

High-Quality, Low-Tech Construction

Contributed by Bruce Etherington, FAIA

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SUMMARY

Twenty-five years ago, hundreds of Manila families living in a squatter settlement built permanent homes for themselves by using a newly developed system of interlocking concrete blocks and joists. Since then, this low-tech, easy-to-use system has been replicated around the world to construct residential buildings at costs far below comparable projects built by conventional construction methods.

BUILDING A COMMUNITY ONE BLOCK AT A TIME

When Bruce Etherington, FAIA, was traveling through Southeast Asia in the early 1970s, he became interested in the plight of people living in slums in developing nations. Working with students at the University of Hawaii School of Architecture, he developed a system of interlocking concrete blocks and concrete joists that unskilled workers could assemble to create fire-, typhoon-, and earthquake-resistant housing.

An early and successful test of the system resulted in substantial permanent housing for a community of 350 families in Manila who had previously lived in a squatter settlement. Built by the residents themselves, the permanent homes became the social foundation of a community whose children, after 25 years, are now entering institutions of higher education, the professions, and business.

MODULAR SYSTEM

On the heels of the initial success, compatible building components were added to complete the modular interlocking building system. The system now includes interlocking floor and roof systems; interlocking stairs; interlocking prehung, prefinished doors and windows; and, of course, interlocking bricks and blocks. Interlocking block walls (Fig. 2) and interlocking floor systems (Fig. 3) are quickly and easily assembled.

EASE OF USE

To encourage small-business entrepreneurs and community-based projects and to minimize the need

for capital investment, the system enables workers to erect buildings without heavy construction equipment. All components are light enough to be placed manually by no more than four persons. All components are fabricated using simple, inexpensive molds and are made from various combinations of aggregates, including soils, ash, sand, and gravel.

WORLDWIDE APPLICATION

After the students found they could replicate the system, one Thai student built a dormitory at the Asian Institute of Technology Bangkok campus using the LokBild System, later opening his own design-build practice in Bangkok, The Lock-BUILD Group. Since 1992, the commercial venture has constructed more than 43 buildings, ranging from a 1,300-square-foot home to a nine-story, tri-tower apartment complex of 1,090 units at costs below comparable projects built by conventional construction methods.

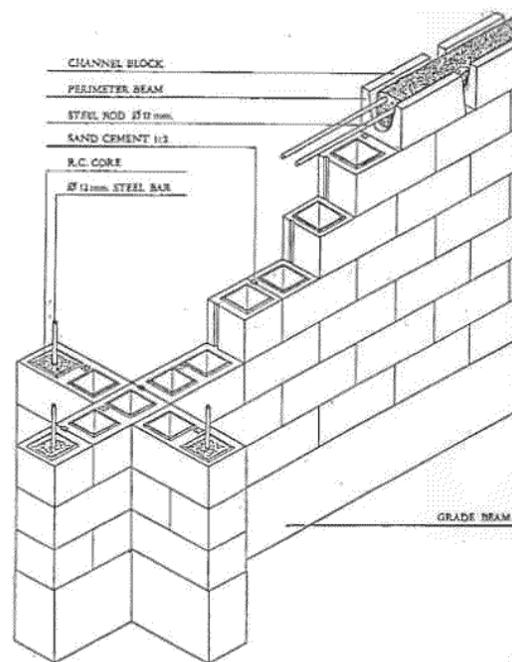


Fig. 2: Block Assembly

An interlocking soil-cement brick system based on the LokBild System was donated to the Thailand Institute for Scientific and Technological Research—the Thai version of our National Science Foundation—to support the Rural Development Plan of the King of Thailand. Approximately 500 small factories throughout Thailand now manufacture system components, forming the basis of a nationwide system of rural housing development.

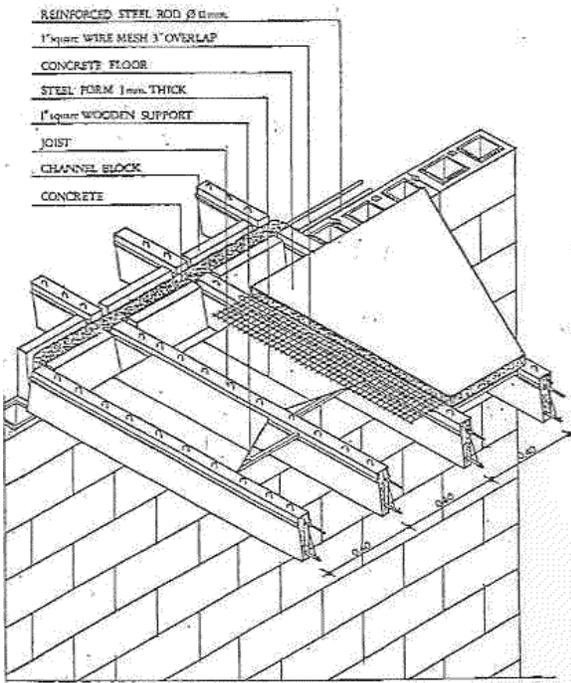


Fig. 3: Floor Assembly

SAFETY FIRST

Of primary importance in new construction technologies is public safety. Concrete, the principal material in the LokBild system, is fire-resistant and handles high stresses well. Two LokBild housing developments in the Philippines have survived earthquakes measuring in excess of 7.5 on the Richter-scale and hurricane winds of 180 mph with no damage.

ABOUT THE CONTRIBUTOR

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To visit the Web site of the Lock-Build Group (a Thailand corporation), go to <http://www.lockbuild.com/index2.html>

RESOURCES

More Best Practices

The following AIA Best Practices provide additional information related to this topic:

- 16.01.02 Green Roof Design
- 16.01.03 Resource Review: Green Guide for HealthCare™
- 11.08.01 Building Commissioning and Maintenance

Feedback

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Key Terms

- Building performance
- Durability
- Structural design