

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	It is difficult to distinguish between the "No Passage" sign necessary at the time of facility inspection, and the sign for "Operation Cautions."	We repositioned the placement area of the "Operation Cautions" sign. At the same time, in order for the "No Passage" sign to be seen clearly and be easily distinguished from the other sign, we changed the placement of this sign to a hanging-down type.
	When a dolly passed over a mudguard mat, it crumpled up the mat, and my foot got caught and I got scared.	We stabilized the mudguard mat by applying a double-sided tape.
	In winter when snow had accumulated, because some of the service water used to melt the snow had frozen in an area where people pass by when leaving work, I slipped and almost fell.	We stopped using service water to melt snow when it is not necessary.
	At the inspection work area, my foot fell into a u-shaped gutter where there was no cover, and I almost fell down.	A cover for the gutter was installed.
	There is a danger of tripping over an eyebath's drain piping that is on the ground.	We painted the drain piping yellow so that it is easily recognizable.
	A rotating machine continues to rotate even after the power is turned off, and there is a possibility one could get caught when the cover is opened.	A lock function was added so that the cover can be opened only after the rotation stops.

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Human Action	When I stepped on a stool that was placed to allow crossing over piping, my foot slipped and I almost fell.	The piping and stool were removed so as to make the area flat so that there is no difference in level.
	Because the work to fill a conduit with antifreeze involves the use of a ladder, there is a danger that one could fall.	We will modify the workplace so that the work will not involve using a ladder.
	On the staircase landing, there are many blind spots, and there is a high risk of colliding with people.	A mirror was installed to make sure there are no blind spots.
	When I put on the rubber gloves that were placed on top of the cover of the reactor, they were hot and it gave me a scare.	We are investigating a place to temporarily put the gloves.
	When patrolling the site, I could not see well the area where I was walking because of the steam coming out of the drainage conduit and I almost fell into the drainage gutter.	A cover was installed over the drainage gutter.
	The handrailing of the plant's staircase deck is constructed according to standard specifications; however, visually it appears to be low and it makes me feel a bit fearful.	We will raise the height of the handrailing.
	When cleaning some greasy grime, I almost missed a step that was in front of the entrance to the room.	We installed anti-slip flooring in the area. We will also conduct a review to specify the cause of the greasy grime and also implement measures to prevent such unclean substances.
	Because of changes in my field of vision due to using bifocal eyeglasses, when I was going up and down the stairs it was hard to accurately grasp a sense of distance and so I almost missed a step.	We will make sure that when workers are going up and down the stairs they must always use the handrail.
	When transferring products to a tank lorry, because there was a ground earth wire, which was supposed to be run along the ground, in an elevated position, it almost became entangled around my neck and chest.	We are considering to add a fluorescent color in order for the ground earth wire to stand out and be easily identifiable.

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Human Action	When engaging in a cleaning job, a part of my body brushed against the emergency call button on an instrument panel and I almost pushed it on.	In order to prevent the emergency stop button from being accidentally pushed on, a cover was installed over the button.
	When unfastening a bolt of a pipe joint, retained liquid came rushing out from the joints.	Prior to carrying out non-routine work, we will make sure that the hazard prediction activities (HPA) are followed and we will prepare piping drawings and directions before the starting of such work.
	When inspecting the facility on a stormy day, while holding the paper data documents in my hand in order to keep them from being blown away, I slipped on the wet floor and almost fell down.	We implemented a skid-prevention measure by mounting an anti-skid tape along the passageway of the facility.
	I am taking a training course on cardiac resuscitation, but I am concerned about whether or not I will be able to correctly perform the resuscitation procedure if I should actually be faced with such a situation.	We created a procedure chart explaining how to apply cardiac resuscitation and posted it in a prominent place to help provide guidance about how to perform the procedure so employees will know what to do if faced with such a situation.
	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 suddenly 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.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Human Action	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.
	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	There is no handrail at the steep staircase in the old building, and I am concerned that there is a danger of stumbling or falling down the stairs.	We installed a handrail.
New	A switch for the ventilating fan is located in the back of the workroom, and I am concerned that a worker might easily forget to switch on the ventilating fan, and there is a possibility of taking added time to operate.	We moved the ventilating fan switch to the entrance area of the room.
New	Because the ladle that is used for sampling is short in length, there is a risk that one can drop the ladle into the equipment.	If the ladle is made longer, it will cause difficulty in sampling. So we attached a chain to the ladle to prevent it from dropping into the equipment.

