

## The Great Chunnel Debate

*Contents:* Information, questions and debate concerning the building of a fixed Channel link.

*Time:* 2 periods or more, depending on the amount of time spent on the debate.

*Intended use:* GCSE Physics, Engineering Studies, Environmental Studies and Technology. Although not linked to any specific syllabus area, the unit illustrates a number of the economic, social and environmental issues associated with large engineering projects.

*Aims:*

- To describe the nature of fixed Channel link projects, in particular the Channel Tunnel
- To develop awareness of some of the economic, social and environmental issues associated with major engineering projects
- To explore some of the benefits and drawbacks of a fixed Channel link
- To provide opportunities to practise communication skills, in particular debating skills.

*Requirements:* Students' worksheets No. 605

The unit is in four parts:

- Part 1 The advantages of a fixed Channel link
- Part 2 The Channel Tunnel plan
- Part 3 The case against the link
- Part 4 The Great Chunnel Debate.

The first three parts comprise general information and questions concerning the building of a fixed Channel link. It should be noted that many different projects have been proposed over the years for a Channel tunnel or bridge. In 1986 the British and French Governments selected the proposal for a twin railway tunnel put forward by the Channel Tunnel Group. Other strong contenders included the Euroroute, a combined road/rail, bridge/tunnel scheme, and Channel Expressway, a proposal comprising two road tunnels and two rail tunnels.

Part 4 of the unit comprises a classroom debate. Having completed the first three parts, students should be reasonably familiar with the arguments for and against the tunnel. It is suggested that two groups should be created, one for and one against. The optimum group size would be four or five, but it will probably be necessary either to have larger groups than this, or to select a limited number of the class for group membership, the remainder making up the voting audience. It will also be necessary to decide how to conduct the debate. One approach would be to allow each group five minutes to present their case, followed by questions from the floor and then a vote. Groups may wish to elect a spokesperson, or to divide up the presentation between them.

### Notes on some of the questions

Q.6 The advantages of a fixed link:

- (a) Independent of weather
- (b) Faster than ferries
- (c) No transshipment of passengers and goods needed
- (d) Safety considerations: there is always the risk of a ferry colliding with other shipping in fog, particularly as the ferries travel almost at right angles to the main shipping routes
- (e) Possibilities for relieving road congestion
- (f) Job creation during the construction period.

Q.7 If road traffic is involved, a bridge has the advantage that it needs no ventilation and is less tiring for drivers than a tunnel. But a bridge would be a potential hazard and constraint to shipping, particularly in fog. It would be less protected from the weather, and it would cost more (see note on Q.12).

Q.8 The maximum debt is £7500 million.

Q.9 The debt is paid off after 22 years.

Q.10 Two years after the debt is paid off the tunnel will have earned £200 million.

Students may wonder why the debt goes on increasing even after the tunnel has opened and has started to earn income. This is because initially it does not earn enough to compensate for the effect of accumulating compound interest. Later, as the income increases, the debt begins to be paid off faster than interest accumulates.

Q.11 This is naturally a matter of opinion and political belief. Most experts consider that at least limited financial guarantees to cover cancellation or delays are needed from both governments if the confidence of investors is to be retained. The EEC is a possible source of funding.

Q.12 In general, bridge projects are more expensive than a tunnel. The combined bridge/tunnel Euroroute project was costed at £6000 million in the 1984 Banks' report (compared with £2000 million for the tunnel).

### Costs

The figures given for the projected costs of the project are taken from the report of five major banks, *Finance for a Fixed Channel Link*, published May 1984. The figures may well be at variance with those given by the promoters themselves. Naturally there is a great deal of uncertainty associated with any estimates of cost for a project such as this.

### Further resources

Further information on the Channel Tunnel project can be obtained from: The Channel Tunnel Group, 28 Hammersmith Grove, London W6 7EN.

*Acknowledgements* Figure 1 BBC Hulton Picture Library; Figures 3 and 4 supplied by The Channel Tunnel Group; Figure 6 supplied by Sealink British Ferries.

## THE GREAT CHUNNEL DEBATE

Dover Strait is a shallow stretch of busy seaway between the English Channel and the North Sea. The weather often plays havoc with shipping services across the Strait. Many projects have been proposed for a fixed Channel link above or below the waves.

One of the first plans, in 1802, was for a tunnel for horse-drawn traffic. In 1880 a tunnel was actually started. It was stopped because people were afraid it could be used for invasion. In 1974, another tunnel was begun, but abandoned in 1975 for lack of money. In 1986, the British and French governments agreed to allow a railway tunnel to be built. But did they make the right decision? In this unit we will look at some of the arguments for and against.

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- Part 2 The Channel Tunnel plan
- Part 3 The case against the link
- Part 4 The Great Chunnel Debate.

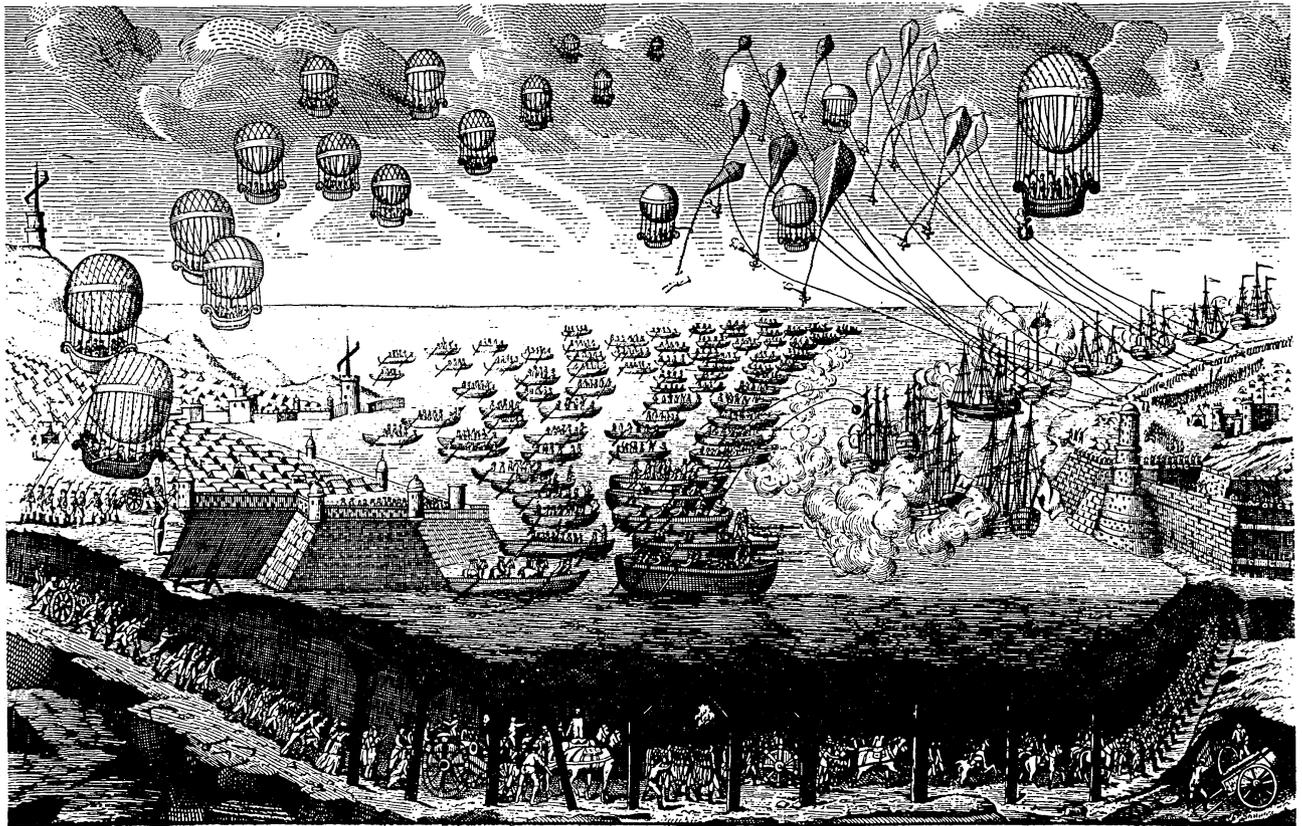


Figure 1 This picture, drawn in 1803, shows an imaginary invasion of England by Napoleon's soldiers by sea, air and Channel tunnel.

## Part 1 The advantages of a fixed Channel link

Since joining the European Economic Community in 1973, Britain has become much more involved with mainland Europe. Nearly half of Britain's trade is with European countries like France, Germany and Italy. At the moment, goods going to and from Europe have to be loaded and unloaded onto Channel ferries. The same is true of passenger journeys.

A fixed Channel link, whether a bridge or a tunnel, would greatly improve trade links between Britain and the Continent. Travel would be faster and much easier. The link would be independent of the weather. Building the link would be an enormous project, and the main problem is how to pay for it. However, it would provide jobs for thousands of people.

Before you go any further, tackle questions 1 to 7. For the time being, forget that a decision has been made to build a tunnel. Decide what *you* think is best.

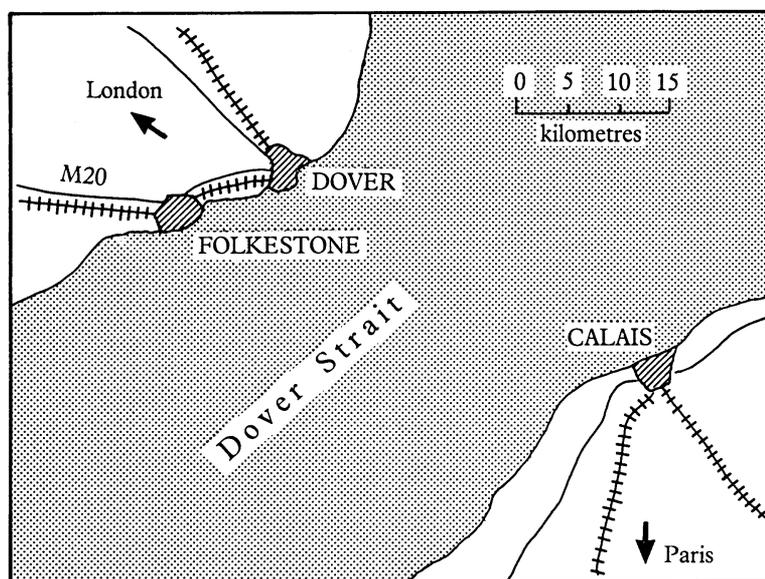


Figure 2 Dover Strait

## Part 2 The Channel Tunnel Plan

Many different schemes have been suggested. The one accepted by the British and French governments was for a twin railway tunnel (Figure 3 on the next page).

Two railway tunnels would be bored through a layer of chalk 40 metres below the sea bed. This chalk is easy to bore through, and it runs evenly from coast to coast. It is impervious — it does not let water in. Laser-guided machines would be used to bore the tunnels.

### Questions

- 1 Make a rough copy of the map of Dover Strait shown in Figure 2.
- 2 What is the shortest distance between England and France, in kilometres?
- 3 Now choose what you think is the best route for a fixed cross-Channel link. You will need to consider the position and ease of access for existing roads and railways. Carefully draw the route on your map.
- 4 What type of fixed link do you think would be best (for example, tunnel, bridge or combination)? Give your reasons.
- 5 Will your link carry a road, a railway or both? Give your reasons.
- 6 What advantages would your scheme have over existing air and sea services, including hovercraft?
- 7 Compare the advantages of (a) a bridge and (b) a tunnel.

