Futuro no. 001 –

documentation and evaluation of preservation needs

Conservation
Historical Interiors
Bachelor's Thesis
28.5.2010

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Metropolia

TIIVISTELMÄSIVU

Koulutusohjelma	Suunteutumisvaihtoehto
Konservoinnin koulutusohjelma	Historiallisten interiöörien konservointi

Tekijä

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Työn nimi

Futuro nro 001 – dokumentointi ja säilyttämistarpeen arviointi

Työn ohjaaja/ohjaajat

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Työn laji	Aika	Numeroidut sivut + liitteiden sivut
Opinnäytetyö	20.4.2010	69 + 11

TIIVISTELMÄ

Opinnäytetyössä tutkittiin 1960-luvun loppupuolella valmistuneen Futuro-nimisen muovitalon nykytilannetta ja kuntoa. Myös talon merkitystä ja säilyttämistarvetta arvioitiin. Talo dokumentoitiin kirjallisesti ja valokuvaamalla. Dokumenttivalokuvien lisäksi kohteesta otettiin myös 360°-panoramakuvia, jotka helpottavat ellipsoidin muotoisen tilan hahmottamista. Vauriot kirjattiin ylös ja niistä tehtiin havainnollistavat vauriokartoituskuvat.

Futuro-talo oli alun perin tarkoitettu nopeasti lämpiäväksi hiihtomajaksi, mutta siitä muotoutui sittemmin kansainvälisesti tunnettu muovitalojen ikoni ja lopulta taideobjekti. Futuro-taloja on valmistettu Suomessa vuosina 1968–78 arviolta kaksikymmentä, ja niistä suurin osa oli tarkoitettu vientiin. Suunnittelijana toimi arkkitehti Matti Suuronen ja valmistajana Oy Polykem Ab. Tutkimuksen kohteena oleva Futuro on sarjanumeroltaan nro 001 ja lajissaan toinen heti prototyypin jälkeen. Se on tiettävästi yksi neljästä Suomessa jäljellä olevista Futuroista. Talo koostuu kuudestatoista pulteilla ellipsoidin muotoon yhteen liitetystä lasikuituvahvisteisesta polyesterihartsielementistä, joiden väliin on laminoitu eristeeksi polyuretaanivaahtoa.

Futuro nro 001 on saanut alkuaikojen kiinnostuksen jälkeen olla pitkään rauhassa alkuperäisellä paikallaan ja omistajallaan Hirvensalmella. Siihen ei ole tehty muutoksia tai korjauksia, vaan se on yhä alkuperäisessä asussaan. Futuro nro 001:een ei koskaan vedetty sähköjä, ja se on ollut alkuajoistaan asti vain satunnaiskäytössä. Se on seissyt paikallaan yli neljäkymmentä vuotta lähes käyttämättömänä uhmaten kuluttavia sääolosuhteita. Talon omistaja on kiinnostunut ajatuksesta kunnostaa talo.

Talon todettiin olevan likaantunut, ja siihen on päässyt syntymään pienempiä vaurioita. Suurimmat ongelmat esiintyivät ulkokuoressa, jossa elementtien halkeilleista saumauksista vesi pääsee kulkeutumaan rakenteisiin. Opinnäytetyön tulokset antavat alustavan kuvan talon kunnosta ja auttavat mahdollisten konservointi- ja restaurointitöiden laajuuden arvioinnissa. Työ toimii esimerkiksi pohjana konservointi- ja restaurointisuunnitelmaa laadittaessa. Suojelutarpeen arvioinnissa tarkoitus on osallistua keskusteluun Suomessa sijaitsevien Futuro-talojen lisäksi myös muiden uudempaa arkkitehtuuria edustavien rakennusten arvostuksen kasvattamiseksi. Tarkempia analyyttisiä tutkimuksia ei tehty.

Teos/Esitys/Produktio

Säilytyspaikka

Metropolia Ammattikorkeakoulun kirjasto – Tikkurilan toimipiste + Theseus verkkotietokanta

Avainsanat

Futuro, dokumentointi, muovi, polyesteri, lasikuituvahvisteinen polyesteri, polyuretaanivaahto, suojelutarve

ABSTRACT

Degree Programme in	Specialisation
Conservation	Historical Interiors

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Title

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Tutor(s)

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Type of Work	Date	Number of pages + appendices
Bachelor's Thesis	20 April 2010	69 + 11

ABSTRACT

The purpose of this study was to document and evaluate the need for preservation of the plastic house called Futuro. For this purpose, a survey of condition was done, illustrated with damage mapping. The damage mapping helps to localize the damages and perceive the extent of the deterioration. Finally, a preliminary guideline for future possible conservation measures was drafted.

The documentation was carried out in writing and with photographs. Panoramic pictures of every room were digitally stitched together to enable the 360° rotational view. The condition survey was done in writing and drawing, observing the house visually. The evaluation of the preservation need was done considering Futuro's history, image, rareness and attractiveness.

The documentation of Futuro house no. 001 design, technology, materials and damages is now compiled in one study. Its damages have been noted down and and analysed. The house was estimated to be in surprisingly good condition. It has not been in constant use nor in regular maintenance. Preliminary recommendations for future possible conservation acts were given.

The Futuro house was considered to have architectural and cultural value and its preservation should be safeguarded for the future generations. There are only three other Futuros known to exist in Finland. The fact that Futuro no. 001 is the first Futuro ever made after manufacturing the prototype in the 1968 makes it even more valuable. It has also remained in its very authentic state.

Work / Performance / Project

Place of Storage

Metropolia University of Applied Sciences – Tikkurila Campus Library

Keywords

Futuro, documentation, plastic, polyester, glassreinforced polyester, polyurethane foam, preservation

CONTENTS

1 INTRODUCTION

The thesis deals with an icon of the so called space-age architecture from the turn of the decades of 1960 and 1970. The icon is a flying saucer looking portable plastic house called Futuro, designed by a Finnish architect Matti Suuronen in 1968. The house represents very well its contemporary way of thinking and living with a strong confidence in the future – ”futuro”. In the same era in 1969 people saw on the blurry TV-screen as Neil Armstrong stepped onto the moon as a first human being. A Russian cosmonaut had already been flying in the orbit in 1961. The space seemed to offer an enormous potential for becoming a new playground for the human nation.

There were massive plans for the future that some day there would be sent a mass of people to build a future city on the moon surface. Designers started to sketch future houses and cities. The sketches and designs turned out to be something very different from the traditional ones. Plastic material seemed to be very suitable for every kind of form and colour and it was used very open-mindly in furniture, lamps, outfits, interior decoration and as in Futuro, in whole houses.

If Futuro represented a wild futuristic utopian in the 1960s one must say that it still seems after more than forty years that it has arrived from somewhere really far from space. The more traditional architecture has kept its ground through the years and these plastic oddities have become rare items. Especially at the end of the 1980s and at the beginning of the

1990s when plastic buildings built in the 1960s and 1970s were not so shiny and new any longer, some of the owners wanted to get rid of their plastic houses. Plastic material had a reputation of a cheep material and was considered disposable material and invalid for repairing.

Some traces of these plastic buildings can still be found all around us but few people recognize their value. These buildings are in danger to be delivered to rubbish tip when they get in an enough bad condition. However, that risk is also subject to all other houses in poor condition. The only way to change this trend is to raise the valuation of the built environment and make people see the beauty and the potentialities behind the dirt and tracks of wearing.

There are known to be four Futuros left in Finland. The thesis is a study of one of those, manufactured by Polykem Ltd. and given the identification plaque Futuro no. 001. It was not the first Futuro because before that Polykem Ltd. had already produced the prototype that was given an identification number no. 000. The next house no. 001 was given to a TV celebrity Matti Kuusla to his lakeside property in Hirvensalmi, Finland. This portable house has never been moved from its original spot and it has been with the original owners since the beginning. Since Kuusla did not manage to receive electricity to his Futuro, the house has been in a limited use.

Today Futuro no. 001 is not in its best condition. The objective of this thesis was to study how badly it has deteriorated and which are the most severely damaged sections. The house was documented in writing and photographing included the 360° panoramic images, which enable the viewer to rotate in every room. That helps to perceive the shape of the house, which as an ellipsoid brings many challenges to the presentation of the house. The damages were noted down and finally mapped on the photographs aiming to illustrate the extent and the places of the damages. The idea of this study is that it can be used as a basis for a possible conservation and restoration plan in the future.

