Annual Report for Fiscal 2016

(April 1, 2016 - March 31, 2017)

The High Pressure Gas Safety Institute of Japan (KHK)

1. Business Environment and Overview of Operations

The gradual recovery of the Japanese economy continued in fiscal 2016, against a backdrop of ongoing improvements in the employment and income environments. On the other hand, various factors need to be taken into account when considering the outlook for the overseas economy, such as heightened uncertainty accompanying US policy trends and Brexit, and its future remains impossible to predict. Moreover, major damage due to natural disasters occurred in this fiscal year. In addition to the damage arising from the Kumamoto earthquakes and from earthquakes with their epicenters in central Tottori prefecture and off the coast of Fukushima prefecture, torrential rain caused by typhoons brought widespread damage to Hokkaido and to Iwate prefecture.

Turning our attention to the field of high pressure gas safety, from the standpoint of responsibility for practical business in this area, we collaborated with the Ministry of Economy, Trade and Industry in order to respond to the move to make high pressure gas safety smarter which is under consideration by the national government. As part of our response, we carried out system design for the practical business aspects of the “fast track system” and launched full-scale operations in December 2016, as well as holding briefings on this system in February 2017. We carried out a detailed study in preparation for the establishment of the “System for newly-accredited places of business” which is scheduled for introduction from fiscal 2017. Furthermore, as progress is made in the provision of hydrogen stations for the purpose of realizing a hydrogen society, the large-scale refurbishment of our Research and Development Center, built more than 40 years ago, is proceeding smoothly, enabling us to carry out the latest safety research to respond to the needs of each era.

Looking at the business environment of KHK in fiscal 2016 in this context, there were various factors leading to a reduction in income: in addition to a cyclic decline in the number of students on legally-required courses this year, the number of technical reviews carried out as part of our equipment inspection business fell. Despite this, each department worked hard to cut spending, for example by embarking upon continual reviews of expenditure. As a result, we were able to secure a reasonable balance of payments.

2. Overview of Financial Statements for Fiscal 2016

(1) **Balance Sheet**

(As of March31, 2017)

Assets	2016	2015
	Million Yen	Million Yen
Current assets	1,481	1,639
Fixed assets	6,050	6,275
Tangible fixed assets	967	640
Intangible fixed assets	117	171
Investments	4,965	5,465
Total	7,532	7,914

Liabilities/Capital	2016	2015
	Million Yen	Million Yen
Current liabilities	858	1,138
Fixed liabilities	2,092	2,553
Reserve	4,222	4,223
Profit for the term	358	248
Total	7,532	7,914

(2) **Statement of Profit and Loss**

(from April 1,2016 to March 31,2017)

Expenditure	2016	2015
	Million Yen	Million Yen
Ordinary expenditure	4,457	4,576
Operating Expenditure	4,457	4,576
Extraordinary loss	0	84
Corporate taxes, etc.	643	0
Profit for the term	358	24
Total	4,815	4,909

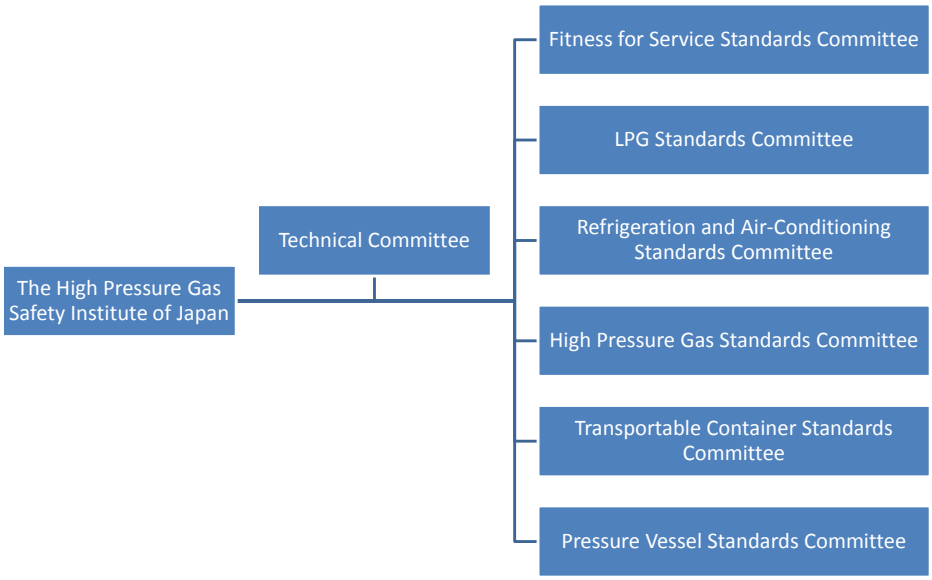
Income	2016	2015
	Million Yen	Million Yen
Ordinary income	4,379	4,582
Operating income	4,269	4,466
Non-operating income	110	116
Extraordinary income	436	327
Total	4,815	4,909

3. Overview of Each Activity

3-1. Development and Issue of Technical Standards

To promote safety in activities involving high pressure gas production, sale, consumption, and transportation, KHK establishes technical standards such as KHK Standards (KHKS) as well as reviews existing standards.

