

えいごばん
英語版

For technical
intern trainees

きんぞくせいひんせいぞうぎょう

金属製品製造業

がいくじんぎのうじっしゅうせい あんぜん けんこうかくほむ
における外国人技能実習生の安全と健康確保に向けて

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(プレス機械の安全対策を中心として)

Safety and Health for Foreign Technical Intern Trainees in the Metal Product Manufacturing Industry

(with a focus on safeguards for
press machines)

During your stay in Japan, please follow
the health and safety rules in order to
gain proficiency without injury or illness.

JITCO

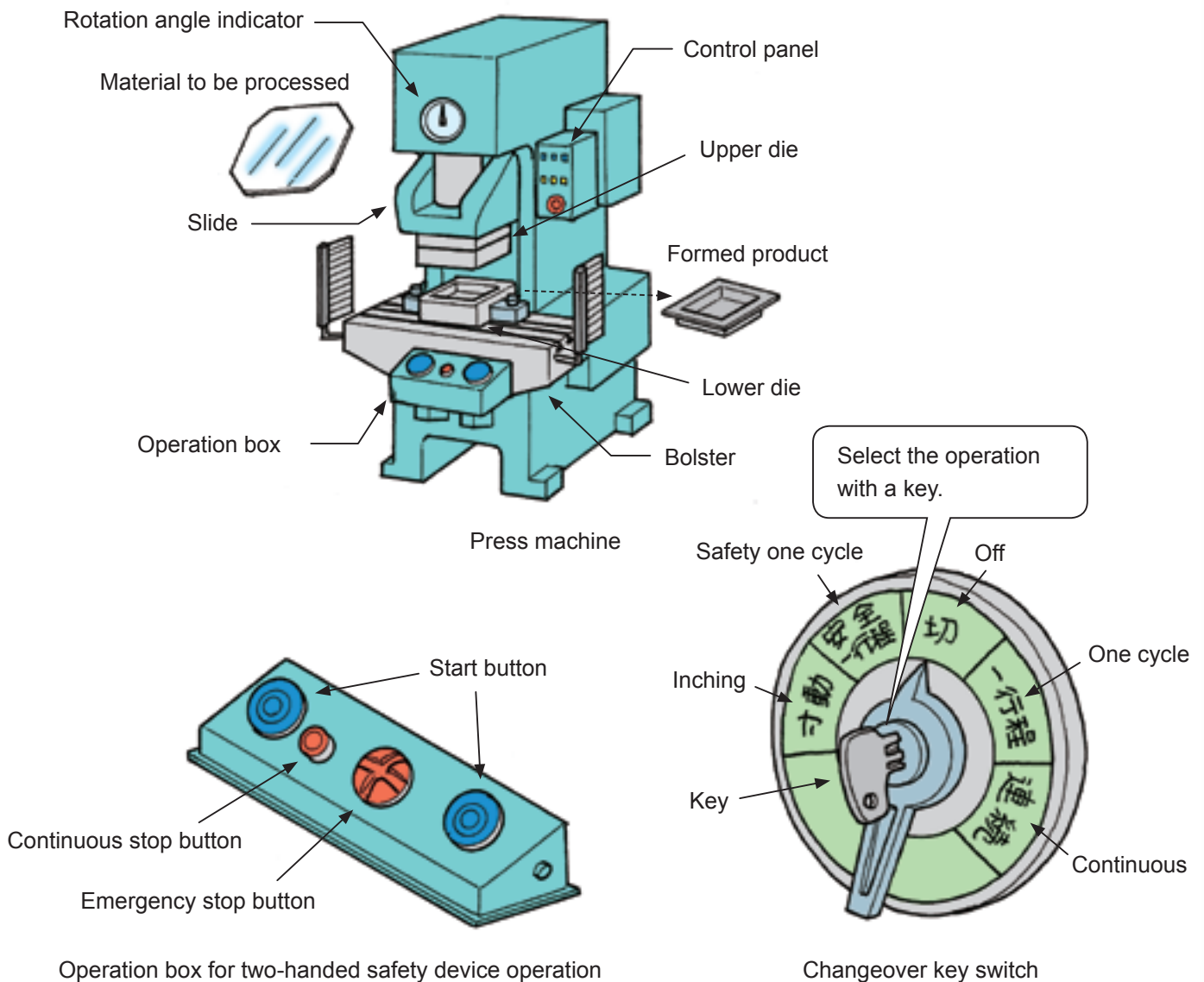
Contents

Q 1	What is press work?	1
Q 2	What are the hazards of press machines?	2
	⊙Hazards of Press Machines and How to Deal with Them	3
Q 3	What safety devices do press machines have?	4
	⊙Main Safety Equipment	5
Q 4	What should and should not be done to ensure safety?	6
	(Unsafe Behavior Prevention Checklist)	
	⊙Examples of Industrial Accidents Involving Interns (mostly caused by unsafe behavior)	7
Q 5	What are the basics for working safely?	8
	⊙Basics of Safe Work Practices	9
Q 6	What inspections should be carried out before starting work?	10
	⊙Explanation of Inspection before Starting Work	11
Q 7	How should press work be undertaken?	12
Q 8	What should you pay attention to while working?	13
Q 9	What precautions are required for work other than pressing?	14
Q 10	What precautions should be taken concerning the working environment?	15
Q 11	How do you deal with abnormal situations?	16
	⊙Reference—Explanation of Important Press-related Terms	17

