

まんがでわかる



English
英語

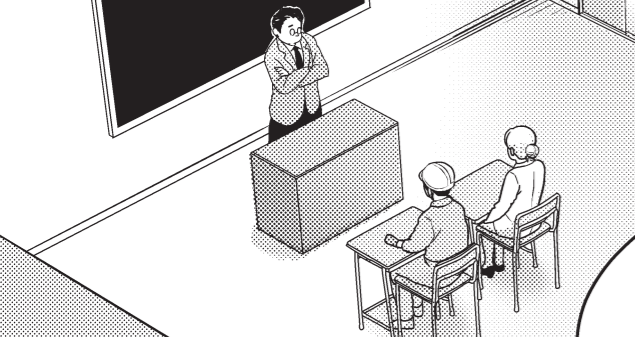
化学物質取扱の安全衛生

Learn through Manga

Health and Safety for Chemical Substances Handling



This audiovisual material has been created for the purpose of learning the basics of health and safety for workers who handle chemical substances through four case examples.



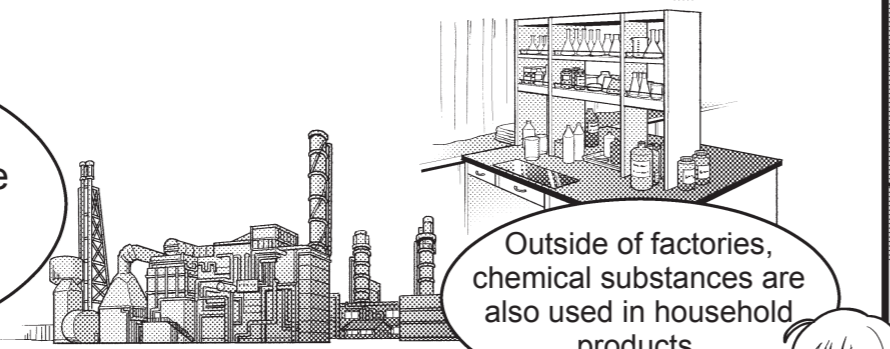
Today, we'll learn about health and safety in handling chemical substances!



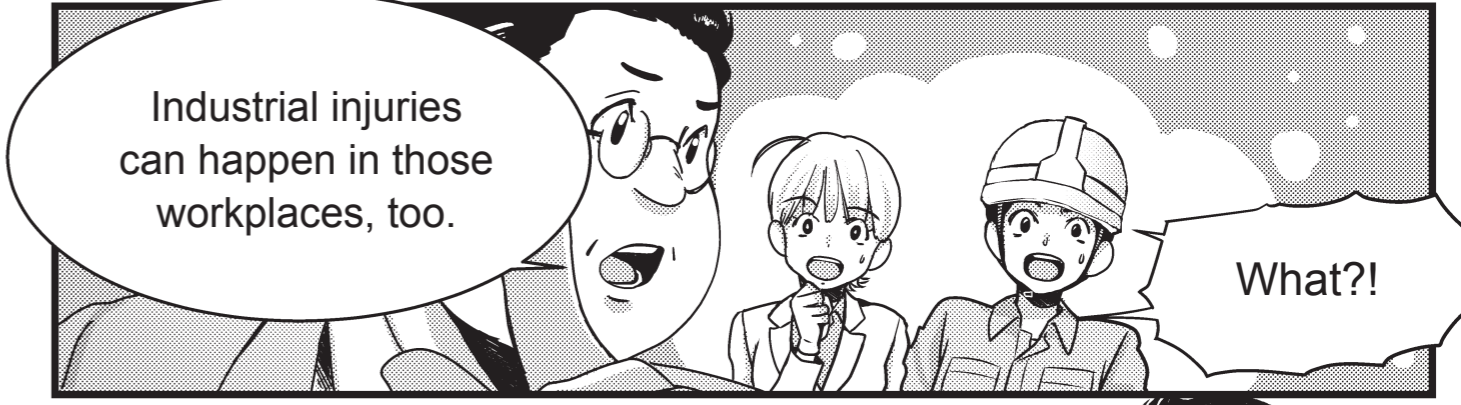
Chemical substances are used everywhere in our lives, and make life more convenient.

Totally!

What kind of chemical substances are used in industrial applications?



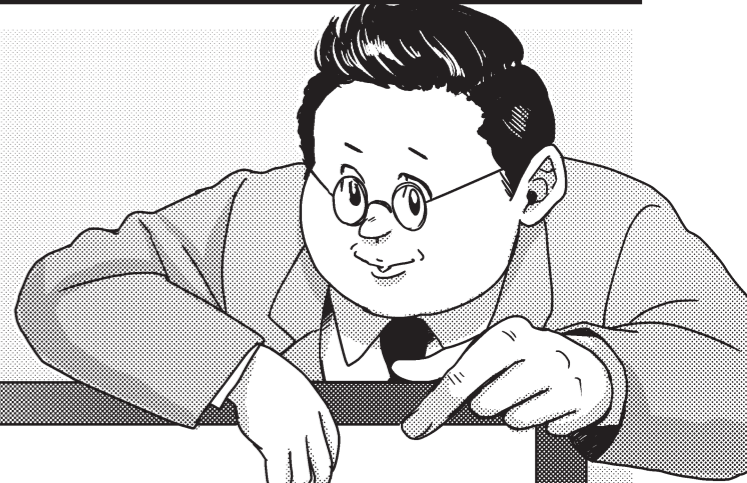
Outside of factories, chemical substances are also used in household products.



Industrial injuries can happen in those workplaces, too.

What?!

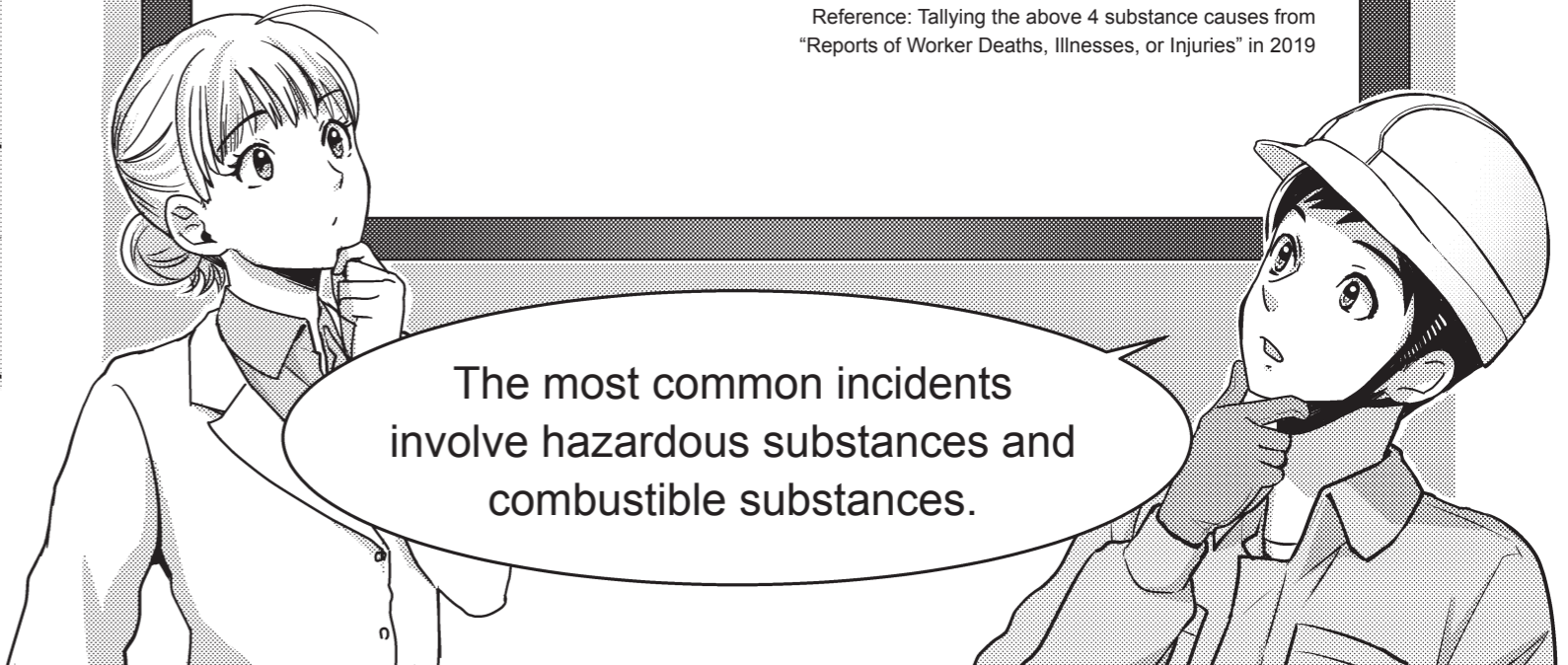
Let's look at the main causes of industrial injuries caused by chemical substances.



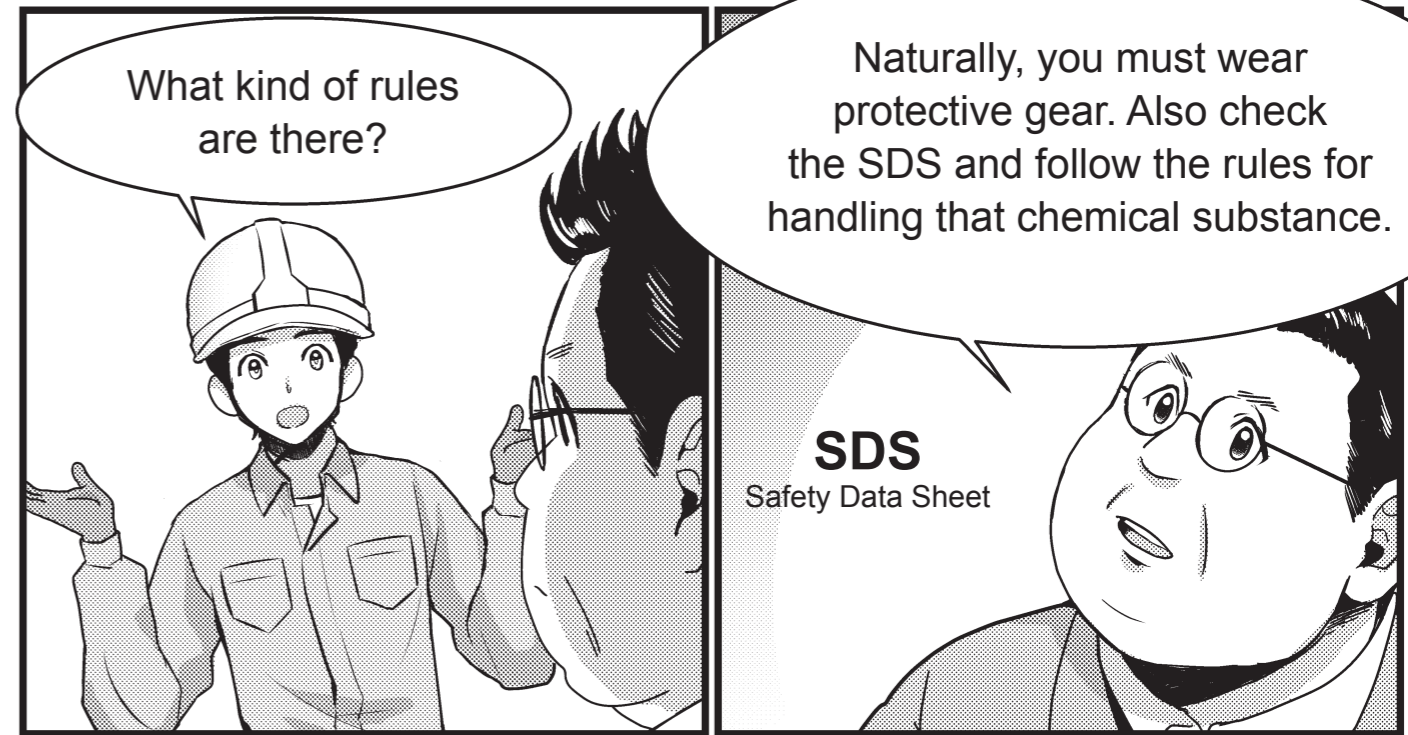
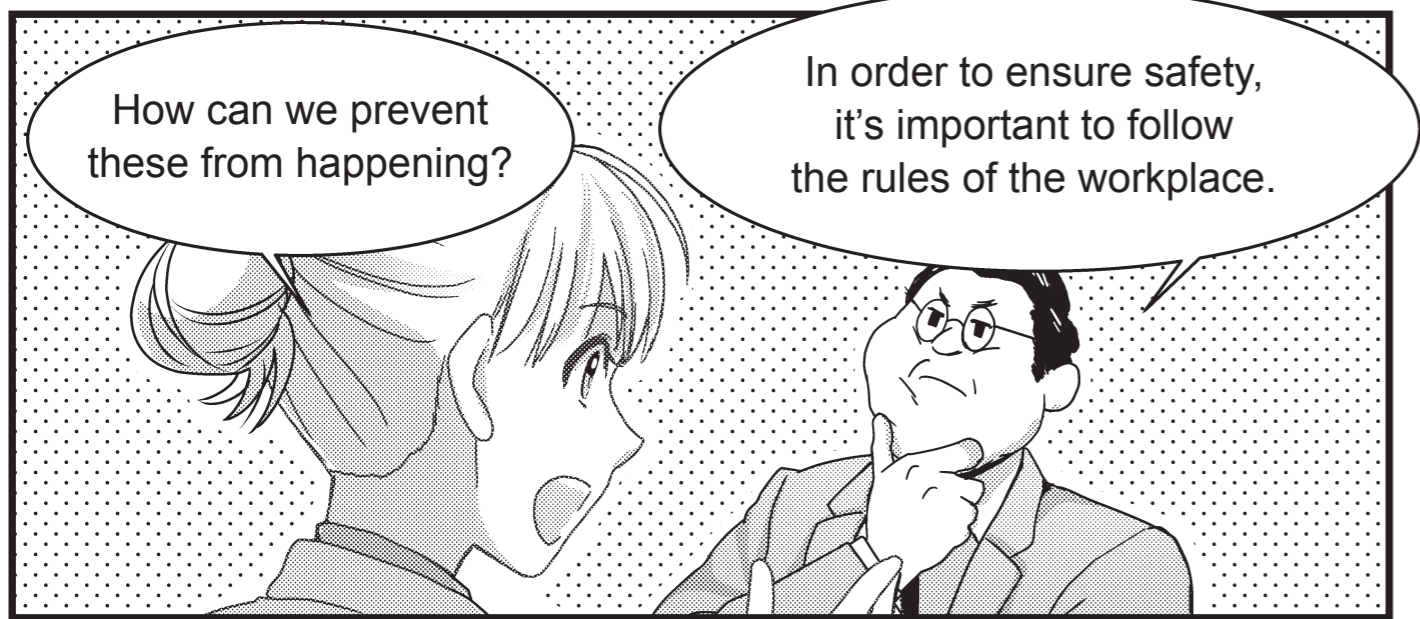
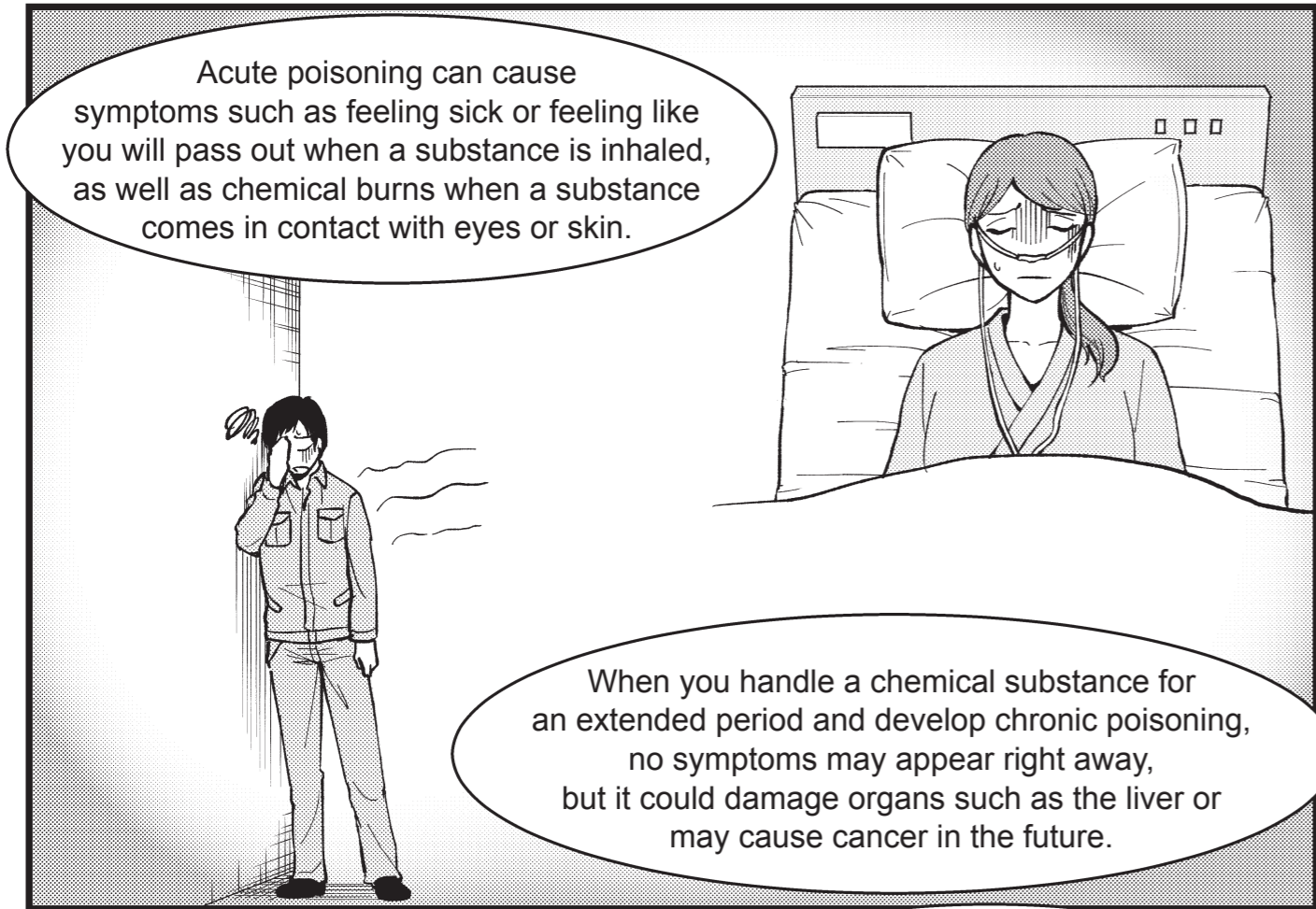
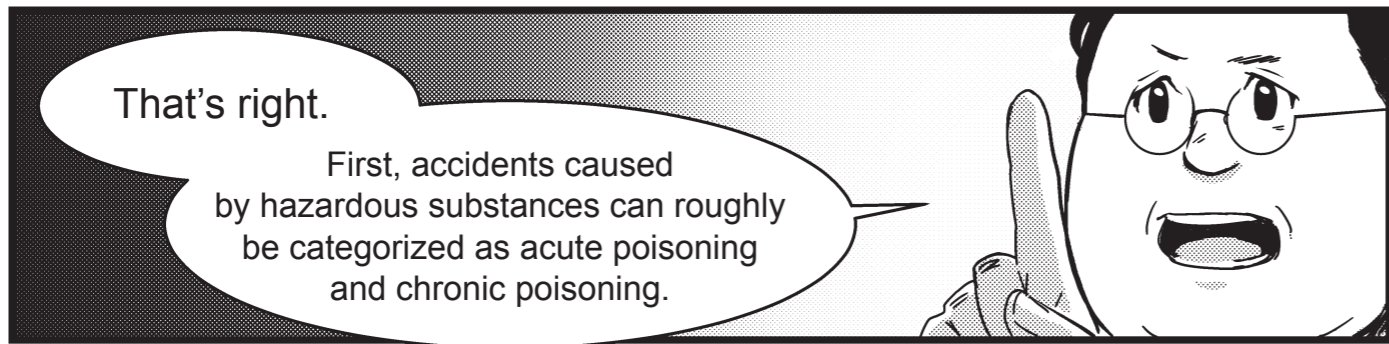
Number of industrial injuries caused by chemical substances (per substance causes)