Committee organizations undertaking the preparation of technical standards are as follows:



Each committee consists of committee members appointed from among experts who have relevant knowledge and experience in high pressure gas or LPG safety.

In response to requests from the president of KHK, the technical committee decides basic policies for establishing the technical standards.

The technical standards are then established by each standards committee section in accordance with the basic policies, and the development and issue procedures maintain fairness and openness as the fundamental rule.

During fiscal 2016, the following standards were revised or abolished.

(a)Newly Established Technical Standards

- Standard for Gas Leakage Alarm for LPG (KHKS 0747)
- Standard for Incomplete Combustion Alarm for LPG (KHKS 0748)
- Standard for Gas Detector for LPG (KHKS 0749)
- Standard for Gas Leakage Detector for Bulk Storage (KHKS 0750)

(b)Revised Technical Standards

- Standard for Ultra High Pressure Gas Equipment (KHKS 0220)
- Standard for Non-cylindrical Pressure Vessel (KHKS 0221)
- Guideline for Design of Threaded Components (KHKS 1222)
- Standard for Periodical Inspection of Seamless Containers for Air Breathing Apparatus (KHKS 0151)
- Standard for Periodical Inspection of Seamless Aluminum Alloy Containers for General Use (KHKS 0152)
- Standard for Low Pressure Indoor Rubber Tubes for LPG (KHKS 0708)
- Standard for Low Pressure Hoses with Joints and Connectors for LPG (KHKS 0709)
- Standard for Pressure Chart Recorders for LPG (KHKS0713)
- Standard for Houses with Combustor Connectors for LPG (KHKS 0721)
- Standard for Automatic Gas Shutdown Device with Microcomputer-based LPG Flow Detector

(Type-S) (KHKS 0733)

- Standard for Automatic Gas Shutoff Devices (Diaphragm Meters) based on Microcomputer-based Flow Rate Detection for LPG (KHKS0737)
- Standard for Automatic Gas Shutdown Device with Microcomputer-based LPG Flow Detector (Type-E and EB) (KHKS 0741)
- Standard for Automatic Gas Shutdown Device with Microcomputer-based LPG Flow Detector (Type-S 4) (KHKS 0742)
- Standard for Automatic Gas Shutoff Devices (Ultrasonic Meters) based on Microcomputer-based Flow Rate Detection for LPG (KHKS0743)
- Standard for High Pressure Gas Pipe (KHKS 0801)
- Voluntary Inspection Guideline (Related to Natural Gas Stand) (KHKS 0850-5)
- Guideline of Hazard Prevention Rule for Class 1 Producer and Specific Plant (KHKS 1800-1)
- Guideline of Hazard Prevention Rule for Class 1 Producer and General Plant (KHKS 1800-2)
- Guideline of Safety Training Program for Class 1 Producer and Specific Plant (KHKS 1801-1)
- Guideline of Safety Training Program for Class 1 Producer and General Plant (KHKS 1801-2)
- Safety Education Guideline for Class 2 Producer, Owner, or Possessor of a Class 1 Storage Place or Class 2 Storage Place, Dealer, or Specific High Pressure Gas Consumer (KHKS 1801-3)
- Guideline of Disaster Prevention Rule of Nankai Trough Earthquake for Class 1 Producer and Specific Plant (KHKS 1803-1)
- Guideline of Disaster Prevention Rule of Nankai Trough Earthquake for Class 1 Producer and General Plant (KHKS 1803-2)
- Regular Voluntary Inspection Guideline (related to Natural Gas Stand) (KHKS 1850-5)

(c)Abolished Technical Standards

- Standard for Quick Coupling for LPG Transportation Vehicles (KHKS 0705)
- Standard for Overcharge-proof Device for LPG Transportation Vehicles (KHKS 0706)