The proper documentation of the object is an important part of the conservator-restorers work before starting any treatments. Documentation is considered as a routine work which

involves each work step of professionally made conservation and restoration. Conservation of plastic material is a relatively new field but many successful research and conservation work have already been carried out since the 1990s. One can find, for example, a report of the conservation of Cora Geisslers Futuro (no. 013) in Berlin, Germany which was carried out by Andrea Funck, a student of the Cologne University of Applied Sciences, in the guidance of the conservation department of Die Neue Sammlung, Munich, Germany (Funck 2004).

This thesis contains also a brief overview of other Futuro houses in Finland. Marko Home and Mika Taanila present shortly the four Finnish Futuros in their book titled *Futuro - The tomorrow's house from yesterday* (2004) and the Taanila's film *Futuro - A New Stance for Tomorrow* (Futuro - Tulevaisuuden olotila, Finland 1998). These publications have been a great source of inspiration also for this thesis. Trying to respect the privacy of the owners, their story is told without names and accurate locations of Futuros. The questions were made about their Futuros current state and possibly made repairs. The owners were also asked possible future plans for their Futuro houses.

Finally the valuing of the Futuro houses architectural and culture historical importance was made and some conservation approaches were discussed. A few suggestions of the possible future use of Futuro were presented as well.

2 FUTURO HOUSE

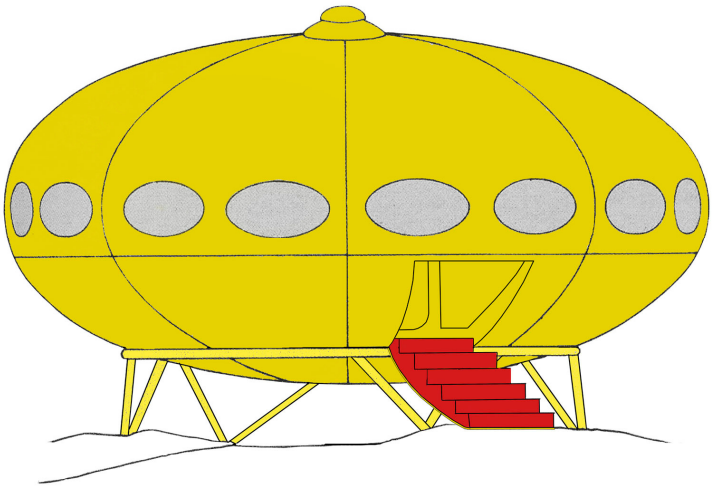


Figure 1. Drawing of Futuro house no. 001. Colours have been added to fit Futuro no. 001. (Home & Taanila 2004)

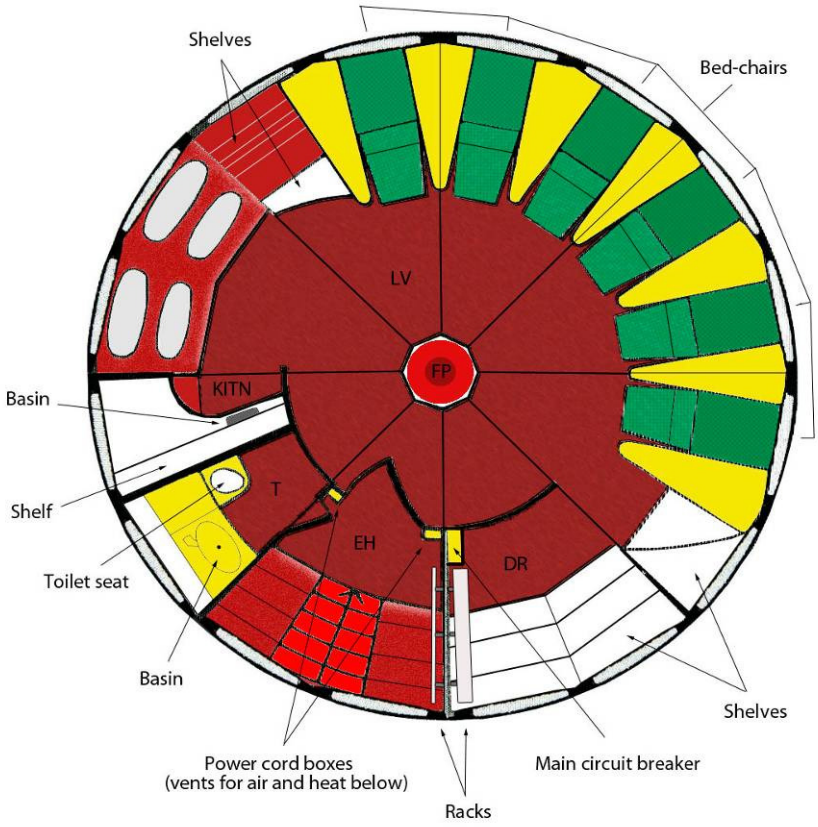


Figure 2. Ground plan of Futuro no. 001. Explanations and colours have been added to fit Futuro no. 001. (Funck 2004)

The Futuro house is an elliptically shaped shell construction which reminds confusingly of a flying saucer (fig. 1.). The house consists of sixteen prefabricated elements which are bolted together through their bent edges inside the house. The elements are so light that they can be lifted up with man power. The light weight building material is polyurethane insulation foam (PUR) laminated with glassreinforced polyester (GRP). The colouring varies a lot. In the first Futuros the colour scale was white, yellow and light blue. (Home &Taanila 2004, 13, 17)

The Futuro house can be transported in parts or as a whole by truck or as it originally was proposed; assembled as a whole, beneath a helicopter (fig. 3.). It takes approximately two days of assembly and with two or more people and a crane. (Genzel & Voigt 2005, 153; Home & Taanila 2004, 16) The Futuro house stands on four V shaped steel tube legs attached to a tubular steel ring. There are steel plates added to the end of the legs, which enables the bolting to the other steel plate ”shoes” set in concrete footings. All utilities run through a column immediately below the house. There are pipes for the electricity and the water supply (fig. 4.).

Figure 3. Helicopter trasportation. (Home & Taanila 2004) Figure 4. Utilities run through a column.

The entry way is a single pull-down door that opens with a key. The door descends and turns into stairs. It is attached to a wire which rotates around a reel so that it would not fall down at a high speed. The windows are double-glazed oval panes made of polymethyl mathacrylate resin (PMMA) which is sold under many names such like Perspex (Waentig 2008, 65).

The round space is divided into different rooms with separating walls made of GRP plastic. The fuction and the size of the rooms may vary a little between different Futuro houses. In Futuro no. 001, the entryway leads to the entrance hall where there is a passage to the toilet and to the living room. The living room is the biggest room and it has a combination of a fireplace and a grill at the centre of it. There are six bed-chairs set in a row close to the exterior wall. The armrests serve as small tables and as a place for lamps. There are passages to the kitchenette and to the small dressing room from the living room. Figure 2. illustrates the room arrangement in Futuro no. 001.

There are many variations of the Futuro house depending on where and for what utility purpose they were made. For example, American markets demanded more spacious rooms with bigger windows which could be opened (Home & Taanila 2004,). In the United States they made an alteration to the steel legs which instead of the steel ring were connected directly to the body of the building. Those Futuros that served as banks could have less windows and those that served as Air Force-owned observation posts could have larger and reinforced windows.