1	Hazardous substances	213 cases
2	Combustible substances	164 cases
3	Flammable gases	59 cases
4	Explosive substances, etc.	14 cases

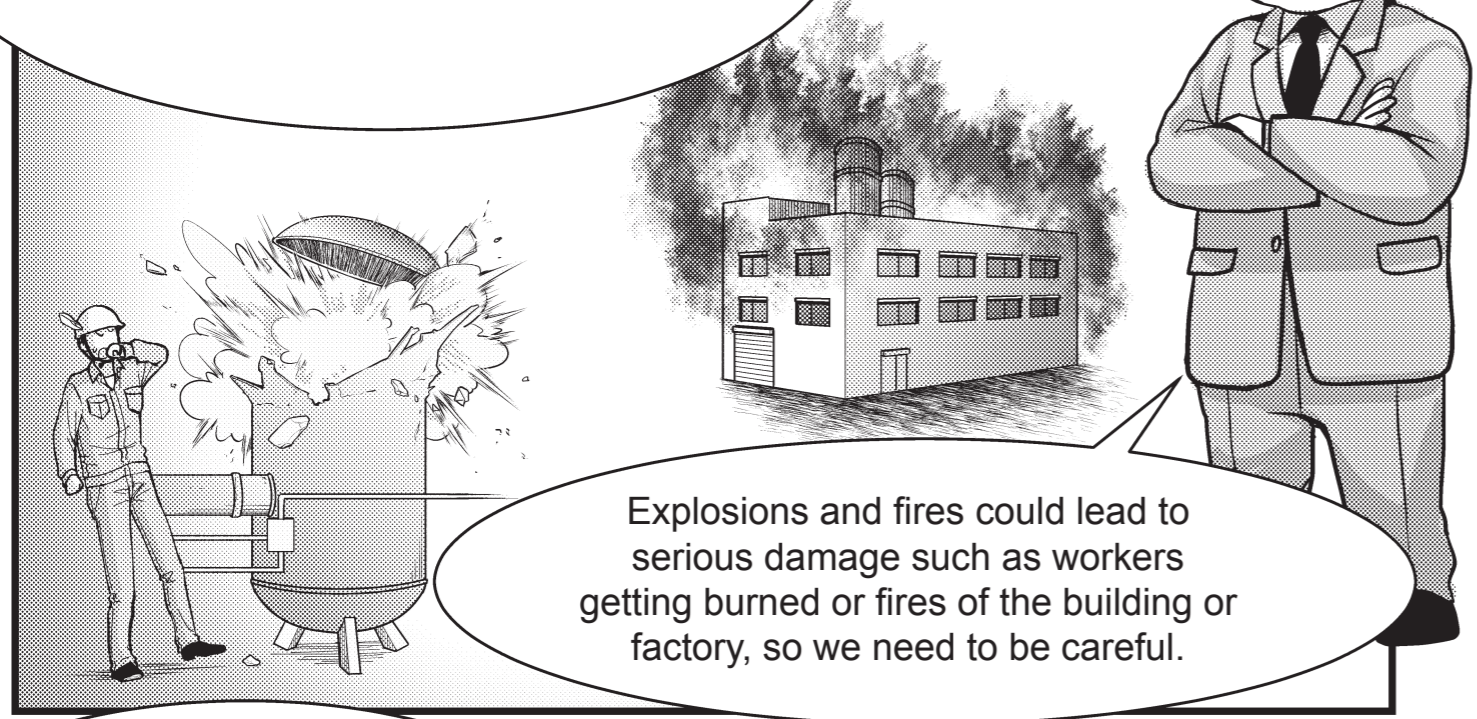
Reference: Tallying the above 4 substance causes from "Reports of Worker Deaths, Illnesses, or Injuries" in 2019



The most common incidents involve hazardous substances and combustible substances.



Next, let's check out explosions and fires. Some chemical substances can burn or explode.



Explosions and fires could lead to serious damage such as workers getting burned or fires of the building or factory, so we need to be careful.

If you can't work due to an injury or fire, your family will worry and it could also result in lost income, too...



That's exactly why it's important to prepare for emergencies on a regular basis.



What you can do is to take a look at the SDS to understand, in advance, what kind of properties the chemical substance has, and what you should do in an emergency scenario.

Measures for fires	
Extinguishing methods:	_____
Prohibited extinguishing methods:	_____
Specific physical hazards and health hazards:	_____
Specific extinguishing methods:	_____
Protection for those attempting to extinguish fires:	_____



It's also important to check how to extinguish a fire.

When do explosions and fires happen?



For example, a solvent catching fire.

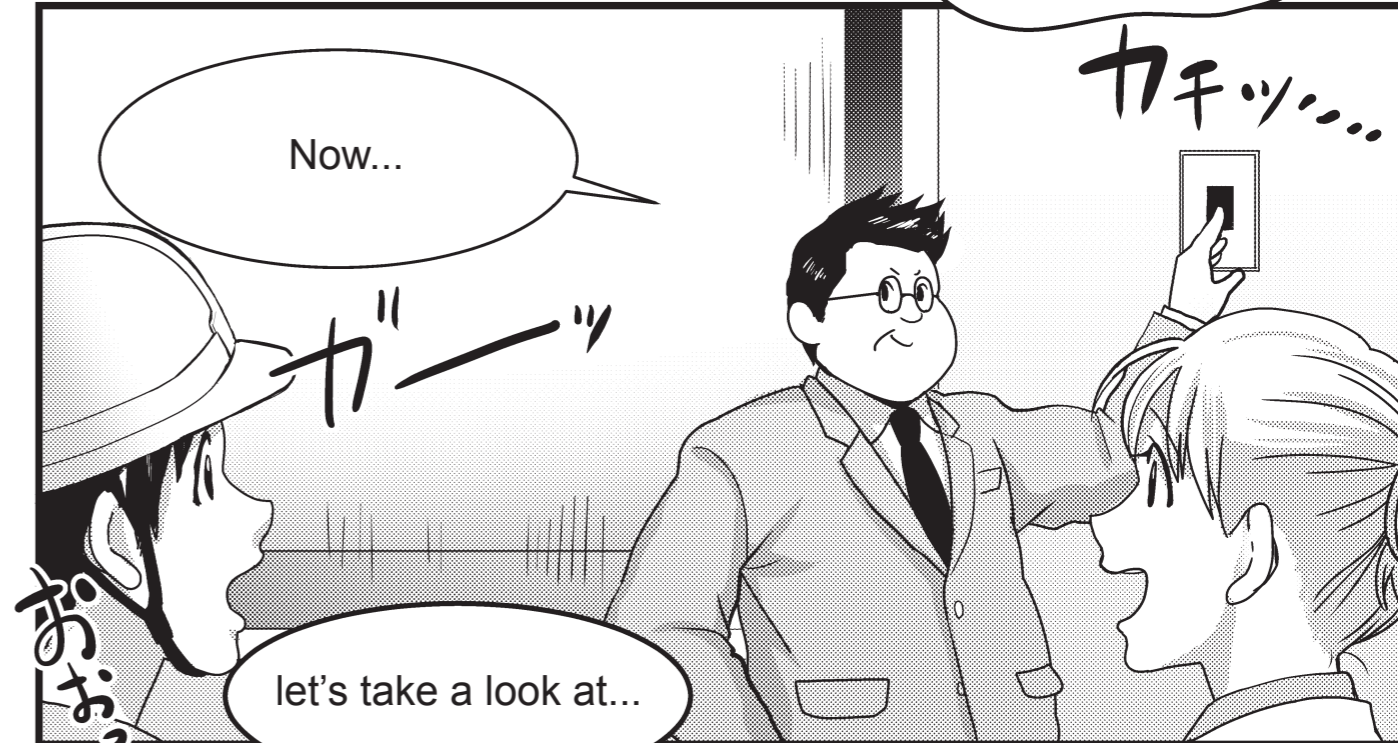
Some sources of ignition can be seen, such as sparks and cigarette fires, but there are many cases where ignition sources which can't be seen such as static electricity ignited a solvent, leading to an explosion and spread of fire from there.



I see...



Now...

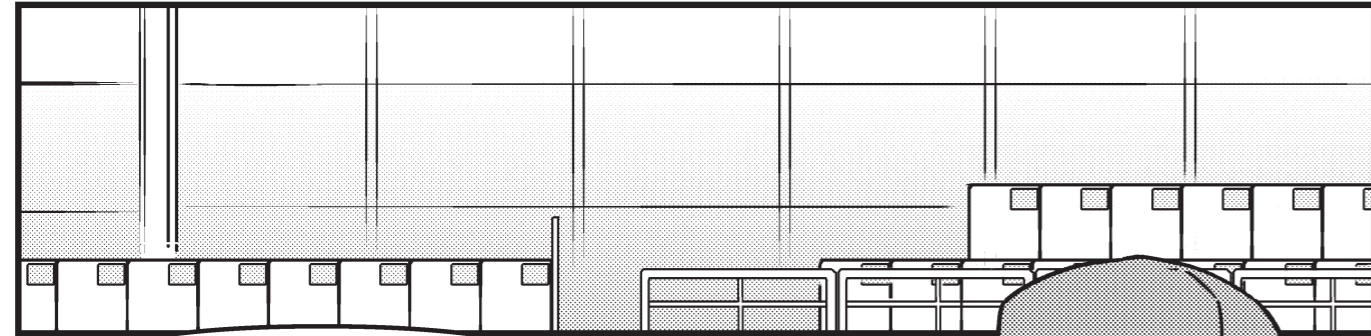


let's take a look at...

...some actual cases!



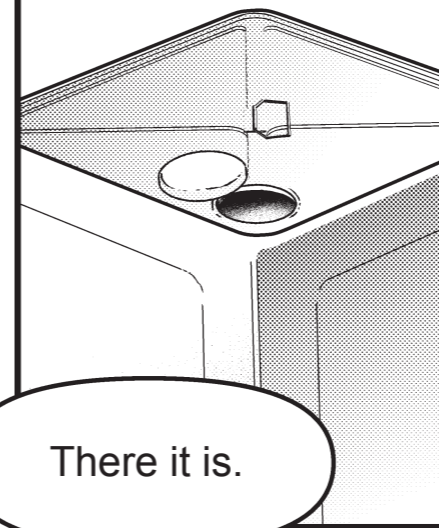
CASE 1



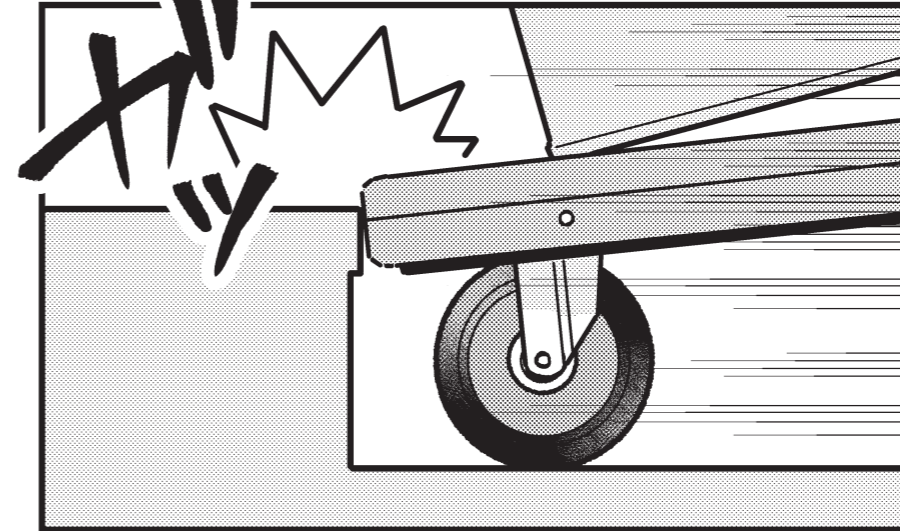
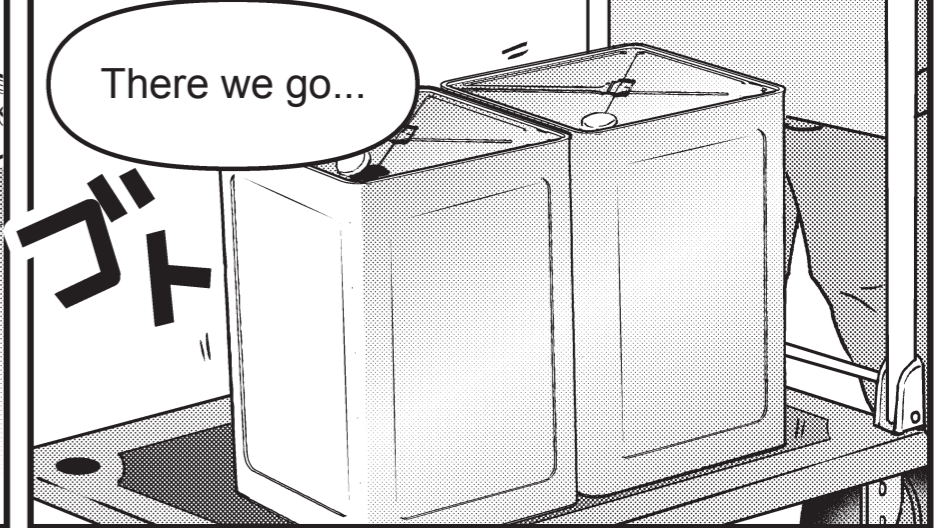
Okay, I should start preparing the solvent soon.

Could you get it for me from the warehouse?

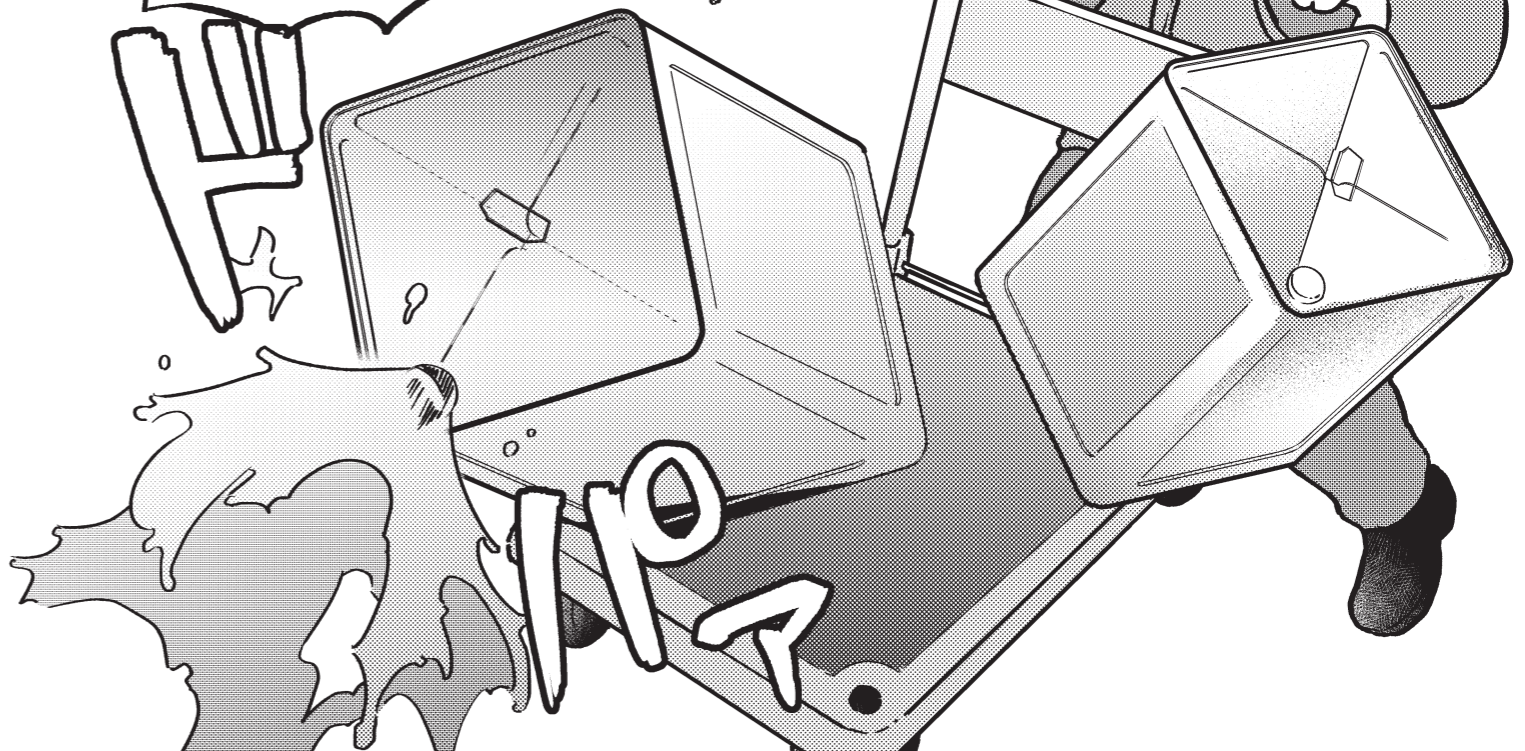
Sure!



There it is.



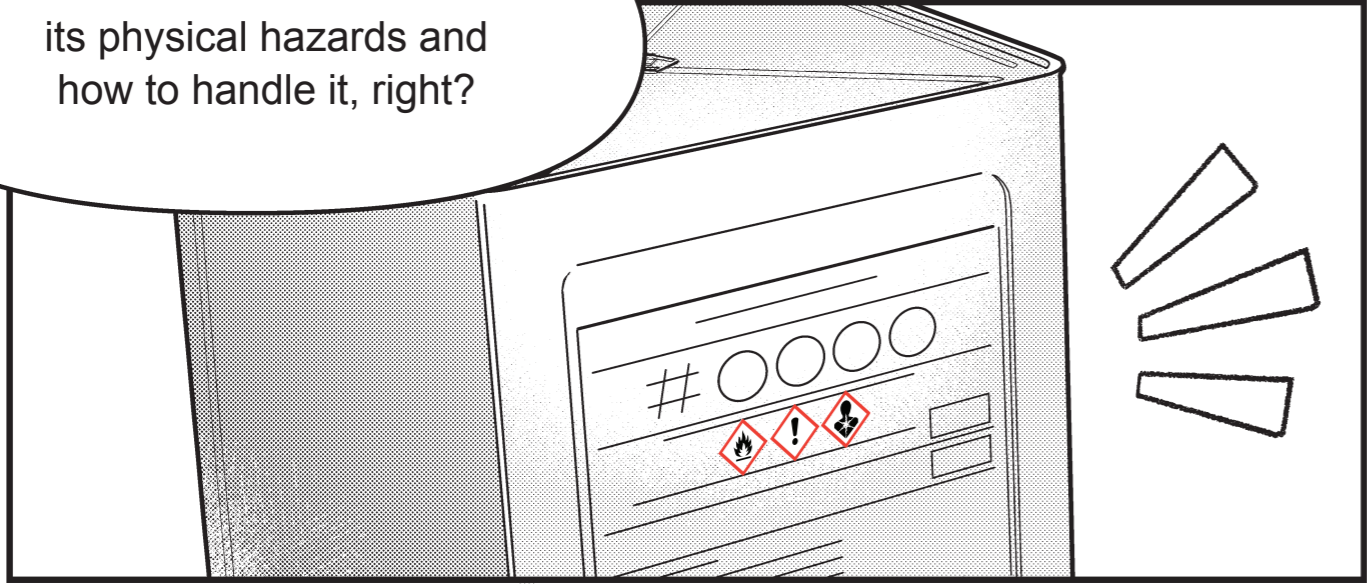
Whoa!





Come on...
If there had been any sources
of fire when the solvent spilled,
it could've caught fire.

See this label? It states
its physical hazards and
how to handle it, right?

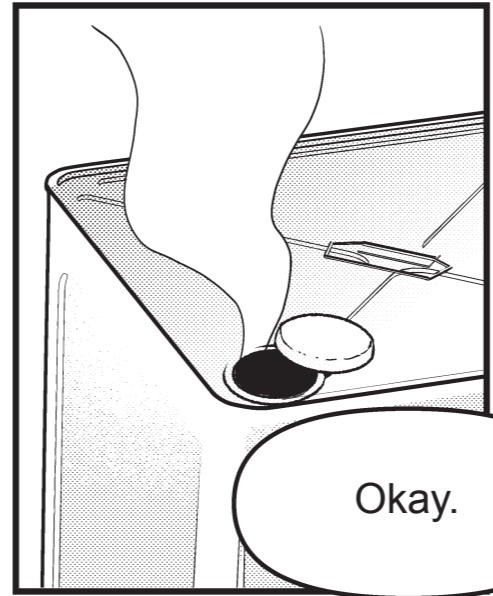
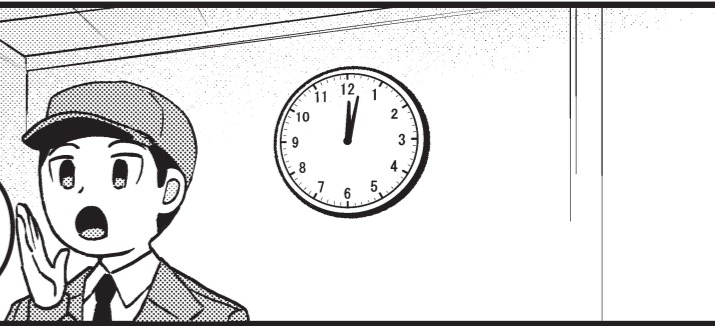


One more thing,
when you transport it,
make sure to confirm that
the lid is tightly closed.

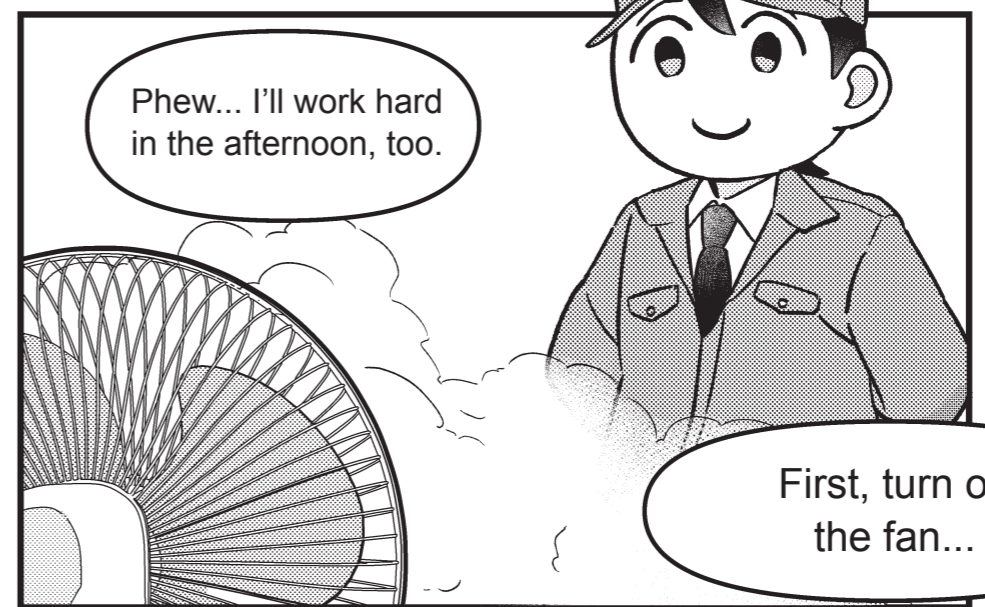
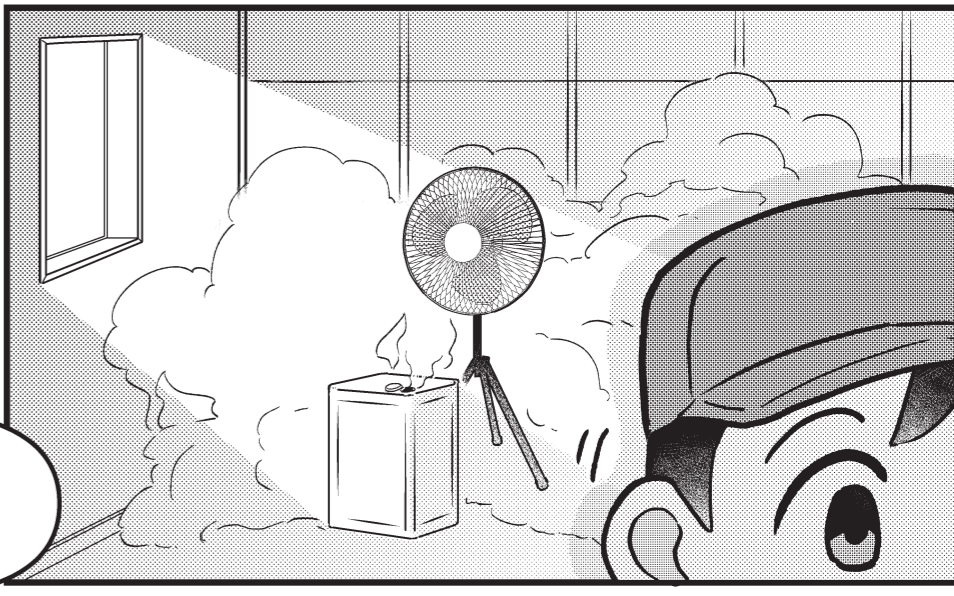


Understood.
I'll be careful...

It's lunch time.
Get some rest.

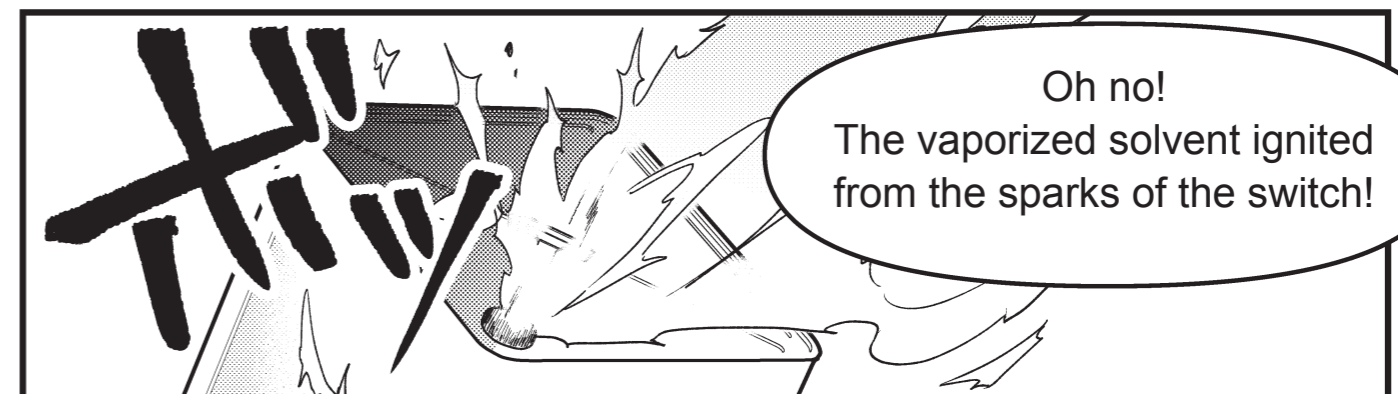
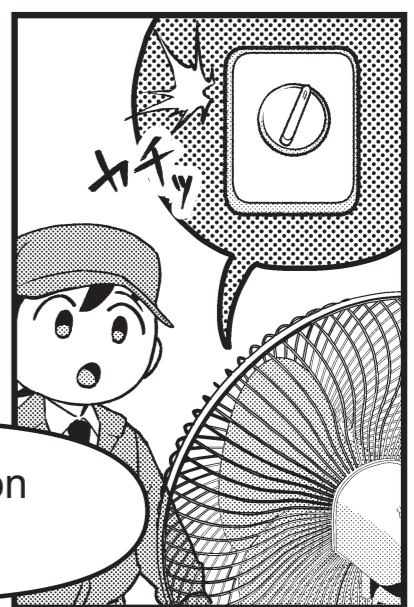


Okay.



Phew... I'll work hard
in the afternoon, too.

First, turn on
the fan...



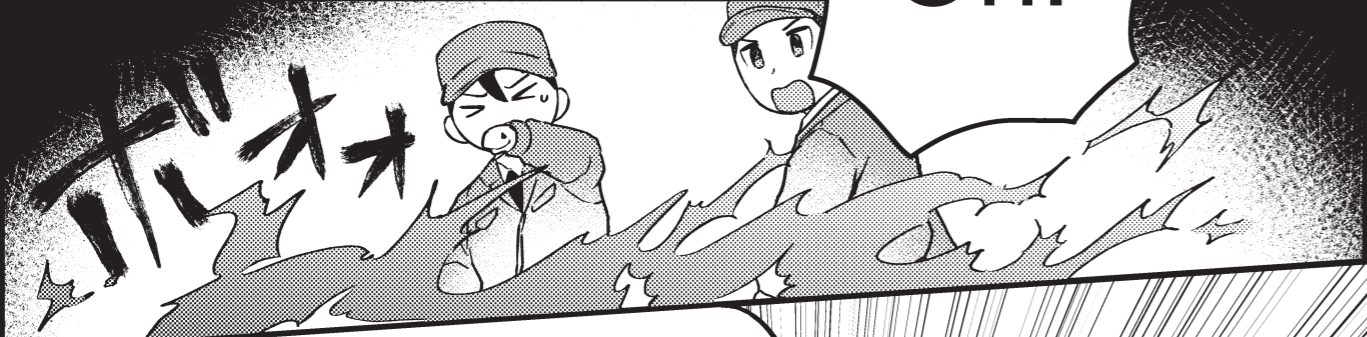
Oh no!
The vaporized solvent ignited
from the sparks of the switch!



Oh no! Um, what to do? Water! Water!



Oh!



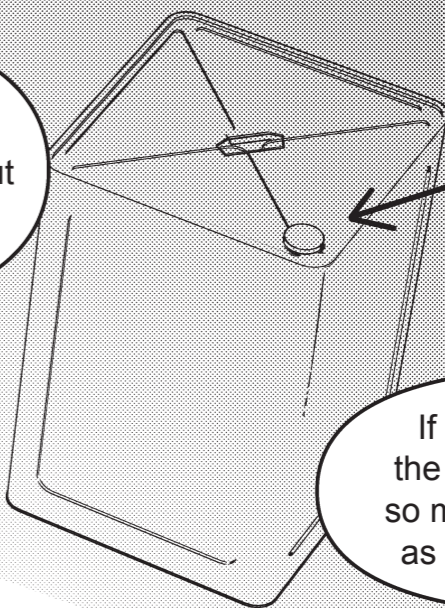
Watch out! Get back!



Phew, that was close.

Thank you.

Listen.
When you've finished transporting a solvent and have stored it temporarily, make sure to place it in a cool place out of direct sunlight and where the container won't tip over and leak.



CHECK

If you don't close the lid, the solvent could catch fire, so make sure to close the lid as instructed from now on.

When you use a solvent, maintain an adequate distance when using electrical equipment. Smartphones could emit electric sparks, so don't bring one in.



If a solvent catches fire, use a properly rated foam based fire extinguisher. There are some substances that can make the fire worse when water is applied.

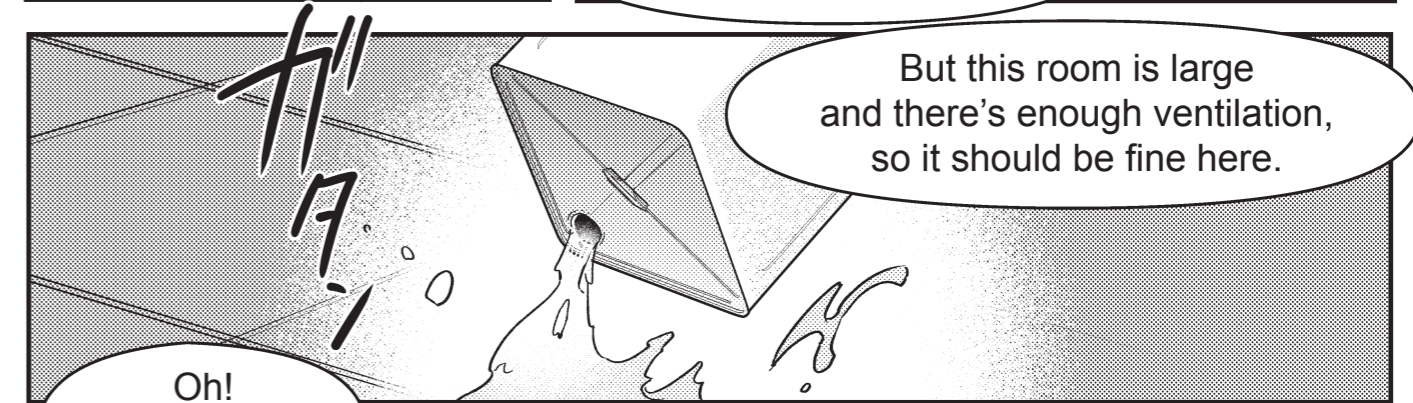
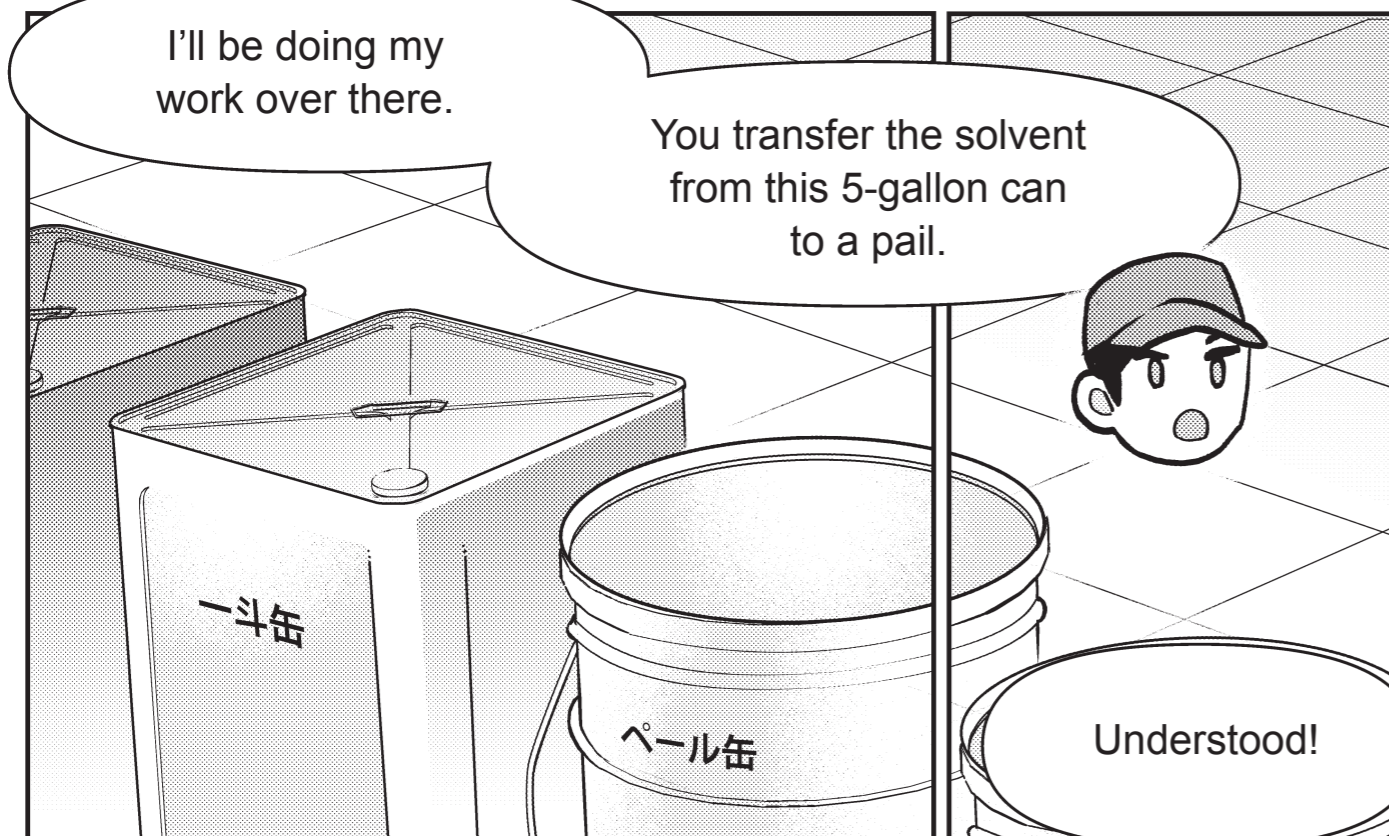
If any leakage of a chemical substance with a strong smell is confirmed, report it to your supervisor immediately.

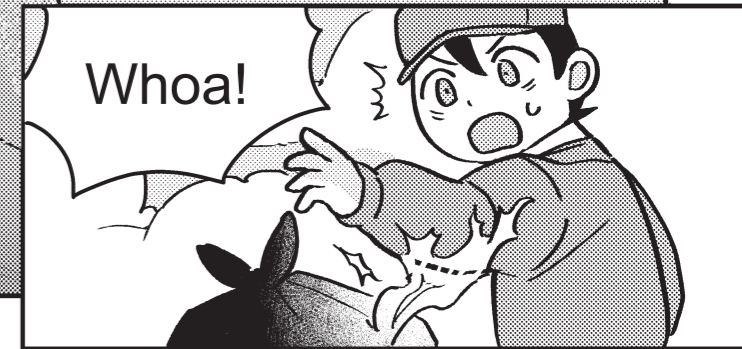
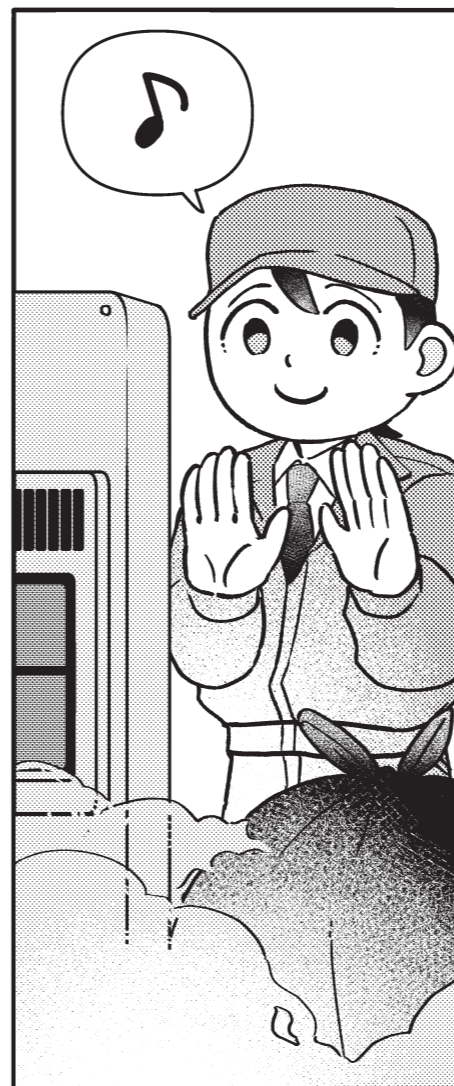
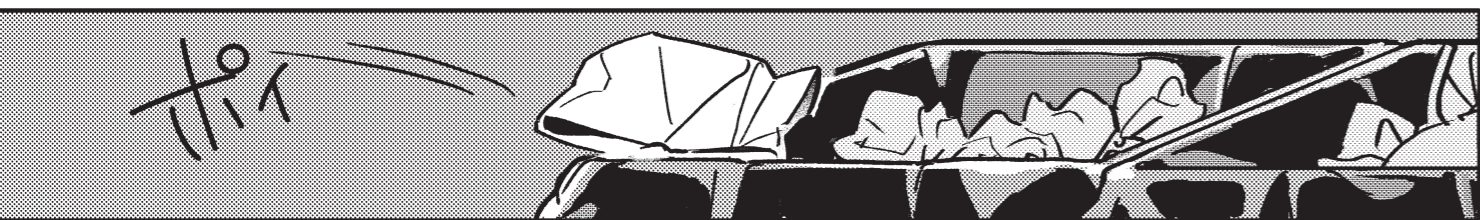
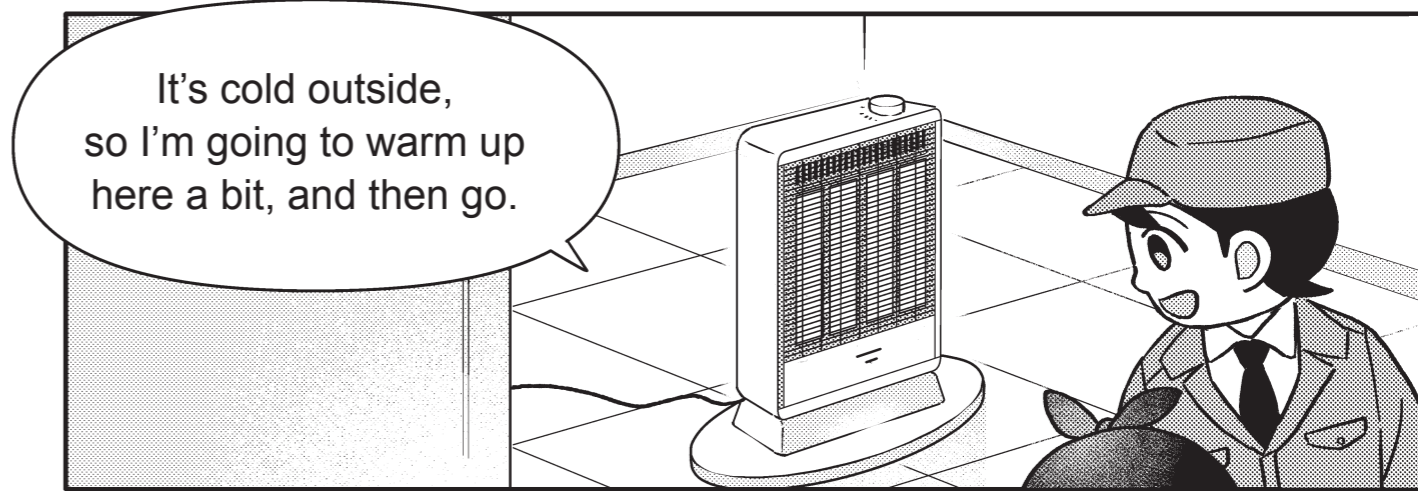
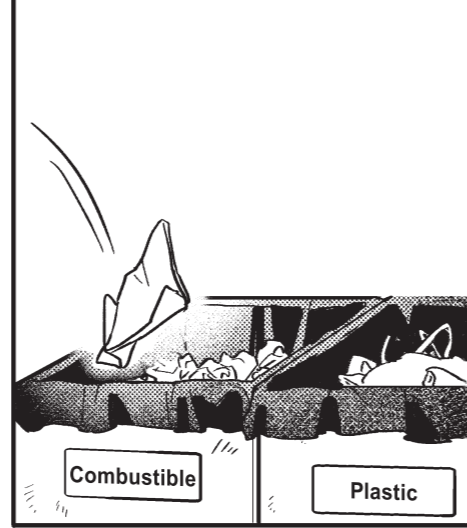