3-2. Inspection, Examination and Accreditation

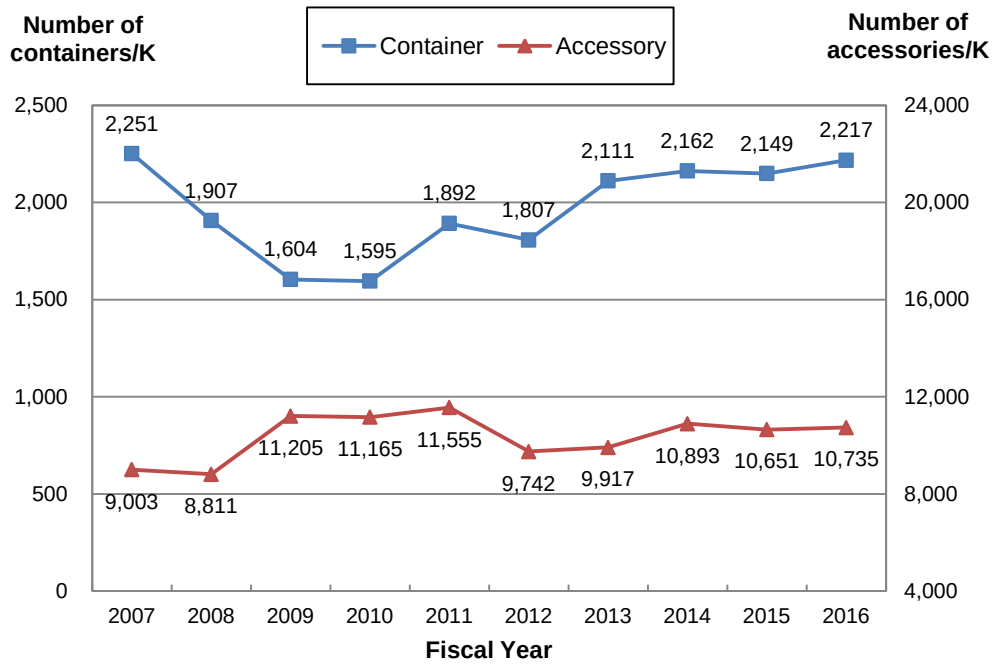
(a) Inspections for Pressure Equipment

The High Pressure Gas Safety Act stipulates that the person who has manufactured/ imported a container or accessory shall apply for the Container/Accessory Inspection. We at KHK conduct these inspections.

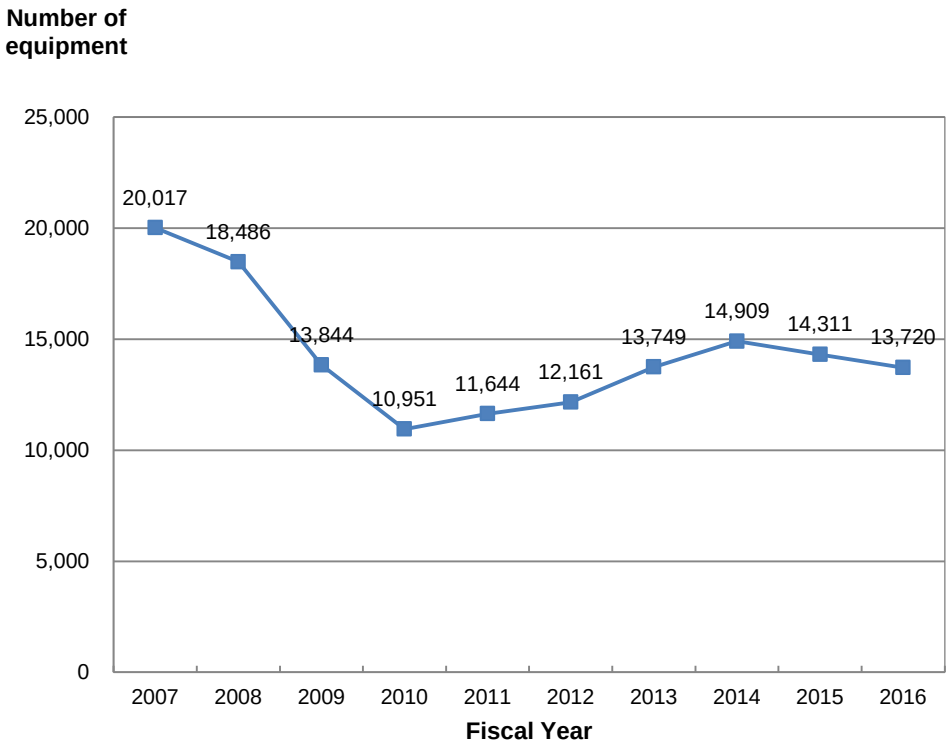
In addition, for preventing explosions or other accidents, the act defines "equipment for high pressure gas production (including storage tanks) "which particularly requires "inspections of its design, material quality, and the process of its manufacturing", as "Designated Equipment." KHK undertakes mandatory inspections of such Designated Equipment at each manufacturing process.

KHK undertakes technical assessments in advance to obtain Ministerial special approval, and also offers services for certification and examination as a part of its optional activities.

In fiscal 2016, the number of application for inspection of containers increased by 3.2% and that of accessory equipment increased by 0.8% compared to the previous fiscal year respectively. And the number of application for inspection of designated equipment decreased by 4.0% compared to the previous fiscal year.