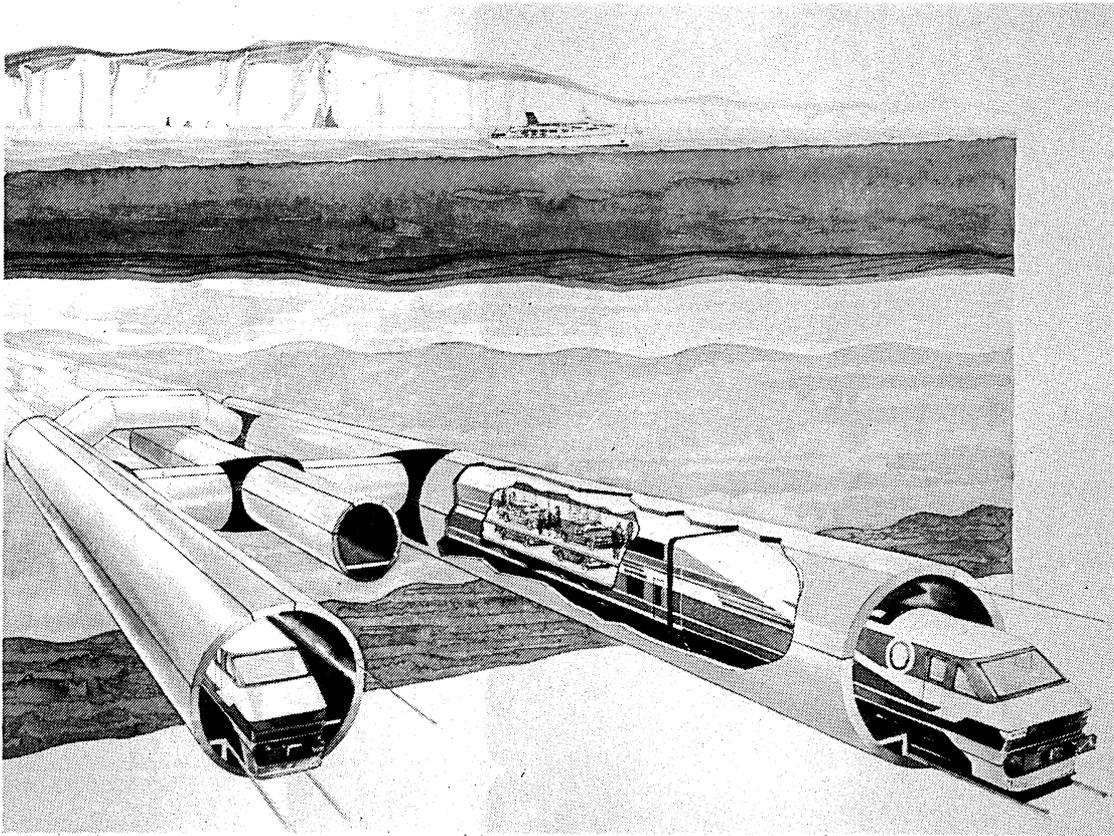


Figure 3 The twin railway tunnel. Length 50km, with 37km under the sea.

Road traffic would be carried by ferry trains. The trains would travel at up to 160 km/hour, and crossing time would be 25 minutes. Vehicles would be loaded onto the ferry trains at terminals at each end of the tunnel. Many goods could be carried by container. The big containers can be quickly loaded from lorries onto trains, then back onto lorries.

Through train services would operate between London and Paris, Lille or Brussels. There would be onward connections to other European cities. The journey time from London to Paris would be about four hours. This is less than half the present time. French Railways (SNCF) have planned a new high-speed track linking the tunnel to Paris. High-speed trains might be able to do the journey from London to Paris in as little as two hours.

Freight and goods could be carried from Britain to many European cities very quickly. For example, Scotch whisky could travel from Glasgow to Geneva in Switzerland in 36 hours.

It would be necessary to build large terminals for the loading and unloading of road vehicles (see Figure 4 on the next page). Most of the work would go on underground. The rock and other material removed from the tunnel could be used to build earthworks for the terminals. It could also be used in other projects, such as sea barriers. An environmental advantage would be that a lot of heavy road traffic would be diverted to rail. The tunnelling work would generate thousands of jobs in the Dover area. More jobs would be created in other parts of Britain, to supply machines and materials for the project.



Figure 4 Model of Channel Tunnel Terminal at Cheriton, near Folkestone, Kent

### How much will it cost?

In 1984 the British government said it would not spend public money on any Channel link project. This means the money has to be borrowed privately — from banks and shareholders. Interest would have to be paid to the people who lent the money. This interest would build up and add to the total size of the loan. The loan would not be paid off until the project had earned enough income. Income would be earned by charging tolls for traffic using the tunnel. Table 1 gives possible cost and income figures for the tunnel.