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Equipment	On the temperature control panel for heating oil, there is a switch that will keep the heater continuing to go on heating. If the switch is turned on by mistake, there is a possibility of the temperature becoming higher than the set temperature.	We eliminated the switch that will keep the heater continuing to go on heating.
	Anti-slip tape is only partially mounted on the edge of the staircase, and the tape has also deteriorated. I am concerned one could slip.	We re-mounted the anti-slip tape all around the edge of the staircase.
	There is an opening on a part of the side ditch cover where one's foot could possibly fall into it.	We have eliminated this open area.
	Because the sample extraction place is located at a high position, there is a possibility of dropping the sample receptacle and possibly receiving a chemical burn. In addition, the workability is not good.	The sample extraction place was changed so that a worker can perform this job by placing the sample receptacle on the floor.
	Because the pipes used for sampling are made of a resin, I am concerned that an electrical charge could ignite the extracted liquid and/or cause a shock to workers.	The piping material was changed to the type that can ground electricity.
	Because a car's stopper block has no indicator, it is hard to recognize during a night inspection, and so there is a danger of tripping over it and falling. In addition, there is also a danger of a wheel of a car getting stuck as it is going through inbetween the blocks.	In order to make it easy to see the stopper block, a reflective tape was attached to the block.
	Because the corner of the eyebath basin's frame has a sharp edge, I am concerned that it may represent a danger.	We attached a cushioning material to the sharp area.
	Piping that does not have a way to drain water has a risk of being damaged in winter when the water freezes.	A drain valve was installed.
	Coolant flow inspection work involves having to lift up a 5kg cover, and this could cause a back strain and/or your fingers could get caught.	In order to eliminate the need to lift up the cover, we installed an inspection hole in the cover.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Equipment	When I was moving a cart, it did not go straight and almost hit the wall. The wheel's rotating bearing part was slightly bent.	The wheel's rotating bearing part was replaced.
	Because the rim of a stainless steel vat is sharp, there is a danger of cutting one's hand on it.	The sharp part of the rim surface was rounded.
	When I tried to use the air from the air blower to dust off the powder sticking to my work clothes, the hose moved wildly and almost hit my face.	An air gun was installed that made it easy to hold the head of the hose so that the hose could not move wildly.
	Work was done so that the piping can be easily removed for inspection. However, because no support for the piping is installed, there is a concern that the piping may become unstable.	We installed a support for the piping.
	An area where mortar is applied becomes slippery when it rains or snows, and so I am concerned that someone could slip and fall.	We applied mortar that is mixed with sand in order to make it non-slip.
	On the equipment display screen, there is a part about the adjusting of the degree of opening of the regulation control valve that is hard to understand, and so there is a risk of making a mistake in understanding the state of the opening and closing of the valve.	We will change the display regarding the degree of the opening of the regulation control valve to make it simpler to understand. In addition, we will continue to conduct training sessions concerning the valve set-up and control methods.
	There is a metal protective cover over the operation lever to prevent operation mistakes; however, the end part of the protective cover is exposed, and my clothes were caught on it, which gave me a fright.	We covered the protective cover with a sheet, and we also put a fluorescent safety tape over it.
	During the cleaning operation of a 3-roller milling machine it was found that the safety device may not function correctly depending on the direction of the installation of the safety cover, and I felt it was a risky situation.	We changed the configuration of the safety cover so that irrespective of the direction of the cover's installation the safety device will always work properly.
	In the event of a serious accident, a yellow-black rope is used to restrict traffic; however, at night the visibility of the rope is not good enough.	We will use a red-color guide light to improve visibility.

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Equipment	In the old building, there are railings whose height is lower than the plant's standards, and there is a risk of falling.	The railings built in accordance with old standards were corrected to the height of the plant's standards.
	The equipment's "STOP" button can easily be pushed by mistake.	We installed a cover over the button to prevent any operation mistake.
	A ground wire with an automatic winding function crosses a passageway and it became disconnected during work, and the metal on the tip of the ground wire almost hit me in the face.	We will change the ground wire's installation position so that it will not cross the passageway.
	I noticed a sudden shortage in the cutting machine's cooling water, and I immediately stopped the machine to prevent damage to it.	We have installed a safety device so that when the supply of the cooling water becomes insufficient the machine will automatically stop its operation.
	While conducting a pre-operation check of an apparatus, I felt a fright when my thigh made contact with the corner of the apparatus cover.	We eliminated the sharp protruding part of the apparatus cover.
	Because the steam trap vent is facing in the direction of a concrete wall, there has been some damage to the concrete.	We changed the direction of the vent and also repaired the damaged area with mortar.
	While walking in the plant wearing a helmet, I bumped my head on a pipe support frame that is about 1.8m above the ground.	We put black/yellow-striped safety tape around the pipe support frame. In addition, we displayed a sign reading "Watch Your Head!" at an eye-level height where it can be seen clearly.
	There is no caution indicator where the steps are in the around the manufacturing facility tank, and there is a possibility that one might stumble, especially at night.	We painted the area so that one can clearly see where the steps are.
	When draining water in the pipes, because of the residual pressure, the hose that was connected at the tip of the pipe moved violently and almost hit my face.	We will extend the pipe to the drainage canal and do away with the use of a hose.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Equipment	When I opened the door to the corridor, because of the pressure differences between the corridor and the room, the door suddenly closed and my body and fingers almost got caught.	We changed the door to a sliding door.
	Screws used to adjust the height of the machinery are protruding more than necessary above the fixed surface of the machinery, and there is a danger that the bottom part of work pants could get caught.	We cut away the unnecessary part of the screws. In addition, we placed a cap nut on and made the surface of the screw smooth so that work clothing cannot get caught there.
	The key box is merely propped against the wall in the room. I am concerned that in case of an earthquake or for some other reason, it might fall over and cause injuries.	We firmly fixed the keybox to the wall.
	There is no safety cover over the open area of the axle pump. I have concerns about the possibility of getting one's fingers caught in it during operation.	We placed a safety cover over the open area of the axle pump.
	There is no thermometer in the cylinder storeroom. Not being able to know the temperature is a cause of concern.	We installed a thermometer so that the temperature inside the cylinder storeroom can always be checked.
	When inspecting equipment I walk across an elevated bridge, and when the snow covers the ground, it is hard to see the floor of the bridge. Thus, there is some danger of falling off the bridge by making a misstep.	We installed a safety fence and took measures to prevent the possibility of such a fall.
	The cover of a manhole is slightly warped as a result of the coming-and-going of large-sized cars. Although the warped part is small, there is a danger of forklifts or pedestrians stumbling over it or being caught by it.	We have replaced the cover and also we have reinforced the frame of the cover with concrete, thus eliminating the issue of the warped cover and making it so that the cover will not warp in the future.
	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.
	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.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Equipment	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.
	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.
	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.
	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.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Equipment	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.
	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.

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Equipment	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, and when you operate it, you have to put yourself in an unstable position, bending forward while stretching your arm. This position is dangerous.	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.
	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.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Equipment	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.
	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	When we tried to dry the substrate by rotating it in the substrate cleaning machine, the substrate broke loose from the equipment and was damaged.	We revised the operation manual in order to thoroughly conduct the method of positioning of the substrate in the substrate cleaning machine and the work process of confirming the installation status.