Number of Container/Accessory inspections



Number of Designated Equipment Inspections

(b) Pre-Assessment of Accredited Completion/ Safety Inspection Executor

This pre-assessment undertaken by KHK is part of the statutory service related to the Ministerial approval of accredited completion inspection executor and safety inspection executor.

Class 1 high pressure gas producers who obtained Ministerial approval as a result of this pre-assessment can replace completion inspections or safety inspections that are conducted by prefectural or municipal governments with self–inspections by the approved producers themselves. When the self-inspections are conducted, the results shall be submitted to jurisdictional prefectural or municipal governments.

Number of pre-assessments

	2016	2015
Accredited completion inspection executor	20	20
Accredited safety inspection executor	20	26

(c) Safety Inspections of Refrigeration and Air-Conditioning Facilities

The number of inspections of refrigeration and air-conditioning facilities undertaken by KHK

	2016	2015
Completion inspection of refrigeration and air-conditioning facilities	80	80
Safety inspection of refrigeration and air-conditioning facilities	1,804	1,991
Approval of specified equipment (refrigeration equipment)	160	181
Transfer of specified equipment (refrigeration equipment)	6	5
Testing of refrigeration apparatus	158	190
Design strength verification test, etc.	155	186

3-3. Education

(a) Statutory Training

By the High Pressure Gas Safety Act, high pressure gas producers are required to establish a safety management team consisting of members with a designated high pressure gas production safety management certificate, depending on the type and scale of processing equipment and the type and volume of gas produced. To train certified personnel, KHK offers lectures on each certificate type, and retraining for existing members of safety management teams.

In addition, KHK also provides training courses for the following certificates: high pressure gas sales safety chiefs required at specified high pressure gas dealers, transportation supervisors required for transportation of specified amount of specified high pressure gas, and specific high pressure gas operation safety chiefs required for storage and consumption of specified high pressure gas beyond the designated capacity.

As for the LPG Law-related activities, KHK offers the following courses: training and retraining of LPG installation engineers for LPG piping facilities used for general consumption, retraining of retail operation chiefs, training and retraining of LPG filling operators, as well as training of safety operators and inspectors of facilities designed to consume LPG.

Number of applicants for statutory training

	2016	2015
Qualification Training	44,464	45,284
Re-training (Compulsory training)	32,416	32,001
Statutory training	76,880	77,285

Among the statutory training, while there was a decrease in the number of the qualification training from 45,284 in fiscal 2015 to 44,464, that of the re-training (compulsory training) increased from 32,001 to 32,416 in fiscal 2016. The total number of applicants of the statutory training decreased from 77,285 to 76,880.

(b) Other Trainings

During fiscal 2016, KHK held periodical seminars including basic lectures on high pressure gas safety (16 types at 50 locations), and organized 39 on-site lectures on voluntary safety activities depending on the needs of each business facility.

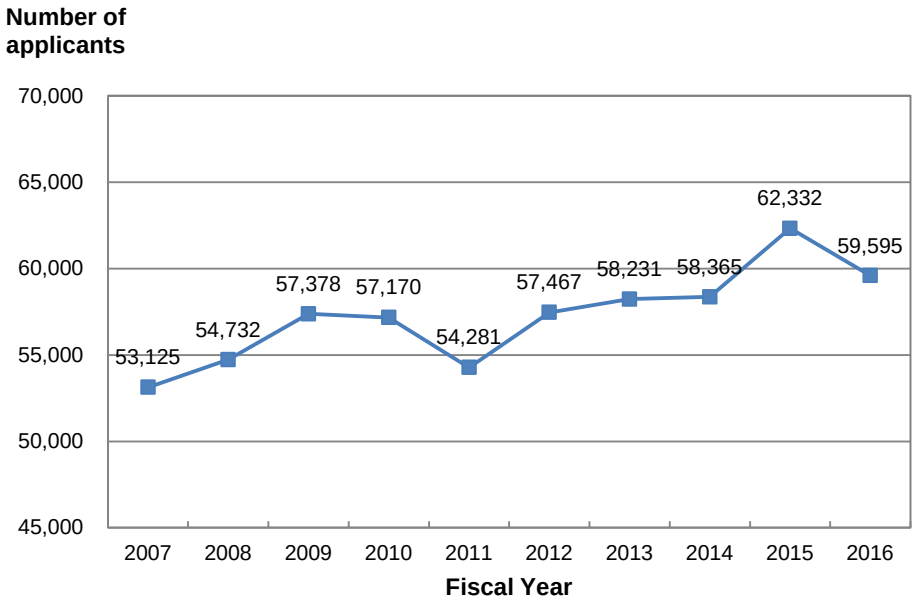
(c) Publications

KHK publishes books related to high pressure gas safety such as high pressure gas safety act, technical standards, and textbooks for training. During fiscal 2016, KHK published 136 types of books, accounting for a total of 149,652.

