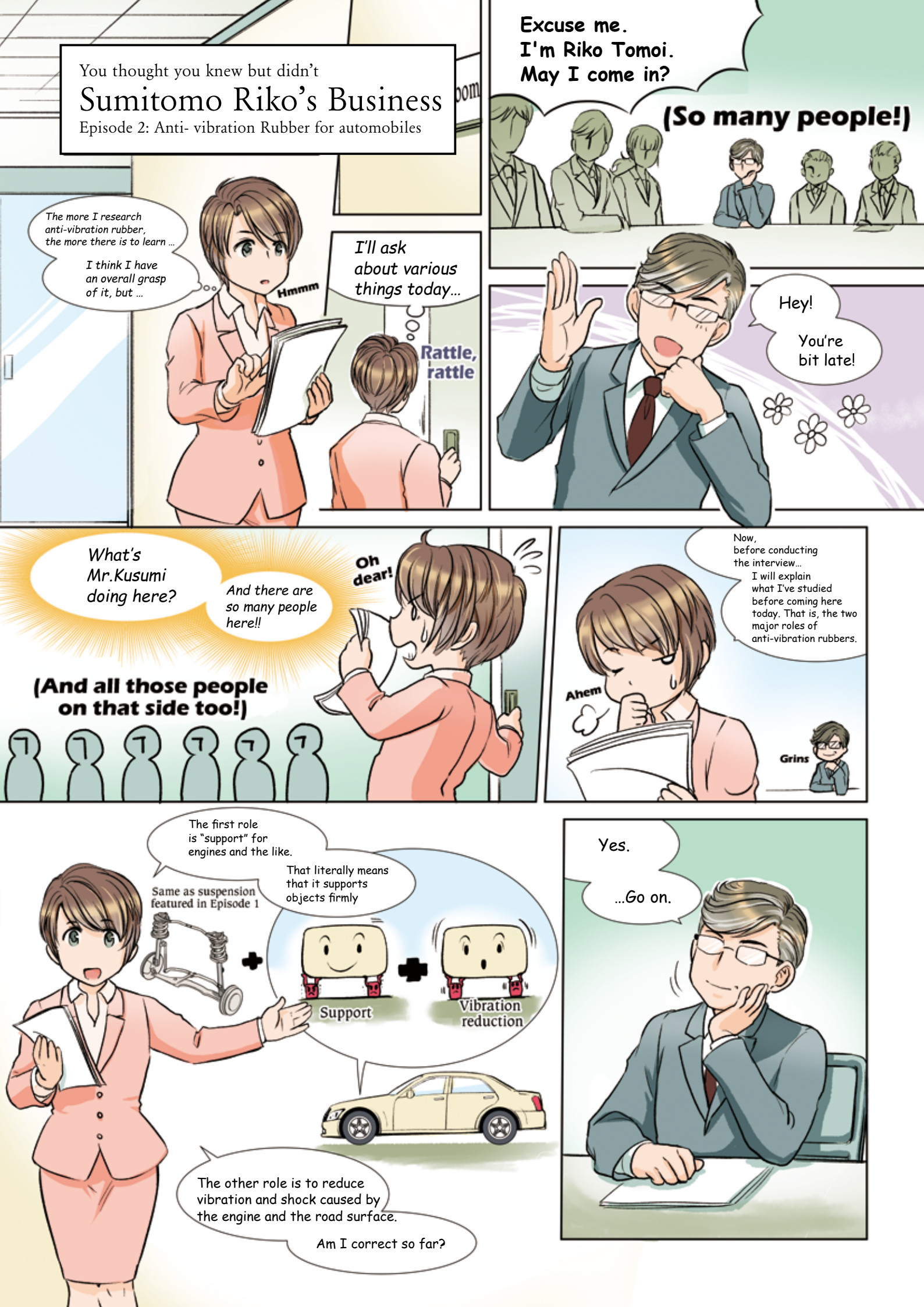
You thought you knew but didn't

Sumitomo Riko's Business

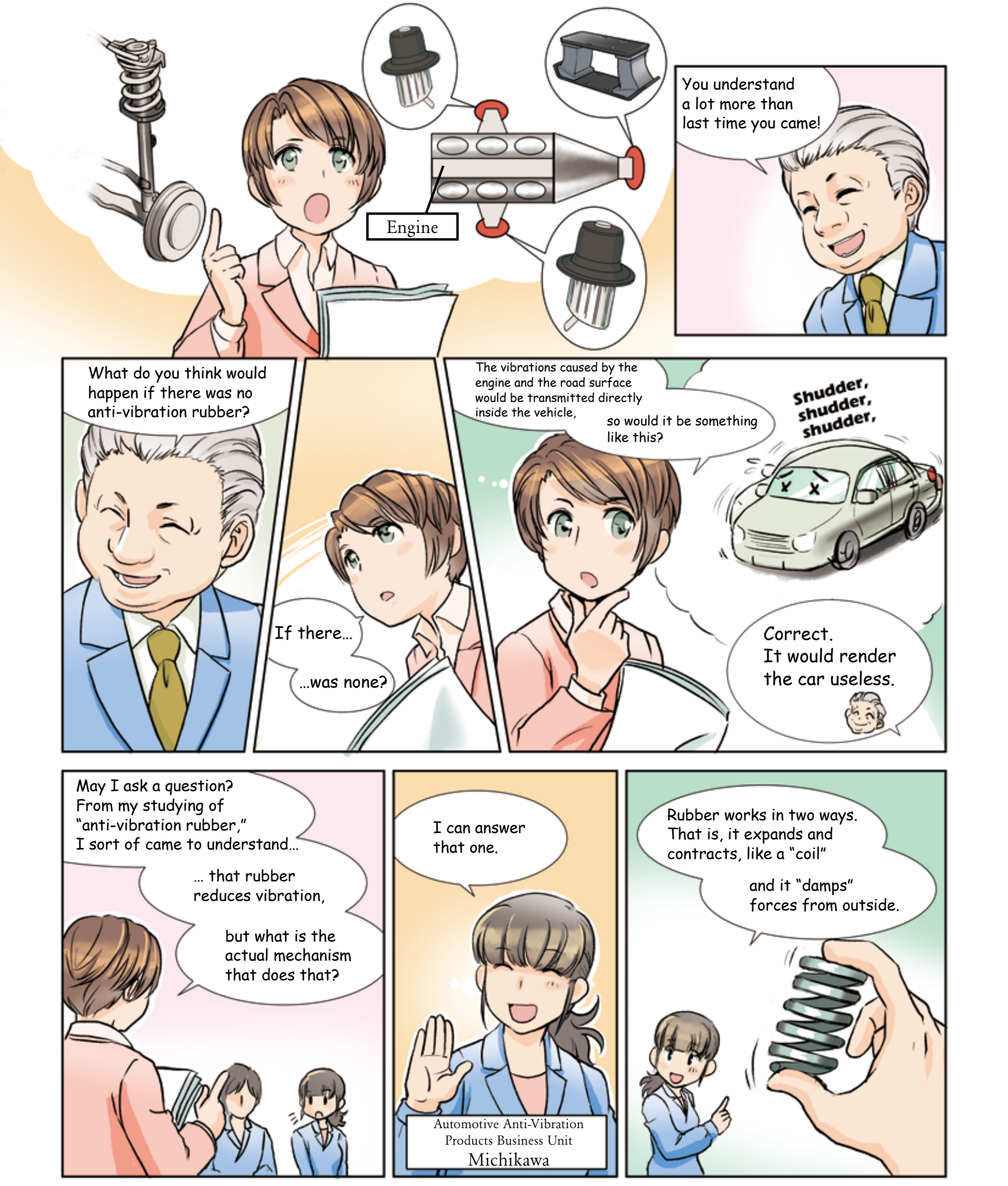
Episode 2: Anti- vibration Rubber for automobiles

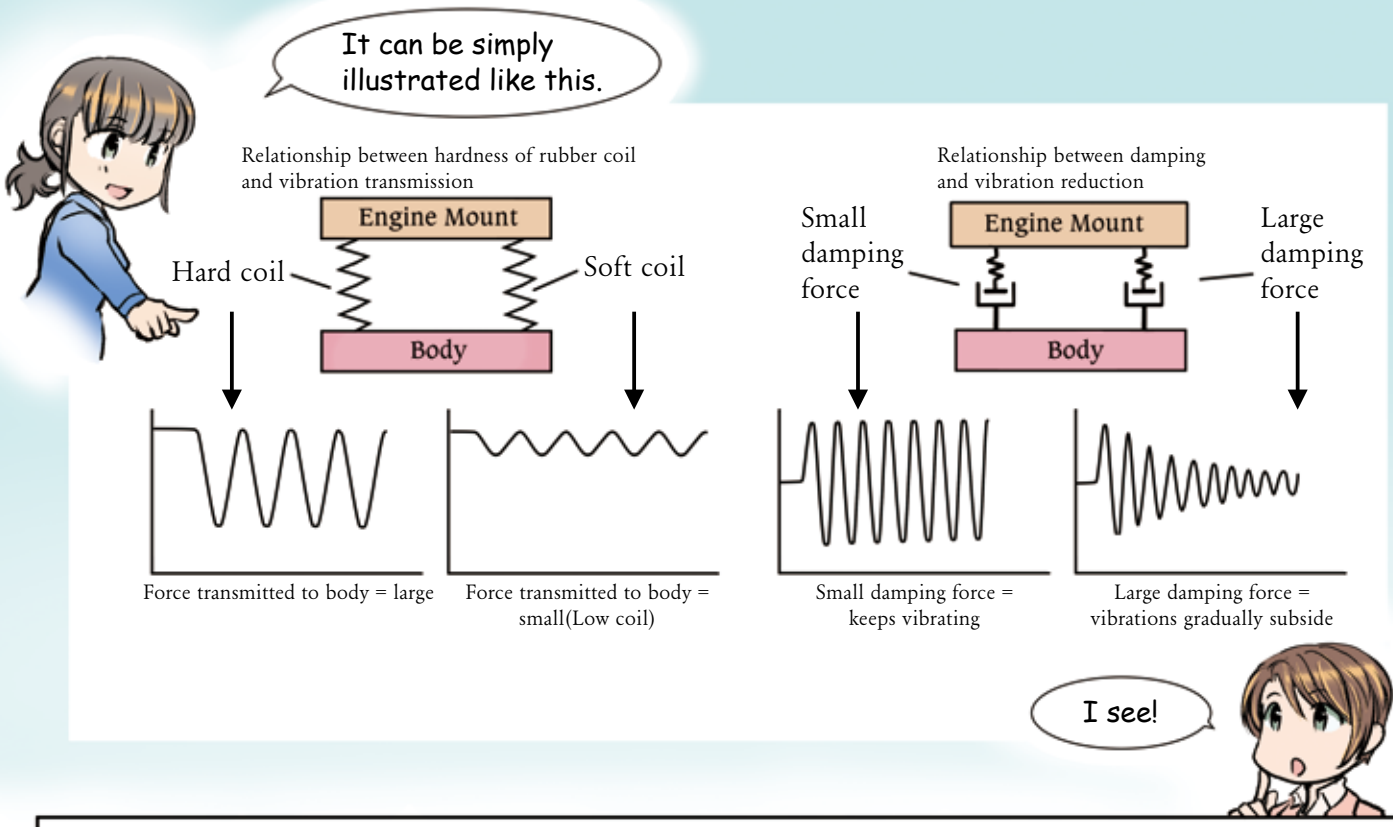


As was explained in the last report
about anti-vibration rubber for suspension,
it is rubber that reduces vibration.

Anti-vibration rubber for suspension mainly
reduces vibration caused by the road surface.

On the other hand,
because vehicles move by exploding gasoline,
anti-vibration rubber in the engine mount reduces
the vibration generated by the engine.



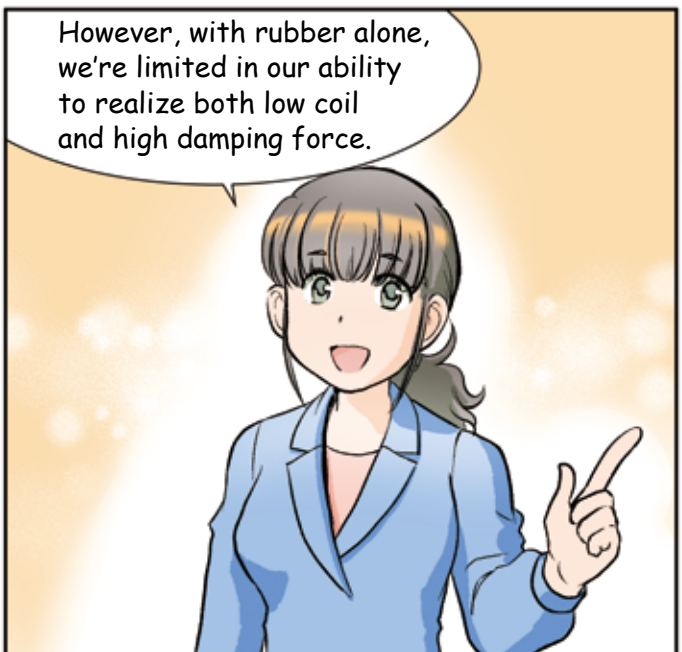


Coils alone aren't enough to stop the vibration, so the car body keeps shaking.