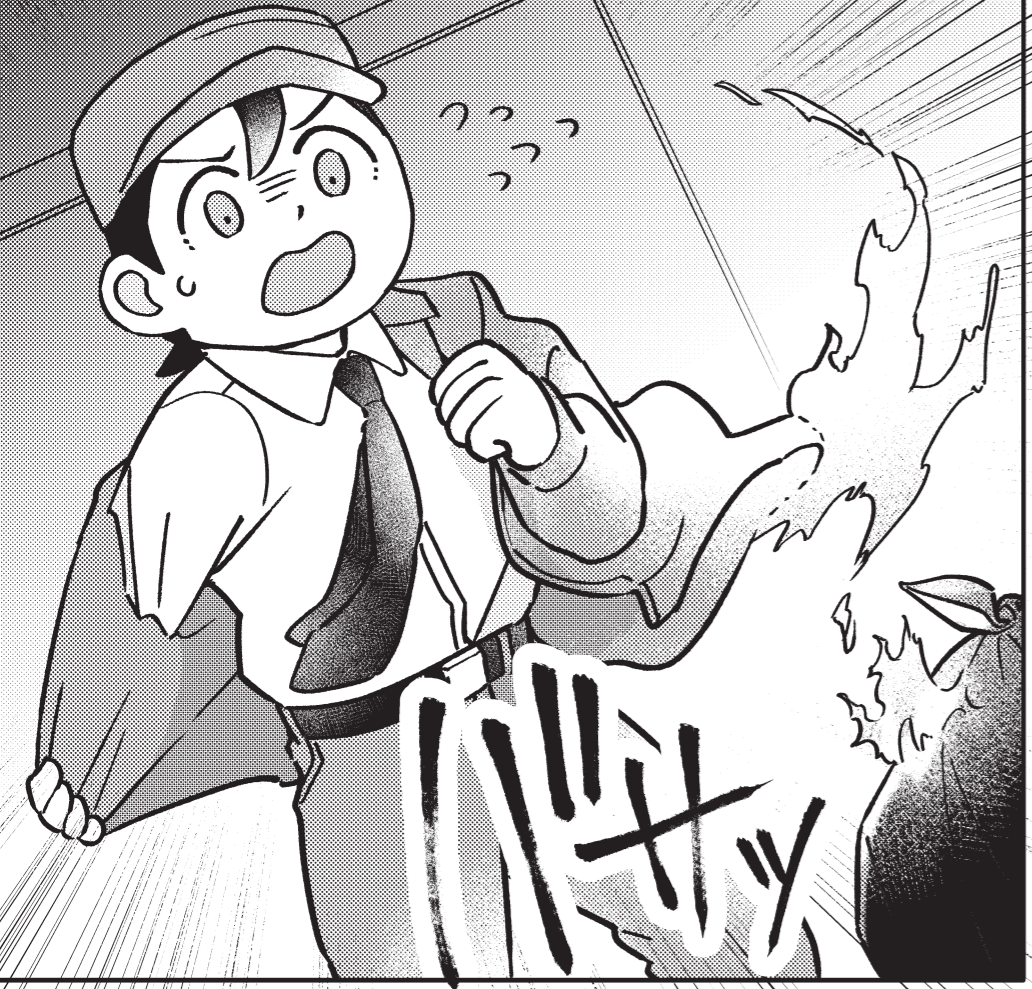
Okay.



CASE 2

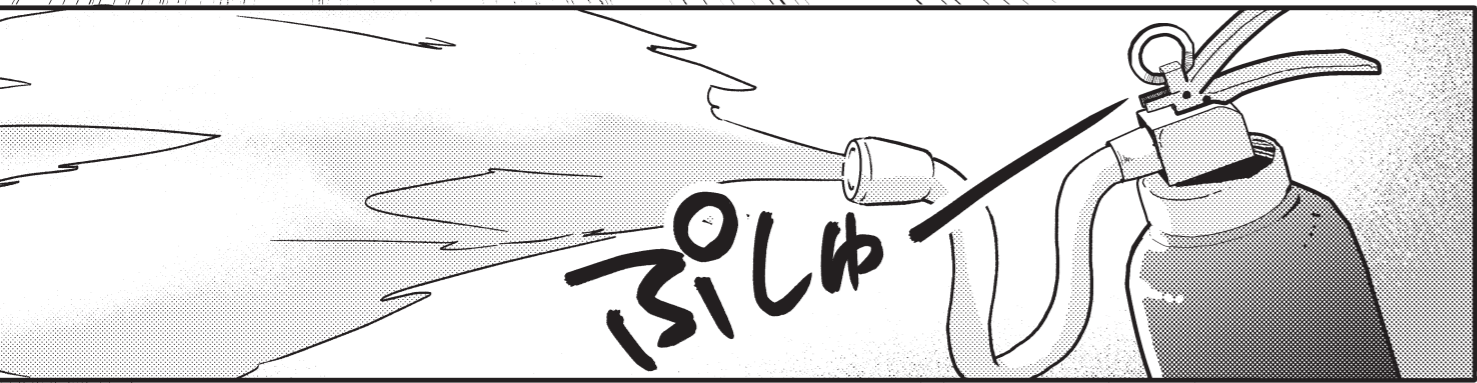






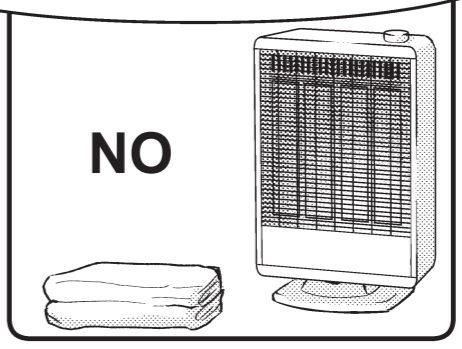
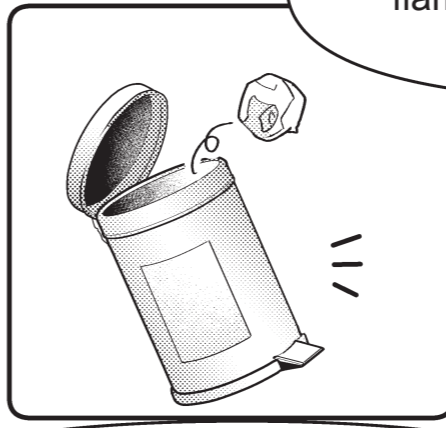
Are you okay?!

Yes.



The rule is to put it in a sealed, fire-resistant container for storage, is it not?

Moreover, you must never put a flammable item near a source of ignition like a stove.

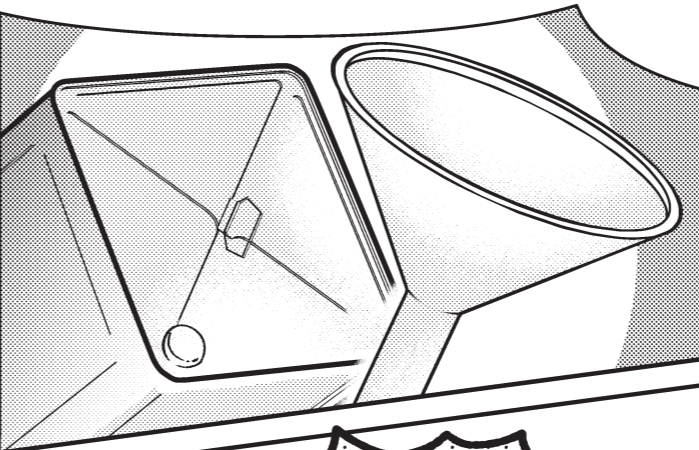


Yes...



First of all, when you handle a solvent, you have to do so in a well-ventilated area.

When you transfer a solvent to another container, do it slowly so you won't spill. Using a funnel would be a good idea.



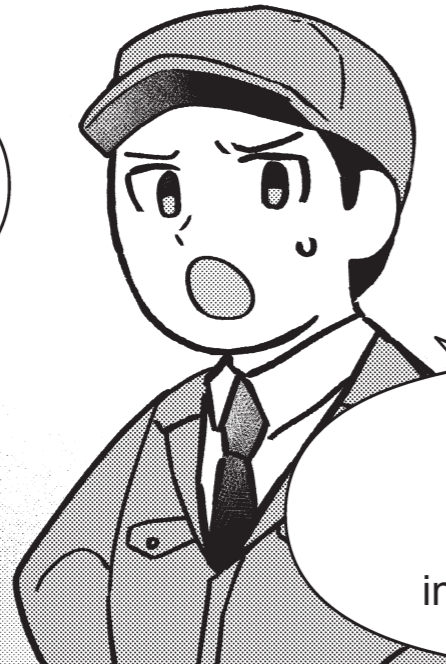
I'm sorry...

Lastly, observe the 4S principles and put things that are not necessary away. This is to reduce the chance for things around you to damage or knock over the container due to an earthquake or strong wind.

4S

- Seiri (Sorted)
- Seiton (Set in order)
- Seiso (Shiny)
- Seiketsu (Spotless)

I understand what happened.



