

Electricity
Transmission

EIP142 - Non-Intrusive and Cost Effective Method for Corrosion Measurement

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ENA Basecamp

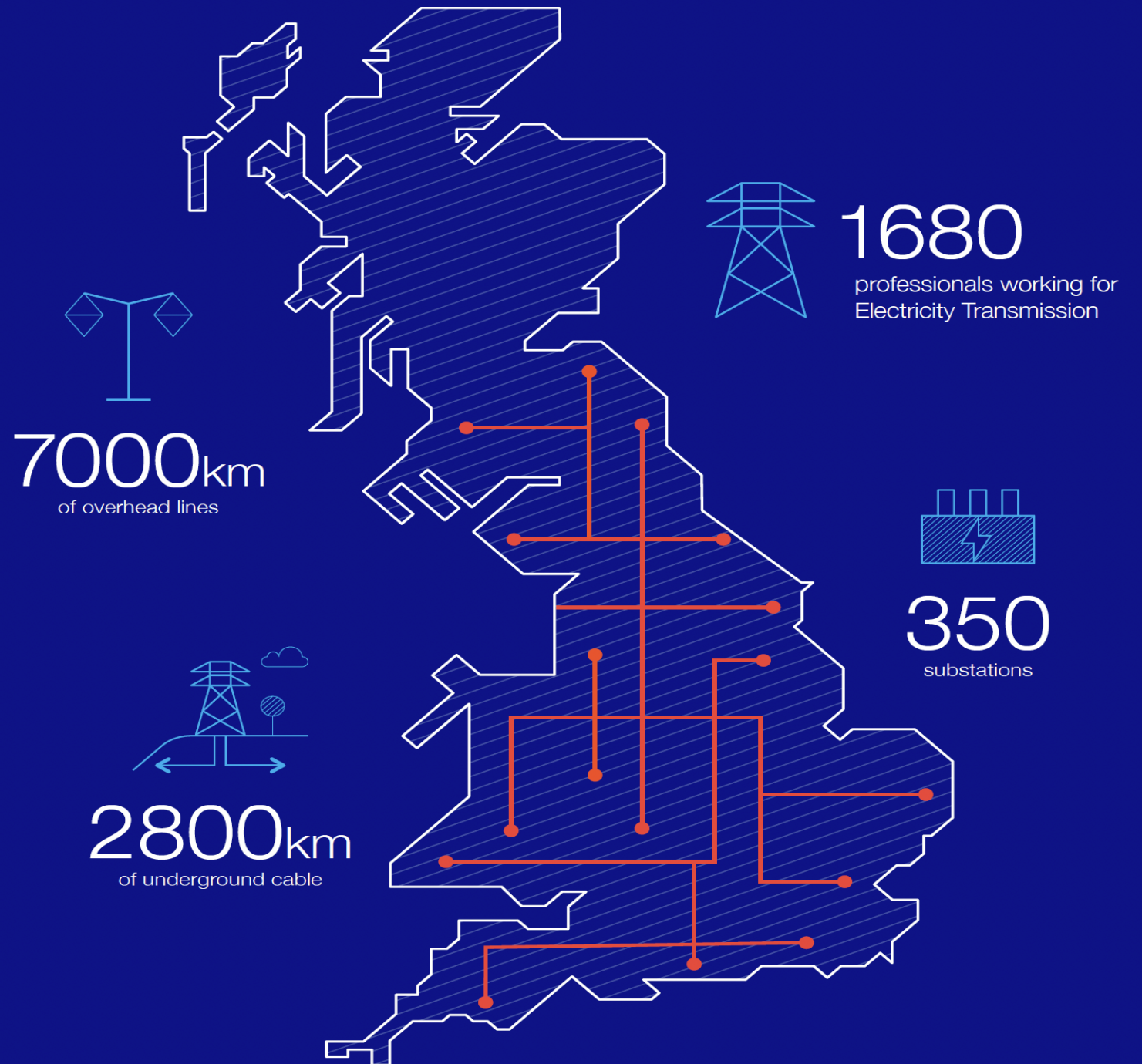


Who we are and what we do

National Grid Electricity Transmission (NGET) owns and maintains the high-voltage electricity transmission network in England and Wales. Every time a phone is plugged in, or a switch is turned on, we've played a part, connecting you to the electricity you need.

We take electricity generated across England and Wales, including from windfarms and nuclear power stations, and transport it through our network, consisting of more than 7000 kilometres of overhead line, 2800 kilometres of underground cable and 350 substations, on to the distribution system, so it reaches homes and businesses.