Q1

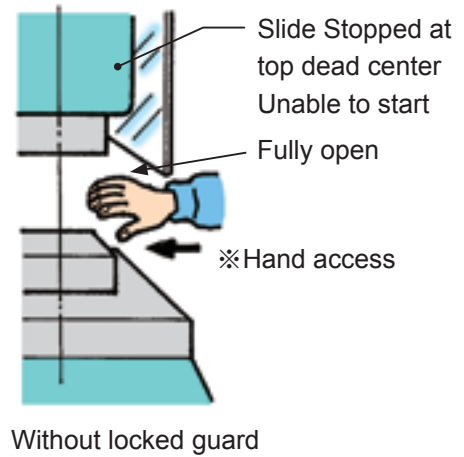
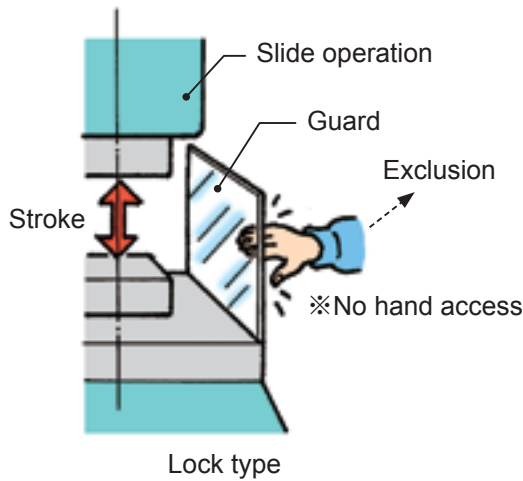
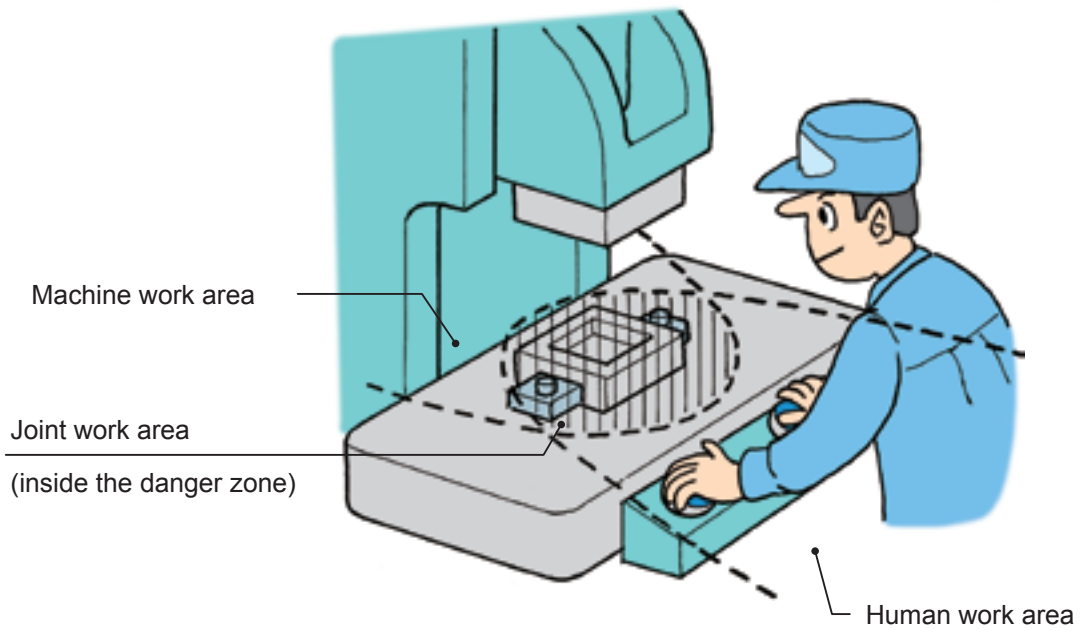
What is press work?

- (1) Attach a top to the slide that moves up and down on the press machine and a bottom die on to the bolster.
- (2) Feed the material into the die and position it.
- (3) Operate the press machine to shape the material by the die.
 - The slide moves down applying strong force
- (4) When the slide moves up and stops, remove the shaped product.
- (5) The operations from (1) to (4) above are called “press work.”
- (6) Shaping the material with the die using the strong force of the descending slide in (3) above is called “pressing.”
- (7) Press accidents may occur in the processes described above.

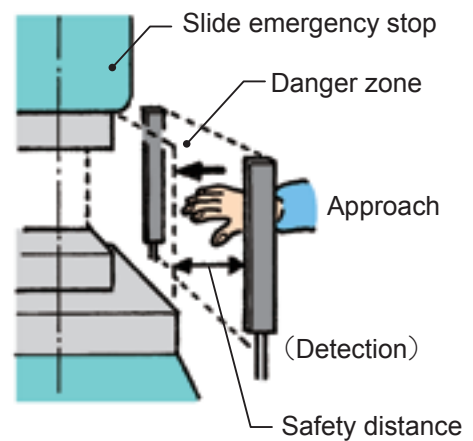
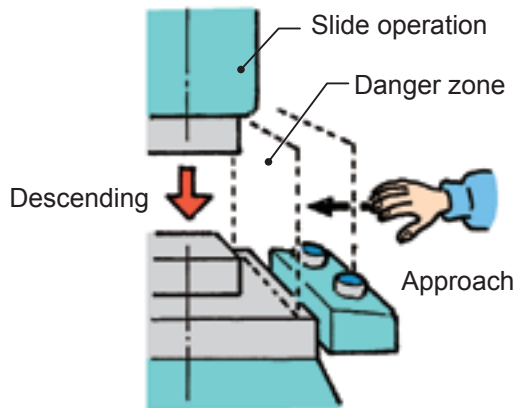


Q2

What are the hazards of press machines?



(a) Interlock guard type



Temporal separation, safety measures for "hands in die" work

⦿ Hazards of Press Machines and How to Deal with Them

(1) What sort of industrial accidents occur with press machines?

- Crushing a hand between the dies is the main type of accident.
- Care is also required to avoid injuries due to fragmentation of dies and workpieces.

(2) What are crushing accidents?

- Crushing accidents occur when the operator puts their hands where the slide is moving to feed or remove materials or products.

(3) How can crushing accidents be prevented.

- It is important to separate the movement of the moving parts of the press machine and the movement of human hands, to ensure that they do not coincide.
- There are two methods of achieving this: spatial separation, and temporal separation.

(4) What is spatial separation or “no hands in die” work?

- It is to separate the human workspace from the dangerous area where the machine operates.
 - ⦿Examples: Use safety fences, safe-type dies

(5) What is temporal separation or “hands in die” work?

