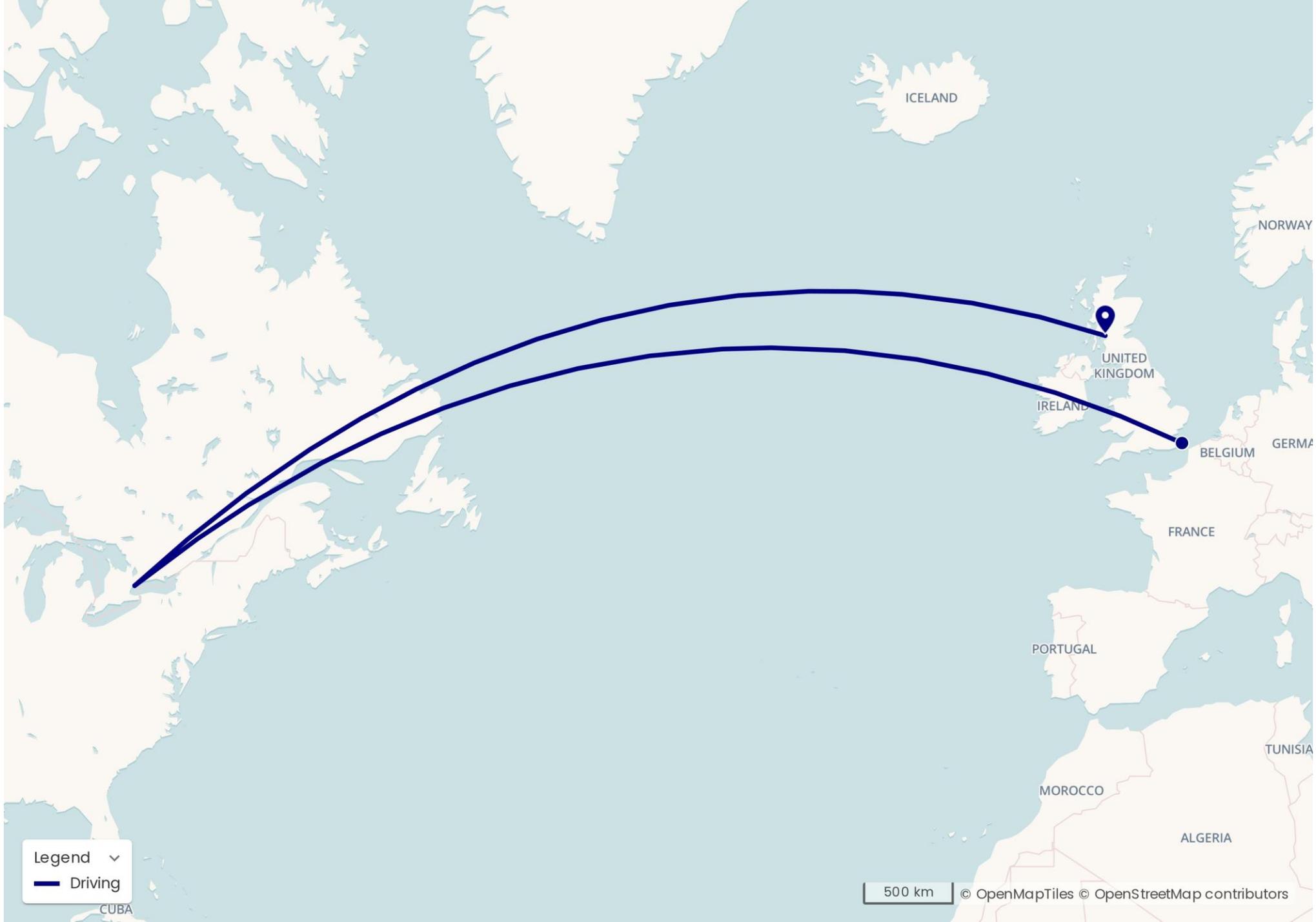


The construction of the Channel Tunnel 1802-1994

Stewart Campbell
Helensburgh, Scotland

Newmarket Men's Probus





Legend
— Driving

500 km © OpenMapTiles © OpenStreetMap contributors

The Channel Tunnel

- Third longest railway tunnel in the world (50.5 km)
- Longest under-sea section in the world (39.7 km)
- UK land section 9.3 km; French land section 3.3 km
- Running tunnels 7.6 m diam, service tunnel 4.8 m diam
- Carries passenger express trains (Eurotunnel) between London and Paris/Brussels and beyond
- Carries car and lorry shuttles
- Carries conventional freight trains

