CONVERSATIONS WITH PRECEDENTS
THE BAMBOO SKYSCRAPER IN RETROSPECT

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ARCH 346: Competitions in Architecture

December 31, 2014

In an age where information is so readily available, architectural precedents are often only understood at face-value. The immense inventory of images and text available online, in libraries, bookstores, and magazines can turn the research process into a "shopping list" activity. However, one must not simply look and imitate precedents, rather understand them. In order to do so, one must look critically at the precedent itself and at the relationships within selected precedents. Looking in retrospect at the Bamboo Skyscraper, precedent analysis became a catalyst for conversations that drove the design process. Understanding various relationships between precedents yielded a process of deconstructing precedents to understand their core idea and then reconstructing these ideas based on the needs of the project's site, program, and tectonics. This process then laid the grounds for not only the design but also for the methods of communicating the design to a distant jury. Reflecting on the design process, the Bamboo Skyscraper group critically analyzed a selection of precedents when designing both the tectonics of the project and when representing it. However, the team fell short of a rigorous precedent analysis when confronted with the prescribed program.

The first topic the team researched was the skyscraper itself, which was the subject of many precedents that were studied, such as the Toronto Dominion Centre by Mies van der Rohe (Figures 1, 2, 3), the HSBC Bank in Hong Kong by Foster and Partners (Figures 4, 5, 6), and the CCTV Headquarters by OMA (Figures 7, 8, 9). These buildings serve as examples of tall buildings in an urban context. The team studied them in parallel and searched for the

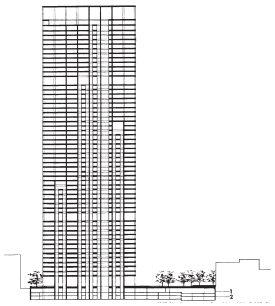

Fig. 01: Section, TD Centre

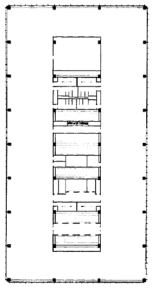

Fig. 02. Typ. Plan 1, TD Centre

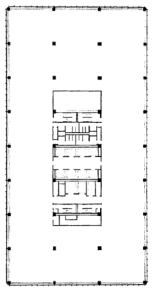

Fig. 03. Typ. Plan 2, TD Centre

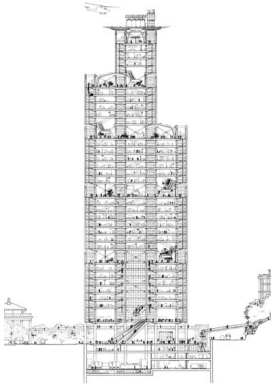

Fig. 04: Section, HSBC Bank

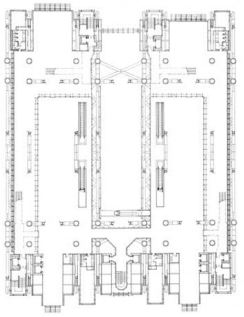

Fig. 05. Typ. Plan 1, HSBC Bank

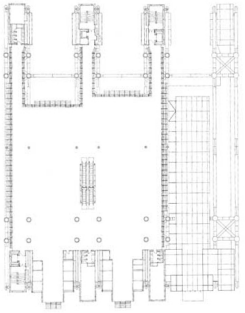

Fig. 06. Typ. Plan 2, HSBC Bank

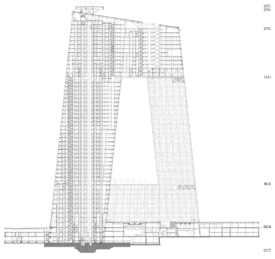

Fig. 07: Section, CCTV HQ

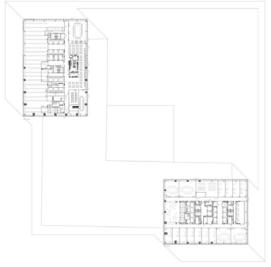

Fig. 08. Typ. Plan 1, CCTV HQ

Fig. 09. Typ. Plan 2, CCTV HQ

common denominator, or the conceptual parti, behind all of the projects. Despite the differences in plan, section, and date of construction, the buildings exhibited similarities in material, structure, and function. All of the buildings were made of concrete and steel, all had a repetitive typical plan, and all were created as structural moment frames. These similarities looked at the skyscraper type through the lens of a system of construction created by modular pieces. This first phase of research raised questions, rather than answers, which drove the team towards designing a new system, rather than simply a new skyscraper.