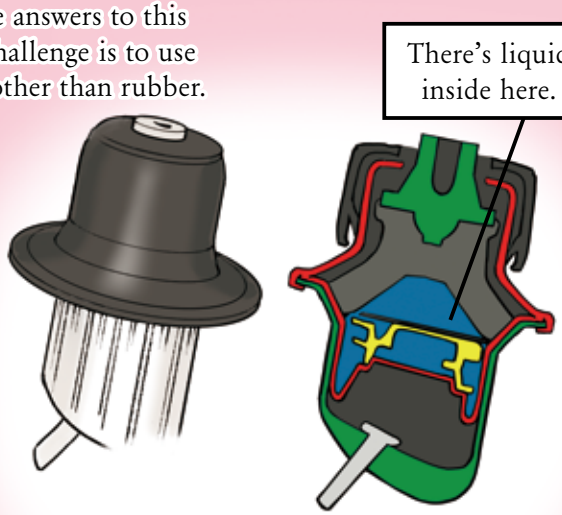
On the other hand, with only a damper, the force transmitted from the road surface and the engine to the body will increase.

Moreover, anti-vibration rubber can change the vehicle's properties in the back-and-forth, right-and-left, and up-and-down directions, making it possible to fine-tune the smooth ride to suit each type of vehicle.

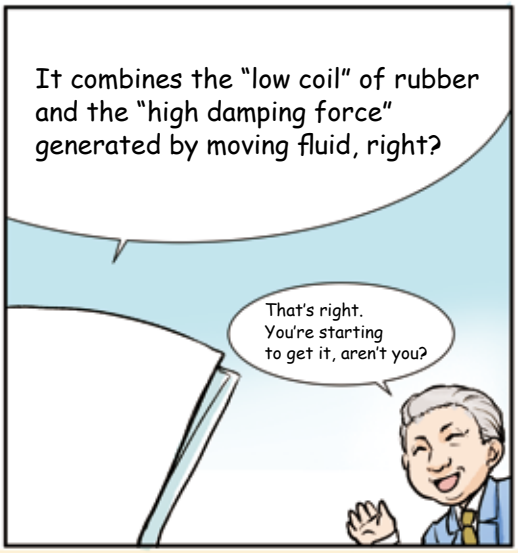
Anti-vibration rubber possesses both of these qualities.

