



Process Safety and Disaster Prevention, Occupational Safety and Health

Basic Policy

Mitsubishi Chemical (MCC) creates action plans comprising annual targets, annual policies and key measures reflecting the status of activities and results of the previous fiscal year and uses said plans to carry out process safety and disaster prevention and occupational safety and health activities. In fiscal 2020, we implemented activities in line with the annual goals of zero serious process safety incidents and zero serious occupational accidents as well as the annual policy of precisely understanding workplace weaknesses and steadily making improvements.

Preventing Process Safety Incidents and Occupational Accidents, Key Measures

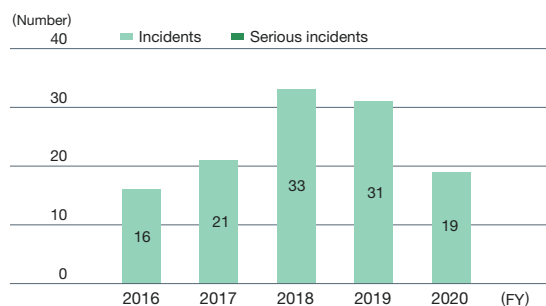
In fiscal 2020, there were 16 incidents, including small fires and leaks of hazardous materials, as well as three chlorofluorocarbon gas leak incidents.

The main causes of the incidents were the corrosion and degradation of facilities and insufficient checking during facility inspections and operations. Behind these factors were management problems, including delays in response to facility aging, insufficient knowledge and insufficient education. However, as process safety incidents have been decreasing, we believe that patrols and other efforts to improve facility management are beginning to produce results.

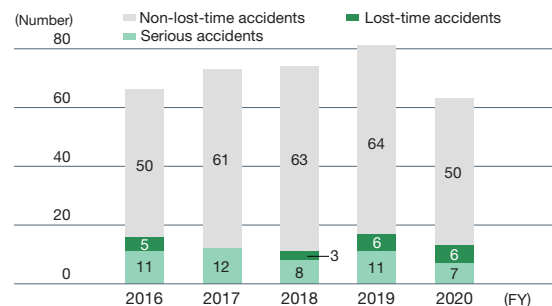
In fiscal 2020, seven serious occupational accidents resulting in four or more days of lost work occurred in Japan. These accidents included such incidents as getting caught or entangled in machinery and contact with high/low temperatures. The main causes of these occupational accidents were lack of competency in basic practices and operations, inadequacies in work procedures and inadequacies in structure design and management. Behind these factors were management problems, including insufficient education and training, insufficient safety activities, and insufficient risk assessment.

Although the total number of lost-time accidents (including those classified as serious) decreased from the previous fiscal year, numerous such accidents still occur, and we will continue striving to reduce the occurrence of occupational accidents.

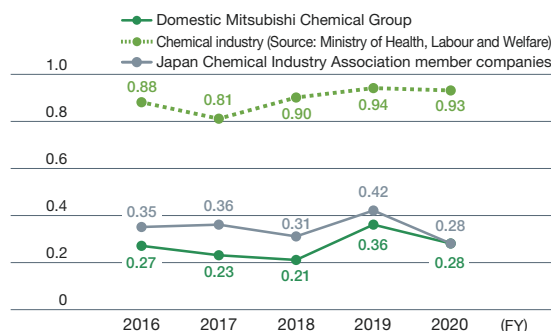
Mitsubishi Chemical Group Process Safety Incidents in Japan



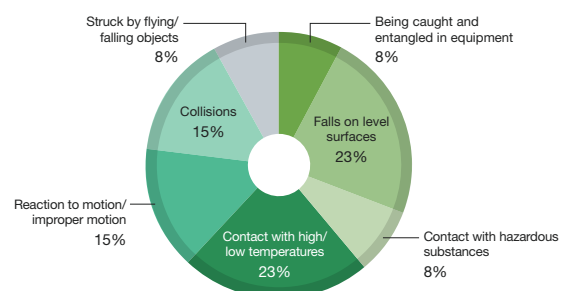
Mitsubishi Chemical Group Occupational Accidents in Japan



Annual Rate of Lost-Time Accidents



Mitsubishi Chemical Group Lost-Time Accidents by Classification (FY2020)



* Data for fiscal 2016 are the totals of the figures for the previous Mitsubishi Chemical, Mitsubishi Plastics and Mitsubishi Rayon and their respective domestic group companies. The same applies hereinafter.