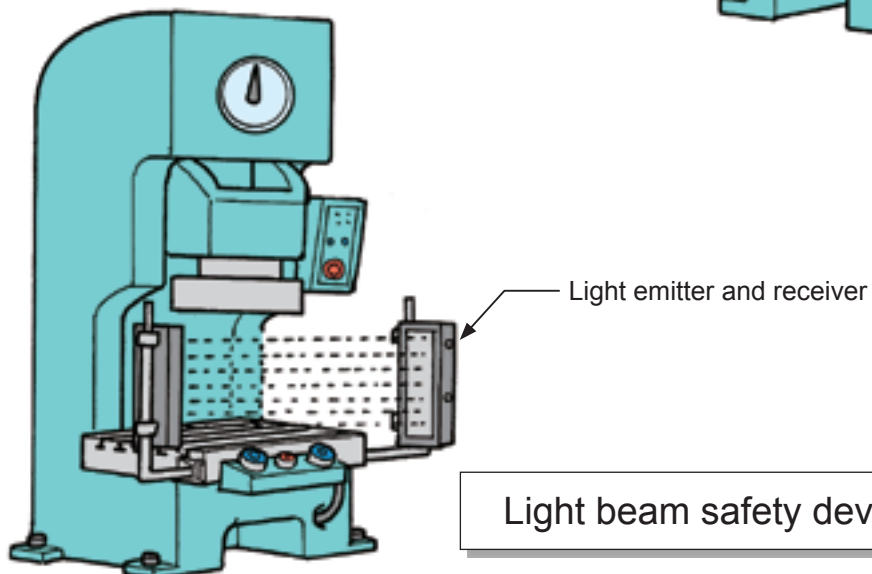
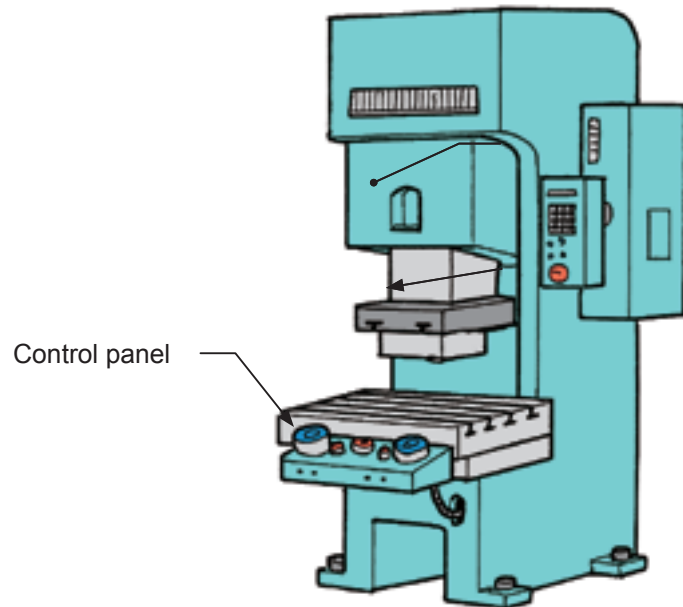
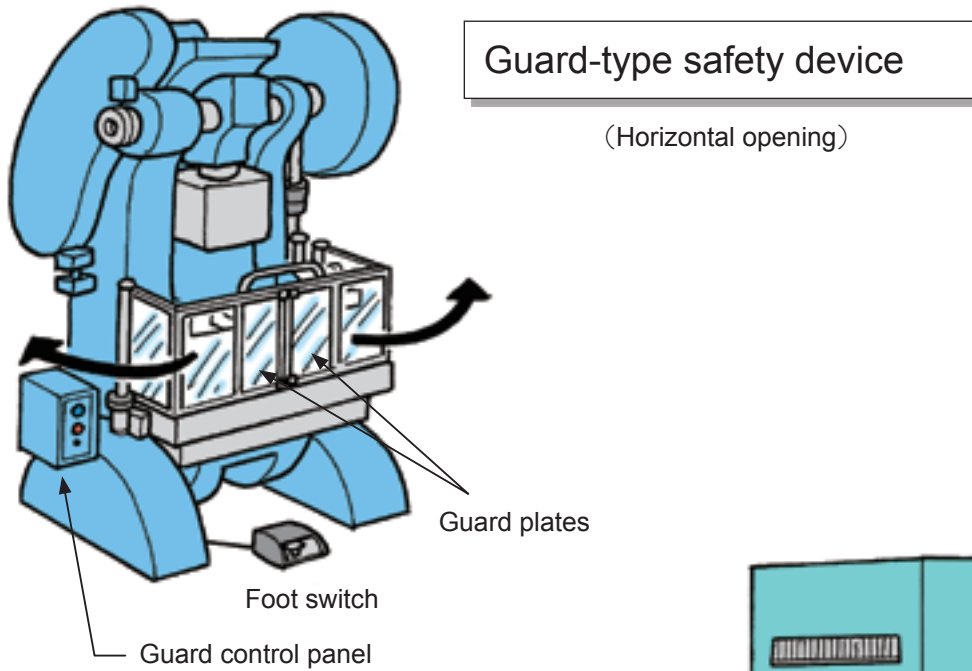
- It is to prevent human hands from entering the danger zone while the slide is moving.
- Safety can be maintained by the temporal separation of hand movement and slide movement. The following safety devices are used individually or in combination.
 - ⦿Examples: Interlock guards, two-handed operation type, light beam type

(6) What are accidents caused by die failure?

- Die failure is typically caused by improper attachment or overloading of the dies.
- Overloading occurs when two or more sheets of material are fed at the same time, or when scraps remain in the die.
- It is important to work correctly in accordance with proper work standards.

Q3

What safety devices do press machines have?



◎ Main Safety Equipment

◎ Outline

- (1) The main types of safety equipment used for press work are the guard type, two-handed operation type, and light beam type shown below.
- (2) All the workers should understand the purpose and configuration of these safety devices and use them properly according to proper work procedures. It will keep you safe.

◎ Guard-type safety device

Outline of the device

- A safety device that makes the slide move only when the guard plates are closed.

