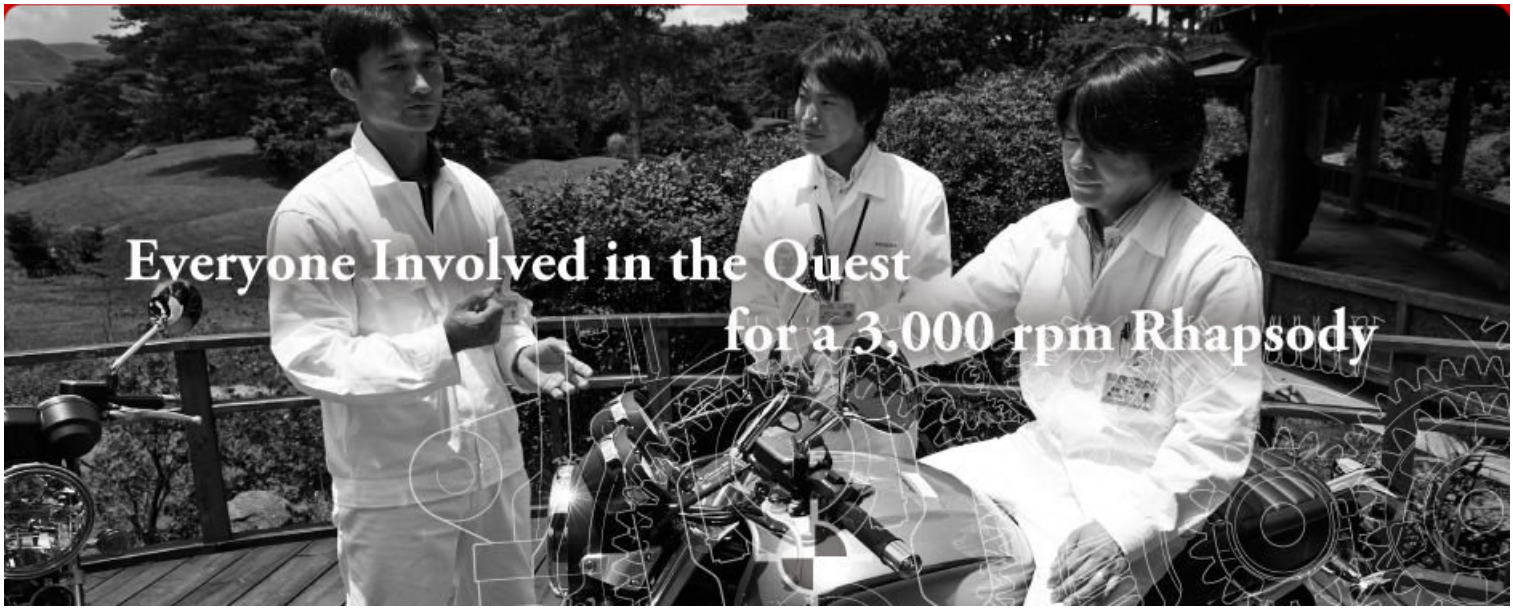


In pursuit of the perfect-feeling 6-speed transmission and pleasant cruise

Sekiya:
Why does the 2014 model have a 6-speed transmission?

Fukunaga (First-generation CB1100 Project Leader): We had already equipped the CBR1000F, a bike with similar displacement, with a 6-speed transmission, so we thought it was a natural step for the CB1100, a bike for pure riding pleasure. We didn't want the CB1100 to be a one-off bike, so the 6-speed gearbox is a natural progression.

Mukai:
We specifically aimed to produce a 'feel' at around 3,000 rpm and 100 km/h. We determined that a 6-speed box was the best choice for a relaxed ride at 100 km/h, the maximum speed limit on Japan's highways, while cruising in top-gear without the need to open the throttle much. We also wanted to improve fuel economy.

Sekiya:
The 'feel' at around 3,000 rpm was one of the defining factors when developing the CB1100, but was that the reason you chose a 6-speed transmission, and did you

determine the gear-ratios from the top-gear down?

