



**Report on European Gas Safety
Gas Distribution (EGAS B)**

2017 to 2022

June 2024

Contact

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ABOUT MARCOGAZ

Founded in 1968, MARCOGAZ represents 28 member organisations from 20 countries. Its mission encompasses monitoring and policy advisory activities related to 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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1. Summary

Safety of gas distribution infrastructure in Europe is subject to a continuous surveillance towards improvement, aiming at improving already good records. Statistics show that the accident rate in the distribution sector, the number of injuries and the number of fatalities has been maintained at a low level over the past six years.

2. Introduction

Utilisation of large quantities of gas in industry as well as in commercial, domestic and transport applications is ranked as very safe among industry experts.

Nevertheless, the public awareness and the media are more focused on spectacular accidents than on safety records or statistical values. But rational discussion about safety and risk in the gas installations is only possible if it is based on unbiased facts and figures.

Furthermore, the gas industry itself wants to show its safety record and wants to identify its own weak points to be able to allow for risk-oriented improvements.

Therefore, in 1995 nine major gas companies and national industry associations began to gather data on gas-related accidents in their countries. Collection of data, exchange of views and development of improving measures was formalised by setting up the ETPS (European Third Party Safety) group.

In 2005 this ETPS group joined MARCOGAZ to allow for a broader data base in new European countries and above all to allow for a better communication of the safety performance of the European natural gas industry.

In 2008 MARCOGAZ, taking into account the unbundling of companies, decided to split ETPS into two specific groups, ensuring thus a more accurate and reliable data collection:

- 🔥 "Gas Distribution" under the designation EGAS B
- 🔥 "Gas Installation" under the designation EGAS C

This report gives an overview on the EGAS B data base over the last six years and on the main analyses and results in a statistical way, shown in tables and different graphs for the period 2017 – 2022. Some conclusions at the end of this report (see chapter 5) aim at providing an easier understanding of the statistical findings. The accident parameters represent a set of safety performance indicators used in the European gas industry.

This report contains a consistent dataset for 8 countries from 2017 to 2022. The sample and the time period were selected in order to ensure consistency in the dataset and in the available information. Other data are also available (up to 14 countries), but as they were not available for all the selected

period, they were not considered. It is foreseen that for next reports and the next selected periods, it will be possible to include more data from other countries.

Moreover, in 2023 additional key performance indicators were integrated into EGAS B report such as:

- Average time duration per year between received emergency call and attendance on site
- Number of annual third-party interference or damage with leaks

3. EGAS B Data Base and Definitions

3.1. Data

Period:	2017 - 2022
Participating countries:	From 7 up to 8
Included number of customers (average):	68,121,328
Included length of mains (average):	1,235,681 km
Contributing countries between 2017 and 2022:	
<ul style="list-style-type: none"> • Austria • Belgium • France • Germany 	<ul style="list-style-type: none"> • Italy • The Netherlands • Portugal • Spain

Table 1: EGAS B data base - General information

Year	Number of accidents	Number of fatalities	Mains length [km]	Number of customers	Participating countries
2017	12	0	1,153,326	64,274,960	8
2018	17	0	1,100,341	61,109,711	7
2019	23	7	1,218,451	66,782,295	8
2020	26	0	1,322,648	71,751,064	8
2021	29	13	1,353,837	72,296,048	8
2022	32	1	1,265,479	72,513,891	8

Table 2: EGAS B data base - Basic data from 2017 to 2022

3.2. Definitions

- ❖ **Accident:** An unintentional event, related to natural gas, which has caused physical injuries or fatalities or substantial material damage.
- ❖ **Distribution Network:** Is defined by the following parts under responsibility of the Distribution System Operator (DSO):
 - distribution mains
 - service lines (piping, valve, regulator, (usually) meter)
 - pressure regulating stations
- ❖ **Fatality:** Death, as a consequence of a natural gas accident; immediately or within 30 days of the event.
- ❖ **Injury:** Injury, as a consequence of a natural gas incident that needs a hospitalization of at least one night.
- ❖ **Substantial Material Damage:** Any damage greater than 100,000 €, e. g. to houses, cars, excavators etc, except damage on the gas distribution system itself.
- ❖ **Average time duration per year** between the received emergency phone call and attendance on site of the incident.
- ❖ **Third party damage (TPD) with leaks.** Damages due to third-party interference (excavators, street works) that lead to leakages, are considered.

