

RAILWAY RESILIENCE:

Safeguarding the
Infrastructure to secure
tomorrow's Journeys.

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RAILWAY RESILIENCE

Content

- The Infrastructure
- Weather & Climate Impact
- Process and Policy
- Implementation



RAILWAY RESILIENCE

- Infrastructure

- Early 19th Century – Steam Engine trains.
- Late 19th Century – Railway electrification (LU 1890)
- Further expansion of Electrification post WW2 (Third Rail 1948 and OHLE 1956)
- Introduction of the diesel Engines 1950.



Railway Resilience – Infrastructure (Cont'D)

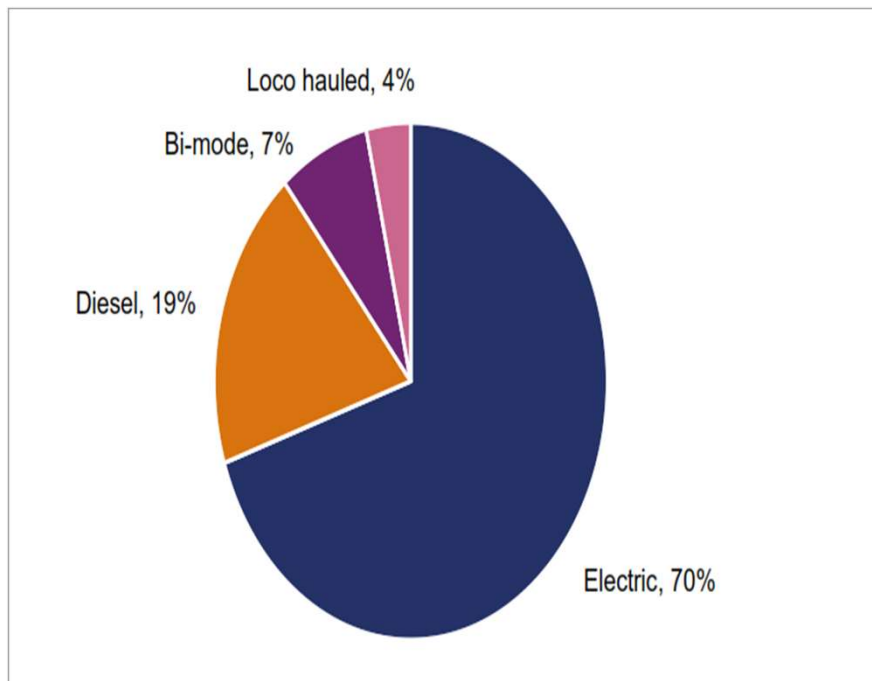


Fig – 1 – Breakdown by % TOC Rolling stock by Traction type

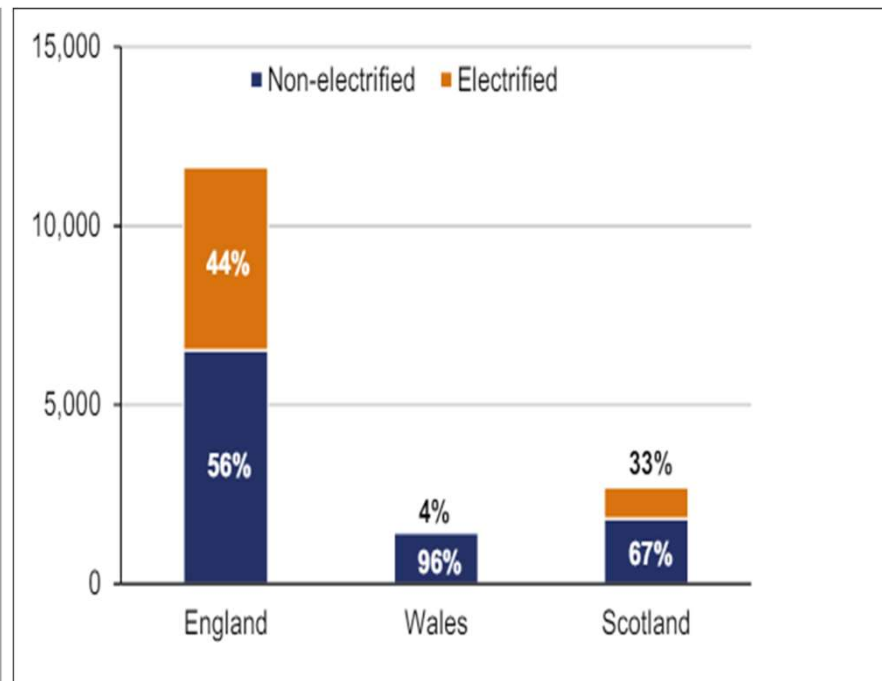


Fig – 2 – Ratio of Electrified to Non-electrified Tracks (in KM) within the UK

RAILWAY RESILIENCE

- The Infrastructure

- Network Rail are the UK Infrastructure managers , responsible for owning , repairing and developing the railway infrastructure.
- That's 20,000 miles of open tracks, 30,000 bridges, tunnels and viaducts and thousands of signals , level crossings and Stations.
- The cost of managing these infrastructure comes from the DfT , which operates a 5-year cycle Funding regime known as Control Periods (currently CP7 2024 -2029)



RAILWAY RESILIENCE

- The Infrastructure

- The UK railway infrastructure is critical to socio-economic growth and performance of both local and/or regional economies.
- The Passenger Performance Measure (PPM) is what the ORR (Office of Rail and Road) use to monitor and assess how effective the Railway operates