Table 1 Possible cost and income for the Channel Tunnel

Cost to build	£2000 million
Time needed to build	7 years
Size of debt at time of opening	£6500 million
Expected yearly income (after deducting running costs):	
at time of opening	£100 million
25 years after opening	£320 million

The graph in Figure 5 on the next page shows how the debt would change over the years. Notice the way the debt builds up, due to interest, then drops, due to repayment from income.

Use the graph and Table 1 to answer questions 8 to 11.

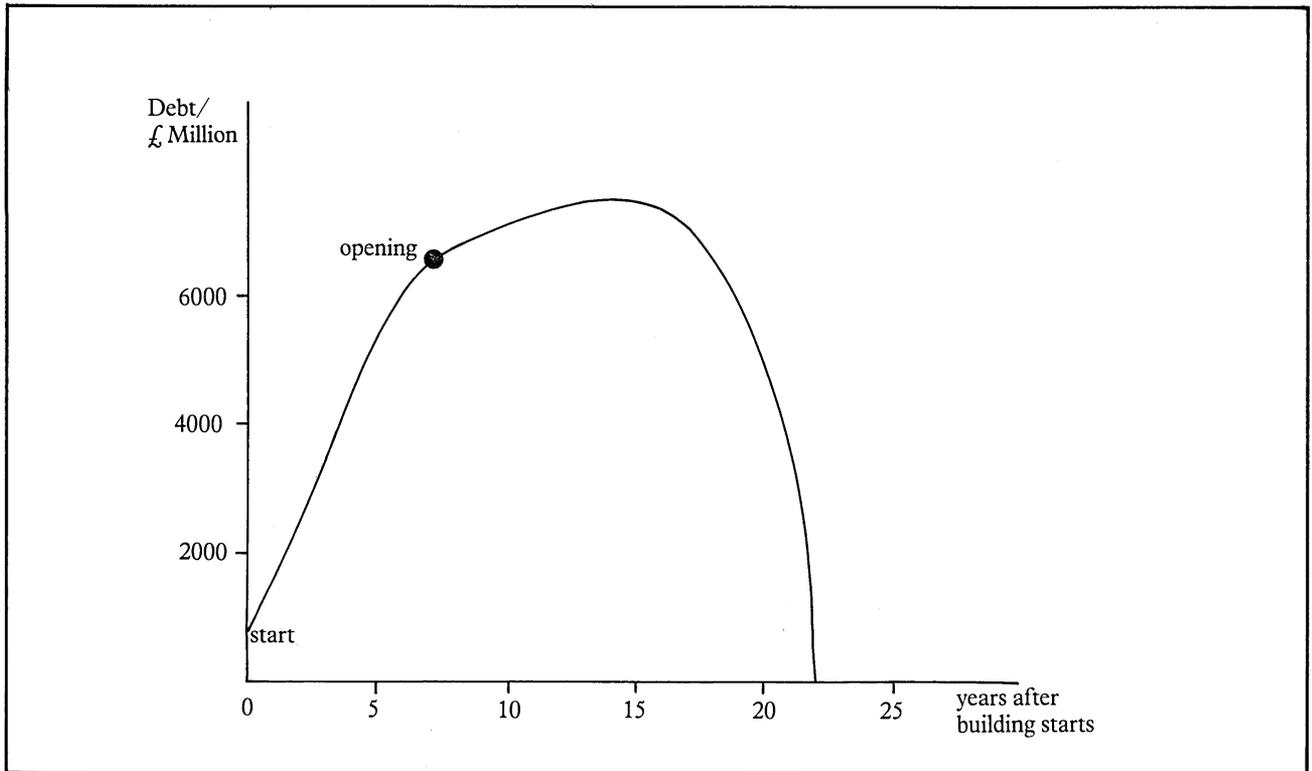


Figure 5

### Part 3 The case against the link

There are a number of objections to building a Channel Tunnel. Some of these are given below.

- *Finance* The Channel Tunnel would cost billions of pounds. Would this money be better spent on other projects?
- *Do we need it?* Dover Harbour Board already operates the world's largest ferry port. Ferry services from Dover could be expanded still further. There are cross-Channel services from other ports too (Figure 7 on the next page). It would be possible to develop these other ports, creating employment in areas other than the South East. Developing cross-Channel ferries in this way could make the Channel Tunnel unnecessary.

