

Close-call (*Hiyari-hatto*) Incidents Experienced during Daily Work

○ Views of Employees Collected Through Questionnaire

The following are typical examples of close-call (*hiyari-hatto*) incidents and improvement action plans made by employees, which were reported at four plants of Shin-Etsu Chemical by means of a questionnaire.

* Depending on the nature of the incidents, we will determine what further actions are necessary to assure essential safety.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Human Factor	When walking to the shipping gate and passing by a truck scale, I saw some people walking just in front of the scale while a truck was being weighed. I think this is dangerous, especially when a tanker truck is being weighed.	We will analyze the situation to determine why people were walking in front of the truck and whether they need to pass in front of it. In addition, we will implement a hazard prediction activity (HPA or kiken yochi) around a tanker truck, and if necessary, improve the facilities to prevent human-behavior-induced accidents. Moreover, we will conduct a training program to inform everyone in the plant why the existing rules are in place and to clarify what latent hazards arise if the rules are not followed.
	There is a risk that operators may lose their grip or footing when climbing up and down the ladder of a tanker or container, causing them to slip and fall.	We will encourage operators to implement a hazard prediction activity (HPA) before a day's work begins so as to ensure that operators can safely climb up and down the ladder.
	Some people wearing lab robes turn up their sleeves, especially in summer. There is a risk that they may get chemical agents on their arms or that their arms may come into contact with the dryer when handling items inside it.	We will provide special training so that operators will recognize the fact again that they work in a chemical plant where there is a risk of thermal and/or chemical burns and to ensure that they properly wear working uniforms according to the safety rules.
	I mistook the "reverse" switch of the cart for the "forward" one and was nearly hit by a cart.	We will encourage operators to carry out "physical pointing and calling out" to prevent a recurrence of such a mistake.
	Some people park their cars near the dining hall or lavatory, leaving their car with the engine running. This could be dangerous, as cases have been reported of such actions having caused a fire at other companies.	We will ensure that all employees and external contractors turn off the engine when their vehicle is parked on the premises.
	We sometimes, but not always, use a cutter knife. I do not think this will cause a major accident, but I sometimes feel there is a danger of injury. Therefore, I will wear Kevlar gloves, just in case.	We will ensure that operators properly wear protective equipment through a hazard prediction activity (HPA) with work instructions.

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Human Factor	It is difficult to wear safety glasses on ordinary glasses at the same time. Therefore, I often forget to wear safety glasses.	We will provide protective goggles to operators who wear ordinary glasses.
	When carrying materials, I piled up and carried an excessive number of boxes to finish the work quickly. I nearly dropped the boxes and tripped over my own feet.	We will instruct operators not to rush in order to finish work quickly at a workplace safety meeting.
	When transferring products from storage to a pallet, I sometimes find an empty box at the bottom of the pile. I lose my balance and nearly fall down as a certain amount of force is applied in lifting heavy products.	To avoid operators having to guess whether a box is empty or not, empty and full boxes will be sorted and clearly marked so that they will not be mixed.
	I sometimes feel we should wear a safety belt when working at a height.	Work performed at a height is regulated by law. We will provide training for operators to ensure that they properly use safety equipment.
Human Action	While making an inspection round on the first floor of the worksite, a bolt came falling down from an area on the second floor where dismantling work was going on, and it gave me a scare.	We insisted that the general contractor and the company working on-site make sure to more thoroughly supervise their work.
	While I was hauling a load with a forklift, a person suddened came out from the side passageway, and it gave me a quite a fright.	An instruction was issued that stated that when transporting a load, one should move slowly, while carefully checking the surrounding areas, and we posted a "no-entry" sign by the forklift passageway.
	Because the nameplate of another tank is located near the tank's ladder, there is a high risk of bumping into that nameplate when going up and down the ladder.	A protective guard was installed.
	When I climbed onto a stepladder to check on how the raw materials were being injected, I missed a step and almost fell down.	We placed a movable stepladder with a handrail.
	While transporting chemicals, I stumbled because of the different levels of the floor at the entrance to a room. The employee lost balance and was frightened.	We installed a metal plate and eliminated the floor level differences at the entrance way to the room.
	When I tried to use a cutter to cut up an empty plastic bottle for disposal, the blade dangerously slipped.	When cutting up empty plastic bottles for disposal, we will make use of a steel saw.
	When I was taking apart the partition board for piping, I almost fell off the scaffold.	We will set up a movable scaffold specifically for this work.