We're investing in the network, connecting more and more low-carbon electricity – it's a crucial role and pivotal in turning the UK's net zero ambitions into reality.



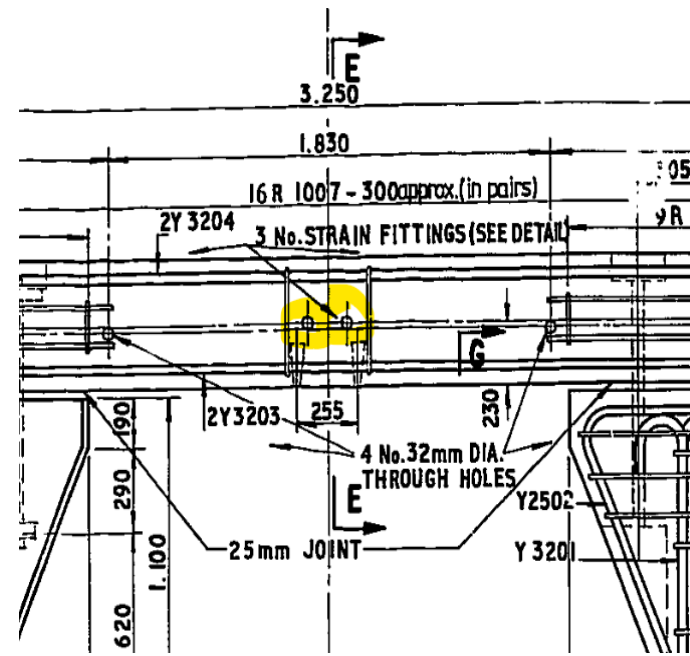
Through Bolts

Through bolts are fasteners that pass completely go through the top of gantries with an insulator attached at either side providing a secure connection between components. They typically consist of a threaded rod or bolt that is inserted through a hole, secured with a nut and washer on the opposite side.

Through Bolts provide:

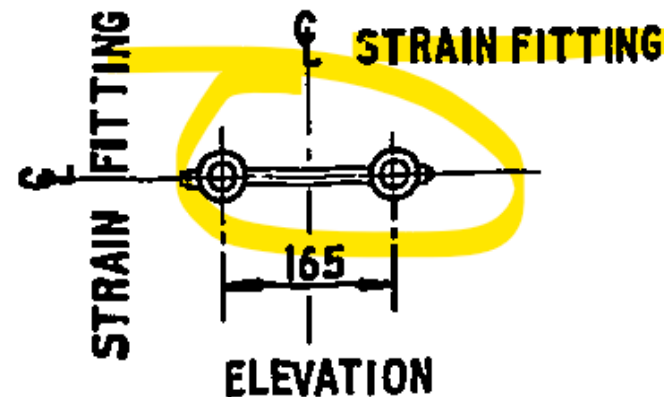
- Structural Integrity
- Electrical Connectivity

NGET needs to do timely inspections (both visual and diagnostic testing) and repairs of Through Bolt for necessary maintenance.



PLAN

4 No 12mm I



Corroded through-bolt failure

What are the problems?

Corrosion & degradation challenges:

- Through bolts corrode in concrete structures, gantries, and switchgears. This is likely caused by repeated wetting and drying of the bolt.
- High water retention in the mounting hole contributes to the issue.
- This can compromise structural integrity and lead to failures in the connections they secure.

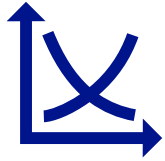
Limitations of current method:

- Visual inspection alone is insufficient to determine the extent of through-bolt corrosion within the mounting hole.
- Variety of through bolt designs pose problems in developing a condition assessment technique.
- Ultrasonic field measurements are proven to be unreliable and time-consuming due to inadequate procedures and calibration standards.

Economic & risk challenges:

- Conducting inspections and repairs for through bolt corrosion currently necessitates electrical outages, which incur costs and require unnecessary workforce involvement. Visual inspections are unable to detect internal corrosion and fatigue, leading to the unnecessary removal and replacement of bolts, resulting in wasted steel.

The benefits of this project



Asset Improvement and Sustainability: The project will enhance asset performance and sustainability by preventing unnecessary bolt removal and replacement, thereby reducing waste and extending the lifespan of infrastructure.



Practical and Cost-Effective Solution: It will provide a practical and cost-effective method for measuring invisible problems, such as corrosion, without the need for intrusive inspections.



Wider Industry Application: Other Transmission Operators (TOs), Distribution Network Operators (DNOs), and various industries can adopt this method to monitor invisible issues, making it a key solution for identifying corrosion and improving overall asset management.

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Q&A

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