Maintenance of grouted ground and rock anchors

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Grouted anchors support structures and slopes by **transmitting a tensile force** to a load-resisting formation of soil or rock.

Maintenance is crucial to an anchor's long-term performance. This desktop study **reviews** current maintenance practices and recommends **improvements**.

Literature review

BS 8081 *Code of practice for ground anchorages / grouted anchors*

- Criteria for monitoring requirements depend on the likely costs of damage in case of failure
- Test at 6-month intervals initially, increasing to up to 5 years
- Sampling: minimum 3 anchors; 10% of first 100 anchors; 5% thereafter

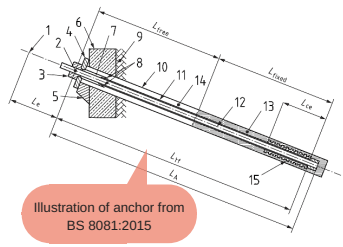


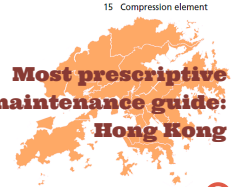
Illustration of anchor from BS 8081:2015

CORROSION is the predominant cause of anchor failure

ANCHOR HEAD is the most vulnerable part of a grouted anchor

CONCERN is expressed regarding workmanship and adherence to guidelines

No EU-wide standardisation of maintenance



Most prescriptive maintenance guide: Hong Kong

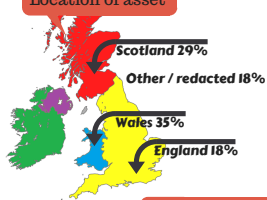
Industry survey

8 stakeholders

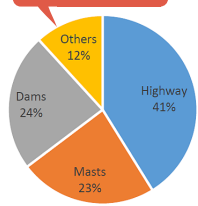
17 projects

all nations of the British Isles

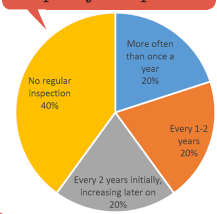
Location of asset



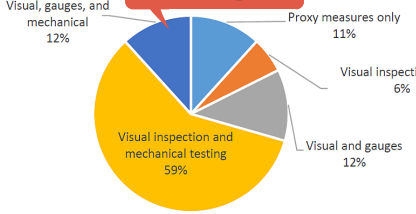
Type of asset



Frequency of inspection



Detail of inspection



Stakeholder comments

1. **Variation** between projects due to emphasis on "mission criticality" in maintenance decisions
2. **Fragmentation** of maintenance regimes due to reliance on other standards
3. **Contract** arrangements give responsibility to client, but specialist contractor is better-suited for the job
4. **Old anchors** are being rediscovered and added to maintenance plans
5. **Standardisation** is desired by most stakeholders

Recommendations

- Propose a **portfolio of standard maintenance plans**
- Focus on **record-keeping** and **supervision**
- Enshrine maintenance requirements into **long-term contracts**

Anchor head protection is more important than load testing

Use **load cells** as the primary means of measuring load

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- Transport NI | **Derval Delargy, Raymond Glass, John McRobert**
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References

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