NOTE: Data of fatalities and injuries of internal personal/contractors are excluded.

4. Analysis and Results

4.1. Evolution of accidents

Figure 1 shows the evolution of the total number of accidents per 100,000 km of mains in the distribution network for the years 2017 to 2022 and gives an overview about the main causes of these accidents. Over the period 2017-2022, there is in average of 2 accidents per 100,000 kilometres, slightly increasing over the period.

As seen in Figure 1, this observation is correlated to the steep increase in the number of accidents due to third party interferences (street works, etc) as of 2018.

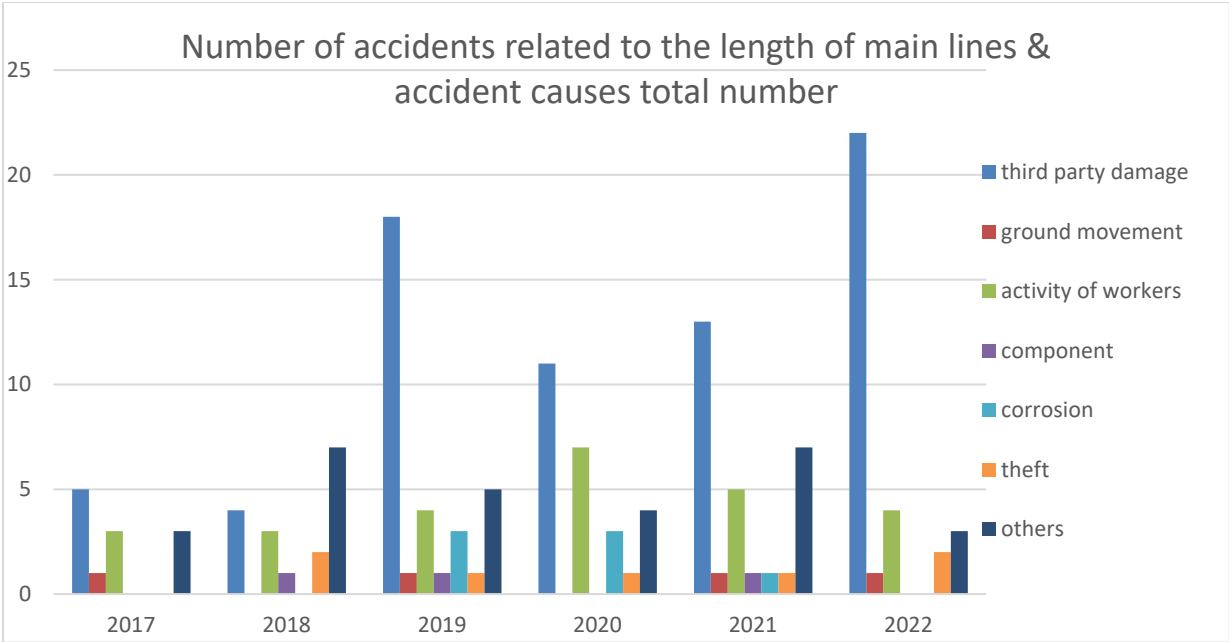


Figure 1: Number of accidents related to the length of main lines (by 10⁵ km) & annual reported causes of accidents

Figure 2 shows the number of people injured in accidents per 100,000 km of mains in the distribution network. The number of injured people per 100,000 km has an average value of 2.91. The particularly high value of the 2019 data point in Figure 2 is due to an exceptional event in 2019.

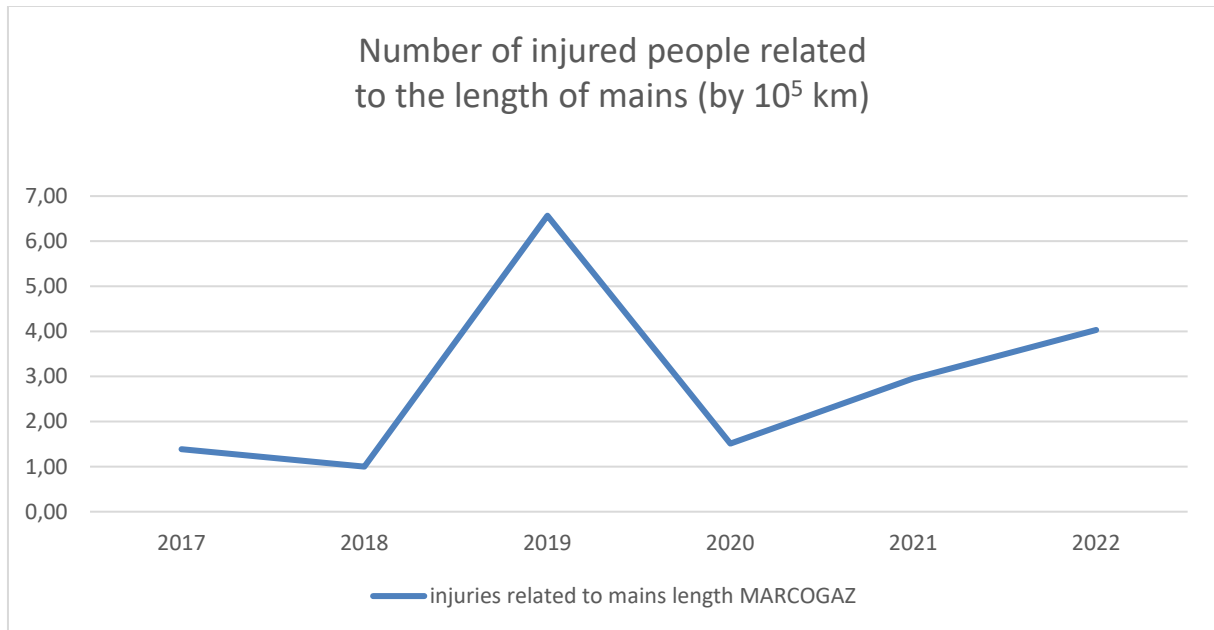


Figure 2: Number of injured people related to the length of mains (by 10⁵ km)

Figure 3 is giving the number of fatalities caused by accidents related to 100,000 kilometres of mains in the distribution network length. The range varies from 0 to 0.96 fatalities per 100,000 km. The peaks reflect exceptional accidents events that occurred in three countries in 2019 and two countries in 2021. No fatalities were reported in 2017, 2018 and 2020.

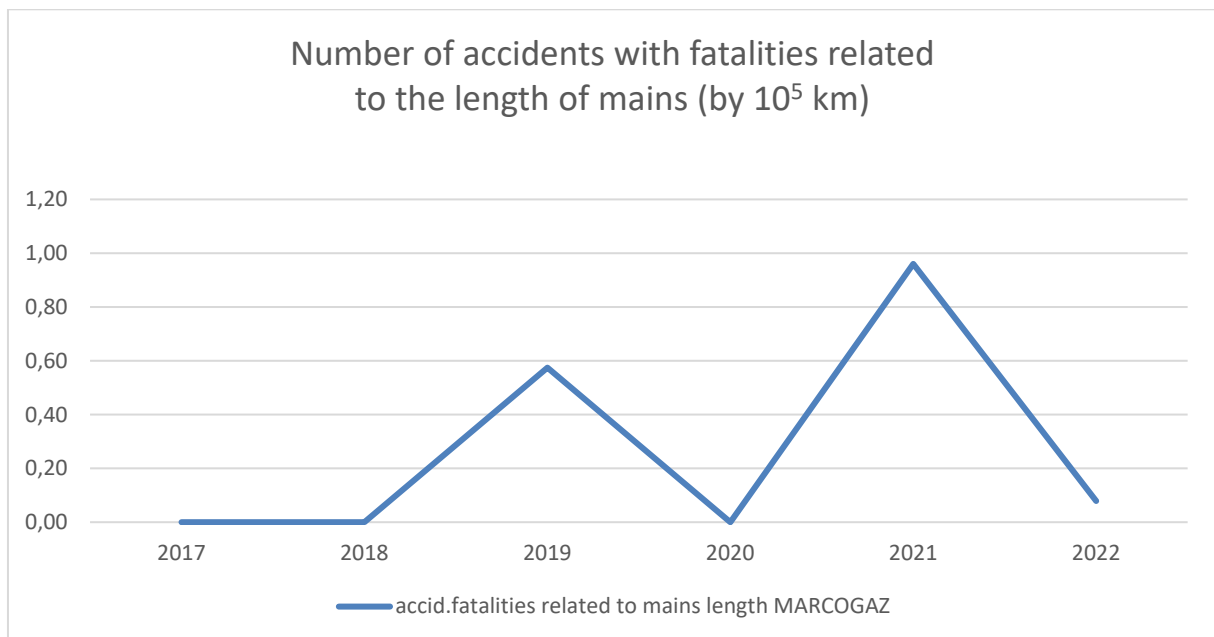


Figure 3: Number of fatalities related to the length of mains (by 10⁵ km)

4.2. Causes of accidents

The following causes of accidents are listed:

- third party damage (TPD)
- ground movement due to e. g. settlement
- activities of workers (own staff or contractor) or operators' error
- component or construction defects
- corrosion or aging
- vandalism or theft
- others, e. g. impact by defect of electrical cable

Annotation: Category “others” appeared for the first time in the survey of 2017. Figure 1 gives an overview of the annual reported main causes of accidents for the years 2017 to 2022.

The graph clearly shows that the three main causes of accidents are:

- third party damage ■
- activity of workers ■
- others ■

Figures 1 and 4 show the three main causes of accidents to date per 100,000 km length of distribution network. Third party damages are by far the main cause of accidents. Also, although the number of accidents due to ‘activity of workers’ or ‘others’ (except in 2018) have remained stable over the past decade, the number of accidents due to third party interference has increased dramatically since 2018. This can be explained by an increase in groundworks due to expansion of electricity networks, application of district heating, the roll-out of glass fibre networks and more.

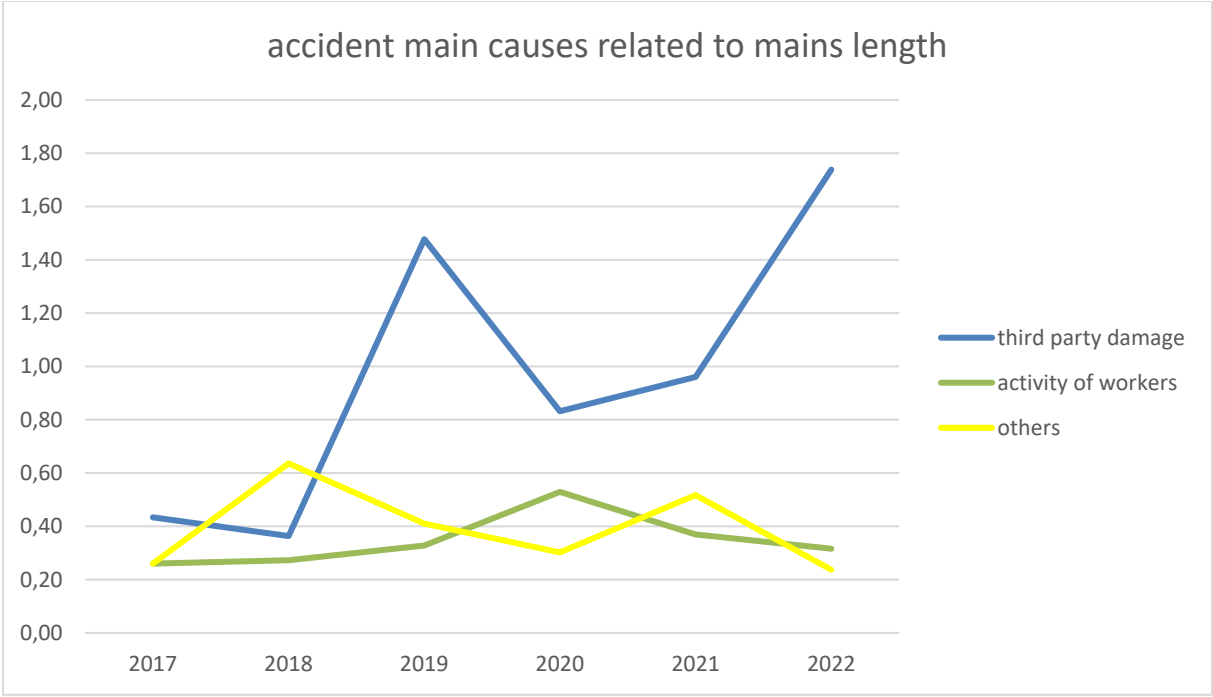


Figure 4: Main causes of accidents related to the length of mains (by 10⁵ km)

4.3. Aspects of safety

Figure 5 shows the average time between transmitted emergency call and arrival on scene. This figure is a new component in the report and currently covers the years 2020 to 2022. Overall, the time varies between 27 and 36.5 minutes over the data collection period. However, on an annual basis, it can be seen that there is little variation in times (30.60; 30.98; 31.18). Six countries participated in the first data collection covering each year from 2020 to 2022.

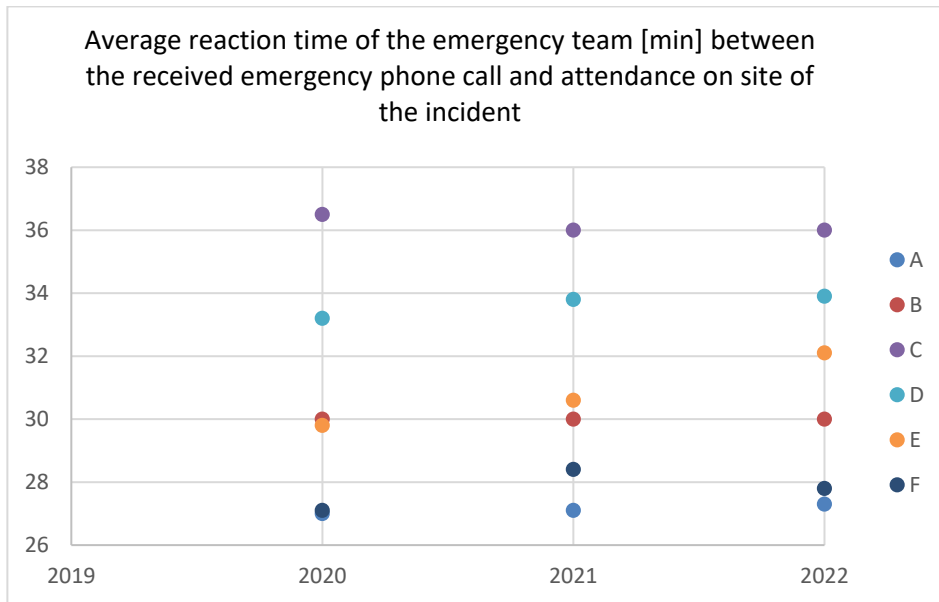


Figure 5: Average reaction time of the emergency team between the received emergency phone call and attendance on site of the incident

Due to the increased number of third-party damages, it was proposed to track the number of annual third-party interference causing damage with leaks as a new performance indicator. This was recorded for the first time over the years 2020 to 2022.

