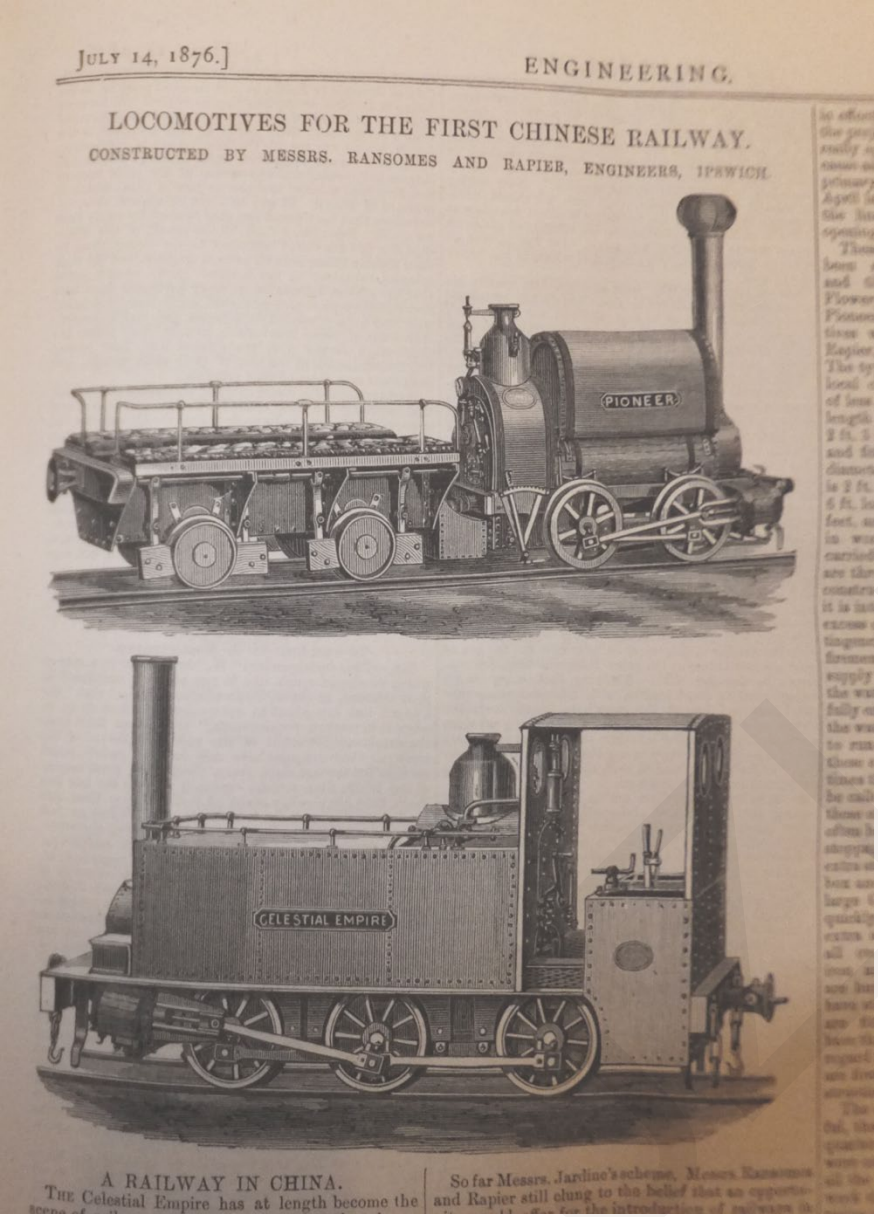
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Background of recent developments of passenger railways in China, the UK and other European countries

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JULY 14, 1876.] ENGINEERING.

LOCOMOTIVES FOR THE FIRST CHINESE RAILWAY.

CONSTRUCTED BY MESSRS. RANSOMES AND RAPIER, ENGINEERS, IPSWICH.