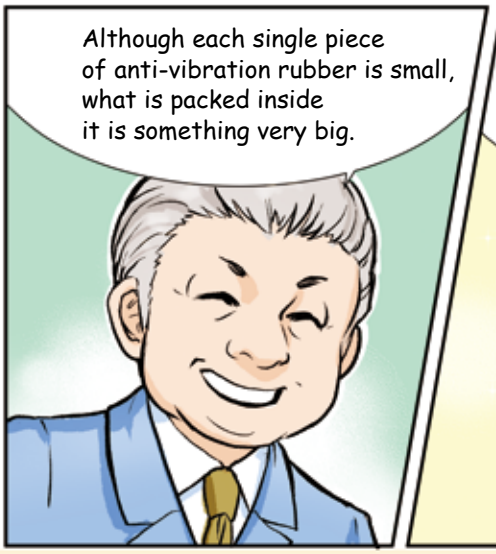


One of the answers to this difficult challenge is to use materials other than rubber.



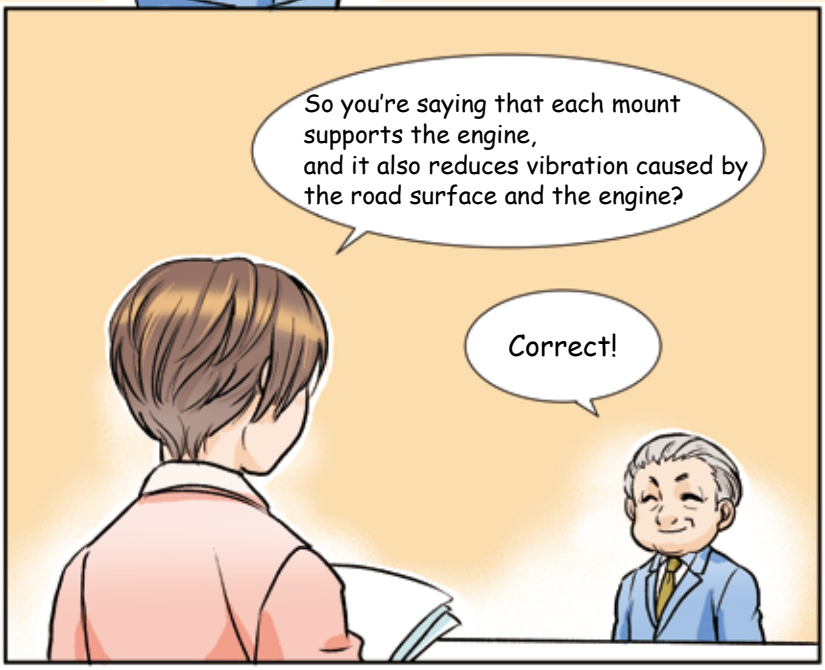
This is an "Adaptive Hydraulic Engine Mount."

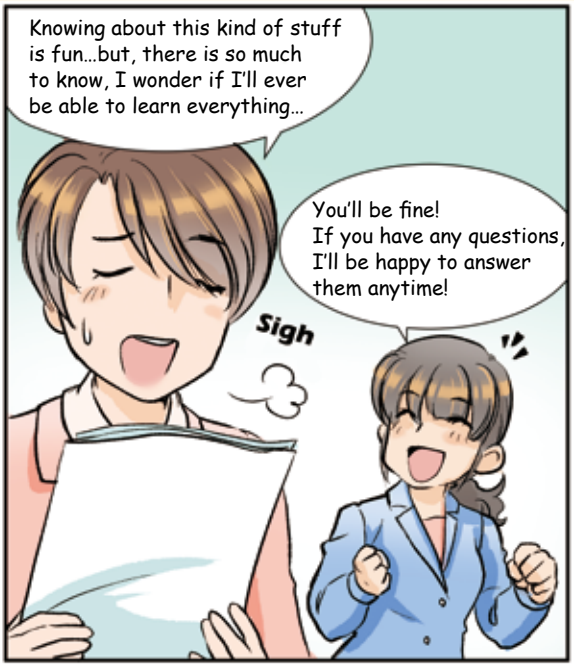

It combines the "low coil" of rubber and the "high damping force" generated by moving fluid, right?
That's right. You're starting to get it, aren't you?


Although each single piece of anti-vibration rubber is small, what is packed inside it is something very big.


I am starting to sense how very profound the concept of anti-vibration rubber is... It makes me want to learn even more about my own company's products.

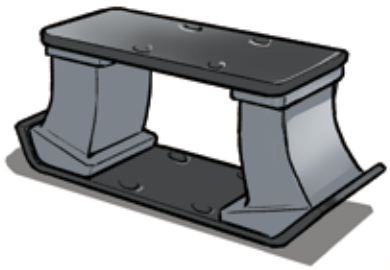

The Adaptive Hydraulic Engine Mount was mentioned earlier, and now we are moving on to today's main theme.
That is, what is required of an engine mount?
To look at in more depth, there are four things demanded of an engine mount.
1.Support the engine ...
Engine mounts support engines that weigh from 100 kg to 300 kg.
2.Reduce vibration generated by the engine ...
Shut out and reduce the vibration generated by the engine that is transmitted inside the car.
3.Reduce shaking of the engine itself ...
Quickly suppress the shaking of the engine itself caused by vibration and shock from the road surface.
4.Prevent interference by the engine ...
During sharp turns of the steering wheel or sudden braking, it keeps the engine from moving and hitting other parts.


So you're saying that each mount supports the engine, and it also reduces vibration caused by the road surface and the engine?
Correct!


Knowing about this kind of stuff is fun...but, there is so much to know, I wonder if I'll ever be able to learn everything...
You'll be fine! If you have any questions, I'll be happy to answer them anytime!
Sigh

Talking of engine mounts,
I took a quick look at one,
but at a glance,
I couldn't see any "rubber".
But it is actually used, isn't it?

Because engine mounts have to support heavy engines, most of the outside is metal.

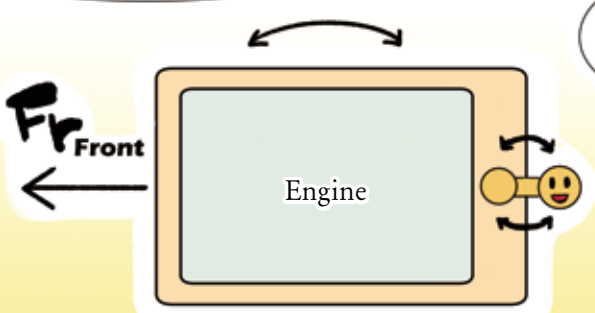


What is this thing that looks like a dumbbell?

That's a torque rod.

When the engine starts, the rolling force makes the engine move back and forth.
The torque rod reduces that movement.

I reduce vibrations!



More recently, we have also been responding to the demands of society for "safety" and "environmental performance."

In terms of safety, one key point is that "it breaks properly."

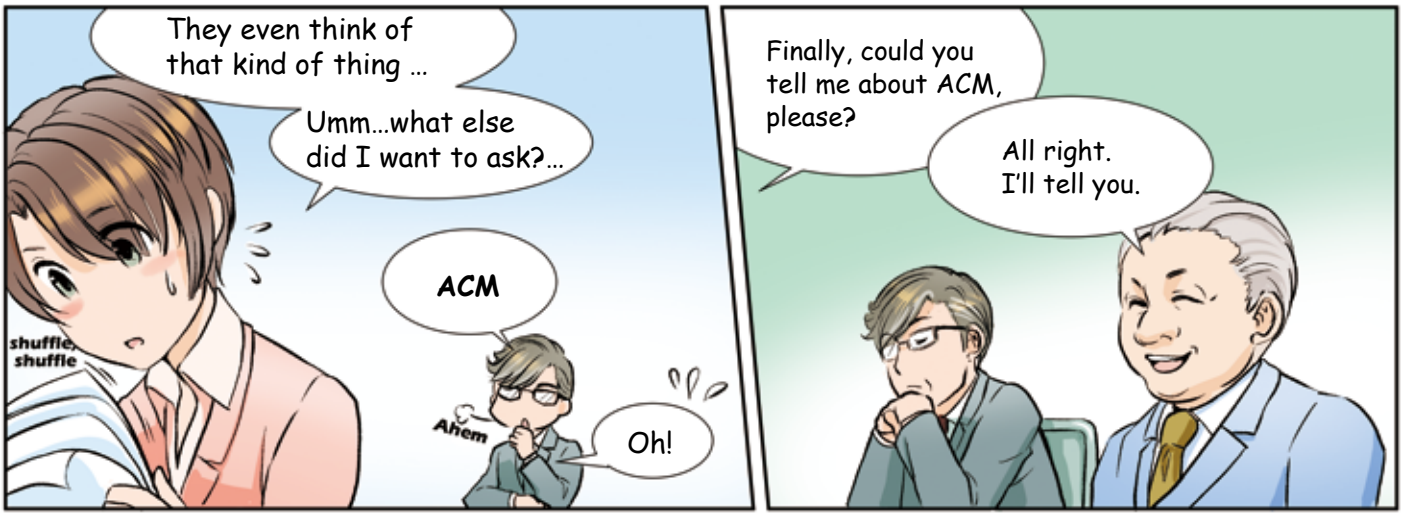
"It breaks properly" ... is a key point?

The engine mount firmly supports the engine at all times, including during sudden starts and stops.

On the other hand, it is designed to secure a crushable zone when the anti-vibration rubber breaks when a hard shock, such as a collision, occurs.

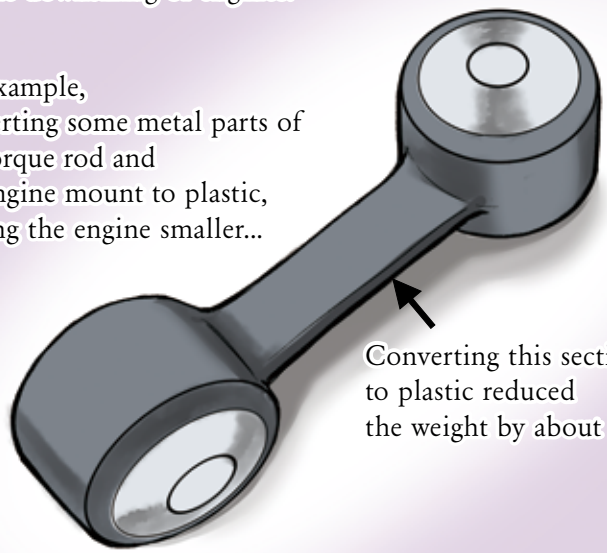
The anti-vibration rubber breaking creates a crushable zone here.

