

Annual Report on High Pressure Gas
Related Accidents
(2022 version)

The High Pressure Gas Safety Institute of Japan (KHK)

1. Introduction

This Annual Report is a compilation of statistics on accidents related to the High Pressure Gas Safety Act that occurred between 2003 and 2022, with a focus on accidents resulting in injuries or deaths, especially those occurred at manufacturing plants for high pressure gas.

Note that among high pressure gas-related accidents, this Annual Report excludes those involving general consumers, which pertain to the Act on the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas.

About accidents resulting in injuries or deaths

“Accidents resulting in injuries or deaths” refer to accidents resulting in death, serious injury, or minor injury to a total of one or more people.

The definitions of death, serious injury, and minor injury are as follows.

Death: the victim dies within five days of the occurrence of the accident.

Serious injury: the victim requires at least 30 days for treatment of injuries.

Minor injury: the victim requires less than 30 days for treatment of injuries.

2. Changes in the numbers of accidents resulting in injuries or deaths and of deaths related to the High Pressure Gas Safety Act

The changes in the numbers of accidents resulting in injuries or deaths and the numbers of deaths related to the High Pressure Gas Safety Act between 2003 and 2022 are shown in Fig. 1. Between 28 and 57 accidents resulting in injuries or deaths occur each year, with numbers remaining steady overall. The numbers of deaths range between zero and eight people per year. In 2021, 6 people died caused by CO₂ gas leakage from the storage facility (2 accidents).

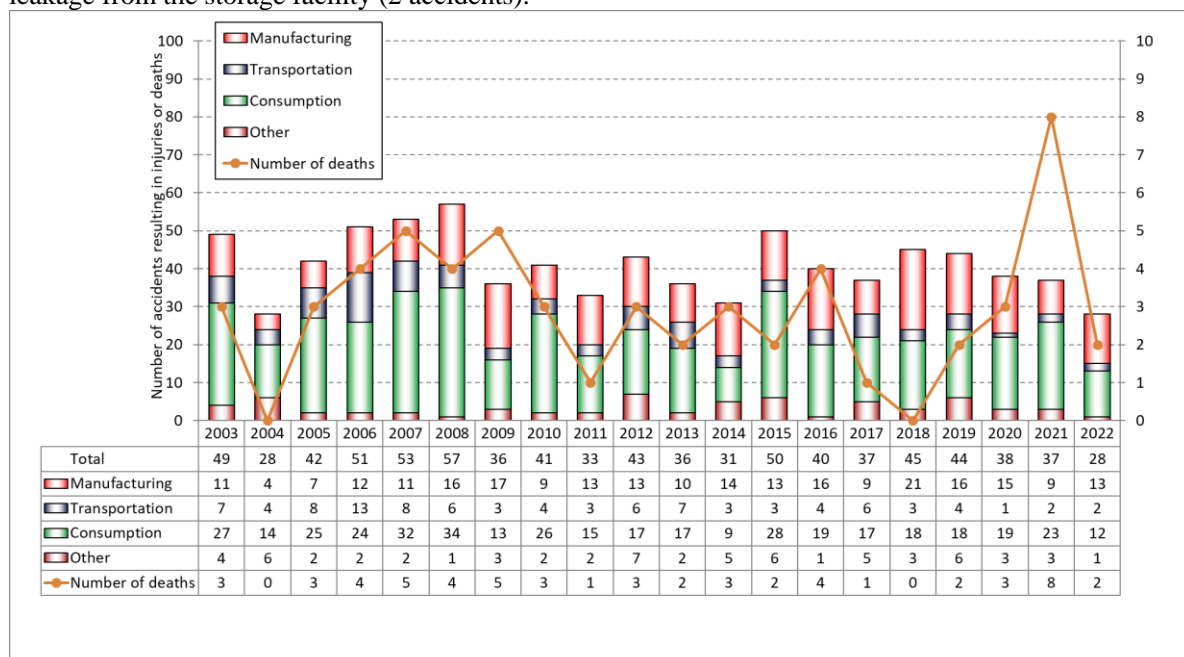


Fig. 1: Changes in the numbers of accidents resulting in injuries or deaths and of deaths related to the High Pressure Gas Safety Act (2003 - 2022)

3. Changes in the numbers of accidents resulting in injuries or deaths and of deaths at manufacturing plants for high pressure gas

The changes in the numbers of accidents resulting in injuries or deaths at manufacturing plants for high pressure gas between 2003 and 2022 are shown in Fig. 2. The total number of accidents resulting in injuries

or deaths fluctuates with a maximum of 21 per year. Looked at by industry, the largest number of accidents resulting in injuries or deaths occur in the “Other industrial gas” field. The “Other industrial gas” field includes filling stations, ironworks, food manufacturing, etc. The second-largest number of accidents resulting in injuries or deaths occurs in the “General chemicals” field, with the number of accidents resulting in injuries or deaths occurring in the “Other industrial gas” and “General chemicals” fields together making up around 75% of all accidents resulting in injuries or deaths.

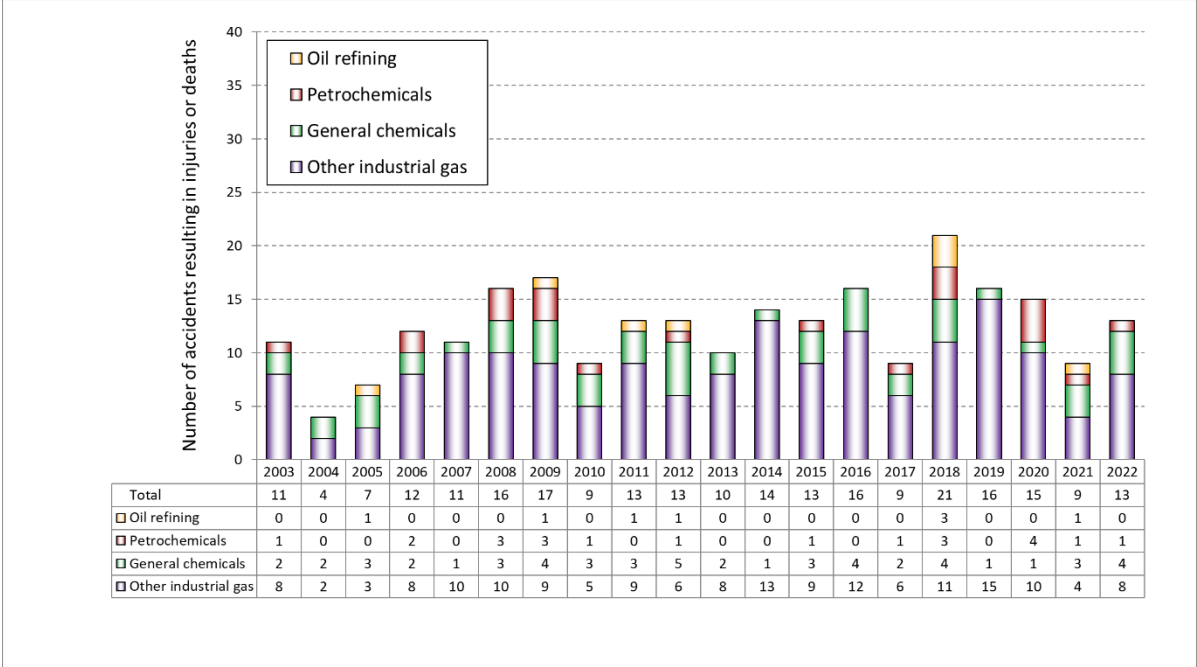


Fig. 2: Change in the numbers of accidents resulting in injuries or deaths at manufacturing plants for high pressure gas (2003 - 2022)

Fig. 3 shows the numbers of deaths in accidents occurring at manufacturing plants for high pressure gas. There have been 14 deaths over the past 20 years. Looked at by industry, a large number of deaths, those of eight people, have occurred in the “Other industrial gas” field. The “Other industrial gas” field encompasses accidents which take place at filling stations, and in refrigerating and air conditioning. The causes of accidents resulting in deaths include the bursting of containers, leakage of poisonous gases, etc. On the other hand, there have been no accidents resulting in deaths in the “Oil refining” field between 2003 and 2022.