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Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Method	When lifting some machinery parts with a fork lift, because the fork insertion was not deep enough the parts became tilted and almost fell off.	We added a line display to indicate the width of the machinery parts on the fork lift. Furthermore, we added a process before the lifting of the cargo to make sure about the position of fork and the cargo.
	The storage location for the bolts and nuts of test equipment is not clear, and there is a possibility of misplacing or losing them. If a bolt/nut is lost, we cannot correctly close the equipment, and that could lead to injuries.	We prepared a storage container indicating the number of bolts and nuts and set aside a place to store the container, and we also added a display indicating the storage location.
	The letters on the sign containing information about the foam fire-extinguishing equipment operation procedure are fading due to exposure to sunlight. I am concerned about whether or not one can appropriately operate the equipment at the time of a fire.	We are going to renew the lettering on the operation procedure sign. In addition, we are going to remind everyone that this information about operation procedure is also contained on the inside of the cover of the operation box.
	When withdrawing the reagent with a syringe from an ampule that had a sharp edge, my hand slipped and I almost cut myself on the sharp edge of the ampule.	We will make sure that one wears cut-resistant gloves and that one breaks the stem of the ampule in the correct place, as explained in the ampule-handling manual.
	Because the hoses used in our work are placed on the floor, there is a danger of getting one's foot caught and one could fall and get injured.	We changed the safe storage method for the hoses by hanging them one-by-one over the pipes that are not being used.
	When cleaning the inside of a hose with compressed air, the band hose clamp came off and the hose began to move wildly.	We doubled the band hose clamp, and by attaching a pressure regulator, we lowered the pressure of the compressed air.
	I am working in a room without a telephone. In case of an emergency, there is a high possibility of being unable to deal with the situation.	A telephone was installed.
	When two people were operating a crane, the other person let the crane switch box go, and the switch box almost hit my body.	We made it so that when the switch box is let go, the switch box will rise.
	The basket that removes solid matter in a liquid needs cleaning because its mesh easily becomes clogged. When cleaning it, the very heavy basket has to be hoisted up manually, and there is a possibility of hurting your back.	We changed the method from manual operation to a method using a chain block.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Method	The aprons used for protection against chemical solutions are folded after use and put back into a box. However, when some of a chemical solution gets on an apron, the solution almost gets on your hands as you fold it, and I felt this constitutes a risk.	Hangers for the aprons were installed so that there will be no folding work involved.
	To clean the blades attached to the rolling machine, tweezers are used to pick up the waste and there is a risk of the blades coming in contact with your hands.	We changed the tweezers to the kind that has the tip bent at a right angle so that the blades will not touch one's hands.
	After unloading containers and placing them in a lift in an angled position, I opened the inside door; then, a container suddenly fell over and my hand almost got caught.	We changed the size of the container to a smaller one so that one does not have to be placed in an angled position.
	At the place to fill the products into the tanker, the wire to place the safety belt is too close to the direction of the tanker, making the operation somewhat unworkable.	We adjusted the position of the wire to place the safety belt. Also, we changed it to a thicker wire to increase its safety.
	When using a flashlight in dark places, I can only use one hand, and I feel that this situation is dangerous.	We will purchase lighting equipment that can be mounted on the helmet so that one can use both hands.
	When releasing pressure from pressure filter equipment, contents inside of the equipment spurted out, and it nearly covered my body.	To prevent any possibility of the contents spurting out, we installed on all the relevant equipment a pressure gauge to check the pressure inside the equipment and also installed a signboard with the cautionary words "make sure the pressure is zero."
	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.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Method	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.
	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.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Method	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.
	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