Mukai:

That's right. We determined the top-gear first, and worked our way down the gear-ratios for each gear, and then every team member tested the bike to fine-tune the gear-ratio settings. The result is exactly what we aimed for, a natural, steady feel accelerating from 1st through 6th, not too slow, not too fast, but nice.

Sekiya:

The 2014 model seems to be high-geared compared to the previous iterations, which would point to higher speeds, but wouldn't acceleration be sacrificed?

Mukai:

I have heard that some customers had the same doubts, but we adjusted output characteristics so suit the 6-speed transmission, and we increased the torque under 3,000 rpm, so the bike has ample acceleration from, say, a low-rev cruising state. Our main objective was the drivability for high-speed cruising, so enough rapid acceleration is always available by shifting down a gear.

Korogi:

We maintained, and improved on the best aspect of the previous CB1100, the feel between 2,800 and 3,200 rpm, or between 80 and 100 km/h.

Sekiya:

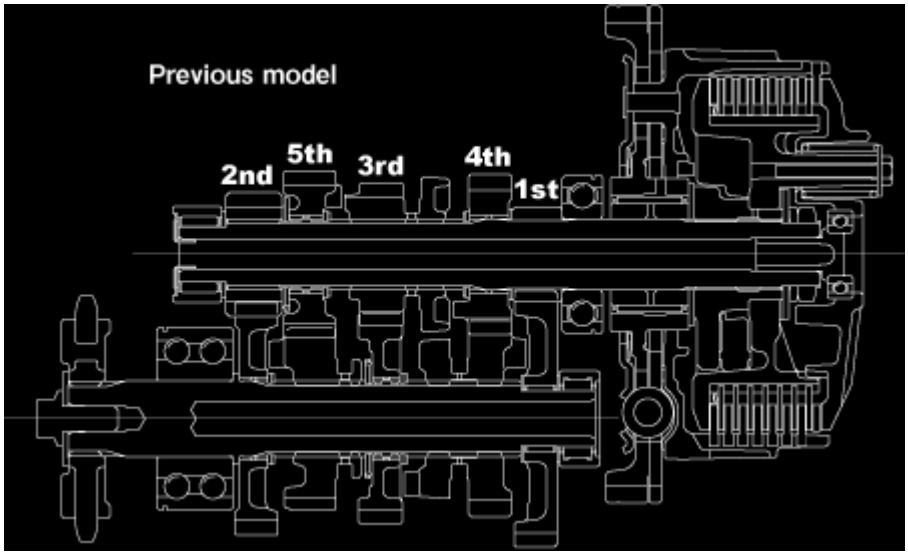
You added one gear, but the crankcase is still the same width. How did you do that?

Mukai:

The width of the transmission increased by more than 10 mm. We managed to secure more room within the crankcase, without widening its cover, but still, there are limits. We looked at each component from scratch to fit the transmission within the limited space we had. We changed the specifications for everything from the bearings to the gears. It's a gearbox packed with ideas, though you can't see that from the outside.

Sekiya:

This is a completely new transmission, as even the number of teeth on the gears has been changed. And still, the engine looks the same, and the dimensions are unchanged. These down-to-earth, behind-the-scenes improvements undoubtedly give more 'depth' to the 2014 model.


