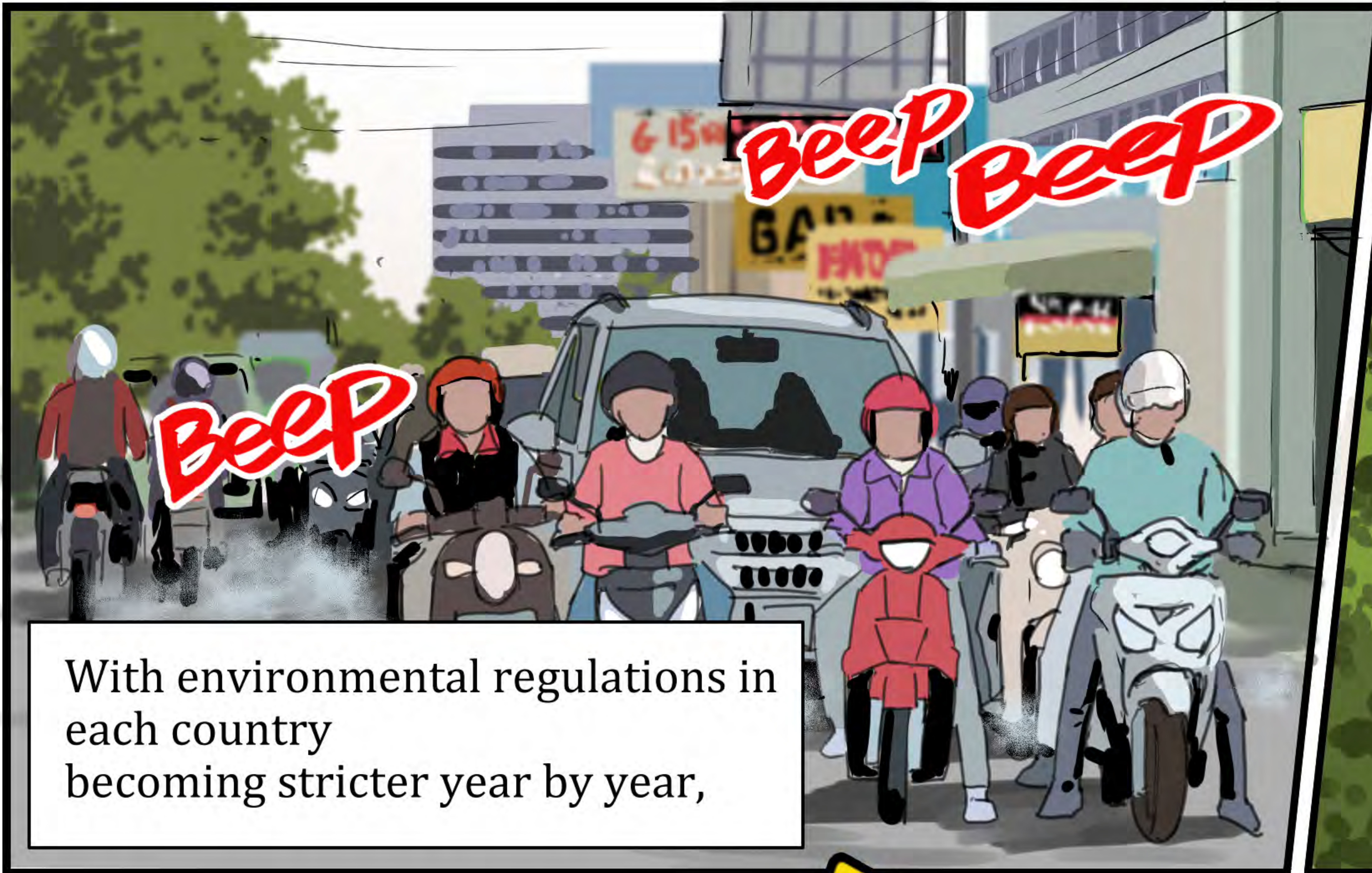


ESTT development story



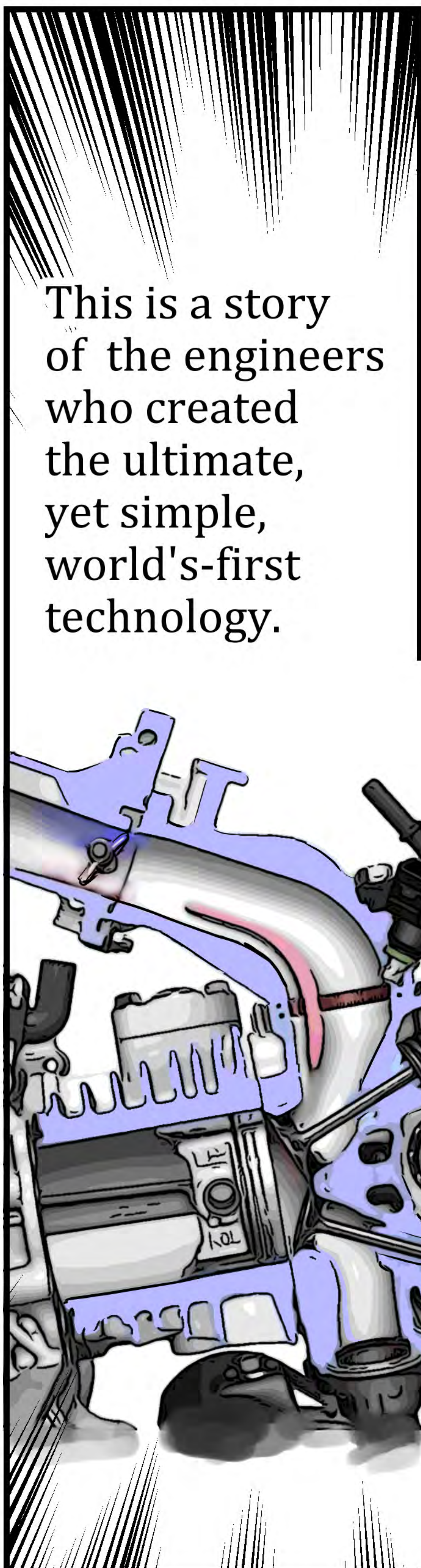


India, 2019

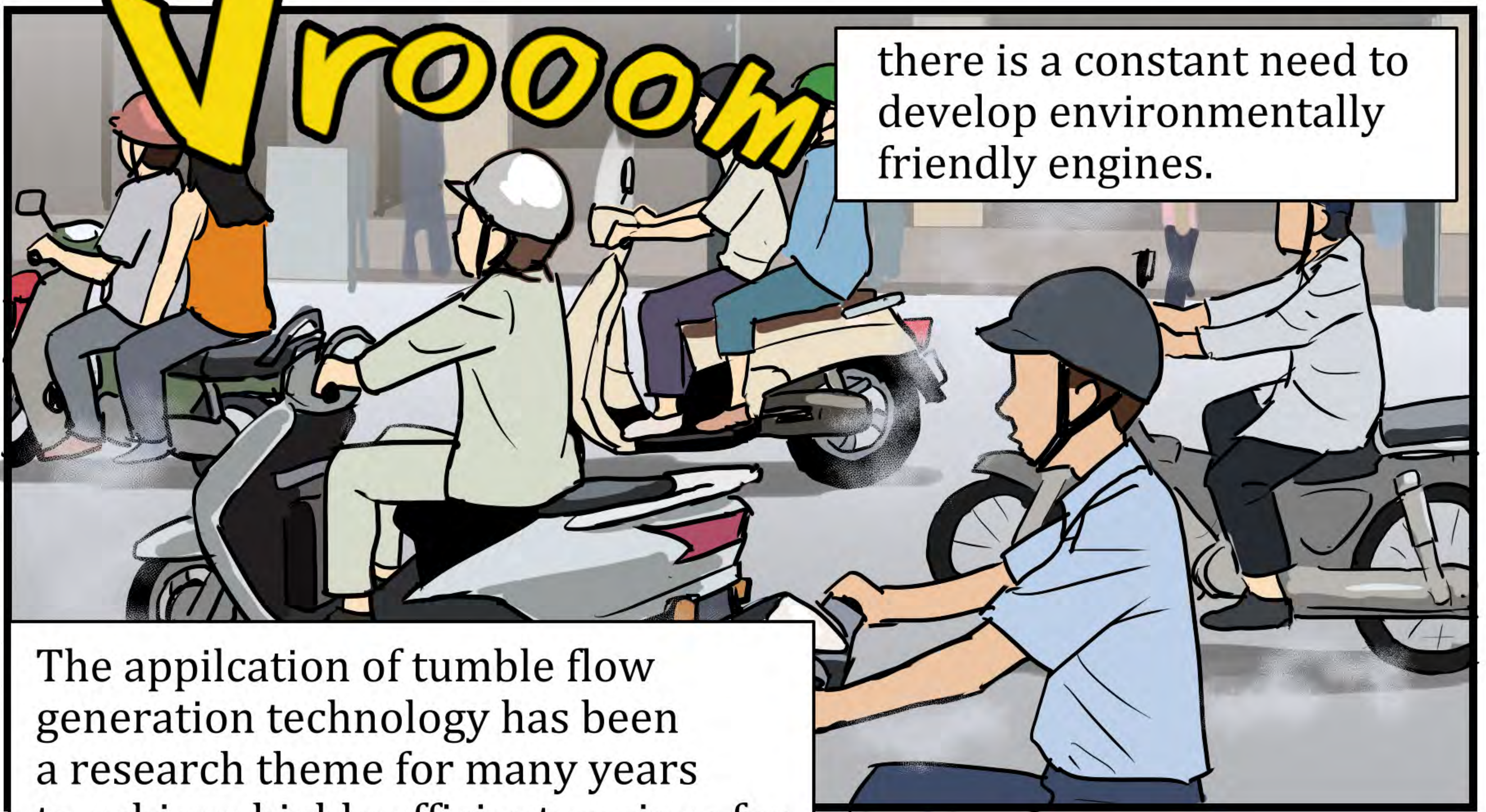
Always Use
Helmet

With environmental regulations in each country becoming stricter year by year,

there is a constant need to develop environmentally friendly engines.



This is a story of the engineers who created the ultimate, yet simple, world's-first technology.

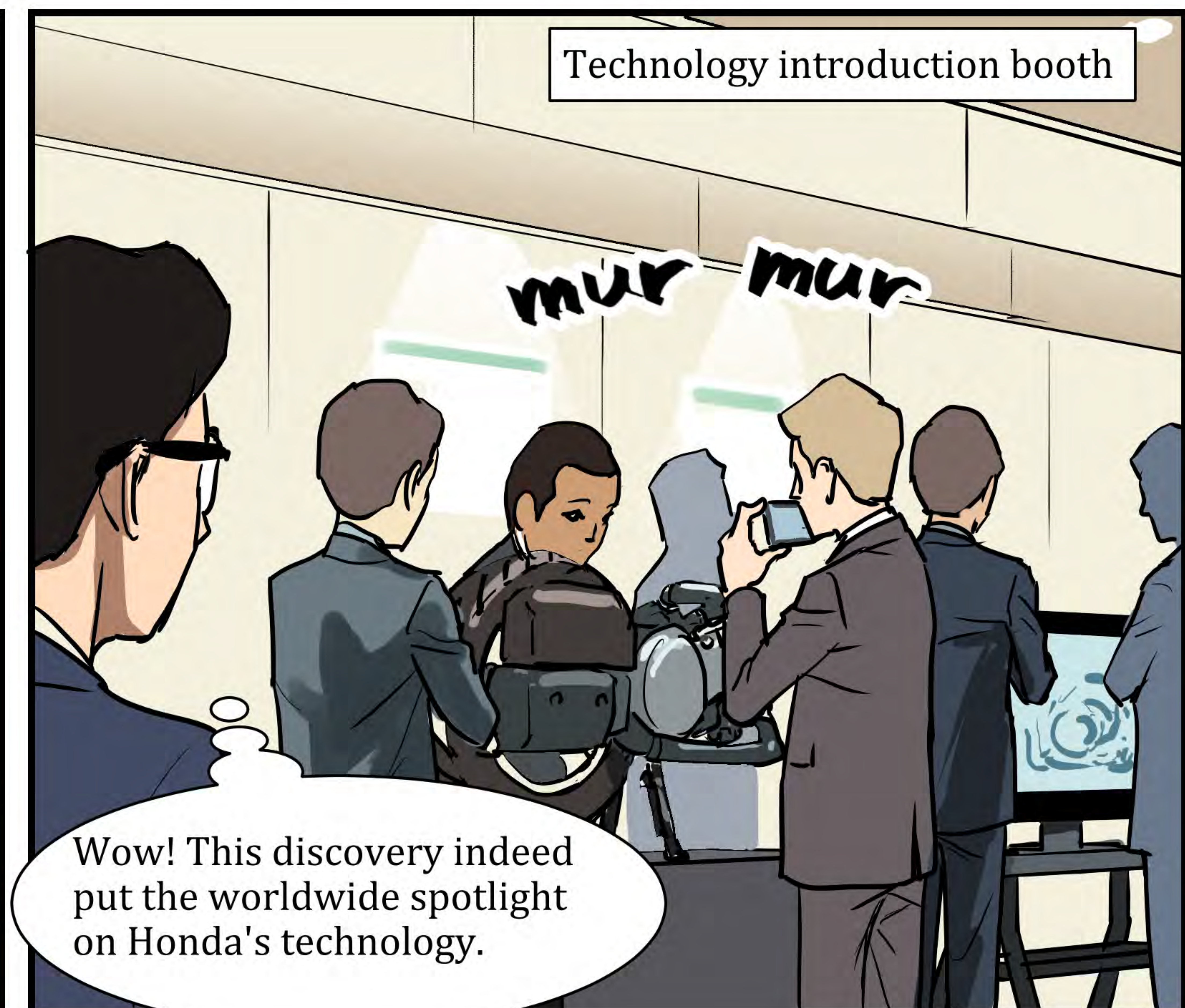
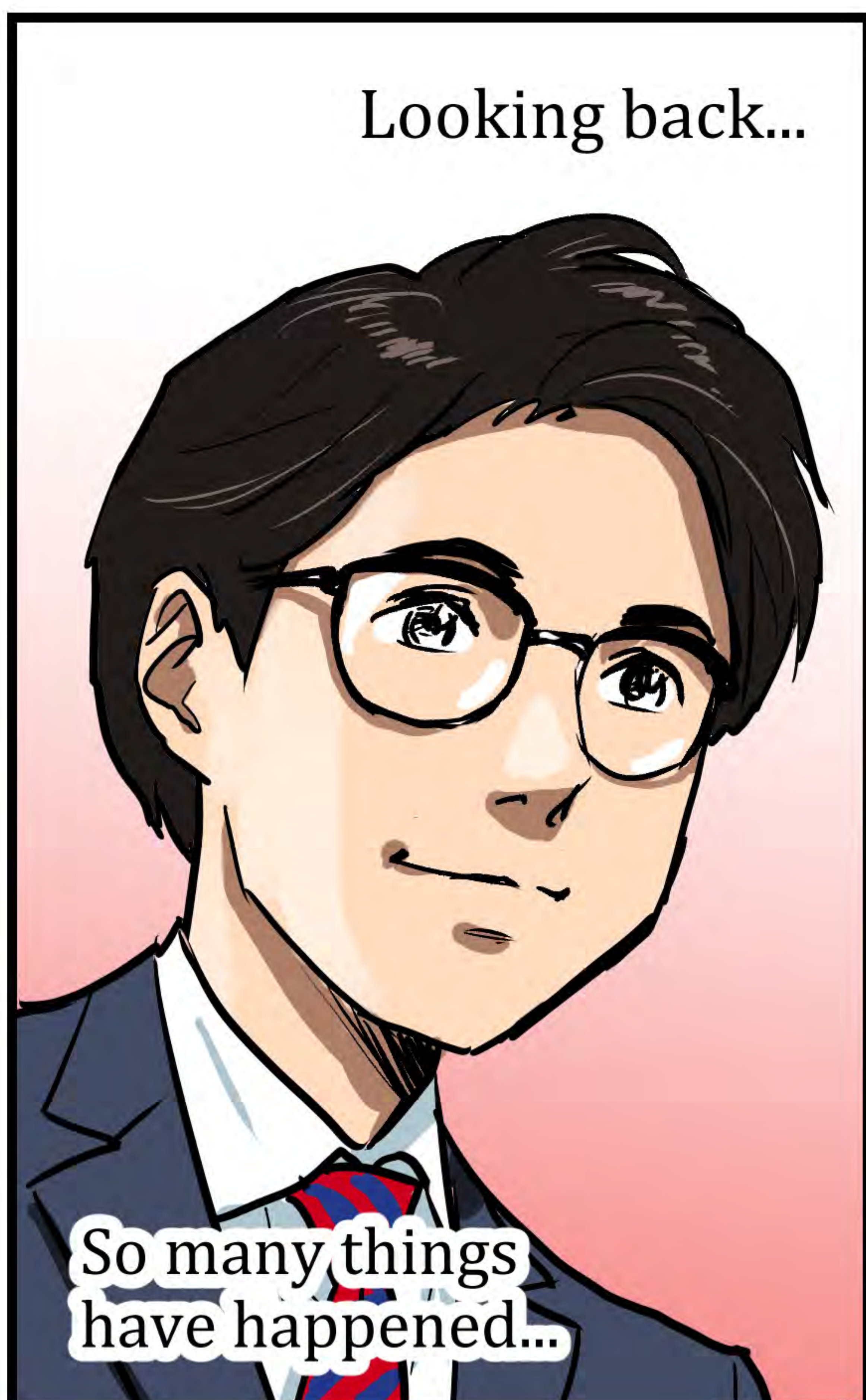


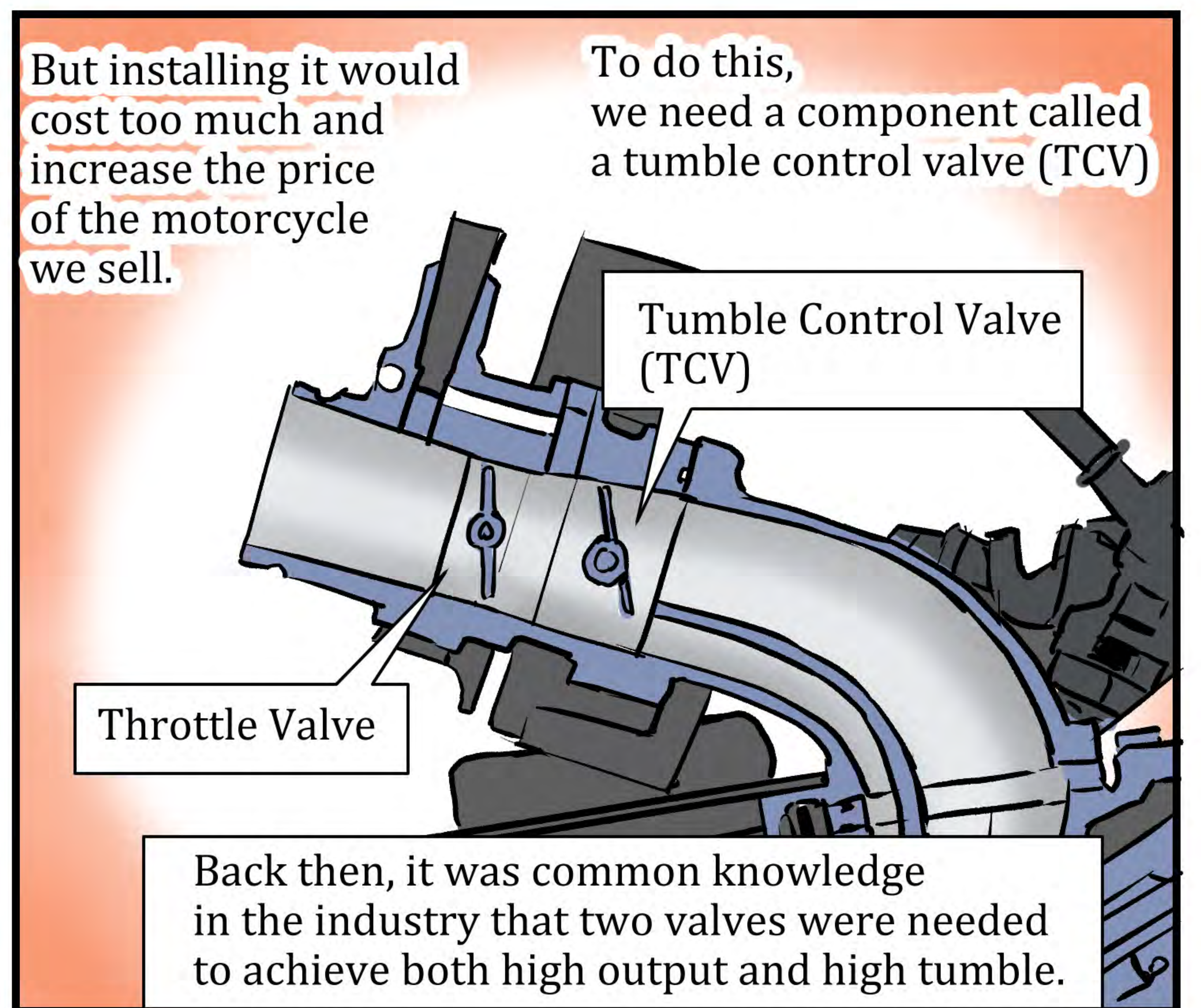
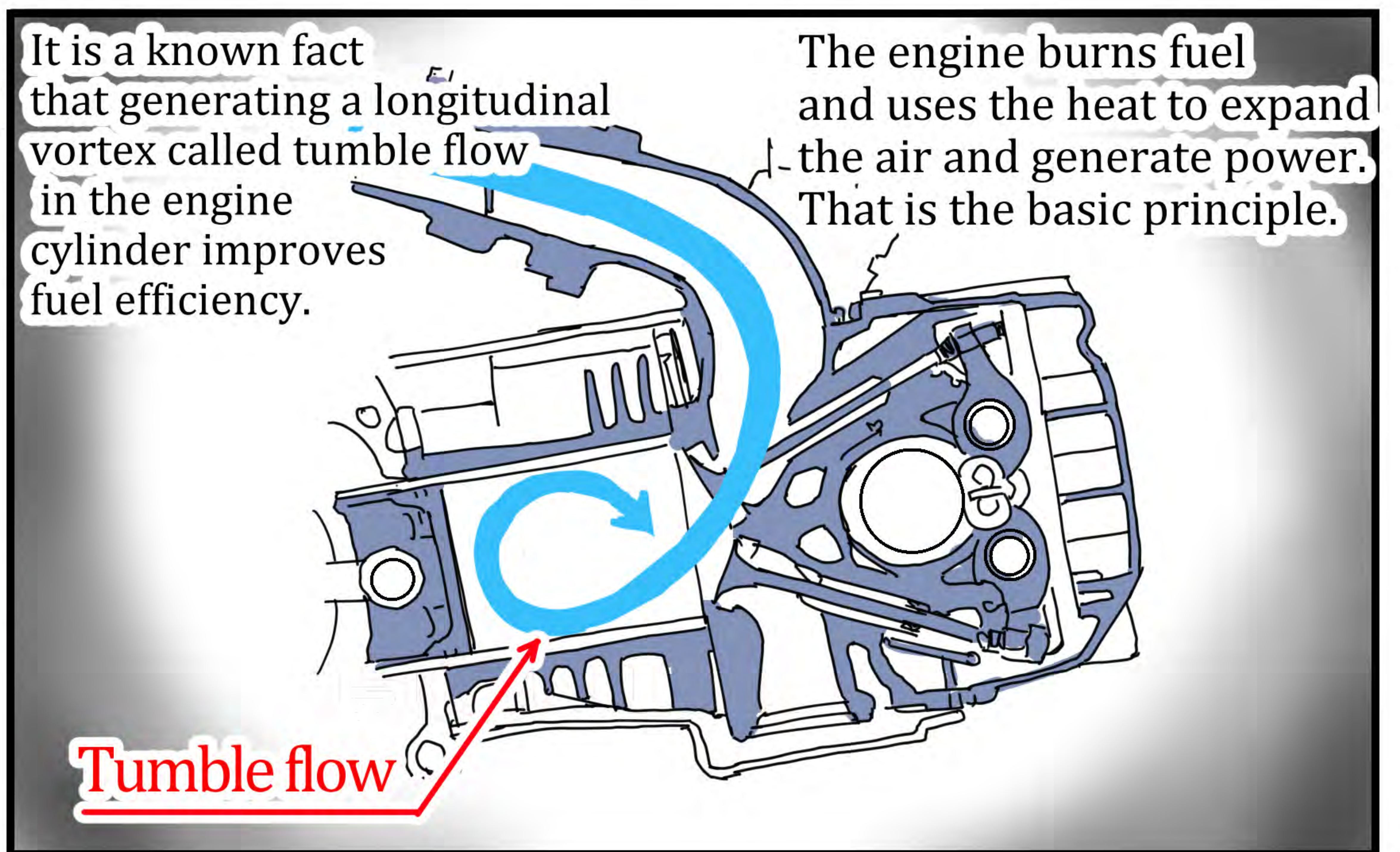
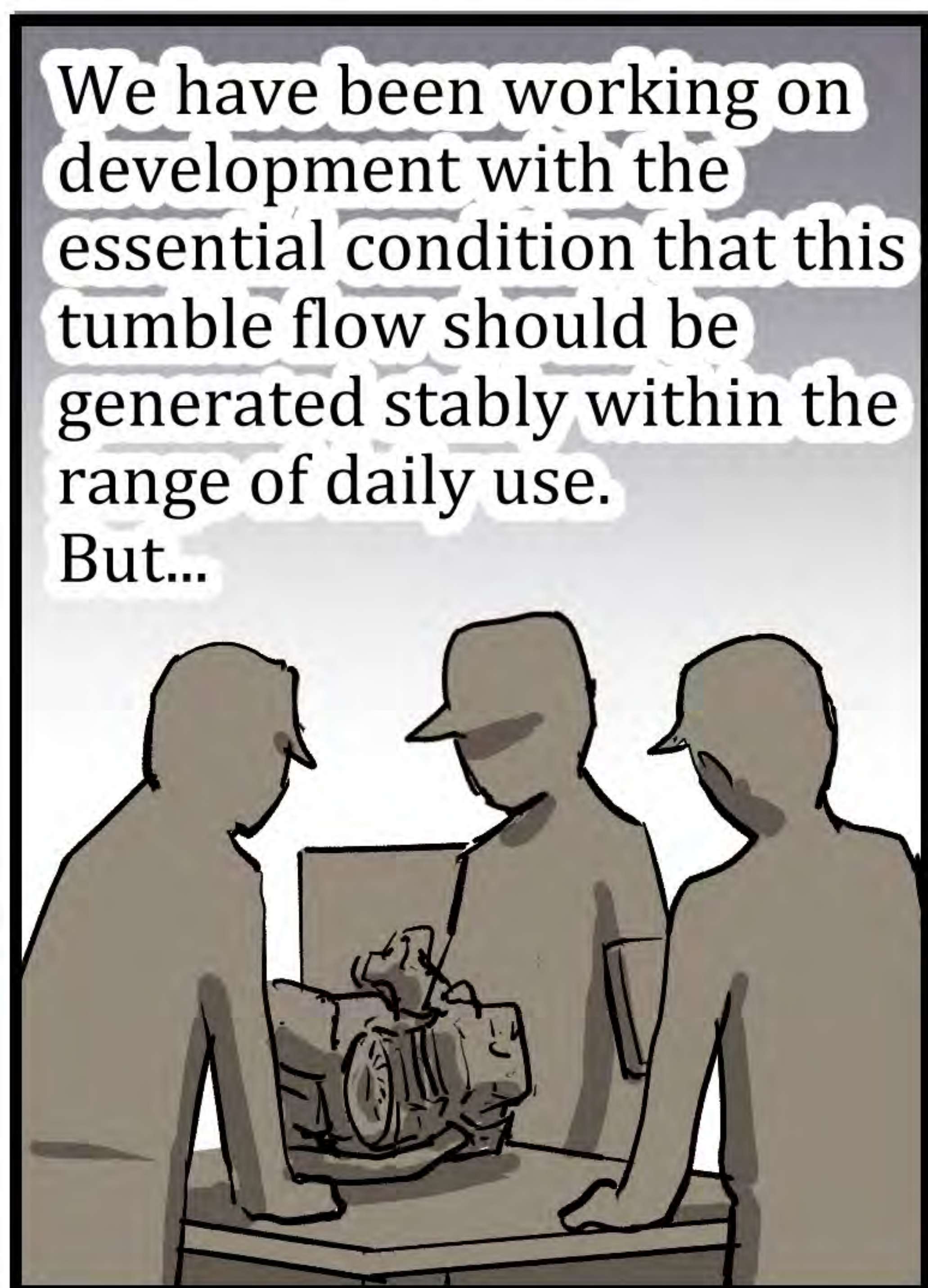
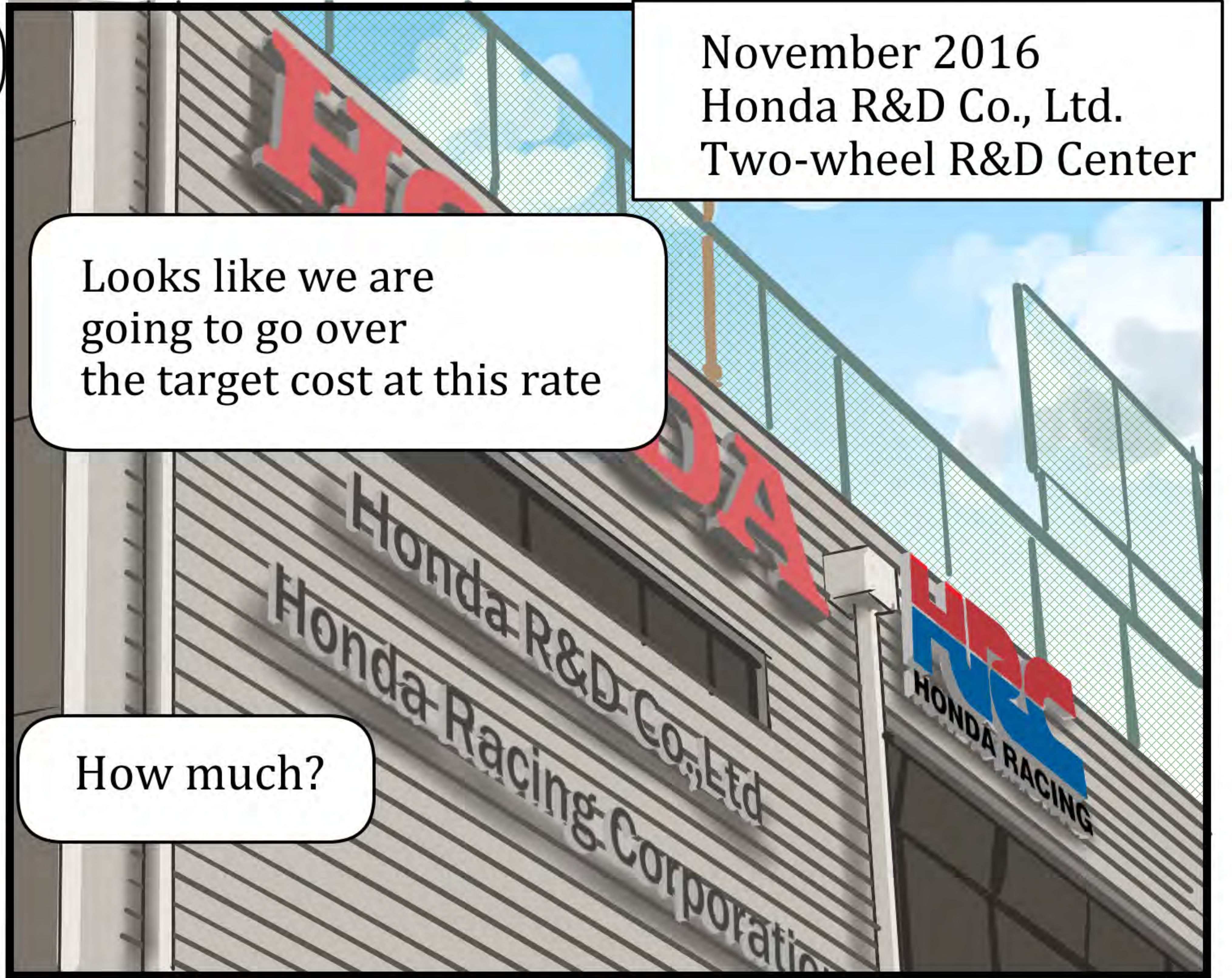
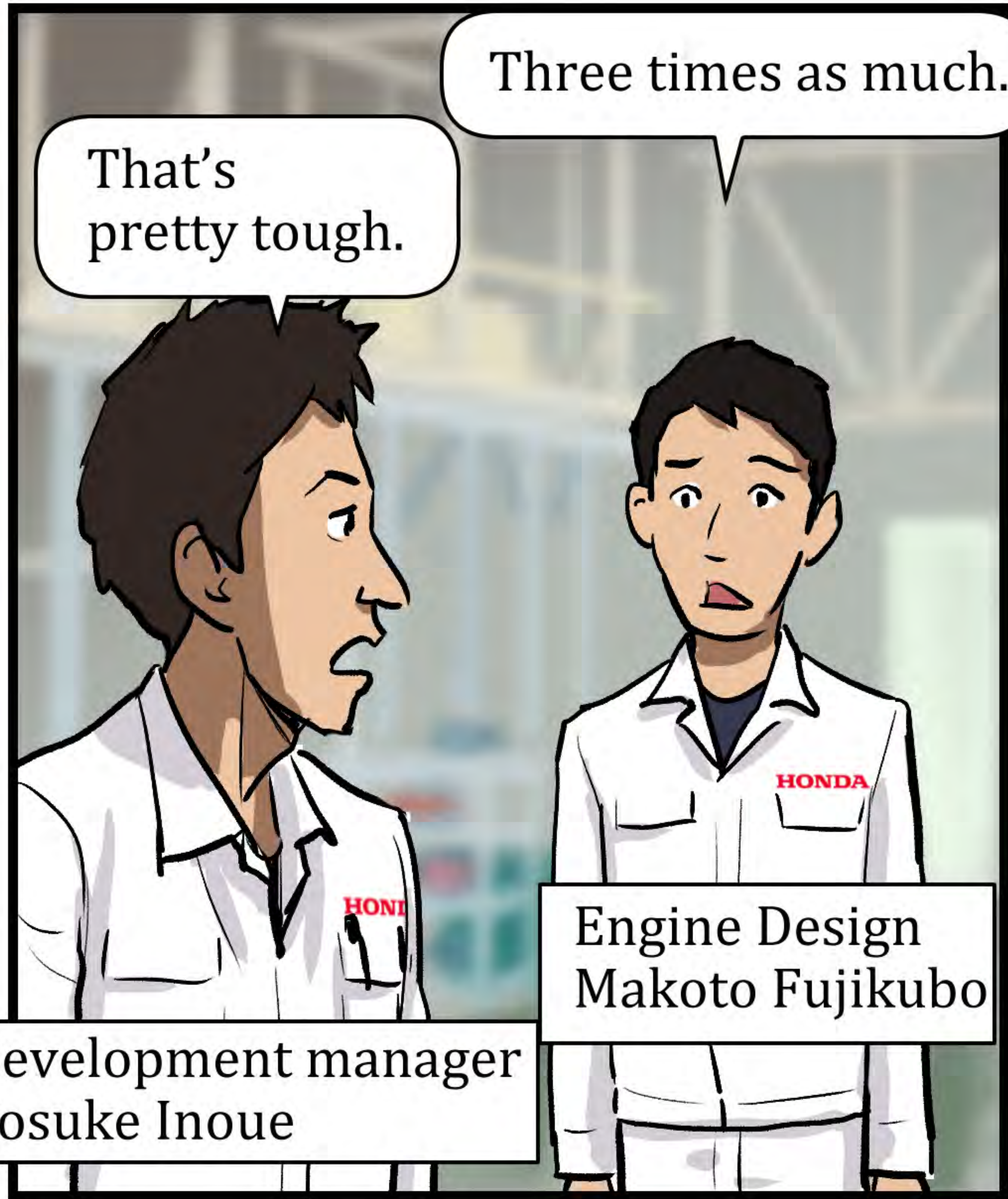
The application of tumble flow generation technology has been a research theme for many years to achieve highly efficient engines for motorcycles.

