



Gas Transmission Pipelines Safety

Position paper

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ABOUT MARCOGAZ

Founded in 1968, MARCOGAZ represents 29 member organisations from 20 countries. Its mission encompasses monitoring and policy advisory activities related to the European technical regulation, standardisation and certification with respect to safety and integrity of gas systems and equipment, rational use of energy as well as environment, health and safety issues. It is registered in Brussels under number BE0877 785 464.

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Contents

1. Introduction to transmission pipelines in the European framework 1

2. Pipelines system safety management 2

 2.1 Pipelines life-cycle management 2

3. Conclusions 4

Figures

Figure 1 – Pipeline’s life-cycle 3

1. Introduction to transmission pipelines in the European framework

Since the 1960s high pressure gas pipelines have been used to transport natural gas across Europe. The length of the European gas transmission network is close to 200,000 km. The transportation of large amounts of gas through high pressure pipelines has proven to be a safe mode of energy transportation, with very limited impact on the environment.

The role and mission of the pipeline operators is to make capacity available to gas shippers so that gas can be transported to end consumers and to ensure the integrity of their pipelines, which is their major responsibility. Pipeline operators have a common objective to avoid incidents and accidents which could lead to damage or harm to the public, properties and the environment while simultaneously ensuring the continuity of gas supplies throughout the Continent. Although the footprint is already very limited, the industry strives for its minimization, especially when considering methane emissions. Monitoring, Reporting and Verification (MRV) are brought to a high level and extensive Leak Detection and Repair (LDAR) programs are set in place.

Undeniably, the amounts of renewable fuels are increasing and will further contribute to the climate targets. Pipeline infrastructure will continue to play an essential role in providing transmission of energy from supplier to (end) user. Pipeline infrastructure is designed, constructed, maintained, and operated for an undefined lifetime. With pipelines, we are facilitating an integrated energy market in which electricity, gas (methane, biomethane and hydrogen) and heating systems play their specific roles and complement each other.

Although legal approaches may differ among European Member States due to cultural, historical and geographical factors, the common aim amongst all pipeline operators is to construct, operate and maintain safe pipelines.

Whenever occurring, incidents are taken very seriously and are investigated in detail for both the likelihood of occurrence and (potential) impact. Pipeline operators attempt to minimise the likelihood of incident by adoption of high-quality technical specifications and standards, as well as integrated Safety Management Systems (SMS) for a wide range of gas compositions, including hydrogen, biomethane and mixtures of these gases. The potential impact of any accident is also mitigated by ensuring that both the authorities and the pipeline operators have adequate emergency plans in place.

2. Pipelines system safety management

Data collected by the European Gas Pipeline Incident Data Group¹ (EGIG) show that external interference, including third party works, is the main cause of pipeline large size failures. Pipeline operators protect against this mode of failure through pipeline design, supplemented by robust safety management procedures that are applied during pipeline operations. Pipeline operators also have notification procedures in place for work carried out by third parties in the vicinity of the pipeline.

Exchange between all stakeholder groups, including individuals, contractors, and involved authorities, is necessary in order to identify and share best practices for continuous improvement.

National legislation also needs to play a key part in ensuring that any third-party work in the vicinity of the pipeline is notified to the pipeline operators and is further managed and controlled according to the pipeline operator's requirements.

The EGIG statistics show a continuous decrease in the frequency of incidents caused by external interference over a period of more than 50 years. This trend demonstrates that the measures introduced by the European gas industry and national regulators are successful and well incorporated in daily operations. The gas industry is aiming for continuation of this trend. A set of technical recommendations contributing to this initiative is published and can be found on the MARCOGAZ website².

The processes of designing, constructing and maintaining gas pipelines are carried out using mainly functional European standards drafted through CEN (CEN/TC234 Gas Infrastructure) and also the ASME³ code on Hydrogen Piping and Pipelines (ASME B31.12.) is relevant until European standardisation bodies have issued recommendations on how to use and how to integrate this code into CEN standardisation work to reflect European practices and reality. These standards cover all the aspects of the pipeline's life cycle (see Figure 1) and include requirements for the safety management of the pipeline system, including the Management of Change (MoC). They are kept up to date and recently revised to incorporate the changing gas compositions. An overview of relevant standards is available on the MARCOGAZ website⁴.

¹ www.egig.eu

² <https://www.marcogaz.org/technical-work/infrastructure/transmission/>

³ ASME: The American Society of Mechanical Engineers

⁴ <https://www.marcogaz.org/knowledge-hub/#relevant-standards>

These standards aim to identify framework elements that are of key importance to ensure pipeline safety. Various mechanisms are used during the life cycle of a pipeline to reduce the risk of pipeline failure.