*Crushable zone: a space that functions to absorb energy by crumpling during a collision.

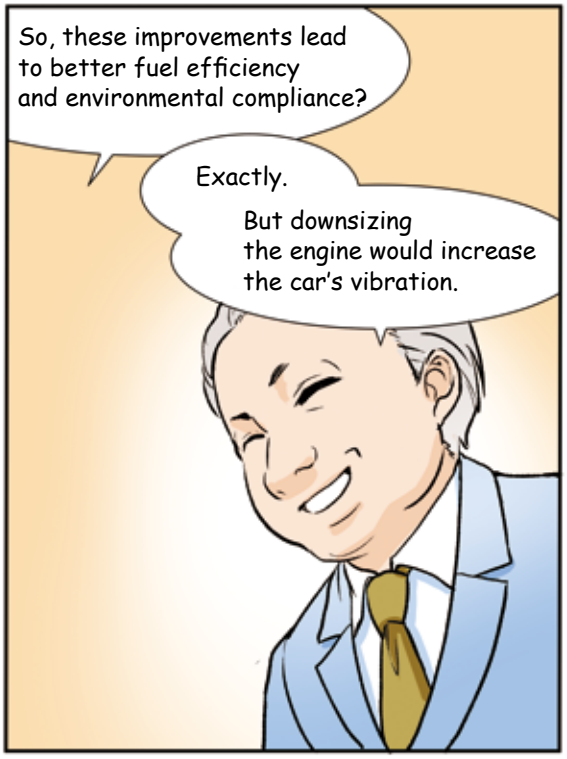


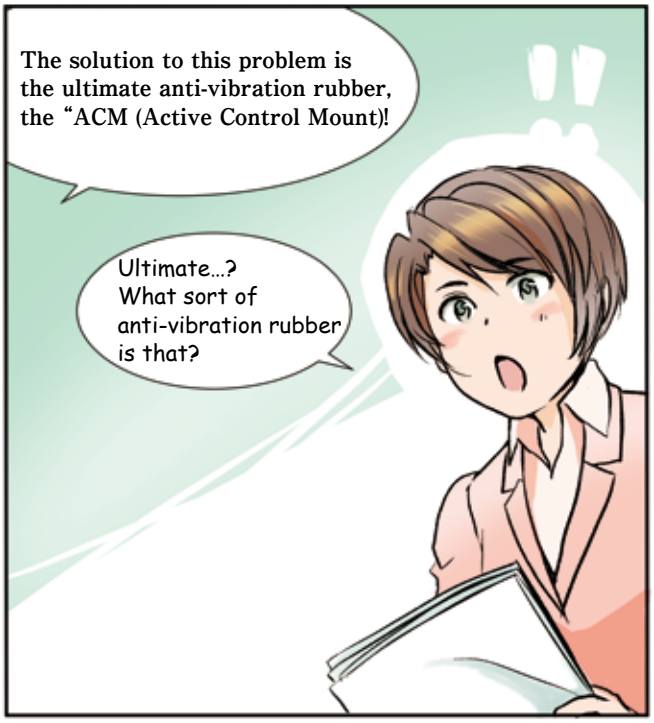
We talked about safety earlier,
and in terms of environmental performance as well,
there has been a lot of progress in reducing the weight of parts
and in the downsizing of engines.

For example,
converting some metal parts of
the torque rod and
the engine mount to plastic,
making the engine smaller...

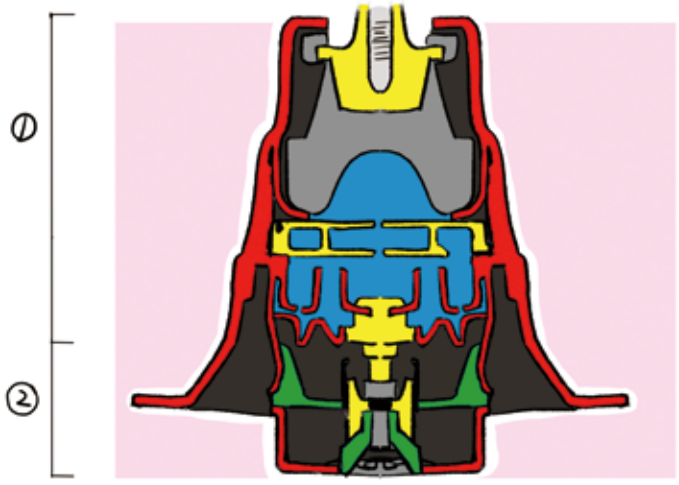


Converting this section
to plastic reduced
the weight by about 35%.