The resulting system of construction that was designed is called the *Bamboo Typical Tectonic Unit* (Figure 10). The intention was to create a unit that acts as a puzzle piece, tectonically specific to the bamboo material, from which space could be constructed. This *tectonic unit* uses spirally arrayed bent bamboo pieces to form a modular unit which consists of a floor, wall, ceiling, and core. Since a typical plan is constructed of multiple units, the core of each unit can be adapted to the building's program. For example, given a plan composed of ten *units*, some of them would house circulation, while others house plumbing, and others washrooms (Figure 11). The *unit* laid the foundation which supports the rest of the project.

Given this system, the team tested the *tectonic unit* against typical bamboo details and material properties to give the tectonic unit validity in terms of feasibility, sustainability, and constructability. Given bamboo's "high resistance in relation to its

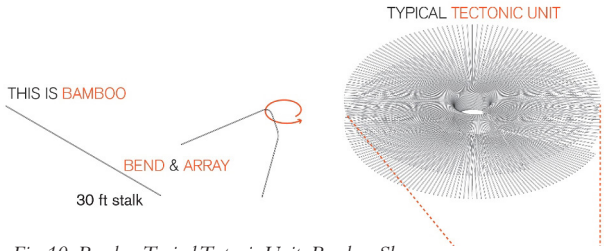

Fig. 10: Bamboo Typical Tectonic Unit, Bamboo Skyscraper

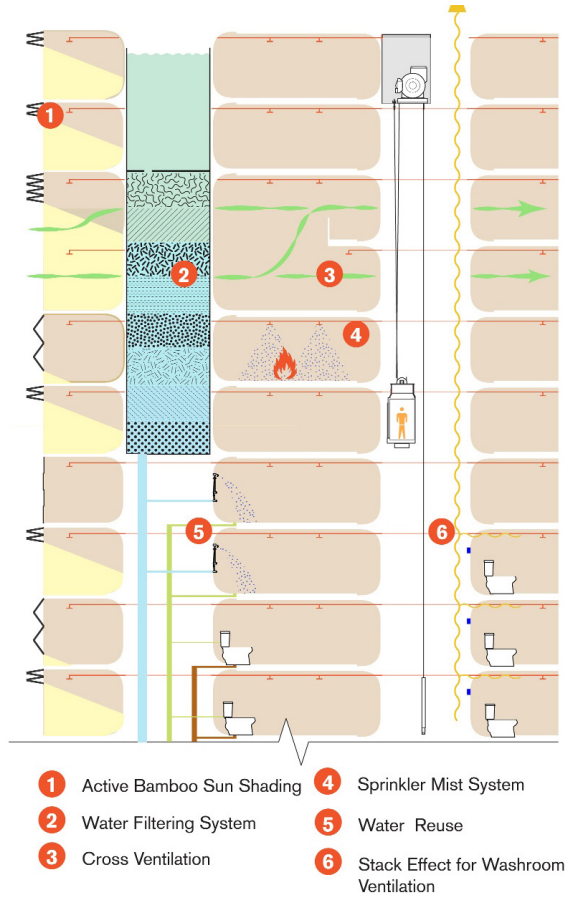

Fig. 11: Diagrammatic Section, Bamboo Skyscraper

weight, its capacity to absorb energy and its flexibility,"[1] the typical tectonic unit takes advantage of bamboo's bending property, making it specific to the material, which yielded an innovative solution to the system. The unit was the product of a hybrid structure which used steel connections reminiscent of the "BAM-BOOTIX system by Waldemar Rothe, which can be installed in [a short time] with common bands that are adjusted perfectly to the circumference of the canes"[2] (Figures 12, 13). The team researched bamboo agriculture and concluded that on a typical bamboo farm, the amount of bamboo needed for the building could be reproduced in two years.[3] Finally, to represent the unit as a system, the team studied diagrams of concrete and steel framing. The team noticed that these diagrams consist of simple connections and modular components.[4] Due to the discussions of system, the team naturally began to research on a much broader palette of precedents including details, bamboo agriculture, and typical construction systems. Thinking in retrospect, understanding the collection of precedents made the project much richer since the team extended the definition of the skyscraper from a building to a system, and