Figure 6 reflects third party damages (TPD) with leaks per 100,000 km with a mean value of 1,060. The newly collected TPD with leaks data was related to the accidents due to TPD per 100,000 km data in Figure 7. This gives a theoretical statistical value that ranges from 0.001898 to 0.002201 accidents per TPD with leaks. The mean value is 0.0020862. The participation of the reporting countries is constant at eight. This last indicator allows to follow the probability of accidents in the case of third-party interference.

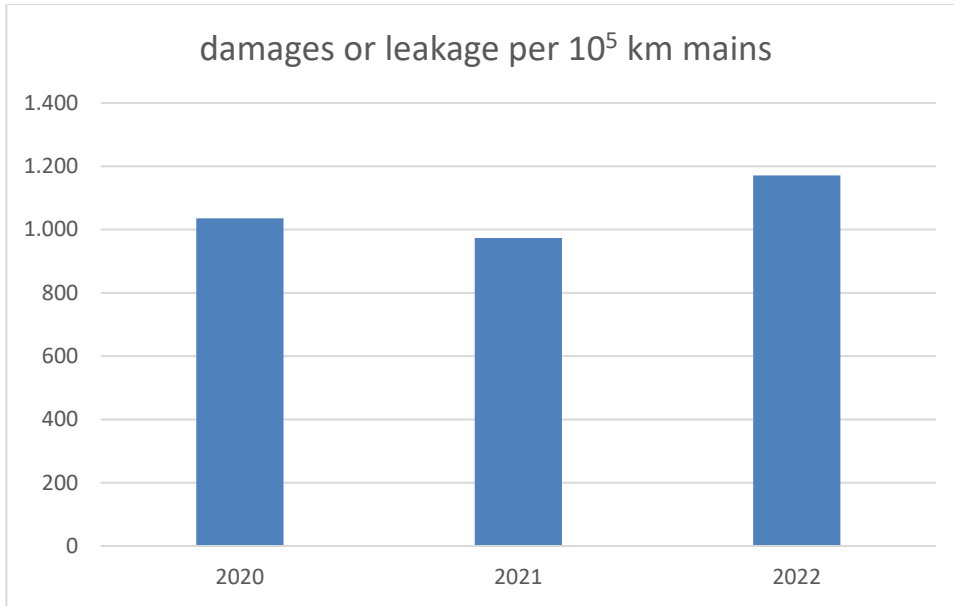


Figure 6: Number of annual third-party interference or damage with leaks per 10⁵ km