Canadian tunnels

- Brockville, Toronto, 518 m, 1860
- Sarnia - Port Huron, 1800 m long between portals, 1891 (first tunnel in North America to be built under compressed air)
- Connaught Tunnel under Rogers Pass, 8 km, 1916
- Mount MacDonald Tunnel, also under Rogers Pass, 14.6 km, 1988 (longest railway tunnel in the Western hemisphere)

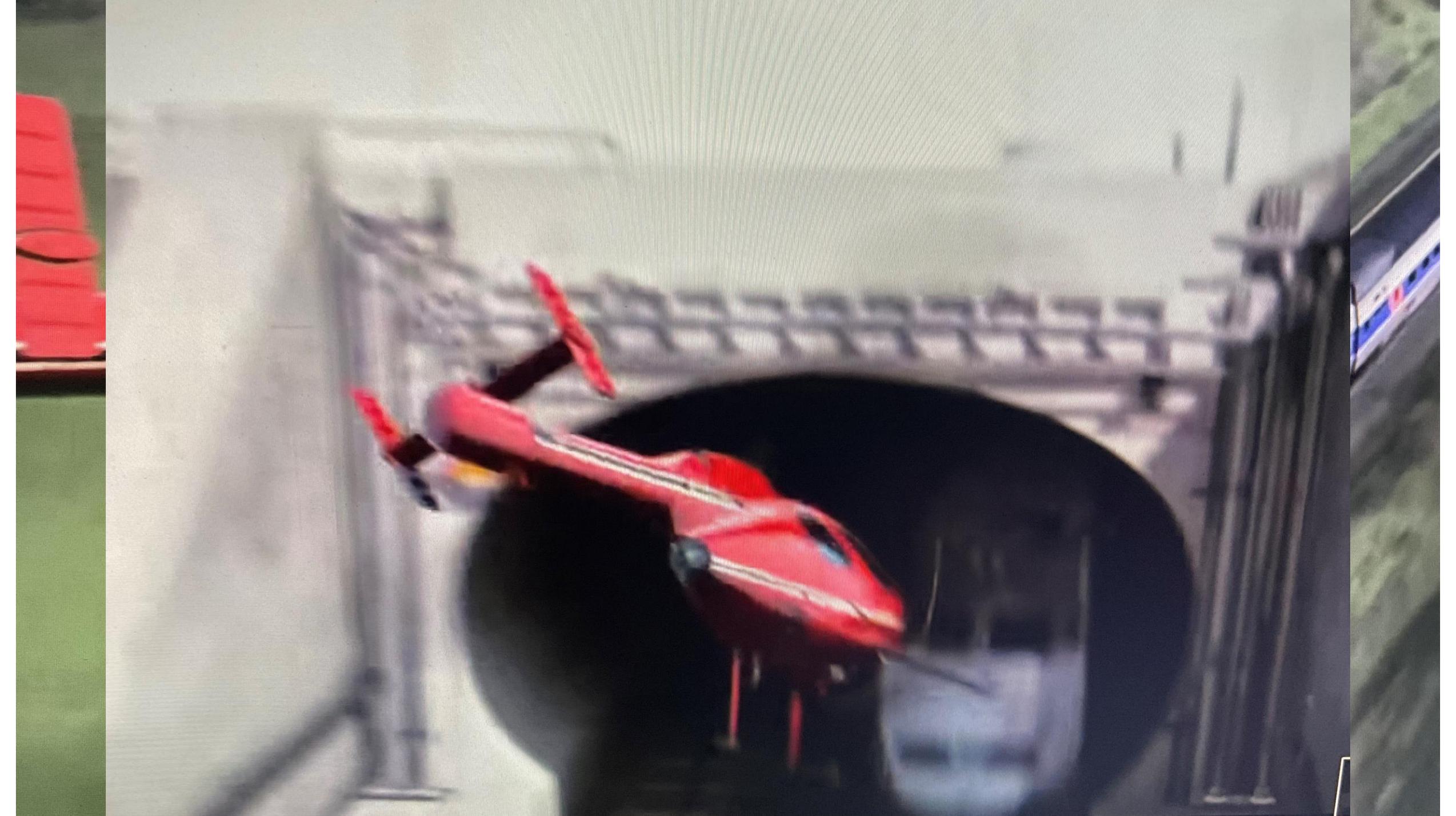
Mission:Impossible 1996

A Channel Tunnel documentary?

