

How Far Can You Go with Bamboo?

Compromising Traditional and Contemporary Methods in Bamboo Product Design and Production in Tasikmalaya, West Java

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Abstract: In the late 90s, when people started seeking materials that can substitute or supplement wood, due to the issues of timber scarcity, bamboo emerged as an optimal one. The exploration of bamboo material in industrial countries has led to various advanced treatments for bamboo, which mostly resulted in products similar to those made of plywood and composites. Bamboo regained its popularity in Indonesia as well. However, on one hand, bamboo production techniques applied in industrial countries cannot merely be copied to Indonesia, due to factors such as inconsistent supply of raw materials and lack of knowledge and technology. On the other hand, skills of bamboo craftsmen are no longer adequate to fulfill the requirements for producing contemporary products that bear different styles and purposes from the traditional ones. Considering the aforementioned conditions, this paper aims to identify the varieties of current methods used to produce bamboo in Indonesia, which compromise between craftsmen's skills and demands in contemporary products, and discuss whether this method lead to bamboo product design innovation. This paper also discusses the aspects of sustainability for this renewed bamboo production methods, and also the discovered, new forms of bamboo products made by these new methods.

Key words: *bamboo, design, Indonesia, production methods*

1. Introduction

Bamboo, a material indigenous to Indonesia, is known to have countless traditional functions after being treated and processed with traditional methods. These methods include natural preservation of harvested bamboo by immersing the poles in running water and mud, tying the poles together with ribbons of rattan skin to make structures, plaiting peeled bamboo strips to make walls, and so on. Therefore, the material bears the image of being "traditional", and even "inferior", instead of being considered as "advanced" or "potential". Eventually, in the early 90s Indonesian academics and researchers started to explore bamboo for its material properties, due to the issues concerning the scarcity of timber and the phenomenal illegal logging, in order to find materials that can substitute or supplement wood. Bamboo started to get the attention as a potential material for such performance. As a consequence, new methods for bamboo treatment and processing have to be introduced to bamboo product industries in Indonesia, most of which are of small- and medium-scale enterprises (SME), including home industries. Bamboo products that are created with these new methods also fulfill different functions from traditional ones, and are aimed at different users and markets. Transitions between the traditional methods of production and the new ones have been taking place, but a search for appropriate methods for different SME is

still going on, since each SME has its own particular skills and potentials. The following sections discuss a number of examples taken in Tasikmalaya, a region in West Java, which is famous for its rich varieties of traditional bamboo products and production techniques, and how the craftsmen respond to the new methods.

2. A Tradition of Bamboo Products Manufactures

2.1 Tasikmalaya, West Java, a center of bamboo product

Tasikmalaya, a city between Bandung and Purwokerto, is located at the South East of West Java Province in Indonesia. It is a city bearing the same name as the administrative capital of a regency. The city, including the regency, is populated by more than 600,000 inhabitants (according to the 2010 census). Tasikmalaya has been known as full of skillful craftsmen, ranging from textile (batik), woven mats made of *mendong* (a variety of reed), brightly-painted paper umbrella, wooden clogs, embroidery, etc. that are spread all over the region. Among all these crafts, products made of bamboo have become among the famous ones, and visitors to the city are generally directed to an area where huge outlets for bamboo products are located. Bamboo products that can be found in these outlets range from daily utensils such as kitchen and household equipment (rice cookers, containers, placemats, trays, baskets, salt-and-pepper shakers, brooms, blinds, stools, benches, etc.), toys and musical instruments (flutes, *angklung*, wind chimes, etc.), to souvenirs and decorations (fan, hairpiece, dolls, animal figures, etc.). These products have been manufactured by generations of craftsmen in home industry units, and hardly went through any significant change in their production process and design. Considering the discovery of advanced treatments toward bamboo that have given bamboo material new appearances and performances, the demand of bamboo products that are suitable for contemporary lifestyles increases. Therefore bamboo craftsmen in rural areas gradually tend to adjust to new methods of production.

2.2 Bamboo production methods and skills in Tasikmalaya

Due to the abundance of bamboo plants that grow naturally in the region, it is evident that bamboo is used for generations in almost every aspect of life. It has been used to build houses and bridges, as farming, fishing and household utensils, as furniture and other products. Traditionally, as a production material, after being harvested and treated for preservation using the traditional method of immersing the material in mud and running water[1], bamboo is processed into the following forms, depending on the use; i.e. intact poles for main structures and columns, thick strips for additional structures, thin strips with different width for weaving or to make sheets. The forming of bamboo into production materials that are ready to be processed further is conducted manually by craftsmen, using only knives as a tool. After the production materials are ready, the process proceeds with forming the products, using traditional techniques, mainly tying, dowelling and weaving, depending on the product varieties. Nails and adhesives are rarely used, considering the characteristic of bamboo that can easily split.

Not all craftsmen are skillful in producing all production materials, since they are also divided into sub-regions or areas that are specialized in particular skills and methods. For instance, if an area is famous for its delicate weaving technique and smoothly woven products, it is almost certain that craftsmen from that area are not capable of manufacturing furniture with strong structures with qualities as good as those made in another area that are famous for it, and vice-versa. Therefore it is important to be able to identify particular skills of certain areas, in order to be able to deliver appropriate methods of production for contemporary products[2].

Such manual skills, which are generally labor-intensive and require particular levels of processing skills that have been handed down for generations and can only be achieved through years of practice, are considered “traditional”. Next to the skills, the tools and additional materials used in production, which are knives and other simple household tools, also place the method as “traditional”. Bamboo products that come out as the result of this method mostly fulfill traditional functions, with indigenous designs, and are used according to its purpose (i.e. a bird cage to keep birds in, a rice cooker to cook rice, and so on), by users who are familiar with the products and its original functions. Such users are referred to as “internal users”, since they are the same communities who produce and also use the products themselves[3] (see Table 1).

Table 1. Traditional and Advanced Methods for bamboo products production in Indonesia (modified from Larasati, 1999)

	Traditional Method	Advanced Method
Production material	Raw bamboo: culm, rod, split, strips, etc.	Raw bamboo: split, woven mat
Preservation material	Immersing in mud and water	Injecting preservative substances
Tools	Simple household tools (knives, scissors, etc.)	Advanced and specialized machinery
Processing	Manual weaving techniques	Forming bamboo boards / moulding / moulded composite
Product Assembling	Manual weaving techniques	High pressure moulding, followed by conventional manufacture assembling
Other Materials and Substances	None	Adhesive substance, additional product elements
Finishing	Natural	Polishing, laminating
Product Groups*	Indoor Furniture and Accessories and Other Products: kitchenware and household products, traditional housing construction elements	Building Components: boards for interior building components
Design	Traditional design	Improved products: new design
Users	“Internal users”, local communities	“External users” (who are not involved directly in the production process), export market
Enterprise	Labor intensive, household-based	Mass manufacturing

*Product Groups are based on classifications for exported bamboo products: Building Components, Furniture and Accessories (that are not directly attached to building construction, divided into Indoor and Outdoor products), and Other Products[4].

2.3 Challenges

As time goes by, craftsmen face new challenges in making a living by merely depending on livestock and/or farming and producing bamboo products. Farming lands become smaller, due to population increase, while

bamboo products, especially household utensils, are gradually replaced with “modern”, mass-produced ones that are more practical and attractive. They can no longer depend on selling the products to internal users in local markets. But, in order to attract external users in a wider market scope, they need to have the knowledge of contemporary lifestyles, of current demands for qualities, and of other relevant aspects such as market connections, marketing strategies, production management, etc., including mastering new production methods that fit their competences. Simultaneously, a number of experiments concerning the performance and appearance of bamboo materials were underway, of which results are to be applied to bamboo product SME. The main challenges concerning these experiments include the facts that, on one hand, designers, unlike craftsmen, lack first-hand knowledge about processing bamboo material manually, while on the other hand, craftsmen in rural areas lack references and experience on interacting with analyzing contemporary lifestyles and methods of generating product ideas and translate them into marketable objects. Another challenge is to find skillful craftsmen who are willing to cooperate in producing prototypes of bamboo products that are completely different from the ones they are used to make, up to a certain level of quality. Moreover, for the designers, next to creating sensible contemporary bamboo products, it is also important to determine production methods that fit the skills and competence of local craftsmen.

3. New Production Methods for Bamboo Products in Indonesia

3.1 Experiments and findings

In the early 90s, an engineer at the Indonesian Science Institute (Lembaga Ilmu Pengetahuan Indonesia/ LIPI) developed bamboo board, using machines that are particularly intended to process bamboo material for that purpose, namely bamboo splitting machine (to split bamboo poles into strips), adhesive machine (where bamboo strips can be immersed thoroughly in adhesive substance), and so on. The technology to produce bamboo boards is mostly derived from technology to process timber, with a number of adjustments. Findings from these experiments were mostly in laboratory scale, or prototypes, which have not necessarily met the requirements for a commodity, or a commercial product, due to the high cost of production and the lack of demand. These experiments, including their findings and results, have been published in academic journals and acquired technology/ industrial patents, and are considered as “advanced” methods in producing bamboo products[5][6]. On one hand, from an engineering viewpoint, bamboo material is treated as common fibers and timber, using machineries and adhesive substances that form the material into composite boards. On the other hand, from the viewpoints of a majority of bamboo product enterprises/ SME that exist in Indonesia, there is a gap of technology and knowledge transfer, should such bamboo product industry be established. Moreover, there are other factors that should be considered in achieving mass-production methods, such as raw material supply, human resource in enterprise and product management, and other tangible facilities.

3.2 Hybrid methods

In order to bridge the gap between “traditional” and “advanced” methods (see Table 1), there are “hybrid” methods that combine both traditional and advanced methods in certain levels that depend on particular competence and access to facilities of the SME that are willing to apply the method (see Table 2). In general, hybrid methods that would fit bamboo product SME in Indonesia are labor-intensive, considering the amount of productive age in Indonesia that would need employments. The methods should also consider the indigenous

skills of particular areas, and should take care that the craftsmen maintain these skills and improve them along with the new methods. Among the important considerations is the input of product design, which can contribute to the product knowledge, concerning contemporary lifestyles, needs and demands of external markets. In this case, the field of product design also keep conducting experiments and producing prototypes, in order to match the design with the skills, techniques and facilities of craftsmen in certain areas.

Table 2. Hybrid Methods for bamboo products production in Indonesia (modified from Larasati, 1999)

	Modified Traditional Method	Combination of Traditional and Advanced Methods	Adaptive Advance Method
Production material	Raw bamboo: culm, rod, split, strips, etc.	Raw bamboo: culm, rod, split, strips, etc., and pre-treated bamboo: boards, composites, etc.	Pre-treated bamboo: boards, composites, etc.
Preservation material	Traditional method	Traditional method, injecting preservative substances	
Tools	Simple household possessions, additional small machinery	Specialised tools, additional small machinery	
Processing	Manual technique with machinery support		Manual processing of pre-treated production material
Product Assembling	Weaving technique, conventional manufacture assembling, adapted manual technique		Conventional manufacture assembling
Other Materials and Substances	Adhesive substances, additional product elements		
Finishing	Variable: natural, polishing, colouring, laminating		
Product Groups*	Indoor Furniture and Accessories and Other Products: kitchenware, tableware, furniture, accessories, etc.		
Design	Modified traditional products, new and improved design		
Users	External users		
Enterprise	Labour intensive, improved household enterprise, with co-operative organisation of producers that are protected by the government's policies.		

*Product Groups are based on classifications for exported bamboo products: Building Components, Furniture and Accessories (that are not directly attached to building construction, divided into Indoor and Outdoor products), and Other Products[4].

After years of experiments and research, including an intense contact with bamboo craftsmen in Tasikmalaya, three varieties of craftsmen are chosen: one who masters in soft, delicate weaving, one in bending (such skill is commonly used in the production of bamboo steamers), and one in common weaving. These three craftsmen are chosen also due to their willingness to face challenges of new methods and due to their professional attitudes in aiming for perfect, high-quality products.

3.3 Applicable hybrid methods

The proposed hybrid methods are similar in principle, but once they have to be applied, real interactions and experiments must be conducted. The usual phase of such work is as follows: (1) Observe: the design team conducts a research on existing bamboo products made by a particular area, and define the most potential skill variations of the local craftsmen. Those products are usually purchased and brought back to the design research laboratory to undergo further observation, such as the detailing of joints, etc. (2) Selection and Design: based on the existing products, the design team comes up with a number of design alternatives, which focuses on two sides, the selection of production methods (based on the skills used to produce existing products) and the current demands and lifestyles of the targeted markets or external users. These designs are presented in two-dimensional drawings and three-dimensional models made of materials other than bamboo, especially if the designers do not have the skills to process bamboo material. (3) Prototyping: bringing the drawings and models, the designers should be able to communicate their designs to the craftsmen. In this case, the designers act as “buyers” who would purchase the requested products, provided that they are made according to the required qualities. This phase takes up most of the time, since intense supervision is crucial, due to the different perceptions that generally occur between the designers and the craftsmen concerning the finished products. This phase also determines the appropriate use of tools, the duration of production, the amount of materials needed to make the products, and so on. It is often the case that the designers should also assist by recommending appropriate tools, or even providing new tools that suit the working conditions of the craftsmen in order to achieve desired results[7] (see Figure.1, Figure.2 and Figure.3). (4) Dissemination: when a final prototype is completed according to the satisfaction of the designers (who act as clients and buyers), the techniques to make the prototyped product are then disseminated to fellow craftsmen with similar skills in a “training” format, instructed by the main craftsmen who produced the first prototype. This phase particularly defines the competence of an SME production unit, in order to be able to predict the production capacity before the products are actually introduced to the market. (5) Exposure: connection to real markets should be conducted strategically, through a number of outlets, such as through exhibitions, trade fairs, etc. and using various media, depends on the aimed market.



Figure.1 (left) A home industry-size veneering machine, a prototype of a research in 2009 that accommodates the needs of Hybrid Method processing of bamboo products. Figure.2 (middle) Eating utensils, designed by D. Larasati (1999 and 2010) and A. Syarief (2010). Figure.3 (right) A standing lamp, designed by Deny Willy (2009). Products in Figure.2 and Figure.3 mainly use bamboo veneers, in order to give an example of how products made of bamboo veneer can have diverse varieties for different target users.

By going through all these phases, designers would gradually find out appropriate methods to apply to certain SME unit. In this case, for the three chosen craftsmen, it is determined that the one who masters in soft, delicate

weaving should continue producing the smooth bamboo sheets as they are used to. The important strategy here is to combine the smooth sheets with other materials to produce products with functions different from what they are used for (as coverings for bags and purses). As an example, the smooth bamboo sheets are now a supplement for pillowcases, which give them a new appearance that fits into modern interiors. The one who masters a bending technique can still use his rounding and bending skills, this time to produce coiled thin bamboo strips into shapes other than steamers that he is used to make (see Figure.4 and Figure.5). Products that have been made by this craftsman are, among others, coiled bamboo seats and containers. The one who masters a variety of weaving techniques should still display his skills through products other than common parcel baskets that he is used to produce, but to containers with slightly different angles and dimensions, which fit into contemporary functions and interiors.



Figure.4 (left) A stool for children, designed by Sadhiya Hanindita (2011) for his final project at Product Design program at ITB. Figure.5 (right) A sling bag designed by M. Ihsan (2010) for an exhibition. Both products employed the bending skill of a craftsman who is specialized in bending bamboo to make food steamers. Using the same skill, but with different mold, the craftsman managed to produce an entirely different product.

4. Sustainability for the Ecology, Economy and Social-Culture

Upon applying the hybrid method, it is important to evaluate the process and results, including the sustainability of the whole system. It is evident that miscommunication happened during the prototyping process, or that some designs do not work for reasons due to lack of knowledge from both sides (designers lack direct practice and skills to process raw bamboo materials, craftsmen lack capability to analyze, design and translate ideas into products), and so on. However, in general, it can be concluded that as long as the designers are capable of identifying the particular skills of the craftsmen, the new products would likely be a successful one in a sense that it succeeded to penetrate new markets. If this happens, economic sustainability could be more feasible. The ecological sustainability could also be achieved if the designers understand the use and supply of raw materials (including the involvement of preservatives) that will not disrupt the ecological balance, the use of safe additional materials (adhesives, combinations, etc.), and the anticipation of waste that is produced during the production process. Finally, considering the social and cultural aspects, the craftsmen who still display and prove their particular skills and expressions through products that achieve high appreciation, would feel appreciated as well, which gives them self-confidence.

5. Conclusions

It can be concluded that, despite all the obstacles and limitations, bamboo product designs can go as far as how the designers and producers wish them to be, as long as the designers understand the competence of a production unit and all its supporting elements (material and human resources, etc.). Particularly in the case of Tasikmalaya,

the designers should be able to distinguish among different skills in bamboo processing skills and match them to their designs, in order to achieve optimum results.

6. Citations

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