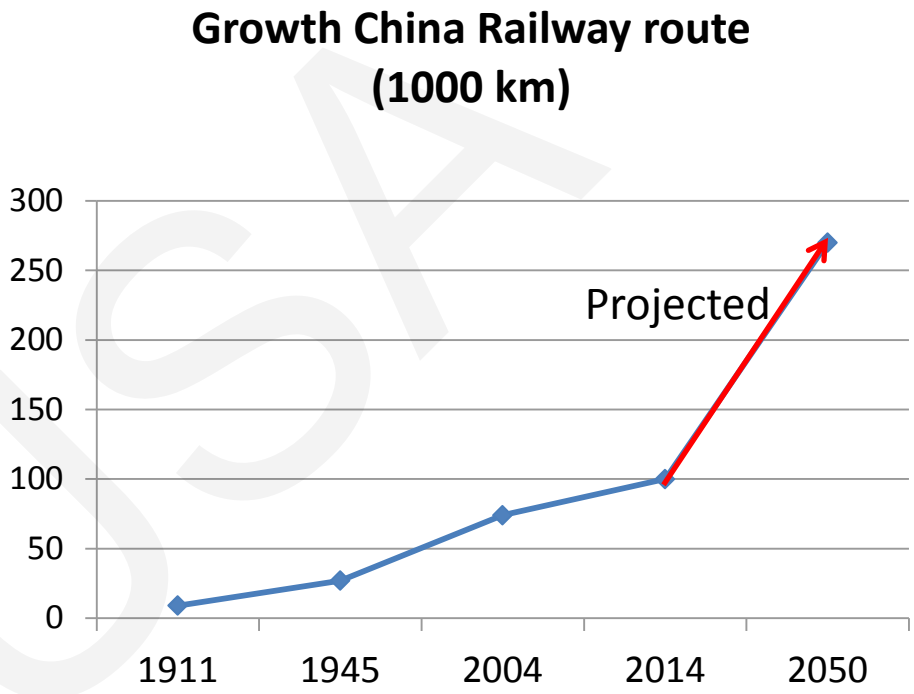
PIONEER

CELESTIAL EMPIRE

A RAILWAY IN CHINA.

THE Celestial Empire has at length become the

So far Messrs. Jardine's scheme, Messrs. Ransomes and Rapier still clung to the belief that an opportu-



China rail today:

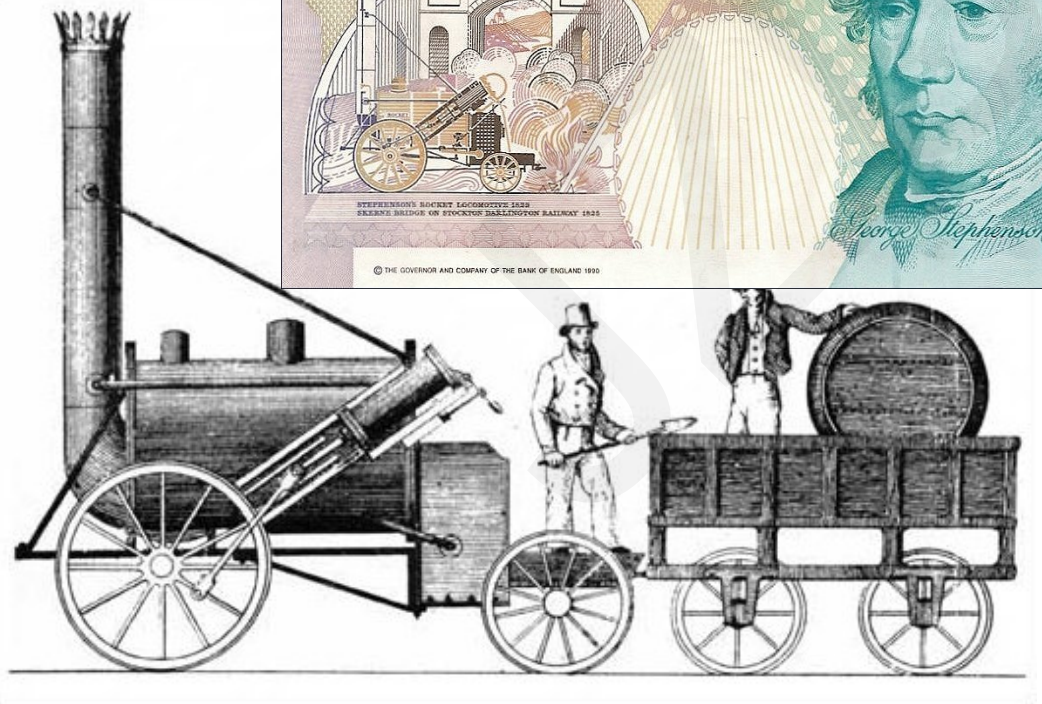
100,000 km
47% electrified
6% of world's railways
25% of world rail traffic
HS lines> 10 k km



Rocket (1829)

George Stephenson

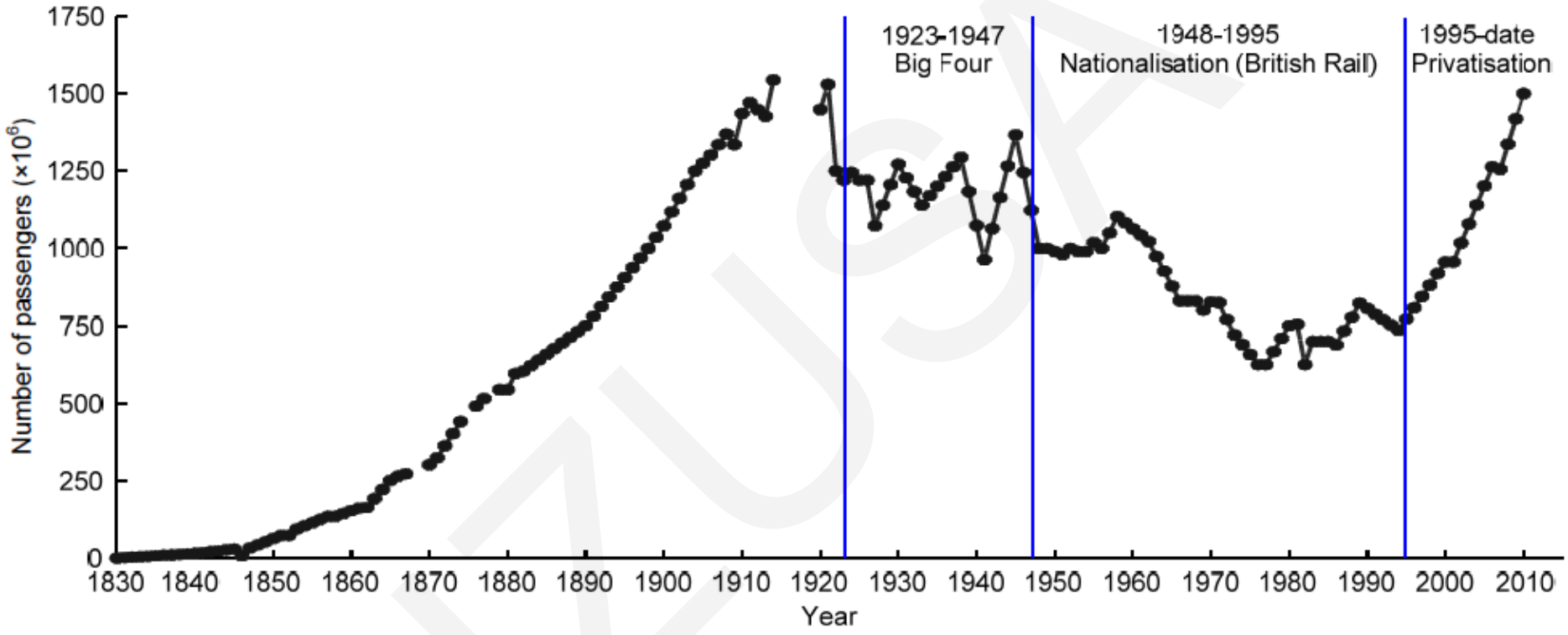






Now (2014) in Science Museum

Historical development of rail passenger volume in the UK



The cuts in number of railway passengers came during a period of rapid expansion of car ownership in the 1960's. This graph of ridership shows the strong return of huge numbers of passengers to the railway in the last decade or so. It is not clear what the reason for this is, but congestion and uncertain journey times on the crowded road network certainly have played a part.

