Photographs: Massey University

Kiwi design students impress world

Students model a motorbike for GenZ

by ***Terry Snow and Oliver Neuland***

A New Zealand student design exercise, using an expensive but traditional 100-year-old clay modelling technique, received the tick of approval from a multinational corporation in 2012. The students working on a transport design paper at Massey University's Auckland School of Design modelled a new-look motorbike, supported by Honda Research and Development (Europe) in Rome.

The project was triggered by research collaboration between Massey University senior industrial design lecturer Oliver Neuland and Paolo Cuccagna, chief designer and manager at the motorbike manufacturer's R&D department in Rome. Cuccagna was invited to visit and collaborate with Massey University's College of Creative Arts.

The brief was to design an entry-level motorbike to re-attract 16 to 22-year-olds to "the two-wheeled bike market and life style." Based on a 125 cc motorbike, the design was to promote the two-wheeler as viable and sustainable transport in the urban environment. The designers also had to consider "the deep emotional connection such products are driven by" as well as the complex technical requirements.

In the course of the 2D design work and three-dimensional clay modelling exercise, students ran blogs so that Paolo and his colleagues in Italy and Japan could follow and comment. At the end, each student presented a full-scale printout of their concept and a video presentation which was sent to Europe for review and marking. Oliver Neuland reported that during presentations to the management in Europe and Japan, the board was impressed with the high level of ideas and skills displayed by the Kiwi students.

Shortlist

Three designs made the shortlist but the board in Japan was impressed by the overall quality of the results of the 2D-phase in New Zealand and announced a follow-up competition among European transport design schools. Even so, out of all entrants in the competing schools, it was Massey student Sam McCafferty who won an internship at the R&D centre in Rome for three months this year.

And it was McCafferty's design, championed by Paolo as a good

compromise between the different worlds of traditional riders and a younger age group, that was finally chosen by the Massey students as the model they would work on for their design exercise.

Along with the rest of the motorbike industry, Cuccagna, a product planner in Europe, is very concerned at the decreasing number of young motorbike riders. They say older generations who have grown up in a mechanically conscious world are not coming up with products that appeal to the young digital generation. The local students were asked to conduct their own research into what would be an ideal motorbike for GenZ 16 to 22-year-olds and then design their vision of this.

Brainstorming

As part of the brief, Paolo and Oliver decided to stick to the conventional combustion engine, which made the design harder—it is easier to design an entirely new category and layout than to work in the confines of a close-to-production layout.

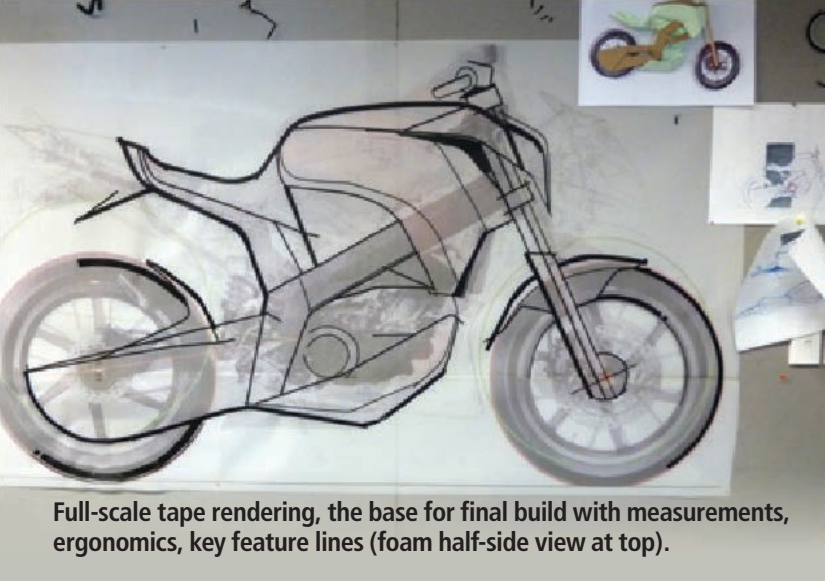
A group of 24 students started with a series of brainstorming session with Paolo, who designed the CB1000R and as a young designer worked with the famous Massimo Tamburini on details the original Ducati 916. The students then did field research. The young interviewees they questioned often described motorbikes pitched to them as imitations of bigger models and so "wannabe" or try-hard" machines. They wanted their own models, not clones of an older generation. They were often less concerned with the technical workings of the bike ("technology"), but wanted something which was easy to use and maintain ("self-explanatory," "smart"). Although young riders wanted to customise their vehicles, they were often scared to alter technical components.