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Human Action	When cleaning one of the two waste-water pumps, another pump started to operate and waste-water spilled out. (I had switched to manual operation only for the pump I was to clean.)	We will carry out a hazard prediction activity (HPA) to ensure the proper switchover. Especially in non-routine work, we will thoroughly implement a hazard prediction activity (HPA) with work instructions to ensure safety.
	When moving a container using a forklift, I nearly dropped the container because the forks had not been thoroughly inserted.	We will operate a forklift checking the position of the forks. We will ensure that the basic procedures are carried out before operation of a forklift truck.
	When transporting process cake (in-process powdered material), the wind blew the powder up into the air and it nearly entered my eye.	We will ensure that operators always wear safety glasses.
	When moving a container using a small forklift, I was nearly caught between the forklift and a cart left in the passageway.	We will ensure that carts are placed only in designated areas. We will instruct operators not to place unnecessary items in passageways.
	When I was working at a height using a working vehicle, another operator below me tried to move it by using the lower control box.	As a temporary measure, we will put a sign indicating that the vehicle must not be operated using the control box. As a permanent measure, we will install an interlocking system so that the working vehicle cannot be operated from two locations at the same time.
New Equipment	After performing the work of draining water from the tank, when I moved away, I stumbled over a step and nearly fell over.	We discontinued the work of people draining water from the tank.
New	Because the electric light used to check the inside of the vessel is a mobile-type, the electric cable, which is at the level of my foot, is not fixed. Because it could cause one to fall, it is dangerous.	We installed a fixed-type LED light and eliminated the cable that was not fixed.
New	When transferring flammable liquids to a smaller container, I can't judge the correct amount of nitrogen to use in order to prevent a fire from starting due to static electricity, etc.	We installed a measuring instrument so that one will know the correct amount of nitrogen to use.
New	Because the tube that allows hot water to flow in order to warm the reactor is put on and off every time this work is performed, I am concerned about being burned.	We changed the tube to one for which it is not necessary to put it on and off.
New	There is a danger of the bolts that are securing the pillar of the building becoming eroded due to rainwater seeping in from cracks in the concrete exterior of the building.	We have replaced the eroded bolts that are securing the pillar, and the cracked areas in the concrete exterior of the building were all repaired so that rainwater will be prevented from seeping in.

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Equipment	When unloading a cargo with a forklift, the area at the above-the-head level where a cargo is to be placed is hard to see, and drivers have to rely on their intuitive sense. I feel this is dangerous.	We positioned a mirror so that the place to put a cargo can be seen from the forklift driver's seat.
	Because of the addition of equipment, in some areas it has become hard to hear warning alarms, and I am concerned about the possibility of a response delay at the time of an emergency.	We have installed additional warning-alarm equipment so that there is no place where a warning alarm is hard to hear.
	Because there is no protective cover in a blind-spot area of the conveyer drive chain, I am concerned that someone's hand might get caught.	We placed a protective cover in the area to prevent any such occurrence.
	The U Band that secures the mercury lamp is corroded and there is a danger that the mercury lamp may fall in the event of an earthquake or other disastrous event.	We replaced the U Band.
	There is a vertical ladder set up on the 3rd floor of the gas-emission processing facility, and if one inadvertently falls from it, he or she will fall down to the first floor.	So that one does not fall to the first floor, we changed the location of the ladder. Moreover, we provided a backrest for the ladder.
	Because there are valves and pipes located in a passageway, there is a risk of someone stumbling and falling and also a risk of a secondary accident occurring such as the breaking of a pipe.	A covering was installed at these places, and the area was also made into a "no-passage" area.
	Because the height clearance limit between the ground and the safety fall-prevention barrier used at the time of filling the tank is actually lower than the displayed (4.5m) clearance limit, there is a risk of passing vehicles coming into contact with the barrier.	The height clearance limit displayed was changed to 4.0m and all vehicle operators were reminded about the caution.
	The color display of the open-close indicator of the manually-operated valve of a process equipment unit is the opposite of the color display rules of the plant. Accordingly, because of this confusing situation, there is a possibility of misoperating the valve.	The color display of the open-close indicator was modified to be in accordance with the plant's color display rules.
	When pouring raw materials from a tank into a container, for the purpose of ignition prevention the nitrogen that is to be poured into the container is discharged into atmosphere so that the pressure does not exceed the pressure capacity of the container. Accordingly, there are concerns about solvent inhalation and oxygen deficiency.	Pipework was carried out to equalize the pressure levels of the tank and the container so as to eliminate the discharge of nitrogen into the atmosphere.