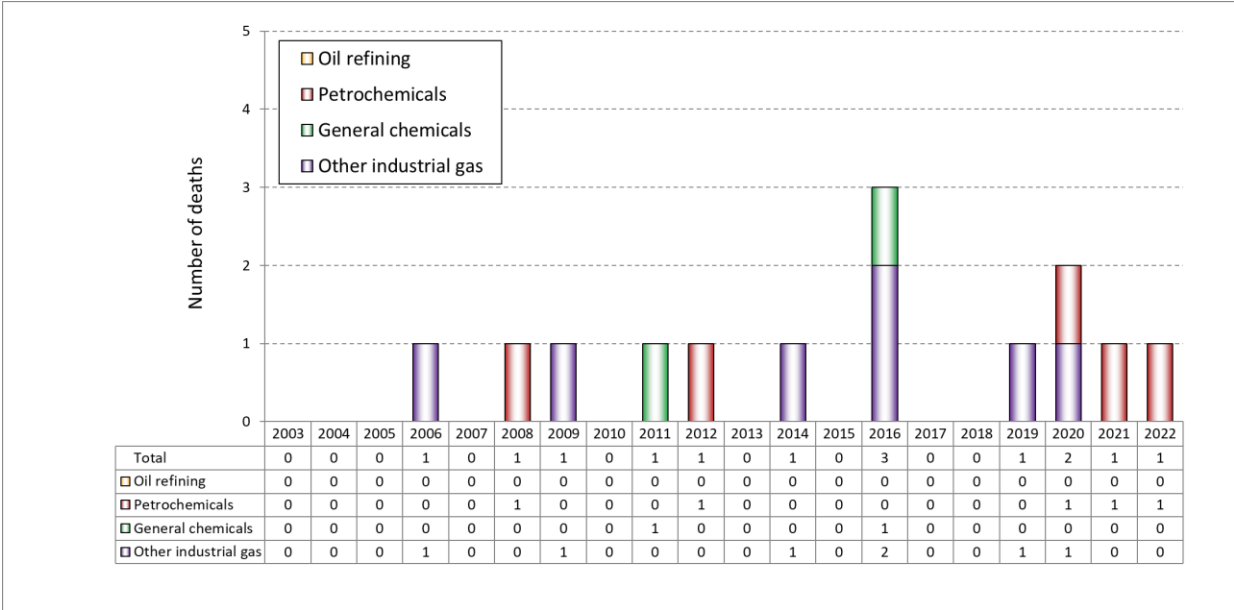


Fig. 3: Change in the numbers of deaths at manufacturing plants for high pressure gas (2003 - 2022)

4. Analysis of accidents resulting in injuries or deaths at manufacturing plants for high pressure gas by type of phenomenon

4.1. Breakdown of types of phenomenon involved in accidents resulting in injuries or deaths at manufacturing plants for high pressure gas (2022)

The breakdown of the types of phenomenon involved in the 13 accidents resulting in injuries or deaths which occurred at manufacturing plants for high pressure gas in 2022 and the numbers of resulting deaths are shown in Table 1.

Note that accidents in which leakages led to explosions or fires are classified as “Explosions” or “Fires.”