- <https://www.youtube.com/watch?v=4WaXuRWGrvw>















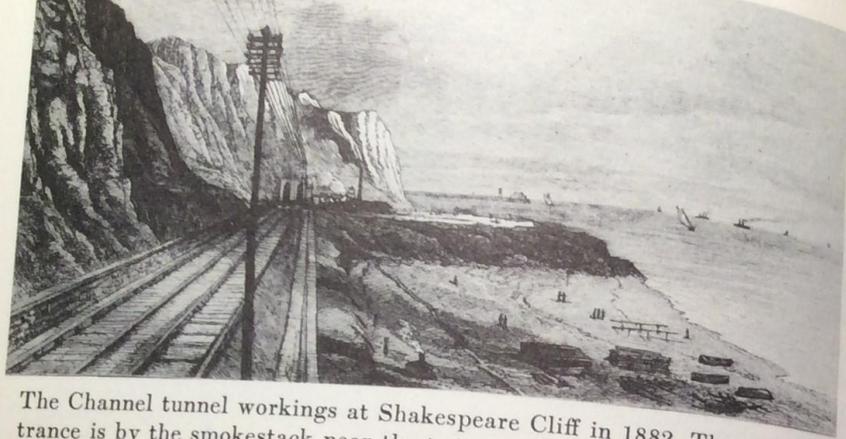


History

- First considered 1802, and many times thereafter
- 1830-50: Thomé de Gamond – fears of invasion/conger eels!
- 1878-80: Sir Edward Watkin and Col Beaumont – fears of invasion!
- Early 1970's governments agreed – abandoned 1975 – fear of cost!
- February 1986 – agreement to proceed via Treaty of Canterbury
- Construction proper began December 1987 – opened 6 May 1994







The Channel tunnel workings at Shakespeare Cliff in 1882. The entrance is by the smokestack near the twin portals, which are unconnected with the tunnel workings.

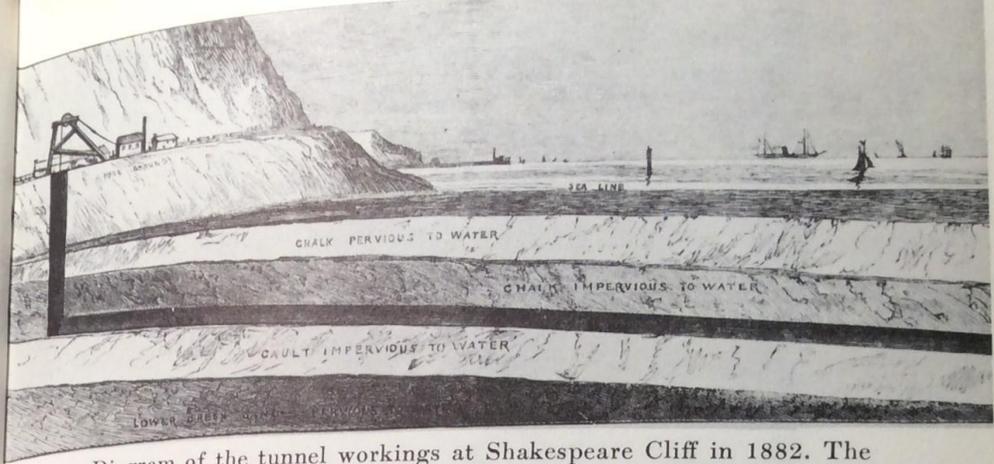


Diagram of the tunnel workings at Shakespeare Cliff in 1882. The Admiralty Pier at Dover is in the distance.



TUNNEL PARTIES IN THE 1880s

Everybody who was anybody went down into the tunnel to inspect the new undersea road to France.

1. Guests preparing for the descent.
2. Being lowered 163 feet below the surface to the gallery.
3. Champagne party in the tunnel.
4. Inspecting the Beaumont tunneling machine as it bores toward France.
5. Tunnel oratory at champagne lunch at Dover.

