Field-Proof vs Lab-Proof

Why MV cable joints fail in the real world (and what DNOs can do about it)

Executive summary

Medium-voltage cable joints are expected to perform for decades in saturated soil, under roads, and in contaminated industrial ground. When they fail, the impact is immediate: outages, emergency repairs and reputational damage. While many jointing systems perform well in laboratory conditions, real-world stresses such as high groundwater, soil movement, mechanical impact and long-term ageing expose failure modes that are not always captured in standard type testing. Field failure investigations show a strong contribution from installation errors and moisture/mechanical damage. The practical implication: DNOs need jointing solutions that are not only compliant on paper, but resilient in the field — and less dependent on perfect installation.

Section 1 — The hidden weak point underground

• Cable joints (splices) often determine whether power continues to flow in underground networks.
• In moisture-prone environments (high groundwater / “lowlands”), moisture ingress remains a primary cause of joint failure.

Section 2 — What the lab doesn’t always capture

Real-world networks add stressors that accelerate joint degradation: • shifting soil and ground movement

• mechanical impact / scratches from buried debris
• fluctuating water tables and long wet exposure
• chemically contaminated soils These mechanisms can lead to seal failure, air pockets and partial discharge initiation over time — even when systems meet baseline testing requirements.

Section 3 — Field evidence

Field failure data shows the pattern: A forensic review (EA Technology & NETA) on 73 MV cable joint field failures reported roughly one-third caused by installation errors and ~40% related to moisture or mechanical damage. IEEE research also confirms moisture at the insulation interface as a main cause for electrical breakdown and insulation failure of cable accessories.

Section 4 — Practical takeaways for DNO decision makers

- Treat “field resilience” as a procurement criterion, not an afterthought.
- Reduce dependency on perfect installation where possible (installer-forgiving systems).
- Specify sealing concepts that stay robust under water table variation and mechanical stress.

Explore ‘Joints for Renewable Energy’ pillar (LINK TO PILLAR PAGE)

Talk to a specialist about field-proven jointing under wet/contaminated conditions Form suggestion: Contact