

## READING PASSAGE 1

You should spend about 20 minutes on **Questions 1-13**, which are based on Reading Passage 1.

### Isambard Kingdom Brunel (1806-1859) — an extraordinary engineer

**A** Isambard Kingdom Brunel possessed the **essential spark of engineering - the drive to innovate**. His French father, Marc Isambard Brunel, was himself a famous engineer. Marc settled in Britain and married an English woman, Sophia Kingdom. Isambard was born in 1806. At the age of 14, he was sent to France to study mathematics and science, later returning to England to assist his father, who was building a tunnel under the River Thames in London. Isambard was injured in a tunnel cave-in, and while recuperating near Bristol, in the west of England, he became involved with his own first major project - the Clifton Suspension Bridge, over the River Avon.

**B** Two design competitions were held, and Brunel presented four proposals. He won with a design for a bridge with a span longer than any existing at the time, at a height of about 75 metres above water. The **technical challenges** of this engineering project were immense, and Brunel dealt with them with thoroughness and ingenuity. Unfortunately, he only got so far as to put up the end piers in his lifetime. The Clifton Suspension Bridge in Bristol was completed by engineering colleagues in 1864, and is still in use.

**C** While Brunel was still in Bristol, working on the bridge project, he learned that the civic authorities saw the need for a railway link to London. Railway location was controversial, since private landowners and towns had to be dealt with. Mainly, the **landed gentry** did not want a messy, noisy railway anywhere near them. Brunel showed great skill in **presenting his arguments** to the various committees and individuals, and **won them over**. He was awarded the contract and constructed the railway line

**D** Brunel's ready acceptance of new ideas overpowered good engineering judgement (at least **in hindsight**) when he advocated the installation of an 'atmospheric railway' in South Devon. It had the great attraction of doing away with the locomotive, and potentially could deal with steeper gradients. However, materials were not **up to the task**, and the mechanism was troublesome and expensive to keep in good repair. The system was withdrawn from use after a year.

**E** The idea of using steam to power ships to cross the ocean appealed to Brunel. He formed the Great Western Steamship Company, and construction started on the Great Western in Bristol in 1836. Built of wood, and powered by sail and steam-driven paddle wheels, it was launched the following year. The first trip to New York took just 15 days one way - a great success, as the normal sailing time was over a month. The Great Western was the first steamship to be engaged in transatlantic service and made 74 crossings to New York.

**F** Brunel immediately got to work on an even bigger ship. The Great Britain was made of iron and also built in Bristol. The initial design was for the ship to be driven by paddle wheels, but Brunel had seen one of the first propeller driven ships to arrive in Britain, and he **abandoned his plans** for paddle-wheel propulsion. The ship was launched in 1843 and was the

first screw-driven iron ship to cross the Atlantic. For years it sailed from England to Australia and other parts of the world, setting the standard for ocean travel

**G** Conventional wisdom in Brunel's day was that steamships could not carry enough coal to make long ocean voyages. But he correctly figured out that it was a question of size. He designed a ship that was five times larger than any previously built, big enough to carry enough fuel to reach Australia without refueling. In addition, it would carry 4,000 passengers. This was to be the Great Eastern.

**H** Brunel chose John Scott Russell, a well-established engineer and naval architect, to construct the ship in London, beginning in 1854, but the contract did not go well. Among other things, Scott Russell kept his estimates unrealistically low, costs soon rose, and the project kept running out of money. Serious technical difficulties led to its launch date being put back more than once, and the Great Eastern was finally ready for its maiden voyage in September 1859. Brunel was too sick to go, and died soon afterwards. Being intended to carry 4,000 passengers to Australia, the ship would have presented serious competition for sailing ships and made a fortune. But the Suez Canal was now in operation and the Great Eastern was too large to use it. Any journey the ship now made to Australia would not be competitive, and it was too large to be economical on the Atlantic run. Although it crossed the Atlantic several times, and survived hurricane conditions that would almost certainly have sunk any other ship, it was not a financial success, and had to be sold in 1864.

**I** Its new owner used it to carry 5,000 tons of telegraphic cable, to be laid on the floor of the Atlantic between Europe and North America. This inaugurated a hundred years of transatlantic communication by cable. In 1874, the Great Eastern was superseded by a custom-made ship. It was subsequently used as a funfair in Liverpool, and in 1888 was sold for scrap.

## WORDLIST

Possess (v.) – to have or own something, or to have a particular quality:

- We're trying to bring out the artistic talents that many people possess without realizing it.
- She had already sold everything of value that she possessed.

Spark (n.) – a feeling or quality that causes excitement:

- They kept running into each other and eventually realized there was a spark between them.
- The music is mediocre because there's no spark, no thrill, no unpredictability.

Drive (n.) – energy and determination to achieve things:

- We are looking for someone with drive and ambition.
- He has the drive to succeed.

Settle (v.) – to go and live somewhere, especially permanently:

- After they got married, they settled in Brooklyn.

Cave in – If a ceiling, roof, or other structure caves in, it breaks and falls into the space below:

- Because of the explosion, the roof of the building caved in, trapping several people.

Recuperate (v.) – to become well again after an illness; to get back your strength, health, etc.:

- She spent a month in the country recuperating from/after the operation.

Thoroughness (n.) – a large amount of care and attention to detail:

- You can rely on the thoroughness of his research.
- They do not guarantee the accuracy or thoroughness of the data or information reported.

Ingenuity (n.) – someone's ability to think of clever new ways of doing something:

- I was impressed by the ingenuity and energy of the contestants.
- It took some time and a little ingenuity, but we were able to rescue the animals.

Pier (n.) – a low structure built at the edge of water, used especially for getting into and out of boats

The gentry (n.) – people of high social class, especially in the past:

- a member of the landed gentry (= those who own a lot of land)

Win sb over – to persuade someone to support you or agree with you, often when they were opposed to you before:

- He's not sure about the idea, but I'm sure we'll win him over in the end.

- This is the last chance for the candidates to win over voters.

Hindsight – the ability to understand an event or situation only after it has happened:

- With hindsight, I should have taken the job.
- In hindsight, it would have been better to wait.

Advocate (v.) – to publicly support or suggest an idea, development, or way of doing something:

- She advocates taking a more long-term view.
- He advocates the return of capital punishment.

Up to sth – able to do something:

- I had four hundred pages of reports to read, and I just didn't feel up to it.
- (up to the job/task) Do you think he's up to the job?

Appeal (v.) – to interest or attract someone:

- It's a programme designed to appeal mainly to 16 to 25-year-olds.
- I think what appeals to me about his painting is his use of colour.
- I haven't been skiing - it's never really appealed.

Conventional wisdom – opinions or theories that have existed for a long time and that most people agree with:

- The book challenges the conventional wisdom that companies are engaged in a "war" for talent.

Be a question of doing sth – to be necessary to do a particular thing:

- It's simply/just a question of working hard for a month and then you can relax.

Run out – to finish, use, or sell all of something, so that there is none left:

- I've run out of milk/money/ideas/patience.
- "Do you have any milk?" "Sorry, I've run out."

Maiden voyage (n.) – the first journey made by a ship or spacecraft:

The Titanic sank on its maiden voyage in 1912.

Fortune (n). – a very large amount of money or property:

- They made a fortune in real estate.
- This dress cost a (small) fortune (= a lot of money).

Scrap (n.) – old cars and machines or pieces of metal, etc. that are not now needed but have parts that can be used to make other things:

scrap iron/metal

We sold our old car for scrap.