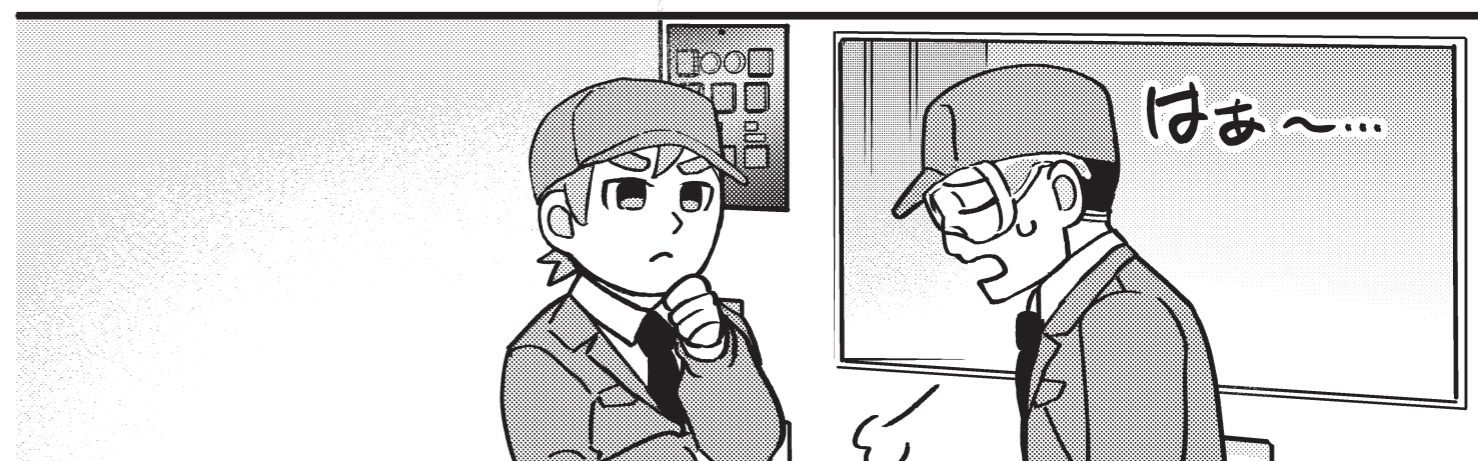
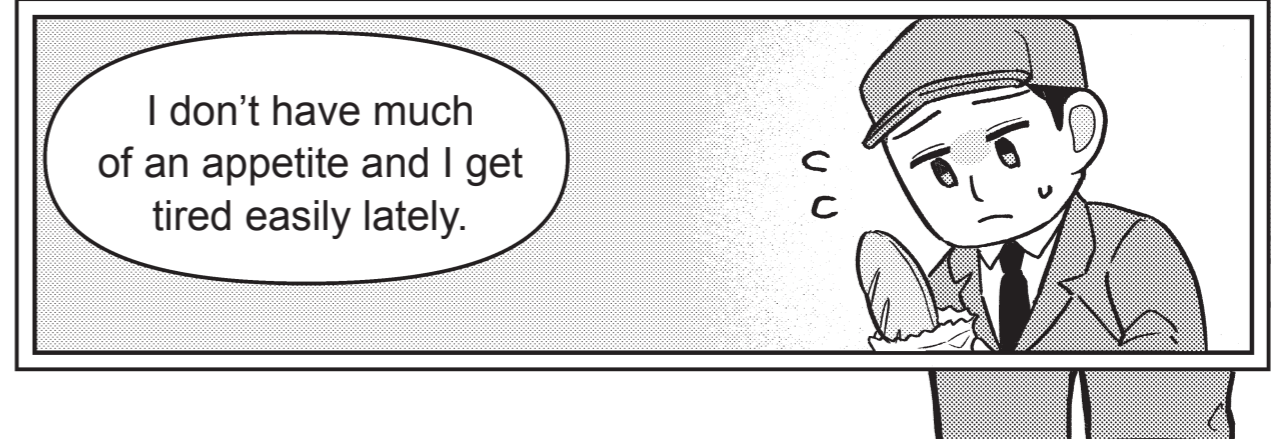
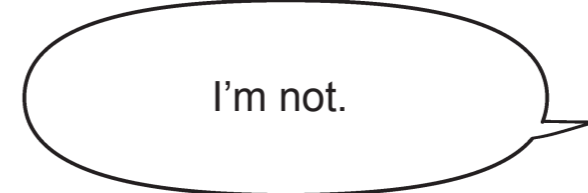
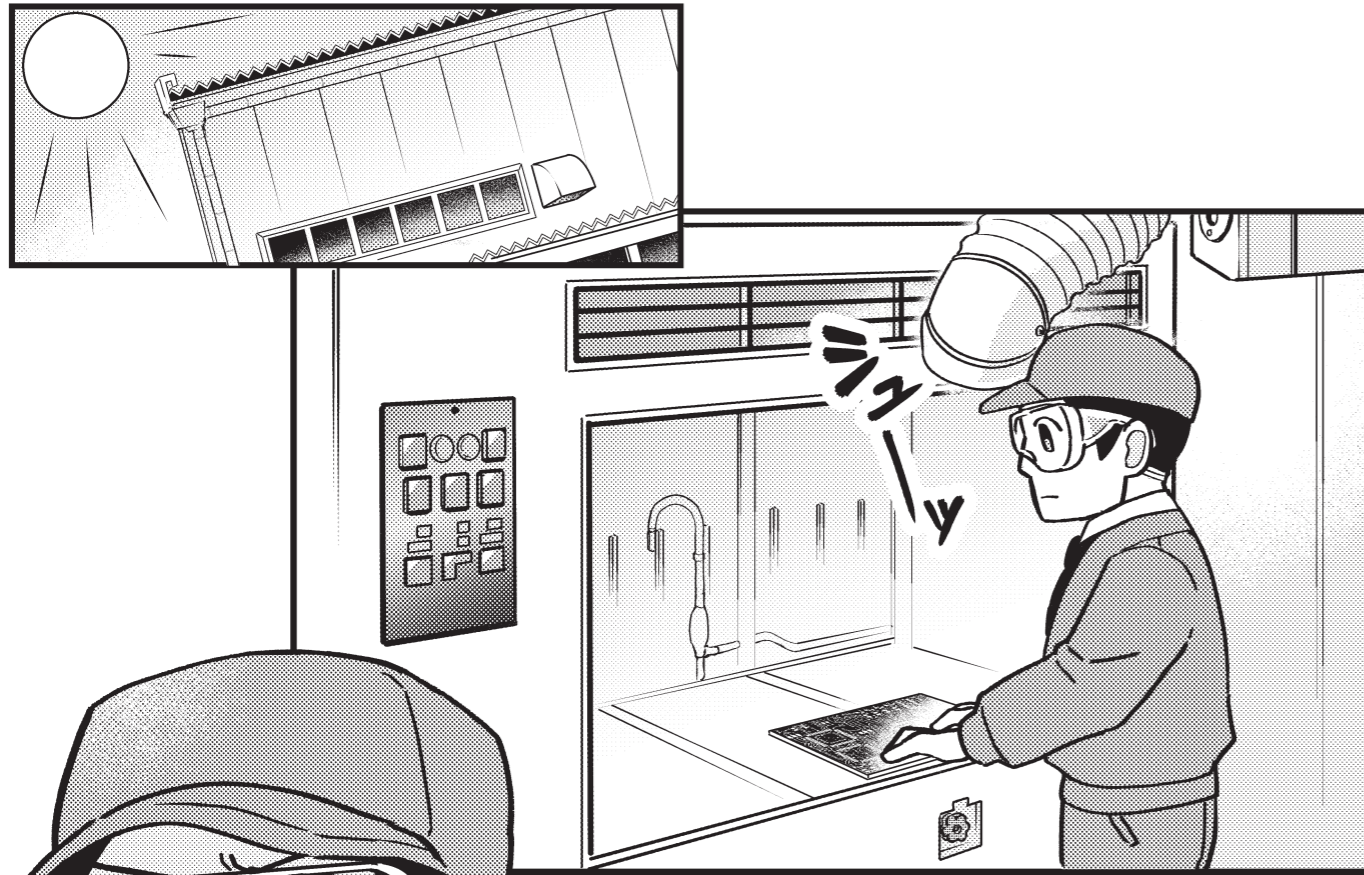
First, a cloth you wipe a solvent with must never be thrown out in the burnable garbage.

Let's all be careful so we won't get injured.



Understood!

CASE 3



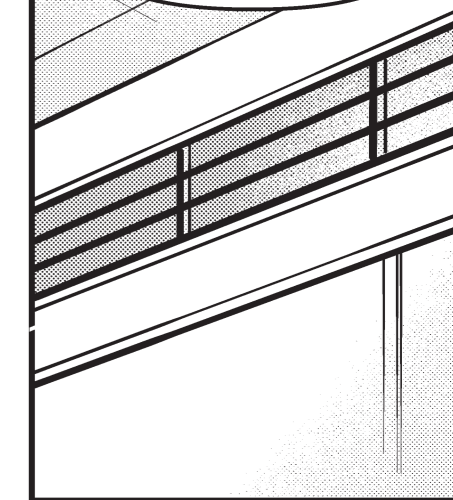
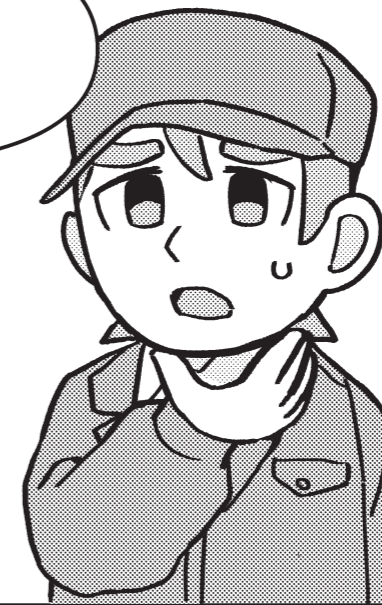
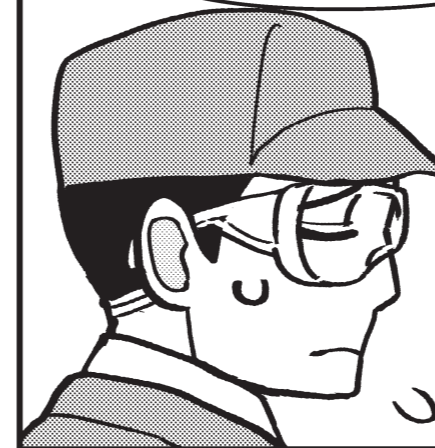
Hm...maybe it's because this room is hot?

Also I think I slightly smell an organic solvent in this room.

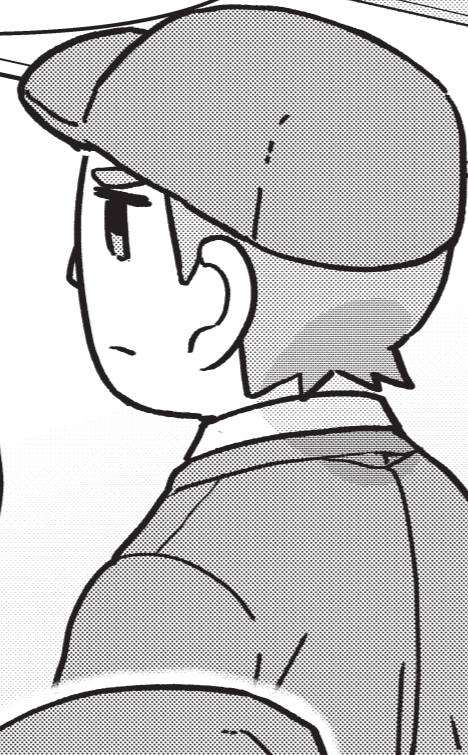


I see. That's not good.

I know!



The AC is on and working fine.



Maybe the cause is the organic solvent.

We had someone with the same symptoms before in the same department as you.



We have an industrial physician here, so why not consult with him?



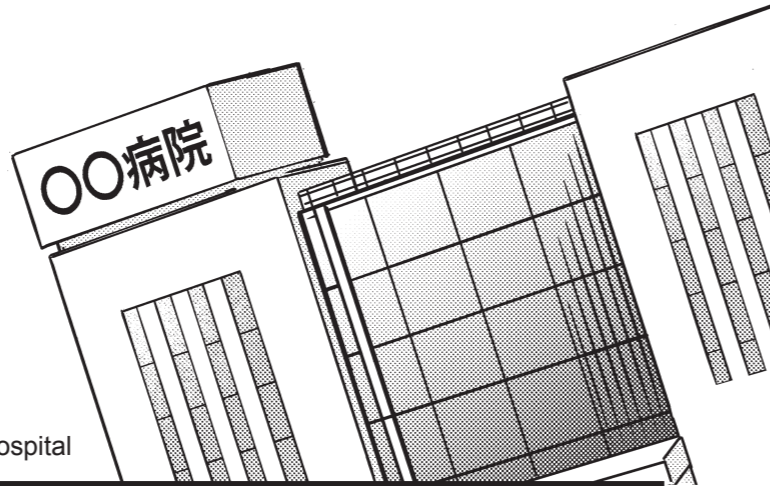
Yeah, I'll do that. Thanks.

I don't know what the cause is, but I make mistakes at my job a lot, and that makes me irritated even more...

It's awful.



Next day



What seems to be the problem today?

I've been irritated, not motivated, and feeling anxiety...

My coworker mentioned it could be because of the organic solvent, but does it have to do anything with this?

I see. Let's run some tests just in case.

Okay.

We have the test results.

I'm suspecting dysautonomia. There is also a chance of chronic poisoning from the organic solvent, so please let me check your tasks and work environment.

A few days later

I was sure there was something going on, so I looked into it, and I found out the cause.

In order to compensate for a performance deficiency in the AC, you adjusted the vent so that the cool air would blow directly at you. This caused an opposite air flow from the exhaust, resulting in you inhaling organic solvent fumes drawn in by the exhaust.

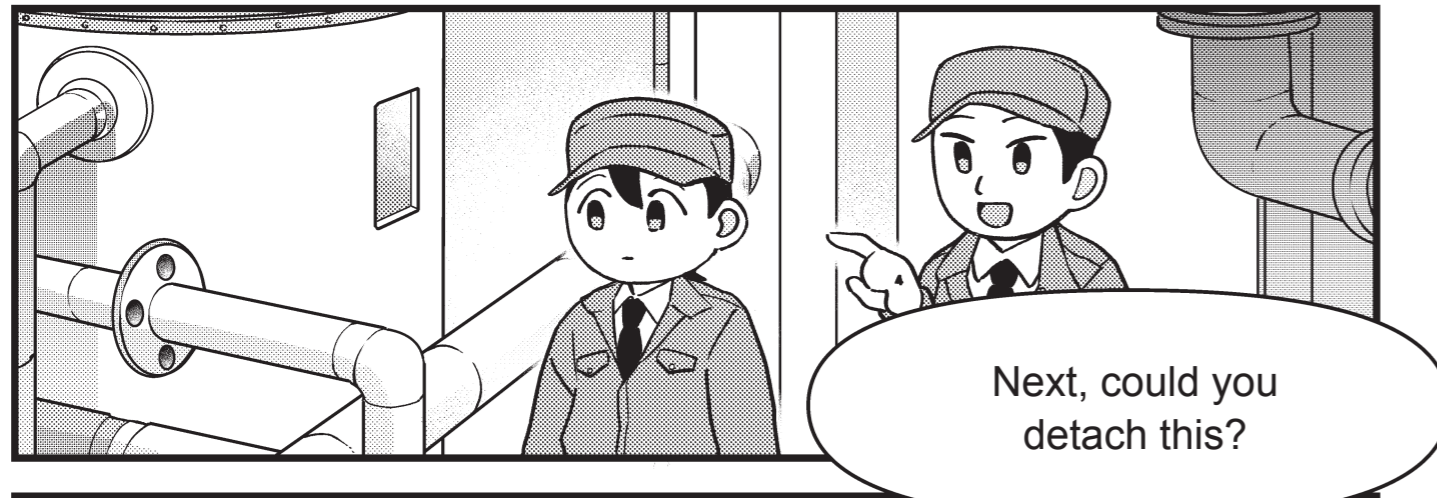
This time, I was able to find out the cause since you mentioned you work with an organic solvent.