Table 1: Breakdown of types of phenomenon involved in accidents resulting in injuries or deaths at manufacturing plants for high pressure gas (2022)

Phenomenon causing the accident	Number of cases	Number of deaths
Leakages	7	0
Fires, explosions	3	0
Leakages → Fires	1	0
Fires	2	0
Explosions	0	0
Bursting, ruptures, etc.	0	0
Other (oxygen deficiency within the tank)	3	1
Total	13	1

4.2 Changes in the numbers of accidents caused by fires and explosions and of resulting injuries or deaths at manufacturing plants for high pressure gas

Of the accidents resulting in injuries or deaths, which occurred at manufacturing plants for high pressure gas between 2003 and 2022, the change in the numbers caused by fires and explosions is shown in Fig. 4. Looked at by industry, many of the accidents resulting in injuries or deaths caused by fires and explosions occurred in the “Other industrial gas” field, a similar trend to that seen in Fig. 2.

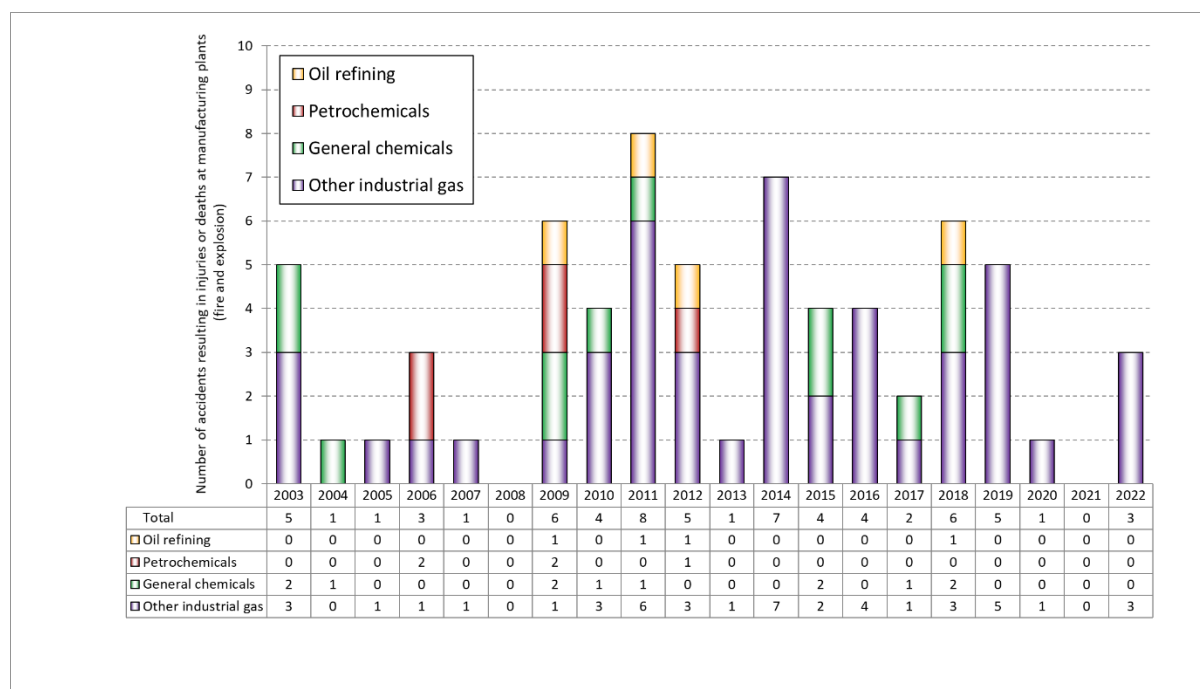


Fig. 4: Change in the numbers of accidents caused by fires and explosions at manufacturing plants for high pressure gas (2003 – 2022)

Fig. 5 shows the change in the numbers of deaths at manufacturing plants for high pressure gas related to accidents caused by fires and explosions. There were three deaths in the 20 years between 2003 and 2022. By comparison with Fig. 3, we can see that of the accidents resulting in deaths, which occurred at manufacturing plants for high pressure gas, 11 deaths were caused by accidents other than fires or explosions.