- Two Key Indicators for the ORR amongst other PPM metrics are Reliability and Punctuality



RAILWAY RESILIENCE

- The Infrastructure

- Disruptions occur on the railway networks requiring timetable adjustments, while causing delays and cancellations.
- Resilience in context of the Railway's ability to overcome disruptions i.e. the impact on the availability and performance of the asset for the smooth running of passenger trains by external factors.
- Weather effect of extreme climate changes are major causes of disruption to the railway infrastructure asset not meeting its normal operational capability.



Railway Resilience – Weather



Fig – 3 – Flooded Tracks at Bowling Station Scotland after a Stormy Weather Dec 2023



Fig – 4 – Flooded Tracks at Balloch West Dumbarton in Scotland Oct 2023

Source : (Network Rail 2023)

Railway Resilience – Weather



Fig – 5 – A fire on Overhead cables between Motherwell and Lockerbie Scotland after a Stormy Weather



Fig – 6 – Fallen Tree at Arrochar Tarbet Station on the West Highland

Source : (Network Rail 2023)

Railway Resilience – Weather



Fig – 7 – Landslide on the Railway line between Ardrossan and Largs in Scotland



Fig – 8 – The fatal derailment of a ScotRail train near Stonehaven in 2020

Source : (Network Rail 2023)

Railway Resilience – Weather



Fig – 9– Aerial view derailment of a ScotRail train near Stonehaven in Aug 2020

Source : (Network Rail
2023)

