High-Rise Bamboo

by Jon Vara

To North American builders, a scaffold is a rigid steel structure that includes convenient working platforms protected by kickboards and guardrails. But in Hong Kong, most of the scaffolding used for everything from replacing windows and repairing neon signs to constructing 70-story skyscrapers is pieced together on the job site from long, flexible bamboo poles — botanically a type of grass (see photos below).

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Hong Kong builders use bamboo scaffolding for everything from small repair jobs to high-rise work.

In high-rise scaffolding, a bottom tier of 4- to 8-inch poles of Chinese fir bears the heaviest compressive loads. Two distinct kinds of bamboo are used above the wooden base posts: a main grid of thick, heavy *maao-chuk* bamboo poles placed on 10-foot centers, and infill of lighter *ko-chuk* bamboo poles, spaced about 2 1/2 feet apart. Fir diagonal braces are added every 20 feet or so. (Because scaffolding is built by eye, with little or no measurement, all dimensions are approximate.)

Until the 1970s, the scaffolding poles were lashed together with strips of bamboo soaked in water to make them pliable, while the wooden braces were fastened with steel wire. Although today's scaffold builders use 12-foot strips of quarter-inch plastic instead, the basic approach is unchanged: A lashing strip is tightly wound several times around the members to be joined, and the free ends of the binding are twisted together and tucked into the gap where the poles intersect. According to the Hong Kong Construction Industry Training Authority, or CITA — an organization that sets safety standards and trains workers in a wide variety of trades, including scaffold construction — accidents resulting from failure of the bamboo itself are almost unknown. But because the material is so easily modified, mishaps often occur when workers not directly involved with the scaffolding cut or alter it for their own convenience.

Apprenticeship training programs emphasize two-layer scaffolding, which permits the use of staging planks. But in the real world, double-layer scaffolding is the exception. Most contractors cut costs by opting for single-layer construction instead — a bare-bones arrangement that requires workers to cling to the bamboo with their legs and feet while working with their hands.

Despite training programs like those conducted by CITA, the long-term fate of bamboo scaffolding is far from certain, given at least two nagging problems familiar to builders everywhere.

The first is a scarcity of raw material. Most of the bamboo used for scaffolding is imported from the Chinese provinces of Guangxi and Guangdong, ideally after four years of growth. But strong demand for bamboo means that many growers now harvest crops after only two years, resulting in a much weaker product.

An even more serious problem is a steadily aging workforce. Most veteran scaffolders are now in their forties and fifties, and despite high wages, fewer workers enter the trade than leave it — however they may leave it.