

# IMI



# CASE STUDY

December 1999

**P**roject highlights: A key to the State's decision to use loadbearing masonry on this project was the fact that the architect/engineer had developed a prototype masonry prison design that had been very successful. Other key factors included the general contractor's experience with such projects and the mason contractor's reputation for constructing such projects on time and within budget. Thanks to the mason contractor's planning, and support from BAC Local 9, Schiffer Mason Contractors, Inc. became the first mason contractor to ever construct a complete Level V Maximum Security Compound in Michigan on a singular basis. All other similar-sized facilities were constructed as joint or tri-ventures.

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## LOADBEARING MASONRY PRISON St. Louis, Michigan

- OWNER:** State of Michigan, Department of Management & Budget, Department of Corrections
- ARCHITECT/ENGINEER:** Giffels Associates, Inc.  
Detroit, Michigan
- GENERAL CONTRACTOR:** Clark Construction Co.  
Lansing, Michigan
- MASON CONTRACTOR:** Schiffer Mason Contractors, Inc.  
Holt, Michigan
- CRAFTWORKERS:** International Union of Bricklayers and Allied Craftworkers Local #9, MI
- SUPPLIERS:** Belden Brick by Karber Block Company, 4D, Inc.;  
Boral Brick by Van Poppelen Bros.
- AREA:** 13 Buildings totalling 266,880 sq. ft.; Includes 720 maximum security cells
- CONSTRUCTION TIME:** June 1997 - July 1999; Completed 4 mos. ahead of schedule
- PROJECT COST:** Total: \$49.2 million; Masonry: \$7.1 million
- MASONRY MATERIALS:** 450,000 8 x 24 CMU; 546,000 4 x 12 utility brick; 82,000 cubic feet of site-batched grout; 936,000 linear feet of rebar; plus, acoustical and glazed block and terrazzo
- MASONRY MANHOURS:** Approximately 95,000

**DESCRIPTION:** Seven buildings are two-story, residential, y-shaped structures with 14-inch masonry walls consisting of a four-inch "skin" of red and gray utility brick, a two-inch air space and an eight-inch wythe of solidly grouted, loadbearing concrete block (8" x 24" units). Cells are located in wings. Precast planks are used for floors and roof decks. "Security walls" are 100 percent grouted with rebars in every block core. Special, angled corner brick and sloped sills are used. Most support buildings are framed with structural steel and infilled with reinforced CMU enclosure walls. Many interior CMU walls occur throughout all structures. There are glazed CMU tile walls in food preparation areas and terrazzo floors in public areas and concourses.

Schiffer's previous experience with projects of this kind resulted in a quick start and a high level of efficiency throughout the masonry work. Special CMU requirements were met through the collaboration of all members of the construction team. To expedite construction, 8 x 24 inch units were proposed. The architect/engineer for the project had concerns about compressive strength and absorption, while the mason contractor had concerns about unit weight. The CMU design was adjusted to accommodate these concerns. The resulting 8 x 24 inch CMU had a weight of 42 pounds. By meeting these requirements, the resulting number of CMU to be laid dropped by 225,000, or about one-third.

There were also special brick challenges to meet. Specs called for brick that would meet all requirements of ASTM C-216. Brick manufacturers had run a product-specific, 50-cycle, freeze/thaw test and measure the moisture expansion coefficient of the unit. ASTM provides guidelines for calculating moisture



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expansion in ceramics, but there was not a documented process for measuring similar movement in brick. Clemson University set up a process for doing this and conducted the tests.

An Internet Website was set up for the project for purposes of communicating instructions and maintaining records. The architect/engineer, general contractor and mason contractor conducted a preconstruction “Masonry Information and Goal Establishment” meeting that included all personnel from the foreman level up. The record of this first meeting was posted on the website, and this practice was followed throughout. All project

personnel were encouraged to use the website to ask questions, and the answers to the questions, provided by the architect/engineer, general contractor and mason contractor were also posted on the site.

Task-specific work teams were set up. Since seven of the buildings were essentially identical, special crews were created to perform the same phase of masonry construction on all of them. There was a crew for the exterior shell, another for the cells, another for corridor walls, and so on. This not only saved time, but also raised work quality levels.

Suppliers were also called on to meet special challenges. Drawings indicated 142 CMU saw cuts for each prison cell. This totaled more than 100,000 cuts for the cells alone. The mason contractor worked with the CMU supplier to produce five custom shapes for cell walls that eliminated 84 cuts per cell, or 60,000 cuts overall.

This particular project was the first large job operating under the new State of Michigan General Conditions, which have set the bar high for both general contractors and subcontractors.

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The Conditions included a “schedule-driven pay process” and mandated liquidated damages. These requirements were met thanks to the cooperation between the general and mason contractors. Quality and cost-efficiency were maintained at a high level, and four months were cut out of the original construction schedule. Because of the project’s success, the State of Michigan indicated its intention to expand the use and role of masonry in its correctional facilities. In the past, Level 1, as well as similar minimum-security prisons, were metal buildings. Future prison facilities built in this geographical area will be masonry loadbearing structures.

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The International Masonry Institute is a labor/management cooperative serving the interests of the International Union of Bricklayers and Allied Craftworkers and the contractors who employ its members.

The International Masonry Institute presents programs in four broad categories: apprenticeship and training, market development and technical services, research and development, and labor/management relations.

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