Railway Resilience – Process and Policy

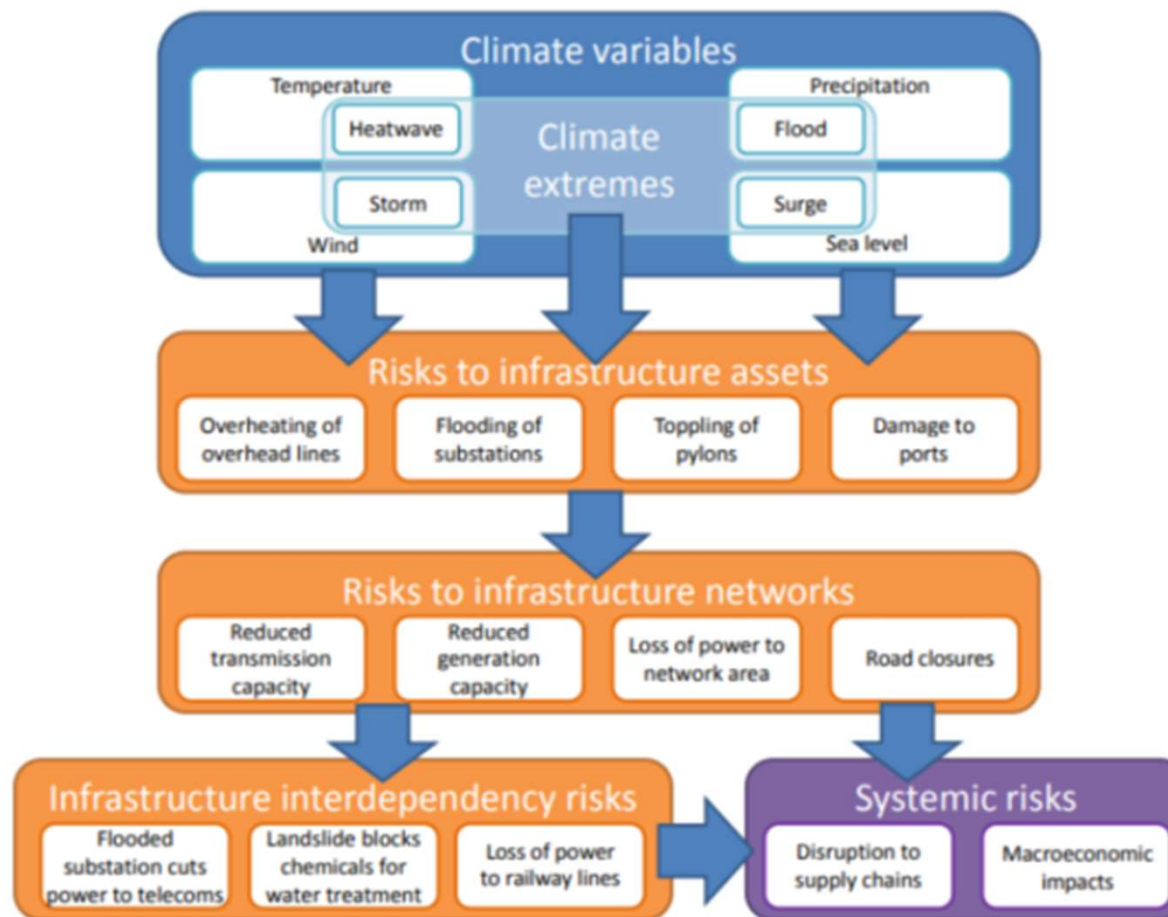


Fig – 10– Overview of the climate change risk assessment framework for infrastructure

Source : (Fisher 2020)

Railway Resilience – Process and Policy

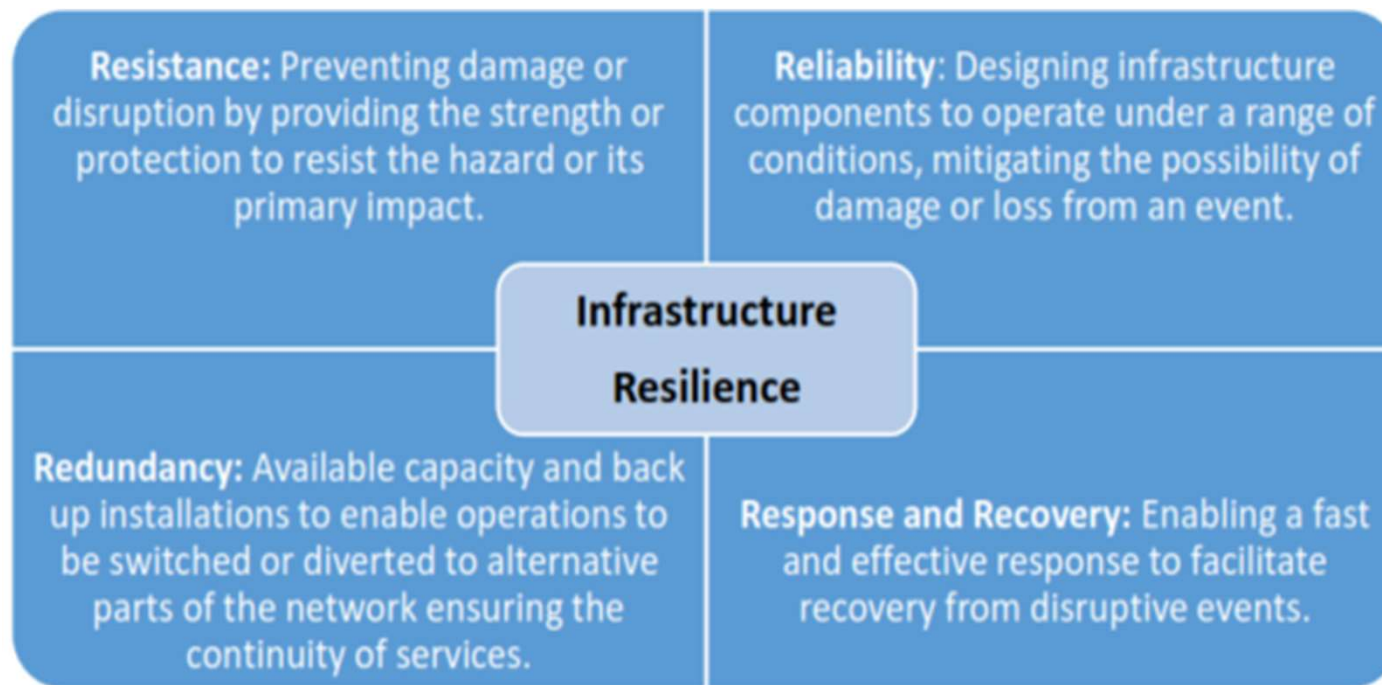


Fig – 11– The Four Components of Infrastructure resilience (Cabinet offices , 2011)