Fig. 12: Bambootix System Typical Detailing

Fig. 13: Bamboo Shelter using Bambootix System

1. Gernot Minke, *Building with Bamboo* (Basel: Birkhäuser, 2012), 26.

2. Ibid., 47.

3. Mary Roach. "The Bamboo Solution." *Discover Magazine, 0*1 June 1996, <http://discovermagazine.com/1996/jun/thebamboosolutio784>.

4. Charles Ramsey and Harold Sleeper, *Architectural Graphic Standards: Student Edition* (Hoboken, NJ: John Wiley & Sons, 2008) 29.

approached the system through lens of details, agriculture, and construction methods.

These discussions of details and agriculture, again, raised more questions than answers, which informed the representation of the system. The team believed that simply showing detail drawings of the building would not suffice and the idea of a narrative began. The *Typical Tectonic Unit* was presented to the jury using a step-by-step narrative describing the construction process (Figure 14) while its sustainability was represented by an infographic (Figure 15). These narratives became an implicit part of the research process. During discussions on details and construction systems, the team drew many diagrams to aid the conversations over the drawing board, ensuring all team members were on the same page. Without this precedent research, these discussions would not have surfaced, which in return would not have yielded the narratives used on the final panel. Therefore precedents aided not only the design process but became part of final representation.

Looking in retrospect, the project's program would have benefitted from a rigorous analysis rather than just a rationalization of the different components. When the team was handling the complexity of the program prescribed by the brief, it simply looked at precedents and employed what seemed to work in the context of contemporary architecture. A basic example of this is how the team looked at OMA's Essence Financial Building[5] proposal and

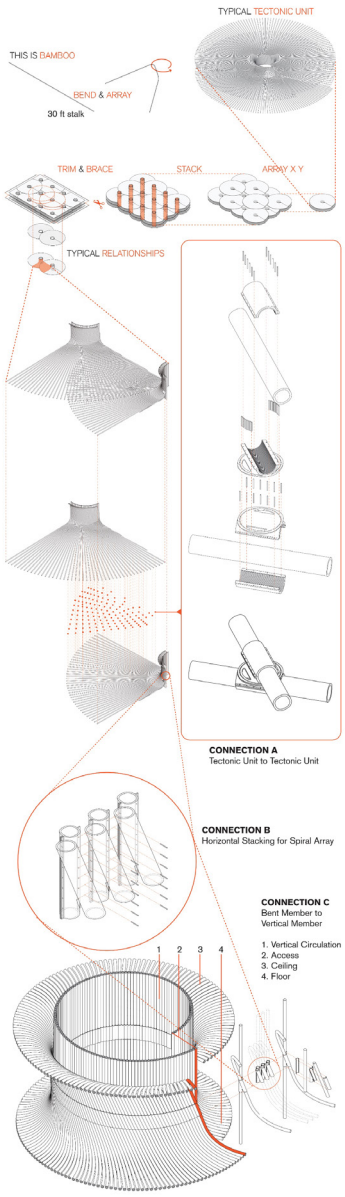

Fig. 14: Construction Narrative, Bamboo Skyscraper

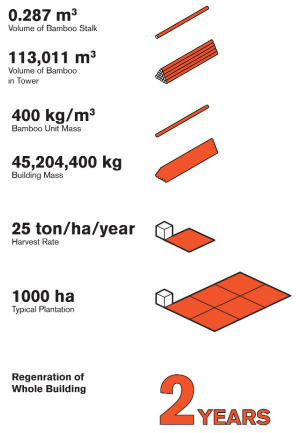

Fig. 15: Sustainability Infographic, Bamboo Sky Scraper

5. Vanessa Quirk. "OMA Wins Skyscraper Competition in China." *ArchDaily*, 12 Feb. 2013.

emulated the break in program defined by an outdoor public park. Rather than having a conversation about what public spaces could mean in the context of vertical urbanism, the team fell into the trap of attempting to recreate seductive imagery.