Some international railway comparisons

Country	Area ($\times 10^6$ km^2)	Population ($\times 10^6$)	Route (km)	Route/person (km/million)	Average journey (km)	Intensity*
China	9.640	1351	1×10^5	70	518	26.9
UK	0.242	62.8	15 775	25	40	9.3
Germany	0.349	82	33 707	41	41	6.3
Japan	0.378	127.5	20 852	16	17	51.6

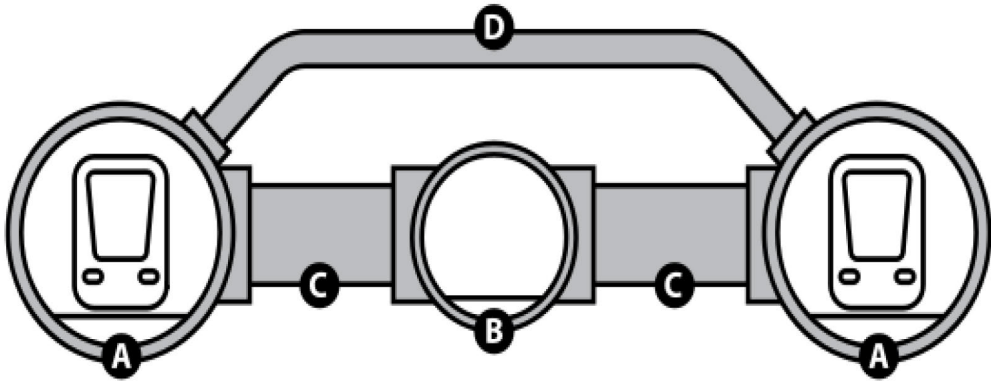
Notice that the huge route length in China is shared by many people, so the length of route per capita is only about ¼ that of the UK and 1/6 that of Germany. The average journey length in China is huge 518km reflecting the importance of the inter city network: notice the low figure of 17 for Japan reflecting the huge commuter network: largely absent in China but developing strongly with new metro and subway builds. The intensity, defined in the figure, is a measure of passenger utilization of route: Japan is the most intense, China is a large multiple better than the UK and other European countries.



High speed 1 opened in full on 14 November 2007

Channel Tunnel:
connected twin bore and service tunnel

Speeds in the Tunnel are limited to 160kph



Fatality risk of passenger using different mode of transport (EU-27 in 2008-2010)

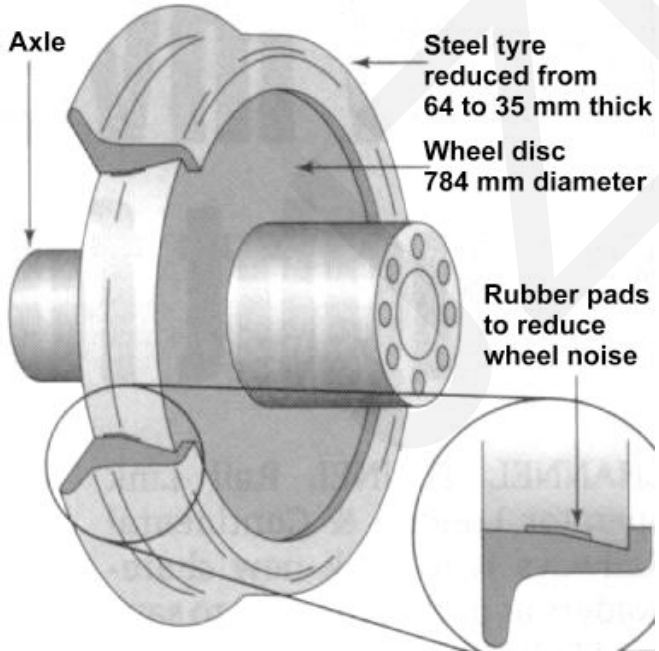
Mode	Fatalities per billion passenger kilometres
Airline passenger	**0.1**
Railway passenger	**0.16**
Car occupant	**4.45**
Bus/Coach occupant	**0.43**
Powered two-wheelers	**52.59**
Vessels passenger	**N/A**

It is well established that rail is a relatively safe mode of transport, these European figures illustrate the point. Notice that the airlines have an extremely impressive safety record.

