

GEORGE NAKASHIMA WOODWORKER, CONOID STUDIO
1847 Aquetong Road
New Hope
Bucks County
Pennsylvania

HABS PA-6783-D
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PHOTOGRAPHS

HISTORIC AMERICAN BUILDINGS SURVEY
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

ADDENDUM TO:
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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GEORGE NAKASHIMA WOODWORKER, CONOID STUDIO

HABS No. PA-6783-D

Location: 1847 Aquetong Road, Solebury Township, Bucks County, Pennsylvania, 18938.

Owner: The property is owned by Mira Nakashima Yarnall, and Kevin Nakashima the daughter and son of the original owners, George and Marion Nakashima.

Present Use: The Conoid Studio is used for offices, work areas for the design of furniture, for education and training, the display of George Nakashima furniture, and the storage of materials (in the basement).

Significance: The Conoid Studio, begun in 1960, is the most remarkably engineered and designed building on the property, utilizing distinctively designed reinforced concrete conoidal shell roof. To help with its construction, Nakashima employed Weidlinger Associates Incorporated in New York City, which continues to be one of the most outstanding engineering consulting firms in the world. Construction of the Conoid Studio inspired George Nakashima to design an entire line of furniture that he sold at his New Hope showroom including the Conoid chair, bench, coffee table, end tables, and dining table. The Conoid furniture differed from much of Nakashima's earlier work by including daring architectural elements such as "rigorously architectonic bases" cantilevered seats, angled back supports, and thin floor runners. As biographer Derek Ostergard points out, Nakashima used for the first time the "fully developed cantilevered seat, a powerful statement, perhaps reflecting confidence after completion of the Conoid Studio."¹

Description: The building is constructed into a south facing hillside and cantilevered from a basement wall. It measures approximately 40' x 40' and is constructed of cement block, stone, stucco, and glass. The most distinctive feature of the Conoid Studio is its distinctively designed reinforced concrete conoidal shell roof. The concrete roof is approximately 2-1/2" thick and has sinusoidal waves beginning on the northern side of the building that flatten towards the southern side of the building. The sinusoidal waves are not only aesthetically pleasing, but are key to the support and structural engineering of the building. There is an arched buttress that supports the roof along the southern façade. The non-weight-bearing upper walls are constructed of light frame.

The interior of the Conoid Studio is a masterful blend of Modern design with Japanese elements such as shoji screens to modulate the light emanating from the completely glazed front wall. The conoid roof was highly successful in creating the desired effect. As Mira describes it:

¹ Derek Ostergard, *George Nakashima: Full Circle*, 77.

The overall effect of the interior of the Conoid Studio is that of a soaring, freely undulating, but organically disciplined space, something like a gigantic, organically formed seashell, transiting in graduated waves from a flat sine curve to an open arch facing the sun. The walls of this structure would be largely glass, as they did not have to carry the weight of the roof.²

The interior of the building includes a large open area with kitchen, bathroom and a design office area. A finely crafted wood partition separates the studio space from the domestic uses, such as the kitchen, bathroom, storage, and design office space. The south-facing windows allow for a maximum amount of natural light partially filtered through rice paper screens. Floors are wood and the ceiling exposes the same sinusoidal curves of the exterior. There is a Tatami, or raised platform with grass mats, located in a rectangular bay that cantilevers outward from the building on the south side. A large rice paper “Akari” lighting sphere by Isamu Noguchi is suspended from the ceiling. Numerous Nakashima designed chairs and tables are used in the room.

History:

Construction of the International Style Conoid Studio began in 1957 and was completed in 1960. To construct the chair department (1957), conoid studio (1957-1960) and the main lumber storage building (1956) George Nakashima hired engineers Paul Weidlinger, Mario Salvadori, and Matthys Levy of Weidlinger Associates. Paul Weidlinger was the founder of Weidlinger Associates Incorporated in New York City, which continues to be one of the most outstanding engineering consulting firms in the world, specializing in the analysis and effect of seismic activity on buildings and structures.³ As Mira explains,

During the 1950s he [George Nakashima] became fascinated by the capabilities of warped thin-shell or “form-resistant” structures. He especially admired the work of Mario Salvadori, Paulo Luigi Nervi, and Felix Candela, and had a correspondingly low opinion of some of Eero Saarinen’s concrete structures, which he called ‘unwilling’ shells, because of their thickness. He determined to build his own shells, based on sound engineering principles that would permit both an economical use of materials and ‘organic’ forms. Behind this idea lay a belief that sound engineering was an expression of the laws of nature, and that a beautiful structure was a manifestation of those laws.⁴

The studio measures 40’ x 40’ and so the idea of the curved or conoid shape was to support the roof and allow it to cover a large open space. While an ordinary conoid has a doubly curved surface, the team decided to add a series of small sine curves to increase the strength of the roof, resulting in its unusual scallop-shell-

² Mira Nakashima, *Nature, Form and Spirit*, 136.

³ Mario Salvadori was an engineer and architect who worked on the Manhattan Project during World War II. In 1956, Matthys Levy was a recent graduate in structural engineering from Columbia University. He went on to design and engineer landmark structures including the Georgia Dome in Atlanta and La Plata Stadium in Argentina. He also was a consulting engineer on the investigation into the collapse of the World Trade Center buildings in New York City on September 11, 2001. He currently is chairman of Weidlinger and Associates, Inc. in New York City.

⁴ Mira Nakashima, *Nature, Form and Spirit*, 136.

like appearance. The roof is supported and further strengthened by a reinforced concrete arch located at the overhanging front of the building, with a concrete lintel atop the wall supporting the rear and stiffeners inserted in alternate corrugations. According to an article appearing in *Engineering* magazine at the time of its construction, “The resulting shell has an entirely new form and represents a new application of the conoidal shell.” As the article also states, while conoidal shells are frequently used in monitored industrial buildings in Europe, they are rare in the United States. Thus, this represents a “departure in the design philosophy of reinforced concrete shells”⁵ and a truly unique structure. The roof of the conoid studio is not only unique for its shape, but also for its poured reinforced concrete construction, which measures only 2-1/2” in thickness.

Sources: James A. Michener Art Museum, *George Nakashima and the Modernist Movement* (essays by Steven Beyer and Matilda McQuaid). Doylestown, Pennsylvania: James A. Michener Art Museum, 2001.

Mira Nakashima. *Nature, Form & Spirit: the Life and Legacy of George Nakashima*. New York: Abrams, 2003.

Historian: Catherine C. Lavoie, HABS, 2012

⁵ “Adventure in Structure,” Also see: Matthys P. Levy and Paul Weidlinger, “Conoid With Corrugations Makes an Unusual Roof,”