- (1) When the operation switch is turned on, the guard plates move, blocking the danger zone.
- (2) After a safety check, the slide moves.

◎ Two-handed operation safety device

Outline of the device

- A safety device that makes the machine operate only when both hands are put on the switching positions.
- It is necessary to install it so as to maintain a safe distance when operating the machine.

- (1) To start the slide, both hands should press the pushbuttons simultaneously (no more than 0.5 seconds differential).
- (2) The distance between the inner edges of the pushbuttons must be at least 300 mm.
- (3) There are two types of safety systems—the safety one-cycle type used for friction clutch presses and other presses with sudden stop mechanisms, and the two-hand starting type for presses that cannot stop suddenly.
- (4) When operating the machine with a pedal, it is possible to mistime hand and foot operations so that your hand enters the danger zone when the slide is going down. Therefore, it is important to start the machine with both hands.

◎ Light beam safety device

Outline of the device

- A safety device that senses when a person interrupts a light beam and it then stops the slide.
- Typically, light beam and two-handed operation safety devices are used together.

- (1) Carefully check whether the safety device is impaired or not, thus ensuring that it is effectively enabled.
- (2) Sufficient protective height must be allowed.
 - Ensure that when the worker is standing to work at the die press, the top of the light beam can detect movement, and when sitting to work at the die press, the bottom of the light beam can detect movement.
- (3) With straight-sided presses that have a long safety distance, the worker may end up inside the light beam so that the safety device no longer functions. In that case, other measures are required.
- (4) This safety device is not effective if the slide fails to stop at the upper dead-end due to some defect of the clutch.

Q4

What should and should not be done to ensure safety?

©Prevent unsafe behavior

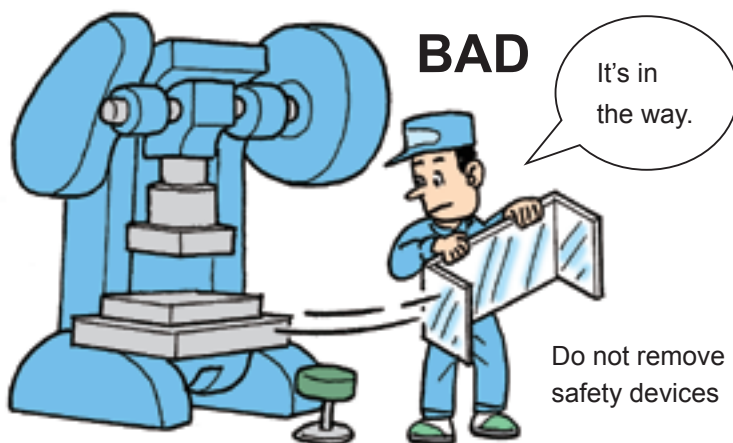
(1) Numerous industrial accidents, including some serious cases, are caused by unsafe behavior by technical intern trainees (hereafter “interns”).

(2) Use the following checklist to prevent unsafe behavior yourself, and strive to ensure safety when you work.

(Unsafe Behavior Prevention Checklist)

Items	Check here if true
(1) Do you fully understand the task that you are performing?	<input type="checkbox"/>
(2) Do you fully understand the work procedures?	<input type="checkbox"/>
(3) Have the safety devices on the press machine, etc. not been removed or disabled?	<input type="checkbox"/>
(4) Cleaning and inspection of the press machine, etc. <ul style="list-style-type: none"> · Are you not performing these tasks without stopping the machine? · Have you displayed a notice on the system activating device to inform others that the machine is stopped? 	<input type="checkbox"/> <input type="checkbox"/>
(5) Before starting the press machine, have you checked around the machine to make sure that it is safe? Do you start the machine in response to appropriate signals?	<input type="checkbox"/>
(6) When you work with others on a press machine, are you observing the correct signals to ensure proper coordination?	<input type="checkbox"/>
(7) Are you not getting unnecessarily close to moving machinery or hoists?	<input type="checkbox"/>
(8) Have you not left machinery or materials in an unsafe state or place?	<input type="checkbox"/>
(9) Are you not performing restricted work* for which you are not qualified?	<input type="checkbox"/>
(10) Are you using protective equipment properly, as instructed?	<input type="checkbox"/>
(11) Are you wearing safe work clothing?	<input type="checkbox"/>

* Note: Examples of restricted work: Sling work for a crane with a hoist load of 1 tonne, and operating a crane with a hoist load of 5 tonnes



Examples of Industrial Accidents Involving Interns (mostly caused by unsafe behavior)

Working with the safety devices of a press machine switched off

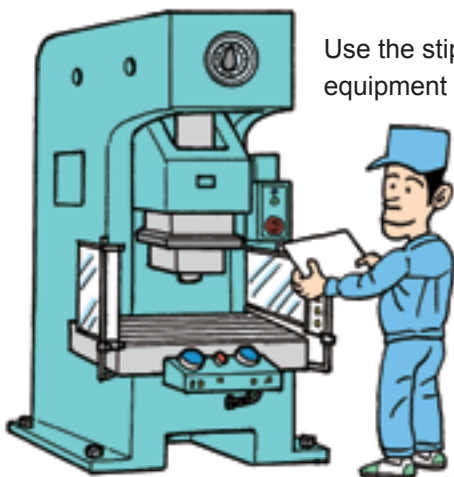
Description	<ol style="list-style-type: none"> (1) A worker was engaged in pressing products from material using a pedal-operated 100-tonne press machine. (2) Since the worker was afraid of inefficiency, he switched off the safety device. While feeding material with his left hand, he removed the products with a magnetic tool in his right hand. (3) In the course of this work, he pressed the pedal before he could get his hand out of the way, and his fingers, holding the magnetic tool, were crushed between the top and bottom dies.
Important	<ol style="list-style-type: none"> (1) Do not switch off the safety devices when working. (2) Understand the importance of working with the safety devices.