Source : (Fisher 2020)

Railway Resilience – Process and Policy

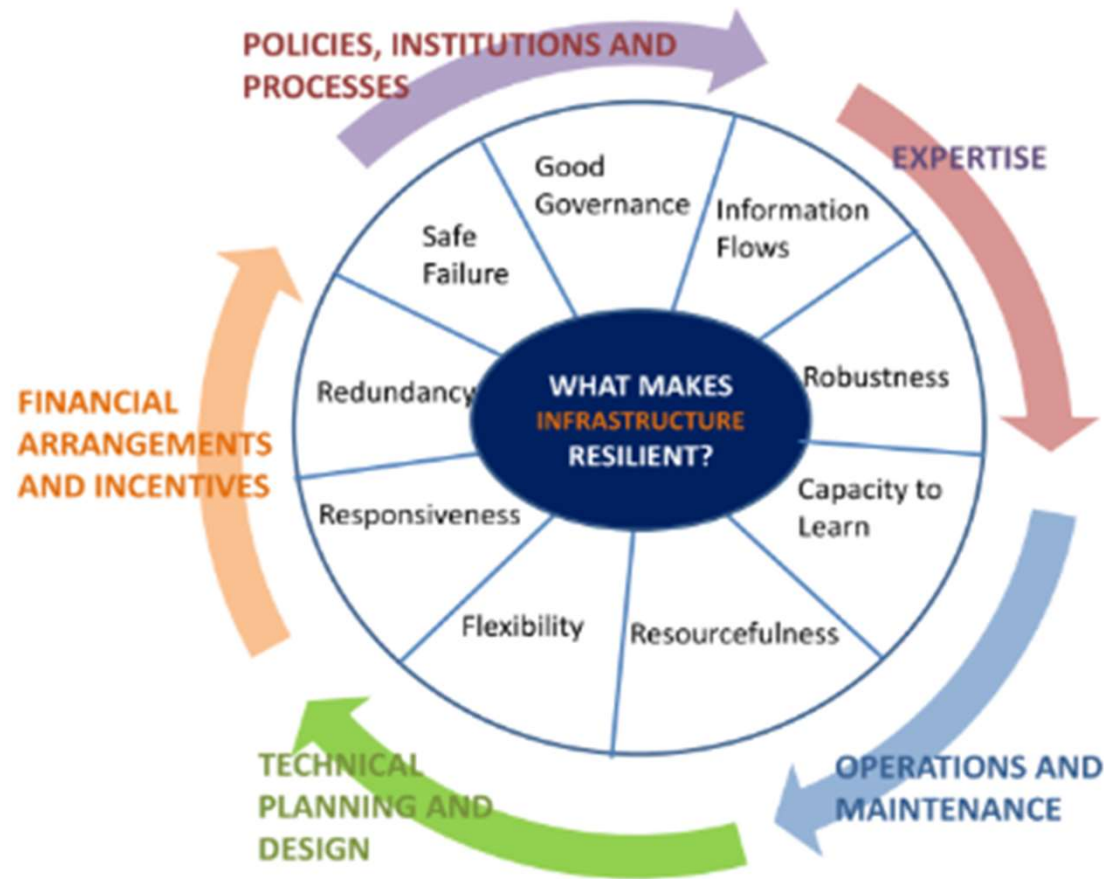


Fig – 12– Infrastructure Resilience Properties (Gov.UK, 2016)

Railway Resilience – Implementation

- Weather Resilience and Climate Change Adaptation Strategy (CP7)
- Business Process L2 Weather – Managing the Operational Risk
- Extreme Weather Response Process (EWAT)
- Weather Data – baseline and periodic forecasting (Flood Warning Database)
- Timetables for Disruptive situations
- Use of Technology to assess and monitor status of current asset and changes (RCM – Remote Condition Monitoring) Earthflow Risk mapping Tool

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Questions