3

5





Southend-on-Sea

Rochester

Maidstone

Canterbury

Ashford

Dover

Folkestone

Margate

Ramsgate

Deal

Bexhill

Hastings

Calais

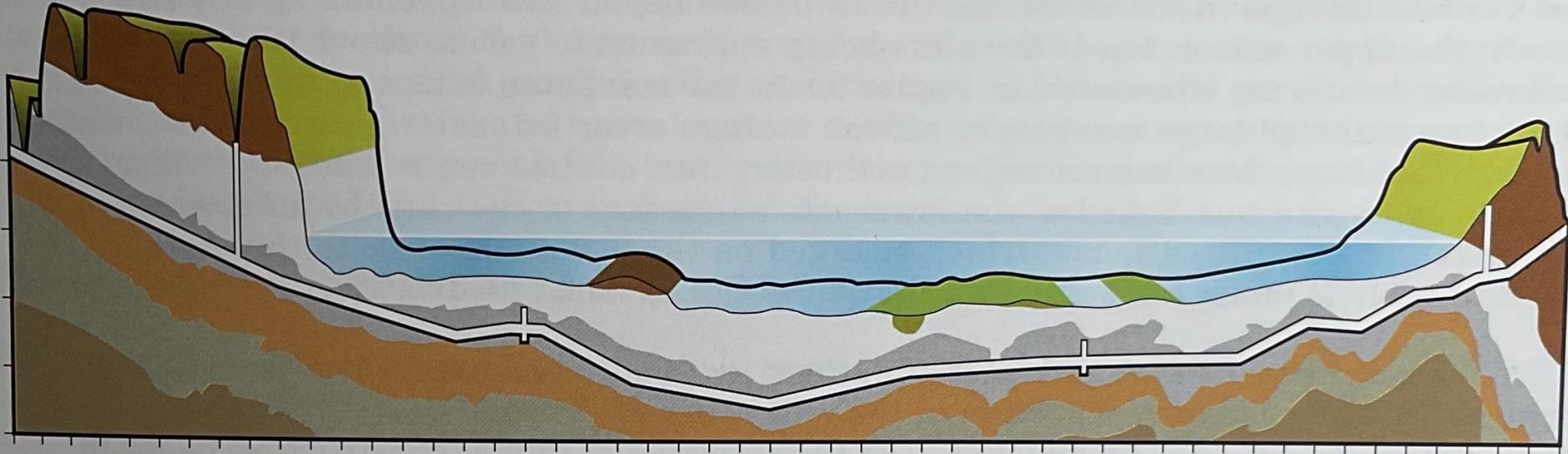
Strait of Dover

EUROTUNNEL

Sites

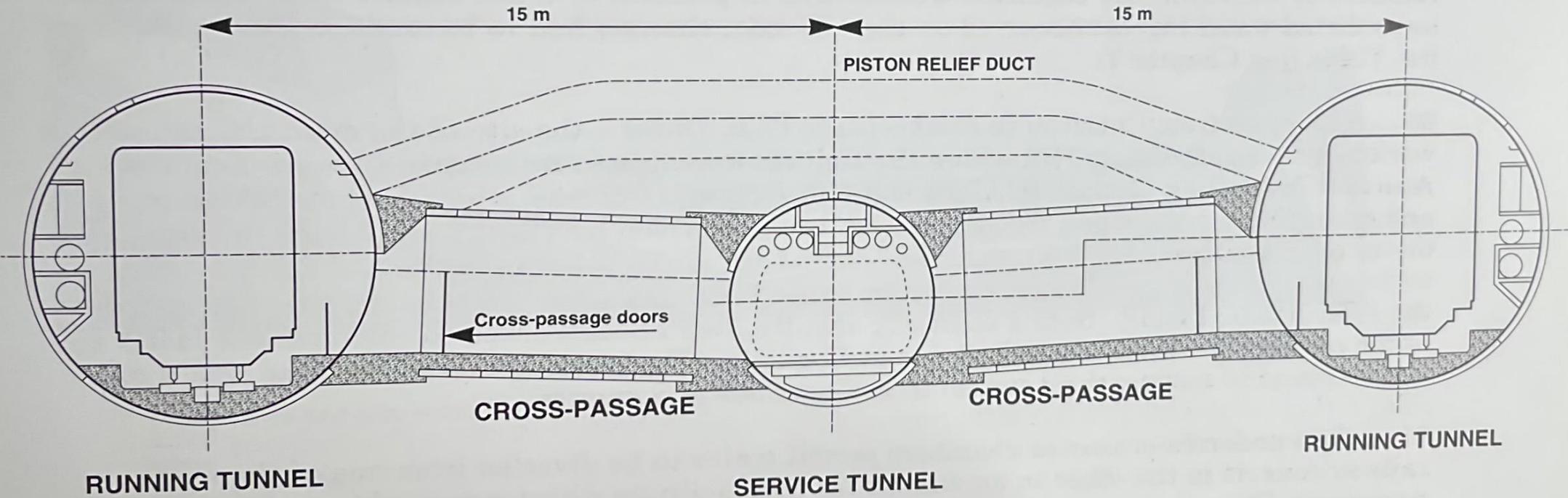
- Shakespeare Cliff, Dover – main tunnelling site (~5,000 workers at max)
- Holywell Combe – land tunnels cut and cover
- Folkestone/Cheriton – shuttle terminal and portal for Eurostar (~1,000 workers)
- Isle of Grain – segment manufacture (~750 workers)

Figure 2 Tunnel undersea route



-  White and grey chalk
-  Chalk marl
-  Gault clay
-  Green sand

Figure 1 Cross-section through tunnels and cross-passages



Tunnelling

- Two running tunnels each 7.6 m finished diameter
- One service tunnel running between them, 4.8 m diameter
- Cross passages 3.3 m diameter every 375 m
- Piston relief ducts 2 m diameter every 250 m
- Two undersea crossover chambers 163 m long x 21 m wide x 15 m high (UK)
- Three undersea pumping stations

Tunnelling continued

- Still longest undersea section of any tunnel in world: about 75m below sea bed and 115m below sea level
- Seikan tunnel in Japan is longer overall and deeper
- Six tunnel boring machines (TBMs) on UK side – three marine, three land. Service tunnel TBMs manufactured by Howdens in Renfrew. Running tunnel TBMs by Robbins-Markham JV in Nottingham. Five French TBMs
- Marine Service tunnel breakthrough on 1 December 1990. Running tunnel breakthroughs in May and June 1991.
- UK marine TBMs buried off-line. French TBMs removed.



ONE DAY MR ALLWOOD, ALL THIS WILL BE YOURS — AFTER I'VE FINISHED WITH IT!



BORIS

NO SMOKING BEYOND THIS POINT
DISCIPLINARY ACTION WILL BE TAKEN AGAINST ANY PERSON OR PERSONS VIOLATING THIS NOTICE

ONE WAY
←
IN

USE OF CIGARETTE LIGHTERS OR OTHER SOURCES OF IGNITION WITHOUT A PERMIT-TO-WORK IS PROHIBITED IN ALL SECTIONS OF THE UNDERGROUND WORKINGS BY ORDER

NO PHOTOGRAPHY & FILMING



PERSONNEL OF ALL RAILWAYS ARE NOT PERMITTED IN THE TUNNEL WORKINGS BY ORDER

BOARDING OR ALIGHTING FROM MAN RIDING CARS WHILST IN MOTION IS STRICTLY FORBIDDEN

WARNING
PERSONAL HI-FI OR PORTABLE RADIO OR RADIOSETS ARE NOT PERMITTED WITHIN THE UNDERGROUND WORKINGS BY ORDER



ALIMAX MAINTENANCE SCHEDULE

PLANT No	TIME/DAY
1-1	0800 - 1600
1-2	0800 - 1600
1-3	0800 - 1600
1-4	0800 - 1600
1-5	0800 - 1600
1-6	0800 - 1600
1-7	0800 - 1600
1-8	0800 - 1600
1-9	0800 - 1600
1-10	0800 - 1600
1-11	0800 - 1600
1-12	0800 - 1600
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1-43	0800 - 1600
1-44	0800 - 1600
1-45	0800 - 1600
1-46	0800 - 1600
1-47	0800 - 1600
1-48	0800 - 1600
1-49	0800 - 1600
1-50	0800 - 1600