Forgetting to turn off the press machine when inspecting and cleaning the equipment

Description	<ol style="list-style-type: none"> (1) Before inspecting and cleaning a press machine, a worker forgot to switch it off. He touched a button by accident, the slide moved, and his fingers were crushed.
Important	<ol style="list-style-type: none"> (1) Be sure to switch off the power before inspection and cleaning. (2) Be sure to comply with the proper work procedures.

Getting foreign material in the eye during finishing work

Description	<ol style="list-style-type: none"> (1) A worker engaged in finishing work experienced pain in the right eye and consulted an optician. (2) Although he was wearing protective glasses, it is thought that particles got in through a small gap.
Important	<ol style="list-style-type: none"> (1) Other cases involving getting foreign material in the eyes have occurred frequently—during finishing work with a grinder or air blower—so be sure to wear your protective glasses properly. (2) Even if it is a light injury, do not ignore it. Go to hospital promptly.



Use the stipulated safety equipment correctly.

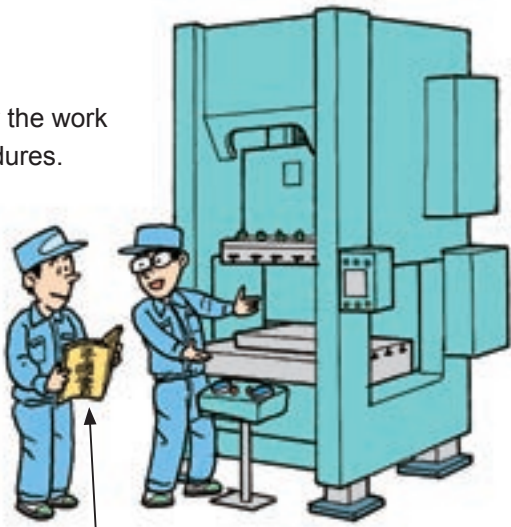
Wear protective glasses during finishing work.



Q5

What are the basics for working safely?

Follow the work procedures.



Work procedures

Carry out standard operations.



Wear work clothes.

【Sort】



Metal

【Straighten】



【Scrub】



【Standardize】



【Sustain】



Basics of Safe Work Practices

(1) Compliance with work procedures

- a) Follow the established work procedures, or work standards, stringently and do not use other methods. Above all, understand the necessity of safety devices and do not remove or disable them.
- b) Practice and master the work procedures shown in the manual.
- c) Obey the relevant laws and workplace rules concerning what you must do and must not do for safety.
- d) If you do not understand anything in the work procedures, do not remain silent. Ask the supervisor.
- e) Avoid injury from overconfidence. Do not engage in hasty or rough actions.

(2) Rigorously apply 5S

- a) Sort
Distinguish between necessary and unnecessary items, and throw away unnecessary things
- b) Straighten
Arrange necessary items so that they are easy to use.
- c) Standardize
Remove dirt and maintain clean surroundings.
- d) Scrub
Remove dirt and trash from around machinery, equipment and desks.
- e) Sustain
Follow established rules.

(3) Clothing

- a) Wear the designated safe work clothes when working.
- b) Work clothes should fit closely and be comfortable.
- c) Button the cuffs of long-sleeved clothing and tuck the hem of shirts into trousers.
- d) Do not work with edged tools, screwdrivers, drills, etc. in your pockets.
- e) Do not wear neckties, towels or scarves around your neck, or anything that could get caught in machinery.

(4) Protective equipment

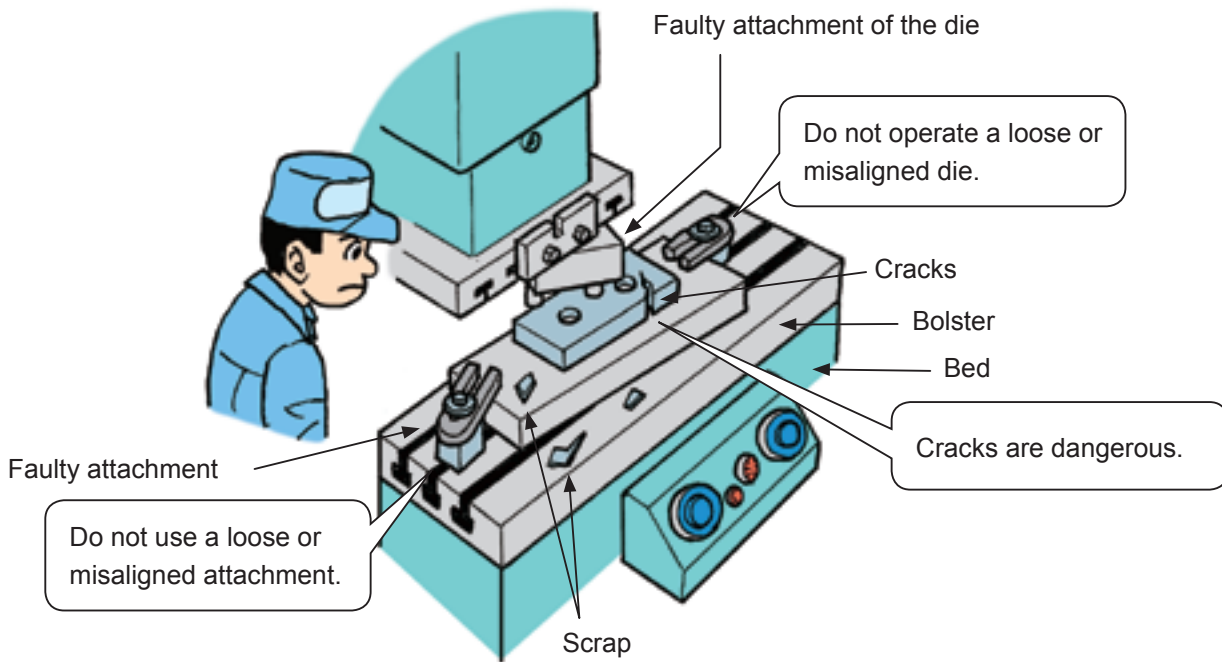
- Be sure to wear designated protective equipment, such as helmets, properly.