If the team was given the chance to revisit a part of the project, investigating the program would have produced much more meaningful solutions and questions. Rather than looking at projects and their programs, the team should have investigated the individual pieces of program and also how they come together as a whole to create an Architect's Village. Retrospectively, the team should have expanded its palette of precedents beyond high rise buildings. For example, an investigation into OMA's Seattle Public Library would have been important to raise a discussion on the drawing board not about program organization, but about program analysis on the macro and micro scale (Figure 16). The methods that Rem Koolhaas and Jonathan Prince Ramus employed to break down the library into components of static nature and components of constant flux[6] produced a future-proof form which challenges the library type (Figure 17). It would have been discussions like these that would have resulted in a much richer program synthesis for the building. The prescribed program for the competition was extremely complex since it was composed of many components that all need to come together to create a village. Looking at the

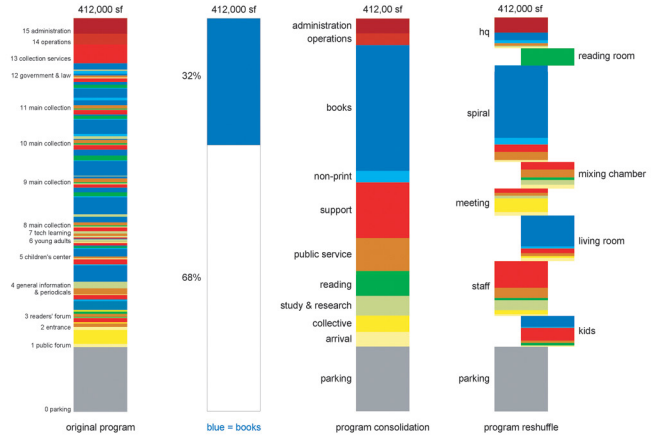

Fig. 16: Program Analysis Process, Seattle Library, OMA

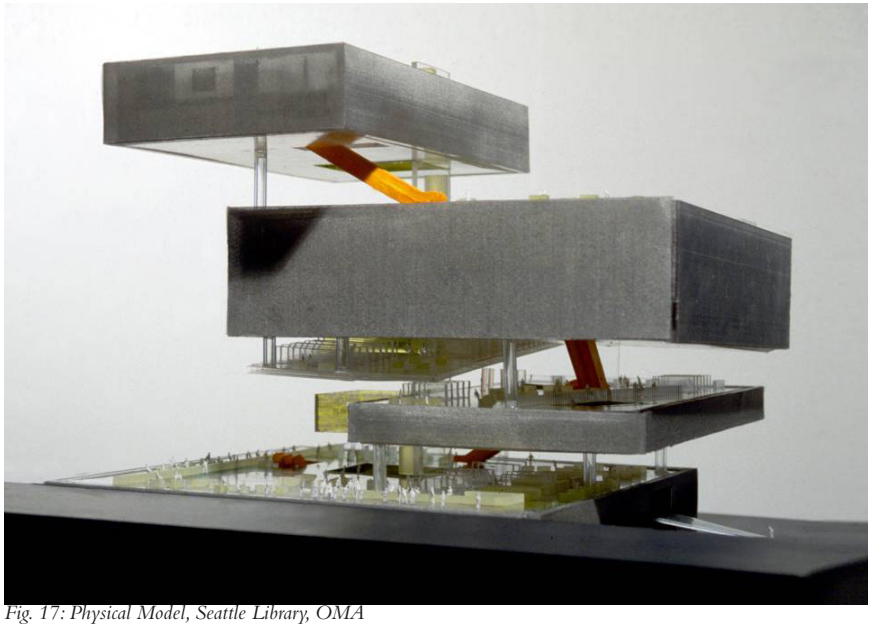

Fig. 17: Physical Model, Seattle Library, OMA

<http://www.archdaily.com/329005/oma-wins-skyscraper-competition-in-china/>.