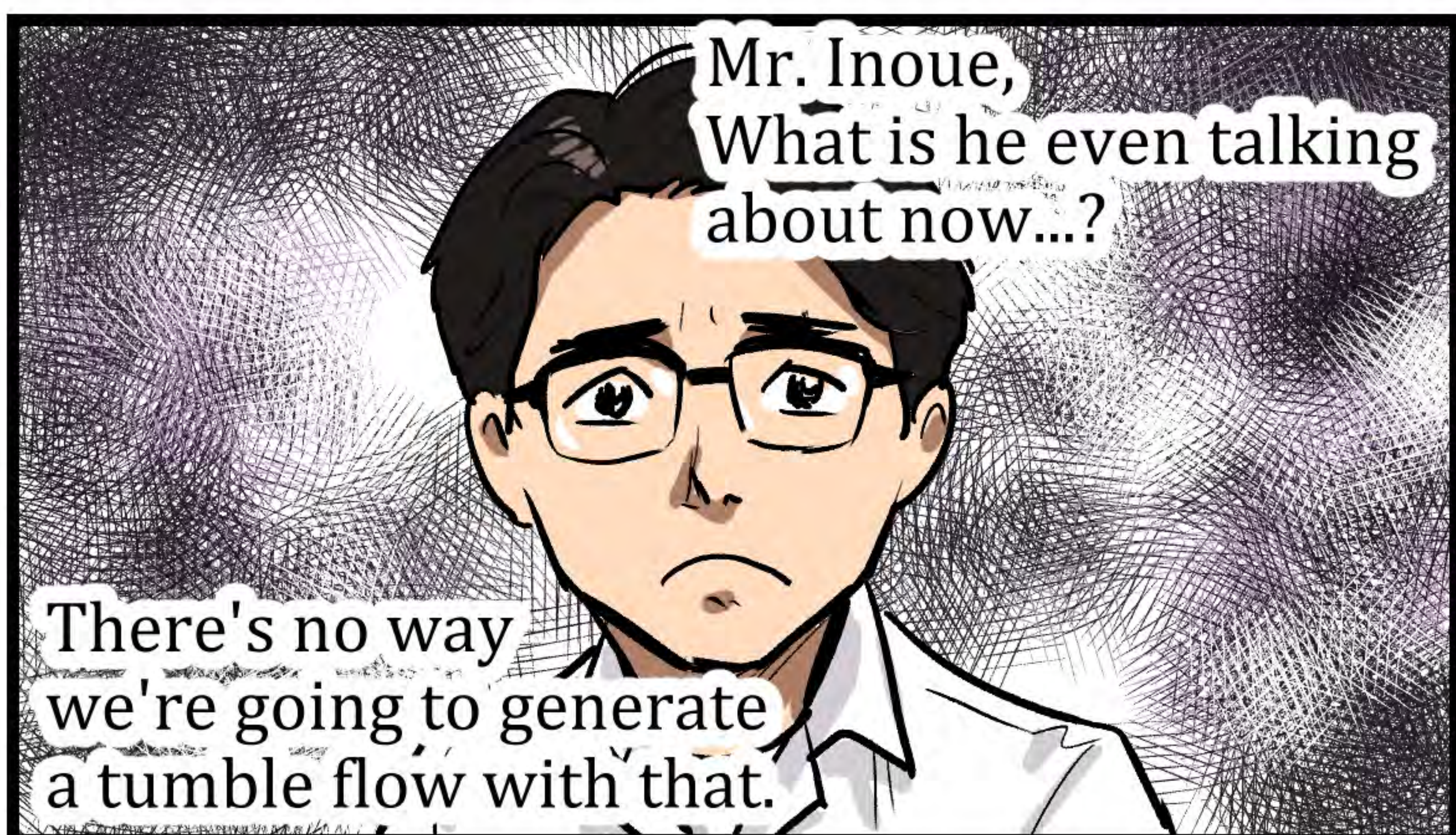
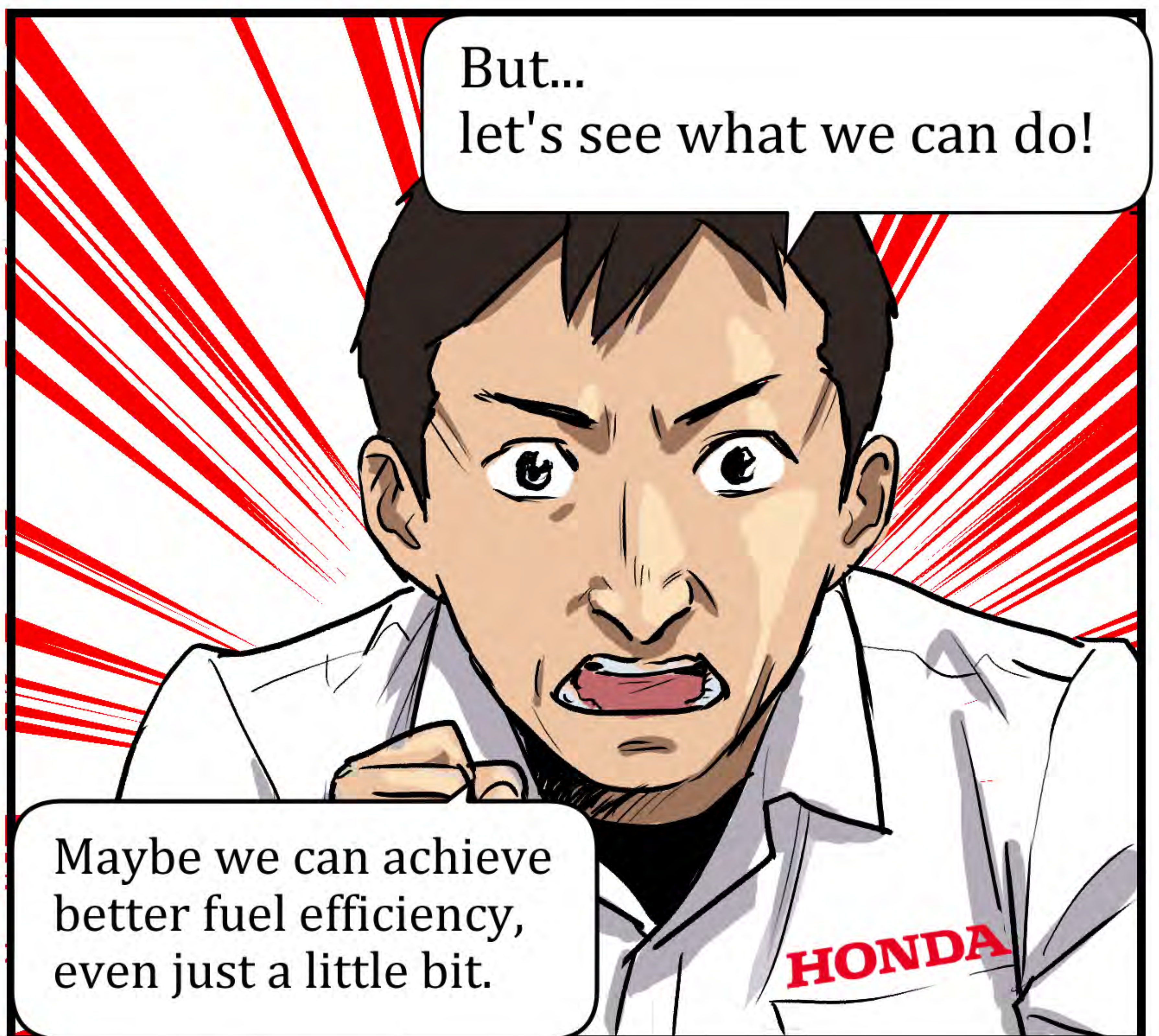
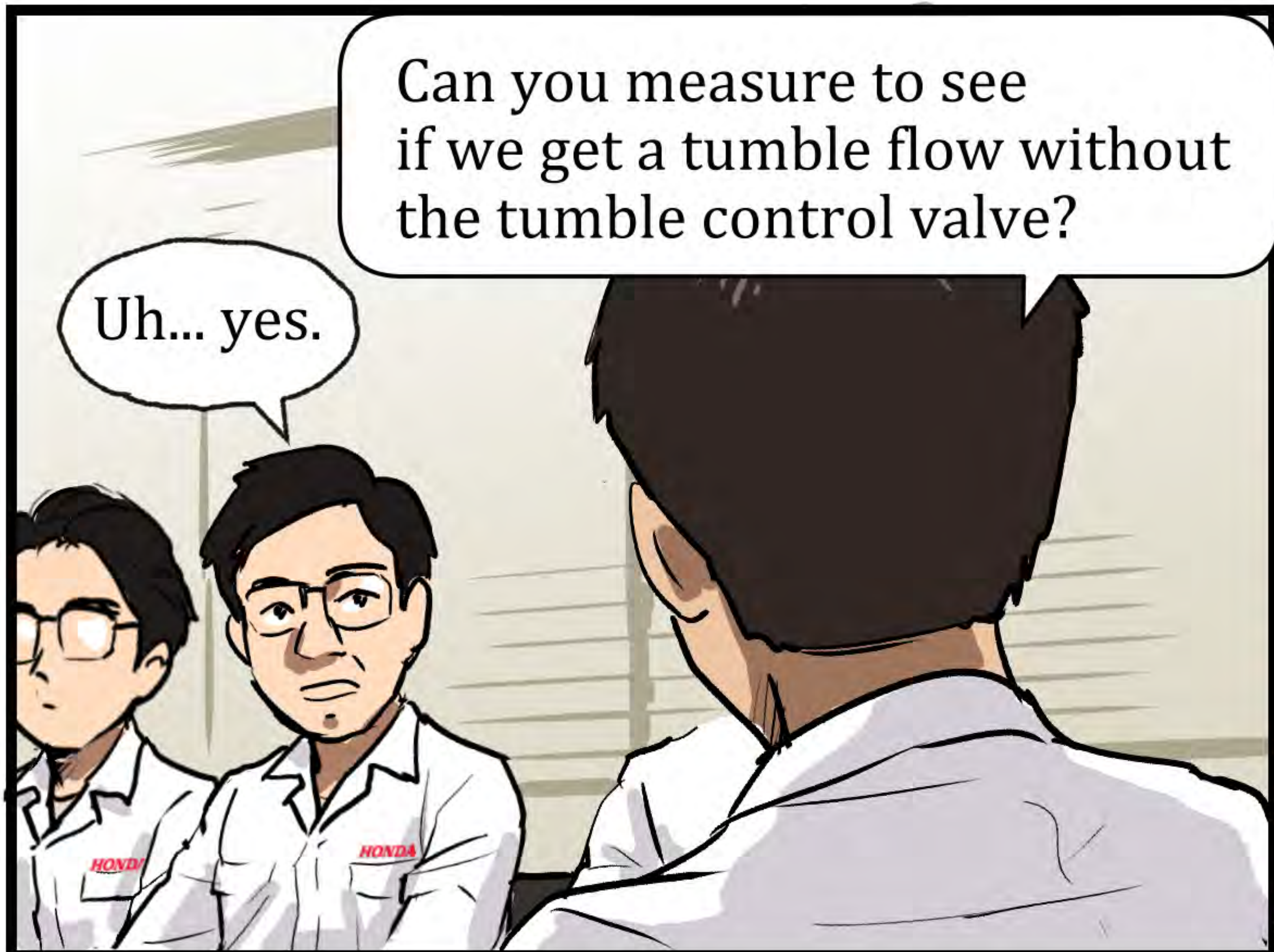
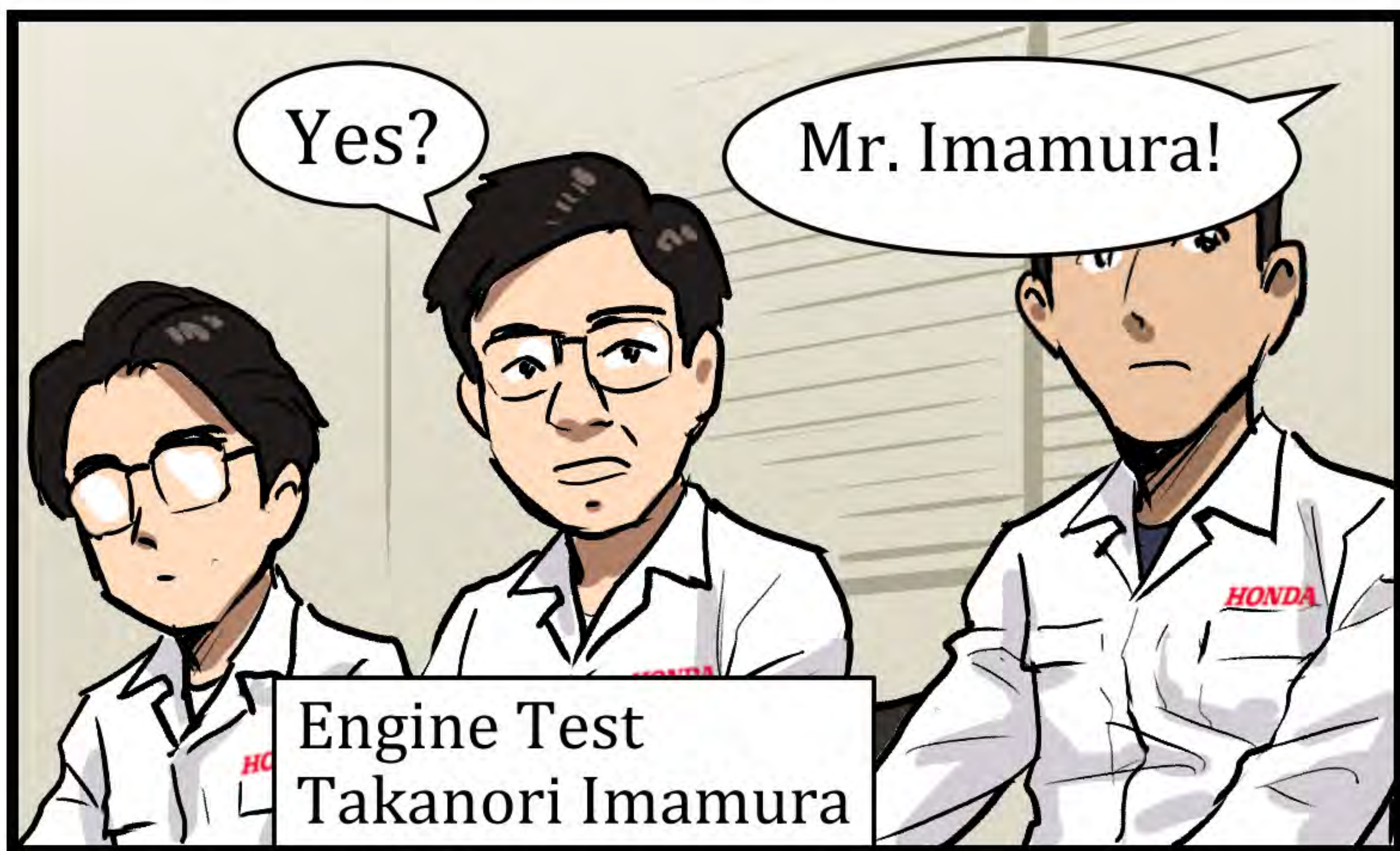
ACTIVA 125, launched in India in 2019 has—

