

Construction Documents in China: SOM's Experiences

Excerpted and adapted from an *arcCA* article by C. Keith Boswell, AIA

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SUMMARY

Ask any architect who has developed a set of construction documents, "What constitutes a thorough set of construction documents, and what is the process used to develop construction documents?" and you will get as many opinions as the architects you ask. Expand the discussion to include the development of construction documents for use in countries outside the architect's home base of operations, and many additional comments and observations will come to the fore.

WORKING IN CHINA



Construction in China is booming. The San Francisco office of Skidmore, Owings & Merrill (SOM) has been active in design-, documentation-, and construction-phase services in China since the early 1990s, working with local design institutes (LDIs) to develop

construction documents that integrate local practice and international standards of construction quality.

We entered the Chinese market early on, starting our first significant project, the Beijing headquarters of the Industrial and Commercial Bank of China (ICBC), in 1994. ICBC's design required details for several systems, such as steel-frame construction, custom curtain wall, and custom stonework, which were fairly rare in China at that time. The project's success established an important precedent for SOM's subsequent commissions throughout China.

Given the rapid growth of China's economy, several factors set the stage for a remarkable period of advancement: the country's desire to advance its own design and construction capabilities, SOM's expertise in large-scale project execution, and our desire to achieve the highest level of design and construction.

Construction-document development in China has been, and continues to be, a learning experience. Our approach has evolved over the last decade, reflecting tremendous change and advancement on both sides of the table. Our knowledge of local practices and relationships with local institutes and fabricators has expanded with each project, allowing us to anticipate issues and propose new approaches in collaboration with local industry professionals.

To fully understand the challenges and possibilities, it is helpful to compare the approaches to, and philosophies about, construction documents in China and the United States.

WHAT ARE CONSTRUCTION DOCUMENTS IN CHINA?

This seems like a simple question—or it did to me when I started this effort. As with most issues, the answer has evolved over time. With the ICBC, our first full-service project in Beijing, the client's design brief requested "an international quality project that would be respected worldwide." For this discussion, full service means design, documentation in all phases, and involvement in the construction phase. At the same time, the client, seeing the opportunity for knowledge transfer, stipulated that local builders and fabricators be involved as much as possible.

First, we acknowledged the language difference, the physical distance between our office and the project (a time difference of 16 hours), and the unknowns of local manufacturing capabilities and fabricators. Second, we placed key team members on the ground for several weeks to gain understanding of local design and construction capabilities, standards, and rules of engagement. We knew from working in other countries that if you are going to play in someone else's yard and succeed, you'd better know the local rules of the game.

We visited local construction sites and met with the client to agree on the definition of "international quality." We interviewed LDIs to gather information on manufacturing capabilities of architectural building products and systems.

We realized early on that our investigation had a parallel track with project team members in China who were trying to understand *our* process. Some significant findings resulted from this early review.

One of the most memorable was the review of LDI-prepared construction documents for recently completed projects. Floor plans, building elevations, and sections were comparable to a set of design development drawings for U.S. projects. Drawings for detailed items such as doors, exterior enclosures (e.g., curtain walls, windows, and stone), partitions, and interior finishes exhibited little to no detail, leaving the local builder to make detail decisions. The building systems for these items consisted of “stock” materials and systems selected from manufacturers’ brochures.

The client’s objective of “international quality” set a higher standard of building material and system quality than available on hand at that time. This forced us to import a large quantity of materials. The construction documents had to define materials and assemblies; establish quality standards using U.S., European, or Japanese standards; and define the installation method that a local workforce could perform with some or no formal training.

ADDRESSING THE LANGUAGE BARRIER

SOM prepared most of the construction documents and specifications in the San Francisco office, incorporating English and Mandarin text—the common ground being a numerical indicator for each note. To aid drawing legibility, a master notation system incorporating each language with the numerical notation was developed for each material or assembly.

The notation system was included on each sheet to facilitate use of full or partial drawing sets by SOM, the LDI, and international fabricators and contractors. The completed set of construction documents was structured similarly to a set of documents we would prepare in the United States, with the addition of the numerical notations for bilingual use.

AN IN-DEPTH, BALANCED APPROACH

A thorough and well-coordinated set of construction documents is a key factor to a successful project. However, if the documents’ authors are not actively involved during construction interpretation of the design, then detail intent for both typical and atypical conditions is at best a roll of the dice.

To assist the local and international contractor team, we contacted international fabricators and

contractors of curtain wall, specialty metal fabrications, and stonework that we knew could deliver the custom aspects of the design in a locale where this type of work had not been performed before. We recruited fabricators and placed several of our team members on site for extended durations to work hand-in-hand with the LDI and local construction trades to guide the work.

We recognized that the opportunity for this type of in-depth involvement is more the exception than the norm. Local owners and companies were impressed with the results of the project but noted that while they were also interested in a quality project, it was not financially viable to enlist a U.S.-based architect to provide a full scope of services and to import a large quantity of building materials, systems, and expertise. To be financially competitive and still achieve an edge in design and building technology required a balance of involvement with the LDI, local building industries, and the U.S.-based design team.

Ultimately, the fundamental considerations and level of detail documentation for construction documents are not significantly different in China. Each project design sets forward materials and systems that will result in either “manufacturer’s standard” systems, materials, and details; “customizing a manufacturer’s standard”; or “custom” detailing.

Similar to practice in the United States, national and local regulations vary by city. The construction document sets are tailored to the specific requirements of each project. The answer to the question, “what are construction documents?” therefore is directly linked to the question of “Who does what?”

WHO DOES WHAT IN CHINA?

Document development is determined by quality; whoever is the most qualified of the U.S. or Chinese design teams will complete project detail documents. There are many local jurisdictional requirements regarding which the LDI is more knowledgeable. In cases where the engineering disciplines (structural, mechanical, electrical, and so on) are local, the coordination effort between the architecture and engineering teams puts a heavier work emphasis on the LDI, and the converse is true in projects with more U.S. consultants.

SOM develops and details any highly customized details that are critical to the success of the design—exterior enclosure, public spaces, and specialized uses or systems, for example. The construction documents for these areas include both drawings and specifications. The custom details are

developed to illustrate size, profile, and type of materials as well as interface with adjacent materials or systems. The specifications include a combination of local materials and internationally available products. We include local products or fabricators only after a thorough review and screening process for that particular material or system.

The construction documents for floor plans, reflected ceiling plans, and other overall layout drawings is a shared effort. We develop these drawings during the schematic and design development phases, and usually the LDI takes them through construction document phases with reviews at key milestones in the construction document process.

WHERE ARE THE CONSTRUCTION DOCUMENTS PREPARED?

In a shared documentation effort, the lead firm (SOM or the LDI) prepares the documents in its home office, with cross-exchange at deliverable points. To develop drawings concurrently at separate locations requires careful delineation of responsibilities in the early planning stages of the project. In addition to face-to-face coordination sessions between the architect and engineering disciplines, the LDI and SOM hold regular coordination sessions, typically in the project city. Face-to-face working sessions remain essential for team members to fully understand the necessary drawing content.

WHEN ARE THE CONSTRUCTION DOCUMENTS PREPARED? WHEN ARE THEY FINISHED?

Usually the most difficult question to answer is, "When are construction documents complete?" Those who have developed a set of construction documents know there never seems to be enough time to fully detail the project.

The pace of construction in China is much faster than in the United States. On recent projects, we have developed details for the customized areas in a staged sequence that generally follows the stages of construction. To accommodate the accelerated pace of construction, we have prepared some of the more custom details that apply to large areas of the project by the end of the design development phase.

Construction documents have been prepared in distinct trade packages such as exterior enclosure, public spaces, elevator/escalator system details, and special-use areas. For larger-scale projects, these construction document trade packages are further divided into distinct packages for (for example) the exterior enclosure, the building base, typical floors, and the top.

About the Contributor

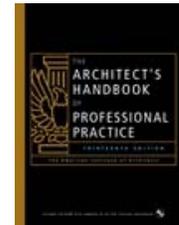
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RESOURCES

For More Information on This Topic

See also "Practicing in a Global Market" by Roger B. Williams, FAIA, and C. Richard Meyer, FAIA, *The Architect's Handbook of Professional Practice*, 13th edition, Chapter 6, page 100.



See also the 14th edition of the *Handbook*, which can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by email at bookstore@aia.org.



More Best Practices

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

- 10.05.06 Adjusting to Foreign Business Customs and Practices
- 10.05.01 International Practice Checklist
- 10.05.11 Lessons from Working in China

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Key Terms

- Practice
- Project administration
- Project management
- International procedures