(5) Other

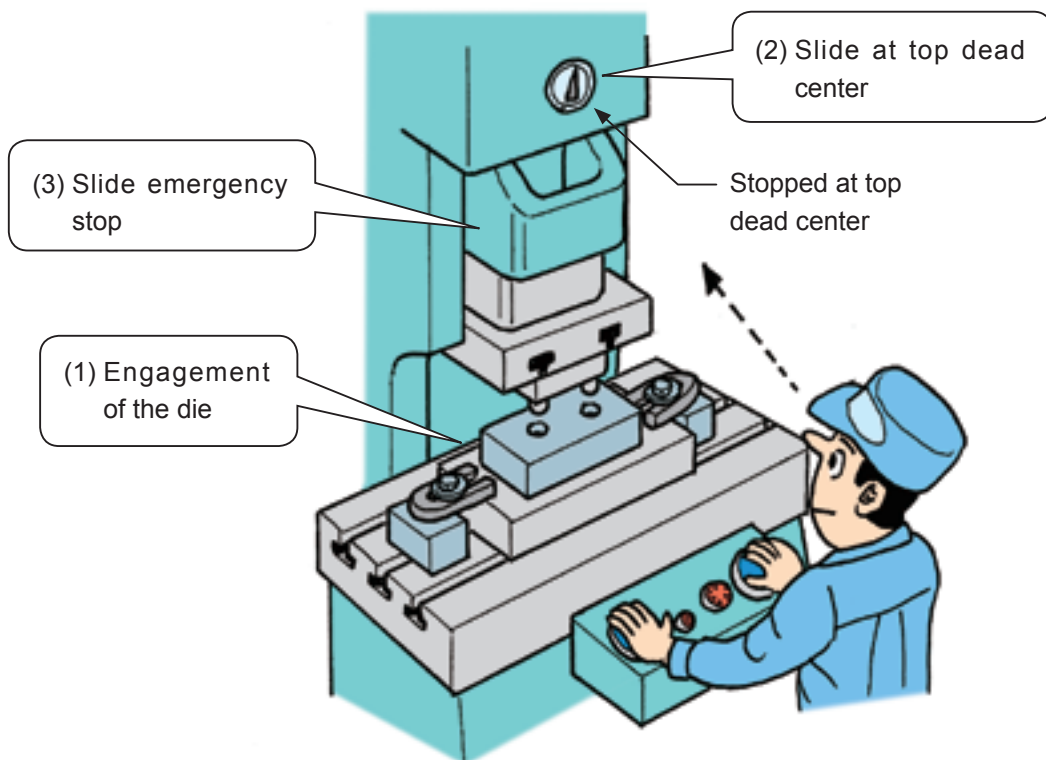
- Always keep the tools, materials and products tidy around the machinery.
- Make sure that the tools and materials are placed in a stable manner so that they do not fall or become separated.

Q6

What inspections should be carried out before starting work?



Reexamination of the inside and parts around the die



Inspection before operating the machinery

◎ Explanation of Inspection before Starting Work

○ Inspection of the inside and parts around the die before starting work

(1) Inspection details

Items	Check here if true
a) Are the upper and lower die mounted correctly?	<input type="checkbox"/>
b) Are the inside of the die, the bolster and the head free of scraps or foreign material?	<input type="checkbox"/>
c) Is the die attached correctly? →Are there no gaps or looseness in the mounting bolts?	<input type="checkbox"/>

(2) Measures after inspection

- If you discover that the die is misaligned, there are cracks, it is difficult to remove foreign material or there are any other problems, call the supervisor and follow the instructions given.

○ Re-inspection before operating the machinery

(1) Inspection details

Items	Check here if true
a) Are the safety devices working and safety enclosures attached properly?	<input type="checkbox"/>
b) Is the die attached firmly and aligned properly? →Are there no abnormal sounds, scraping, movement, etc.?	<input type="checkbox"/>
c) Is the slide stopping properly at top dead center?	<input type="checkbox"/>
d) Does the slide stop immediately when you take your hands off the start buttons?	<input type="checkbox"/>

(2) Measures after inspection

- If you discover these kinds of problems or any other problems, call the supervisor and follow the instructions given.

○ Other inspection items

(1) Protective equipment, gloves and hand tools

- Check for damage, and if you discover a problem, call the supervisor.

(1) Position of the operator and workpieces

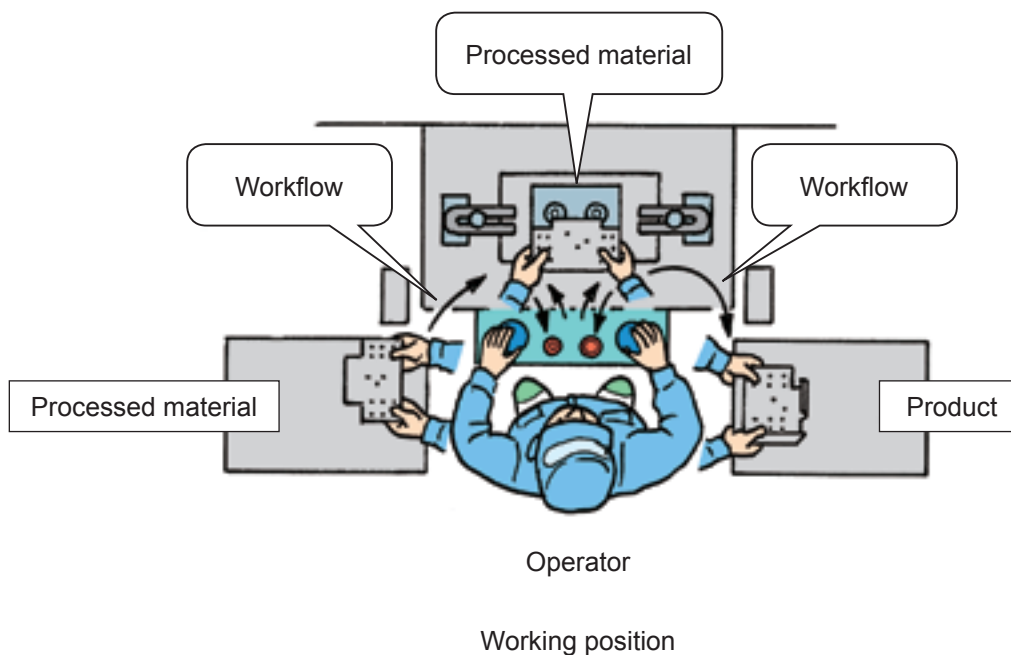
- It is best for the operator to stand in front of the press machine with the material on the left and the products on the right, making the work flow from left to right. The following points concerning this positioning are important.