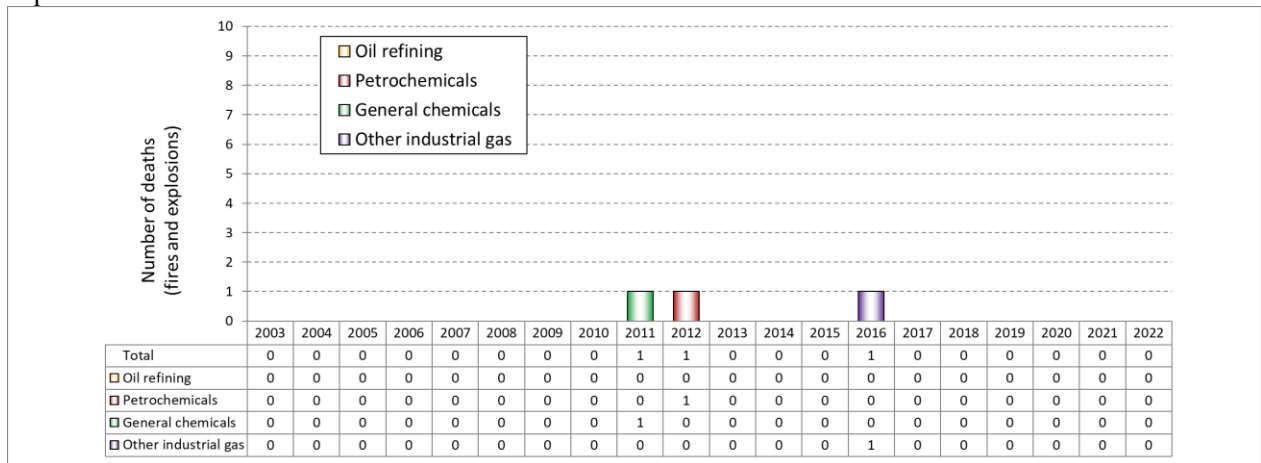


Fig. 5: Change in the numbers of deaths due to accidents caused by fires and explosions at manufacturing plants for high pressure gas (2003 – 2022)

4.3 Changes in the numbers of accidents caused by leakages (excluding leakages which led to fires or explosions) and of resulting injuries or deaths at manufacturing plants for high pressure gas

Of the accidents resulting in injuries or deaths, which occurred at manufacturing plants for high pressure gas between 2003 and 2022, the change in the number caused only by leakages is shown in Fig. 6. Looked at by industry, many of the accidents resulting in injuries or deaths caused by fires and explosions occurred in the “Other industrial gas” field, a similar trend to that seen in Fig. 2.