Table 1 Facts and figures of Futuro no. 001 (Genzel & Voigt 2005; Home & Taanila 2004; Waentig 2008)	
Form	Rotation ellipsoid (spheroid), consists of 8 elements which form the floor and 8 elements which form the roof
Diameter	8 m
Height	4 m
Effective area	50 m²
Floor area	25 m²
Weight	2 500 kg (without furnishing), c. 4 000 kg (furnished)
Volume	140 m³
Materials	Sandwich shell construction: GRP – PUR-foam – GRP 5 mm – 50 mm – 3 mm (may vary)
Windows	16 double oval windows, PMMA (Perspex) 2 double oval windows, PMMA (Perspex) 2 double oval windows, PMMA (Perspex) Windowseals, rubber
Floor	Plywood-metal-construction, (vinyl?) carpet on the top
Foundations	A tubular steel ring with V shaped legs, concrete footings
Rooms	An entrance hall, a toilet, a living room, a kitchenette and a dressing room
Furnishing	Six bed-chairs which can be pulled horizontally (GRP, foam plastic cushions), a combined fire-palce and slab that serves as a grill (steel, laminated plywood table), fixed shelves (laminated plywood) in the kitchenette, living room and dressing room, toilet seat, basin in the toilet (GRP) and ia basin n the kitchenette (steel)
Heater and ventilation	Electric heating and fan system manufactured by ASEA under the floor plates. Air circuits through air ducts in the floor and goes out through the flue above the fireplace and air ducts in the kitchenette and in the toilet. (30 minutes from -30°C to 22°C)
Architect	Matti Suuronen
Manufacturer	Polykem Ltd.
Manufacturing year	1968
Owner	Matti Kuusla

2.1 Architect Matti Suuronen

Figure 5. Architect Matti Suuronen standing next to the miniature Futuro house. (Kotilainen, Heikki, http://www.hs.fi/kulttuuri/artikkeli/Muovinen+Futuro-talo+myytiin+140%C2%A0000+eurolla/1135232169613)

Matti Suuronen (fig. 5.) was born in 1933 and studied for four years at the Tampere University of Technology. In 1961, he completed studies and established his own architectural office in the same year in Helsinki. He designed apartments, offices and industrial buildings. (Genzel & Voigt 2005, 135) In the late 1950s, he participated in the four-day workshop, where he familiarized himself with glassreinforced polyester plastics (GRP). At that time, Suuronen became interested in the new raw material, which he later used as designing material. Suuronen received his first experience of GRP in 1964, when he got the opportunity to design a cupola of eight meters in diameter to cover a grain silo located in Seinäjoki. The following year, Suuronen's former schoolmate, Dr. Antti Hiidenkari asked him for a sketch of a ski cabin, which would be easily built on a steep slope and quickly heated even in winter time. The project was called *After-Ski-cabin*. (Genzel & Voigt 2005, 135; Home & Taanila 2004, 12)

Suuronen decided to undertake the construction of the GRP cabin. It took two years of development with the plastic company Polykem Ltd. The first solution was meant to create

from standard products of Perspex (PMMA) having a shape of a cupola standing on pillars. Its disadvantage, however, turned out to be the solar radiation causing heat and high thermal expansion. It was tried to be diminished with a sunscreen with no satisfying results. This was followed by an igloo-development stage, which examined a series of products suitable for structural solutions to Perspex, PVC (polyvinyl chloride) and GRP. Finally, an ellipsoid shell structure was chosen in which two GRP shells laminated the insulation of polyurethane foam. On the 13th of November in 1967 they could finally start the implementation of a prototype. (Genzel & Voigt 2005, 135; Home & Taanila 2004, 13)

Suuronen has often explained that the Futuro design is based purely on mathematics and on the value of π (pi) 3.14 which is the same value as the ratio of a circle's area to the square of its radius (Home & Taanila 2004; Visit to the site of Futuro no. 001 with Matti Suuronen 2009). He also says that the idea of the steel leg foundations came up at the breakfast table when he looked at an egg cup. He anounced that when the egg was ready it was simply put in an egg cup. Such legs allowed water and rocks pass underneath the cabin. (Genzel & Voigt 2005, 135; Home & Taanila 2004, 13)

After many years, Matti Suuronen still has a passion for architecture and continues working on plans and projects. He has a dream to bring to life a new production of Futuro houses. But since the Futuro house moulds are not existing anymore, Suuronen visited the Hirvenslami Futuro to see if there was a possibility to make new moulds out of it. (Visit to the site of Futuro no. 001 with Matti Suuronen 2009) To realise such a dream the fundings need to be secure and the marketing should be well planned. To find a manufacturer is propably not the hardest stage of the project, because today there are numerous plastic manufacturers only in Finland.

2.2 Polykem Ltd.

Figure 6. The sign of Polykem Ltd. (Home & Taanila 2004)

The plastic manufacturer Polykem Ltd. (fig. 6.) won the contract to start the Futuro house production. The company was founded in 1954 but began to manufacture plastic products in January 1957. The company located in Hiekkaharju, Tikkurila which is a neighbouring city of Helsinki. The Managing Director was a master of engineering, Ensio Söderström. Already in 1964, the company's staff consisted of eighty people. (Laalo 1990, 197)

Polykem focused primarily on PMMA plastics, but they produced also polyester products, glass fiber materials and PVC products for the chemical industry. Their most famous products were dome light windows which became common in the business and factory buildings in the 1960s. As a PMMA products manufacturer, Polykem was able to meet more than half of Finland's need in the 1960s. (Laalo 1990, 197–199) In the beginning Polykem Ltd. manufactured also plastic illuminated signs in collaboration with another Finnish plastic company Airam. Products were such as PMMA door handels, PVC plastic boards for building facades and corrosion protected concrete pipes. (Laalo 1990, 197-199; Nyman & Poutasuo 2004, 76) The latter part of the 1960s Polykem Ltd. started to produce a whole series of glassreinforced polyester buildings (fig.7).

All the plastic house projects were carried out in co-operation with architect Matti Suuronen. The house development group consisted of engineer Yrjö Ronkka, who was responsible for structural calculations, technicians C.J. Olander and Heikki Tikkanen, Suurosen’s assistant Hannu Laitinen, foremen Peter Stude and Sven Lindfors, the latter of whom was in charge of the manufacturing technique. The Manager Director Ensio Söderström was responsible for the economy of the project. (Home & Taanila 2004, 12–13)

The first house prototype, the so called *After-Ski-cabin*, was made of design drawings. The foreman Peter Stude has said in the Taanilas documentary film (Futuro - A new stance for tomorrow, 1998) that accurate construction drawings at this stage did not yet exist. Suuronen could even visit the spot with the instructions saying that ”You should remove it and put a bit more to that”. The prototype was introduced to the media at the end of March 1968. The Managing Director of Polykem Ltd. stated to the media representatives that the "Flying saucer has landed Polykem". (Home & Taanila 2004, 13, 16)

Figure 7. Assembly and finishing of the Futuro house at the factory of Polykem Ltd. (Home & Taanila 2004)

Polykem Ltd. participated Finn Focus- export exhibition in London in October 1968. Polykem had decided to present mainly their plastic signs but showed also the Futuro prototype to the visitors. Due to the great interest among the public, Polykem Ltd. decided to start mass production of Futuros and began to advertise for them (fig. 8.). Soon they founded also a selling company with big expectations in the United States. Futuro got its name when the third house (no. 002) was built. (Home & Taanila 2004, 21)

Figure 8. In the front page of the brochure can be seen Futuro no. 001 in Hirvensalmi spot. Interior pictures are propably from the prototype (no. 000). (Home & Taanila 2004)

However, Polykem Ltd. manufactured all in all twenty pieces of which twelve were destined for export. There are known to be four Futuros still existing in Finland. The manufacturing licenses were sold to twentyfive countries such like Sweden, Norway, England, France, the Federal Republic of Germany, the United States, Canada, New Zealand, Japan, Iran, Lebanon and South Africa. Approximately fifty-sixty Futuros were produced with the licences. (Genzel & Voigt 2005, 135; Home & Taanila 2004, 36)

Later, when the interest in the Futuro houses began to decrease, Polykem Ltd. launched a whole series of Matti Suuronen's designs for GRP buildings under a title *Casa Finlandia* (fig. 9.). The *Casa Finlandia* series included the CF-100/200 service station (1969) (fig. 10.), the CF-10 kiosk (1970) and the CF-45 residential/commercial building, better known as Venturo (1971). The numbers indicate the floor area in square metres. What the Casa Finlandia houses including Futuro house had in common was that they were all prefabricated, suitable for mass production and easy to transport and assemble. (Home & Taanila 2004, 27) The Polykem company does not exist any longer. It is not known when and why they finished their whole production of plastic products. It is known that the last Futuro house they produced was in 1978 (Home & Taanila 2004, 36).

