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Minimum Documentation Fiche 2003

International working party for
documentation and conservation
of buildings, sites and neighbourhoods of the
modern movement

composed by national/regional working party of:

0.1 Picture of building/site

depicted item:
Institut für Leichte Flächentragwerke University of Stuttgart, Germany
© Frei Otto, Warmbronn
source: internet
date:1967

		db code
1.	**Identity of building/group of buildings/urban scheme/landscape/garden**	
1.1	current name of building: Institut für Leichte Flächentragwerke, short: IL	3
1.2	variant or former name: Institut für Leichte Flächentragwerke	4
1.3	number & name of street: Pfaffenwaldring 14	5
1.4	Town: Stuttgart	6
1.5	Province/state: Baden Württemberg	7
1.6	zip code: 70569	8
1.7	Country: Germany	9
1.8	national grid reference:	10
1.9	classification/typology: REC/ EDC (Experimental building for pavilion construction/ institut)	11
1.10	protection status & date: List of protected monuments city of Stuttgart: 1989	12

2 History of building

2.1 original brief/purpose: 13
Because of the innovative construction of the planned German pavilion for the Expo 1967 in Montreal (Architects: Frei Otto, Rolf Gutbrod, Hermann Kendel) the ones in charge decided to have an experimental building erected on the Vaihinger site of the Stuttgart University in advance. The architect Frei Otto and the engineer Fritz Leonhardt then began to experiment with numerous details as well as complete assembly processes for rope net and membrane. After the tent-like experimental building had fulfilled its intended purpose, Frei Otto was able to complete and extend it to house the ‚Institut für leichte Flächentragwerke' which he was heading. The project was supported by the Volkswagen Foundation and company donations.

2.2 dates: commission/completion: 14
In order to use the originally temporary building as a fully functioning institute building for the University of Stuttgart it was necessary to modify the roof skin in 1967. The rope net was insulated with Eternit shingles on top of a wooden casing.
(Facts taken from Frei Otto/Nerdinger 2005)

2.3 Architectural and other designers: Architect: Frei Otto 15
Members of staff: Berthold Burkhardt, Friedemann Kugel, Gernot Minke, Bodo Rasch

2.4 others associated with building: 16
Engineers: Fitz Leonhardt und Harald Egger

2.5 significant alterations with dates: 17

2.6 current use: Research institute of the University of Stuttgart 18

2.7 current condition: The building is in very good condition. 19

3 Description

3.1 general description 20
The center of the covered area of 460 m² is made usable by two steel platforms which have also been developed for the German pavilion in Montreal.
A complete glazing which follows one of the ropes on the edges and the acryl glass covered “eye” at the pole caused by the construction offer a natural lighting for the inside of the building.
A small library and some of Otto's constructed experiments were integrated into the institute. The worktables are positioned along the windows, rooms which require closed walls like for example the photo laboratory and darkrooms are located under the steel platforms. A curved hallway connects the large tent-covered room with the toilets, heating and storage as well as the workshop.

3.2 Construction 21
Bearing element of the building is a net made of steel ropes which is hung from a centered steel pole.
Construction of the experimental building: A thin stretched membrane is fastened to this net. The membrane is made of translucent PVC coated polyester fabric which is able to completely follow the shape of the net.
The surrounding rope on the edges limits the large roof surface.
Construction of the institute: Since the modification in 1967 the roof skin is covered with roof shingles and an insulation layer on the outside and a visible wooden casing on the inside.
Due to the principle of the rope-net-construction it was necessary to have a pole with an eye-shaped opening. This opening was also covered with rope net and closed with a clear acryl glass. This lights the interior from above.

3.3 Context 22

The German architect Frei Otto is known as one of the founders of nature-oriented building. Besides being an architect he was also the founder and director of research groups where he promoted the cooperation between engineers, architects, natural and liberal arts scientists. Aim was the development of economic and ecological buildings and constructions which adapt to the environment.
One of the most important buildings was the German pavilion for the World Exhibition in Montreal in 1967. The experimental building which was meant to test the construction method was built in 1965 on the University grounds in Stuttgart. In 1967 it was completed and turned into the ‚Institut für leichte Flächentragwerke'. This makes the IL a very well preserved monument for Frei Otto' developments and researches.

4 Evaluation

Technical

The Institut für leichte Flächentragwerke is an outstanding example of light-weight tent roof constructions.

4.1 The hanging construction of the tent-like roof of the ‚Instituts für leichte Flächentragwerke' has become one of the first and groundbreaking constructions in the development of nature-oriented architecture. The development of the twice curved surface took place mainly by experimenting at the time. 23

Social

4.2 Ground breaking is the project's focus on ecological building. The Institut für leichte Flächentragwerke is one of the first examples for material and energy saving light-weight building methods. Not only the building itself stands for a sustainable, future oriented planning for the society but also the use as a research institute with interdisciplinary teamwork of construction experts, material technicians, biologists and liberal arts scientists meets a new zeitgeist. 24

Cultural & Aesthetic

4.3 Inspired by nature it was possible to carry out technical and social aspects of the new light-weight building method in an elegant, airy and light appearing architectonical shape. Cells, trunks and blades, diatoms and cobwebs, water twisters and soap bubbles were investigated in order to get to know their processes of growth and legalities. The shape was not designed but experimentally developed. It is most of all expression of existing physical forces and results in reaction to these. 25

Historical

4.4 The 'Institut für leichte Flächentragwerke' is an outstanding building of post war Modernism and revolutionized the architectural world of the 20th century. The architectural language of the light, tent-like building was intentionally meant to stand as a contrast to the monumental heaviness of the national socialist buildings.
Frei Otto has continued the ideas and projects of the experimental buildings of Classical Modernims of the 1920s and 1930s. While visiting Frei Otto's studio, Walter Gropius felt reminded of the working method and atmosphere at the Bauhaus in Dessau. Ecology and building were treated equally in the second half of the 20th century and are therefore characteristic for the entire era. 26

4.5 general assessment : 27

Like no other Frei Otto investigated the light-weight building methods in the second half of the 20th century and promoted and influenced the development of light, resource saving and environmentally sound bearing constructions. The ‚Institut für leichte Flächentragwerke' is an early experimental building and has become a continuously functioning contemporary document by

having been turned into a research institute. Like the institute, the building is a proof for the innovative developments of the 1960s.

5 Documentation

5.1 principal references: 28
OTTO, Frei/ NERDINGER, Winfried, Frei Otto - das Gesamtwerk. Leicht bauen - natürlich gestalten, München, Birkhäuser; 2005; **ISBN:** 3764372338
GLAESER, Ludwig, The works of Frei Otto, New York, Museum of Modern Art, New York, 1972; ISBN: 0870703331

5.2 Visual material attached: --- 29

5.3 rapporteur/date: Juliane Vierich (contact@julianevierich.com) Juli 2006 30

6. **Fiche report examination by ISC/R**

name of examining ISC member:
date of examination: 26-06-2006
approval:
Wp/ref. no: NAI ref. no:
comments: