You thought you knew but didn't

# Sumitomo Riko's Business

Episode 3: Automotive Hoses

So, today's I'm gathering data about hoses.

Interview Data "About Hoses"

I thought hoses were just for water to flow through, but there seem to be all other sorts.

The type of hose may vary depending on what's flowing through it...

Thank you for waiting.

You're Ms. Tomoi, aren't you?

I'm working with you today!

Automotive Hose Business Unit
Mr. Ryugo

I look forward to it!

I'd like to ask you something right away

The type of hose depends on the liquid flowing inside, doesn't it

Well, you're half right, I suppose.

There are two things that determine the type of hose.

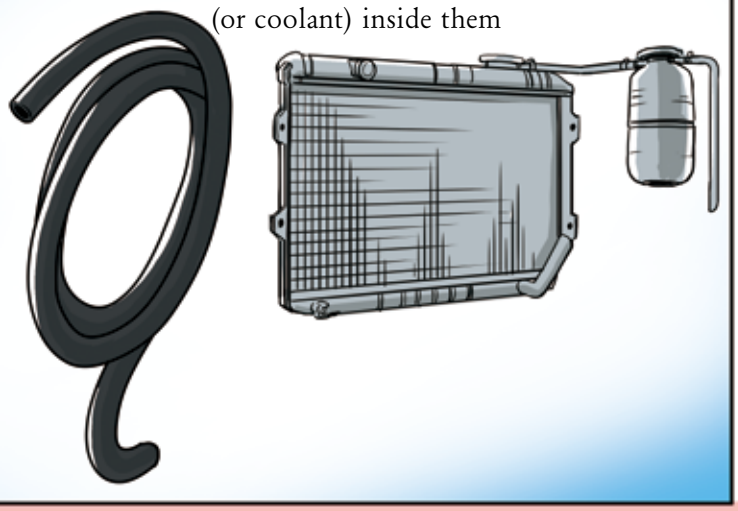
First is its role in letting liquid "flow" through it, as you said.

Second is its role in "transmitting" pressure (or operating pressure).


Let me explain in a little more detail.

You know that fuel hoses carry things like gasoline inside.

Radiator hoses and heater hoses cool or heat engines by circulating liquid (or coolant) inside them



So the type of hose depends on the liquid inside, doesn't it?

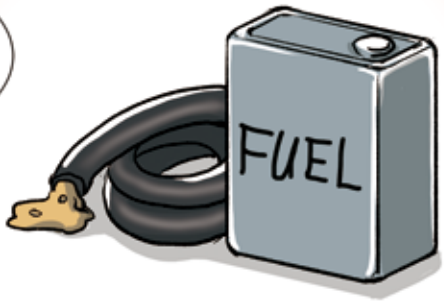

Yes, but we also consider where the hose will be used.

Huh?

Because hoses don't only carry water.

Their inside may be exposed to chemicals like fuel and oil.

That's why we use rubber with a high tolerance to such things, so that the rubber's performance is not impaired.

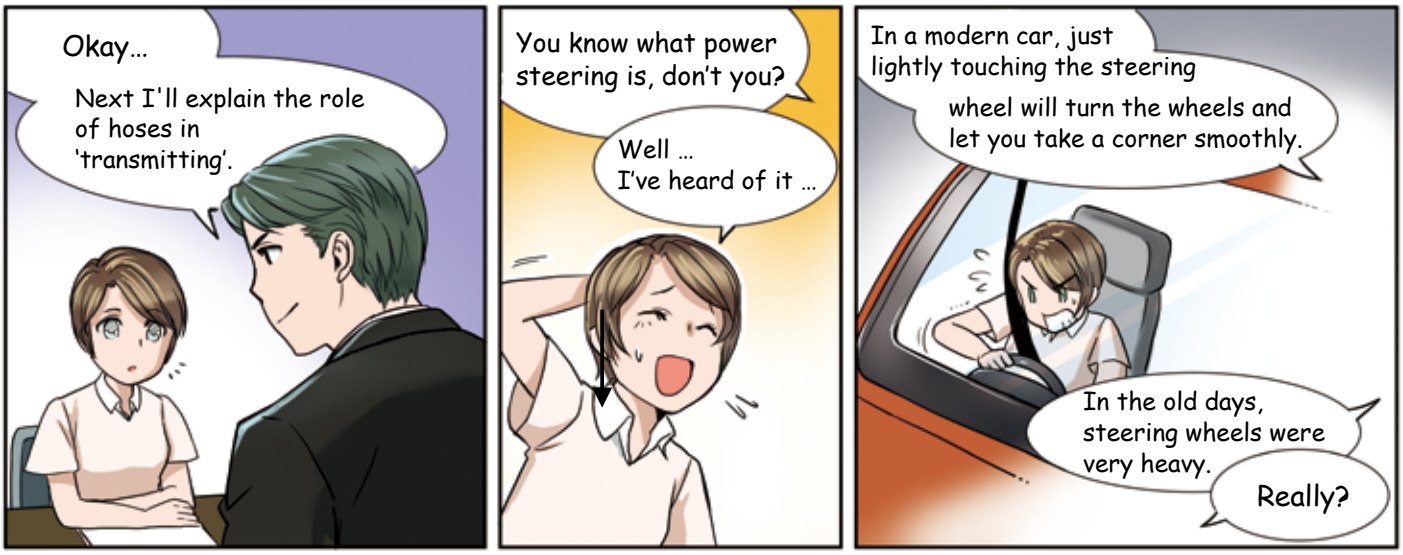



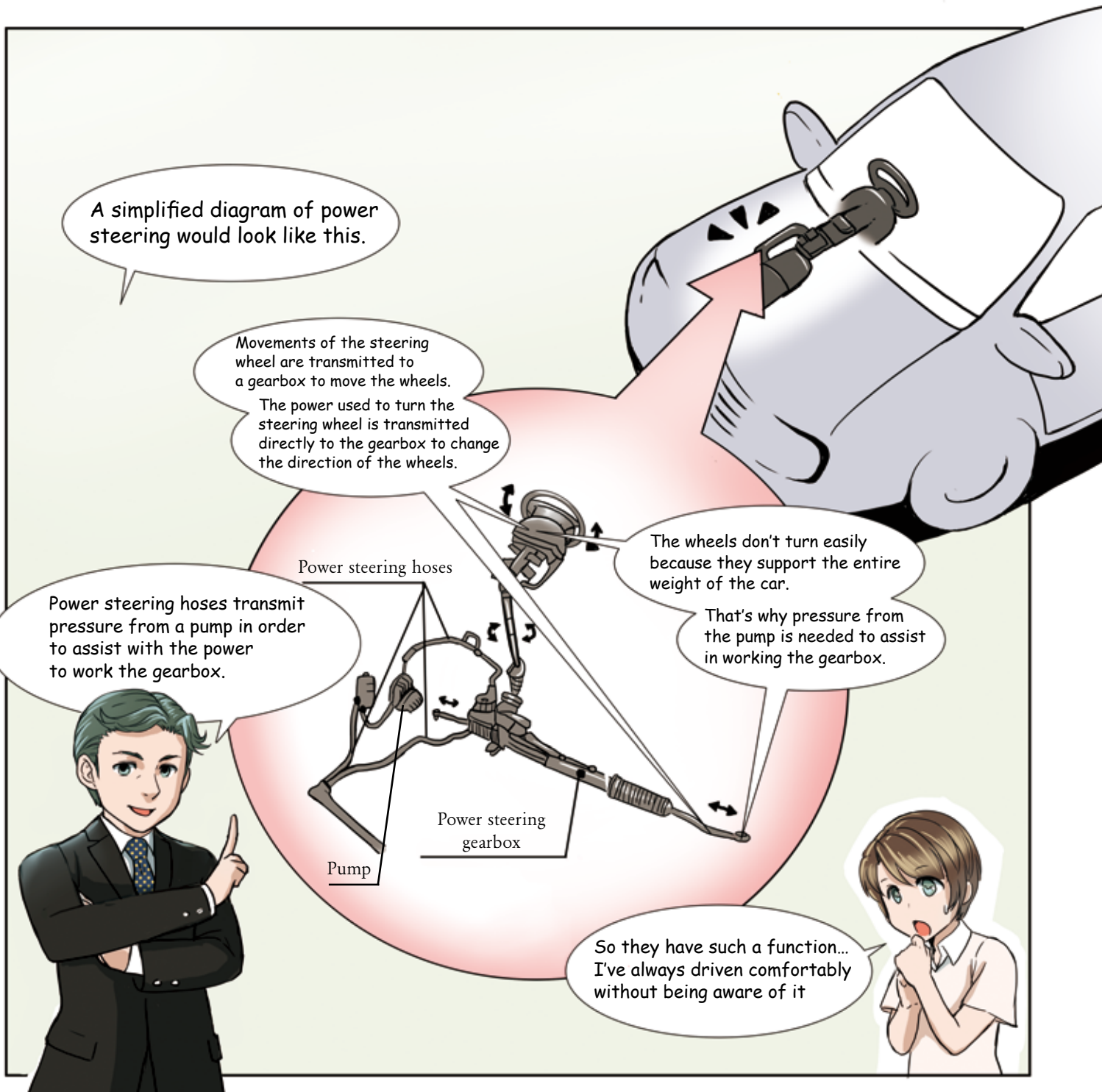

As for the outside of a hose, it can be affected by chemicals, sand, stones, UV rays, heat, and so on.