3-4. National Qualification Examination

The High Pressure Gas Safety Act and LPG Law stipulates that the Minister of Economy, Trade and Industry or prefectural governors must be responsible for conducting the high pressure gas production safety management examination, the high pressure gas sales safety chief examination, and the LPG installation engineer examination, depending on the classification of examinations.

However, the actual implementation of such examinations was transferred to KHK from the Minister of Economy, Trade and Industry and prefectural governors. The total number of applicants for such examinations in fiscal 2016 was 59,595, which was a decrease of 4.4% compared to 62,332 from the previous fiscal year.



Number of applicants for National qualification examinations

3-5. Research and Development

The Research and Development Center at KHK owns testing machines such as tensile/fatigue tests of materials, as well as hydraulic fatigue/explosion tests of pressure equipment including transportable containers, undertaking research and development to enhance high pressure gas safety. In addition, KHK are working on researches commissioned by the government and incorporated administrative agencies.

In fiscal 2016, KHK conducted four researches commissioned by the Ministry of Economy, Trade and Industry as well as by the New Energy and Industrial Technology Development Organization (NEDO). The following is the overview of the research commissioned by NEDO.

"Investigation and Research on Fuel Cell Vehicles and the Optimization of Domestic Regulations and International Harmonization and Standardization of Hydrogen Supply Infrastructure"

(a) Research and Development on the Diversification of the Types of Metal Materials for Hydrogen Fueling Stations

In preparation for the advent of the hydrogen society, it is intended to build up an environment, which will allow the selection of reasonable, easy and convenient materials at temperatures and pressures desired for the construction of a hydrogen station, and gain experience by practice. It is also aimed to study and determine the criteria to evaluate availability of materials in hydrogen stations, including test types, conditions, evaluation methods and the like, and standardize these techniques and widen the range of usable materials.

(b) Research and Development on the Standardization of Composite Cylinders and Tubes for Stationary Storage

In the testing of composite cylinders and tubes which are used in hydrogen stations, there is a big gap between an ambient temperature pressure cycling test, one of the evaluation methods, and actual use conditions. A further sophistication of the evaluation methods, including the fatigue design of composite cylinders and tubes, is desired. Under the circumstances, it is aimed to improve and sophisticate (1) the evaluation techniques of Composite Cylinders and Tubes for Stationary Storage, (2) the evaluation techniques of CFRP, (3) the fatigue design methods of Composite Cylinders and Tubes for Stationary Storage and (4) the safety inspection techniques of composite cylinders and tubes, in order to contribute to the research and development for the standardization of composite cylinders and tubes for hydrogen stations.

3-6. Measures to Promote LPG Consumer Safety

(a) Liquefied Petroleum Gas Safety Commission

The commission operates with contributions from 17 LPG-related organizations and KHK. In partnership with the Gas Safety Office at METI Commerce, Distribution and Industrial Safety Policy Group, the commission performed the following safety campaigns during fiscal 2016.

- LPG Consumer Safety Campaign

  Prepared and distributed LPG safety guides and posters, and advertised in magazines, while provided assistance to safety activities undertaken by prefectural LPG associations.

- LPG Consumer Safety Promotion Conference

  At the event, the commission offered commendations for LPG retailers and related operators including individuals with the 'METI Minister's Secretariat, Director-General for Commerce, Distribution and Industrial Safety Policy Award,' 'KHK President's Award,' and 'Liquefied Petroleum Gas Safety Commission President's Award,' respectively.

(b) Examination

During fiscal 2016, the following examination activities were undertaken.

Examination activities

	2016	2015
LPG leak alarm examination and gas leak senor	2,763618	2,745,026
LPG incomplete combustion alarm examination	28,039	26,183
LPG sensor examination	1,930	2,510

3-7. Collection and Offering of Information, Technical Exchanges

(a) Collection of Accident Information

Acting on a commission by METI, KHK compiles a database of high pressure gas and LPG-related accidents and conduct a statistical analysis. See reference at the end of this brochure.

(b) Organization of Various Conferences and Conventions

The notable conferences and conventions KHK organized during fiscal 2016 include the following:

- Grand Conference of National Association of General High Pressure Gas Safety Organizations (Tokyo, July 2016)

  The conference was organized for the purpose of fostering cooperation and discussions among general high pressure gas safety organizations established in prefectures. KHK acted as the administrative department for the conference.

- Seminar on Lessons from Accidents and Safety Management Technology (Tokyo and Osaka, August 2016)

  - Part of Safety Management Technology

    This seminar is for the accredited completion and safety inspection executors and the personnel of three management divisions (equipment, operation, and safety), including those at headquarters management level, of high pressure gas producers at industrial complexes, and it is organized to provide a place of information provision, information exchange, and discussions related to high pressure gas producing equipment, their operations, and safety management activities.