6. Michael Kubo and Ramon Prat. *Seattle Public Library, OMA/LMN* (Barcelona: Actar, 2005) 10 - 23.

pieces in terms of time, flexibility, and occupation would have been needed for the team to understand the building's function beyond the level of a reductive diagram. Diller Scofidio's approach to the Eyebeam Museum (Figure 18) was founded on the reciprocal theatrical experience between the scientist and the visitor[7] which, again, led to a compelling solution challenging a list of program in terms of experience. Again, thinking in retrospect, the team needed to look at the program through the lenses of the multiple characters inhabiting the bamboo superstructure and question things like program adjacencies to create an experience and atmosphere beyond elevated outdoor parks. Both of these precedents are prime examples of catalysts that would have raised important questions about the prescribed program.

Precedents are integral to the design process. The Bamboo Skyscraper competition has taught the team that precedent research is not a preamble to the design process but is very much a part of it. The team's ability to critically think of precedents was successful when designing the *Typical Tectonic Unit* and its representation, but also limited when confronted with the program. This project, looking in retrospect, was more of lesson in research than in bamboo. The journey the team embarked on during the design process was a messy experience of back and forth design research with moments of conversations that produced a project which was

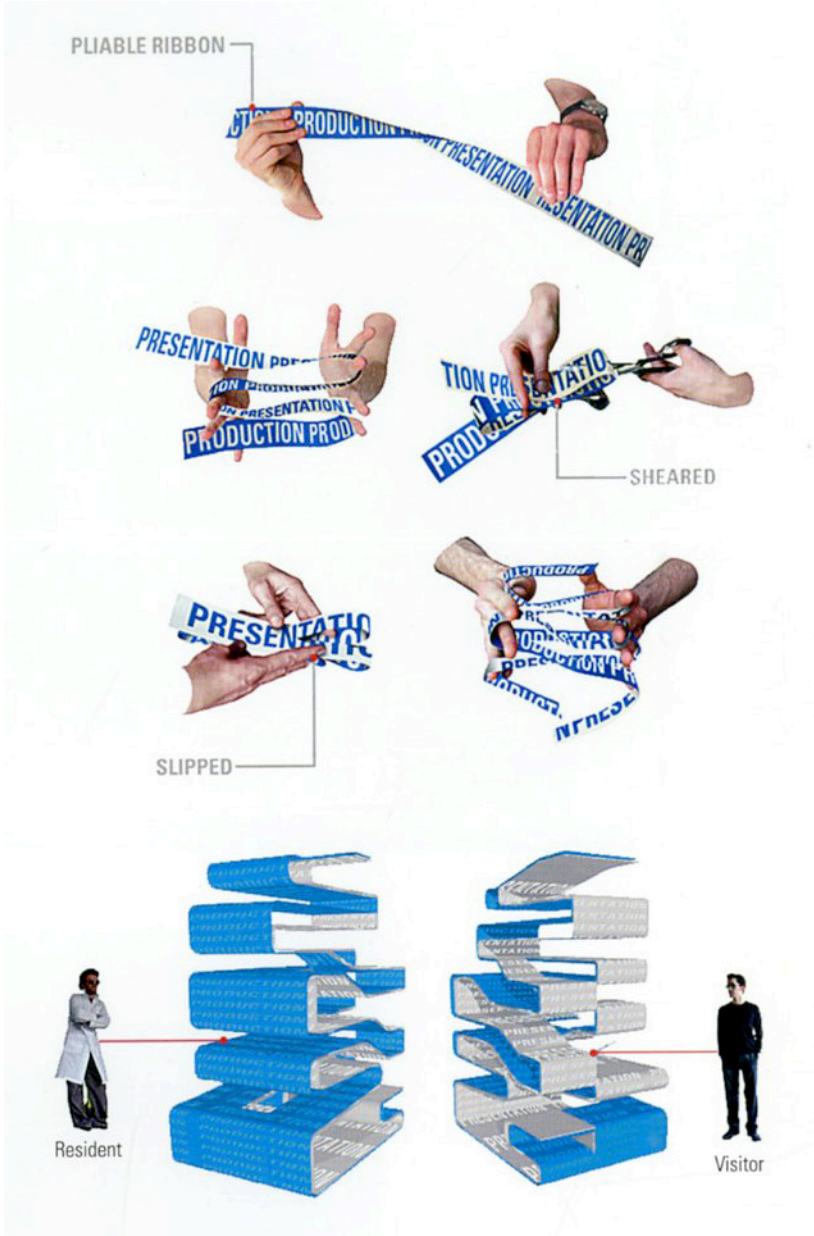

Fig. 18: Program Strategy, Eyebeam Museum, DS+R