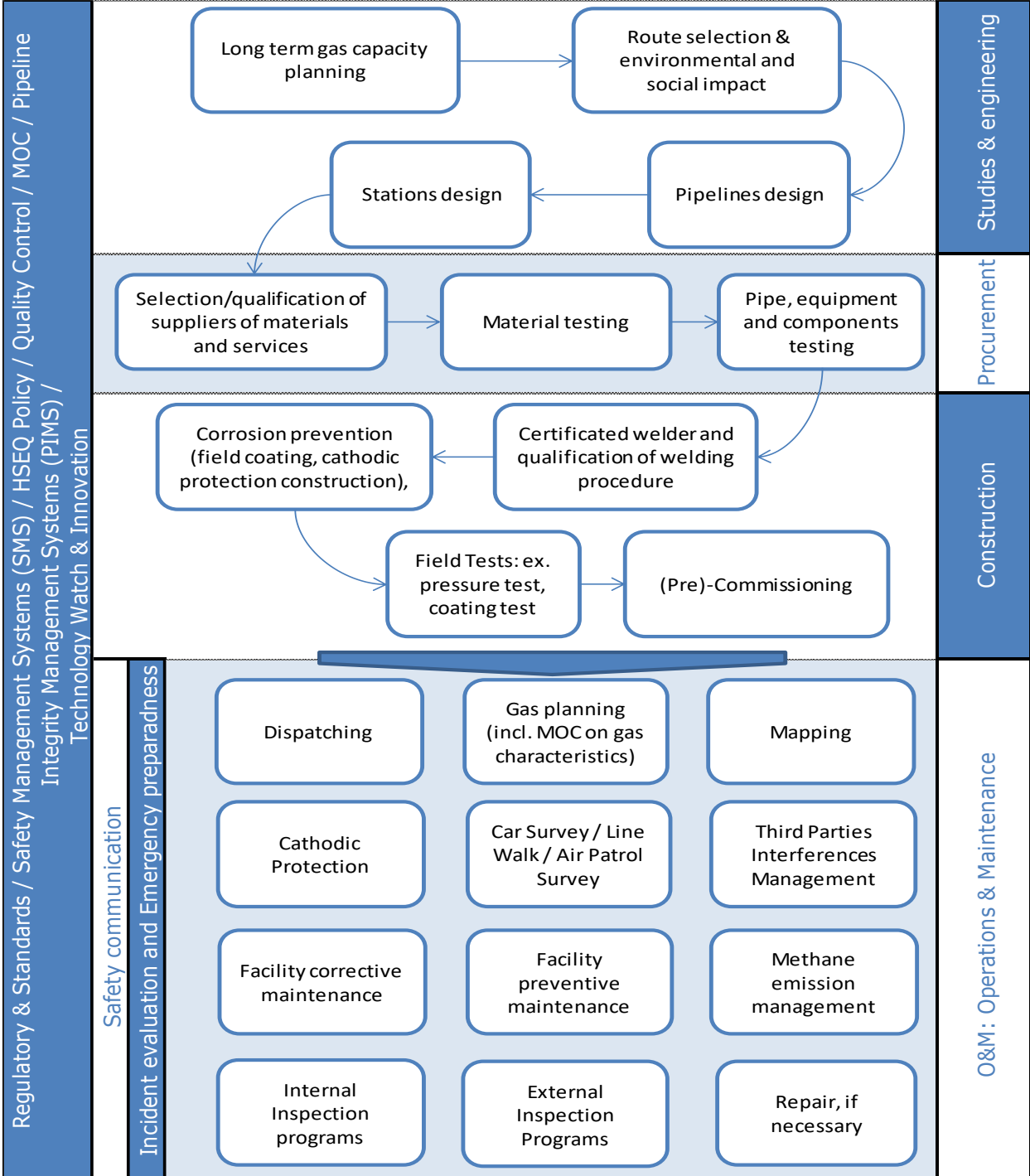


Figure 1: Pipeline's life cycle

3. Conclusions

In order to keep improving the safety of gas networks in an effective way, MARCOGAZ believes that the following key conclusions and recommendations are crucial:

- Technical self regulation has proved to be very efficient in improving the safety performance of European gas pipeline operators.
- Pipeline safety can be further improved by addressing third party interference, the development of advanced inspection tools and using the latest technology of performance monitoring by SCADA⁵ systems. Although gas pipeline operators can contribute to tackling the problem of third-party interference, a large part of the activities occurring in the vicinity of pipelines are outside of their control. The focus of any new legislation should therefore be on improving awareness of buried utility infrastructure and controlling the competence of the individuals carrying out excavation work in the vicinity of high-pressure pipelines.
- Rather than introducing additional safety legislation for gas pipeline operators, further improvements in pipeline integrity are best facilitated by pipeline operators adopting an appropriate Safety Management System (SMS) including Pipeline Integrity Management Systems (PIMS). These systems are based on a “*Plan-Do-Check-Act*” approach which promotes a continuous improvement in pipeline safety and guarantees a outstanding Management of Change (MoC). This ensures among others appropriate managing of changing gas composition. The improvement in performance will apply to both preventive measures and mitigation measures such as emergency procedures.
- Continuous research and development and innovation are key elements to ensure that the gas industry can continue to maintain high levels of safety for its infrastructure. The European Gas Research Group⁶ (GERG), being a member of MARCOGAZ, provides a close and strong working relationship with the aim of research, development and innovation.

⁵ SCADA: Supervisory Control and Data Acquisition

⁶ <https://www.gerg.eu>