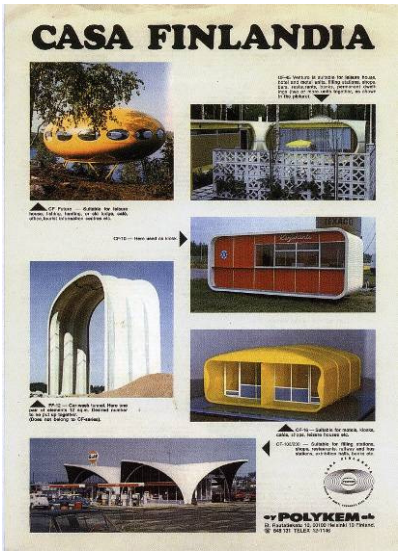


Figure 9. Brochure for the international distribution of the Casa Finlandia series. (Home & Taanila 2004)
Figure 10. CF-100/200 service station in Simonkylä, Vantaa in 2009.

2.3 Futuro's fall

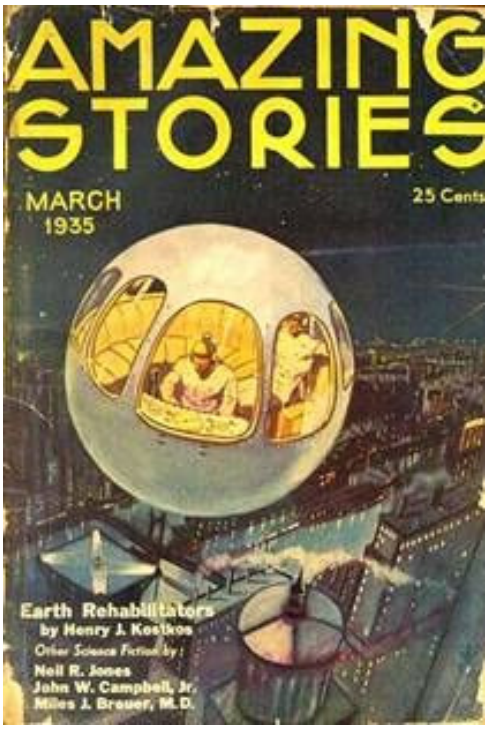
The plastic house development was interrupted by the 1973 oil crisis. Oil-based material prices got high leading to the fact that the business became unprofitable. By that time also other plastic companies found it difficult to get raw materials. After that the sales were focused on the Soviet Union instead where Polykem Ltd. got many orders. Then the Cold War politics came along and all the orders were cancelled. That was due to the Šots Olympic boycott of many western countries after the Soviet Union had invaded the Afghanistan. (Home & Taanila 2004, 33–36; Huokuna 2003, 95–96)

It was not only the oil crises that became an obstacle to the production. There have been speculations that the marketing was not as well organised as it could have been. The price was also quite high for the average people compared to the traditional summer cabins. (Home, interview 26.2.2010.) Matti Kuusla, the owner of Futuro no. 001 believes that the marketing could have worked better if Futuro had been advertised as a luxury item, for selected consumers only (Kuusla, interview 25.3.2010).

3 EPOCH

The Futuro house was designed in the 1960s in the era of high expectations of a future and human abilities to create almost anything. That was the time of the economic growth after World War II. The improved quality of life brightened people's attitudes towards the future. A growing number of people started to have more money and more leisure time. (Home & Taanila 2004, 80–81.) Consumption changed so that the number of non-essential commodities grew, such as invests in homes (Huokuna 2006, 153).

That was also the time when the first humans landed on the moon (1969) giving a strong belief that soon the entire human nation would populate the surface of the moon. The sci-fi magazine entitled Amazing Stories (pub. 1929-2006) visualised flying saucer on its cover already in 1935 (fig. 11.). Everything seemed to be possible, even those utopian drawings for the future cities on the lunar surface. A team of six British architects named Archigram has many famous drawings from these futuristic visions of transportable capsule houses (fig. 12.). (Home & Taanila 2004, 57–58, 64; Topham 2003, 57)



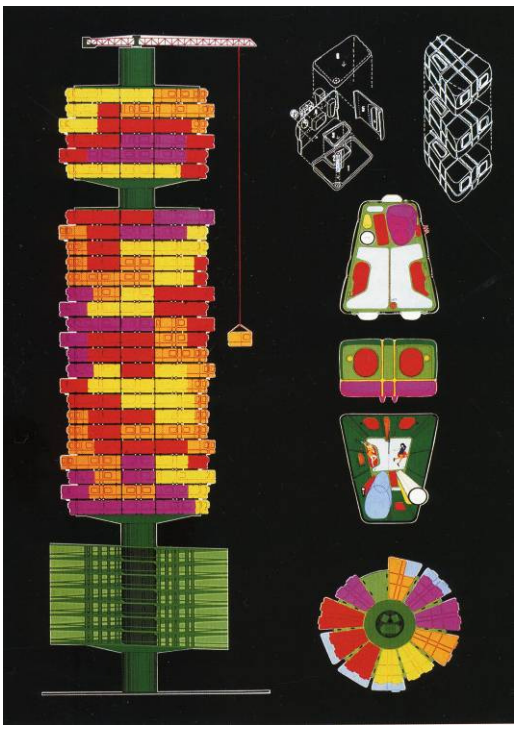


Figure 11. (left) Cover of the Amazing Stories, March 1935.
Figure 12. (right) Design of mobile and flexible buildings by Archigram-group. (Home & Taanila 2004)

3.1 Plastic potential

Plastic started its new life in Finland in 1960s as a real material itself, not just a substitute material. The new way of using plastic materials gave possibilities to create something that had never been done before. It was considered a material of infinite potential. Many famous designers adapted plastic material into their works. Light-weight, easy-care and durable plastic gave an opportunity to build and produce faster than before thanks to the conveniency for mass production. One Fnnish example of this is the floating glass-reinforced polyester Pastil Chair by interior designer Eero Aarnio (fig. 13.). (Huokuna 2006, 82, 90)

Figure 13. Pastil chair by Eero Aarnio is made of glassreinforced polyester. (http://www.aarnioshop.com/shop/?sivu=chairs)

The mass production was thought to keep costs lower so that everybody could afford plastic products. In Taanila's film a former Peter Stude tells that some people wanted to believe that mass production of plastic houses would bring a solution to the growing demand for dwellings in the developing countries. According to Stude, Futuro was too expensive to allow this type of settlements. (Futuro - A New Stance for Tomorrow 1998)

3.2 Contemporary plastic architecture

A number of houses similar to Futuro appeared in the industrialized world around the same time. Already in the 1954–57 the Monsanto House of the Future was built in Disneyland, California, USA. It was created by architects R.W. Hamilton and M. Goody with Monsanto Chemical Company. The structure was made of GRP – paper honeycomb + PUR – GRP which appeared to be so durable that in the time of demolition in 1967 the demolition hammer could not destroy it. (Genzel 2006; Topham 2003, 64; Waentig 2008, 62)
There were also other plastic houses like Futurotel (1966), a two-storey accommodation space which had a window looking like a bug eye. French architects Jean Maneval and Ifert

+ Meyer's Six Shell Bubble House (1969-70), architects Casoni & Casoni creation, a holiday house Rondo (1968) in Basel and a floating Bio-Dom (1970). The three latter ones attended the first international plastic house exhibition of IKA ´71 together with nine other plastic houses including Futuro. (fig. 14.) The exhibition was held in Lüdenscheid, Germany and lasted for two months. (Genzel 2006, 14; Topham 2003, 64–65)

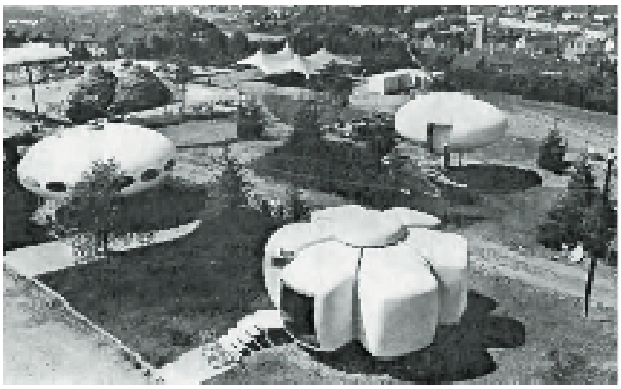


Figure 14. IKA ´71 exhibition in Lüdenscheid, Germany.
Six Shell Bubble House (lowest in the right),
Futuro (lowest in the left), Rondo (upper right)
and Bio-Dom (upper left) (Genzel 2006)

4 SIGNIFICANCE OF FUTURO HOUSE

There is something in the Futuro house that does not quite appear clearly at first sight. It raises one's interest to study more about it. The Internet surfing shows that there are tens and tens of Websites about Futuro, even Websites listing all the Futuros existing today around the globe. Supposedly no other plastic house gained so many fans from all around the world.