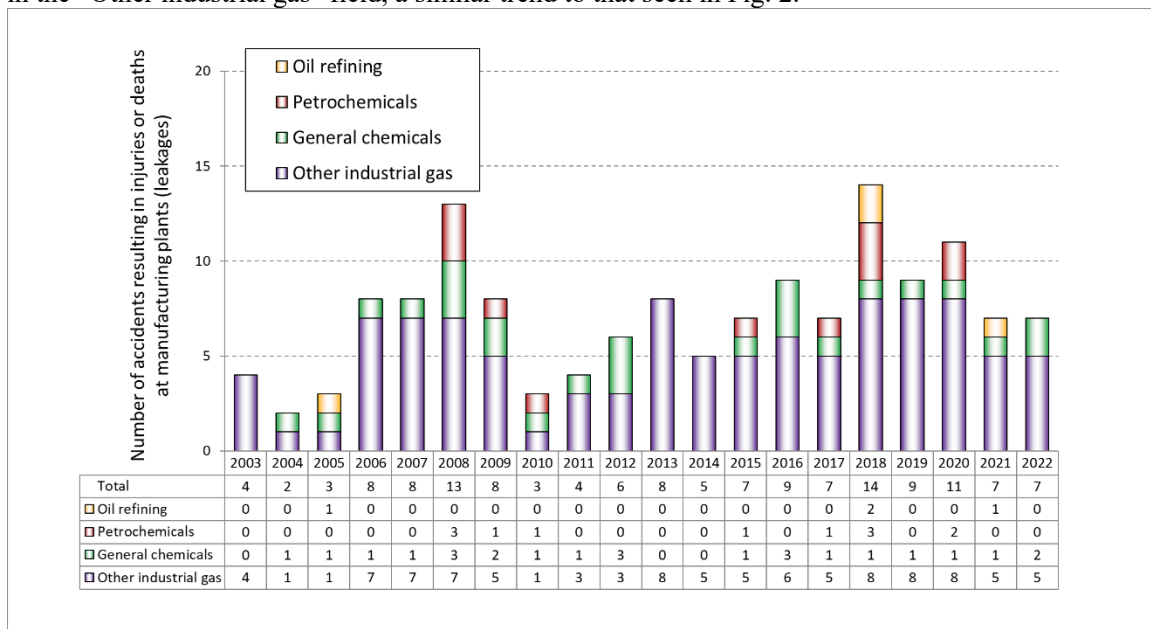


Fig. 6: Change in the numbers of accidents caused by leakages at manufacturing plants for high pressure gas (2003 – 2022)

Fig. 7 shows the change in the numbers of deaths at manufacturing plants for high pressure gas related to accidents caused by leakages. There were four deaths in the 20 years between 2003 and 2022. The main cause of accidents resulting in deaths was leakage of poisonous gases.

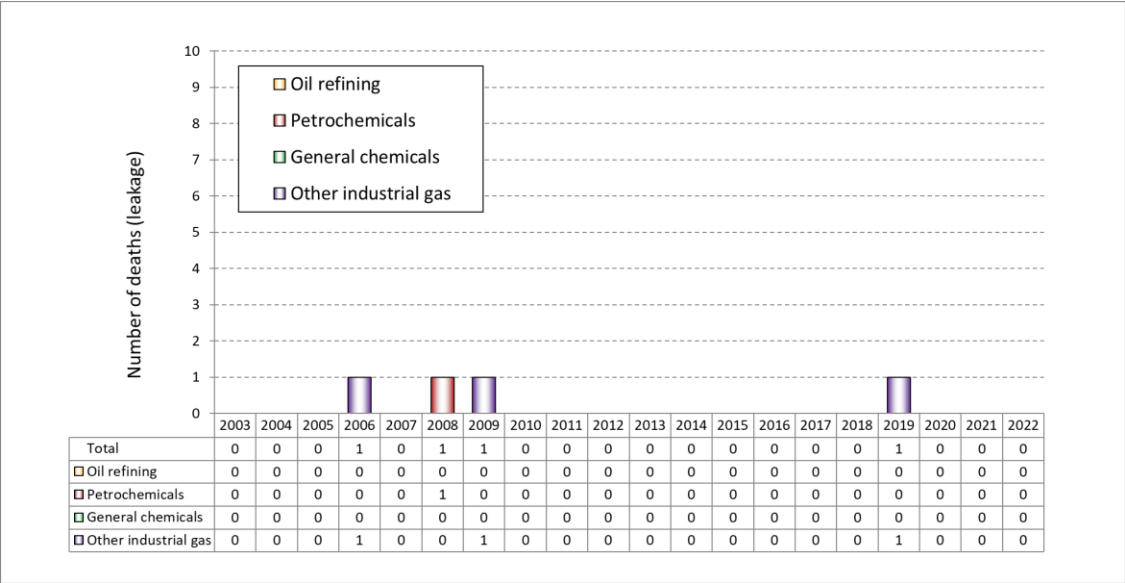


Fig. 7: Change in the numbers of deaths due to accidents caused by leakages at manufacturing plants for high pressure gas (2003 – 2022)

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