  - Part of Lessons from Accidents and Safety Measures

    The high pressure gas producers that actually caused accidents explained their experience and post-accident efforts on safety measures so that seminar participants could make use of the information that would be helpful for their future voluntary safety activities, including lessons from accidents and preventive measures.

- National Conference of High Pressure Gas Safety (Tokyo, October 2016)

  The conference, which takes place every October, is organized as a part of the annual high pressure gas safety promotion week, hosted by METI in conjunction with KHK. Each year, top-rated plants of safety, persons who have rendered distinguished safety service and excellent production safety managers are awarded in honor of their continuing hard work, support, and resulting outcomes in preventing high pressure gas-related accidents.

- High Pressure Gas Equipment Manager Meeting (Tokyo, October 2016)

  The meeting is organized annually for the purpose of informing high pressure gas equipment personnel (applicants for Designated Equipment Inspection) of question and answers about material, design, welding, and structure-related issues in order to achieve consistent applications across varying issues.

- General Research Presentation (Tokyo, November 2016)

  The presentation is hosted annually to disseminate information on the findings from the investigative research undertaken by the Research and Development Center at KHK.

(c) International Technical Exchange

KHK sends a delegate to the boiler and pressure vessel standards committee and the post-construction standards committee of the American Society of Mechanical Engineers (ASME), and also has established good relations with Korea Gas Safety Corporation and Industrial Safety and Health Association of the R.O.C.

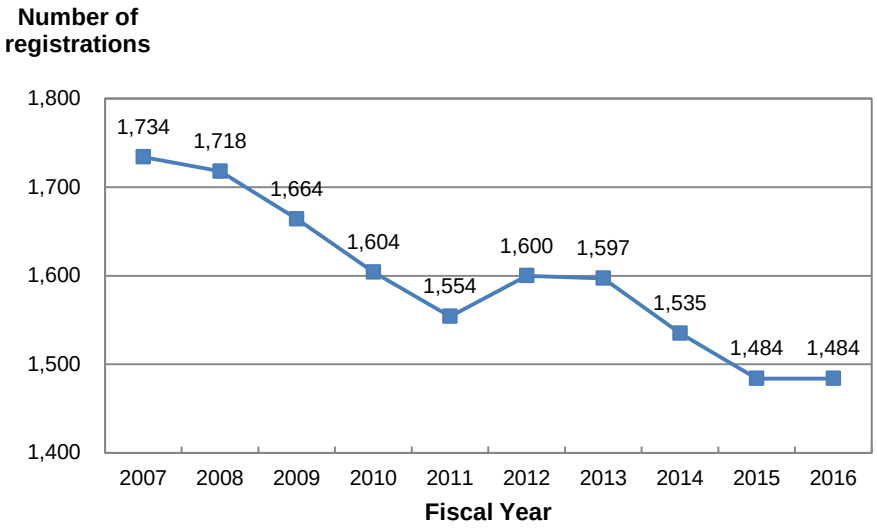
3-8. Assessment and Registration System

(a) Assessment and Registration of Quality Management Systems

Since being accredited by the Japan Accreditation Board (JAB) as a quality management system certification body in 1994, KHK ISO Registration Center (KHK-ISO Center) handles registration of quality management systems for operators in accordance with the ISO9000 series standards, and manages registration and publication of registered organizations. As of the end of fiscal 2016, it operates registration in 30 out of 39 class JAB accredited (class 1-39). As of the end of fiscal 2016, the number of registrations stands at 884.

(b) Assessment and Registration of Environmental Management Systems

For assessment and registration of environmental management systems (ISO14001), the center became a JAB- accredited certification body in 1996, and as of the end of fiscal 2016, it operates registration screenings in 34 out of 39 JAB-accredited classes (class 1-39). As of the end of fiscal 2016, the number of registrations stands at 544.