** The figure for chlorofluorocarbon gas leak incidents represents leaks from refrigeration equipment with a capacity of 20 refrigeration tons or greater.

In light of the problems underlying these process safety incidents and occupational accidents, in fiscal 2021, we are implementing the following key measures.

- **Thoroughness and Continuation of Safety Activities**

In addition to efforts to thoroughly ensure safe basic practices and operations, we are reviewing and working to ensure adherence to proper procedures and safety equipment use in construction and other operations, steadily implementing change management and risk assessment, thoroughly responding to incidents and occupational accidents, and effectively utilizing information to prevent the recurrence of incidents and occupational accidents as well as the occurrence of similar incidents and accidents.

To minimize and contain harm in the event of an accident or natural disaster, such as an earthquake, we have in place systems for rapid response within plants and the prevention of negative impacts on the areas around our sites and conduct drills accordingly.

- **Thoroughness and Continuation of Facility Management**

To prevent incidents and occupational accidents, we properly inspect facilities for age-related deterioration and repair and replace them as needed while steadily performing regular monitoring to ensure that signs of irregularities in facilities are quickly detected and dealt with appropriately.

- **Human Resources Training**

We strive to train people who prioritize safety at all times and who can think for themselves, have good judgment and take action. Furthermore, to enhance risk assessments, we are proactively developing human resources with specialized risk assessment knowledge and skills.

- **Enhancing Safety Culture**

We have launched initiatives aimed at realizing organizations in which employees mutually enhance one another's awareness regarding safety, such as the MCC Group Basic Safety Behaviors, in which all employees remind each other to practice safe behaviors. In addition, to comprehensively understand the safety culture and particular characteristics of specific workplaces, we have begun implementing safety culture surveys of all employees at specific workplaces and analyzing the results with the help of third-party experts.

Focus

Promoting the Consistent Practice of the MCC Group Basic Safety Behaviors

MCC is working to raise awareness to ensure that all employees consistently practice the MCC Group Basic Safety Behaviors. To foster knowledge and awareness of the basic safety behaviors, we provided posters to our sites in and outside Japan and distributed tote bags and hand towels printed with illustrations of the basic safety behaviors at domestic sites.

We also held a lecture on preventing falls to deepen employees' understanding of the importance of using handrails, the dangers of walking while distracted and occupational accident prevention. A video of the lecture was used in e-learning, helping to firmly root the basic safety behaviors.



Hand towel and tote bag



MCC Group Basic Safety Behaviors poster

Risk Assessment

MCC implements robust risk assessments of processes, operations and chemicals, striving to prevent process safety incidents and occupational accidents. In these risk assessments, we comprehensively identify, evaluate and work to reduce risks related to process safety, occupational accidents and health. This includes risks not only under steady conditions, but also unsteady conditions, such as when responding to a problem. Furthermore, to effectively reduce risks related to changes, we use mechanisms for identifying all changes and conduct risk assessments under the supervision of expert technicians.



Process Safety and Disaster Prevention, Occupational Safety and Health

Enhancing Self-Directed Process Safety

MCC's Ibaraki, Mie, Okayama and Hiroshima plants are accredited as having high-level process safety under the High Pressure Gas Safety Act. These plants maintain a high level of process safety by creating mechanisms in line with the requirements for accreditation under the High Pressure Gas Safety Act, such as 1. Process safety management and inspection frameworks, 2. Continuous improvement of process safety systems via PDCA cycles, 3. Risk assessments and 4. Education and training.

In addition, we are proactively working to advance smart process safety, aiming to leverage the latest digital transformation (DX) technologies to further enhance process safety management and make more precise judgements based on collected data. By doing so, we seek to address social issues and changes in the environment, including dramatic advances in technology, such as IoT, big data (BD), AI and drones; increasingly serious and frequent disasters; the risk of major earthquakes; the aging of plant facilities; and decreasing numbers of process safety personnel.