The Taanila's film and the book called *Futuro - Tomorrow's House from Yesterday* (2002) published later and edited by Marko Home and Mika Taanila have been playing a significant role in telling the Futuro's story to the public. The influence of the film, aswell as the book, are obvious and since then those have been used as a source of reference in many theses and diploma works of historians and architects in other publications.

4.1 Image of its time

The flying saucer like Futuro is very simple by its construction but is quite complex by all its meanings. It might be more understandable for the people from the same era because they might well remember the conquest of the plastic in every area of their lives. They might also remember the so called space age when people talked a lot about a human being going to moon. For the second generation it may give an impression of the past plastic and moon madness. The everyday life is still full of plastics and talks about space. The visions about living in space might even get current again due to the talks about the climate change.

Juhani Pallasmaa, the acting professor of architecture, the Aalto University School of Science and Technology has said in an interview in 2003: "Futuro was a rare item, so that architects, at least in the Finnish architecture have never done at other times a product, which was accompanied so strongly by its contemporary image of the world, utopian, progressive and fashionable image of the world." (Nyman & Poutasuo 2004, 144)

4.2 Utility building

Futuro was advertised as convenient for various uses. It could be used as a ski, fishing and hunting cabin or just a normal leisure house. It has been used as all of them but also as a bank, restaurant, bar and café and also as a boutique or as an exhibition hall (fig. 15.). All these and many more fuctions can be addapted there. In all these cases the function propably came after the style and its beauty. Even if it wasn´t always a practical place to serve clients it certainly was a place that a client would remember!

There are still people who have Futuro house as their actual home (fig. 16.). For those the house is primarly a utility building that cannot be protected from the normal effects of usage. There is also a need to renovate the house and make some alterations depending on the needs of the owner.

Figure 15. (upper) (Futuro as an restaurant in 1973, Lahnajärvi, Finland. (Home & Taanila 2004)
Figure 16. (middle) Futuro as a private house in Melbourne, Australia. (Home & Taanila 2004)
Figure 17. (under) Futuro as an art object in 1996, Skop-exhibition, Wien. (Home & Taanila 2004)

4.3 Art object

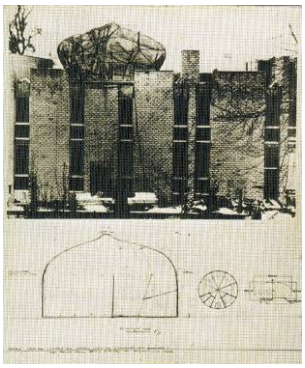


Figure 18. Christo wrapped Charles Wilp's Futuro. (Home & Taanila 2004)

Futuros life as an art object is said to have started in 1990 when a Finnish artist, Jussi Kivi, rented a Futuro (no. 000) from Matti Suuronen and set his presentation about the UFOs inside it in Radar exhibition in Kotka, Finland. Then in 1996 a German artist Carsten Höller borrowed the same prototype to the Skop exhibition in the Vienna Secession. (Home & Taanila 2004, 38–42)

The prototype ended up to the collections of the Central Museum of Utrecht, the Netherlands in 1997. Since then the prototype has been in numerous exhibitions as an art object (fig. 17.). An interview with a painting conservator Sami Supply reveals that the prototype has moved from Utrecht to the Museum Boijmans van Beuningen in Rotterdam, the Netherlands. Supply has acted as an assisting conservator to Lydia Beerkens in the conservation plan of the prototype. Supply told that the head of the Museum Boijmans van Beuningen considers Futuro as an art object. (Supply, interview 2.3.2010)

There was also a well-known German artist and filmmaker who owned a Futuro, Charles Wilp, who called himself an ARTronaut. Wilp put his Futuro onto the roof of his house so that anyone could see it. He also invited many celebrities to his house and there came, for example, pop guru Andy Warhol and Playboys owner to visit the Futuro. Playboy made also an article of the "Portable playhouse". Wilp also invited a Bulgarian wrapping artist Christo to wrap Futuro with a plastic film (fig. 18.). (Home & Taanila 2004, 105)

5 FUTURO NO. 001

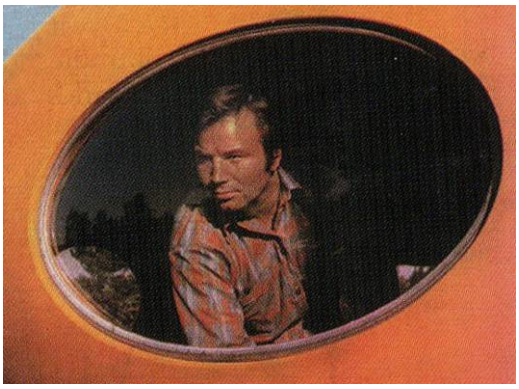


Figure 19. (left) Kuusla inside his Futuro house. (Home & Taanila 2004)
Figure 20. (right) Identification sign.

The yellow Futuro with an identification plate of no. 001 (fig. 20. & 21.) is owned by a former Finnish TV celebrity Matti Kuusla (b.1933), better known as "Pikkis" among the Finnish TV viewers (fig. 19.). He started as an actor in his early childhood but was also a very productive scriptwriter, producer and founder of a theatre group. The house came to Kuusla's ownership in 1968 soon after it was manufactured. Kuusla got the house as a free gift together with an affordable land sale arranged by Lomanotko Ltd., the marketing company of Futuro cabins. Lomanotko hoped that Kuusla's publicity would increase sales of the other Futuros. (Kuusla, interview 25.3.2010)

Kuusla mentions that Futuro advantages are lightweight and mobility which are the reasons that it does not need any building site to be built and can anytime be transported away from there. He reminds that the Futuro house itself does not leave much trace on nature when it is gone. (Kuusla, interview 25.3.2010) In Taanila's film Kuusla describes the house as a butterfly who can simply fly away (Futuro - A New Stance for Tomorrow 1998).

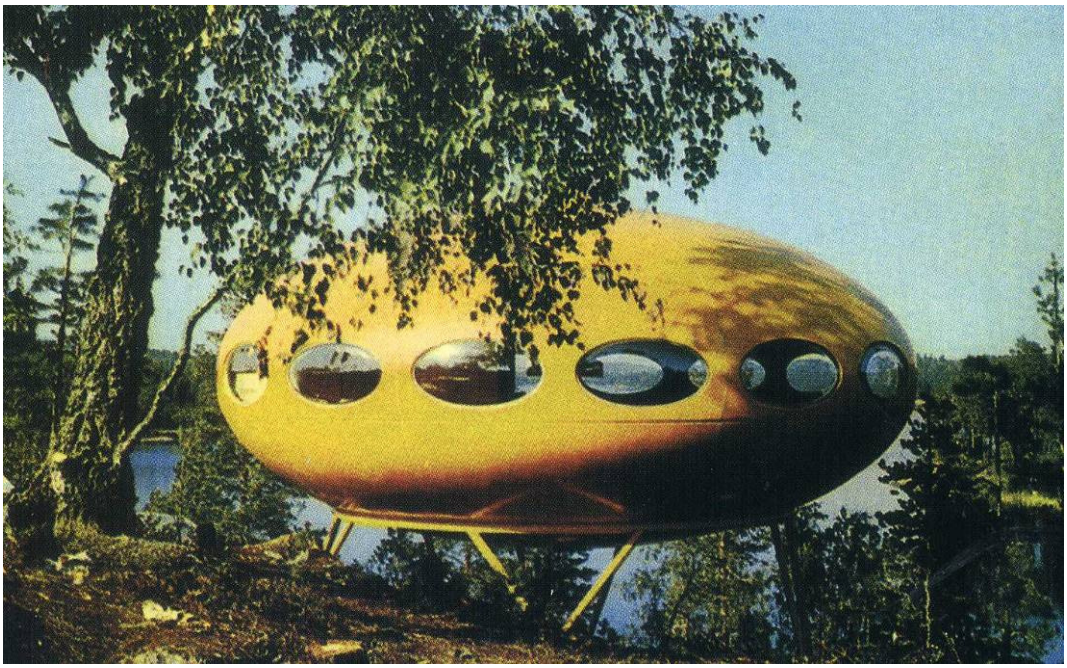


Figure 21. Futuro house stands close to the lake on a steep slope.
Trees were cut down by the time of assembly in 1968. (Home & Taanila 2004)

Figure 22. Today some of the trees grow quite close to the house.