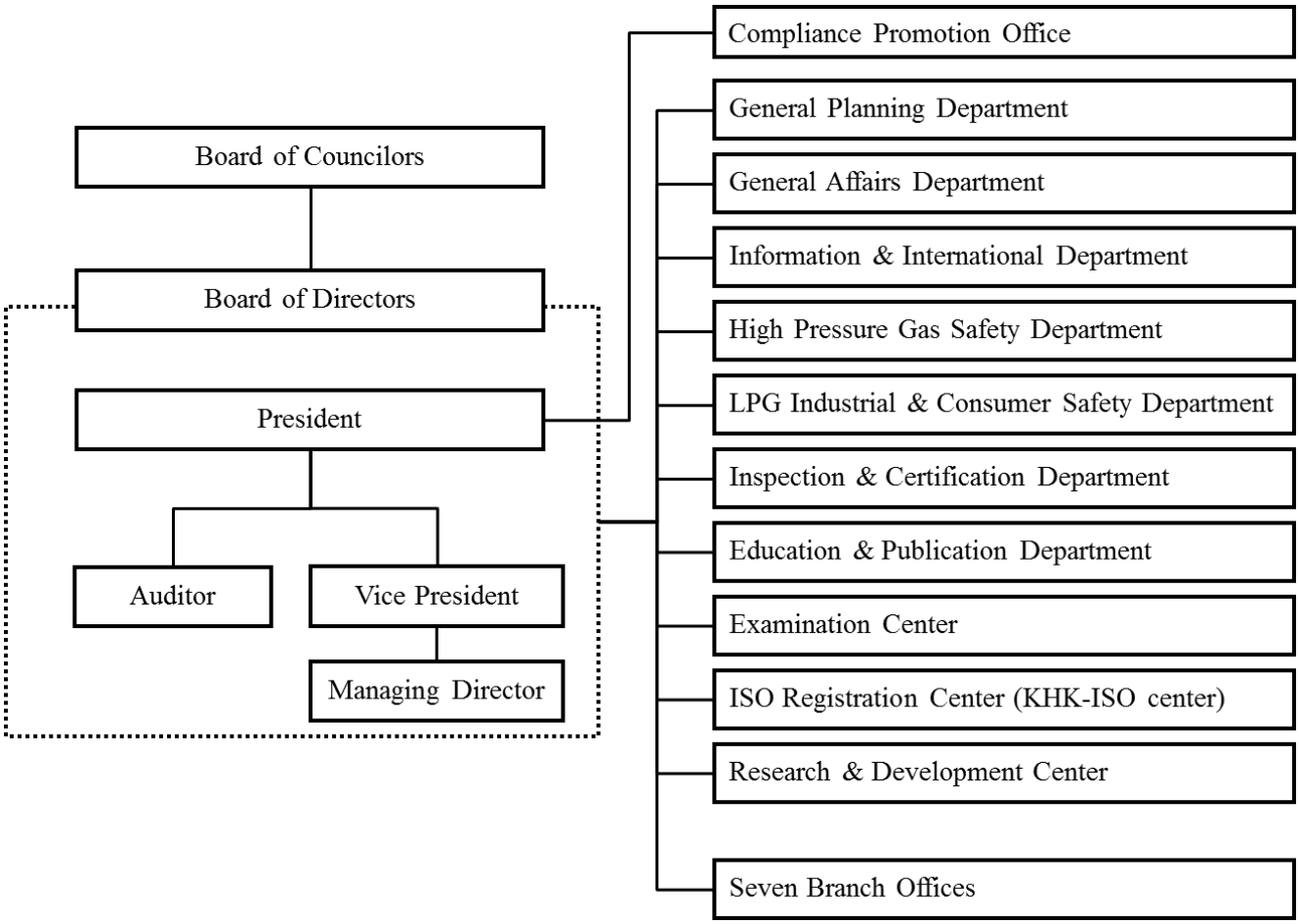
Change in the total number of registrations (Quality and Environment)

(c) Other Assessment and Registration

As of the end of fiscal 2016, the total number of occupational health and safety management system (OHSMS) registrations was 23. The total number of food safety management system (ISO22000) registrations was five, and the total number of FSSC22000 series was six.

4. Organization

4-1. Organization Chart



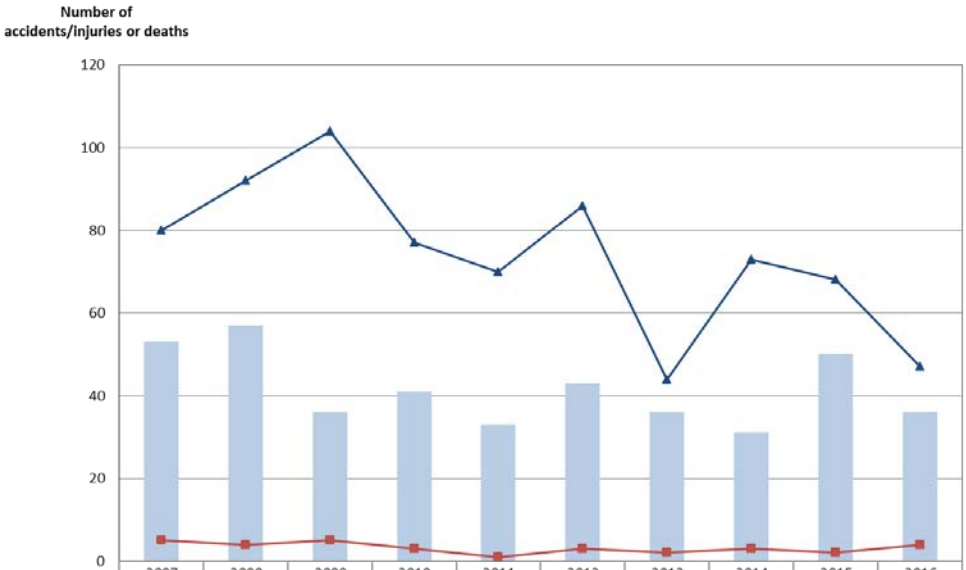
4-2. Membership Status

Types	March 31, 2017	March 31, 2016
Companies	871	887
Organizations	192	192
Individuals	92	95
Supporters	32	30