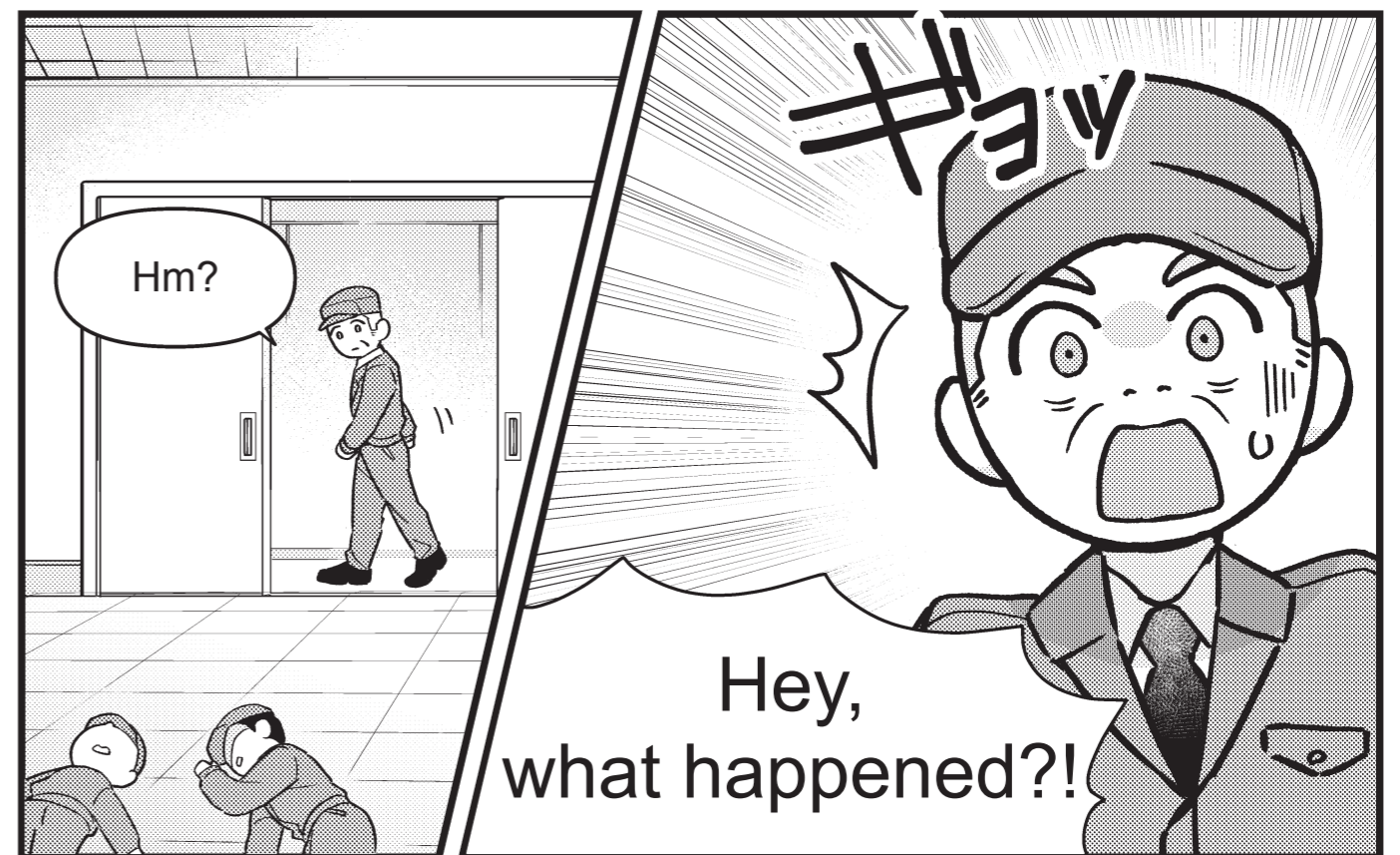
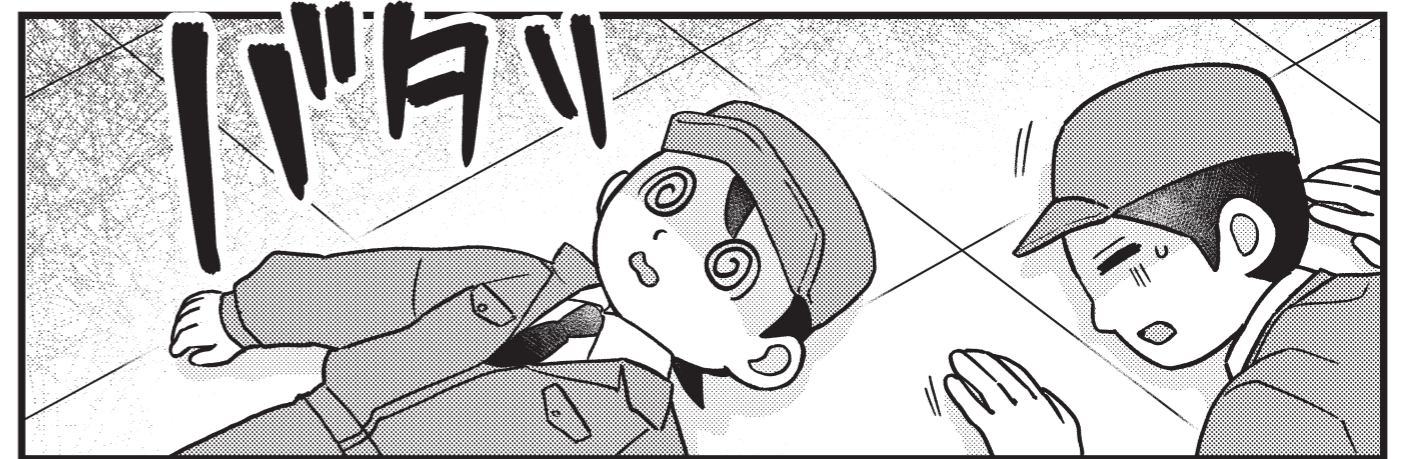
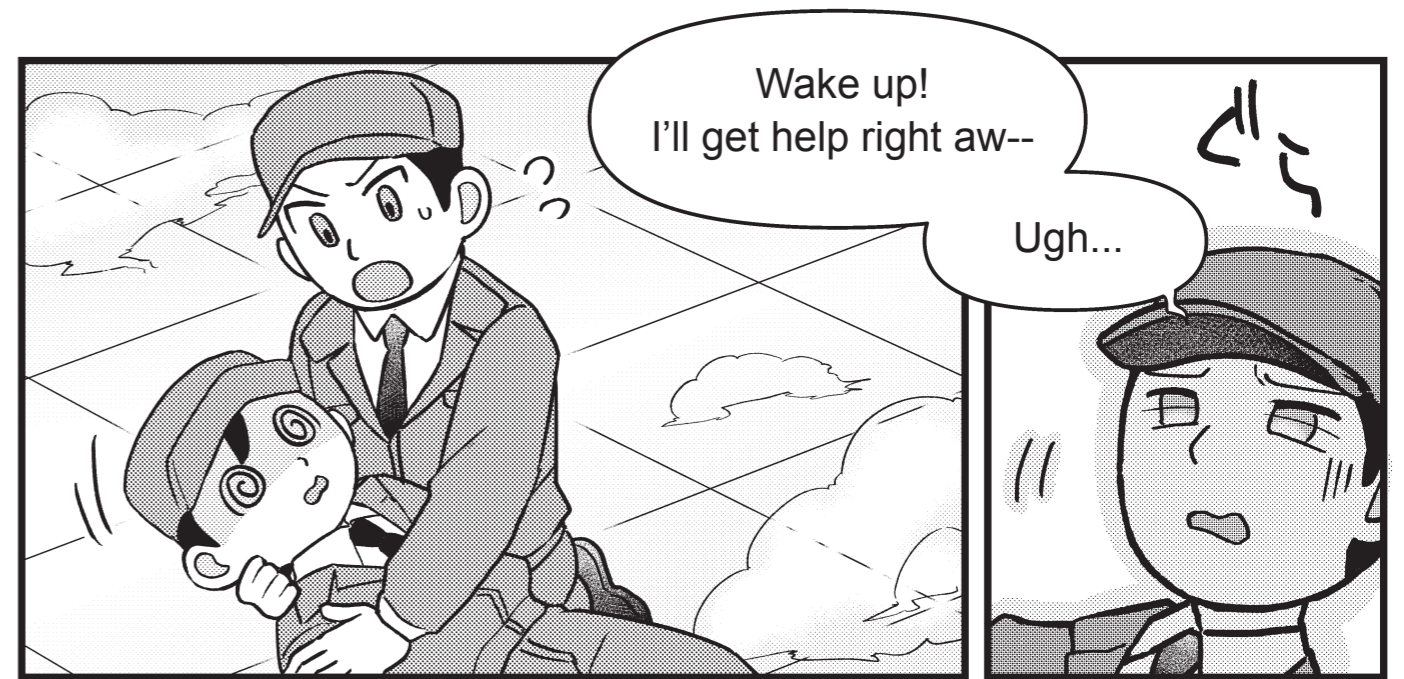
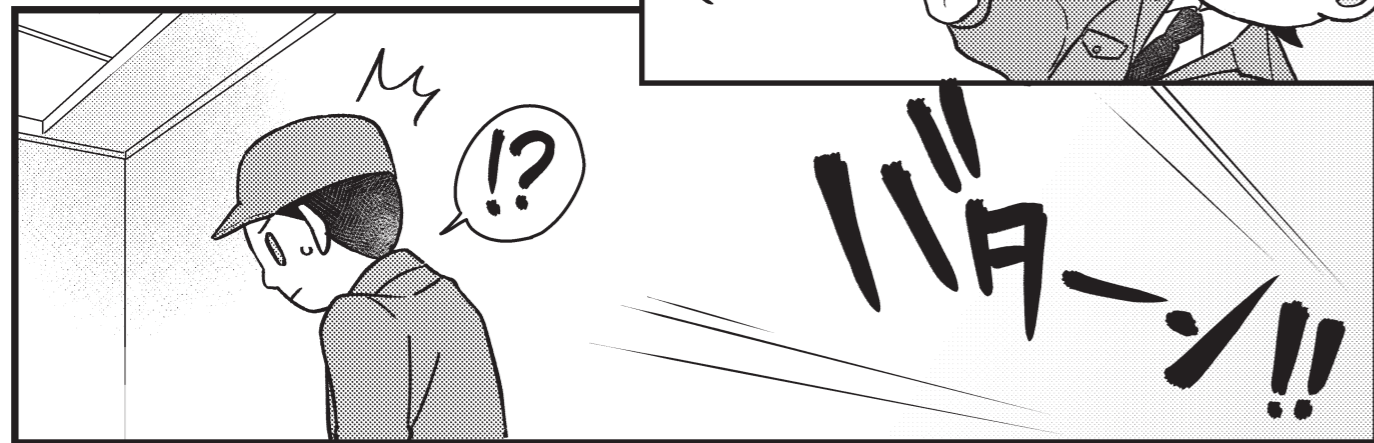
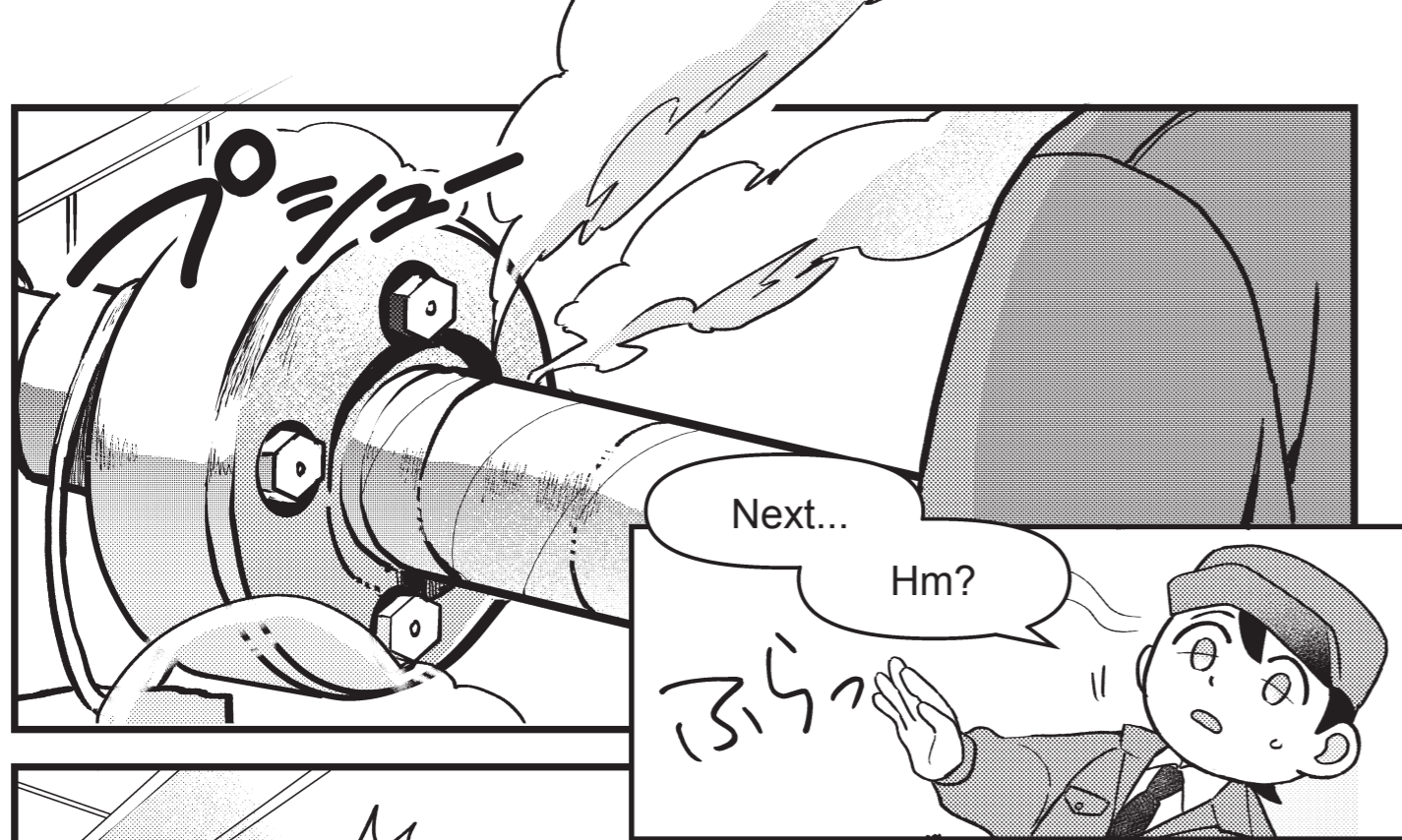
If you had kept inhaling organic solvent fumes at that rate, you could have become seriously ill.

Really?!

If you feel that you're not yourself or something's wrong, it could be caused by a chemical substance you're using. Talk to your supervisor immediately.

CASE 4







Now I get what happened.

It's good that it wasn't anything serious, but...

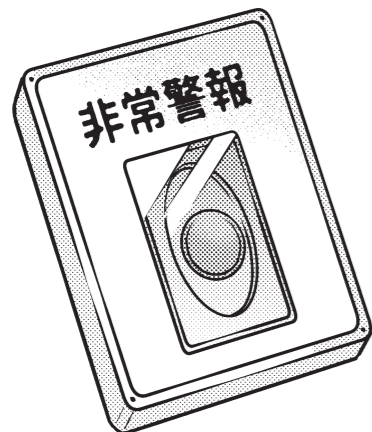
Listen.
If there's an abnormality, you're supposed to ring an alarm.

"Rescuing the victim is a top priority" doesn't mean sacrificing yourself to rescue a victim.

People using the appropriate gear should attempt a rescue.
If you don't have the gear, immediately run and ring an alarm.
Also, let everyone know around you with a loud voice.



It was good that I just happened to pass by, but you would've been seriously in danger if I hadn't.



Even if it is to rescue a coworker, if you put yourself in danger in an accident, that doesn't help anybody.

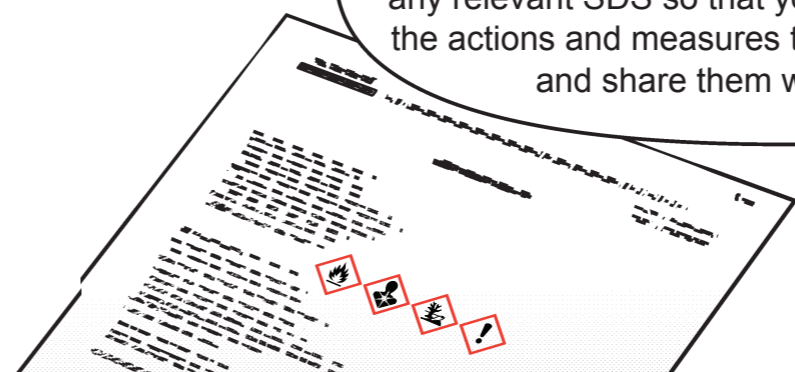
Don't let your emotions over wanting to rescue the victim overwhelm the need for safety.

It's not easy to act calmly in an emergency, which is why it's important to prepare for one on a regular basis.