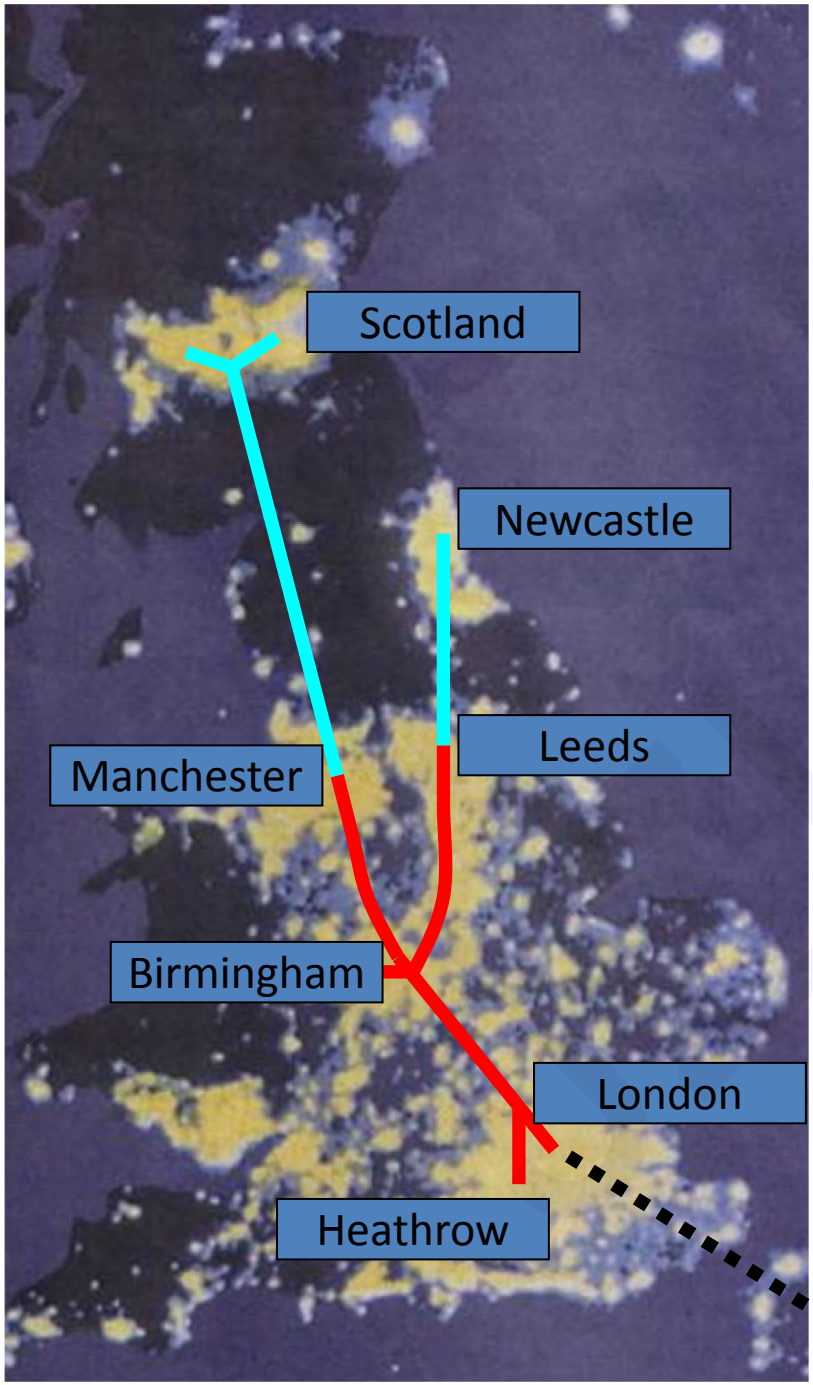
Source: ERA.