6 DOCUMENTATION

Futuro house no. 001 was documented in writing and in photographs. The documentation includes also 360° panoramic images which enable the viewer to rotate in every room. That helps to perceive the shape of the house, which as an ellipsoid brings many challenges to the presentation of the house. Microscopical pictures with Dino Lite Digital Microscope were also taken. The house has not been previously documented.

The documentation was seen very important noticing the fact that there are only a very few Futuros remaining in Finland. The oldest houses are already more than forty years of age. The manufacturer Polykem Ltd. has promised that they can withstand at least for more than thirty years (Bechthold 2008, 29). These plastic houses may still leave through many more years, particularly if they are kept in good condition.

Futuro no. 001 has for a long time been without any particular use and care and whose future prospects are not yet clear and decided. It is good to remind that Futuro no. 001 is the second ever produced Futuro, which brings more value to it. Nobody knows exactly the total number of the Futuros, although there have been attemps to calculate them. Also the fact that it has been in its original location with its original owers since the beginning, makes it even more interesting. And because it has not undergone any major alterations rather than repairs, it is in a very authentic mode. The authenticity of the house is another important criterion to carry out proper documentation.

The documentation with a survey of condition can provide relevant information to the owners and serve as a basis in making decisions related to the house. Documentation and survey of condition are always done before any actual treatments. Professionally made conservation and restoration includes a conservation-restoration plan based on the previously made documentation and condition survey. Documentation is a continuous process through the conservation-restauration project as well as thereafter. It should be kept up to date and used in observing possible changes. A properly made documentation can also some day be useful for historians and scienists.

ABBREVIATIONS:

R1 Entrance hall
R2 Toilet
R3 Kitchenette
R4 Living room
R5 Dressing room

W Wall
Wi Window
FP Fireplace
BC Bed-chair

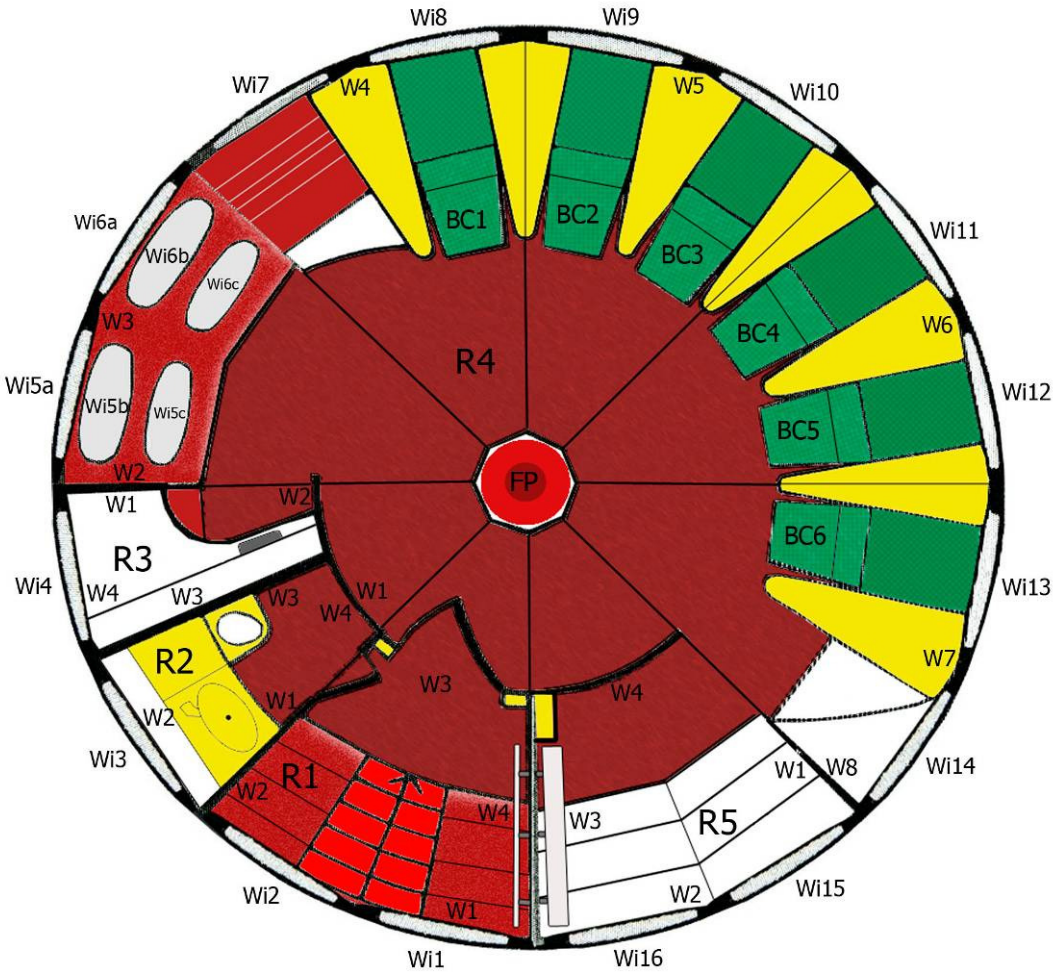


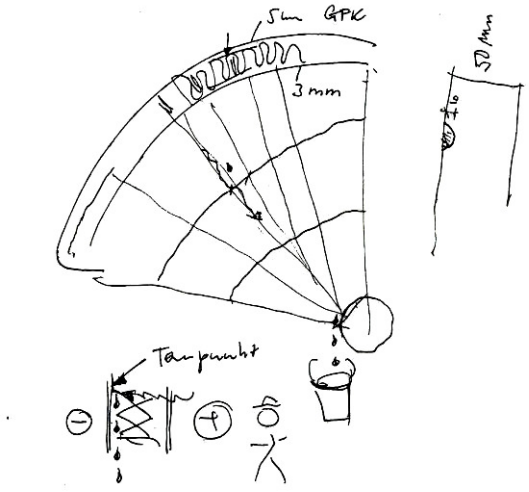
Figure 23. Ground plan with colours and numbers.

6.1 Site and surroundings

The Kuusla spot is located in a small island in Pääskyniemi, Hirvensalmi. His Futuro house stands on a steep slope in the scenic shorelines of the lake of Puulavesi (fig. 21.). There is a hilly road leading to the island but the rest of the way goes through a narrow path. The house is surrounded by forest where there grow mainly pines, spruces and junipers. There are quite many trees growing very close to the Futuro house (fig. 22.). At the time of the house assembly in 1968 almost all trees had been cut down and the place was much more spacious than today. The house could easily be seen from the lake.

6.2 Structure

The structure of Futuro no. 001 is composed of sixteen individual elements made by using waterproof plywood molds with metal reinforced plastic finishing according to the architect Matti Suuronen (Suuronen, interview 6.4.2010). The exterior and interior shells were made of glassreinforced polyester (GRP) and insulated with polyurethane foam (PUR). The layer thicknesses were GRP (5 mm) – PUR-foam (50 mm) – GRP (3 mm) as shown in the figure 26.