Focus

Mie Plant Receives Outstanding Award in the JCIA's RC Awards

MCC's Mie Plant implements joint patrols involving facility management departments and operational management departments to address the desire of employees to learn about specialized maintenance and apply that perspective in patrols. This helps to more quickly detect signs of irregularities. In addition, to share expertise and provide reinforcement for weaknesses caused by differences in levels of experience with specific facilities, we are implementing departmental patrols in which employees make explicit and share their know-how, including key points to inspect during patrols and methods for checking places where changes have occurred. For these activities, the Mie Plant received the Outstanding Award in the Fiscal 2020 Responsible Care (RC) Awards of the Japan Chemical Industry Association (JCIA). This award is bestowed in recognition of process safety management enhancement activities (in the areas of infrastructure development, facility stabilization and human resource development) that serve as a model for other organizations.



Departmental patrol



Outstanding Award from the JCIA

Working Environment Management

Some employees within the MCC Group perform work that requires occupational health considerations, such as the handling of specified chemical substances and organic solvents and operations performed in hot or noisy conditions. To prevent health problems in these employees, the MCC Group manages working environments based on ongoing working environment measurement performed in accordance with relevant laws and guidelines and its own rules. In addition, MCC carries out a range of occupational health measures, such as implementing specialized health checkups, workplace inspections by industrial physicians and initiatives to reduce risks identified by chemical substance risk assessments.

Human Resource Development Initiatives

MCC implements human resource development using educational plans tailored to specific types of work and levels of seniority.

We carry out education and drills for employees who conduct operations at manufacturing sites to ensure that they can correctly carry out basic practices and operations and follow rules about prohibited behaviors. We also use creative techniques to help employees apply the knowledge gained through education at actual work sites. Furthermore, we carry out experiential education using facilities that provide simulated experiences of process safety incidents and occupational accidents to increase employees' sensitivity to danger.

For technical staff, we also provide chemical engineering education and carry out such initiatives as mandatory participation in safety assessments of processes at their respective work sites. Through such efforts, we are developing chemical process safety engineers with specialized knowledge of chemical substances and reactions and risk assessment methods.

Focus

Training Using VR Technology

MCC's manufacturing sites are introducing a training and drill system that utilizes virtual reality (VR). This system allows employees to virtually experience accidents, such as falls and being caught or entangled in equipment, to heighten their sensitivity to danger and help prevent occupational injuries. The system can be used to practice on-site work (such as opening and shutting valves) as well as to drill employees in basic operations, such as the handling of tools and correct work posture and position. We expect it to be very useful for developing plant operators.

MCC's Okayama Plant operates a VR danger simulation training system.

We have been using the VR system since fiscal 2020 to recreate dangerous circumstances and provide simulated experiences that are difficult to achieve using conventional practical safety training equipment.

In fiscal 2021, we plan to add seven new lessons to system, bringing the total to 12. By having employees experience simulations with the system, we are striving to further enhance their sensitivity to danger.



Lesson selection menu



Simulated experience of fall danger



An employee during training

At MCC's Mie Plant, to enhance employee training, we have created and operate a VR training program for implementing an emergency response to a stop the plant's raw material feed. The program uses video from the actual site and helps employees learn how to implement emergency measures, such as opening and closing valves.

Employees who have undergone the training have responded positively, noting that it allows them to train by themselves whenever they have time, clearly indicates which actions are correct and incorrect, making it easier to learn, and allows them to undergo training appropriate to their knowledge level. We thus expect that the system will help save time and accelerate employee training.



VR training using video of the plant



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Accident and Natural Disaster Response

MCC has in place a range of countermeasures to minimize and contain harm due to accidents and natural disasters. We evaluate potential external effects, including impact on surrounding areas, and establish response procedures to be implemented in the event of a disaster. We also conduct training based on scenarios in which accidents occur simultaneously at multiple facilities or plants due to large-scale natural disasters or other factors. Through such efforts, we maintain an emergency response system.

■ Earthquake-Resistant High-Pressure Gas Equipment

MCC uses earthquake resistance design standards to evaluate the earthquake resistance of such facilities as spherical storage tanks with welded steel pipe braces and high-pressure gas facilities designated as vital in terms of earthquake-resistant design. Based on such evaluation, MCC draws up plans to improve facilities where necessary and advances earthquake countermeasures in line with said plans.

- (1) Spherical storage tanks with welded steel pipe braces
In fiscal 2020, we completed earthquake countermeasures for the nine tanks found to require them.
- (2) High-pressure gas facilities designated as vital in terms of earthquake-resistant design
In fiscal 2020, we completed earthquake countermeasures for the 28 facilities found to require them.