- The operator should have a relaxed posture and be calm and clear minded.
- Place the material where it is easy to reach.
- Ensure that the products can be taken from the die easily.
- Make space to place the products.

(2) Processing procedure

- Use the following procedures.

- Take a piece of material.
- Place it carefully in the die with both hands. Ensure that the placement guide allows safe and easy placement.
- Use both hands. Press both start buttons simultaneously.
- Check that the slide is stopping properly.
- Remove the product with both hands, and place it in the designated position.



Q8

What should you pay attention to while working?

(1) Precautions when working

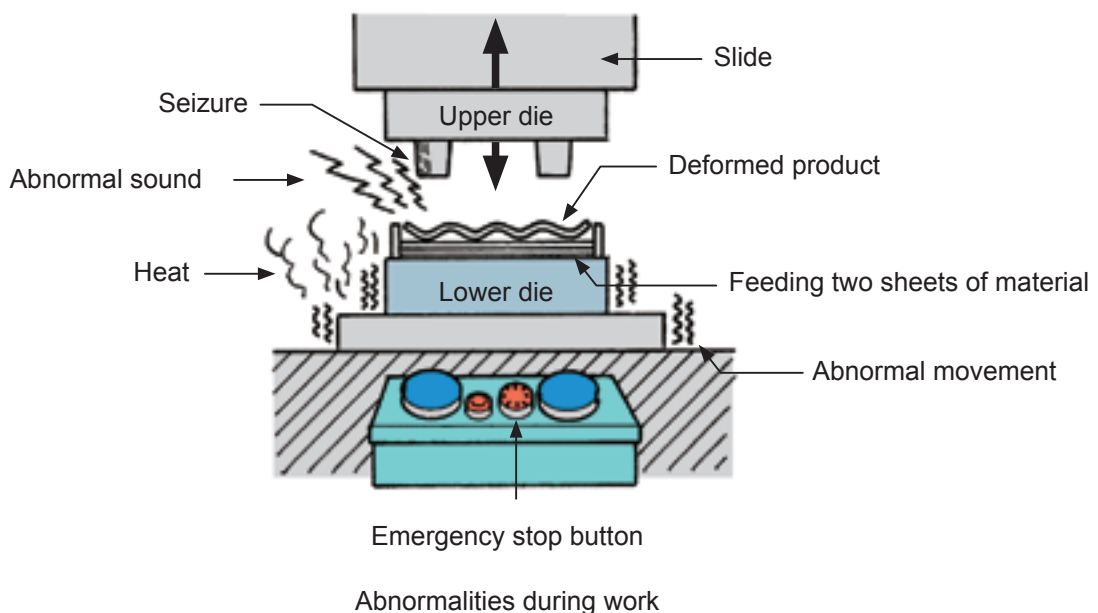
· Watch for the following abnormalities during press work.

Items	Check here if true
a) Are there no abnormal sounds?	<input type="checkbox"/>
b) Is there no unusual heat being generated?	<input type="checkbox"/>
c) Are there no abnormal smells?	<input type="checkbox"/>
d) Is the machinery not moving in an unusual manner?	<input type="checkbox"/>
e) Are seizures not occurring?	<input type="checkbox"/>
f) Is scrap not being ejected properly?	<input type="checkbox"/>
g) Is foreign material not entering the workflow?	<input type="checkbox"/>
h) Are you feeding the material singly?	<input type="checkbox"/>
i) Are the products not misshapen?	<input type="checkbox"/>

(2) Handling of abnormalities

· If an abnormality occurs, carry out the following procedure promptly.

- a) Press the emergency stop button and stop the machine.
- b) Check that the machine has stopped completely, then report immediately to the supervisor
- c) The supervisor, or both you and the supervisor, will then take the necessary measures.
- d) The supervisor will restart the machine.



(1) Product checking

- Check whether the finished products are marketable before shipment. In particular, check for scratches and cracks.
- If you find a defective product, stop working and report it to the supervisor.

(2) Supplementary work

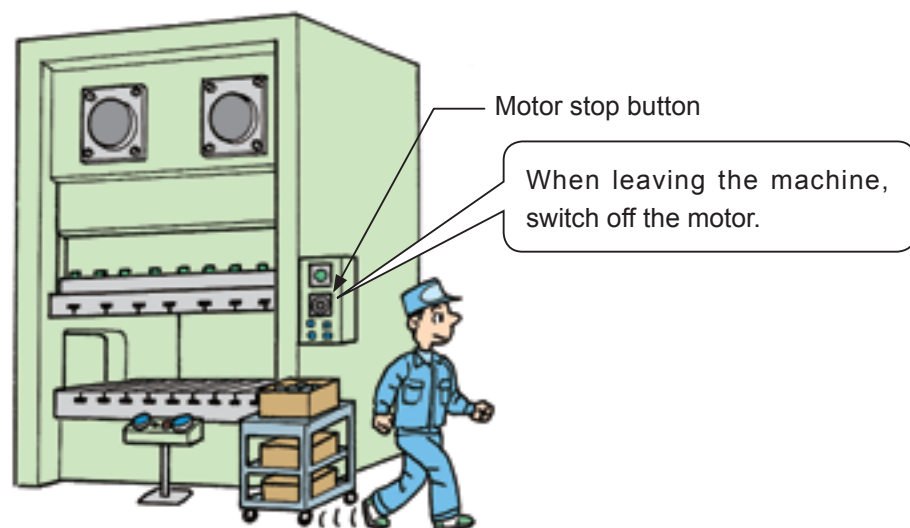
- Pay attention to the following tasks that supplement press work.

