earlier, between the flat earthers and the heretics who believed in a round earth. A modern day equivalent would be the exec at IBM who after seeing the first computer remarked that it was an interesting machine but there would only ever be a market for six of them. After Stephenson's work neither would the railways simply be mechanised donkeys for coal miners.

There were a great many detractors with vested interests in the canals and turnpikes that would have been more than happy for the Liverpool line to fail. The general public's fear was so great that Parliament was told of the locomotive that, "*Passengers would be mangled under the wheels of the fiery juggernaut if they were not suffocated in tunnels or by the sheer unnatural speed of their*

passage through the air. Before it's hot breath, crops would wither and animals sicken and die."

During the project there was as much political intrigue as there was engineering. Which reached a dramatic conclusion on the launch day of the new rail line when William Huskisson "*one of the greatest statesmen of his generation*" managed to get his leg trapped under the train which then erupted in a '*fiery fountain*' of blood. He died a few hours later after being ferried to a nearby hospital on the train. This event turned the glorious morning of the opening of the first passenger railway into a tragic and dramatic afternoon.

EPISODE 5
THE THAMES TUNNEL

The First Sub-Aqeuous Tunnel (1825 - 1843)
Engineer: Marc Isambard Brunel (1769-1849)

MI Brunel fled revolutionary France to the US where he began his career as an engineer. He then came to the UK where his career flourished. He engineered many imaginative devices including ship blocks, suspension bridges, floating piers and, of course, the Thames Tunnel.

It was Marc's invention of the ingenious Tunneling Shield based on his observations of the humble Toledo worm that allowed him to build this first underwater tunnel. During the construction of the Tunnel there was, yet again, much controversy and disaster. This scheme had no precedent and was an engineering exploration of the first degree. Numerous stoppages meant that many minds were put to task and the project started the careers of many illustrious engineers including Richardson, Hawkshaw, Davies and of course Isambard Kingdom Brunel. IK was apprenticed on this job and made several descents in a diving bell to inspect the problems at first hand. There were two breaches from the river. IK successfully dealt with the first but on the second he was seriously injured although he saved the lives of several men.

Seven years of inactivity followed and it was during this time convalescing that IK began designing in his own right, he submitted plans for the Bristol Suspension Bridge and went on to become Britain's most celebrated engineer.

This story provides a little known context for Isambard's life and how he became as successful as he was, through the telling of Marc Brunel's story. An engineer who was every bit as successful and insightful as his contemporaries or his son.

EPISODE 6
THE LONDON UNDERGROUND

The First Underground Railway (1863 -1890)
Engineers: John Fowler (1817-1898) ***and Benjamin Baker*** (1840-1907)

Fowler and Baker are most famed for their work on the Forth Railway Bridge but both were pioneers of the London Underground beating off competition from all the great names of the day, including the Stephenson's and The Brunel's and the might of the Great Western and Great Northern Railways. This episode examines the origins of the London Underground and describes a transitional period for engineering in the UK. From it's energetic infancy to a mature and structured profession. This epsiode completes our story of these original imagineers from Smeaton's humble beginnings all the way up to the nation changing ability of the legendary engineers.

By the mid 19th century London had several rail termini serving the rest of the country and there was a need to connect these stations by some form of rapid transit system to relieve the congestion on the capital's roads and the idea to build an inner ring connecting the stations was born.

The first such railway was the Metropolitan Railway, opened in 1863, which ran from Paddington to Farringdon Street. John Fowler was the engineer. The Metropolitan Railway was then extended from Paddington to South Kensington and from Moorgate to Tower Hill in 1864. Construction of the southern section of the Inner Circle, connecting South Kensington to Tower Hill, was granted to another company, the Metropolitan District Railway, which again had Fowler as engineer. Work began in 1865 and the Circle was completed in 1884.

The railway had been built by Fowler and his associate Baker initially using cut-and-cover techniques, which were extremely disruptive and costly, and a radical solution was found by going deep underground and turning to the new techniques of mechanised shield tunnelling. After several aborted schemes the first "tube" railway was completed in 1890. Throughout the construction there were a series of financial scandals, mismanagement and botched schemes that provided the means for this engineering envy of the world to be constructed.