#### Questions

- 8 What is the size of the maximum debt?
- 9 How long after the start of building will it be before the debt is completely paid off?
- 10 How much income will the tunnel have earned one year after the debt has been paid off?
- 11 Do you think a Channel link project should be paid for out of public money or out of private money? Give reasons for your answer.



Figure 6 A cross-Channel car ferry

- *Flexibility* Ferry services are more flexible than a tunnel. They could easily adapt to future trends in cross-Channel transport. A tunnel, once built, could not be changed.
- *Environmental problems* Large terminals would have to be built at each end of the tunnel. These would take up a lot of land and change the local landscape. There would be 4 million cubic metres of rock and spoil removed from the tunnel to get rid of.

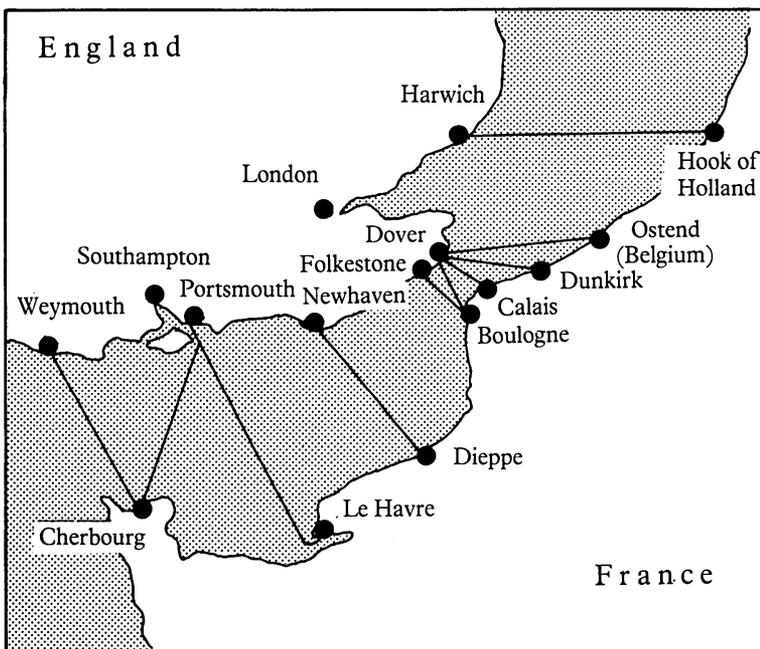


Figure 7 Some ferry services between England and Europe

- *What happens if the tunnel has to close?* This might happen temporarily from time to time, for example, because of accidents. Closure would cause enormous traffic jams if the tunnel was the main route to Europe.

- *Sabotage* A tunnel would be vulnerable to sabotage. For example, terrorists might threaten to blow it up or block it.
- *Cost and time over-run* It is very difficult to estimate how much a project like this would cost, or how long it would take to build. It is quite likely that the project would cost more, and take longer, than estimated. An example of this occurred with the 22-kilometre tunnel between Japan's two main islands. It was seven years behind schedule and cost three times more than estimated.

Answer questions 12 to 15.

## Part 4 The Great Chunnel Debate

In this part you will be debating and voting for or against building the Channel Tunnel.

There will be two groups, one for and one against.

Each group should prepare its case carefully, using the information earlier in the unit.

You should consider:

- (a) the quality and convenience of services offered
- (b) the cost
- (c) the employment generated or lost
- (d) the environmental advantages and disadvantages
- (e) the long-term prospects

and any other important features.

Each group will have a chance to present its case to the class. There will be opportunities to question the two groups. Then a vote will be taken to decide for or against the Channel Tunnel.

### Questions

*Suppose there had been a decision to build a bridge instead of a tunnel.*

- 12 *Would a bridge cost more or less than a tunnel, do you think?*
- 13 *Would a bridge provide better services than a tunnel?*
- 14 *Would a bridge be more or less vulnerable to sabotage?*
- 15 *Would a bridge cause more or less environmental problems?*