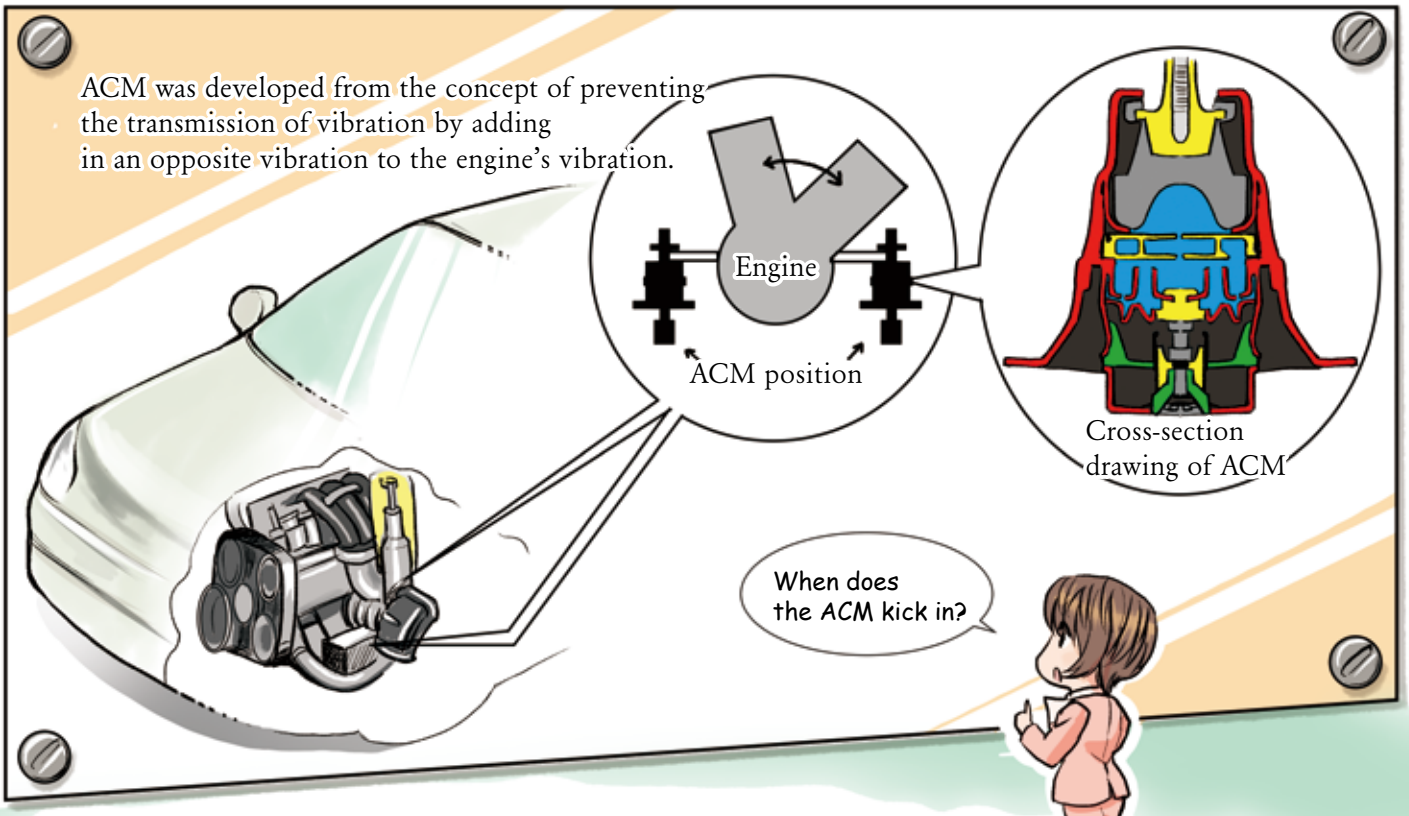


ACM sends an electrical signal corresponding
with the engine's revolutions,
and by synchronizing the actuator ([2]) installed
in the bottom of the Adaptive Hydraulic Engine Mount ([1]),
cancels out the vibrations from the engine.



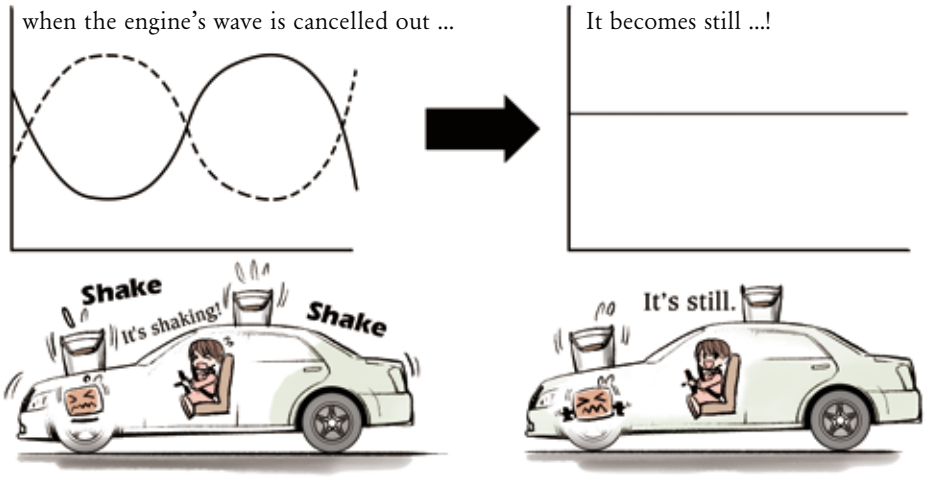
That's why ACM is well received by car manufacturers
as a device that achieves both fuel efficiency
improvement and vibration control.