Sam McCafferty's winning concept.

The hardest hurdle: parents. If the bike looked too aggressive and fast, the teenagers might not get permission to ride it (chunky wheels seemed to be a one good way to make a bike look safe). They wanted to see and be seen, have fun commuting, ride something they could toss around like a BMX or skateboard but have a machine with fewer chrome and glossy panels, and more cheap, replaceable scratch-resistant plastic parts. Many did not see a need for two full seats (although the

Paolo meets students.

Stripped-down bike and tape exercise.



Full-scale tape rendering, the base for final build with measurements, ergonomics, key feature lines (foam half-side view at top).

Youth preference was for integrated storage, not attached.

company did) and wanted good storage space safely integrated into the bike rather than attached.

From 24 initial concepts (developed across campuses in Auckland and Wellington) three design ideas were selected and evaluated for further development.

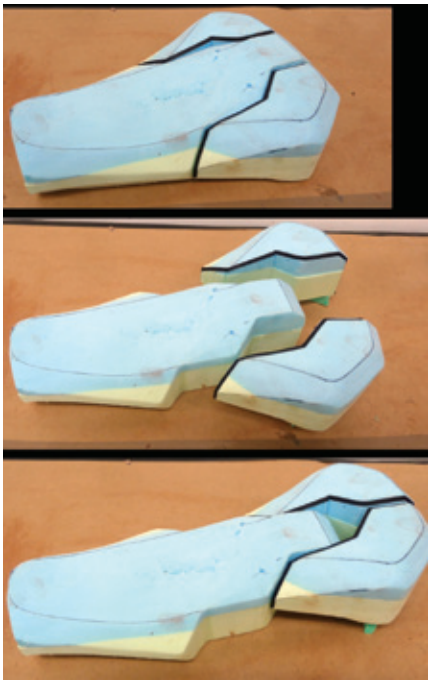
Clay

Oliver Neuland senior lecturer at Massey University's Auckland School of Design writes:

"The full-scale model which was made in the professionally equipped clay modelling studio on Massey's Albany campus is one of only few full-scale clay models ever built in New Zealand and the first motorbike clay model at the Massey School of Design.

In only a few weeks a core group of eight students converted the key design sketch into a realistic concept model. They first produced a small, half-side foam model interpreting the design sketch from one of the selected concepts, followed by a full-scale tape rendering as a base for the final build (to take measurements for the middle section, ergonomic positions and key feature lines).

The modelling process is accompanied by hundreds of workshop sketches and renderings to decide on details. The students found this challenging but always came to an agreed answer, often giving the creator of the initial concept the final say. The lecturers tried as much as possible to let the group make their own decisions, encouraging them to act as independent designers.



100 years

The main build material is a wax-based industrial plasticine or modelling clay which has been used by the automobile industry for designing cars for nearly 100 years. This is very expensive and hard to source in New Zealand but was sponsored by the German manufacturer Staedtler who air-freighted it to the

Foam and base...

...for clay mould.

students. The hard-modelled parts were built with polyurethane foam and heaps of car bog. The students followed a low-tech modelling process.

They didn't have an industry digital Co-ordinate Measuring Machine (CMM) which is based on a metal plate and digital measuring arm but used an MDF base and analogue measuring tools.

This is less accurate for symmetry but good enough for concept development.

Alternative fronts.

Industry usually refers to this as the "sketch model" phase and only the first of several steps on the way to final tooling. It still explains the design idea directly and clearly though not all the technical and legal requirements are fully met. Often in this phase the design is slightly exaggerated to make a point. These students, however, stayed very close to what could be realistic in production.