7. Keith Mitnick, *Diller Scofidio: Eyebeam Museum of New Media: The 2002 Charles and Ray Eames Lecture* (Ann Arbor, MI: U of Michigan, A. Alfred Taubman College of Architecture and Urban Planning and Diller Scofidio, NYC, 2004) 15.

very well received (Figure 19, 20). The bamboo skyscraper has its limitations but when looking at its positive aspects, it is an example of the inquisitive attitude that the team had towards the skyscraper type.

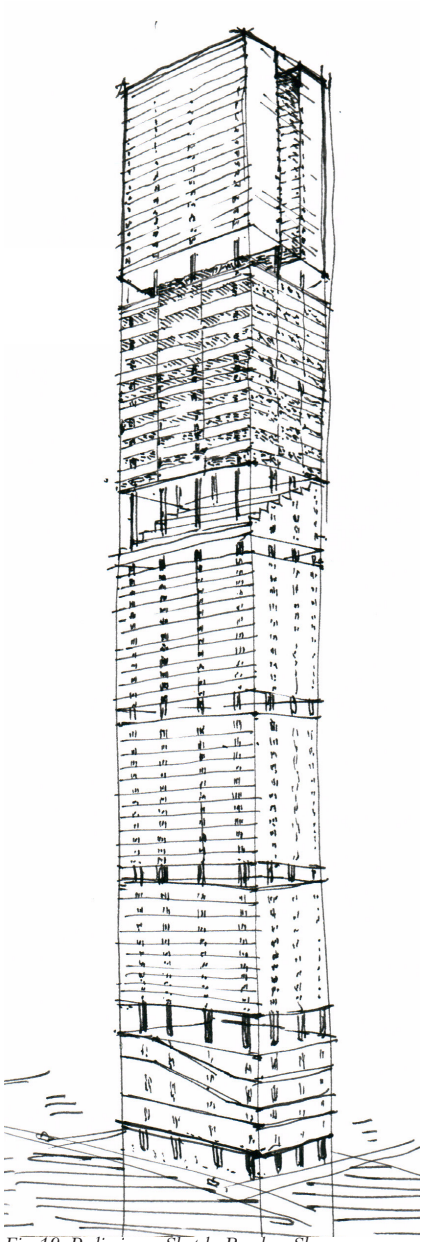

Fig. 19: Preliminary Sketch, Bamboo Skyscraper

Fig. 10: Final Vignette, Bamboo Skyscraper

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Roach, Mary. "The Bamboo Solution." *Discover Magazine*. 01 June 1996. Accessed 08 Dec. 2014. <http://discovermagazine.com/1996/jun/thebamboosolutio784>.

Images

[Figure 01]
DuBois, Mary. "Toronto Dominion Centre," *The Canadian Architect*. November (1967): 32.

[Figure 02]
DuBois, Mary. "Toronto Dominion Centre," *The Canadian Architect*. November (1967): 32.

[Figure 03]
DuBois, Mary. "Toronto Dominion Centre," *The Canadian Architect*. November (1967): 32

[Figure 04]
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[Figure 05]
"HSBC Bank." *Foster + Partners*. Accessed 23 Dec. 2014. <http://www.fosterandpartners.com/media/Projects/0501/drawings/img5.jpg>.

[Figure 06]
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[Figure 07]
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[Figure 08]
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[Figure 09]
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[Figure 16]
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[Figure 17]
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*All other images produced by Alexandru Vilcu, Di Wang, and Richard Mui for the SuperSkyScrapers 2013 Competition.