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Equipment	When operating the control panel of the river water intake gate, because the foothold area is narrow, there is a risk of falling into the river due to a recoil reaction caused by the operation.	A safety barrier is being put up. Until the end of the installation work, tape will be used as fall-prevention measure and a safety belt will be used as well.
	A part of a floorboard in the second-floor exit area of the building is corroded and it appears that a hole could open.	A steel plate was immediately laid and a "Watch Your Step" warning sign was put up. Later on, the corroded area was replaced.
	On top of the stairs, there is a fire alarm detector installed in the ceiling, and there is a risk of someone coming in contact with it and thus sounding a fire alarm.	A sign was immediately displayed indicating that one should avoid coming in contact with the fire alarm detector, and the fire alarm unit was soon moved to a safer location.
	Because the bearings are exposed when one is cleaning the dust collector receptacle, there is a risk of being caught there during times of intermittent operation.	Immediately a caution sign was put up, and later a safety cover was installed.
	Water run for the purpose of preventing freezing of a fire hydrant was discharged onto the road and the road surface froze. When checking outside at night, I slipped and almost fell down.	We attached a hose so that the discharged water will go into a drainage channel.
	There is no fence behind the ladder for the stock storage cases in the storage lane. Thus, there is a possibility of injury from being caught between them.	After discussing the problem with the maker, we changed the position of the ladder and put in place an additional safety fence.
	Because piping support that was not being used at the time was still present, an employee's foot might get caught there and cause the employee to fall.	We removed the piping support immediately.
	The position of a nozzle that directs the flow of a liquid is above eye level and there is a danger of the liquid splattering over the face of an employee.	We extended the piping and lowered the position of the nozzle.
	The curvature of a gas supply pipe was too sharp and it became crushed.	We connected an angular pipe fitting to avoid the sharp bend.
	The condenser cooling water outlet thermometer is installed near foot level, and when making the rounds, I almost banged into it.	We will add a protective cover for the thermometer so that the structure will be hard to bang into.
The deck for the operation of the valve for steam supply is at a distance from the place where the valve is installed,	In order to permit operators to do their work in a stable body position, we will extend the deck to the place where the valve is installed.	

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Equipment	and when you operate it, you have to put yourself in an unstable position, bending forward while stretching your arm. This position is dangerous.	
	When I got on the edge of a grating in the raw-material filling area, the opposite side of the grating sprang up, and it scared me.	By connecting the gratings with clips, we will prevent a grating from springing up.
	When making some pipe changes, the valve attachment position became inappropriate and valve operation became rather difficult to do.	By installing a deck, we will make valve operation easier.
	There is a risk of an explosion when powder materials are put into a large amount of solvent through a manhole. Is it possible to convert the tank into a sealed tank?	We will re-confirm information regarding the risks of substances used in the plant and consider converting the tank into a sealed one to eliminate the risk of explosion and fire.
	There is a risk of electrostatic ignition when a product storage tank is cleaned using solvent, even though nitrogen gas is injected inside the vessel to inhibit combustion. I suggest that the tank be sealed when it is cleaned.	We will seal the tank as suggested to enhance the safety of the cleaning process.
	When preparing raw materials, I sometimes stumble because of uneven state of the floor.	We will check the floor of the workplace and remedy the unevenness of the floor to enhance safety.
	In my workplace, many forklifts are used to handle heavy objects. There is a risk that operators may collide with forklifts. I do not think it is possible not to use forklifts, but I believe automation may reduce such risks.	We will review the routes that forklifts travel and operators walk. We will look into automating conveyance work.
	Though their basic operation method is almost the same, the models or positions of valves differ from one piece of equipment to the next. The positions of the buttons and indicator lamps on control panels also differ from one piece of equipment to the next. This may cause improper operation of equipment. Is it possible to standardize them?	We will re-check the valves, buttons, and lamps pointed out and review the indicators to prevent mistakes.
	When organic solvent was put into a bucket for filter cleaning, the solvent nearly splashed on me.	There is a rule that states operators must wear safety goggles and protective gloves when organic solvent is being used. Furthermore, the use of a bucket for taking out organic solvents will be prohibited.

