

SHIKKUI RENAISSANCE

Shikkui, a lime plaster made of hydrated lime, water and additional materials, has been used around the world for more than 5,000 years. In Japan, this highly fire-resistant building material has been used on the walls of castles, earthen storehouses and other structures. Now, Tagawa Sangyo in Fukuoka Prefecture has garnered attention with its successful development of Limix, a material of extraordinary strength made by forming shikkui with new technologies. Toshio Matsubara reports on the diverse potential of this material.

“Development of Limix began when one of our clients, a house manufacturer, asked us if we could make *shikkui* panels that could be easily used as a wall material,” says President Nobuyoshi Yukihiro of Tagawa Sangyo, who has led the development of Limix since 1992. “It is never easy to make thin panels that have sufficient durability to withstand use as a wall material. The development was a series of trials and errors.”

At that time, sick building syndrome caused by the spread of building materials containing chemical substances, such as vinyl wall covering, had become a societal problem. Shikkui was chosen because it contains no harmful substances and is even effective at adsorbing them.

Shikkui comes in powder form and is mixed with water and kneaded to be plastered on walls. It gradually hardens by drying and absorbing

carbon dioxide in the air. Great numbers of microscopic pores form inside, inevitably making



Nobuyoshi Yukihiro,
president of Tagawa
Sangyo

the material brittle. This is fine when plastered on walls, but for use as panels its strength needed to be improved to develop a panel-type building material that meets specifications. To accomplish this, the basic method of using shikkui mixed with water had to be revised.

Yukihiro's solution was super high-pressure vacuum

Limix offers an extremely high degree of freedom in design. Inlaying fallen leaves and other materials or mixing in straw or glass particles, for example, can create an entirely new texture.



forming. In this manufacturing method, a proprietary mixture of crushed limestone, fully matured shikkui, pigments and natural auxiliary materials is pressure formed in one burst using an ultra high-pressure press, while deaerated into a vacuum state. This technology uses absolutely no water, heat or resin.

The final product, called Limix, was commercialized in 2003, and has strength that ex-



Limix features a unique beauty with a markedly smooth and lustrous texture. Its applications have widened rapidly for both interior and exterior to include department stores, music halls, shopping malls and other facilities, in addition to houses. Pictured, from left, Limix in use for entryway flooring, on the wall of a shopping mall, and on the floor of a company building.

ceeds even marble, in addition to offering the four characteristic shikkui functions of fire-resistance, moisture absorption and release, adsorption of odor, and a natural anti-bacterial property. This enables it to be used not only for walls but also for flooring. The product is supplied as 40 x 40 cm tiles meeting basic specifications; a 60 x 60 cm commercial version will soon be available as well.

The unique manufacturing method brings even greater advantages to Limix. If an object, such as paper or glass, is laid inside metal molds, concave-convex patterns and other textures can be accurately reproduced on the surface, greatly increasing the degree of freedom in design. Cutting and drilling are also possible after forming. Also notable is that since Limix is produced without firing, there is 80% less carbon dioxide emission during manufacturing as compared with fired tiles. Also noteworthy is that the product is made completely from natural materials. With Limix and several other products, Tagawa Sangyo is currently the only company in Japan to receive the prestigious environmental Cradle to Cradle certification, awarded to materials that can be safely returned to nature.

“By coating Limix with photocatalyst that re-

acts to light and decomposes odorous substances, the intrinsic odor-adsorbing function of shikkui becomes almost permanent when the product is exposed to sunlight,” Yukihiro says.

This creation of new materials with remarkable benefits has been highly regarded and Limix has received numerous awards including the Japan Prime Minister’s award of the Monodzukuri Nippon Grand Award in 2007. The company has already made inroads into the United States, Singapore, China, South Korea and other countries.

Tagawa Sangyo, which was founded in 1924 and has grown into one of Japan’s largest lime plaster manufacturers, is aiming to make even further advances with the Limix product.

“Unique and top-ranking technology is essential for a medium-sized company like us to make our leap into the world,” Yukihiro asserts about the company’s future development. “We hope to disseminate not only Limix but also Japan’s inimitable and flawlessly beautiful shikkui to other countries by offering products that suit their market. We hope to establish the world’s top shikkui brand. That is our primary target.”



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