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Management	There is a level difference at the entrance to the toilet, and it could cause one to stumble or trip.	We placed a fluorescent color safety strip of tape on the area of the upper part of the step so that people can clearly see that there is a level difference.
	Repair of the parts for the raw material feed pump is done only after discovering a malfunction. So if a part gets damaged during usage, liquid may spout out and could cause a chemical burn.	We will decide on a replacement cycle and will carry out a periodic exchange of the parts.
	When going down the staircase while holding on to the handrail, a metal fixture to hold pipes was attached to the handrail, and I almost hit my hand against it.	We changed the location of the metal fixture to hold pipes from the handrail to another location.
	The safety cover of a pump has a caution on it that reads, "Caution: Be careful to avoid being sucked in!" However, the color of the written characters of these words of caution has faded, making the words almost illegible. It is not getting the attention that the caution needs, and I am quite concerned.	A new caution label was attached to the safety cover.
	When inspecting a wheeled fire extinguisher, it could not be quickly taken out from its storage place, and I felt uneasy about its usage in the case of an emergency situation.	To better inform all the workers in the area how to easily remove the fire extinguisher, we attached at the storage place a photo showing the storage method so that the fire extinguisher can be taken out easily if it may become necessary.
	A display in the area of a sprinkler valve for cooling a cylinder is too small and hard to read. When it is necessary to carry out a cooling operation, it could delay the initiation of the necessary operation.	The display in the sprinkler valve area was replaced with one that is larger and easier to read.
	A rechargeable transceiver that is being used for communication purposes is not equipped to deal with the possibility of the battery's power being depleted.	A spare battery was made available at all times.
	A specific gravity conversion table is displayed at the worksite. However, the letters are small, and when making a change in quantity, there is a possibility of making a mistake.	The specific gravity conversion table was replaced with a table that has larger characters.
	There is no telephone number displayed on the telephone itself. So in case of an emergency, you cannot give the number of the telephone you are using, and there is a possibility that you would not be able to get a return call to keep in contact and receive	We clearly indicated the telephone number on the telephone so that anyone talking on that phone can instantly know the number of the telephone being used.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Management	In the laboratory, a flask that was exposed to sunlight turned into a condensing lens and burned a hose that was nearby.	We blocked out the sunlight by using blinds in the laboratory.
	The stop line on the road inside the plant and the lines that indicate the working area have faded away, and I am concerned that an accident might happen.	We re-drew the lines for the stop line and the lines indicating the working area. Moreover, we decided to carry out periodic inspections.
	When throwing waste into the wastebasket placed near the staircase, the cover of the wastebasket almost fell off and it might have fallen down the staircase.	We moved all wastebaskets placed near a staircase to other areas.
	When moving by car in an area near the place storing empty cans, a strong wind swept some of the empty cans away and they almost hit the car.	We installed an enclosure to the storage place for empty cans so that the empty cans will not be swept away by the wind.
	When making the rounds to carry out the inspection of machinery, we have to inspect them by going up on the machinery. At such times, there is a possibility of falling off of it.	We changed the placing of the inspection window so that one can inspect the machinery without going up on it.
	When making a routine inspection tour of the plant, I discovered that a reserve machine for a drainage pump, which is normally not in operation, was actually operating.	We have implemented a noticeable display of an "in-operation" tag so that the operation situation can be clearly understood.
	Parts of the manual for subdividing chemical units are difficult to understand. One could make an error in method, and that could lead to the danger of an injury caused by a chemical.	We are revising the manual so that it is easier to understand, including the way visuals are used.
	On the cylinder's pressure regulating valve, because there is no indicator of the maximum allowable operation pressure, there is a possibility of not noticing pressure abnormalities.	We have added an indicator of the maximum allowable operation pressure. In addition, we are creating a list of maximum allowable operation pressures for all of the pressure measuring instruments.
	Condensed water from steam is coming out onto the road. This condensed water could freeze, and then there would be a danger someone could slip on it.	We have improved the pipeline so that the condensed water from the steam does not come out onto the road.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Management	Because the condensation water of the vat heating steam is being released inside the room, the floor was wet.	We extended the steam pipes to outside of the building to let the condensation water go outside so that the floor on the inside of the building will not be wet.
	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.	

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
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.

New

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Management	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.
	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	In the garage for company cars, there is no car parking block so when one goes too far back, there is a danger of bumping into the wall.	We installed a car parking block to prevent a car from hitting the wall.
	In the locker room where we change clothes, there was a crack in a wooden floor grate, and I almost got my foot caught in it.	We changed from using a wooden floor grate that could crack to a mat that does not crack.
	In the passageway for employees coming to or leaving from work, I almost fell when walking on a checkered steel plate that was wet due to rain.	We put anti-slip tape on the checkered steel plate.
	I found a gap in the grating of a gutter cover. I felt it might become dangerous if one's toes or the wheels of a dolly got caught there.	We closed the gap in the grating by installing a steel plate.
	The goggles to protect the eyes have rubber straps that become stretched in about six months, and there is a possibility that the goggles will not be able to adequately perform their protective function.	We switched to use a different maker's goggles that had better results in durability tests.
	A dolly was placed in a blind-spot area in the hallway, and I almost bumped into it.	A place to store the dolly was set up, and at the same time, a display was installed to indicate the proper place to store the dolly.
	While operating a fork lift, when I turned the handle, the earphone cord for the transceiver got caught between the handle and it gave me a fright.	We stopped the use of earphones and decided to use only the transceiver main itself.

Factors Leading to a Close-call	Reported Close-call Incidents	Improvement Action Plans *
Others	When walking at a corner in an indoor corridor, because I was unable to see ahead, I almost bumped into a person who was coming from another direction.	We installed a half dome safety mirror at the corner.
	At an intersection in the plant, the "STOP" sign is hard to see because of a planted tree.	We trimmed the tree branches.
	When I was operating a forklift, there was a strong wind. Dust got in my eyes and the visibility became so low that I almost caused a collision.	When there is a strong wind, we will make sure that workers wear protective safety glasses.
	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.