ACM was developed from the concept of preventing the transmission of vibration by adding in an opposite vibration to the engine's vibration.



The ACM is pre-programmed depending on the type of vehicle, so it works immediately in response to the vehicle's situation.

The drawing on the left ([1]) shows that, without ACM, the driver's seat vibrates when the engine vibrates.

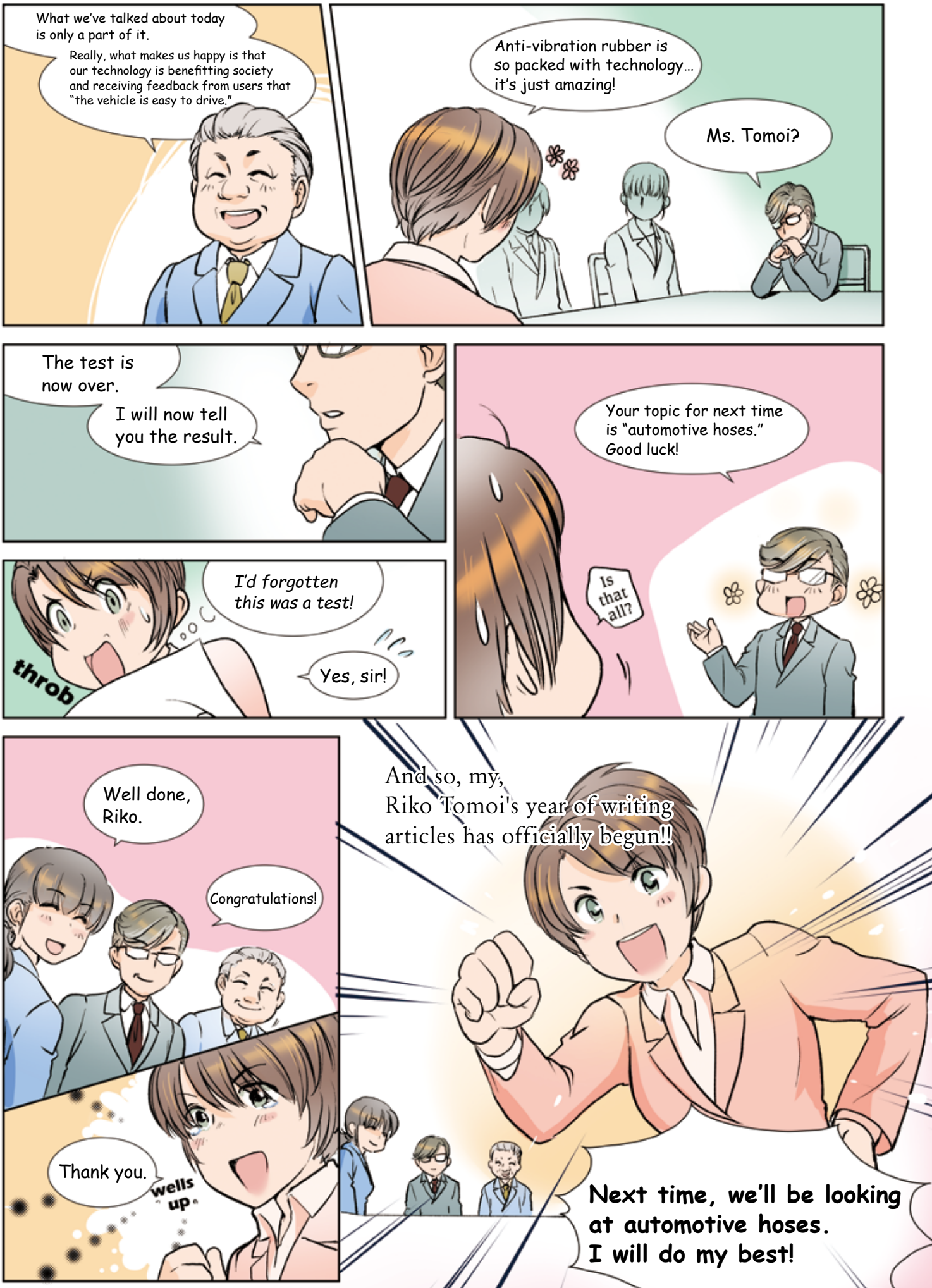


[1] Without ACM

[2] With ACM

In the drawing on the right ([2]), the ACM cancels out the vibration so the vibrations aren't transmitted to the driver's seat.

The driver's seat is still, even when the engine is running.


What we've talked about today is only a part of it.
Really, what makes us happy is that our technology is benefitting society and receiving feedback from users that "the vehicle is easy to drive."
Anti-vibration rubber is so packed with technology… it's just amazing!
Ms. Tomoi?
The test is now over.
I will now tell you the result.
Your topic for next time is "automotive hoses." Good luck!
Is that all?
I'd forgotten this was a test!
throb
Yes, sir!
Well done, Riko.
Congratulations!
Thank you.
wells up
And so, my, Riko Tomoi's year of writing articles has officially begun!!
Next time, we'll be looking at automotive hoses. I will do my best!