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Equipment	A gutter cover fell when a cart passed over it. There is a risk of a cart toppling over.	A stopper has been welded to the back of the cover.
	When wheeling a cart around while carrying ingots (cylindrical poles), I nearly caught my hand between the ingot and the handle of the cart.	The length of a cart has been adjusted so as to eliminate the risk that operators catch their hands.
	When a grating cover (gutter cover) was replaced, the spare parts did not fit, as the size was slightly different from an original one. It may fall.	We will install a safety fence to prevent the grating cover from falling. The size of the grating fence was adjusted to fit.
	A gutter cover was deformed. I nearly stumbled over it.	We will immediately replace the iron gutter cover.
Method	A display showing the direction of the flow on the filter's switch cock is hard to see because of dirt accumulation, and there is a danger of making an operation error.	We colored the gutter channels of the switch cock and made it easy to see the direction of the flow on the filter's switch cock.
	When I placed a bucket to take a sample for a bottle, the lye in the bucket splashed onto my face.	We set up a system for sampling directly from the pipe to the bottle. We made sure that operators wear total-shield-type protective gear.
	While loading the finishing agent through the funnel into the reaction-tank loading mouth, I lost my balance and almost fell.	Because the loading position was high, a special work bench of the appropriate height was placed there.
	On a staircase, non-slip tape became covered with paint, which made the staircase more slippery.	The non-slip tape was replaced.
	When I broke the 2m glass rod in order to discard it, the whole thing burst into pieces, scattering small pieces of glass. Because I was wearing a protective face shield and gloves, no injury occurred.	When you are breaking a glass rod, cover it with a sheet so that the pieces will not scatter.
	When I was putting a catalytic agent into a tank using a funnel, because the container was heavy it was difficult to pore it into the tank. Some of the liquid spilled and came in contact with my body.	By using a pump for feeding the catalytic agent into a tank, the problem of some of the liquid spilling will be eliminated.
	A glass bottle for sampling purposes was placed at the extraction area. However, there was some extraneous matter there and the glass bottle did not fit right. When I tried hard to tighten it so as to fit it in, the glass bottle broke.	We will add in our safety manual the process step of cleaning the adhered hardened material at the extraction area prior to placing the glass bottle in the area.

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Method	By mistake, I operated the wrong valve, which resulted in a lowering of the tank liquid surface.	To prevent such a mistake, we will highlight the name of each valve in red.
	While carrying out a glass-disposal process with my safety glasses on, broken glass flew close to my face.	We will change the protective gear from safety glasses to a safety shield that covers the entire face area.
	When cleaning equipment with solvent and operating filtration in the same room at the same time, I feel there is a risk of ignition and explosion. The ventilation of the room needs to be improved.	We will re-evaluate the safety of the processes to identify potential risks. In addition, dangerous processes will be classified. Upon measurement, we will consider improving ventilation.
	Processing objects are becoming heavier than before. I nearly dropped one.	The operating procedures for handling heavy objects will be reviewed. In addition, we will consider installing labor-saving equipment.
	I am concerned that operators may be injured due to the improper installation of a heavy metal mold.	The procedures for carrying heavy metal molds and installation equipments will be reviewed to eliminate such a risk.
	Sometimes, I nearly forget to release pressure when removing a pressurized vessel. => I suggest that a pressure meter be installed so that the inside pressure can be checked.	The operating procedures are set forth in the written operating instructions and standards. We will examine if there is any problem with them and provide operators with training on them.
	When removing the filler cap for oil replenishment to the vacuum pump, I was nearly burned by spilled hot oil.	The operating procedures for oil replacement or replenishment are set forth in the written operating instructions and standards. We will examine if there is any problem with them and provide operators with training on them.
	There is a risk of a chemical burn when a vessel is directly put into a cleaning tank for acid-cleaning. (It must be made mandatory to wear an apron in addition to designated safety glasses and gloves.)	The procedures for acid-cleaning of containers will be reviewed to determine if there is any problem with it and to thoroughly familiarize operators with it.
	Chemicals splashed into my eye. => I did not wear safety glasses because I thought it was OK to wear only ordinary glasses. I learned that it is necessary to wear safety glasses even if wearing ordinary glasses. There are safety glasses designed for those who wear ordinary glasses.	We will instruct operators wearing ordinary glasses to wear special safety glasses or goggles, as we have already pointed out.
	Plastic boxes are piled too high on a cart. As a result, the pile collapses due to uneven floor surfaces or wind. There is a risk of such boxes hitting other operators.	We will rearrange the storage area and secure the routes for carts.

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Method	I feel it is dangerous to improperly pile plastic cases or to push a cart with products protruding from the box.	The procedures for piling cases will be standardized and rules for moving products safely will be made.
	I nearly cut my finger when pushing hard pieces of quartz glass into a waste box.	We will standardize operating instructions, such as by explicitly starting to use anti-cut gloves, and give operators training about them.
	Boiled water splashed on me when a steam trap (condensed steam collector) was being replaced. It was dangerous.	The procedures for removing pipes will be clearly documented. In addition, we will ensure that we implement a hazard prediction activity (HPA).
New New	Because the permissible amount of the source gas is not posted at the workplace, I am concerned about toxicity.	We posted the permissible amount of the source gas at the workplace.
	In order to fill liquid products into a container, I went up to open the cover, my feet slipped and I almost fell.	We have placed an anti-skid material at the top area of the container.
	There is no "STOP" sign in an area of a T-junction on a busy traffic road. It could lead to a grave accident.	We set up a "STOP" indicator and sign on the road where it was needed.
	In the area of the tank lorry filling place, the hoses used for filling are scattered around and there is a risk of someone tripping over them.	A special-purpose hose rack was set up and everyone was instructed to make it a habit to return the hoses there after using them.
	Many pieces of paint coating are hanging down from the air-conditioner's duct, and there is a risk of these broken pieces falling and getting into one's eyes or of inhaling particles of them.	After removing all the pieces in the area where the paint coating was falling off, the area was repainted.
	When the camlock of a hose was loosened up to let acidic chemicals into the tank lorry, the cap noisily rattled off.	In cases where the pressure inside of a hose is expected to be high due to high temperature, the camlock should be gradually loosened so as to reduce the pressure inside the hose. This instruction was included in the operation manual.
	Liquid sludge splattered from a sieve and almost entered into my mouth.	We will recheck the sieve cover and also change the shape of the protective gear.
	I nearly fell over an object placed on the floor.	Designated areas will be clearly indicated. In addition, the managing method will be reviewed so that items are not placed anywhere other than in designated areas.

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Management	A floor sheet had peeled away. I almost fell down when I carried rods to be processed.	We will take necessary actions immediately. When finding any hazards, please report it to your supervisor at the daily meeting. We will immediately carry out safety measures against the reported hazards.
	There is a risk that when walking down the steps of furnaces, an operator may catch his or her hand between the rail and the wall, and topple over, resulting in injury, as the gap is small.	We will check whether there are any hazards in buildings, walls, passageways, etc. and review management methods to ensure a safe work environment.
	Many external contractors visit the plant and many cars go back and forth on the premises. Traffic should be limited or banned for a certain period of time, such as lunch time.	The entry of vehicles is restricted according to the traffic rules in each plant. We will review whether any areas or times are hazardous.
	During night patrol, I feel the weighing place is dark. Outdoor lights are needed.	Though the luminosity is checked through work environment assessment, we will check it again around the area that was pointed out.
	The women's working uniform for the summer season is loose, especially around the waist. It is dangerous that the loose clothing could easily get caught. Clothes that properly fit bodies might be better.	In addition to the problem pointed out, we will review all of the working uniforms from the safety aspect.
	In the passageway where steel plates were laid, a cart got stuck and nearly toppled over because there were gaps between the steel plates.	We will take necessary actions immediately. When finding any hazards, please report it to your supervisor at the daily meeting. We will immediately carry out safety measures to counteract the reported hazards.
	There are a lot of hazardous raw materials. I think that we need to prepare a list of hazardous materials to re-evaluate the danger levels of the materials.	In accordance with our management standards, hazardous materials are stored and the quantity of hazardous materials is controlled. We will check the status of hazardous materials daily and review the manner of conducting safety training, such as the frequency of the training.
	There are some places where rain water leaks through. I am concerned that such rain water may enter the control panels of machines, causing trouble such as a short-circuit.	The problem area pointed out will be located and repaired immediately.
	The cover of a trench was taken off and I nearly fell into the trench.	We will ensure that we take appropriate measures to prevent someone from tripping or falling in when a cover has been removed and to ensure that the cover is replaced when the work is completed.

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Management	When I was about to weigh a container containing oil, some oil was spilling over. The container slipped from my hands and almost hit a pipe.	We will carry out 4S activities -- <i>Seiri</i> (Sorting), <i>Seiton</i> (Straightening up), <i>Seisou</i> (Cleaning up) and <i>Seiketsu</i> (Practice cleanliness) at the particular workplace, on the equipment and at the entire facility. We will ensure that the spilled oil is wiped up immediately.
Others	I am sometimes concerned that problems are not detected quickly enough because there is not a sufficient number of operators and each operator has too many tasks, causing operators to become careless. Measures need to be taken based on a new way of thinking, both in terms of equipment and management.	We will promote the automation and installation of labor-saving equipment to reduce the burden on operators.
	At automatic doors or gates, the other side can not be seen through. I nearly collided with other operators even when taking care to avoid such an accident.	To avoid operators having to take action by guesswork, we will provide training for operators to be sure to be especially aware of assuring the safety of those around them before starting work. For some areas, sensors and flashing lights will be used to ensure safety.