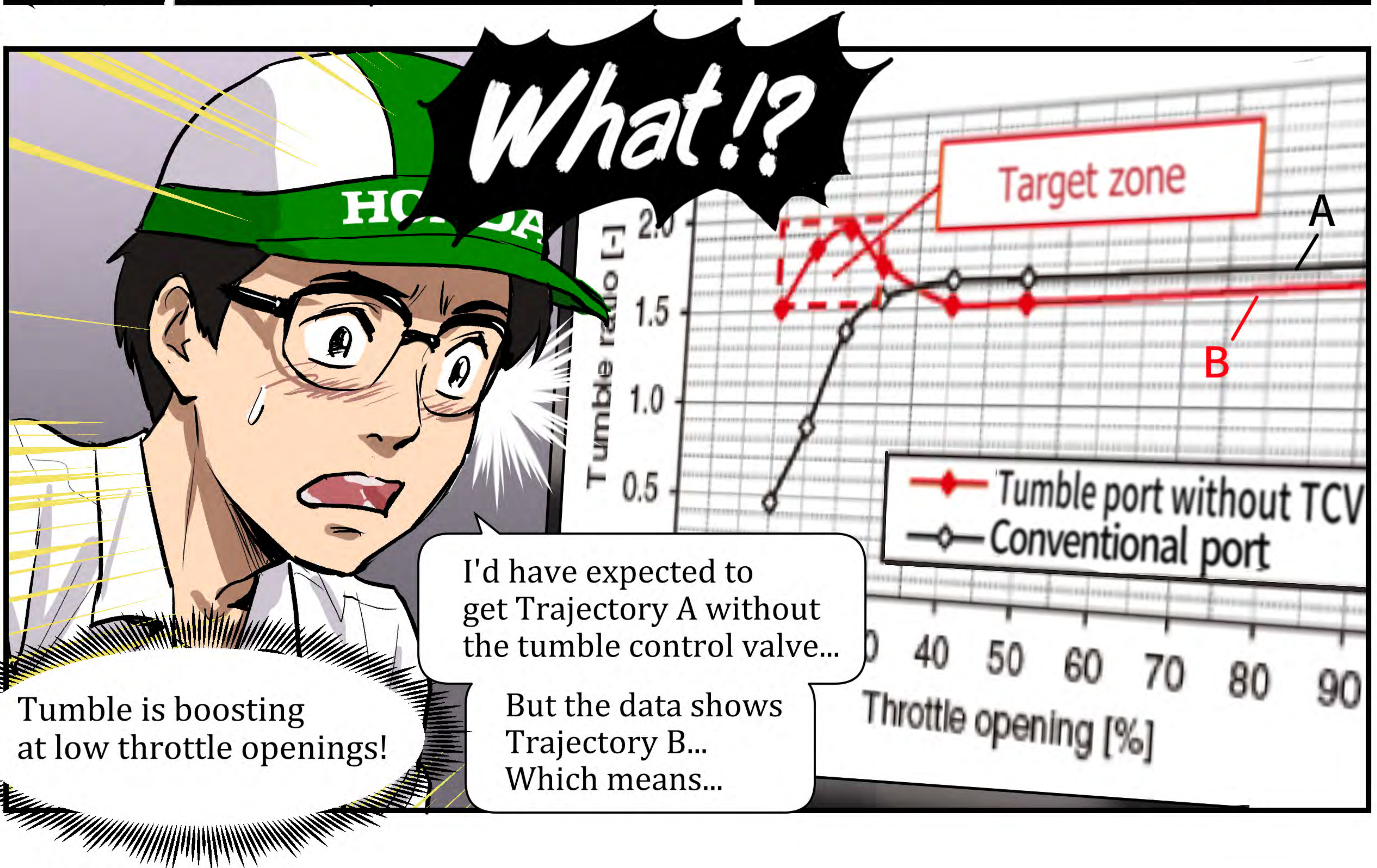
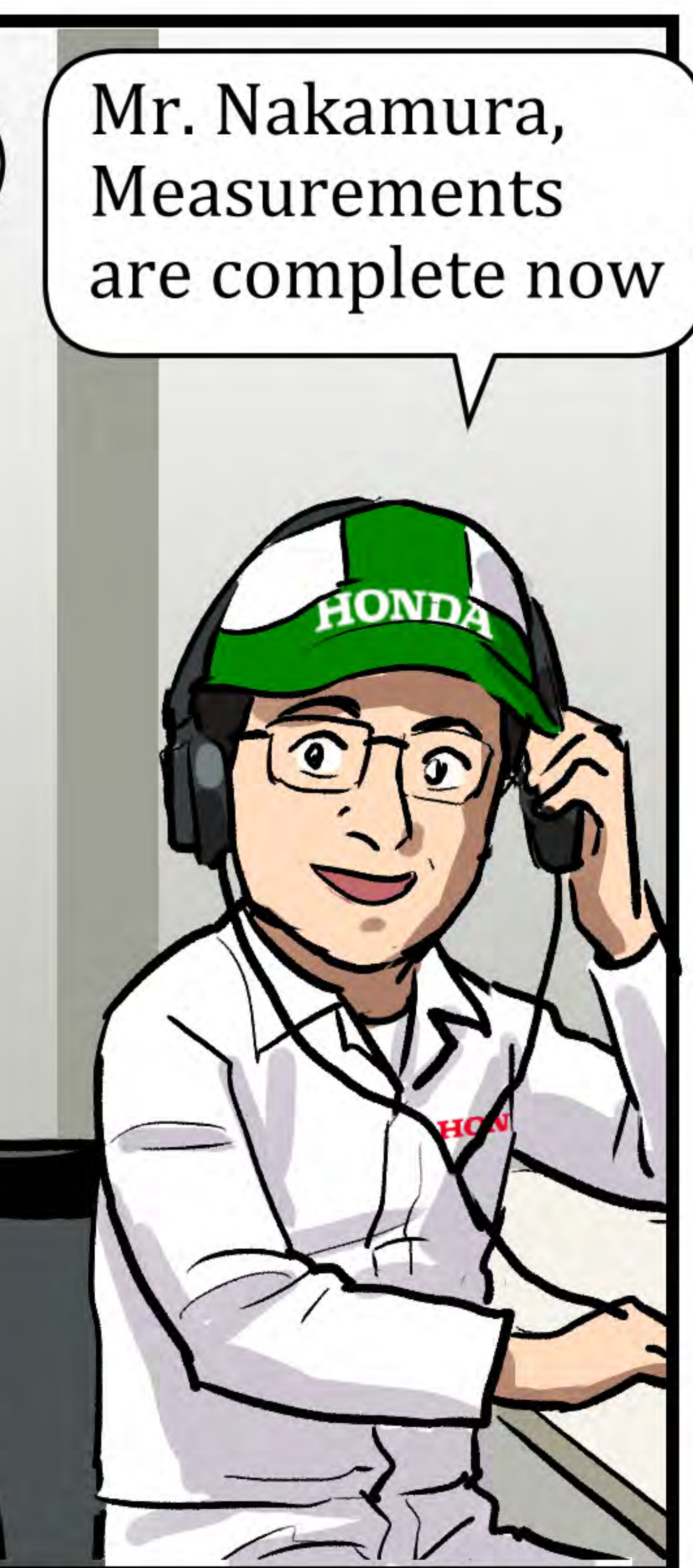
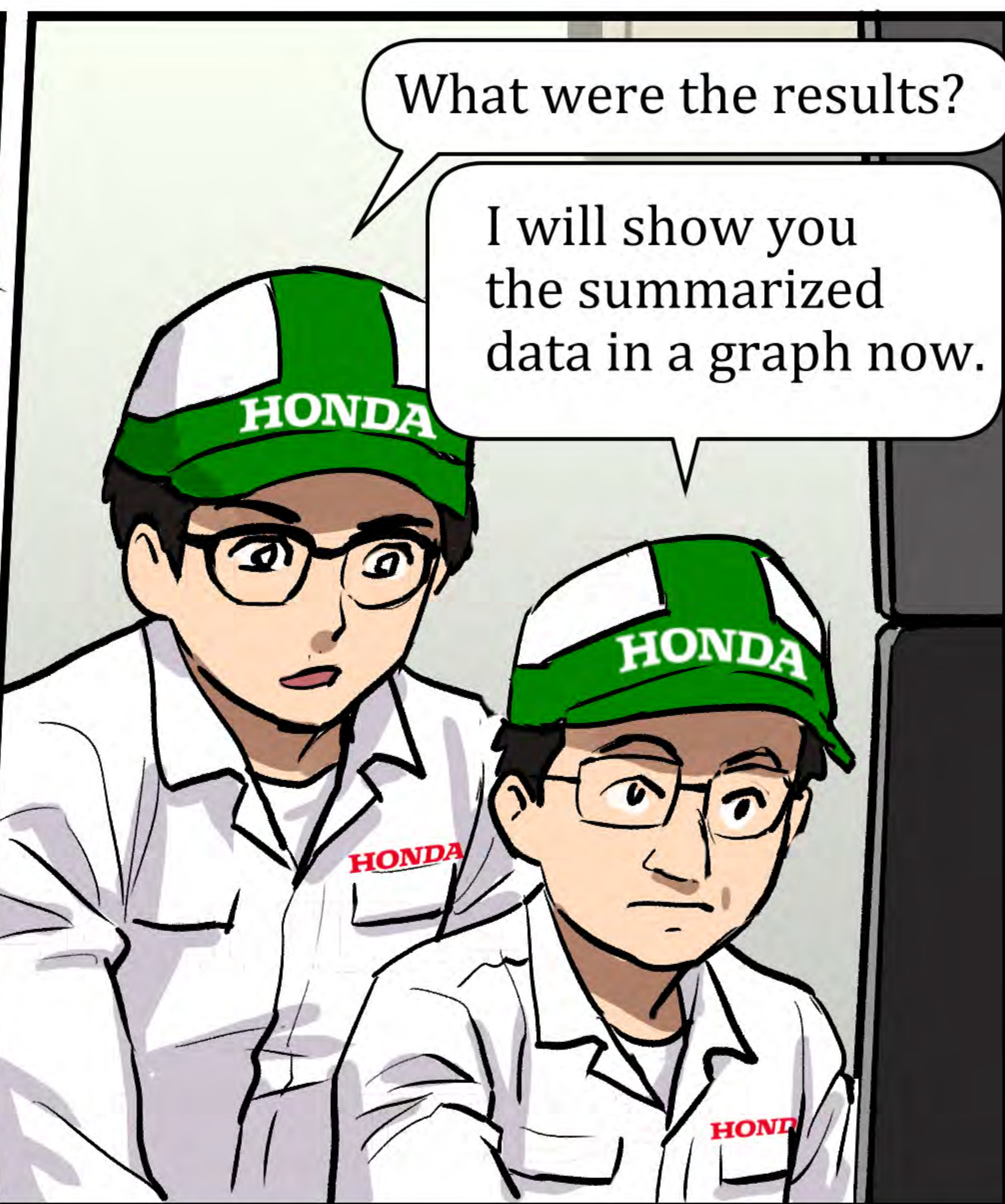
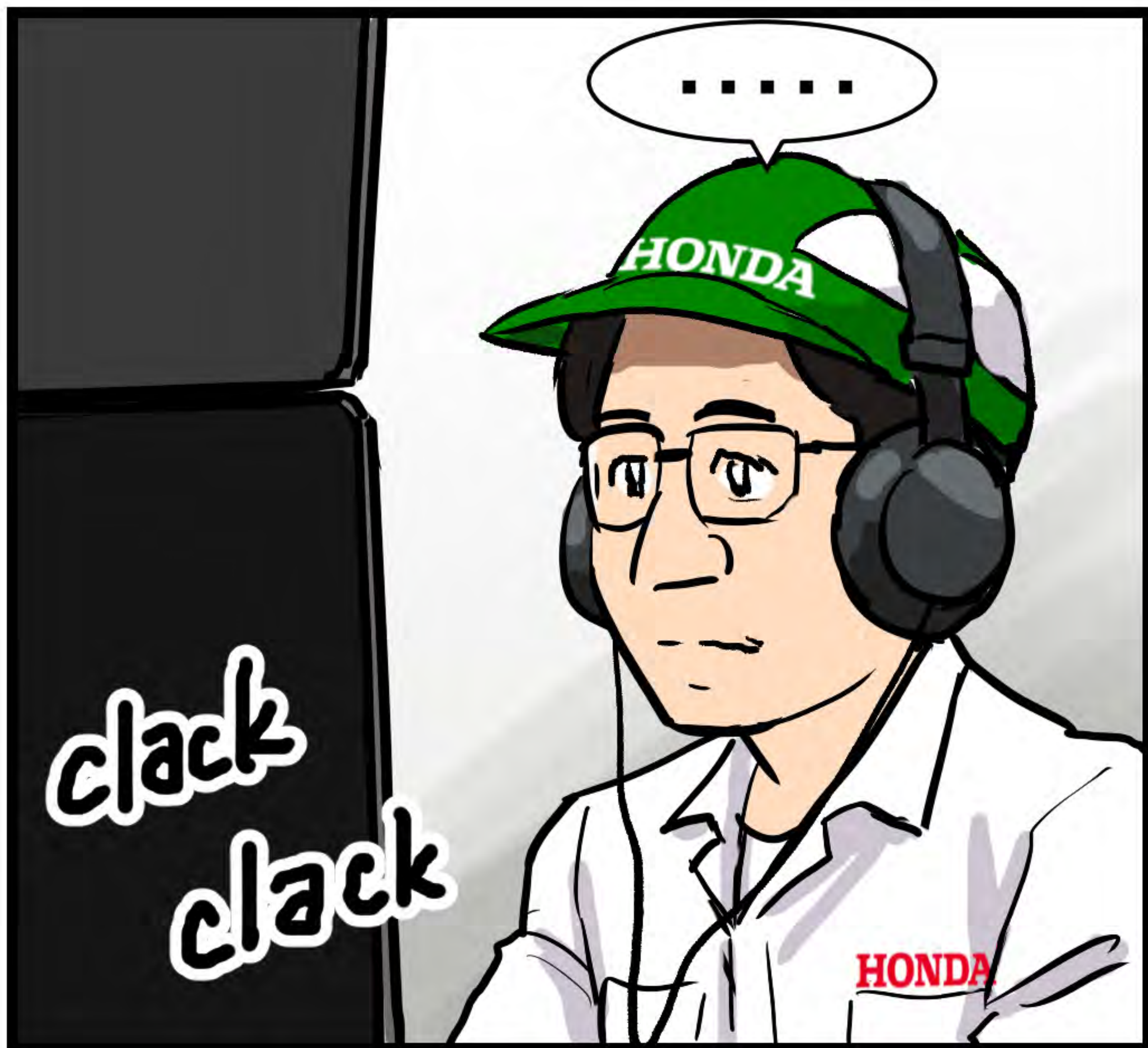


“eSTT”, the world's first tumble system installed in the engine.



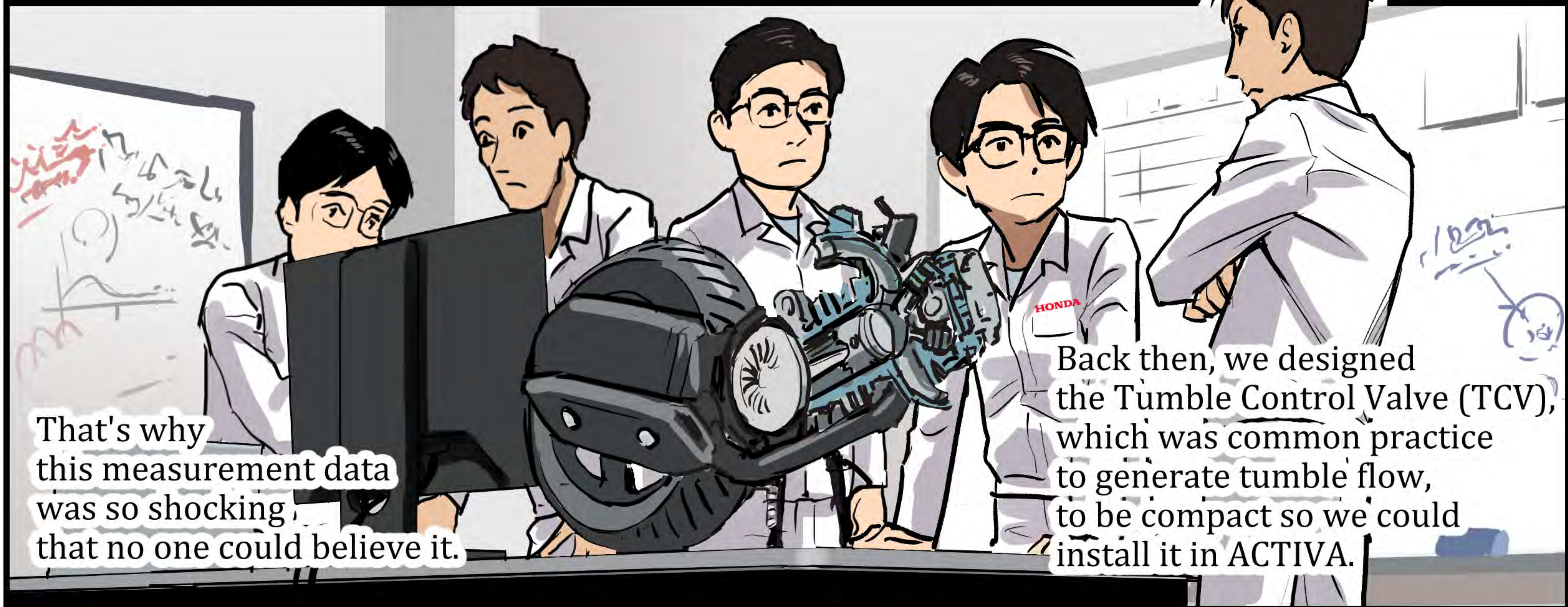






It's almost the same strength as having the tumble control valve on...

Hmmm...
What does this mean?



That's why this measurement data was so shocking, that no one could believe it.

Back then, we designed the Tumble Control Valve (TCV), which was common practice to generate tumble flow, to be compact so we could install it in ACTIVA.



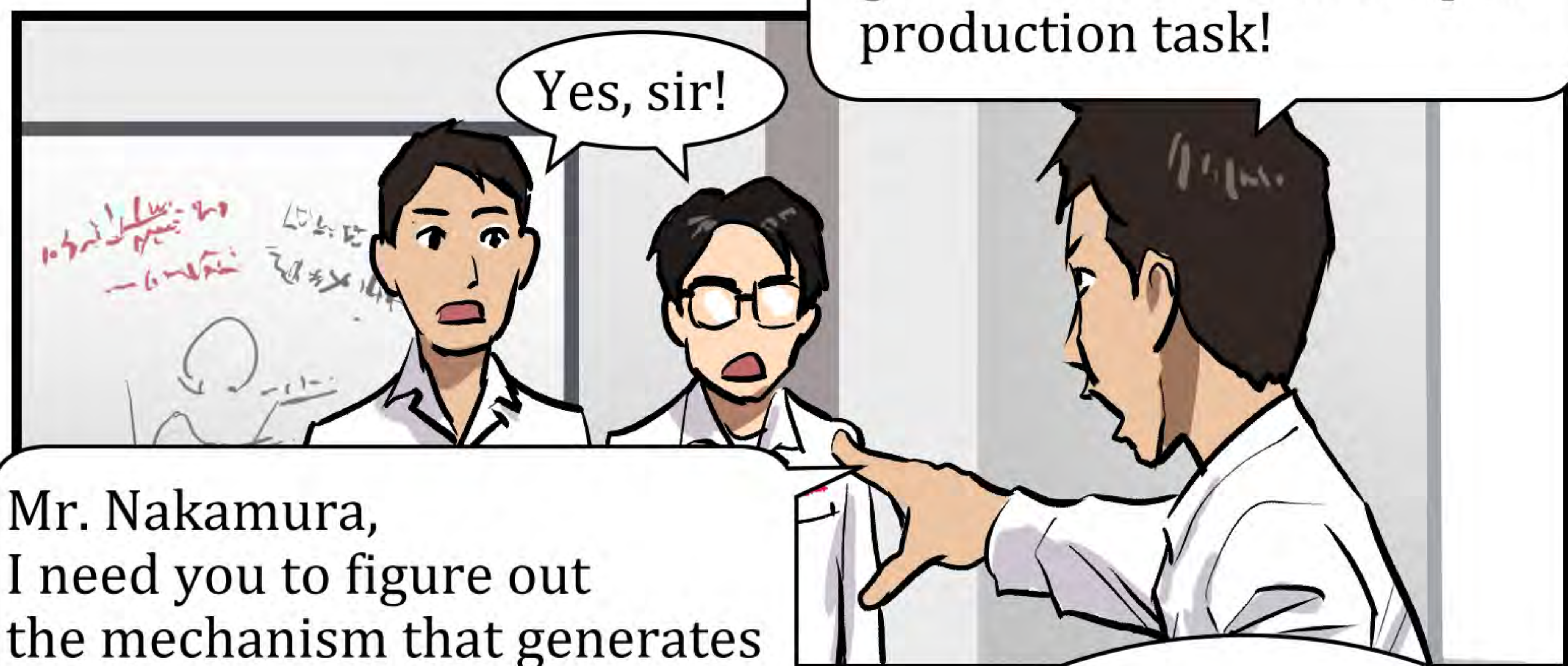
We only have three months left, but... let's carry on with the development!

If we can figure out and control this phenomenon, we may be able to perfect our technology without a device!

Mr. Fujikubo, get on with the tumble port production task!



Yes, sir!



Mr. Nakamura, I need you to figure out the mechanism that generates the tumble flow!



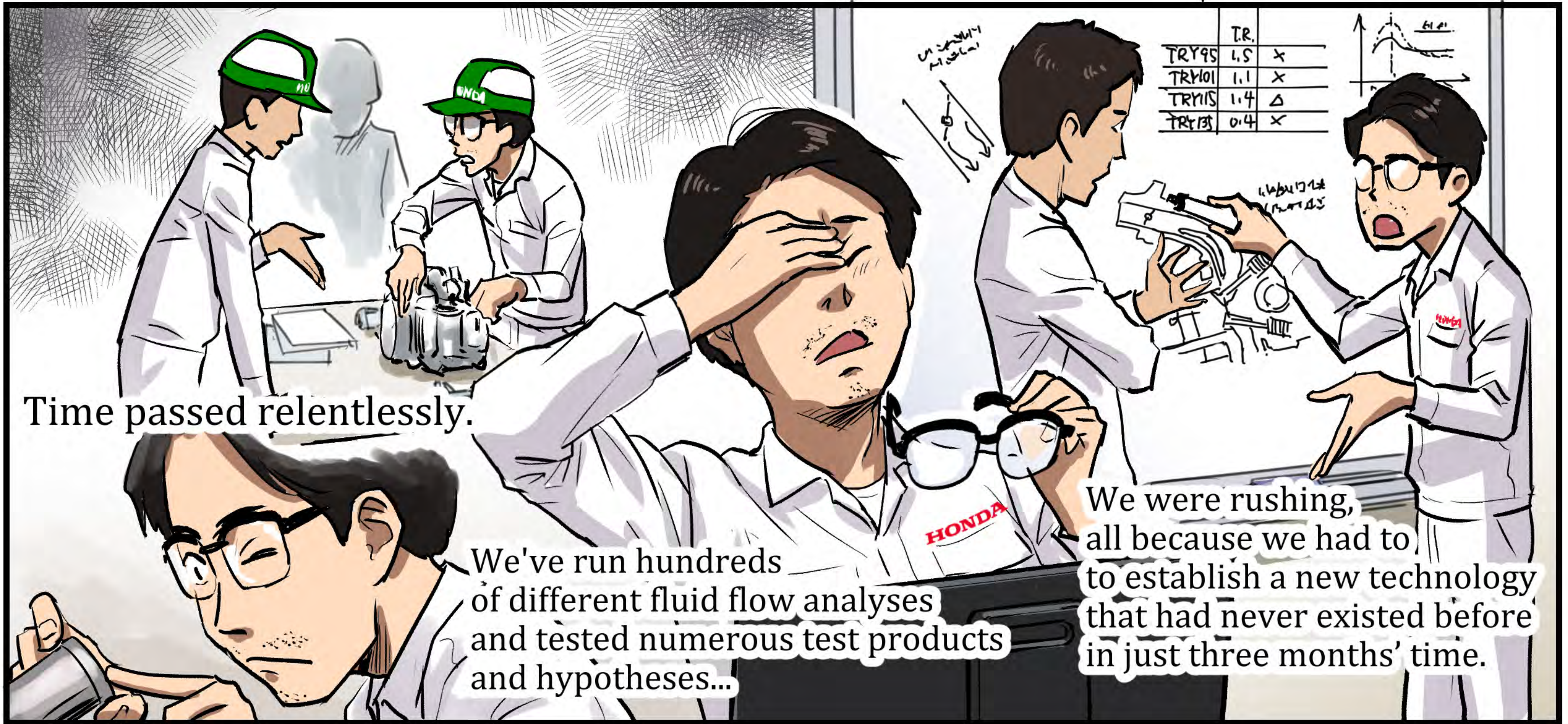
Why... How did that happen?

Rumple

Ughhh...

Why? Why would there be a tumble flow in that condition...

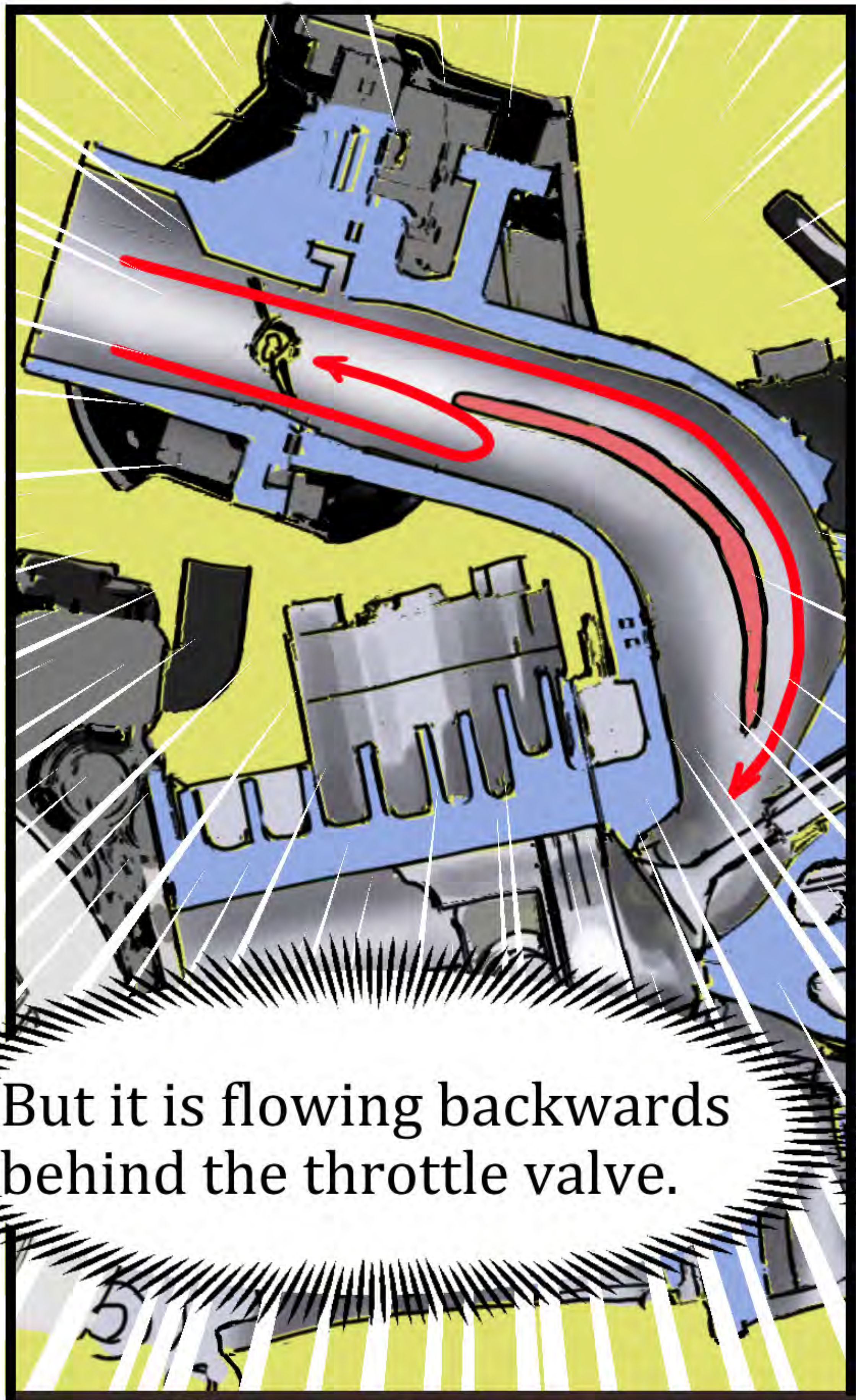
I'm gonna figure this out!



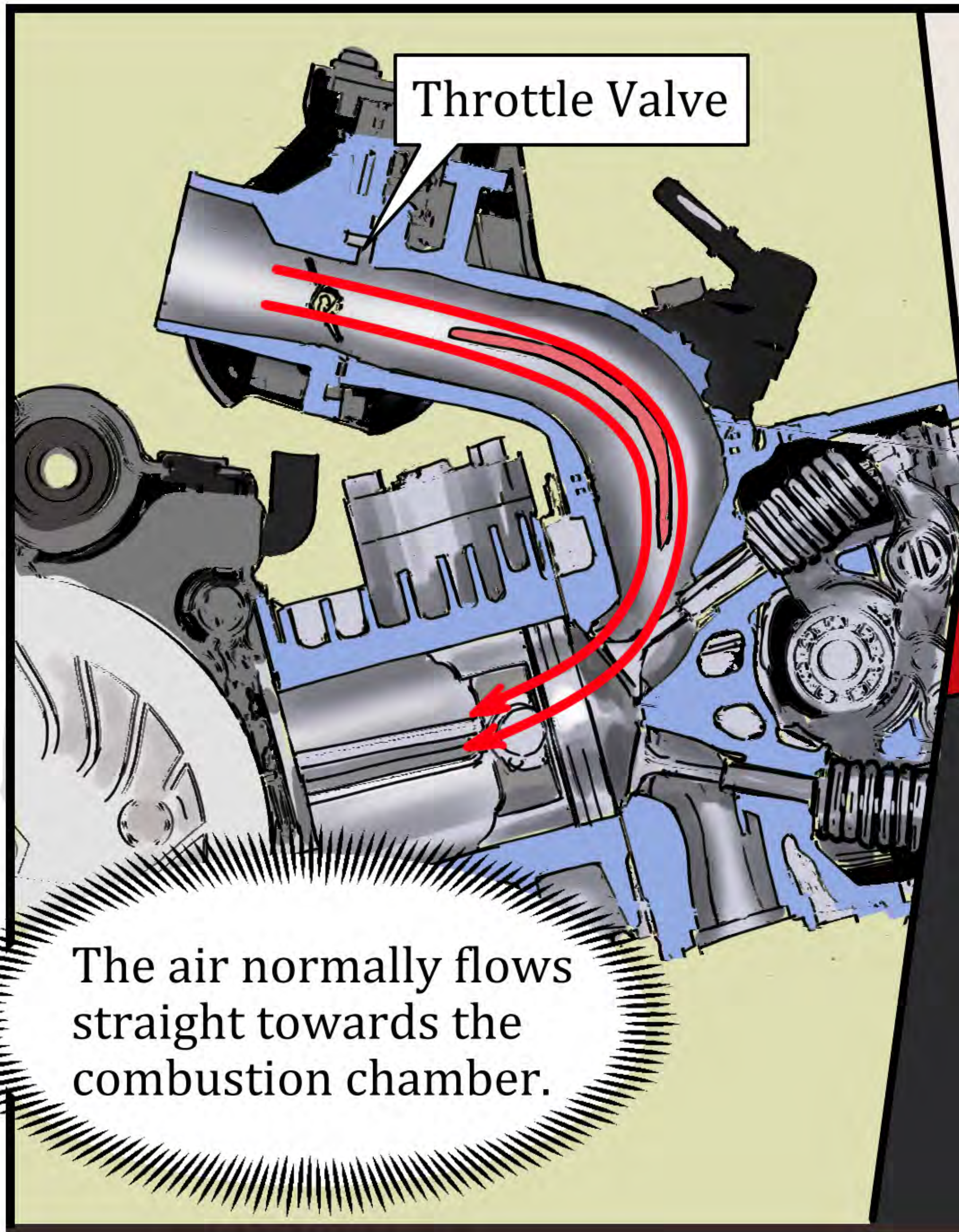
Time passed relentlessly.

We've run hundreds of different fluid flow analyses and tested numerous test products and hypotheses...

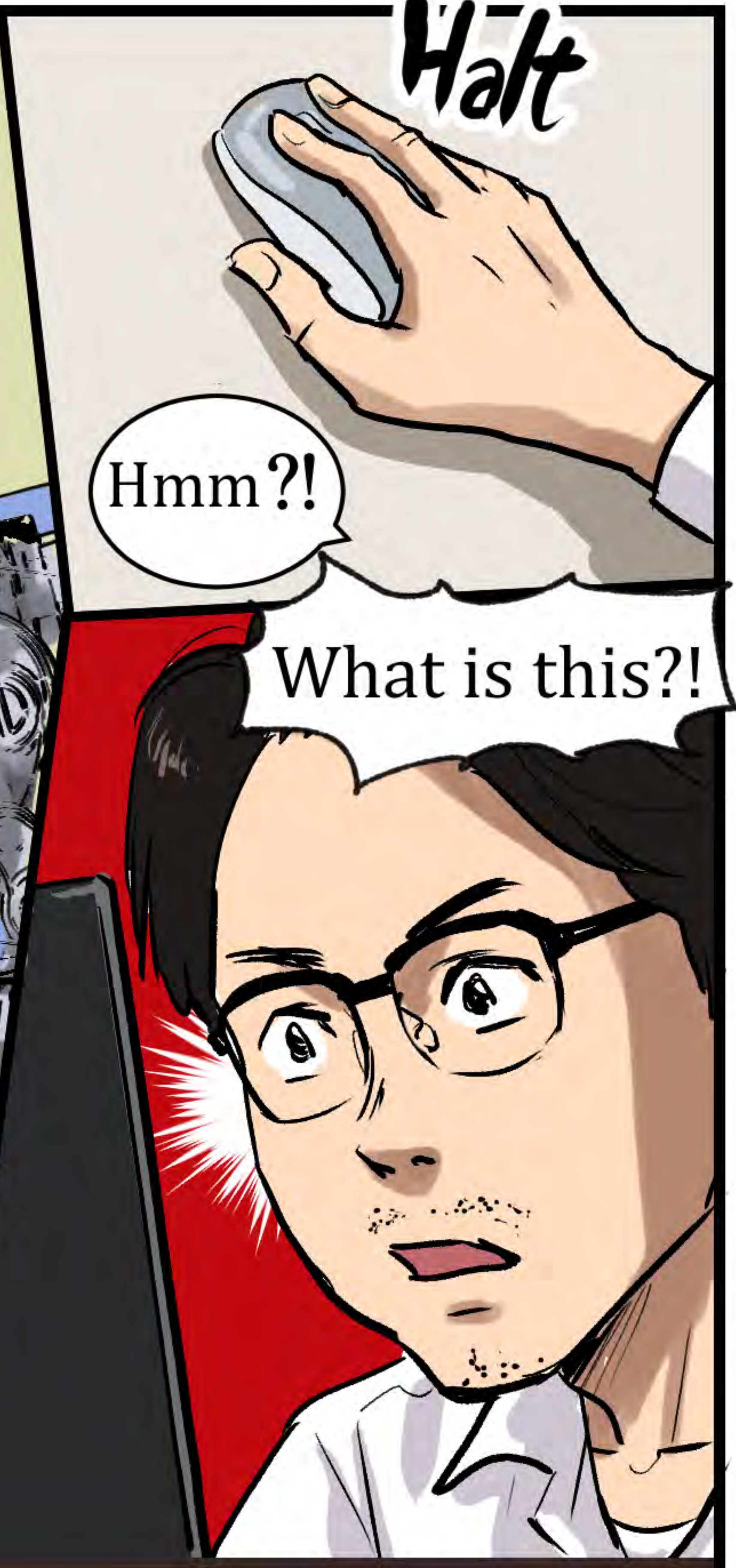
We were rushing, all because we had to establish a new technology that had never existed before in just three months' time.



But it is flowing backwards behind the throttle valve.



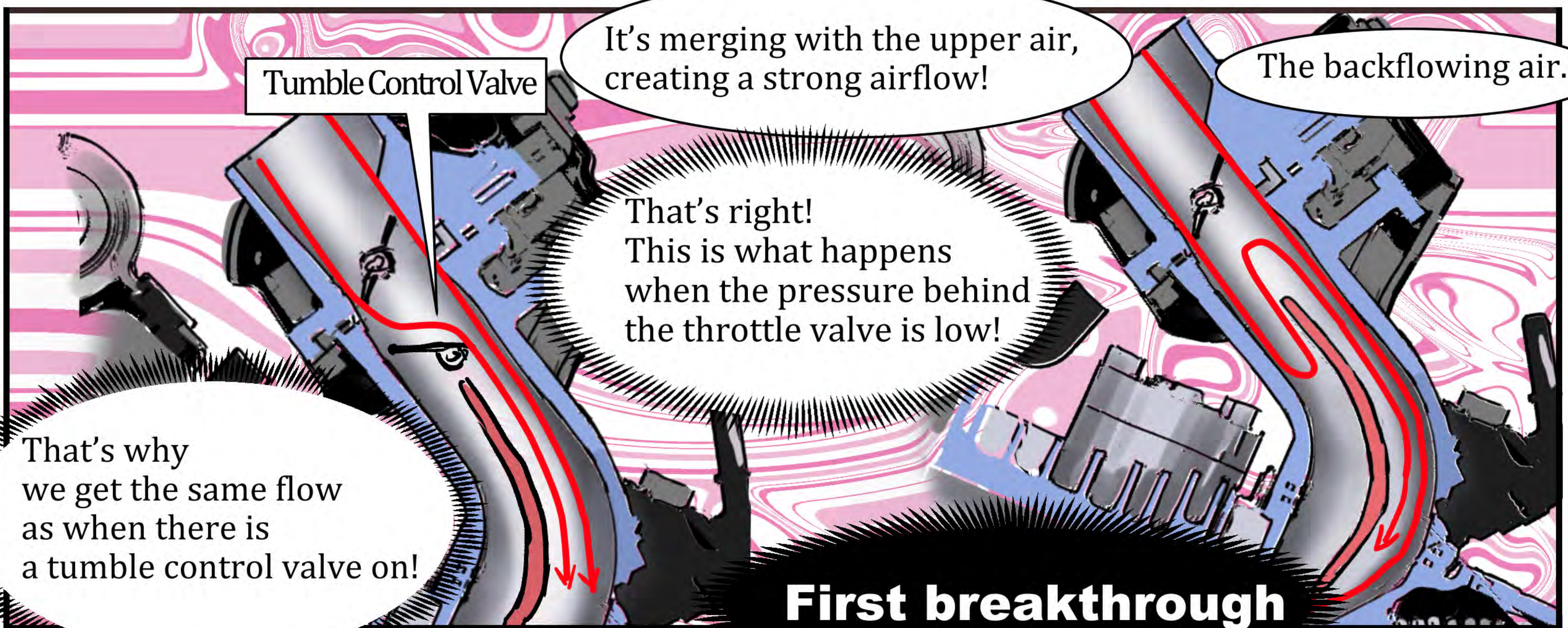
The air normally flows straight towards the combustion chamber.



Halt

Hmm?!

What is this?!



Tumble Control Valve

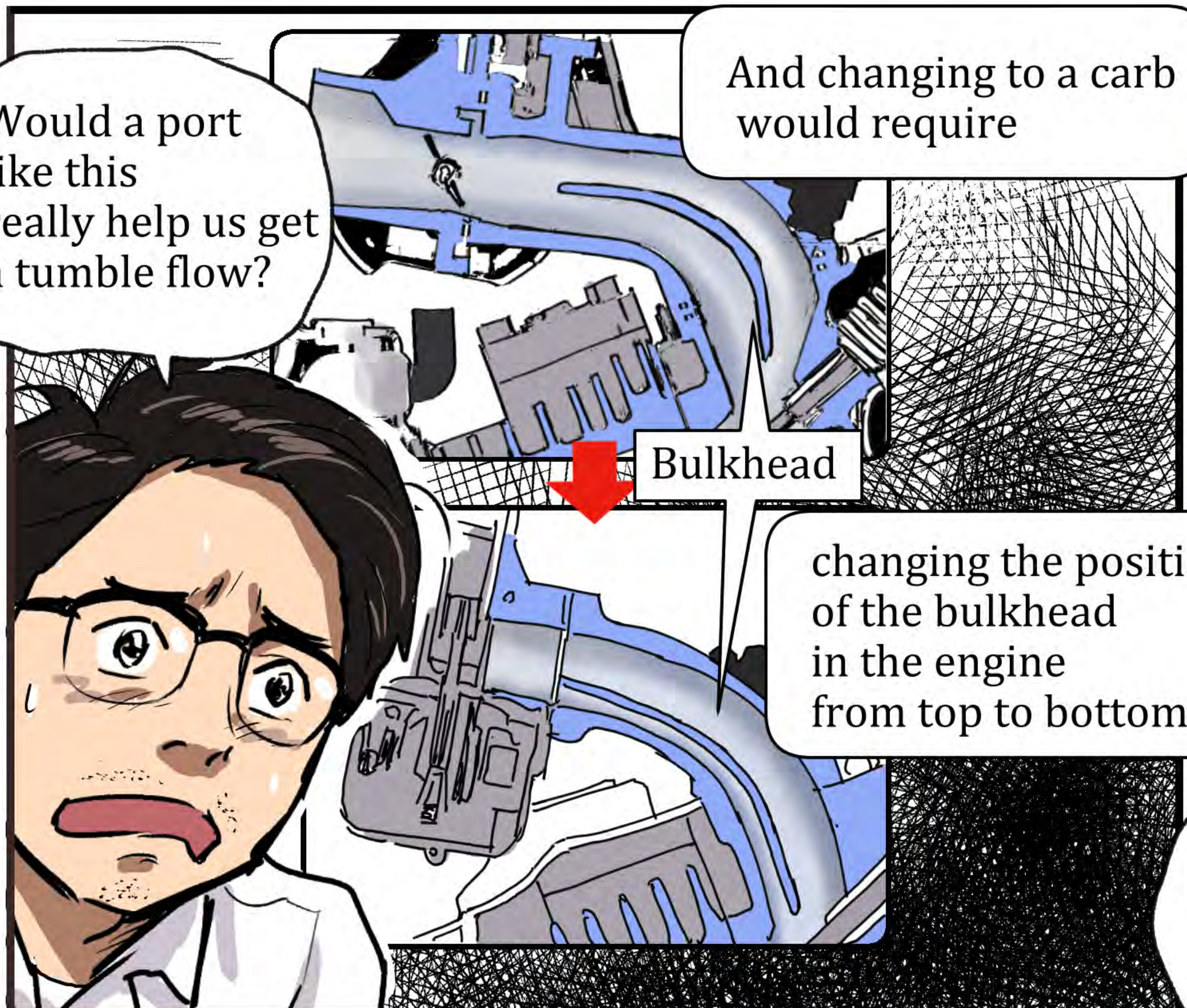
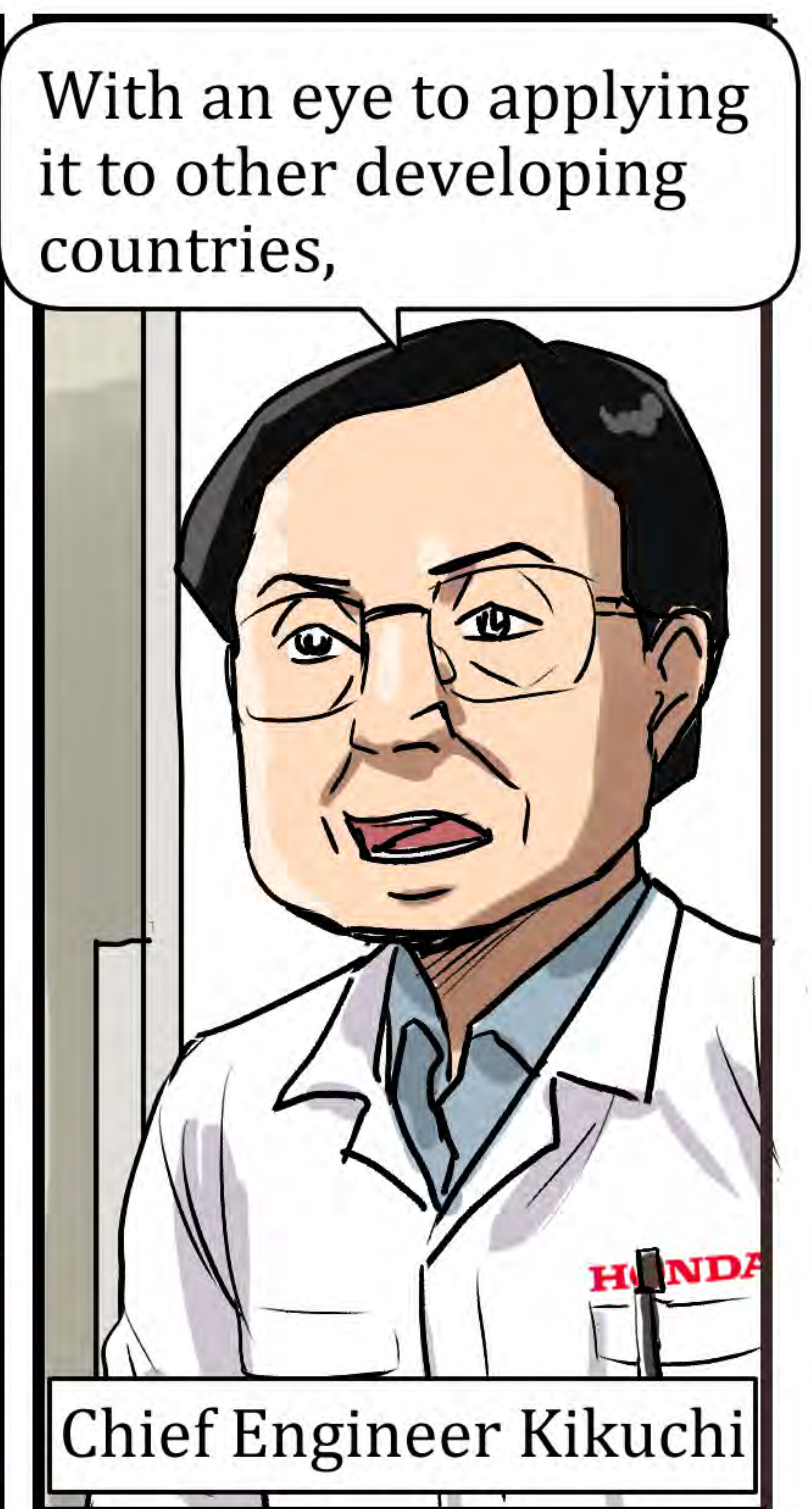
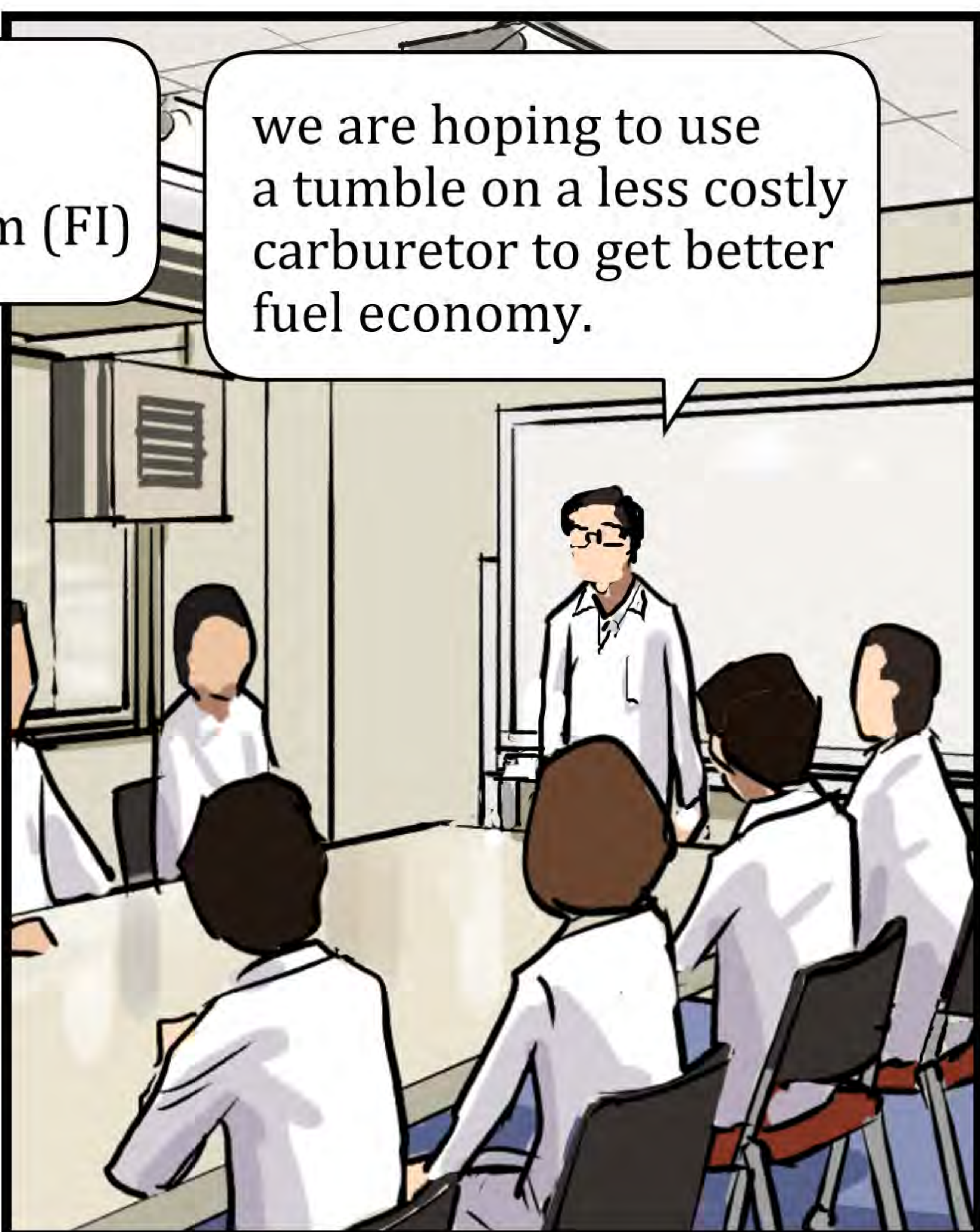
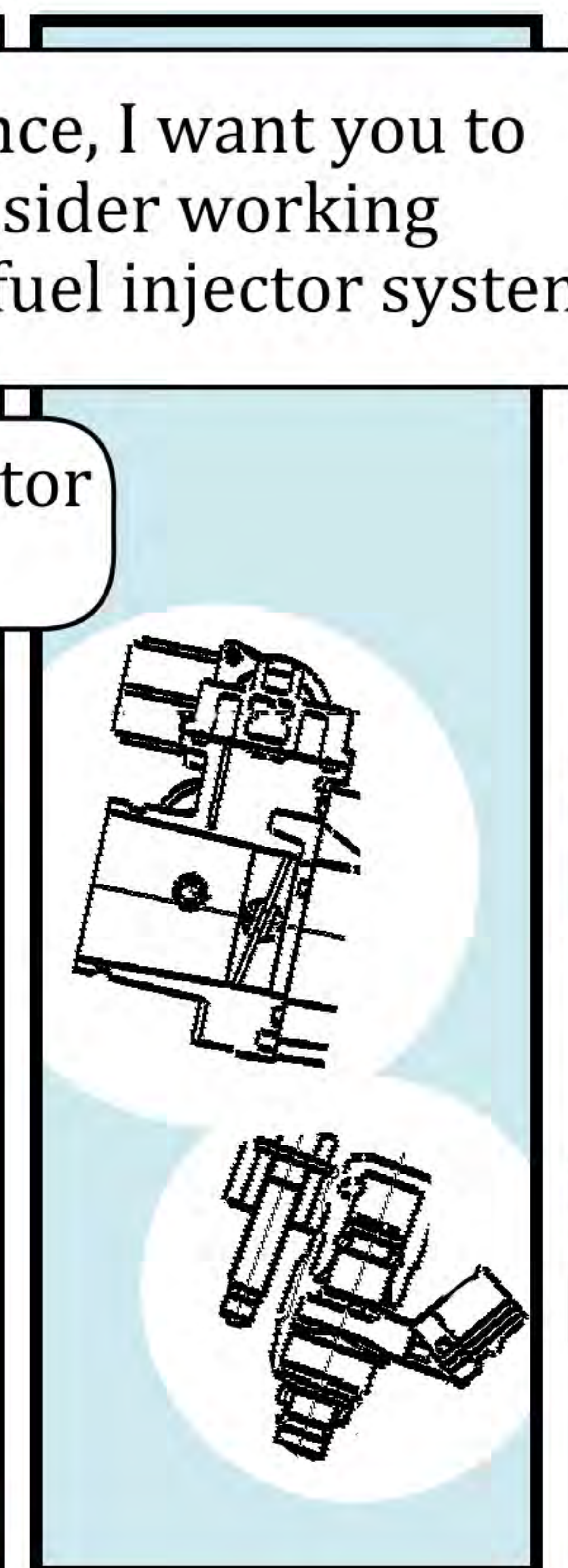
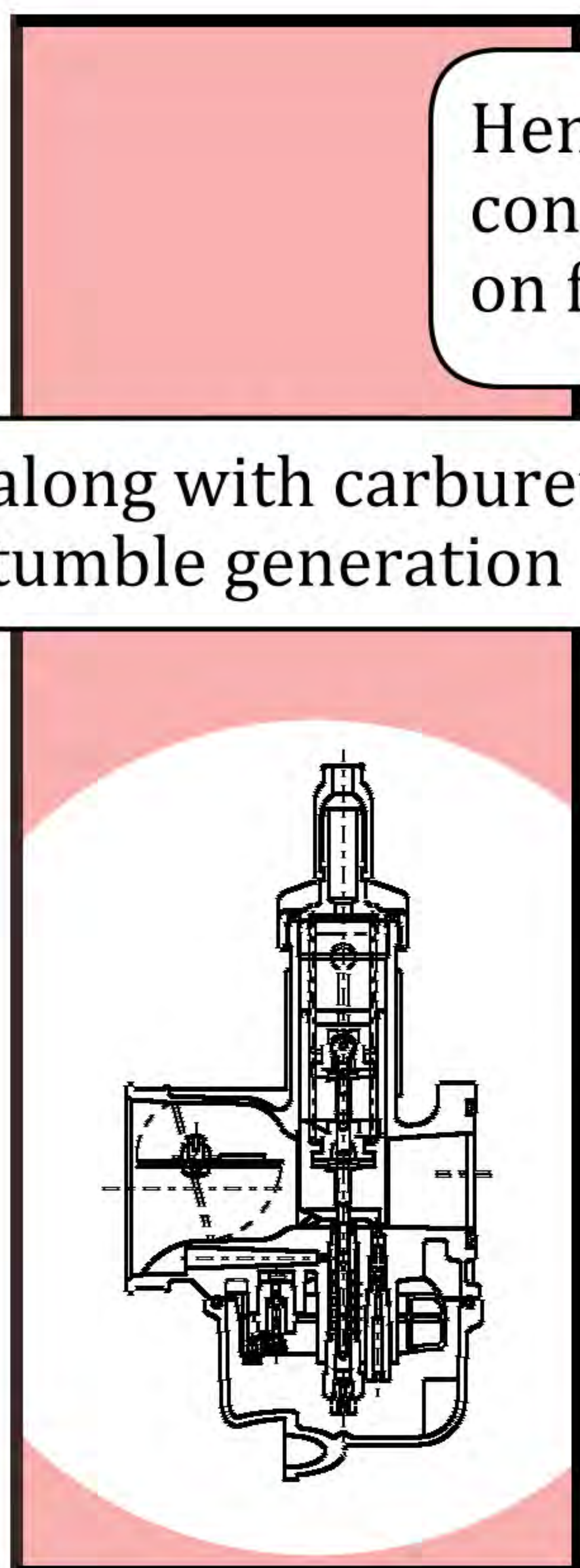
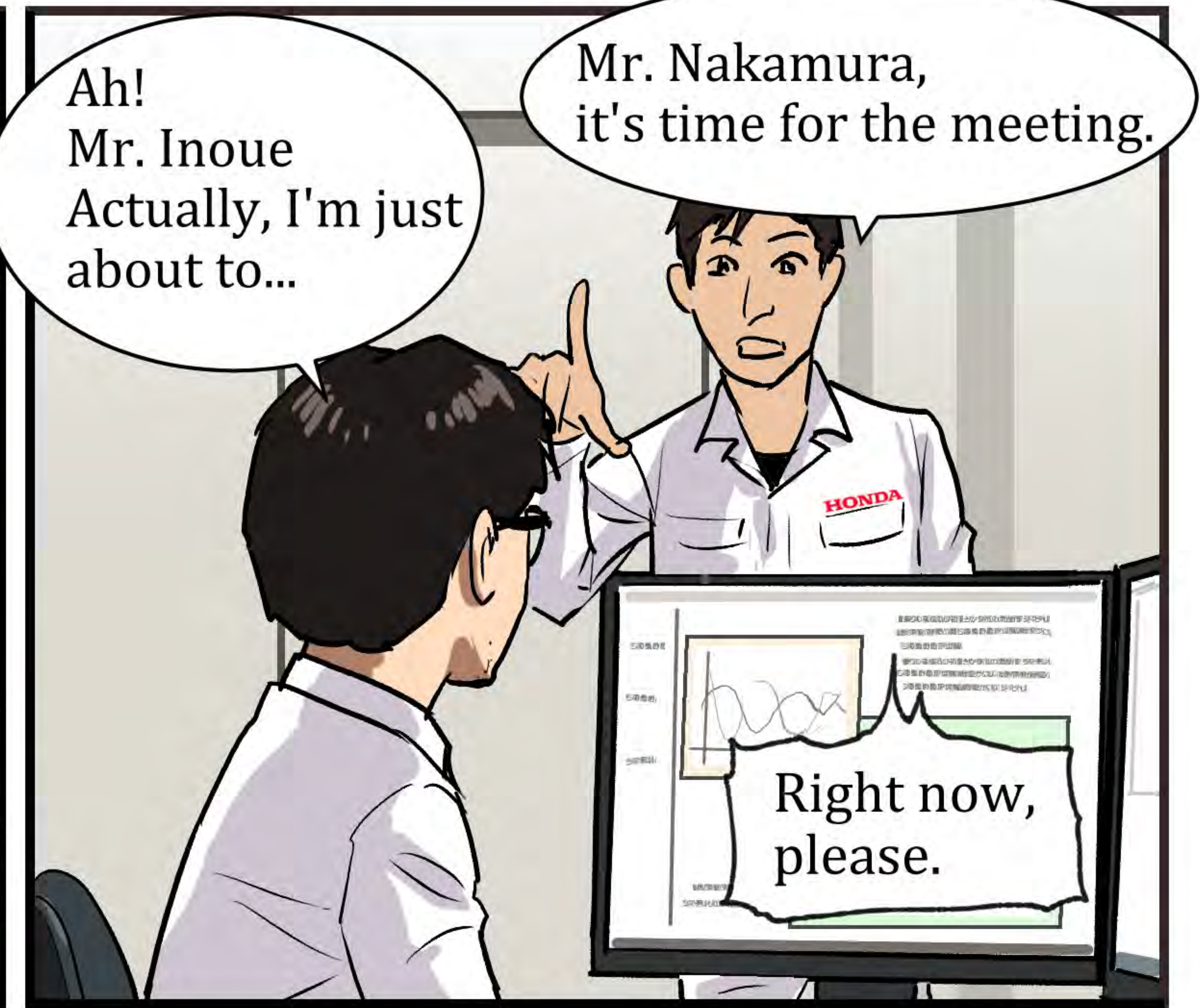
It's merging with the upper air, creating a strong airflow!