Foam

To start, they stripped an original 125 cc motorbike which was donated by the R&D headquarters in Rome. They mounted the remaining chassis on a centre pole, straightened to the centre line, then built a foam under-construction and cut parts of the frame off the bike so the could cover the remaining skeleton with a 20-30 mm layer of clay.

The clay becomes soft at 60 °C, the working temperature, and semi-hard at room temperature. It can be applied by hand and sculpted with metal knives scrapers and slicks as the rough proportions are modelled then refined. The clay's softness has its own challenges but allows the modeller to create smooth surfaces and transitions and make quick changes to test the design options.

While professional clay modelling takes years of training and can be learnt in only a few places in the world, the basic steps are easy to learn. Getting a high-quality surface finish and understanding the complex geometry are the biggest issues, but the students did very well on their first go. Honda modellers in Rome gave input via the web blog and mentioned the student's good-quality work (considering their beginners' level).

Mudguards

Hard parts like the mudguards and handle-bar raisers were designed and modelled parallel with the clay modelling. Once the clay was finished, it was primed (sealed) and painted with the company matt red to indicate the durable, cheap plastic parts of the body panels. The hard parts, seat and storage cover became matt black, presenting the bike overall as "rough" rather than "bling," comfortable to ride rather than a nervous race horse.

The students kept a large tank area to give the rider some mass to work with (they didn't like the narrow tank on the original bike) and made a storage area underneath. The seat looks like it is for a one-seater bike, but can fold out to carry a passenger for shorter trips.

In attempting to be new rather than the smaller version of an existing model, the bike became what I would describe as sharing the characteristics of a sports Ducati Monster, dirt bike KTM Supermoto, sand bike Van Van and the utility of a Honda Cub, without coming to close to any of them."

German-born Oliver Neuland had previously worked in the motorbike industry, particularly with BMW, and is converting his experience and

Clay was sculpted with knives, scrapers and slicks.

Final front taped.

Raised handlebars.

Successful designers.

material collected from fellow designers into a book about the complex task of designing a motorbike professionally. He says the book will not only be about engineering or chassis layout, but actually about creating a form, aesthetics, emotional qualities, user interaction and ergonomics which all go together to make up transportation or vehicle design.

"Nowadays these factors make or break a motorbike as much as the physical performance," he says. "Sometimes they are even more important to the user or rider than the pure figures about performance on paper. That seems to be one of the reasons why sales figures are still declining in New Zealand and other western markets, despite good product performance, affordability and excellent sustainability of entry level products.

"For customers and riders—and parents who decide whether their child can ride such a vehicle—the motorbike is a highly emotional product with stereotypes and preconceptions attached to it. This baggage means good money for some brands with a dedicated following, but it also makes it hard to look at the category objectively or to attract the next generation."

Painted final version.

Sam McCafferty in Rome

Sam McCafferty writes: "In my three-month internship, I spent a good amount of time on research then went onto concept/idea generation (with continuing research) similar to the Massey project, but with a more professional outlook on the engineering, material and manufacture. I am restricted from saying much about the actual nature of the project due to security.

"The setup is great. I spent my first weeks in Italy in the main studio with the senior designers which was incredibly inspiring and eye-opening. They are all amazing designers and were very helpful and welcoming; to be working alongside all of them was an honour.

I then moved to a smaller studio with another intern (another Sam, from France). This was great because we could turn it into a base specifically for our project—imagery research, notes and sketches covering all the walls, plus desks and design equipment in the middle. The equipment is great, all the gear you need. Wacom Cintiq [LCD screen and press-sensitive cordless pen for drawing directly onto the screen] was my favourite new toy, although you can't go past the trusty black pen. Cool little room for sure—literally, heavily air-conditioned for a poor Kiwi in the 40-degree heat of an Italian summer.

"It was great to be able to wander into the garage downstairs and check out the engineering or design of certain parts of all the motorbikes there, or simply just to marvel at some beautiful machinery (the most common reason...)."