Previous model
2nd
5th
3rd
4th
1st


NEW CB1100 / CB1100 EX
2nd
6th
3rd
4th
5th
1st

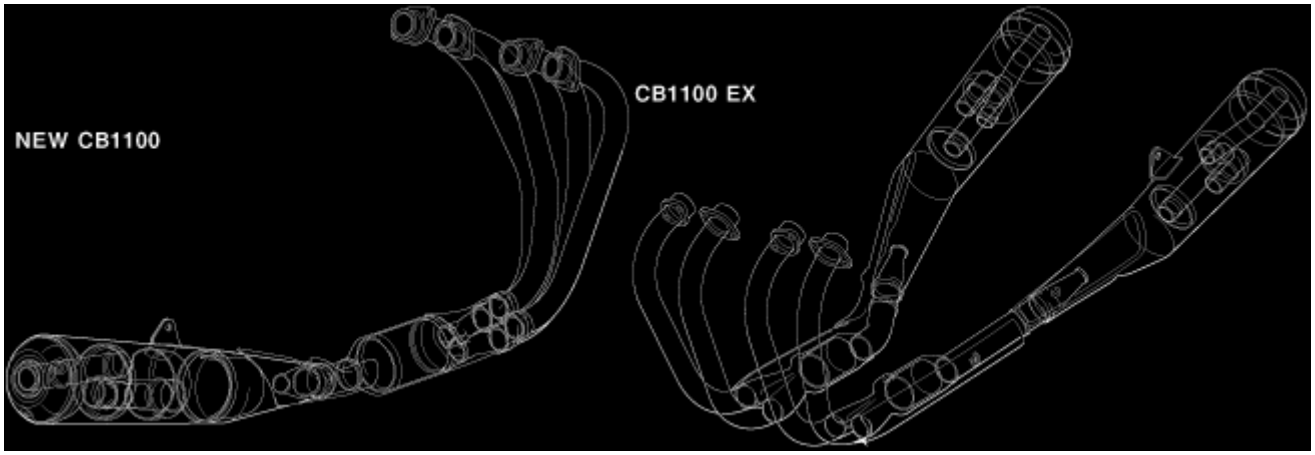
The precision and performance of the dual mufflers

Sekiya:
The CB1100EX newly features dual mufflers on both sides. What is the difference with the previous model?

Kashiwagi:
We choreographed the 'deep rumble' without linking pistons 1-2 and 3-4. As we were concentrating on the feel of the bike rather than high-output, we used our analytical data and experience to create prototypes with variations on the muffler's 3-chamber structure, tailpipe diameters, exhaust pipe internal diameters, and plate thicknesses, and road tested them all. We chose the prototype with the best balance between the exhaust note and performance, which was the basis for the final product.

Korogi:
We were already planning on dual mufflers, so there weren't any discrepancies within the team. The last problem we had was assembly precision. The muffler-ends on the pre-production models sheared to the left. It was only a minute defect of 5 to 10 mm and around 1.5º, but the visual symmetry was upset and mufflers are large, heavy components, possibly affecting the chassis balance leading to handling and stability concerns.

Sekiya:
Was it a matter of each component being within acceptable tolerances, but when assembled the tolerances would add up?
Korogi:
Precisely. The factory solved the problem by using dimensional control jigs to make adjustments on the assembly line, rather than redesigning the components or adjusting the tolerances.



Sekiya:
So, that's how the 'feel' made upon a intricate balance is achieved. Did the setting of the dual mufflers go as planned?
Kashiwagi:
We took a lot of time on the test course for the final settings. It was laborious, as we all were synchronizing our images of what 'deep rumble' and 'relaxed ride' meant, but we achieved the 'feel' we wanted.
The basis was in the hardware, such as the phased valve timing between cylinders 1-2 and 3-4, and we created the 'feel' by fine-tuning the fuel injection amount and spark timing. We focussed on the feel of throttle linearity.
The bike's movement or handling isn't right if the engine revs too little, or too much, in response to throttle amount or speed. We strived for a one-to-one relation between the rear tire and the rider's right hand.
I personally liked water-cooled straight-fours and V4 super sports bikes, so I had difficulties in creating a 'relaxed ride.' Whenever I hit an impasse, I'd let my personal tastes take over, towards an engine with great pickup and a quick response.
We fine-tuned the output characteristics according to Korogi's instructions, but if it was too suppressed, someone would say 'it isn't a bike !'
I think in the end we managed to improve the output characteristics under 3,000 rpm and attain an air-cooled, gradual pickup feel, allowing for a relaxed ride without having to open the throttle unnecessarily.
Sekiya:
I understand that the CB1100's output characteristics are intricately crafted, but I can see that by refining and heightening, you purposefully designed an understated linearity. It must have been difficult to find the sweet spot, as the torque characteristics have been improved.