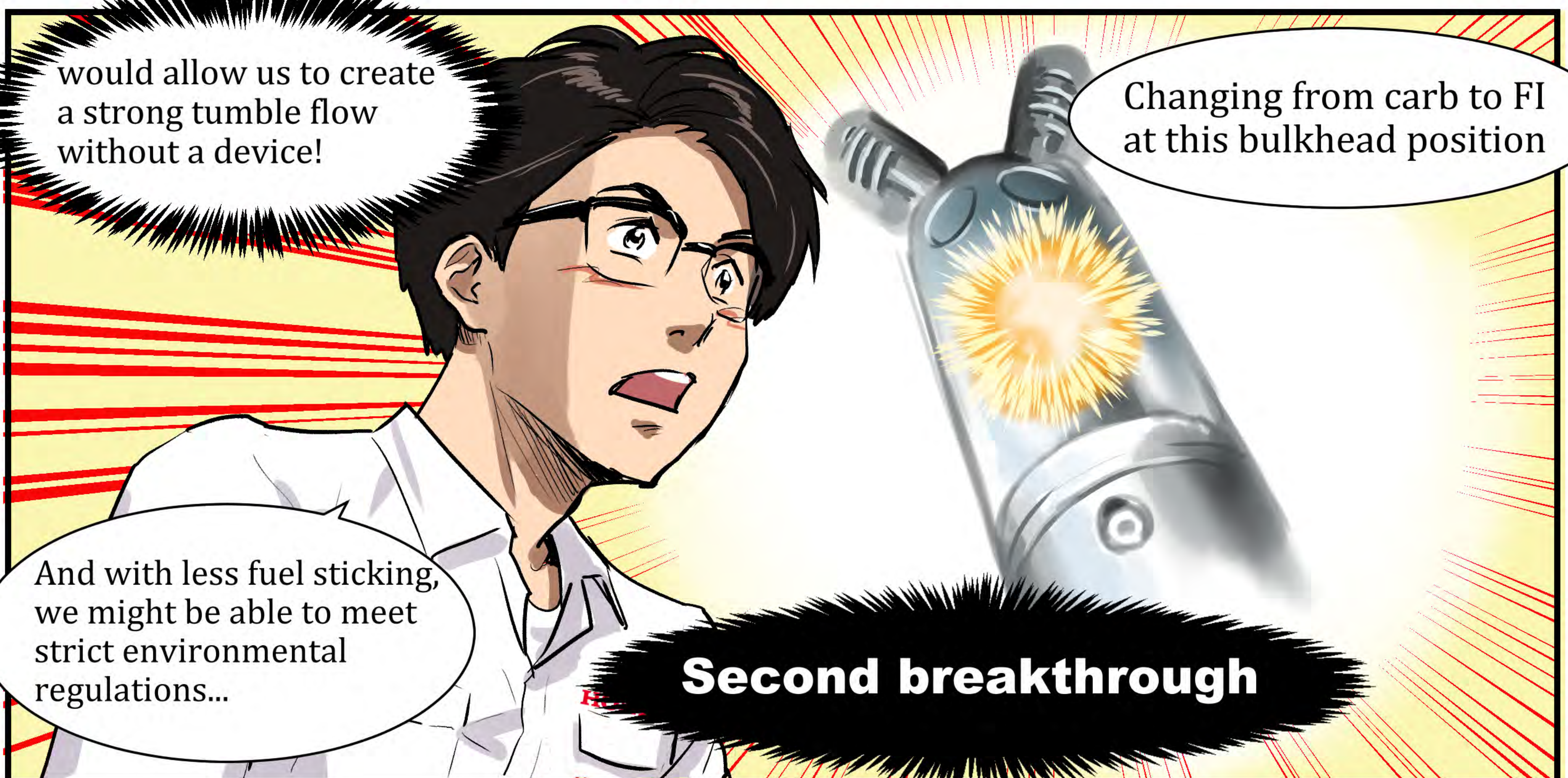
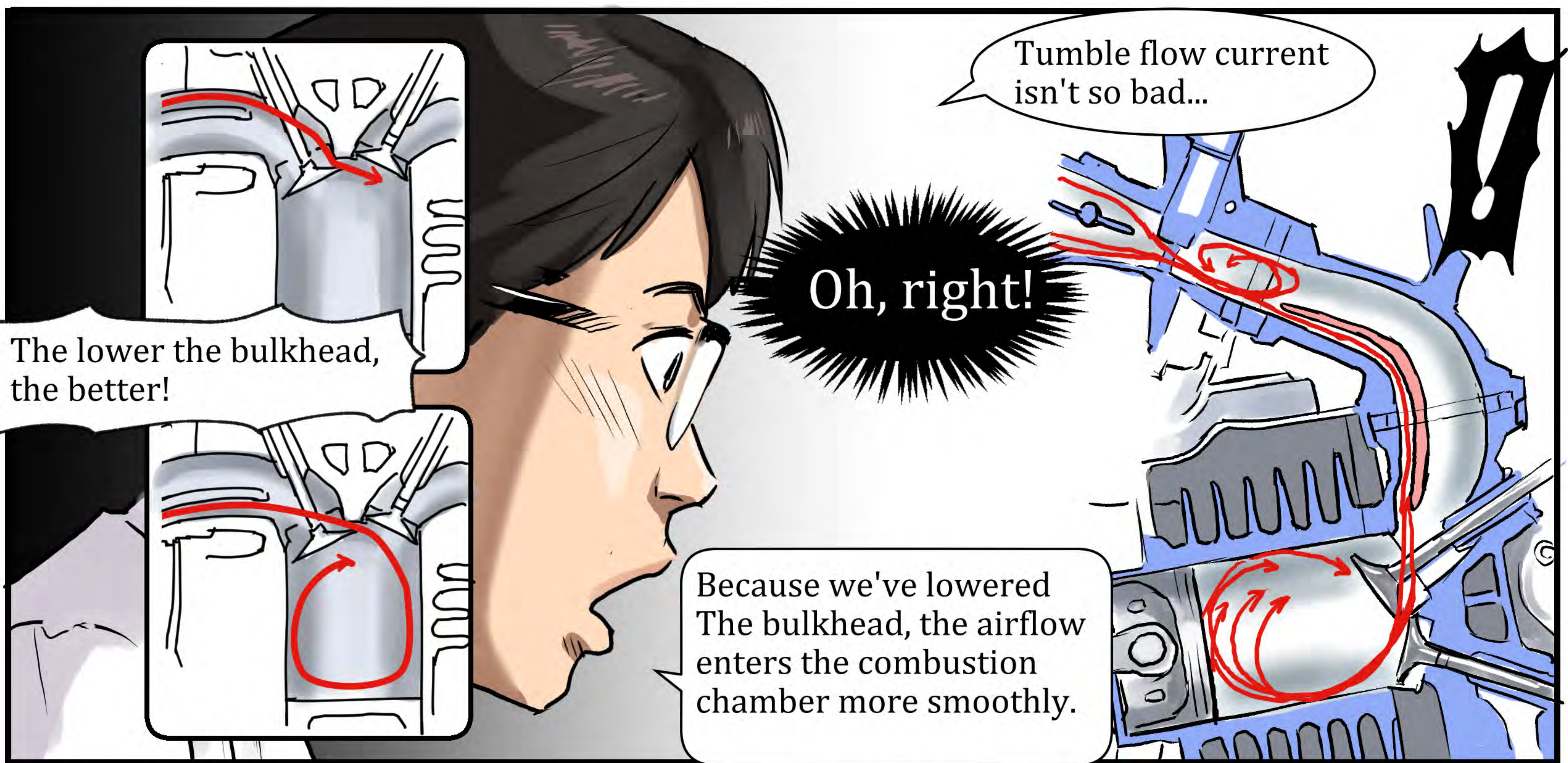
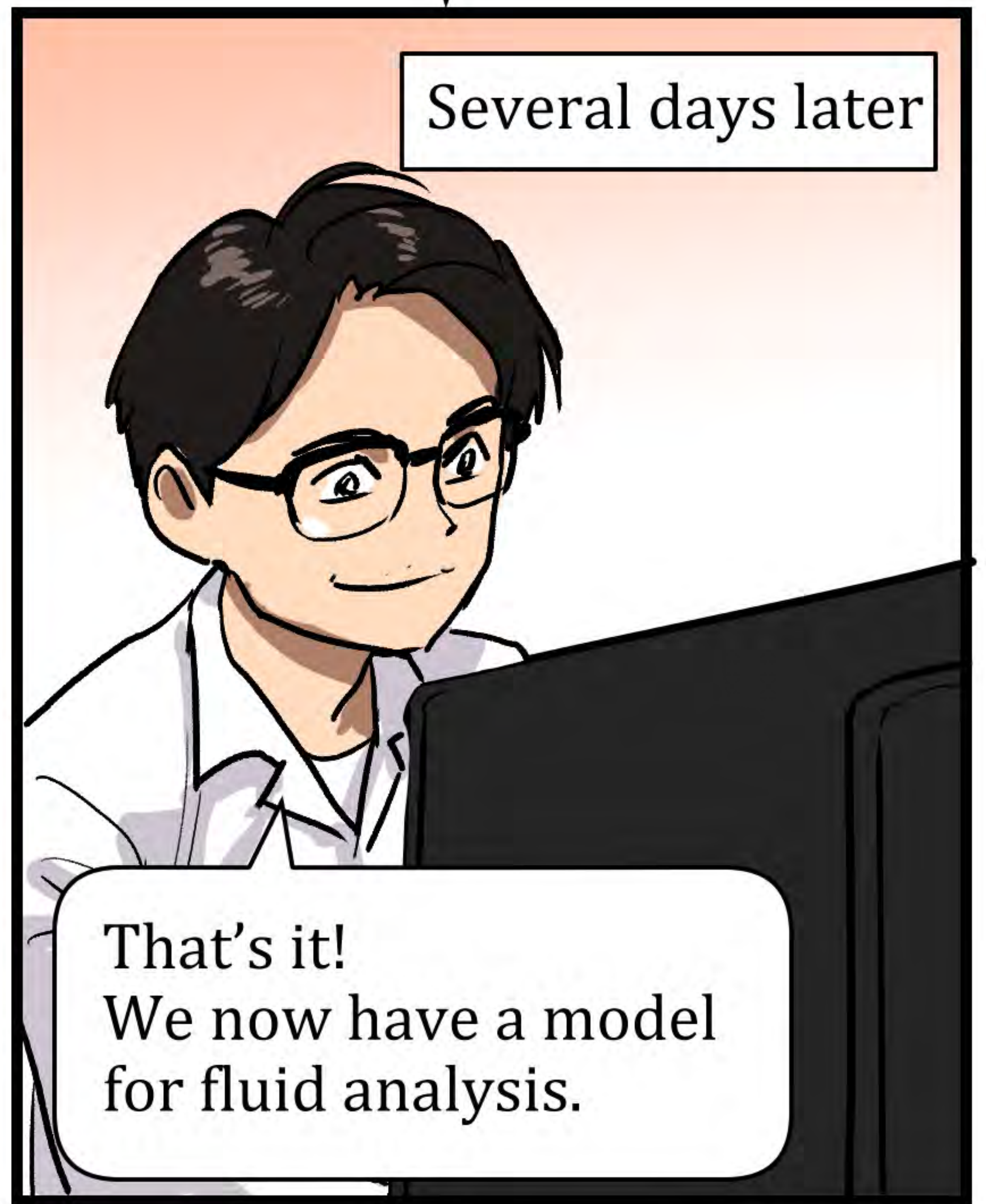
The backflowing air...

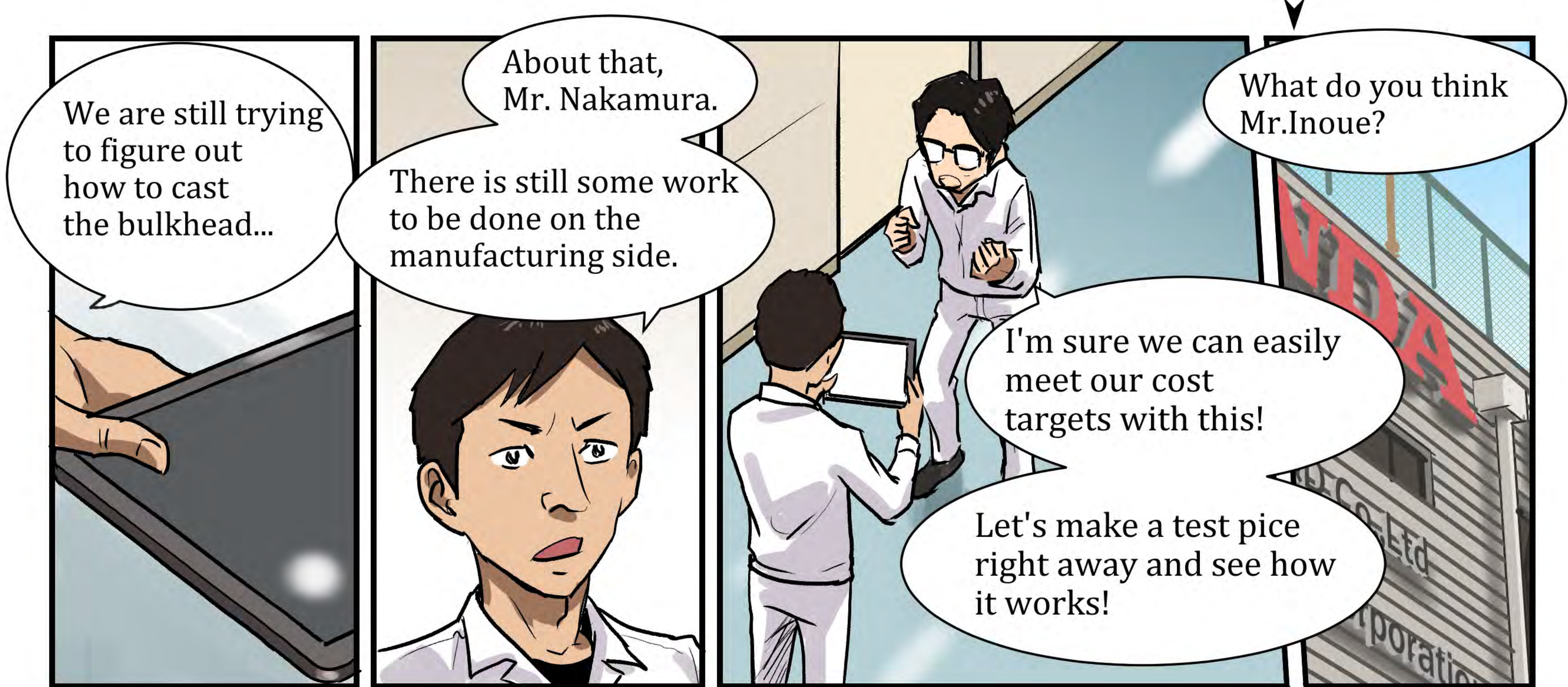
That's right! This is what happens when the pressure behind the throttle valve is low!

That's why we get the same flow as when there is a tumble control valve on!

First breakthrough







We are still trying to figure out how to cast the bulkhead...

About that, Mr. Nakamura.
There is still some work to be done on the manufacturing side.

What do you think Mr. Inoue?

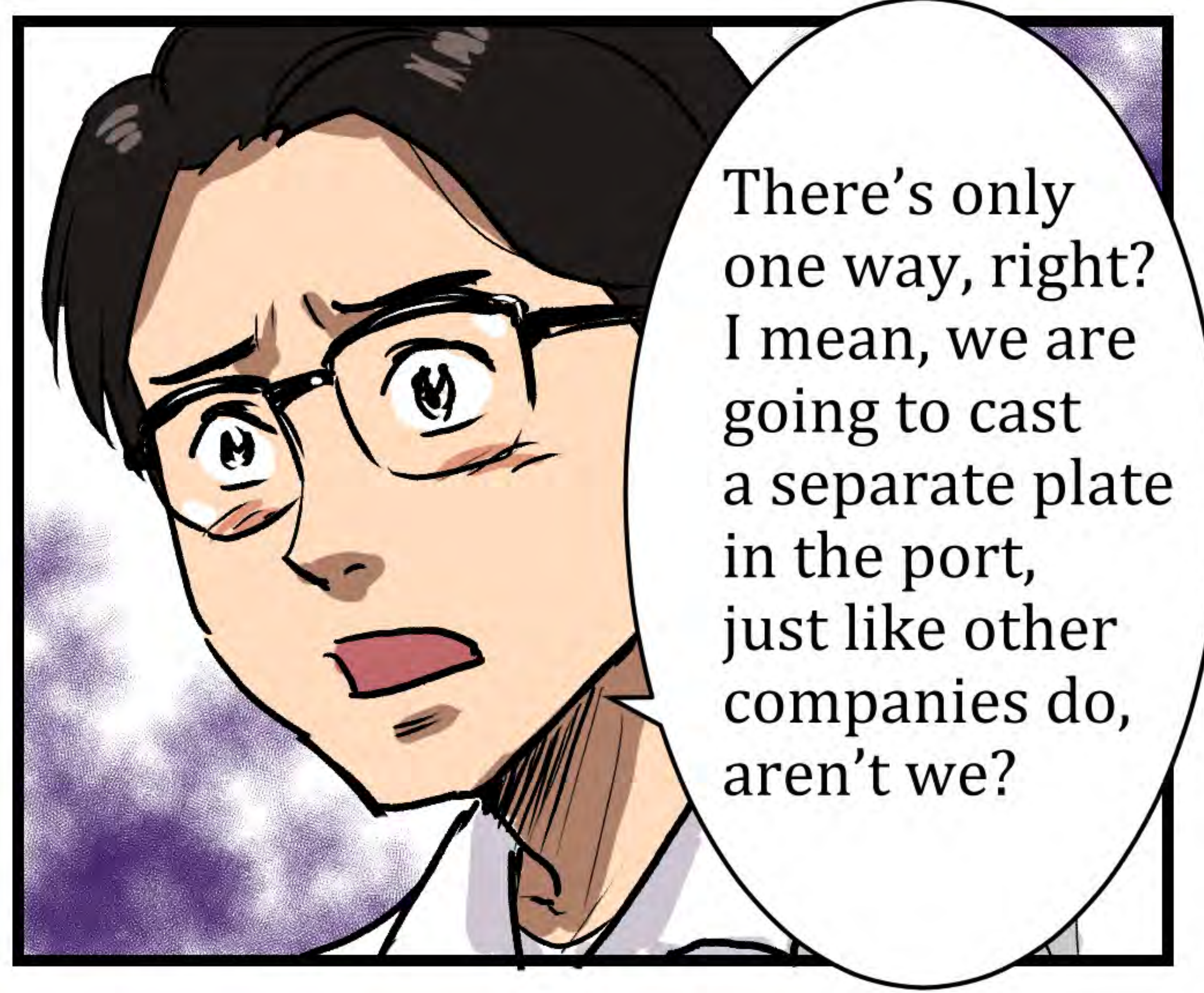
I'm sure we can easily meet our cost targets with this!
Let's make a test piece right away and see how it works!



Sigh...

But it's going to cost too much, too...

....

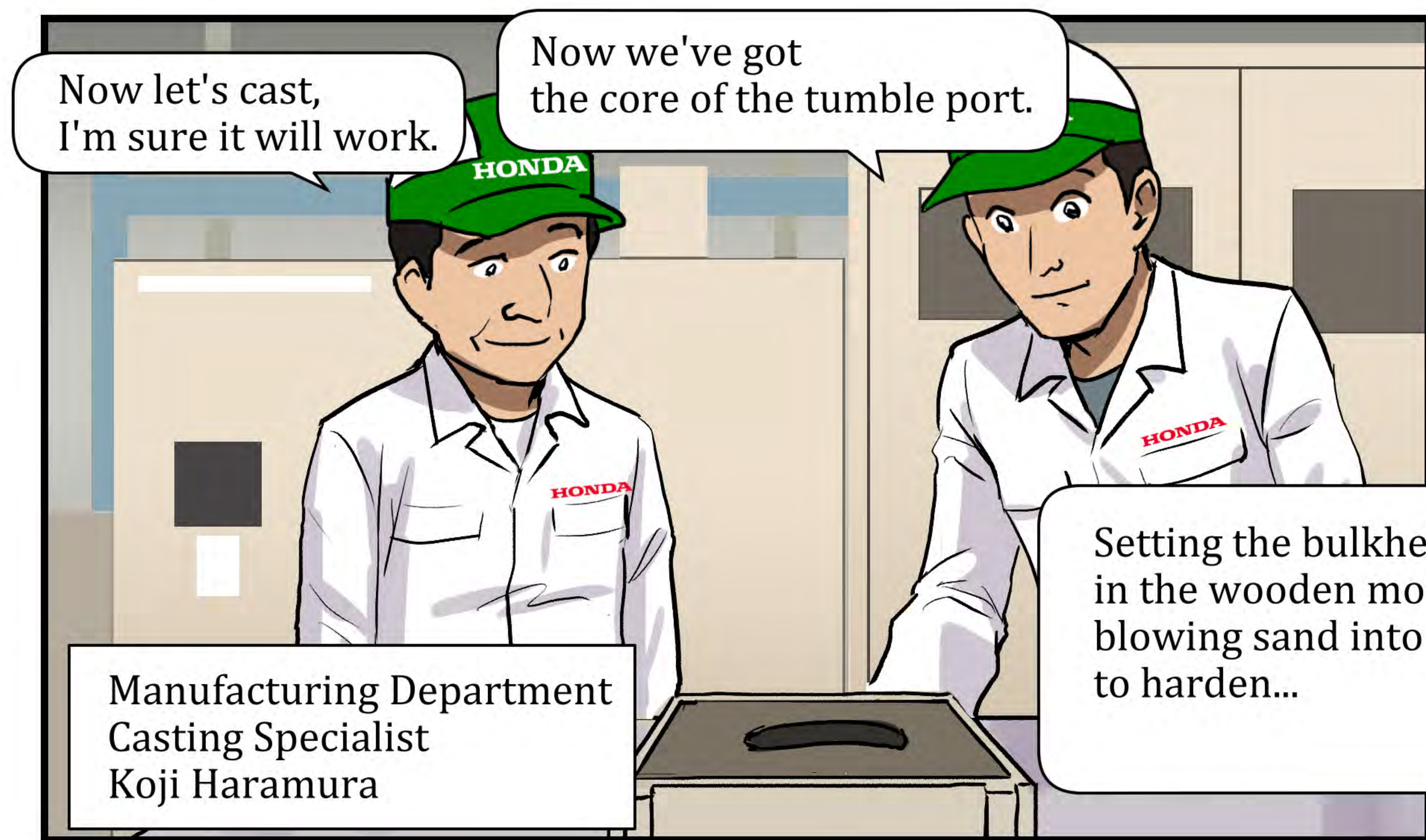


There's only one way, right? I mean, we are going to cast a separate plate in the port, just like other companies do, aren't we?



Meanwhile, preliminary verification of the casting method was underway with a casting specialist on site

At the factory

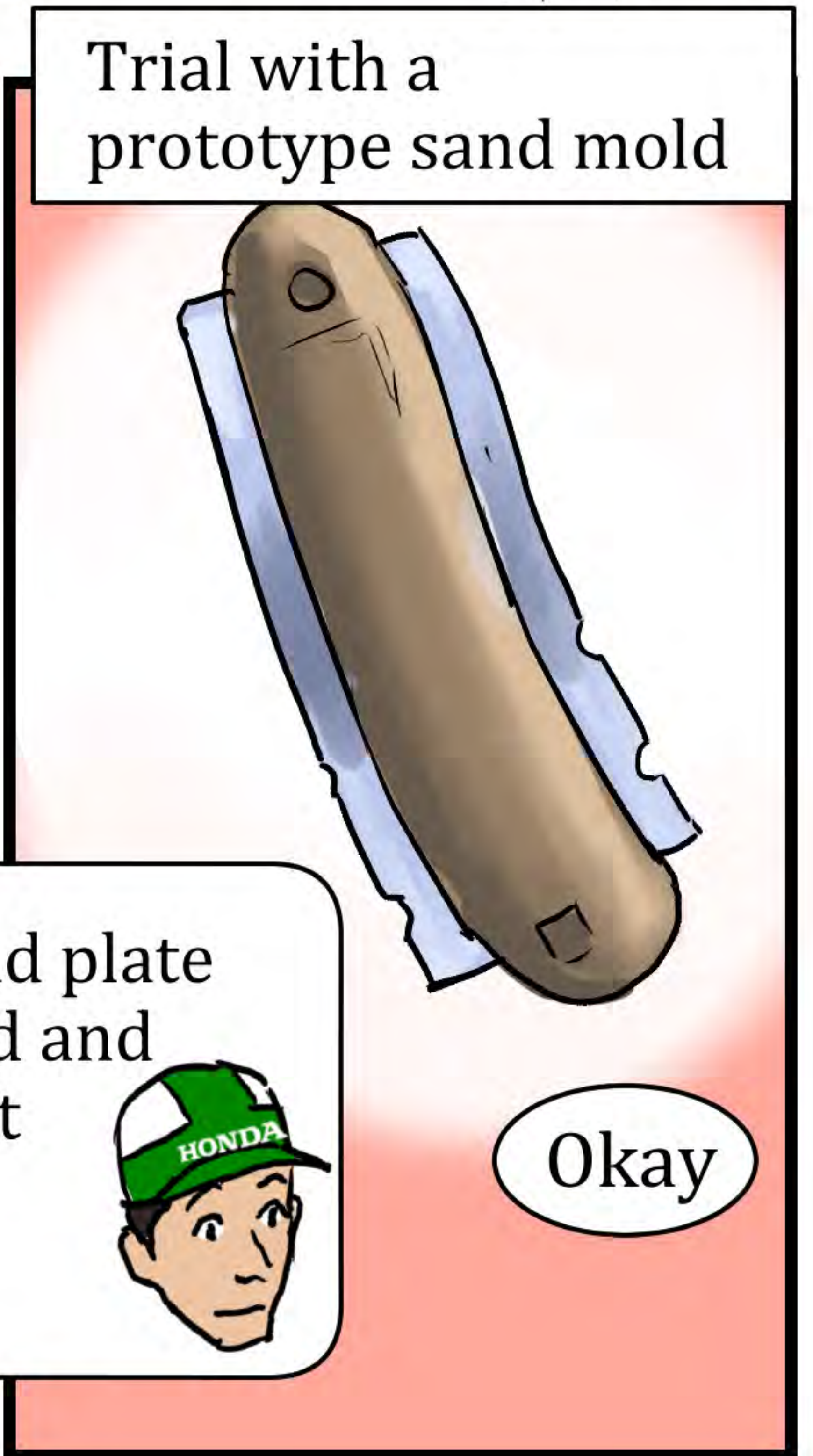


Now let's cast, I'm sure it will work.