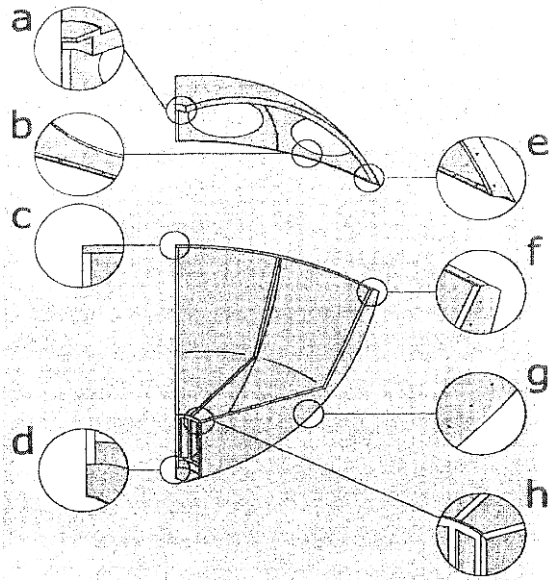
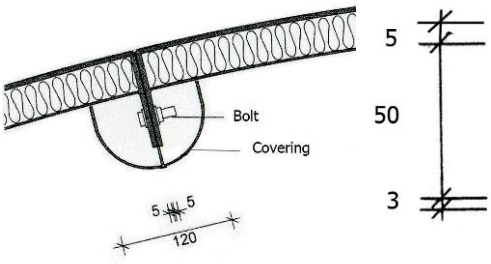


Figure 24. (left) Sketch of how condensed water passes down the structure by Suuronen. (Genzel & Voigt 2005)
Figure 25. (right) The roof and the floor elements. a) shelter, b)below the window, c) angle, d) center of the floor, e) bent edge for bolts, f) angle and bent edge for bolts, g) floor structure and bent edge for bolts & h) metal support structure. (Rasier 2002)

Suuronen (2010) explained the production of the elements as follows:
The dyed gel-coat was sprayed first on the mould as 2 mm thickness. The gel-coat provides the coloured and glossy finishing to the element's surface. It consisted of polyester and colour pigments. The pigments were expensive, which is the reason why the gel-coat was used so little. Then a transparent polyester layer was spread and pre-sliced pieces of glass fibre matt and was left to cure. This measure was repeated until a certain thickness of 3 mm was reached (together with gel-coat 5 mm). This was done by hand-laminating in the case of the first Futuro houses. Later a method of spray-lamination was introduced when the 3–5 cm long pre-cut glass fibres were blended into the polyester. The employee sprayed on top of the stand which had been placed above the mold. After the polyester and glass fibre layers a suitable pre-cut to size polyurethane foam insulation was put on top of still wet polyester. Sandbag weights was put on top of the insulation to ensure its adhesion to the polyester. The glass-reinforced polyester was spread as 3 mm of thickness. Finally a red paint was applied on the surface. (Suuronen, interview 6.4.2010)

There were eight larger elements which formed the roof and eight smaller elements which formed the floor as shown in figures 25., 28. and 29. The wall elements were bolted together through their bent edges inside the house. The bolts on the ceiling were hidden under GRP coverings which were attached to the elements with screws from their sides (fig. 26.). A few pieces of wood were placed inside the covering where the screws sank in. The gaps between the elements were sealed with silicone mass from the outside.



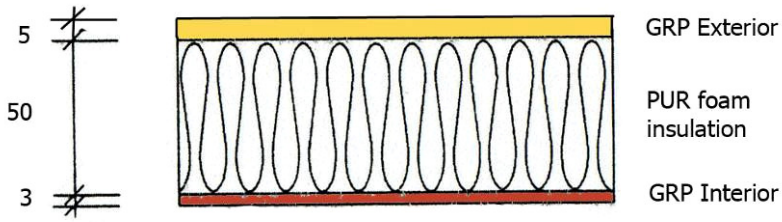


Figure 26. (left) Cross-section of the wall structure demonstrates the bolting. (Genzel & Voigt 2005)
Figure 27. (right) Cross- section of the wall structure.

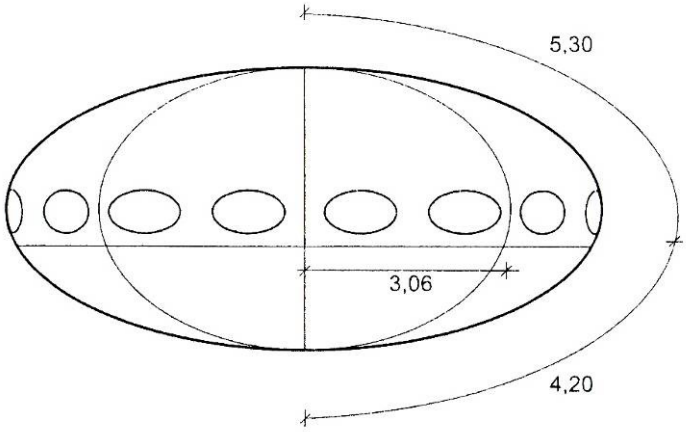


Figure 28. Dimensional drawing of the exterior. (Genzel & Voigt 2005)

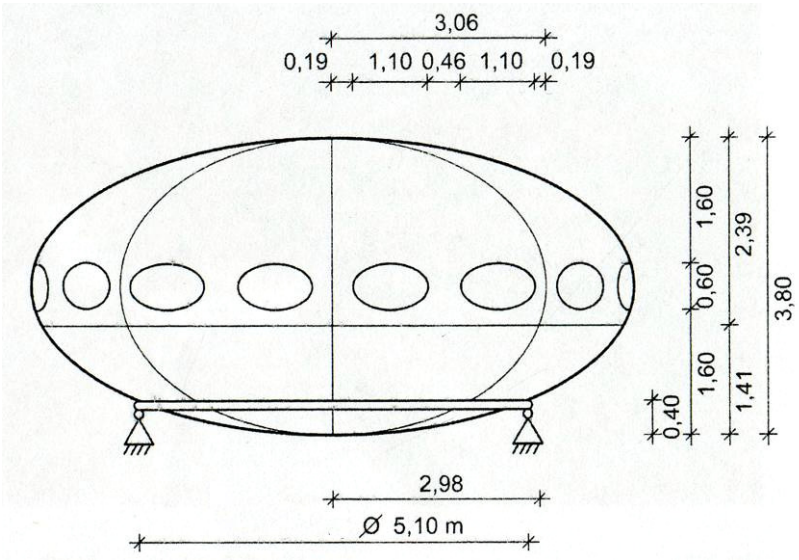


Figure 29. Dimensional drawing of the exterior. (Rasier 2002)

A closer examination of the structures reveals that the floor forming elements are slightly different from the roof forming elements. In addition that they are smaller, they also have structural elements of the floor plates attached to it which shows in figure x. The floor elements are also not all identical. Six of the eight are covered with plywood plates extending to the floor plates. One of the two different elements contains four oval windows offering a view out instead of plywood coverings. The other different element is in the Entrance hall. It is also not covered with plywood but it has a cascading staircase.

At the lower and upper ends of the eight roof elements on the exterior side there are small shelters to ensure that rainwater does not penetrate the stucture (fig. 30. & 31.). At the

bottom of them there is a canopy that fits the angled top of the lower elements. (Rasier 2002, 86)

The partition walls of the house are made of hand laminated GRP plastic shells with yellow dyed gel-coat finishing. Their form goes in line with the exterior walls so that the partition walls close to the exterior walls are slightly curved. There are canopies in their edges, where the wooden mounting battens fit in. The mounting battens facilitate putting the walls together (fig. 32., 33. & 34.).

Figure 30. (left) The top of the roof element has a shelter to prevent rainwater from penetrating the structure. (Rasier 2002)
Figure 31. (right) There is a shelter on the bottom of the roof element to prevent rainwater from entering the structure.

Figure 32. (left) Partition wall set in the mounting batten, which instead is set in the element bent edge.
Figure 33. (middle) Between two partition walls is a wooden mounting batten.
Figure 34. (right) Wooden mounting batten in the corner of two partition walls.

6.3 Steel leg foundations

Futuro house no. 001 stands on a tubular steel ring, with four tubular steel legs welded into it (fig. 35. & 37.). The ring consists of four curved parts, each including one leg. The parts are screwed together. The ring is attached to the body of the building with bolts and rectangular connecting plates (fig. 36.). Steel connecting plates locate at the confluence of the elements. Each leg consists of two steel tubes which are perched to the ring so that they resemble a V shape. There are steel plates joint into the end of the legs. The plates are bolted to steel mounting plates which in turn are attached to concrete foundations.

Figure 35. (left) Tubular steel legs.
Figure 36. (right) Connecting plates at the confluence of the elements.

The steel legs are scaled so that they follow the forms of its ground in a steep cliff. The legs which stand higher on the cliff have been cut shorter than the other legs. A round, gray plastic foam band with an airtight cell structure has been added between the house and the ring to protect the exterior shell from scratching. The ring, legs and the plastic foam padding have been painted with yellow paint.