The conditions hoses are exposed to vary depending on the country or region where they are used. So we design them in anticipation of the harshest conditions.

I see... That's quite deep.

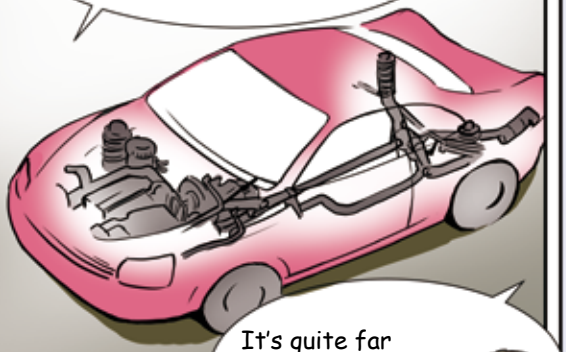
Yes, it is.


Okay…
Next I'll explain the role of hoses in 'transmitting'.
You know what power steering is, don't you?
Well … I've heard of it …
In a modern car, just lightly touching the steering wheel will turn the wheels and let you take a corner smoothly.
In the old days, steering wheels were very heavy.
Really?


A simplified diagram of power steering would look like this.
Movements of the steering wheel are transmitted to a gearbox to move the wheels.
The power used to turn the steering wheel is transmitted directly to the gearbox to change the direction of the wheels.
Power steering hoses
The wheels don't turn easily because they support the entire weight of the car.
That's why pressure from the pump is needed to assist in working the gearbox.
Power steering hoses transmit pressure from a pump in order to assist with the power to work the gearbox.
Power steering gearbox
Pump
So they have such a function… I've always driven comfortably without being aware of it

Next, let me explain 'flow' with this picture.

You know there are fuel system hoses connecting the fuel tank at the rear to the engine at the front, don't you?



It's quite far from the back to the front, isn't it?

Yes, it is.
Which means fuel won't reach the front without strong enough pressure

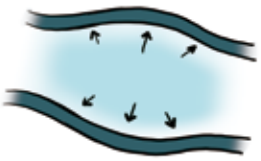
Power →

A short hose means a small power is OK

Power →

A longer hose means a larger power is needed!

I see! So hoses have high pressure resistance.



So if the hose expands, the flow of liquid inside gets weaker

That's right.
If the rubber expands, the pressure inside falls and fuel cannot be supplied accurately.

So we have to make the inside of the hose pressure resistant by winding it in nylon or polyester thread.

The rubber also needs to be heat resistant near the engine.

We meet these strict requirements with our 'rubber mixing technologies' and 'pipe design technologies', two strengths of Sumitomo Riko.


You've probably heard that safety and environmental aspects are important for anti-vibration rubbers.
For hoses, they're even more important.
To ensure 'flow' and 'transmitting', it is vital that there are no leaks.
For sure … A gasoline leak would be terrible!
Seeping
Safety is key, of course, but from an environmental perspective
hydrocarbon (HC) is released into the air and causes atmospheric pollution. If left alone, it leads to the occurrence of optical smog and PM2.5 (particulate matter).
Oh no …
It impacts the lives of people worldwide!
Rattled
Rattled
A broken hose would be very serious, so product testing includes repeated durability tests, destruction tests, and so on to ensure adequate performance.
But … did you know that gasoline can leak even if the hose isn't broken?
Shock
Really!?
Even though hoses have several layers and are tested?

For example ...

Problem 1:
Gasoline leaks from the fuel opening as it is poured in

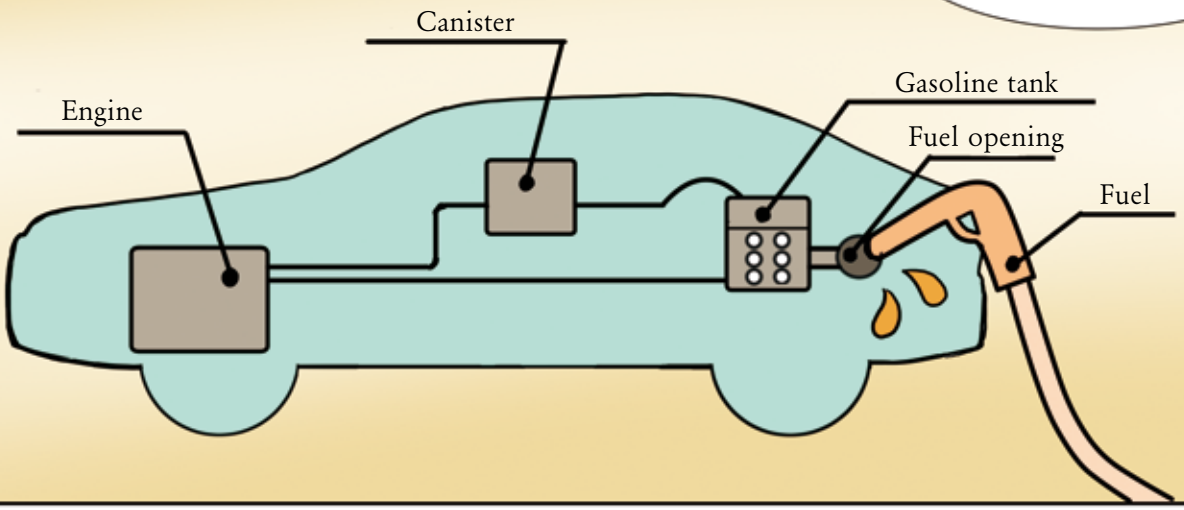
Problem 2:
Gasoline evaporates inside the tank, the pressure rises,
and when that pressure is relieved, some gasoline leaks

Problem 3:
Some gasoline always leaks through the gaps in
the bonds between the macromolecules of the hose rubber (Permeation)

To date, we have addressed these problems one by one.

ORVR(Onboard Refueling Vapor Recovery)

This kind of system is installed in cars nowadays.




Our current solution strategy for these problems is this.
By reducing the reverse flow of gasoline vapor from the fuel opening, we can prevent gasoline leaking out.
(Solution to Problem 1)

Also, gasoline vapor inside the tank is collected in the canister and sent to the engine to be consumed, so it does not leak.
(Solution to Problem 2)

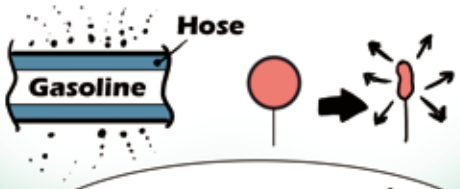
Recently, gasoline leakage has been largely controlled due to the improved environmental performance of automobiles.

Many of our company's products are used in these processes

Whoa

But permeation, the natural escape of gasoline through hoses,
cannot be completely eliminated with current technology.
So there is still scope for research into problem 3.

It's easy to understand
if you compare it to a balloon.
If the air inside leaks out, the balloon will deflate




I see!
It's easy to imagine!

Compliance with Euro 6 in Europe
LEV III in North America
China 6 in China (6 countries)

Internationally, environmental regulations for reducing
air pollution are also getting stricter every year,
and Sumitomo Riko is researching flat out in order to
meet the strictest environmental regulations in the world.


So there is cutting-edge research into hoses, too.

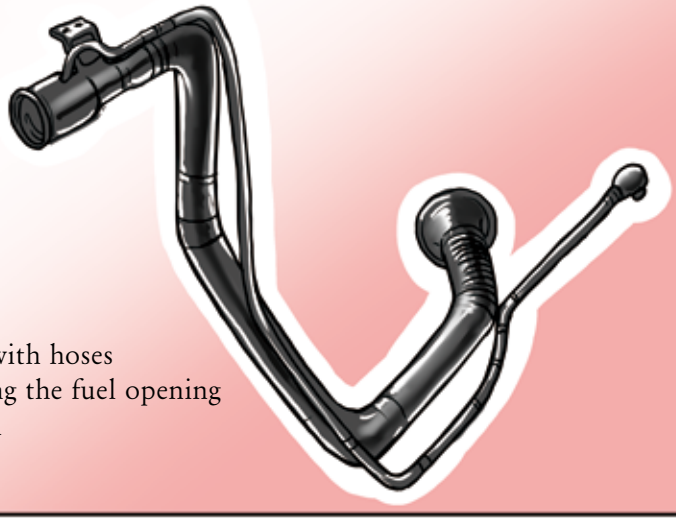
*I'm ashamed that I used to think they were just for distributing water.*

In emerging nations where infrastructure remains undeveloped, traffic congestion is frequent and the fuels on the market are crude.
So there is a need for products with high heat and chemical resistance properties.

I see... Our company's technologies have a role to play not only in countries where the environment is prepared but also in places with harsher conditions.

Oh, I like what you're saying!

Concerning the environmental response I mentioned earlier, I believe the next step is to take on the manufacture of not just simple hoses but also modules made up of parts, which will also help to shorten the manufacturing time of vehicles.



Module with hoses connecting the fuel opening to the tan

Automotive hoses … I was hardly aware of them before.

They're not very visible, and it's natural to just drive in comfort …

Today was a good opportunity for you, wasn't it?

As an executive, I hope many people will learn about our work through your article.

Executive?

Next, after automotive hoses, you'll go to Gifu prefecture.

That will be interesting too, so keep at it!

Right, then …

Clattering

I'll be off. Goodbye.

Huh? Executive? Gifu prefecture? What???

rattle

**What on earth was that!?**