

Satyendra Pakhalé works in high-tech industry and is acutely aware of the lack of sensorial quality in industrial design. Tactility is often missing in mass-produced design, which has become divorced from the senses and has thus lost its cultural and symbolic meaning. By going back to basics and working with traditional materials and techniques, Pakhalé aims to harness this absent quality to modern technological objects.

The B.M. Horse Chair is made by the bell-metal lost-wax process, which has existed in different areas of the world for many centuries. Pakhalé chose to work with a tribe in central India that has a culture of making art objects. The tribespeople collect beeswax and roll it into spaghetti-like strands, which they wind around a clay mould. The mould is left to dry and then a second layer of clay is added. This is fired in a basic furnace, causing the wax to melt and the clay to harden. Metal is poured into the cavity and allowed to set. When ejected, the metal retains the patterning of the wax strands. By adopting this method in a more refined manner, Pakhalé created a range of contemporary objects that gave him the idea of designing a sculptural chair with a primal horse form; an iconic identity that relates emotionally through symbolic connotation and cultural reference.

The challenge of producing the entire chair in a single piece of seamless casting was to dominate Pakhalé's life for the next eight years. To achieve the desired

form and surface quality, Pakhalé hand-sculpted the chair using initial sketches to determine profile and rough dimensions. These were introduced into a computer program to check ergonomics and overall dimensions before a 1:3 model in clay, replicated in plaster, was produced in his Amsterdam studio. It would have been impossible to cast the chair using the facilities available in rural India, so Pakhalé found a sculptor's studio in Nagpur, taking members of the tribe with him to undertake the highly skilled wax spaghetti work. A final full-scale form was made in plaster from which a polyester (fibreglass) mould was produced. A core was cast in a combination of brick powder and plaster, around which the rolled wax strands were wound. From 2000 to 2005 Pakhalé tried four times to cast the chair, but failed each time. To cast an object this big in one piece with such a thin metal wall is challenging, as there have to be enough points for the gases to escape, and the outcome is never known until the mould is broken apart.

In 2005 Pakhalé moved the exercise to Europe and started to think of an alternative to be used in place of the natural substance. Carrying out a small casting using rubber tube and a silicon mould, he devised a new way to do the wax modelling; then the search was on to find a foundry that would work with this uncertain technique. After five months an enterprising company in northern Italy took on the challenge. During this time Pakhalé carried out a metallurgical

test using 3D scanning and reverse engineering; the digitized version of the chair was carefully studied to examine the metal flow over the highly sculpted surface. A replacement was sought for the wax/rubber piping. A flexible 5mm (1/4in) diameter tube in a plastic composite was needed for the intricate work. Again Pakhalé was lucky to find a company that believed in his research. A manufacturer of all types of tubes for industry fulfilled the bespoke order. The polyester model was skilfully encased in the plastic tubing and was shipped to the foundry. There it was coated in silicon, with a strengthening layer of plaster, and the mould created. From that a hollow wax model was made and the cavity filled with plaster and brick powder. The mould was heated for ten days to slowly harden and finally fired to melt the wax. The bronze was poured, allowed to set and the cast was broken away. The process had worked. The metal was then chiselled, filed and the patina finished. The finished chair was presented at Design Miami, Basel in 2007. With its mix of craftsmanship and industrial technique, engineering and material research, it was an enormous success.

B.M. HORSE CHAIR

SATYENDRA PAKHALÉ

Production: Satyendra Pakhalé

Bronze alloy, recycled bell metal

H: 96cm (37¾in) x W: 55cm (21¾in) x D: 85cm (33½in)

Design to manufacture: 7 years, 6 months

Limited edition

Distribution: Designer's Gallery Gabrielle Ammann, Germany

www.satyendra-pakhale.com



The B. M. Horse Chair is made from a unique and innovative process that combines old and new materials and technologies.

1-2. In the summer of 1998 Pakhalé created a range of contemporary bell metal objects distinguished by their sensorial quality, refined use of wax patterns and sophisticated designs, finesse and finish. He adapted the lost-wax casting techniques of a tribe in central India that had a specific culture of creating and making art objects.

3. The objects gave Pakhalé the idea of designing a sculptural chair with a primal, iconic horse form. The size of the piece made it impossible to cast in one piece in rural India, so a sculptor's studio was found in the city of Nagpur. Pakhalé needed the specific craft skill of the tribespeople so took them with him: this was a logistic nightmare, as many had never travelled out of their immediate environment. Four self-financed attempts were made to cast the chair. All of

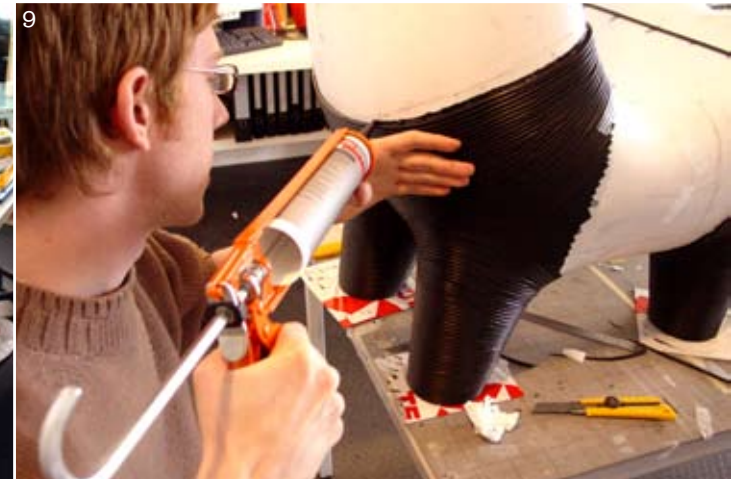
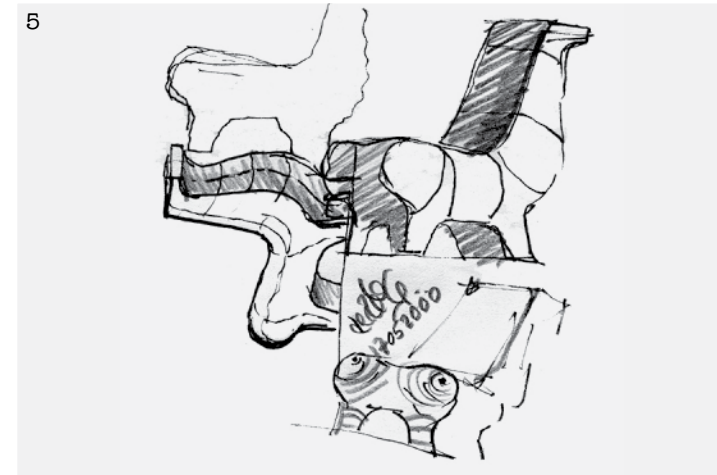
these failed and the exercise was moved to Europe.

4. Pakhalé was encouraged to continue by the positive response he received for a 1:1 model of Horse Chair in flock technique that he designed for Cappellini and exhibited during the Milan Furniture Fair, 2001. He sought to find an alternative method of substituting the natural substance, and rethought the entire process.

5-6. Pakhalé developed the form using sketches (5) and 1:3 models made from clay and then replicated in plaster (6).

7. Pakhalé creating the polyester (fibreglass) model, which was originally sculpted in clay and then plaster.

8-11. The model is painstakingly covered by the 5mm (1/8in) plastic composite; this is not too stiff and not too flexible, but just right to be able to work with.



12. The skilled operation is of utmost importance to the project, as what is left at this point will be the final appearance of the cast object.

13. The tube being manufactured. The firm that undertook this work makes pipes for industry; it is owned by a woman who is not just a technical expert but was culturally interested in design. She took the gamble of closing her factory for two hours to fulfill the order.

14. Packing the model in the Amsterdam studio to send

to the foundry in northern Italy. Pakhalé had sourced an industrial glue used in the automotive industry to stick the plastic tube to the polyester. A strict schedule meant there was no time to test the glue and there was a real concern that it might become brittle in the sub-zero temperatures of the plane's hold.

15-16. Once at the foundry the model was coated in silicon along with a strengthening layer of plaster, and the mould created.



17. A hollow wax model was made and then checked by means of a custom-made tool to correct movement and distortion.

18. After the wax model preparation, the real casting work starts. The planning of the casting, installing it in

the furnace and strategically placing the runners and risers on the wax model are immensely skilled tasks.

19. Once the mould is prepared it is slowly heated for ten days to harden and finally fired so the wax melts. The mould is ready.

20. The bell metal (a combination of bronze and tin alloy made from broken old utensils) is poured into the cavity and allowed to set. Then the cast was broken.

21. Opening of the metal casting. After dedicating eight years of his life to the project,

Pakhalé couldn't bear to be there at this point and awaited the news in Amsterdam. Luckily, the process had worked.

22-23. The chair being chiselled, filed and the patina finished.