Now we've got the core of the tumble port.

Manufacturing Department Casting Specialist Koji Haramura

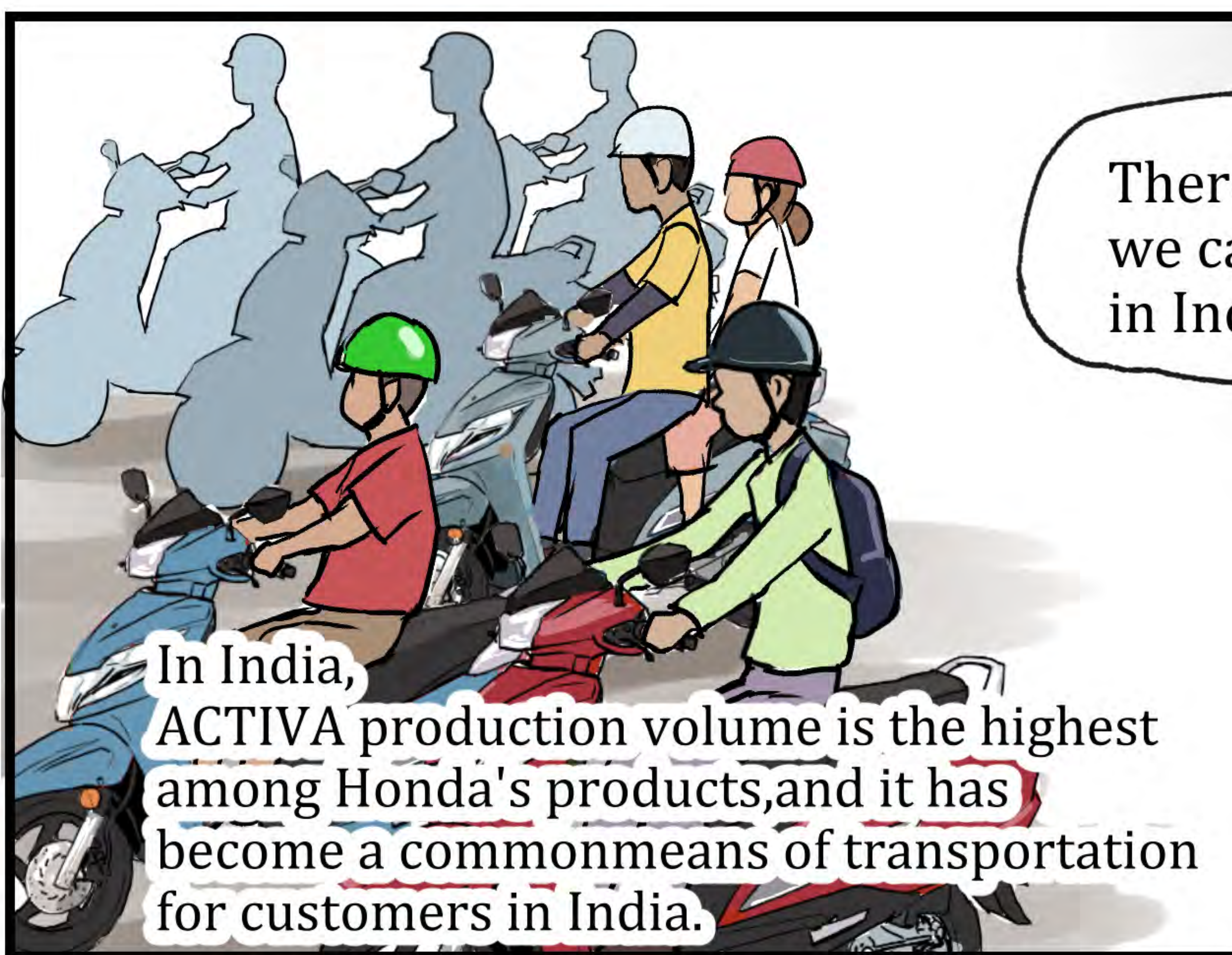
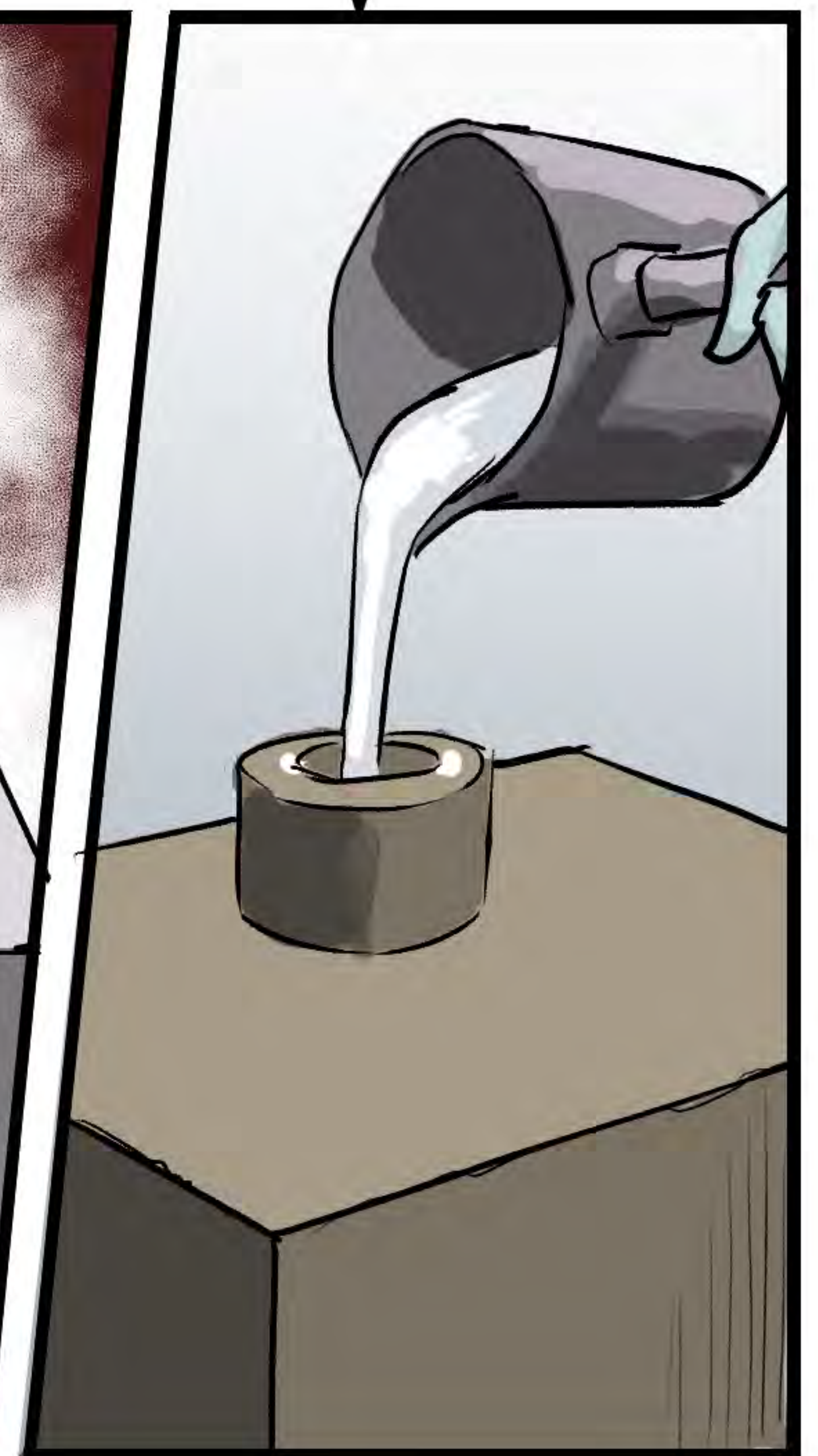
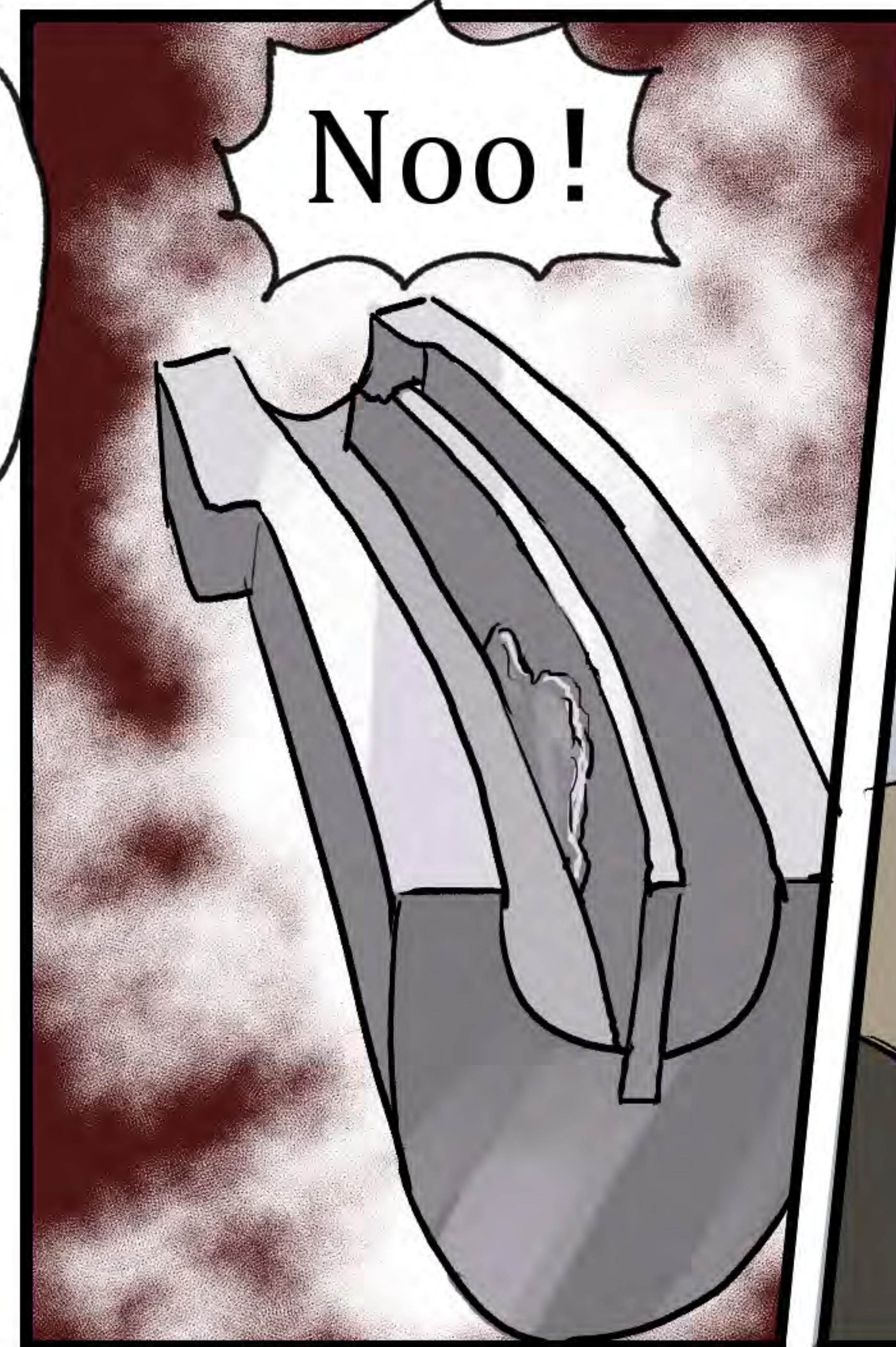
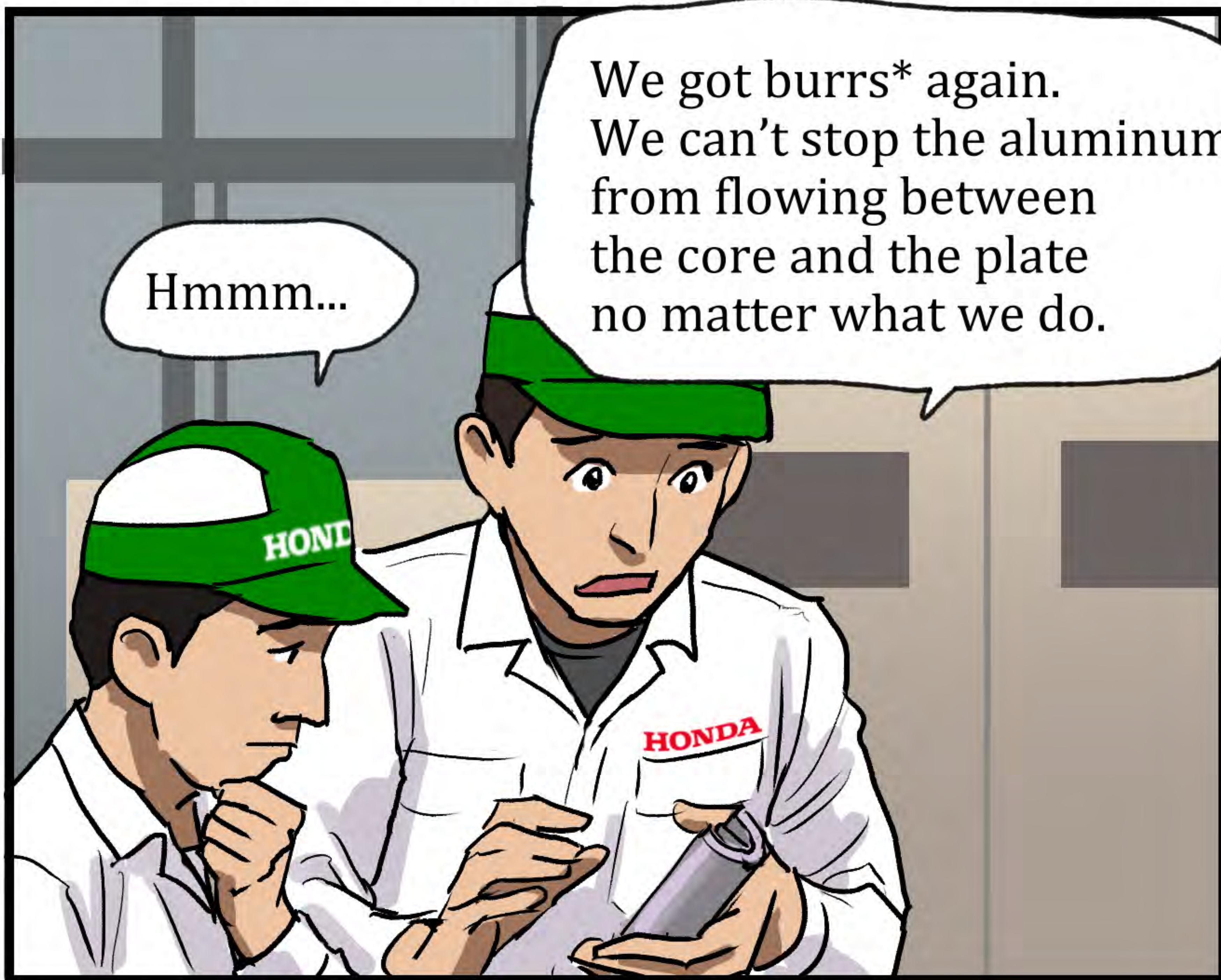
Setting the bulkhead plate in the wooden mold and blowing sand into it to harden...



Trial with a prototype sand mold

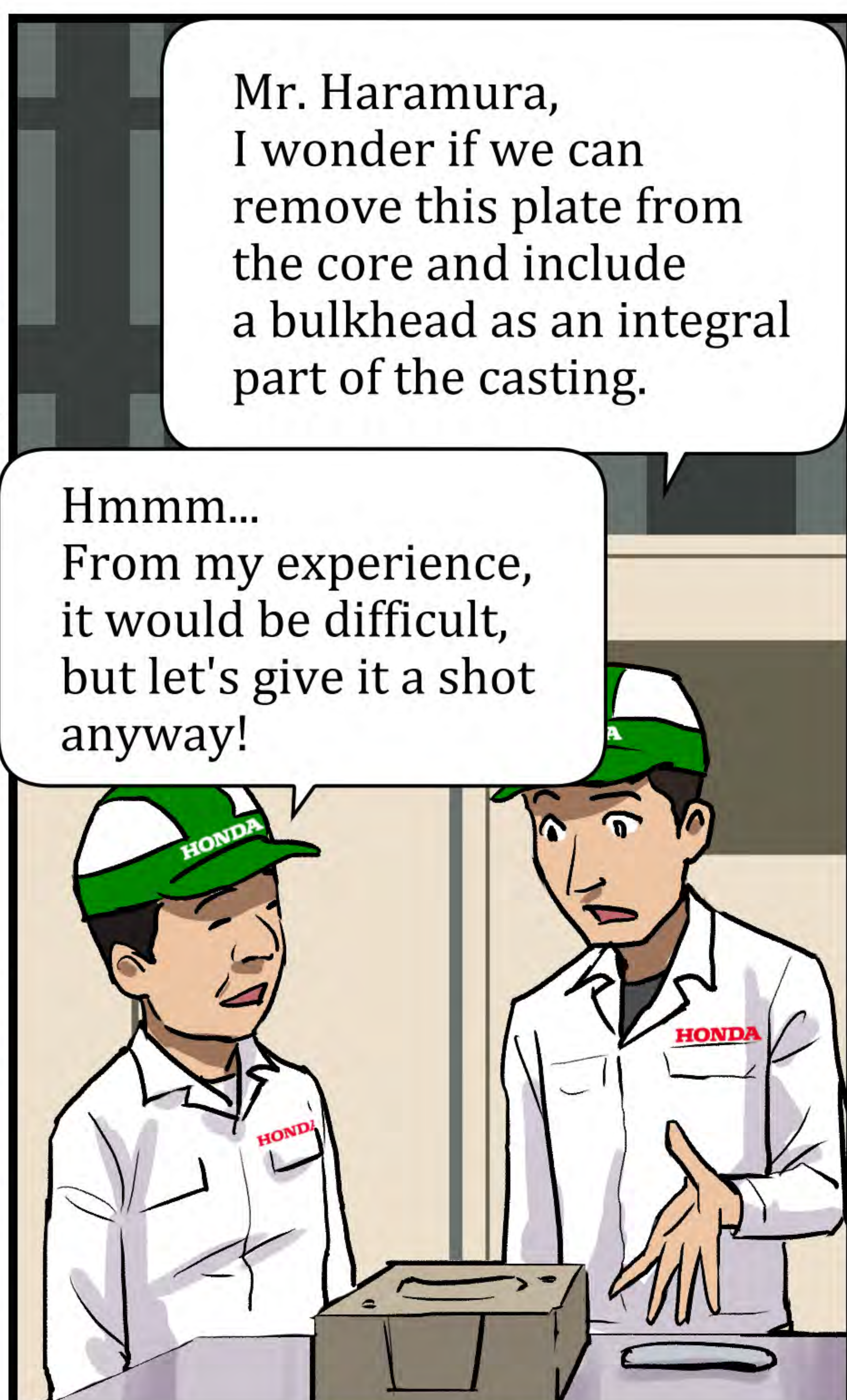
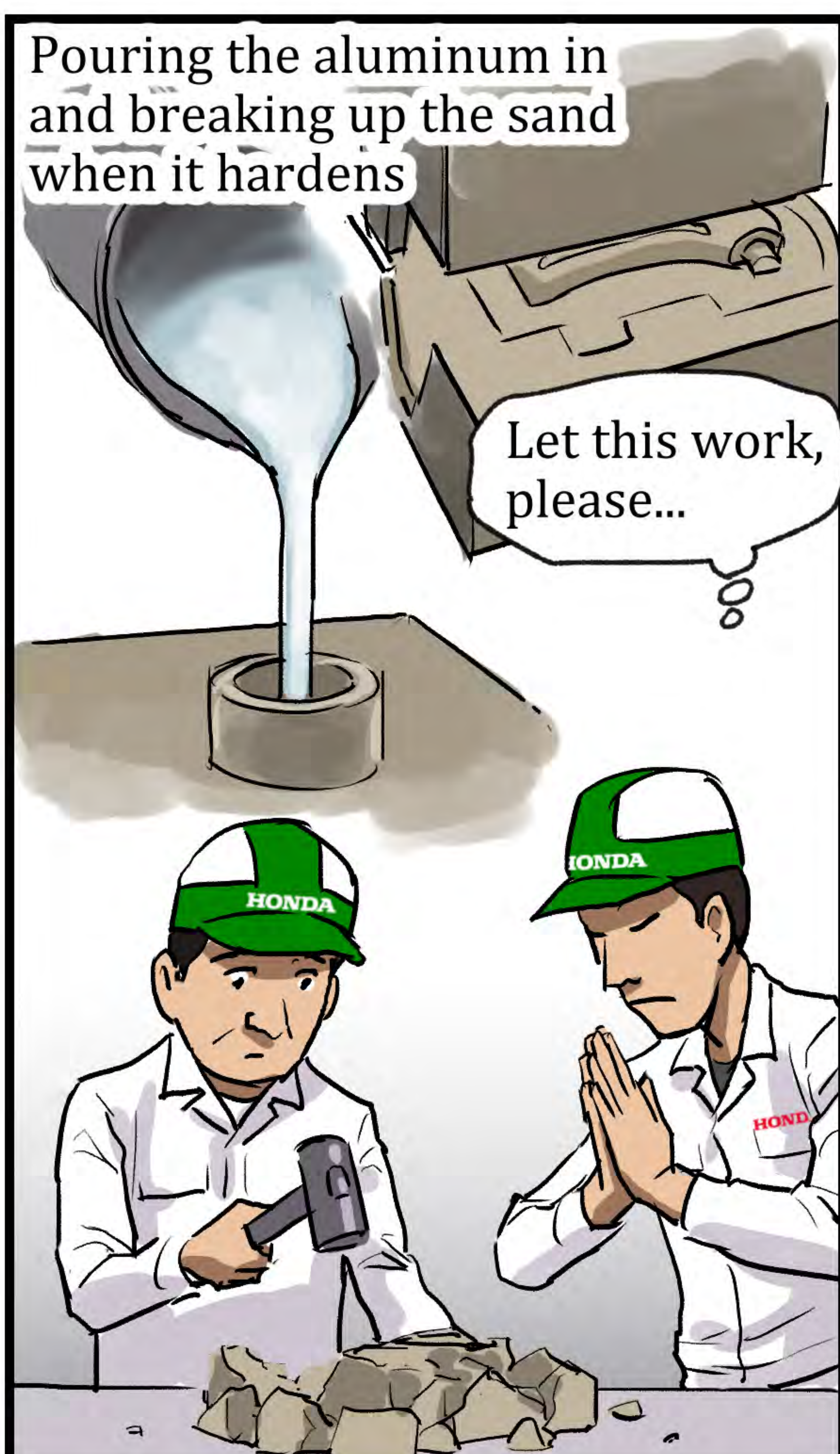
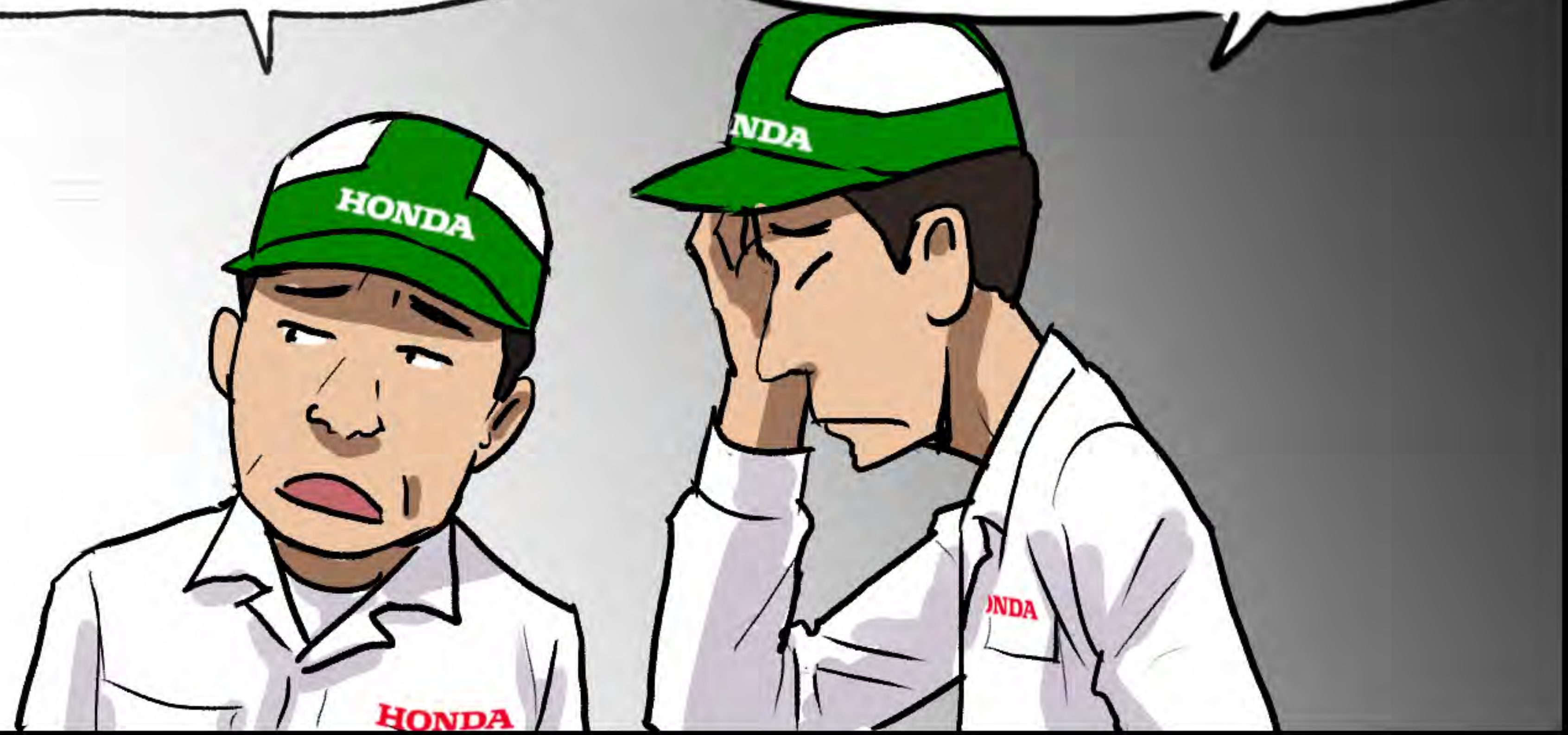
Okay

* A small piece of aluminum that should not be in the finished product.



There's no way we can mass produce in India this way.