- a) Periodically dispose of scrap and clean the work area.
- b) Wipe up any oil in the workplace immediately.
- c) Periodically move materials and products.
- d) Hold discussions with your partner away from the machinery.
- e) When leaving the machine temporarily, be sure to stop the machine by switching off the motor.

(3) Actions after finishing press work

- Pay attention to the following tasks when finishing press work.

- a) Switch off the motor.
- b) Tidy the machinery, equipment and workspace.
- c) Return the materials, tools and products to their designated storage place.
- d) Report the completion of the three tasks above to the supervisor.



Rules when leaving the machine or workplace

Q10

What precautions should be taken concerning the working environment?

○Noise and hearing loss

(1) Conditions for press work

- Manufacturing facilities with press machines are noisy.
- Being in a noisy environment for a long time can cause noise deafness. Measures are required to prevent this.

(2) Measures to take against noise

- In places with intense noise, use protectors such as earplugs or earmuffs.

○Preventing back injury

(1) Conditions for press work

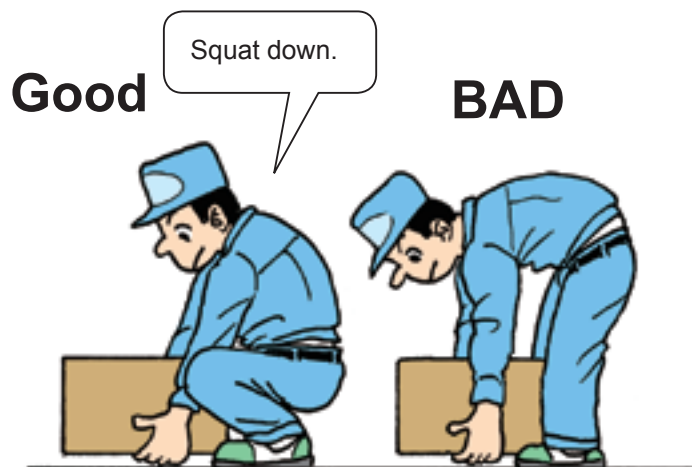
- Preparation for press work involves carrying a lot of materials and products.
- Moving things by hand involves lifting, twisting the body (excessive movement), and sudden movement, which places strain on the lumbar region in particular, leading to lumbar pain. Therefore, care is required.

(2) Measures to prevent back injury

- When lifting objects, squat down before lifting.
- Next, place yourself as closely to the center of gravity, and then lift the object.
- Maintaining good working posture is the best way to avoid back injury.



Use the designated protective equipment such as earplugs correctly.



How to lift heavy objects

Q11

How do you deal with abnormal situations?

○Action when you discover an abnormal situation

- (1) If you discover an abnormal situation, first confirm what is happening.
- (2) Alert the nearby supervisor and your colleagues in a loud voice.
 - It is important to remember what to say in Japanese in this situation.
- (3) Cooperate with your colleagues to carry out corrective actions as directed by the supervisor.
 - Do not act on your own.
- (4) When the abnormal situation has returned to normal, report to the supervisor on the circumstances leading up to the situation.

○Evacuation and disaster prevention training

- (1) In case of an explosion or fire, alert the people nearby and evacuate to a safe place. It is important to ensure that there is illumination of the evacuation route and exits if there is a blackout.
- (2) Always take part in disaster prevention training, and receive expert advice on responding to abnormal situations and evacuation methods.



If the machinery is not working normally, alert the leader and others around!

For example:

レバーが ぐらぐら します
The lever is wobbling.

あかい ランプが ついて います
The red light is on.

ランプが てんめつして います
The light is flashing.

へんな においが します
There is a strange smell.



へんな おとが します
It makes a strange noise.

あおい ランプが きえて います
The green light is out.

さわると あついです
It is hot to touch.

○○が ありません
○○ is missing.

Reference (Explanation of Important Press-related Terms)

Term	Definition of terms
◎Slide	· A part that is moved up and down by a crank. The upper die is attached to the bottom of the slide.
◎Bolster	· A mounting for the lower die.
◎Control panel, console	(1) A panel incorporating the operating power source switch, the press stroke changeover switch and selector switch, switches for operation methods such as two-handed, one-handed, pedal, etc., the motor operation button (start-stop), and so forth, and lights indicating the status of the various switches. (2) There is a key for the stroke changeover switch and for the operation method changeover switch, and it is not possible to operate either switch without the key.
◎One-handed operation	(1) A method of operation that allows starting by pressing a single button. (2) The other hand is free, so safeguards are required.
◎Pedal operation	(1) The machine starts by pressing a pedal switch with your foot. (2) This leaves both hands free for taking out the materials and feeding work, but if the timing of pressing the pedal is not coordinated with these movements, there is a high risk of accident, so safeguards are required.
◎Clutch	(1) This moves the slide intermittently by connecting the flywheel shaft with the crankshaft. (2) There are two types of clutch, a friction clutch and positive clutch. (3) With a positive clutch, the clutch is not released until one stroke is finished, so the slide cannot stop suddenly. Therefore care is required.
◎Brake	(1) Stops the movement of the slide. (2) If the function of the brake deteriorates, the slide will no longer stop at the proper position, and it may descend to bottom dead center, which is very dangerous.
◎Emergency stop device	· This is a device that stops the movement of the slide if the operator detects a hazard and operates the device.
◎One cycle	· When the slide makes one cycle, stopping at the top dead center, even though the operator releases the start button. · The mechanism where the slider stops at the top dead center until the next operation is called “one cycle, one stop.”
◎Safety one cycle	· “Safety one cycle” is when the slide stops immediately if the operator releases the start button when the slide is descending in mid-cycle.
◎Danger limit	· The range of motion of a slide or edged tool.
◎Safety distance	· The distance between a two-handed push button or optical axis and the danger limit.
◎Industrial accident	· A case in which a worker is injured, contracts a disease or is killed due to causes attributable to buildings, facilities, raw materials, gases, vapors, particulate matter, etc. in or with which he is employed, or as a result of his work actions or attending to his duties.

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