The German Eschede train disaster occurred on 3 June 1998,
101 people killed: the worlds worst high speed rail accident





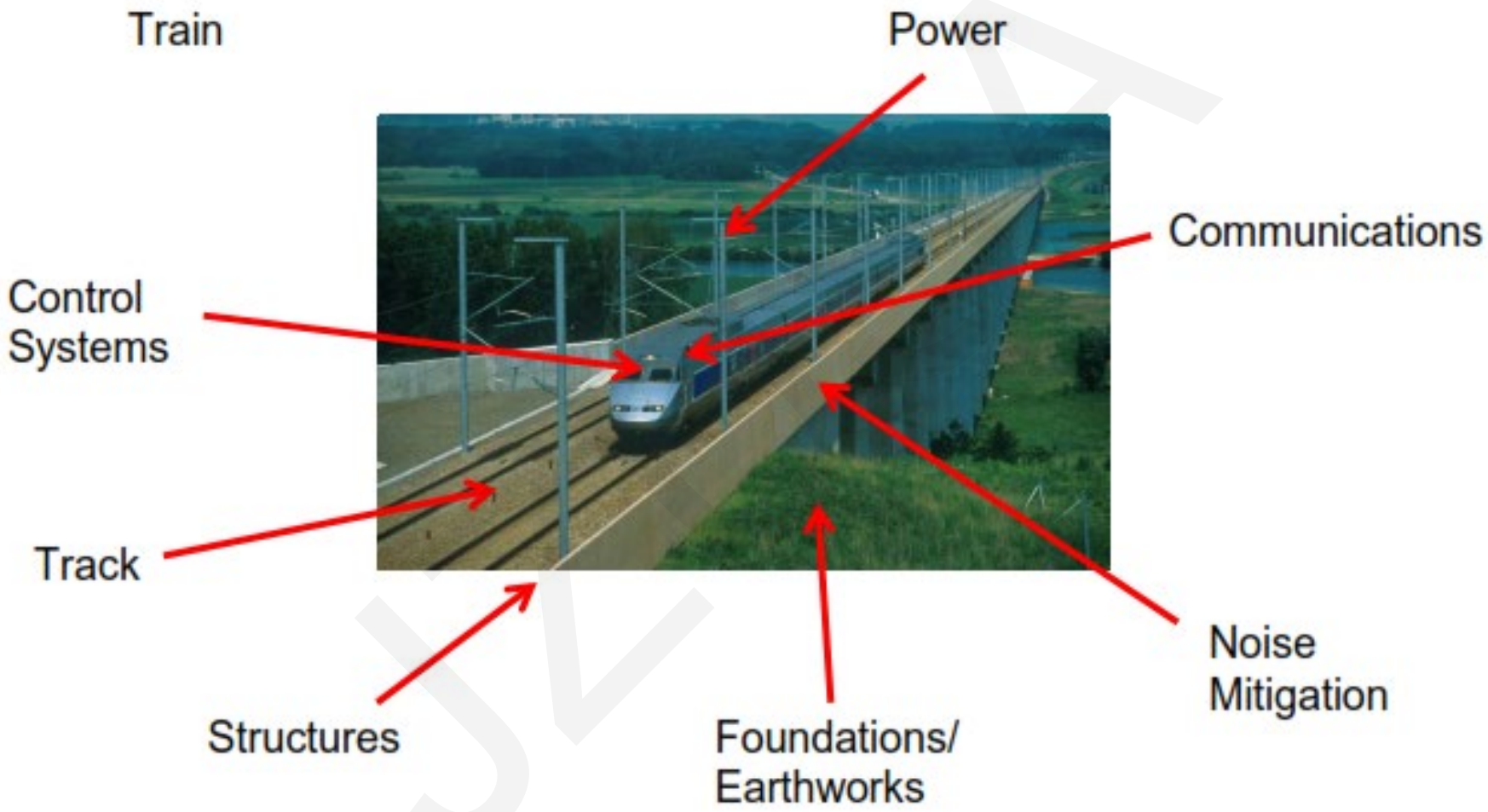


The HS2 plan is to built a Y shaped network. London to Birmingham, then onwards to Leeds, and Manchester with possible Scotland connections either by the west or east routes shown.

- Old & new times London to
  - West Midlands 1-24 to 0-49
  - Manchester 2-08 to 1-08
  - Leeds 2-12 to 1-22
  - Scotland 4-20 to 3-38

- Birmingham to
  - Manchester 1-34 to 0-41
  - Leeds 2-05 to 0-57
  - Paris 4-30 to 3-00

Complex technical system



+ people, both staff and passengers