

The frequent occurrence of flooding events shows the growing importance of resilient, monitored pipe systems.

Extreme weather events as a new challenge for underground infrastructure

1. INTRODUCTION

Climate change is one of the greatest challenges of the 21st century. Extreme weather events are occurring more and more frequently in Europe. Between 2001 and 2020, almost 900 events were recorded in Germany – almost twice as many as in the comparable period 1981-2000.[1] Especially droughts, floods, extreme temperatures and storms are putting increasing strain on our infrastructure.

Underground infrastructures are the backbone of modern societies. They ensure the supply of clean drinking water, the disposal of wastewater and the transmission of electricity and data. However, these systems are facing new challenges due to climate change. This whitepaper examines the impact of extreme weather events on underground infrastructures and shows how modern piping systems can help to overcome these challenges.

2. CHALLENGES DUE TO EXTREME WEATHER EVENTS

2.1 Heavy rainfall and flooding

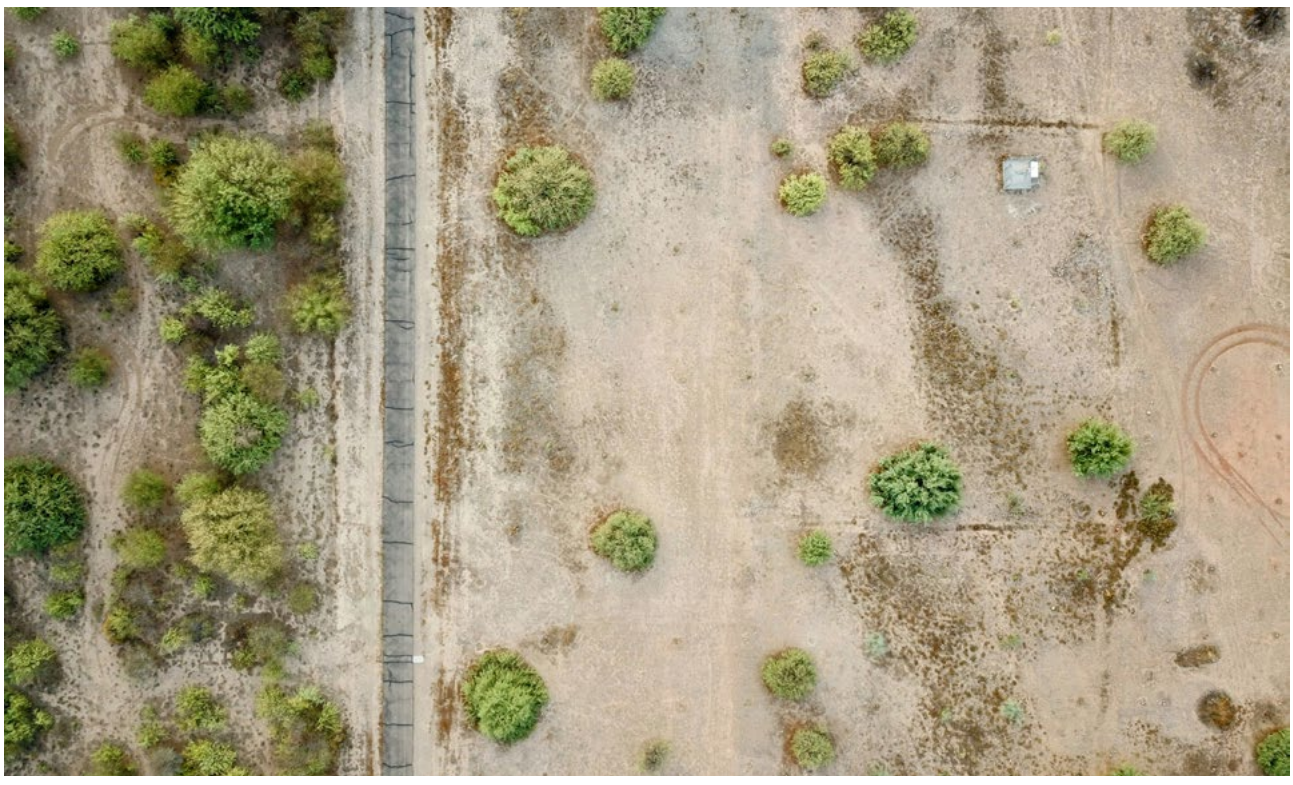
- Statistics: According to forecasts for the city of Hagen (Germany), the number of heavy rainfall days in the period 2031-2060 will increase by 20 % compared to 1991-2020. Not only will the number of heavy rain days increase, but also their intensity.[2]
- Consequences: Overloaded wastewater systems, backwater and flooding lead to untreated wastewater entering the environment and polluting soils and water bodies.[3]

2.2 Drought and soil movements

- Statistics: In 2022, the European Drought Observatory (EDO) reported that 47% of EU countries were affected by drought.[4]
- Consequences: Prolonged drought leads to cracks in the ground, which can damage pipes Experiences from dry regions in Europe confirm this trend.[5]

2.3 Water losses and contamination

- Statistics: In England, almost three billion liters of water are lost every day due to leaks[6] – equivalent to the daily water consumption of around 20 million people.[7]
- Consequences: In addition to enormous water losses, the risk of drinking water contamination increases due to pollutants entering through leaks. In times of growing water scarcity, every liter lost poses a challenge for suppliers, the environment and consumers. Moreover, the costs for repairs and water treatment increase, while unnecessary energy consumption worsens the carbon footprint.