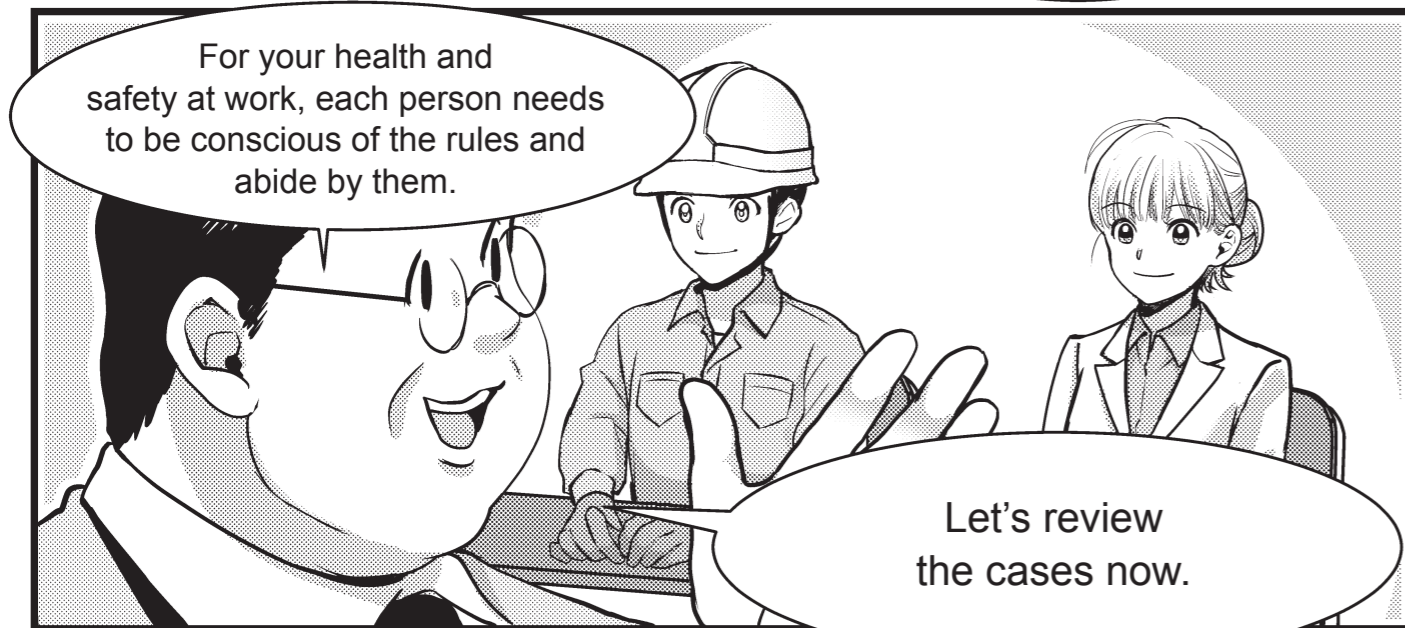
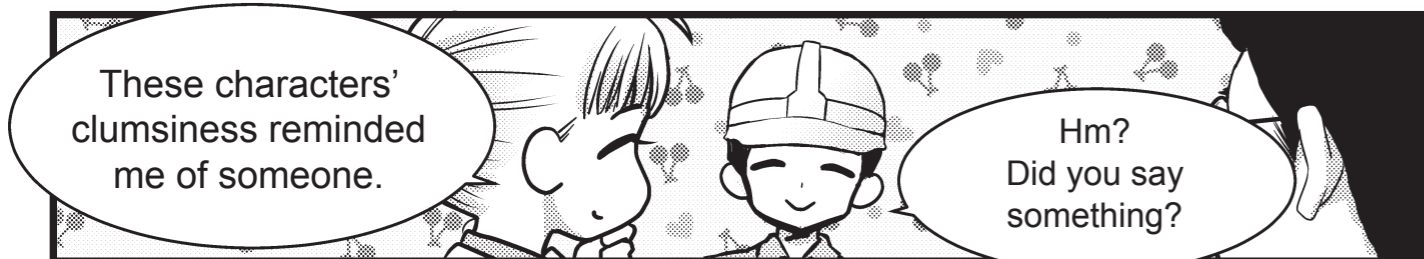
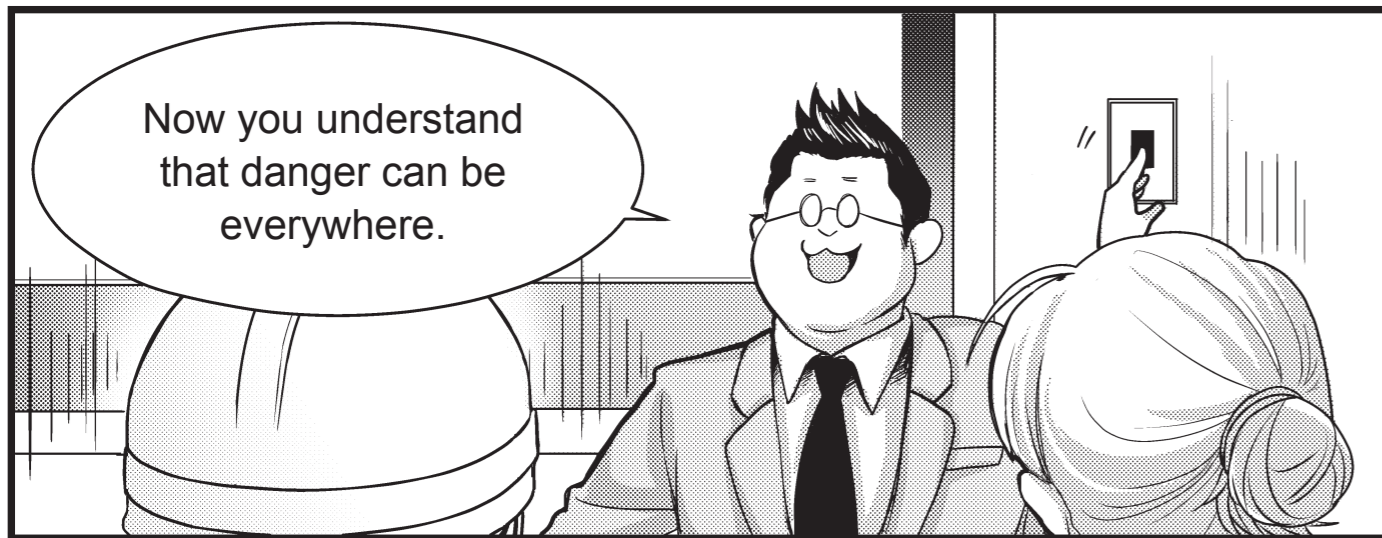
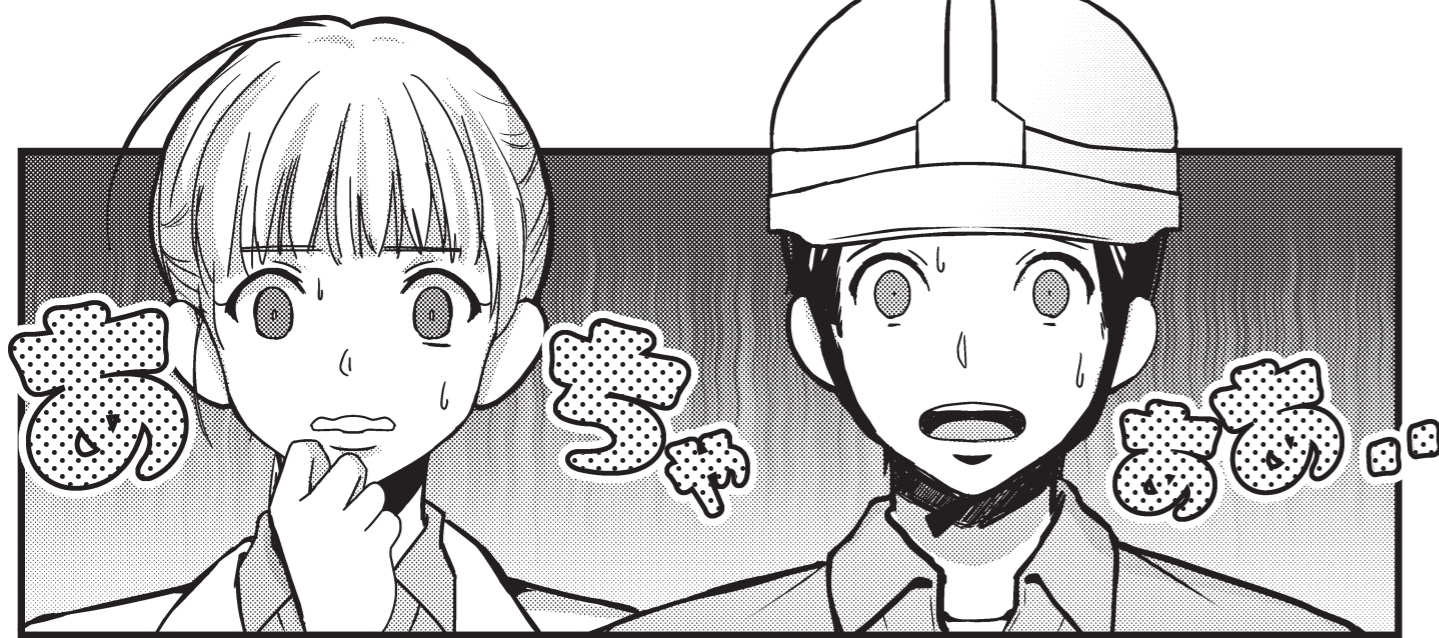
Make sure to check for evacuation routes, an initial action plan when you encounter an accident, precautions for rescuing a victim, and what to do after rescuing someone.

Don't rely on your past experiences or a hunch, and make sure to read the company's "Emergency Response Manual" again

as well as Section 4 "First-aid Measures," Section 5 "Firefighting Measures," and Section 6 "Accidental Release Measures" of any relevant SDS so that you can imagine in detail the actions and measures to take for emergencies and share them with everyone.



Okay!



Precautions to remember when handling chemical substances



1 | Properly manage combustible and flammable substances.



When transporting and storing, make sure to close the lid.



After use, dispose of it properly. Otherwise, it could lead to an unexpected accident.

2 | If there are any concerns or anything unusual, consult a supervisor immediately.



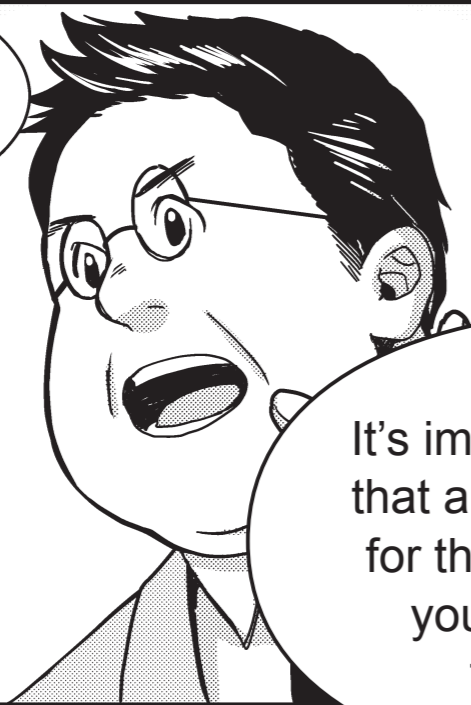
If you're exposed to a chemical substance, there's a risk of health damage. If you feel sick, report it to your supervisor immediately.

3 | Do not act impulsively.



If you try to be a hero and rescue someone without any concern for the consequences, there's a risk of getting yourself involved in the accident. Check the rules to prepare for emergencies.

Industrial injuries could happen to anyone.



It's important to remember that abiding by the rules is for the sake of protecting your physical health, family, and life.

Daily communication at a workplace

is also important in case something happens.



Okay!

I'll follow the rules and work hard every day!



Chemical substances handling

Things to watch out for!

Tips for health and safety!



1 No fire around flammables!



Be careful of ignition from sparks as well.

2 Comply with operational procedures!



If you make a mistake in the procedures, it could lead to a serious accident.

3 Wear your protective gear properly!



In a task that requires protective gear, make sure to wear it properly in order to prevent an accident.

4 If any hazardous substances get on you, immediately follow the recommended decontamination procedure!



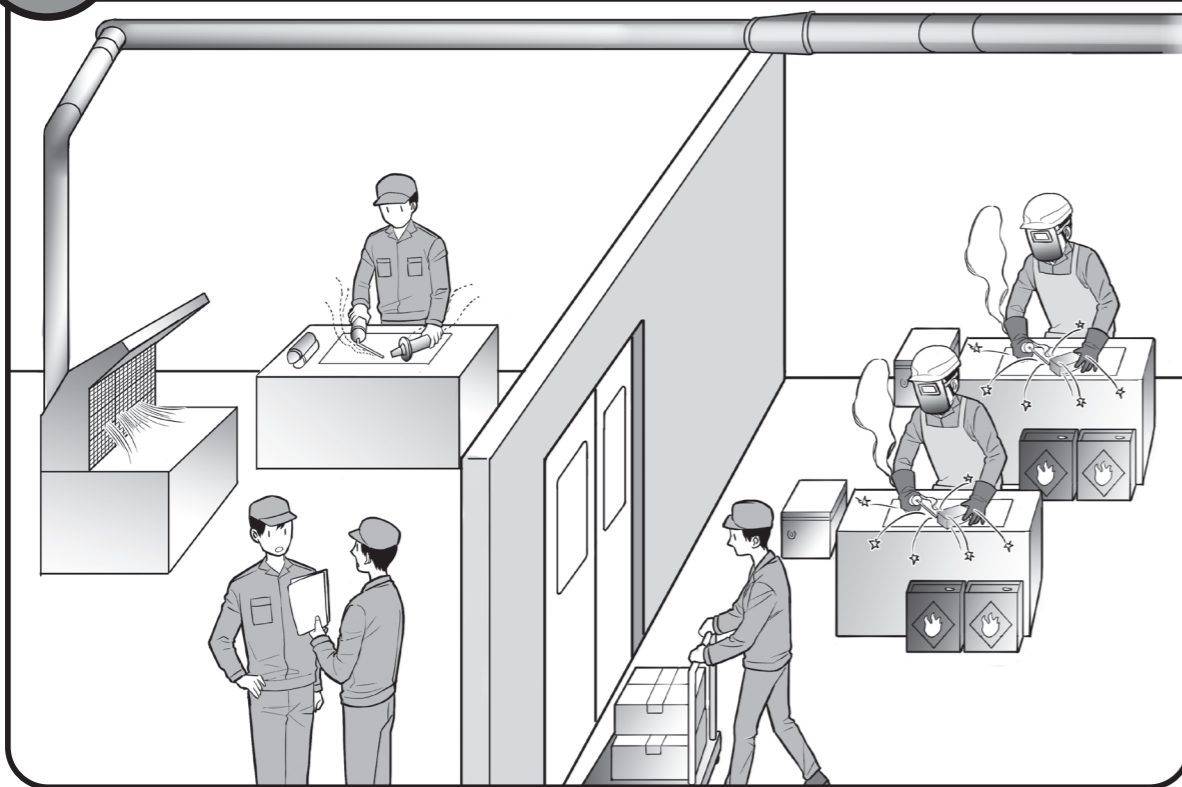
Do not forget to make it a habit to clean your hands and your workbench often.

Learn through pictures

Know the dangers that can be found within the workplace!

Q

Spot where the hazards are!



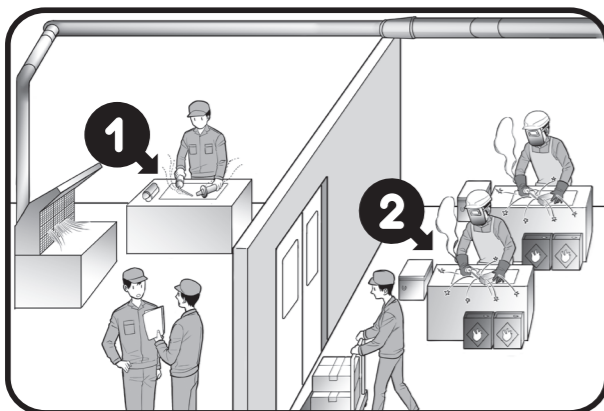
A

These are the hazards!

1 Use local exhaust ventilation when working.



2 When working around flames, take steps to reduce the danger of unintended ignition.



Think carefully and see if you can spot any other possible hazards.

Learn through Manga
**Health and Safety for
Chemical Substances Handling**

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