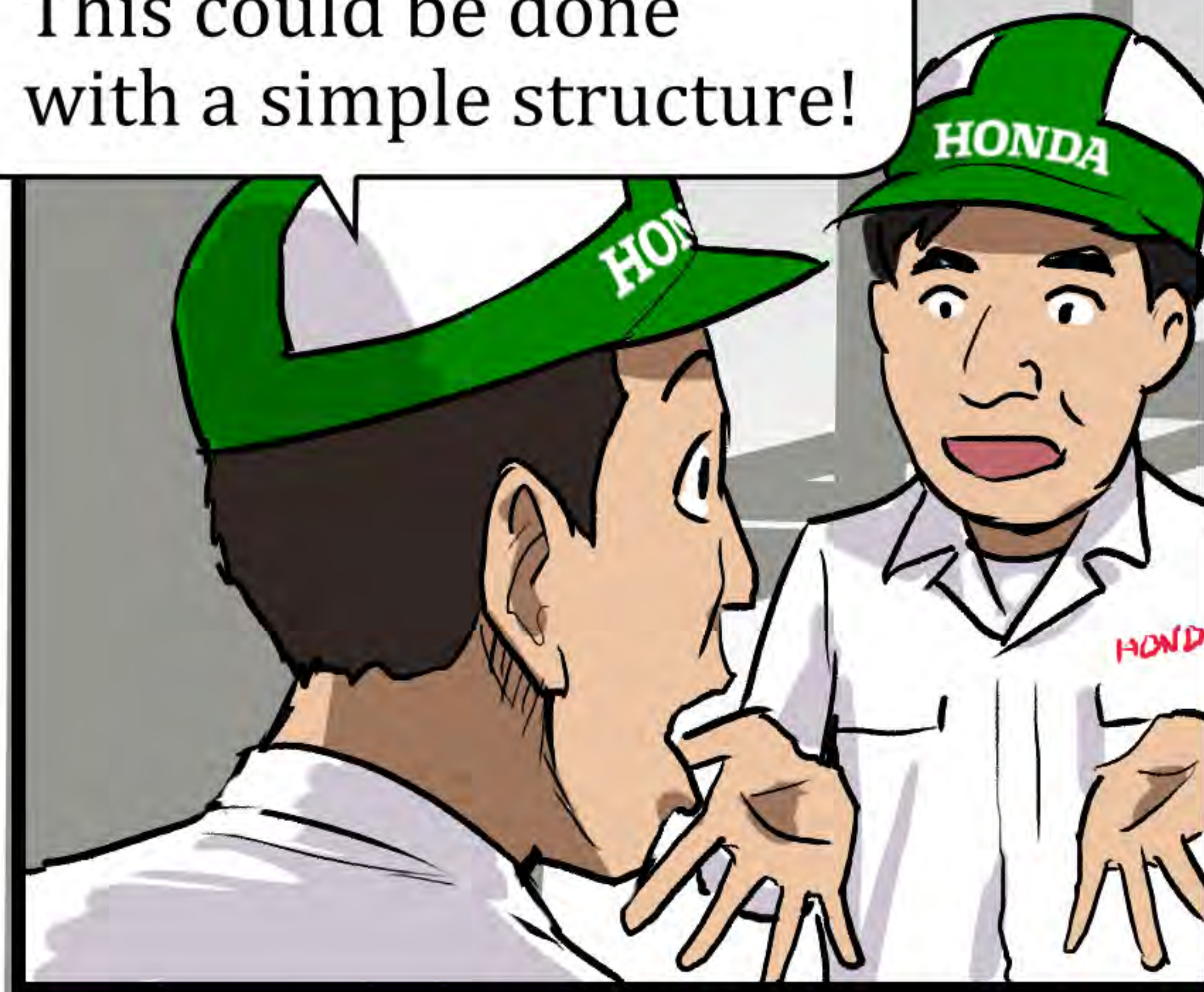
It would take a long time to remove burrs and the quality would not be stable...



Next, let's simulate and verify the mass production process with the metal mold!

If all goes well, we may be able to manufacture tumble ports with the existing mass production equipment as is!

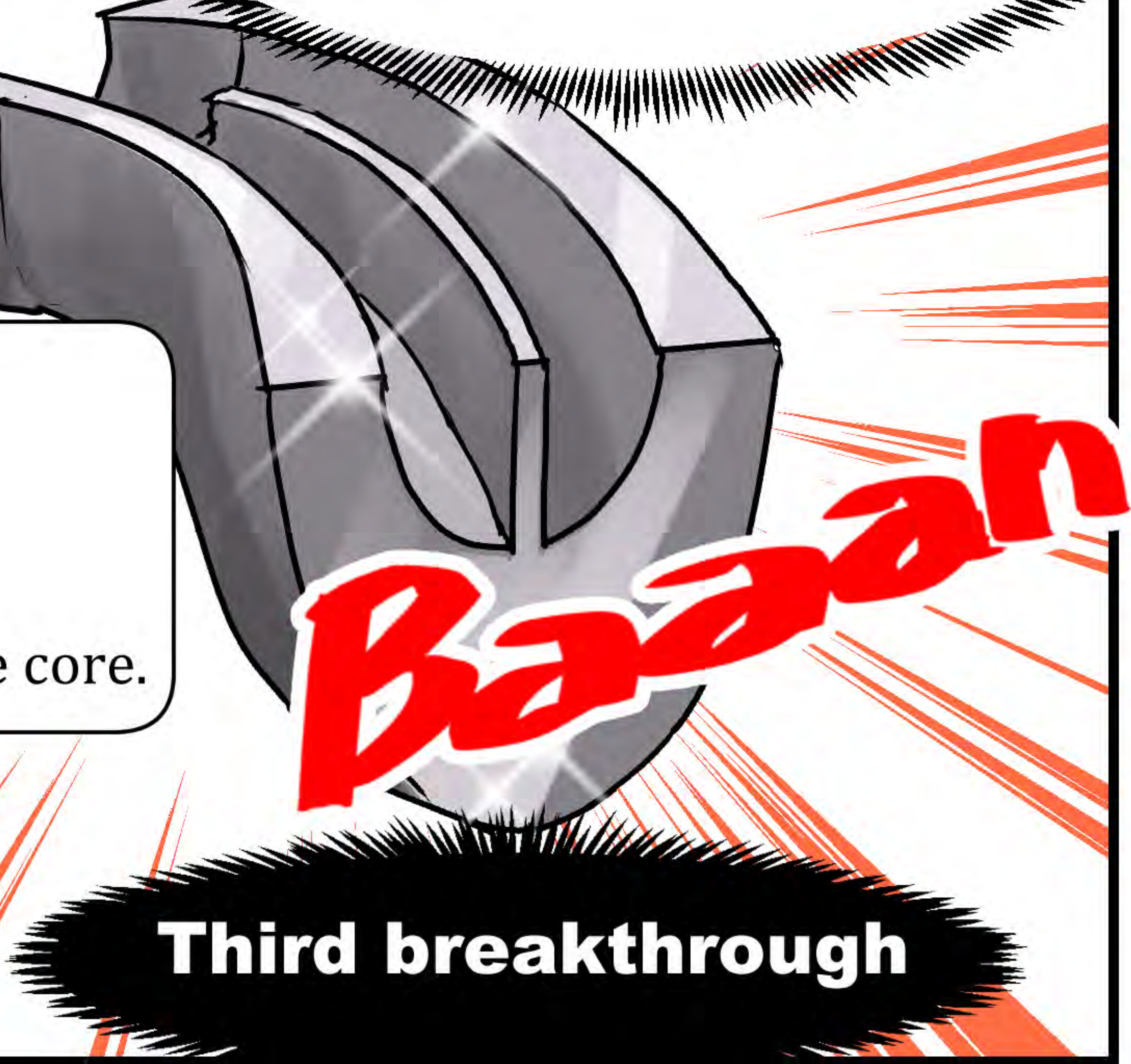
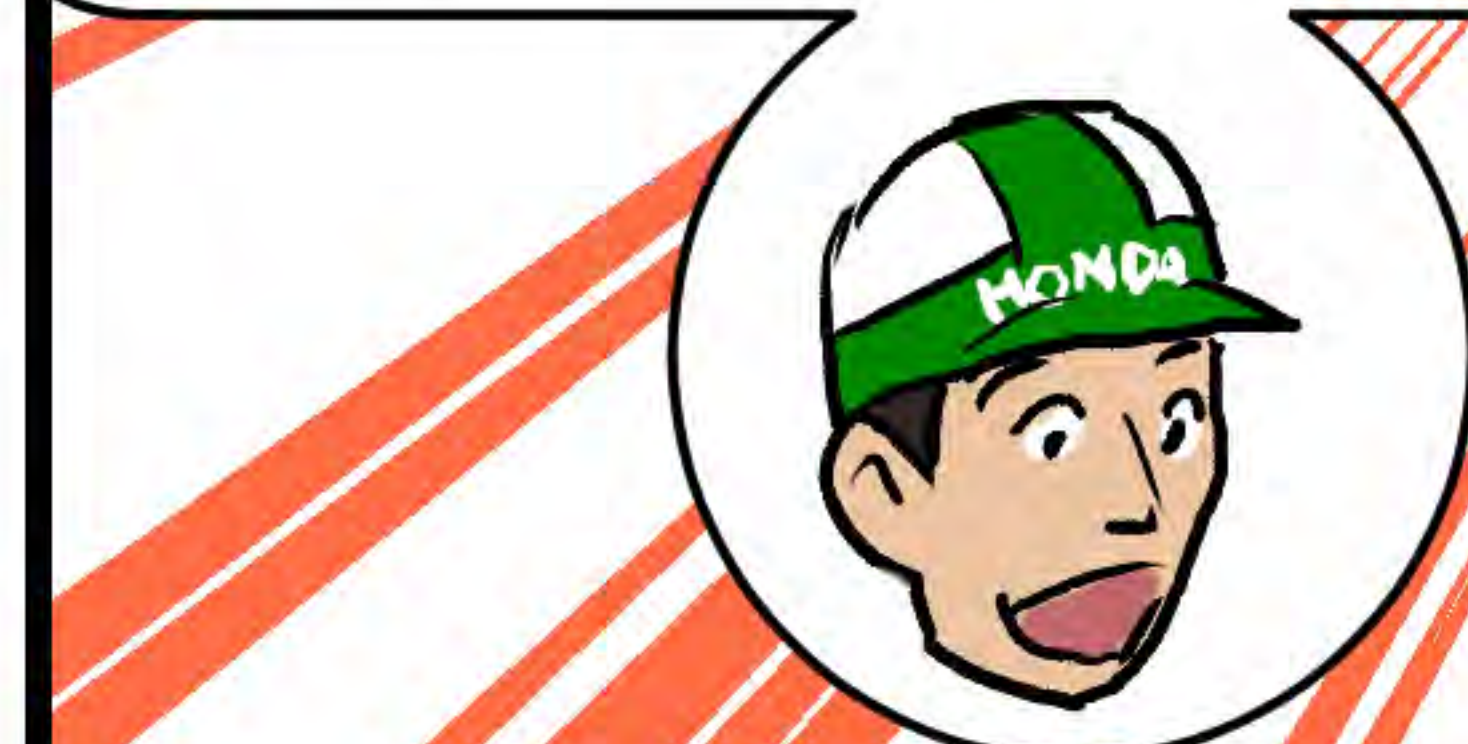
Alright! This could be done with a simple structure!



We will be able to keep costs down this way.

The bulkhead and the core were nicely formed in one casting!

And we can design the shape of the bulkhead at will by devising the mold layout of the core.



The three breakthroughs accelerated the evolution of the system.

There is no problem with the casting quality!

I've tried a few different casting conditions, and the bulkheads are coming along nicely!

Let's split the port core mold of from left to right instead of top to bottom, and use a slide mold to punch out the valve guide part!

Now that we have more freedom in port design, it's easier to balance tumbling and power output.

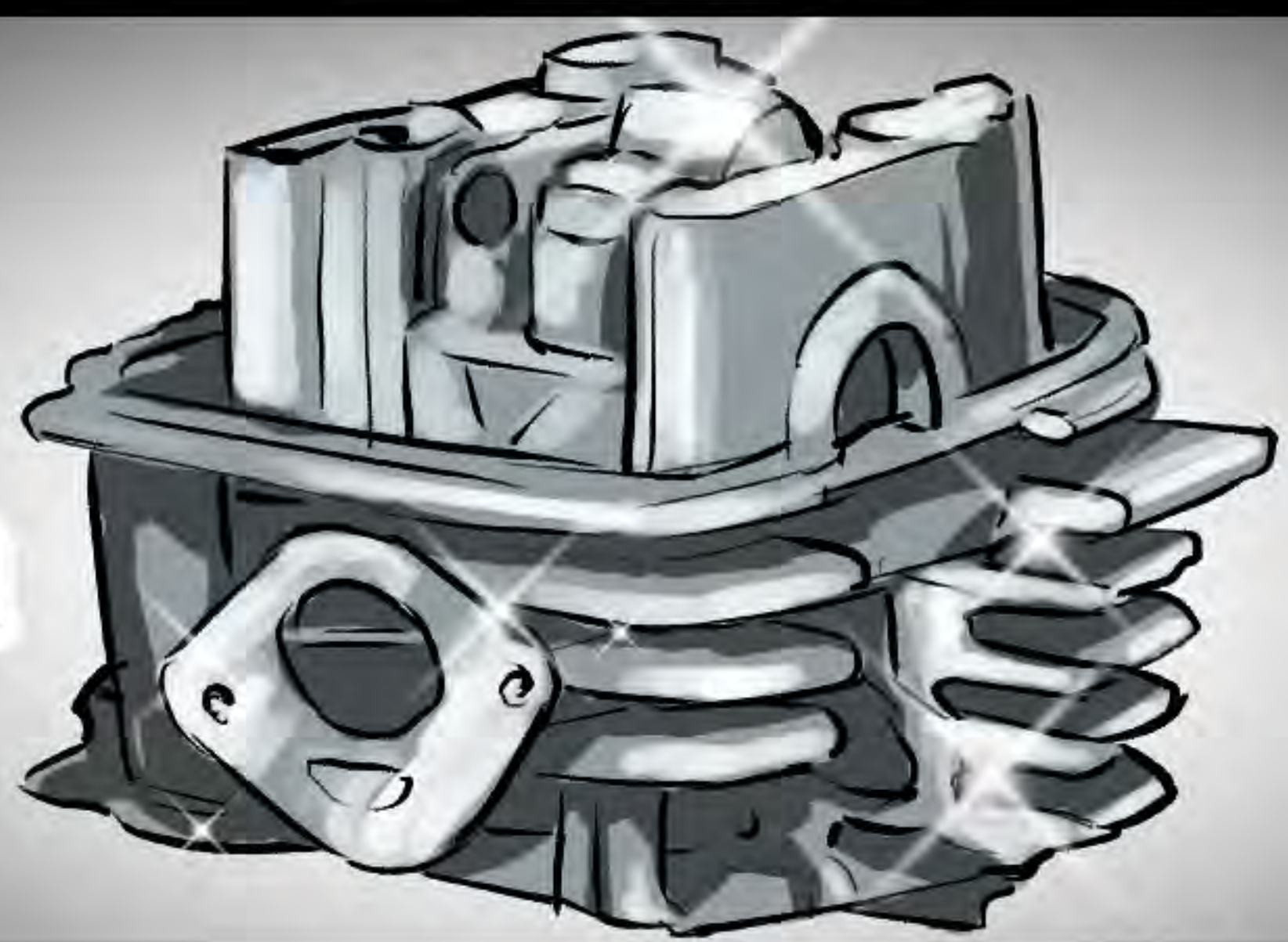
Materials Department
Hazuki Hidaka

Manufacturing Department
Hironobu Oikawa



Manufacturing Department Mold Design
Keigo Kameda

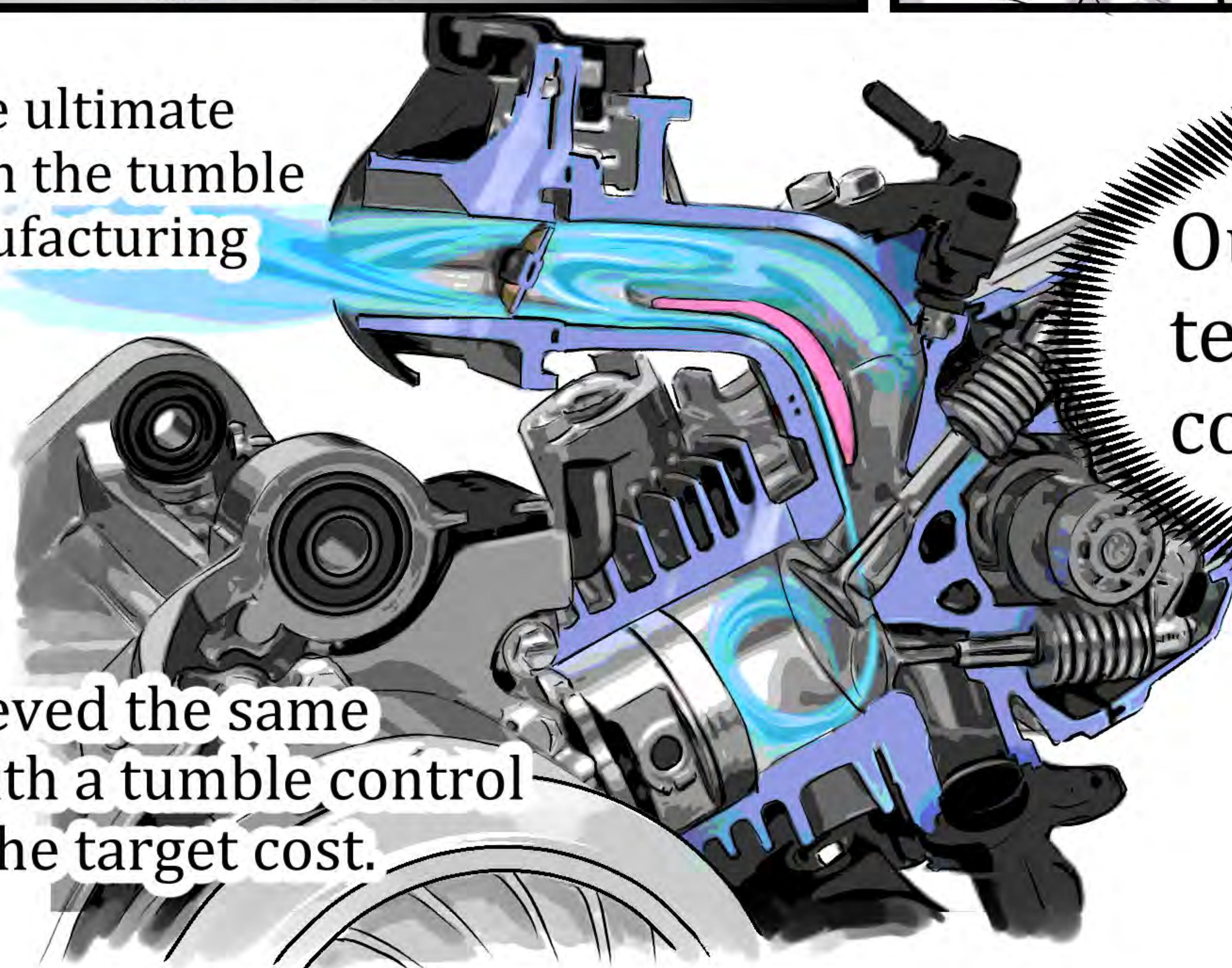
This led to the decision to apply the technology to mass-produced engines.

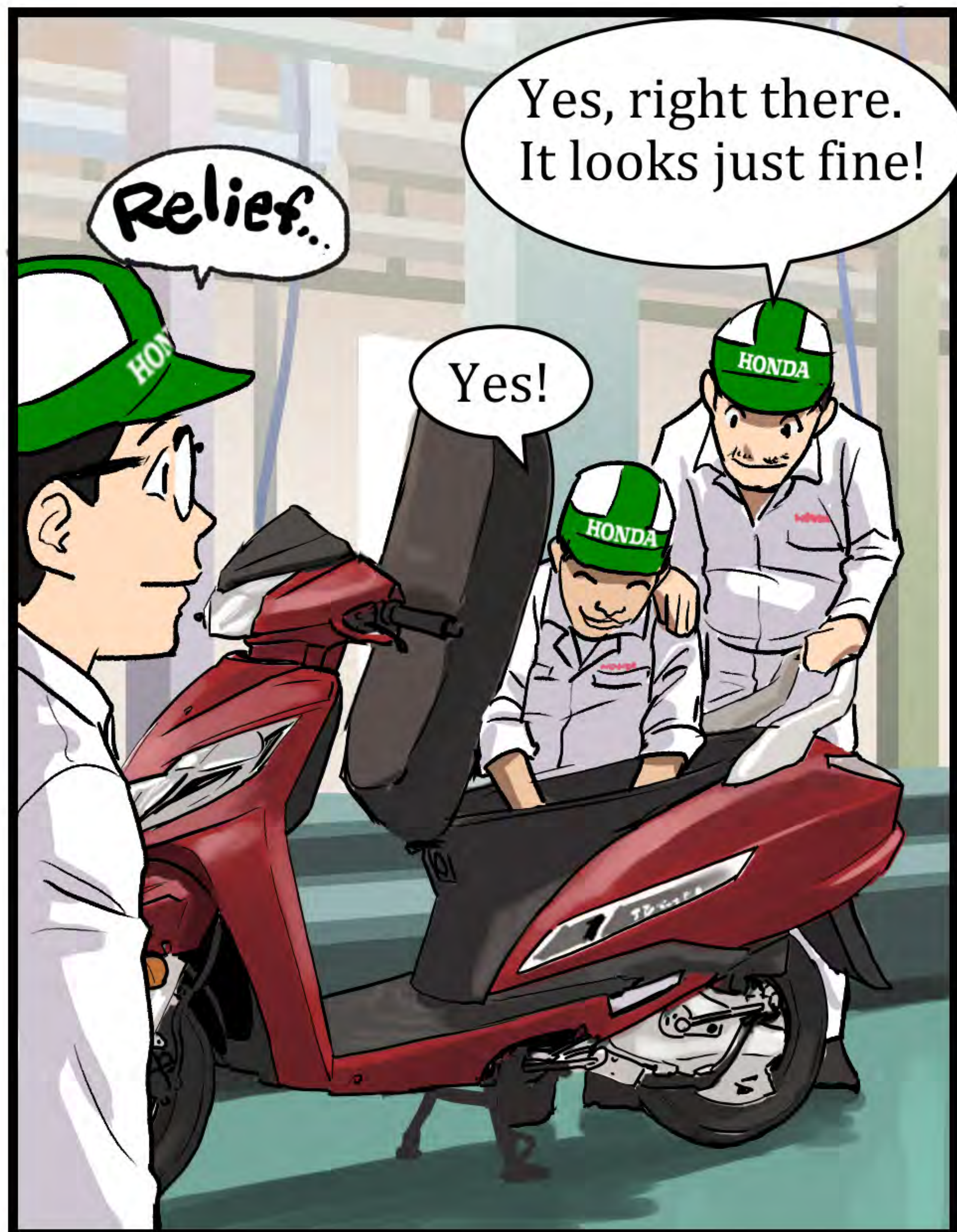


We also achieved the ultimate simplification of both the tumble generation and manufacturing methods.

Our world's first technology was completed!

In the end, we achieved the same fuel efficiency as with a tumble control valve at 1/50th of the target cost.

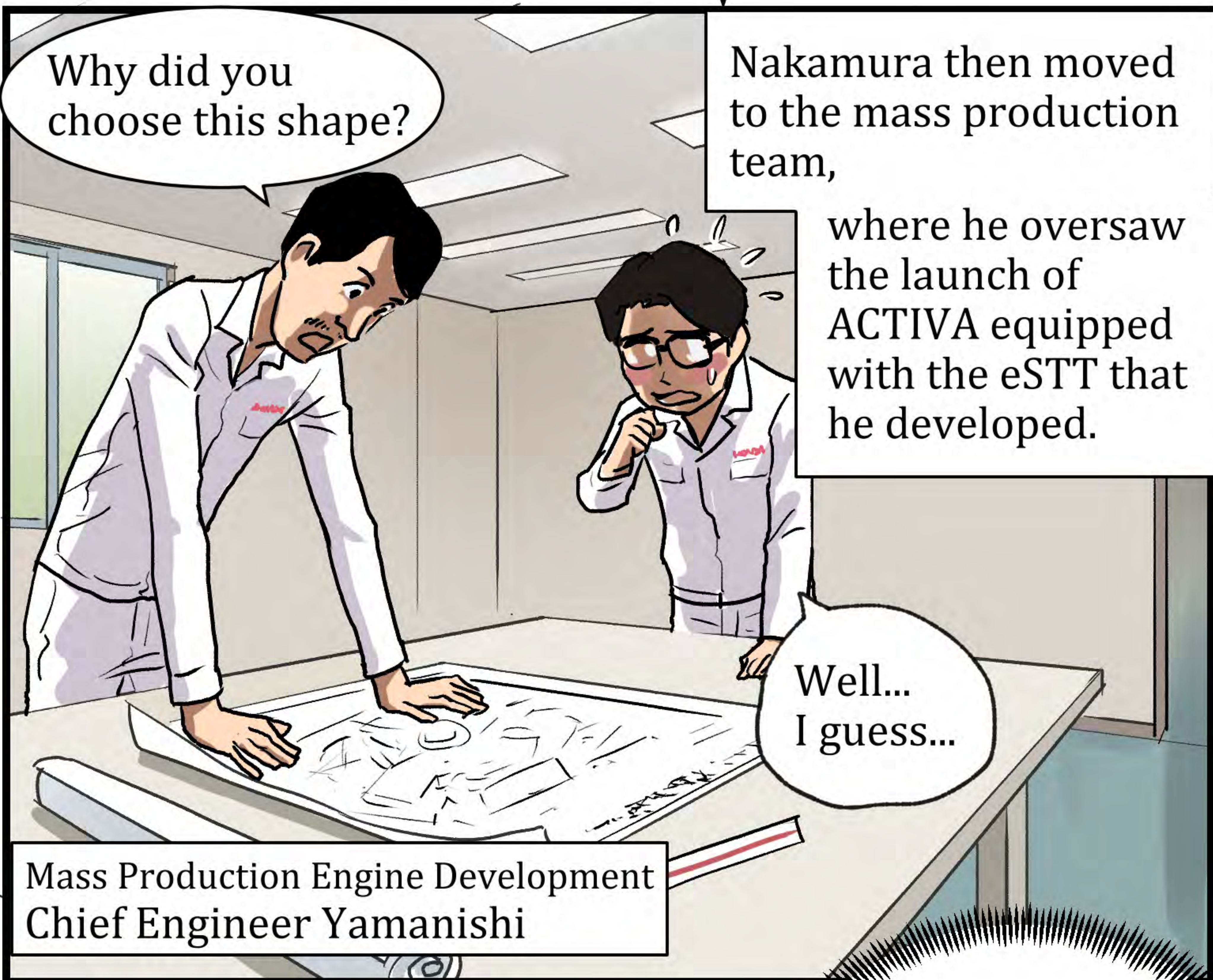




Relief..

Yes, right there. It looks just fine!

Yes!



