Architecture, Design & Materials Studio

Coordinator: Kai Gutschow
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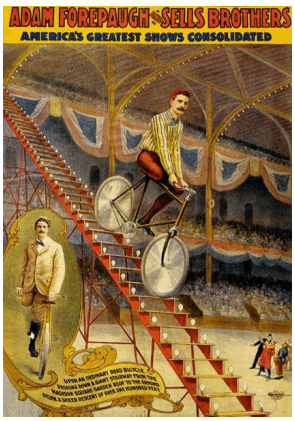
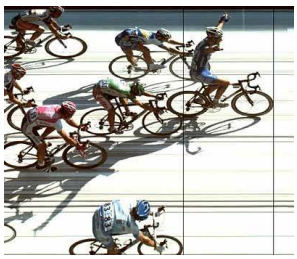
Off. Hr: M/W 12:30-1:30pm & by appt. in MM307

Spring 2005, CMU, Arch #48-205, M/W/F 1:30-4:20
Class Website: www.andrew.cmu.edu/course/48-205

(1/7/05)

PROJECT "0 + 1" – Materials Exploration & Bike Shed





MINDSET:

Building on our exploration of composition, concept, and spatial experience last semester, we will begin a more intensive exploration of the physical materials and assembly methods of specific architectural components. We will focus on the the scale of the human body encountering the physical presence of architecture. An intense investigation of real materials, structure, enclosure, joinery, building and craft techniques will lead to an attempt to elevate ordinary construction to poetic expression, and the creation of significant architecture in the form of a bike shed.

PROBLEM:

The problem arises out of the famous statement by the architectural historian Sir Nikolaus Pevsner in his History of European Architecture (1943) that "A Bicycle shed is a building; Lincoln Cathedral is a piece of architecture." Pevsner later described that in order for a building to be considered a work of architecture it must feature three different pleasing aesthetic sensations: 1) Utilize the role of *proportion* in the establishment of the wall; 2) Treat the exterior of the wall as a *whole* using contrast, rhythm, and recession; 3) It must effect our *senses* through the treatment of interior space and sequence.

This studio project will question how a bicycle shed can become something beyond a mere utilitarian building, and how ordinary materials and construction techniques can lead to the essential characteristics of "architecture." Inherent in that will be an exploration of the significance of bicycles as a human-scaled, environmentally responsible and socially friendly means of transportation for urban environments such as Pittsburgh.

PROGRAM:

To enhance the City of Pittsburgh's rails and trails initiative, your charge is to design down to the smallest level of detail a simple bicycle shed for the protection, repair, and rental of bicycles, and for assisting the associated bicyclists. The program includes:

1. A covered, lockable area for 20 bicycles and 20 helmets
2. Repair area with 2 bike stands, tool and parts storage
3. A rental/retail counter, with modest display for snacks, maps, and bike accessories
4. Seating and rest area for 5 people inside or outside
5. After-hours self-service lockup for a minimum of 10 bicycles
6. System Integration: Lighting for interior and exterior, water and air hoses and hose storage, exterior grade electric receptacles

SITE: The site in Pittsburgh will be different for each studio.

FINAL REQUIREMENTS: (minimum for all studios)

1. Site Plan and Building Plan
2. Cross Section(s)
3. Perspective
4. Exploded axonometric of components
5. Presentation Model
6. Large-scale material and joinery mock-up
7. Precise materials list with quantity and size of all components
8. Project Documentation for website and portfolio

MATERIALS RESEARCH (PROJECT “0")

In order to design a bike shed with a detailed knowledge of the required materials and assembly, each student must develop a working understanding of basic building materials. In parallel to the beginning of the bike shed design process, each studio will do intensive research on a list of specific materials such as the ones listed below according to functional characteristics (by what other categories could they be listed?). Students will be asked to research materials in the library, on the web, in large home centers, at specialty supply stores, and in conversation with, and literature from, materials reps and contractors. Find out the following about the materials: What is it? How it is made? What is its history? How it is used traditionally? How are advancements in technology or design changing its use? How might its use and detailing be altered to create different and non-standard results? What are the drawbacks or challenges of using the material?

Elements of Structure:
Concrete: pre-cast, site cast, block
Brick, Stone, Masonry
Wood: stud framing, heavy timber
Engineered lumber
Steel tube, channel, bar, conduit
Tension cable
Metal framing
Paper and pvc tubing
Scaffolding
Straw bale & rammed earth
Pneumatic structures
Stacked / tied recycled materials

Elements of Cladding:
Plywood (many kinds)
Orient Strand Board “OSB”
Fiberglass and plastics
Metal: seamed, corrugated
Cement & gypsum board
Wood siding & dimension lumber
Glass
Building Paper, ice & water shield
Fabric, sheeting
Roofing: asphalt, shakes, grass
Composites such as Structural Insulated Panels

Systems:
Fasteners such as threaded rods, washers, nuts, bolts, screws
Glues, adhesives, bonding agents
Basic electrical items such as lampholders, receptacles, rough- in boxes, metal conduit, electrical meter/panels
Simple plumbing items
Flooring
Seating, counter
Bike racks, bike repair stands
Shelving, storage

Students should arrange to bring full-scale material samples into the class to allow for detailed mock-ups and construction experiments. Each studio will undertake design exercises to develop a “hands-on” knowledge of the materials, to encourage students to challenge conventional assembly methods of known materials, and to explore how the material might be manufactured differently to generate new methods and architectures. Exercises should help students explore the poetic potential and limits of the materials.
** Each student must document their fact-finding and discoveries in 8.5x11" pdf pages that can be collected in a group reference binder posted on the class website.

LECTURES & READING

There will be an intensive series of studio lectures during the first weeks detailing “case studies” of how and why architects chose materials and assembly techniques for their buildings, and the effects that can result physically, sensually, aesthetically, perceptually, symbolically, functionally, and in terms of maintenance, use, longevity, cost, and meaning. Students will be asked to do readings, both unique to each studio, and communally throughout this project and the semester, with several “Reading Roundtables” scheduled to discuss issues and ideas as a large group.

Detail magazine
Ford, Details of Modern Architecture, 2 vols.
Frampton, Studies in Tectonic Culture
Frampton, “Critical Regionalism”
Leatherbarrow & Mostafavi, Surface Architecture
Pye, Nature and Art of Workmanship
Ruskin, Stones of Venice
Semper, Four Elements of Architecture
Weston, Materials, Form and Architecture
Zumthor, Thinking Architecture

and works on and by the architects: Alvar Aalto, Toyo Ito, Tadao Ando, Mies van der Rohe, Adolf Loos, Ove Arup, Peter Rice, Carlo Scarpa, Frank Lloyd Wright, Peter Zumthor, Herzog & Demeuron, Gigon/Guyer, Juhanni Pallasmaa, Jorn Utzon, Renzo Piano, Williams/Tsien, Diller & Scofidio, ShoP, Lewis Tsurumaki Lewis, Louis Kahn, Santiago Calatrava and more.