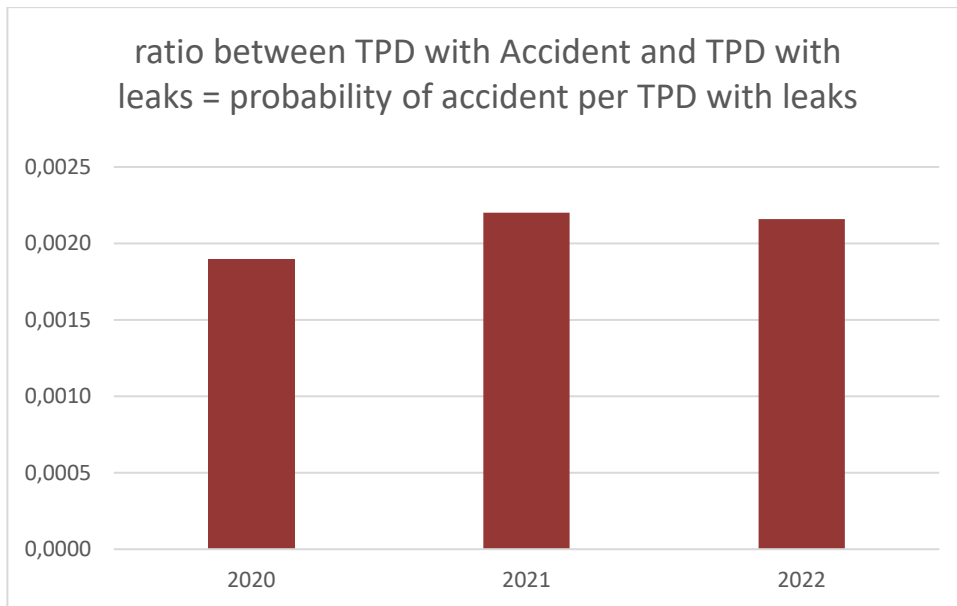


Figure 7: Ratio between TPD with accident and TPD with leaks

5. Conclusions

- a) The EGAS B data base for the period from 2017 to 2022 is based on the eight participating countries that have provided data for the whole period. The dataset represents on average more than 68.1 million gas customers and about 1.235 million kilometres of distribution network.
- b) The ratio of the number of accidents to the length of the distribution network is 2 an average over 100,000 km, with a slight increase since 2017. The figures presented show that this is due to an increasing number of third-party damages. In fact, it has been observed in all countries that the number of street works has significantly increased due to the expansion of electricity networks, the application of district heating, adaption of water networks, the roll-out of fibre networks and more. This increase in excavation activities has led to accidents in the distribution networks.
- c) The number of fatalities on the gas distribution system caused by accidents in the period from 2017 to 2022 has an average frequency of 0.27 per 100,000 km distribution network. They are specific to the years 2019 and 2021, when exceptional accidents occurred in some of the countries.
- d) The European gas industry will continue to maintain and improve technical measures to achieve the highest possible level of safety. In particular, this will require enhanced prevention with all third parties involved as prevention of third-party damage is a key issue for the industry.

6. Annex 1: Gas distribution accident form EGAS B

MARCOGAZ WORKING GROUP GAS DISTRIBUTION: GAS DISTRIBUTION ACCIDENTS

General Info	
Country	
Year	2022
Association / Company	

Number of annual third-party interferences or damage, with leaks, occurring on the distribution system which is under the responsibility of the DSO.

Network Data	
Number of customers (excluded industrial customers)	#
Total lengths of mains	km

Including contractors activity the DSO is responsible for.

Aspects of safety	
Number of annual third-party interference or damage with leaks	#
Average time duration per year between the received emergency phone call and attendance on site of the incident	min

Breakdown of the total number of accidents to different causes.

Incident Data	Statistics						Causes					
	Assets	Number of fatalities	Number of injured people	Total number of accidents (per asset)	Third party damage	Ground movement	Activity of own company workers or operators error	Component of construction defect	Corrosion / ageing	Vandalism / theft	other	
Mains MP (P > 100 mbar)												
Mains LP (P ≤ 100 mbar)												
Service lines (sub total)												
- piping												
- meter												
- regulator												
- valve / others												
Grid pressure regulation stations												
Total	0	0	0	0	0	0	0	0	0	0	0	

PLEASE CONSULT THE DEFINITIONS BELOW BEFORE ANSWERING

Accident	An unintentional event, related to natural gas, which has caused physical injuries or fatalities or big material damage.
Fatality	Death, as a consequence of a natural gas accident, immediately or within 30 days of the event.
Injury	Injury, as a consequence of a natural gas incident that needs a hospitalization of at least one night.
Big material damage	Any damage greater than 100,000€, e.g. to houses, cars, excavators etc, except damage on the gas distribution system itself.

Note: data of fatalities and injuries of internal personnel/contractors are excluded.

Distribution Network	Is defined by the following parts upstream from the gas installation under responsibility of the DSO: - distribution mains - service lines (piping, valve, regulator, (usually) meter) - pressure reduction station
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