WARNING

YOU ARE ABOUT TO ENTER A 'NO SMOKING' ZONE
DO YOU CARRY ON YOUR PERSON

1. CIGARETTES
2. MATCHES
3. PIPE OR CIGARS
4. CIGARETTE LIGHTER
5. ANY OTHER PROHIBITED SOURCE OF IGNITION ?

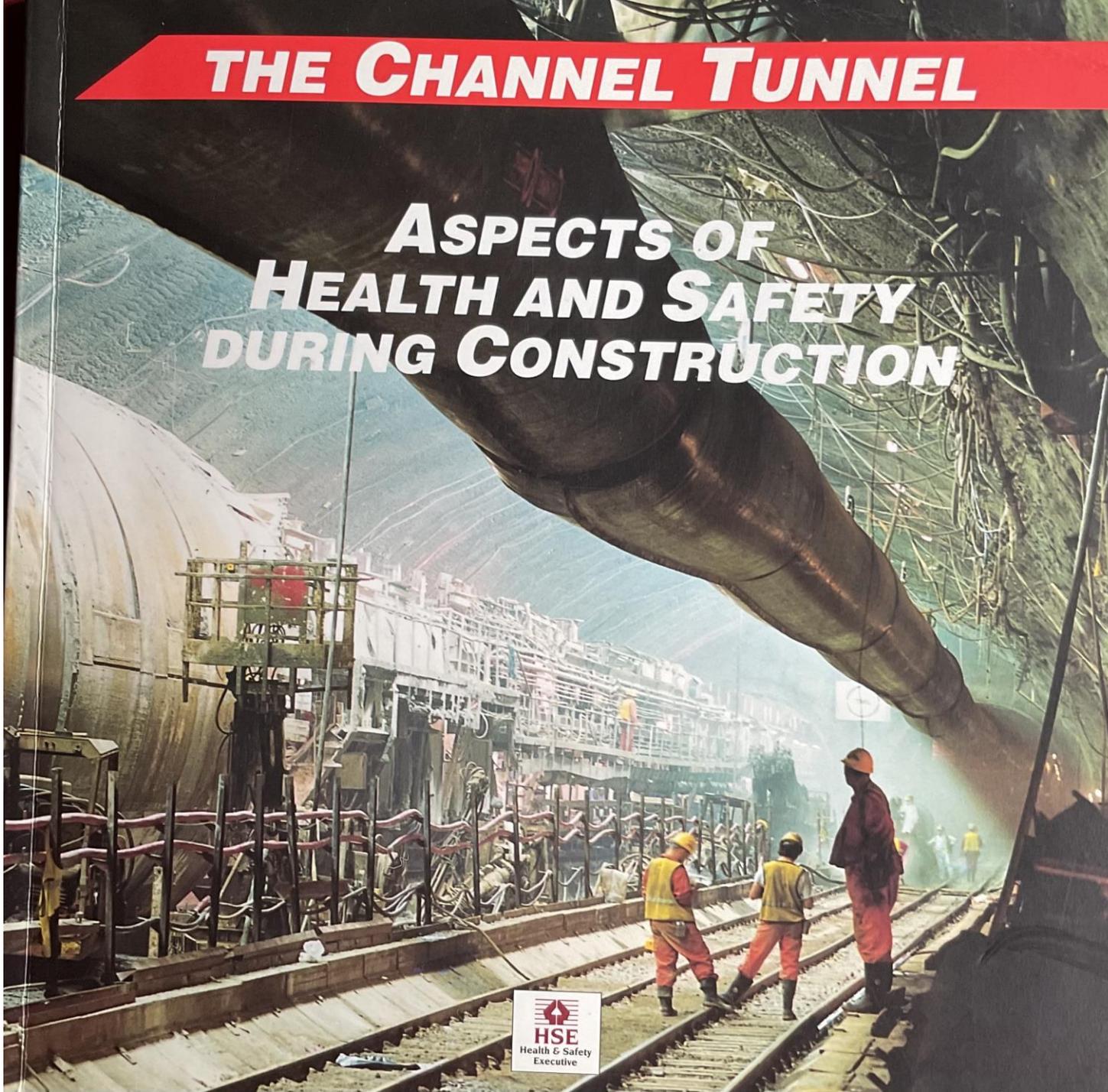
YOU MUST NOT ENTER IF YOU DO THE UNDERGROUND WORKINGS





THE CHANNEL TUNNEL

ASPECTS OF HEALTH AND SAFETY DURING CONSTRUCTION





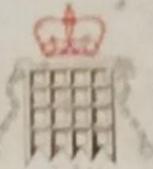




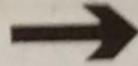




FRANCE



U.K.



LEEDS 365 MILES



Memories

- Deaths
- Scale
- Ingress/boreholes/technical changes/Glenn Miller
- Blind heading/mineral oil
- Cable sheathing/banning smoking
- Gold coins on terminal site

References

- https://en.wikipedia.org/wiki/Channel_Tunnel (but beware, there are issues)
- “The Channel Tunnel: Aspects of health and safety during construction” HMSO 1996 ISBN 0 7176 0906 5
- “The Tunnel under the Channel” Thomas Whiteside, publ Rupert Hart-Davis, 1962
- <https://www.channel5.com/show/building-the-channel-tunnel-25-years-on/>

Thank you for listening