Prolonged drought leads to cracks in the ground, which can cause damage to pipes.



3. SOLUTIONS FOR FUTURE-PROOF INFRASTRUCTURES

3.1 Climate-resistant materials

New pipe systems must be able to withstand extreme weather conditions. Important properties are chemical resistance, mechanical resilience to ground movements and stability against temperature fluctuations.

3.2 Monitoring and early damage detection

Leakage monitoring systems detect and report water losses in real time before they cause major damages. Early detection of leaks helps reduce water losses, lower operating costs, and avoid expensive repairs. This contributes to the long-term security of drinking water supply and the conservation of valuable resources.

3.3 Durability and sustainability

Investments in durable and sustainable materials reduce costs in the long term and prevent environmental impacts. Systems made from recyclable materials with minimal water loss make an important contribution to climate protection.

4. INNOVATIVE SOLUTIONS IN PRACTICE

4.1 egeplast Barrier Pipe SLA® System: Protection against contamination

The Barrier Pipe SLA® is a permeation-tight pipe system that has been specially developed for use in contaminated soils and for extreme conditions.

Advantages:

- Prevents contaminants such as chemicals or hydrocarbons from entering the drinking water.
- Protects the environment from permeation of harmful substances from the pipe.
- Ensures a safe supply and disposal network even under difficult conditions.

4.2 egeplast egeSmart: Integrity DCS System: Continuous leakage monitoring

The egeSmart: Integrity DCS system enables continuous monitoring of pipes and offers effective protection against leaks.

Advantages:

- Early detection of leaks before major damage occurs.
- Reduction of water losses and reduction in operating costs.
- Proactive maintenance and repair extend the service life of the infrastructure.

4.3 egeplast egeSmart: Leak Control 3L System: Maximum safety

The egeSmart: Leak Control 3L System combines the advantages of the Barrier Pipe SLA® and the egeSmart: Integrity DCS system.

Advantages:

- Permeation-tight and leakage-monitored for maximum safety.
- Protection against contamination and continuous monitoring for a holistic solution.
- Increased security of supply and permanent security of water quality.



5. CONCLUSION AND RECOMMENDED ACTION

Extreme weather events increasingly strain underground infrastructure. To ensure secure supply and disposal in the long term, resilient, innovative pipe systems are essential.

egeplast offers practical solutions with the Barrier Pipe SLA®, the egeSmart : Integrity DCS System, and the egeSmart : Leak Control 3L System, which minimize water losses, extend the infrastructure's lifespan, and guarantee the highest safety standards for drinking water and wastewater systems.

The use of these technologies enables cities, municipalities, and utility providers to adapt early to changing climatic conditions and future-proof their networks.

CONTACT



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Sources:

[1] Statista: Anzahl von Naturkatastrophen und Extremwetterereignissen in Europa, in: Statista, 05.06.2018 https://de.statista.com/infografik/30203/anzahl-naturkatastrophen-extremwetterereignisse-in-europa (Access at: 19.05.2025)

[2] ZDF: Klimawandel: Wo das Wetter in Deutschland noch extremer wird, in: ZDFheute Stories, 05.06.2025 https://zdfheute-stories-scroll.zdf.de/deutschland-klimawandel-hitze-starkregen/index.html (Access at: 19.05.2025)

[3] VDI: Wie Starkregenereignisse die Umwelt belasten, in: VDI, 23.10.2023 www.vdi.de/news/detail/wie-starkregenereignisse-die-umwelt-belasten (Access at: 19.05.2025)

[4] ZEIT ONLINE: Trockenheit: Fast die Hälfte des EU-Gebiets laut Experten von Dürre bedroht, in: ZEIT ONLINE, 22.08.2022 www.zeit.de/wissen/umwelt/2022-08/duerre-europaeische-duerrebeobachtungsstelle (Access at: 19.05.2025)

[5] Kearney, Philip: Anstieg von Rohrbrüchen, in: Backnanger Kreiszeitung, 27.08.2018 www.bkz.de/nachrichten/anstieg-von-rohrbruechen-826.html (Access at: 19.05.2025)

[6] Discover Water: Leaking Pipes, in: Discover Water, o. D. www.discoverwater.co.uk/leaking-pipes (Access at: 19.05.2025)

[7] Statista: So viel Leitungswasser verbrauchen die Europäer, in: Statista, 05.06.2018 https://de.statista.com/infografik/19751/leitungswasserverbrauch-in-den-eu-laendern (Access at: 19.05.2025)

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ABOUT EGEPLAST

Safety with tested pipe systems from egeplast

Pipes are the backbone of modern infrastructures – and at the same time one of the most valuable assets of municipal and industrial network operators. Particularly with trenchless installation methods, for where subsequent visual inspections are not possible, quality must be at the forefront.

egeplast offers pipe systems with integrated protection and testing functions, which already ensure documented safety during installation and also during operation. This gives planners, engineering offices and network operators the certainty that their investment will deliver what it promises in the long term – for over 100 years.

egeplast – Because safety must be plannable.









Information, sources and background details regarding our sustainability management can be found on our website at www.egeplast.de/en/sustainability

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