Reference: Overview of Accidents in Recent Years

Under the commission of METI, KHK records statistics of high pressure gas- and LPG-related accidents, based on the number of reports submitted in accordance with the regulatory requirements of the High Pressure Gas Safety Act (hereinafter referred to as “HPG Act”) and the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas (hereinafter referred to as “LPG Act”).

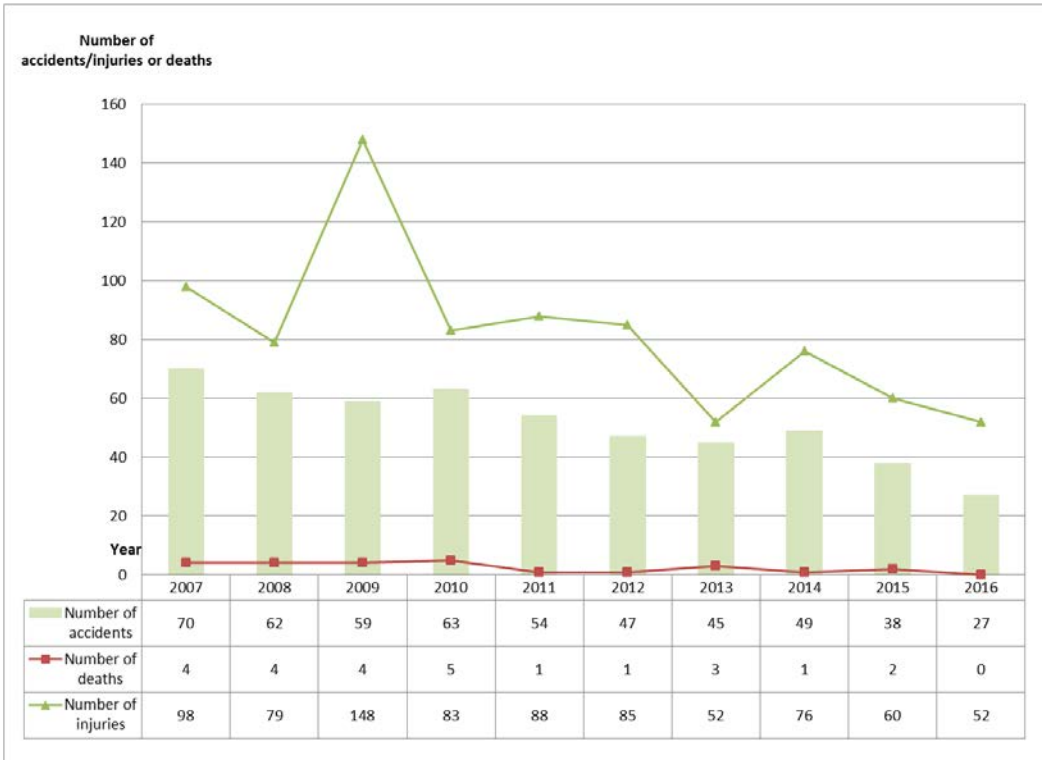
Figure 1 shows the number of the HPG Act accidents that occurred between 2007 and 2016 classified as human damages. Note that among the HPG accidents, the figure excludes those involving general consumers, which pertains to LPG Act.



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of accidents	53	57	36	41	33	43	36	31	50	36
Number of deaths	5	4	5	3	1	3	2	3	2	4
Number of injuries	80	92	104	77	70	86	44	73	68	47

Figure 1: Change in number of HPG Act accidents classified as human damages

Figure 2 shows the LPG Act accidents that occurred between 2007 and 2016 classified as human damages. The total number of the LPG Act accidents classified as human damages is gradually decreasing. In 2016, no accident resulting death has occurred.



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of accidents	70	62	59	63	54	47	45	49	38	27
Number of deaths	4	4	4	5	1	1	3	1	2	0
Number of injuries	98	79	148	83	88	85	52	76	60	52

Figure 1: Change in number of the LPG Act accidents classified as human damages

Contact for inquiries related to this document

The High Pressure Gas Safety Institute of Japan (KHK)

Information & International Affairs Department
International Affairs Division
4-3-13 Toranomon, Minato-ku, Tokyo 105-8447
TEL: +81-3-3436-2201 FAX: +81-3-3438-4163
Web: http://www.khk.or.jp/english/index.html
MAIL: oversea@khk.or.jp