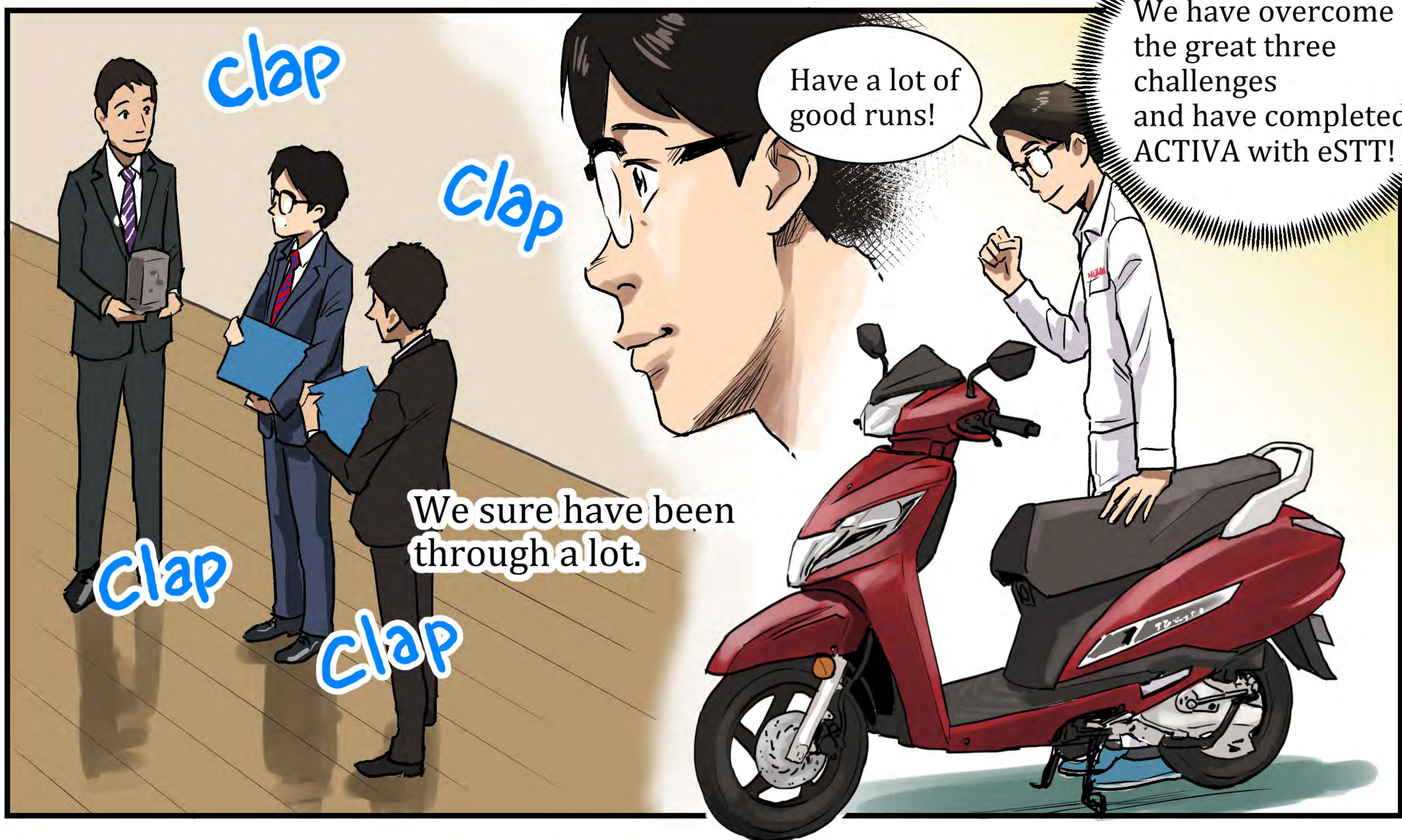
Why did you choose this shape?

Nakamura then moved to the mass production team,

where he oversaw the launch of ACTIVA equipped with the eSTT that he developed.

Well... I guess...

Mass Production Engine Development Chief Engineer Yamanishi



clap

clap

clap

clap

Have a lot of good runs!

We have overcome the great three challenges and have completed ACTIVA with eSTT!

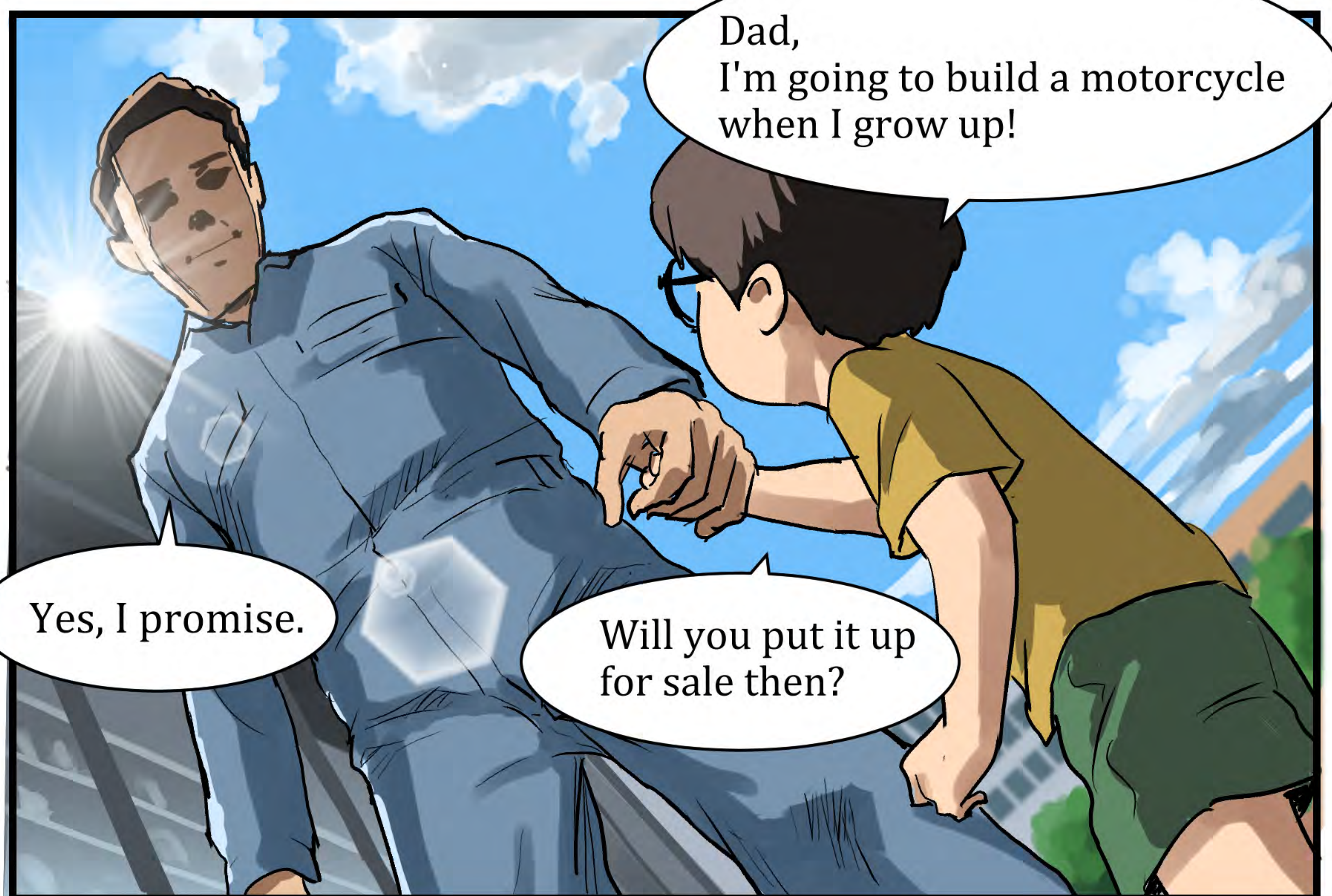
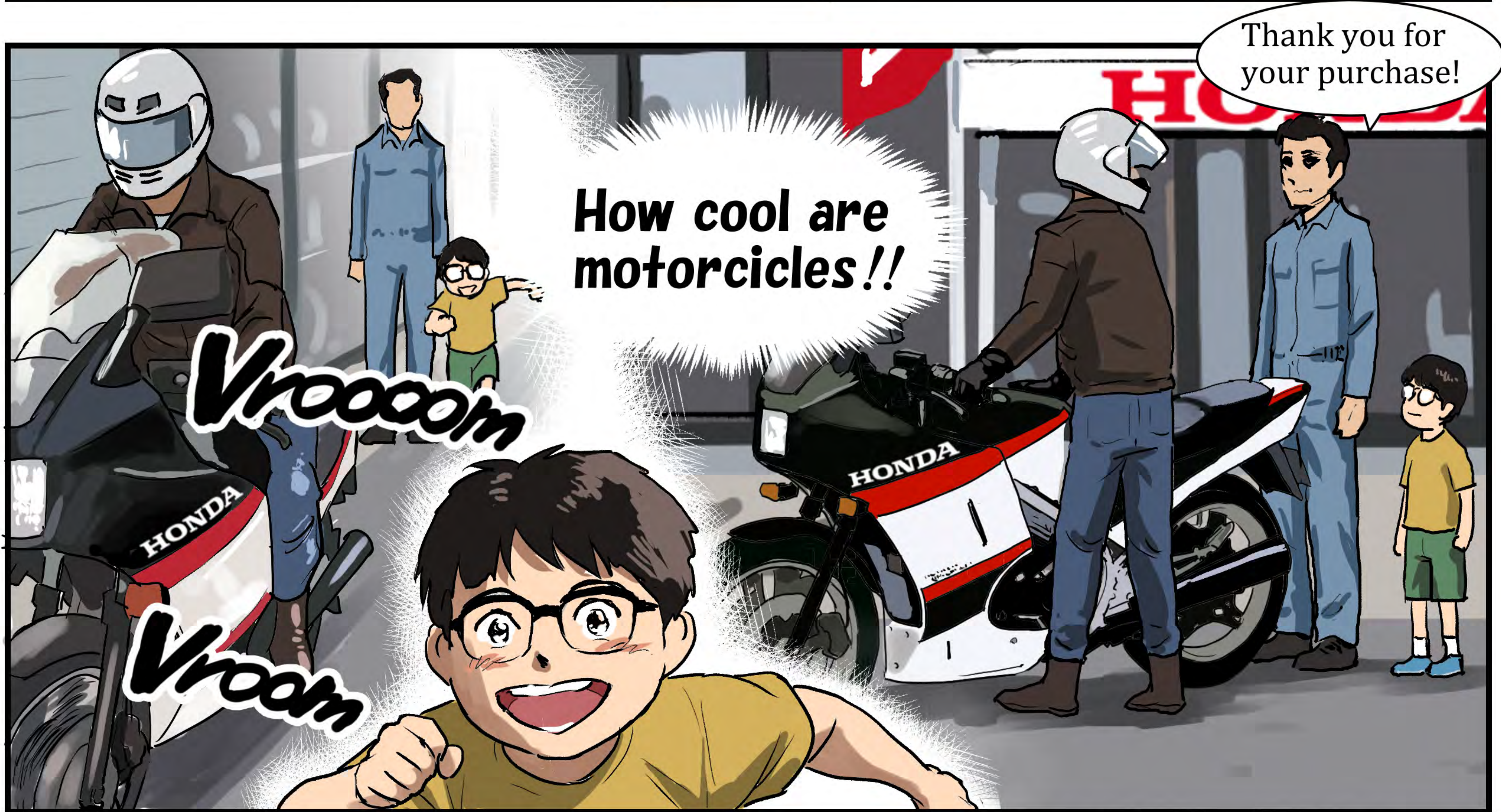
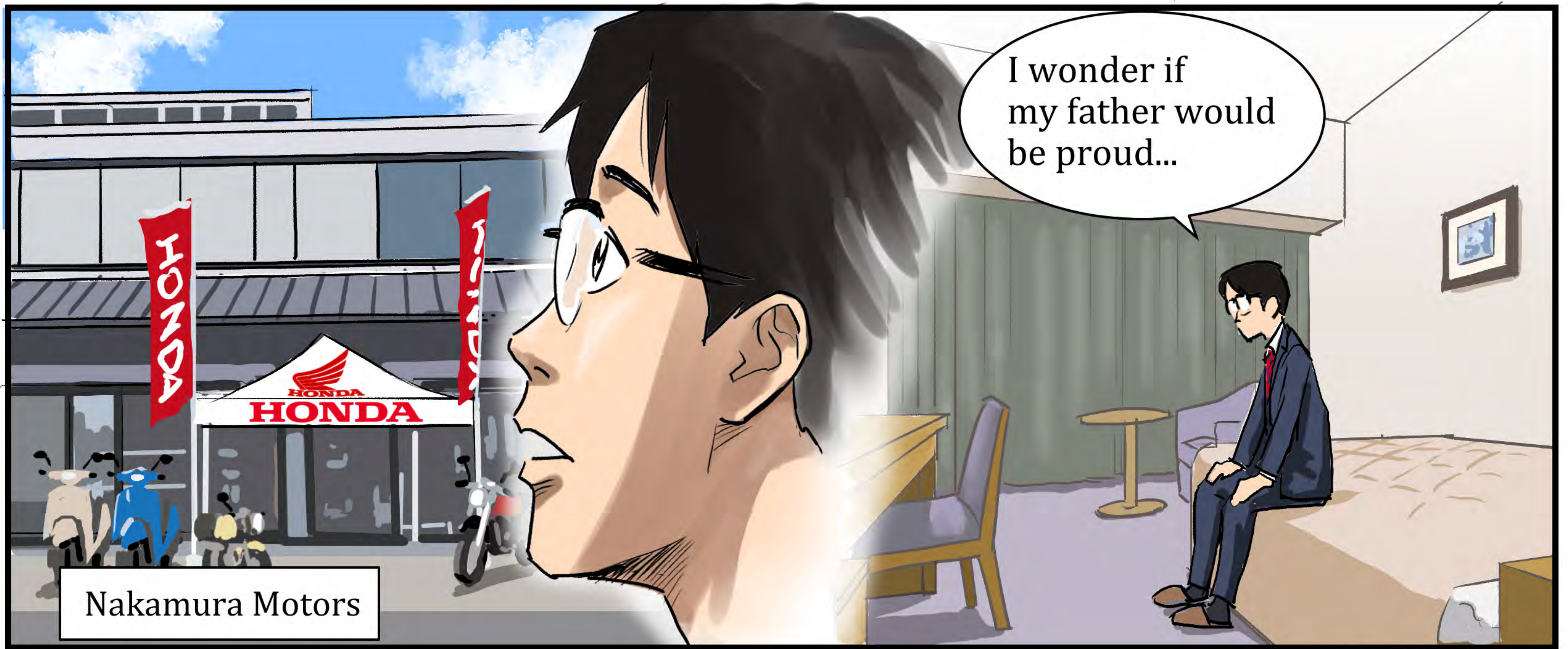
We sure have been through a lot.



Phew...

Bang





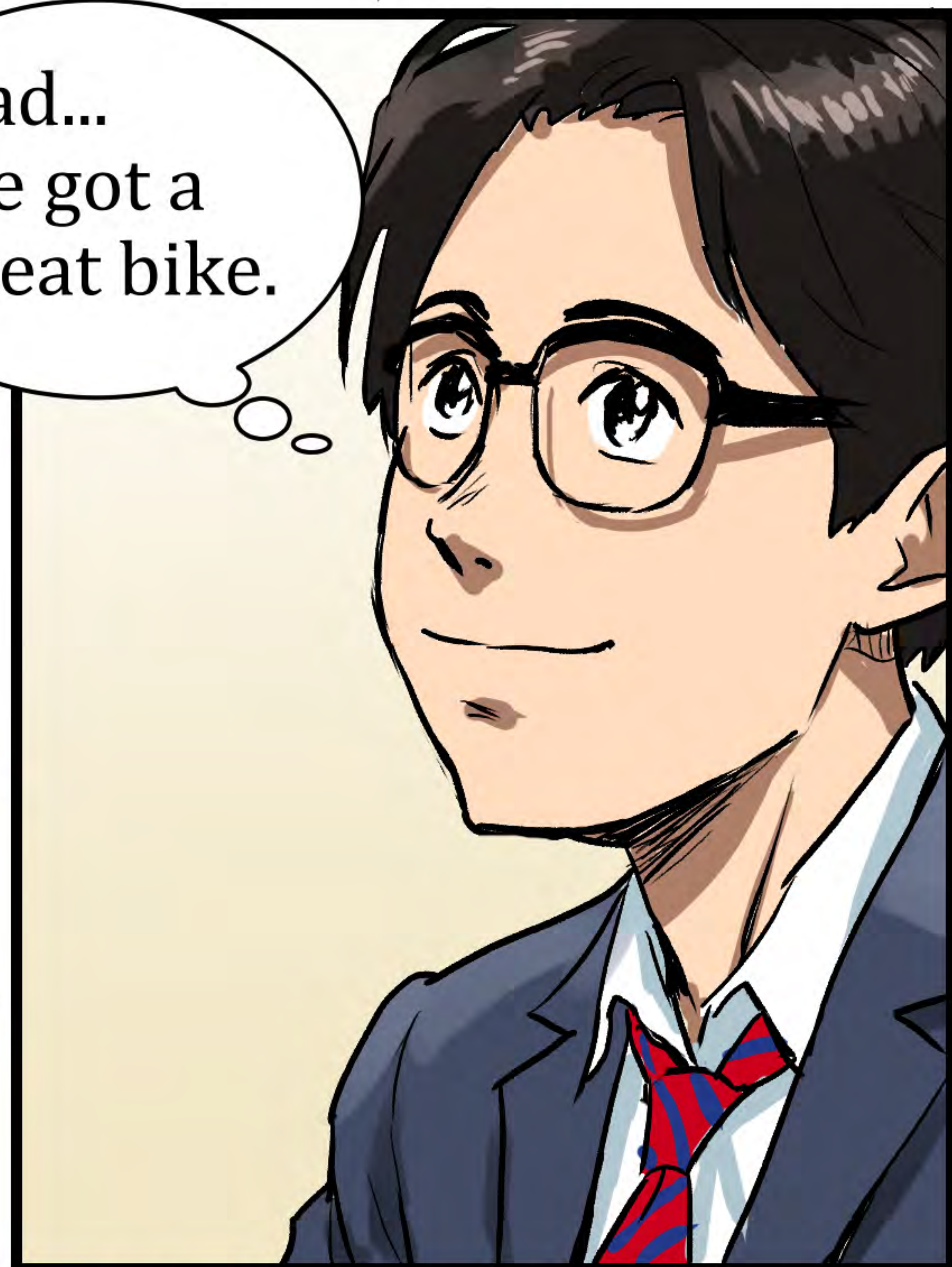


All right!

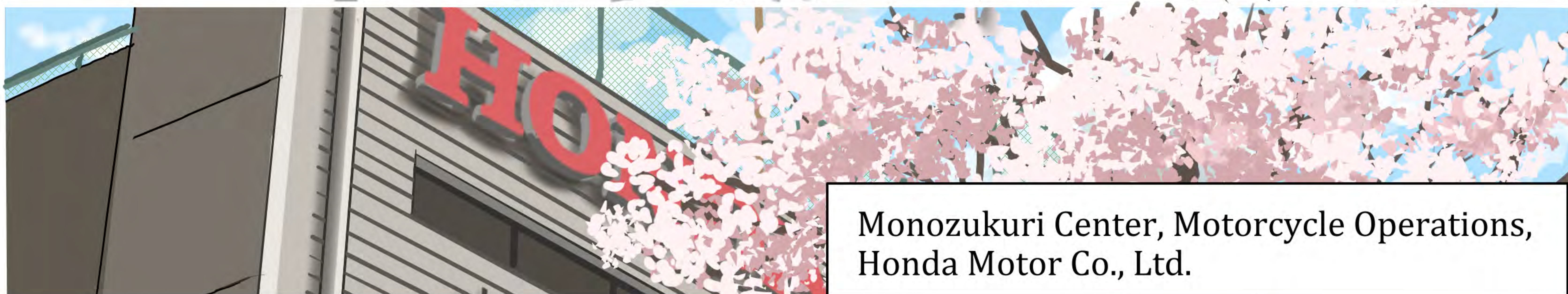
Next time,
I'll build a better bike!



Swoosh



Dad...
we got a
great bike.



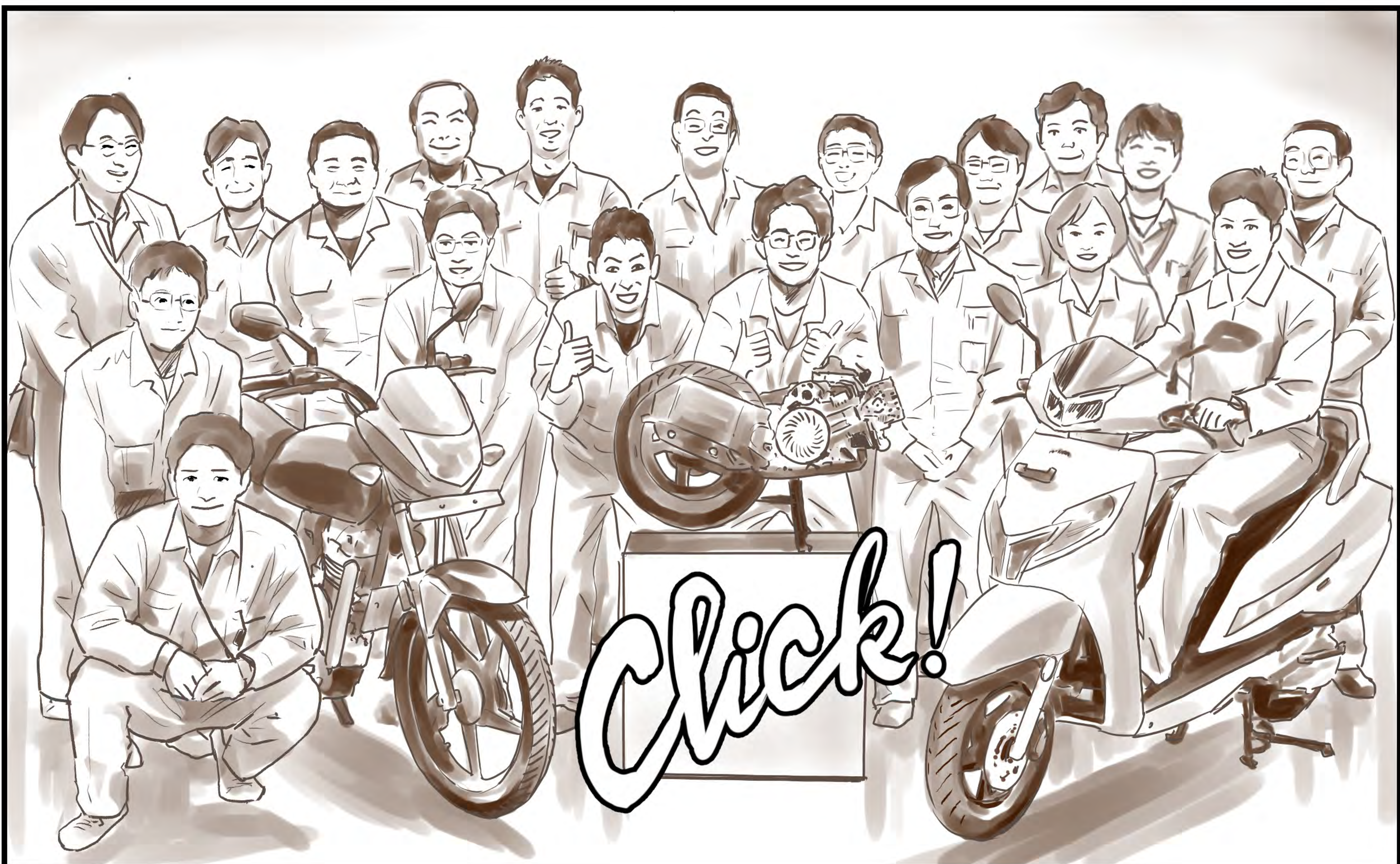
Monozukuri Center, Motorcycle Operations,
Honda Motor Co., Ltd.



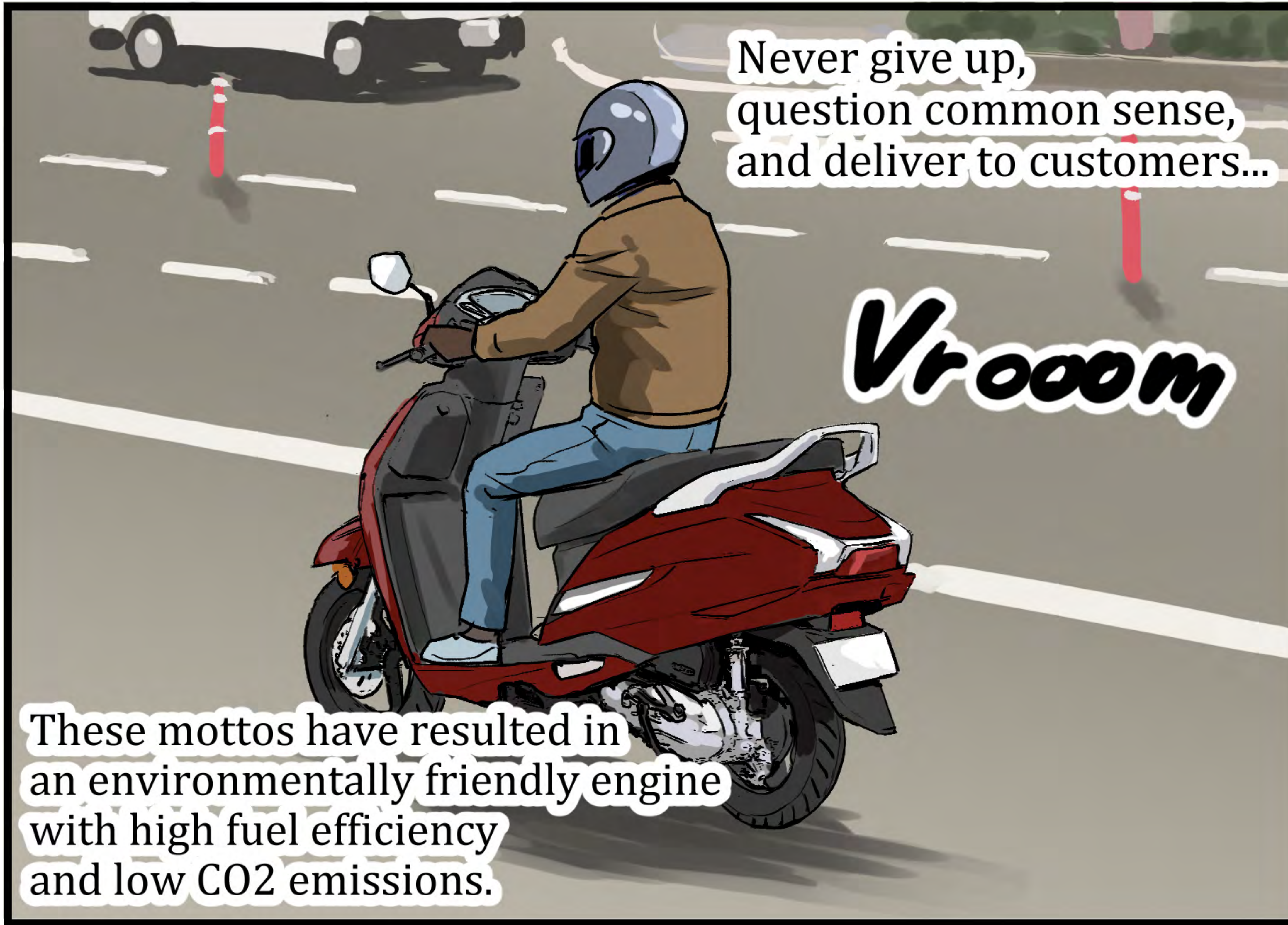
Mur mur

Let's take a photo.
Ready?

Mur mur



Click!



Never give up,
question common sense,
and deliver to customers...

Vrooom

These mottos have resulted in
an environmentally friendly engine
with high fuel efficiency
and low CO2 emissions.



In 2019,
Honda launched
an engine with world's-first
technology installed.

Vrooom



Blue Skies for Our Children

Chatter

Chatter

Honda will continue to run.