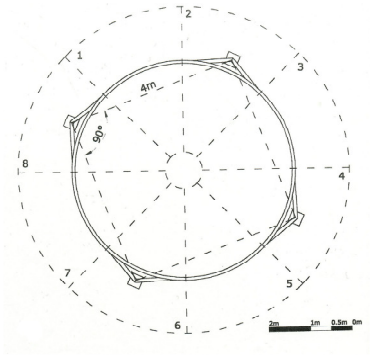


Figure 37. Top view cross-sectional drawing of the steel legs and the floor elements. (Rasier 2002)

6.4 Exterior and interior surfaces

The exterior surface has a smooth and durable finishing which is achieved by spreading the yellow gel-coat first to the smooth mould surface (fig.38.). The other layers had been implemented afterwards. In the interior finishing no gel-coat was used. Therefore, the interior finishes are not smooth and the fibers are visible (fig. 39.). Since the gel-coat not only provides for the smooth surface, but is also responsible for the colour, an extra layer of red paint was applied. There might be Futuro houses with smooth interior finishing due to a different manufacturing process such like sprayed gel-coat. The interior finishing in Futuro prototype no. 000 has similar visible fibres with no. 001 but the colour is purple. (Supply, interview 2.3.2010.)

Figure 38. Smooth exterior surface.

Figure 39. Uneven interior surface.

6.5 Floors

The floor deck is built of plywood plates which are installed on the eight floor elements. The cross-sectional drawing of the floor deck with dimensions is shown in figure 39. There are wooden and metal support structures (fig. 41. & 42.). Each element has three plywood supports which are supported by wooden ribs and vertical wooden supports hold them in their places. There are metal compounds in the center, leaving an opening for the airflow and the heating and fan mechanism. The mechanism is manufactured in Sweden by ASEA, according to the sign on the device (fig.43.). The mechanism with its fan blades can be seen below the house behind the wire netting. There is thin GRP matting laid on the bottom with edges brought and bolted up to the support structure walls (Rasier 2002, 92). All the floor surfaces are covered with red plastic carpet which is adhered from several precisely cut

pieces (fig. 44. & 45.). The carpet is made of smooth film of c. 5 mm thickness. The material is unknown but reminds of a plasticized polyvinyl chloride (PVC) that is used for flooring material (Shashoua 2009, 20). The red colouring has some greyish line patterns.

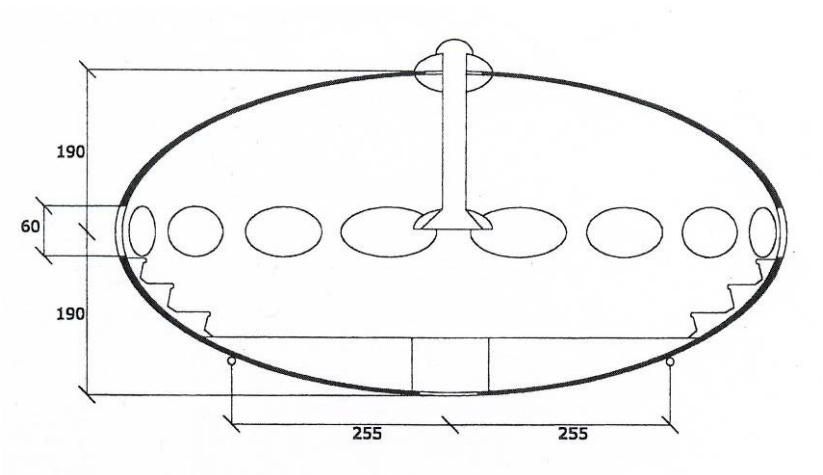


Figure 40. Dimensional drawing of the interior. (Rasier 2002)

Figure 41. The floor plates are partially dismantled. (Rasier 2002)
Figure 42. Prefabricated floor upright position. Support structures are shown. (Rasier 2002)

ASEA		
Mot 3~50 Hz		Code 140.0431
Typ M	63B14–6	S43
0,125 kW	0,17 hp	870 r/m
38V Y	0,7A	220V Δ 1,2A
Class E		cos φ = 0,60
SEN 2601	IEC 34–1	6 kg
Made in Sweden		Fabr. en Suede

Figure 43. Text on the heather and fan machanism sign.

The air flows through ventilation holes on the floor deck. Two larger holes are in the entrance hall floor but the openings are towards the living room on both sides of the door (fig. 44.). The holes are covered with high boxes made of GRP in the two corners of the entrance hall. The boxes hide also some plastic tubes which probably were meant to carry power cords. Some air circulation is made possible by leaving narrow gaps to the floor deck close to one of the exterior wall with fire-safety windows (fig. 45.).

Figure 44. Ventilation holes both side the door.

Figure 45. Narrow gaps close to the windows.

6.6 Windows

The house has overall twenty oval windows made of double panes of PMMA (Perspex). The windows seemed to be installed to the wall structure with seals. The window seals are made of grey rubber, which has canopies in the middle for rubber bands (fig. 49.). The seals of the smaller windows are made of black rubber. When the rubber band is removed from the canopy the seal is loose, which facilitates the installation and removal of the panes. After that it can be pressed back to its canopy. One exception is the fire-safety windows where the seals are made of black rubber without separate installation rubber bands. The cross-sectional drawing in figure 48. demonstrates the window installation closer.

The windows are evenly distributed around the house and are located mainly in the elements that form the roof (fig. 46.). Each wall element has two windows. Four smaller windows are placed in one of the floor element for fire-safety reasons. These windows are in two rows below each other and they are smaller in relation to the upper windows (fig. 47.). No folding windows are installed.

Figure 46. Window from the outside.

Figure 47. Fire-safety windows.

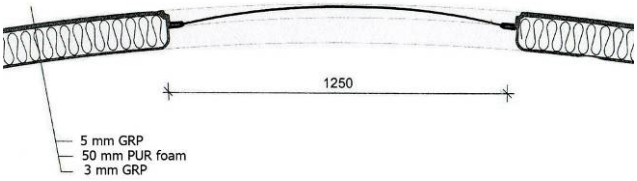


Figure 48. The window attachment to the wall. (Genzel & Voigt 2005)

Figure 49. Window seal from inside.

7.6 Rooms

All the rooms are generally in surprisingly good condition. A point worth noting is the fact that they are, in authentic appearance according to the owner. No changes or restorations have been done. (Kuusla, interview 25.3.2010.) The rooms are a little untidy and each room also has dirt in the walls as mentioned in chapter 7.3 about exterior and interior wall surfaces. The dirt contributes to the fact that the outer door has been left open for a long time, about five years, remembers the owner. The door was left open after the house was broken into by breaking down the door. The only regular cleaning method has been wiping the floor with a cloth. (Kuusla, interwiev 25.3.2010.)

6.7.1 Entrance hall

The entrance hall is a small room. Its already small floor area is reduced by the entrance door (fig. 51.). The entrance door opens downwards and transforms stairs which lead inside (fig. 50.). The lowest part of the door is slightly narrower than the upper part. It was originally meant to be closed by turning the lever next to the door while the wire would go around a reel (fig. 57.). The exterior surface of the entrance door is made of the same material as the exterior surfaces. The stairs are made of red polyester plastic. They are hand laminated in a mold in negative form and have a 1,5 mm thick wall. More thickness is not good for the stability because of their shape necessary. (Gentzel & Voigt 2005, 153.) The outer edges of the steps are made to be non-slip. The upper step is embellished by an identification sign saying with stylized letters *Casa Finland Futuro 1, Product of Polykem Ltd. Helsinki, Finland, Design by Matti Suuronen Architect SAFA* (fig. 20.).

Two yellow boxes with a few shelves have been built in the corners, on both sides of the partition door between the entrance hall and the living room (fig. 53.). The boxes are above the two air circulation holes and contain grey plastic pipes probably meat for power cords. Oval openings on the front side of the boxes have been added (fig. 56.). The upper openings are covered with white opaque Perspex windows. All the other openings may have been covered with Perspex sheets as well. Next to the left box is a white round light switch with a square button (fig.55.).

Both doors leading to the toilet and to the living room have rounded corners (fig. 52.). The toilet door handle is a narrow steel handle. The handle of the living room door is missing. The door handle in the living room side of the door is made of black oval Perspex. The entrance hall side handle may have been similar.

Figure 50. The entrance door transforms stairs.

Figure 51. Entrance hall floor.

Figure 52. The toilet door.

Figure 53. Boxes both side the door.

Figure 54. Rack.

Figure 55. Light switch.

Figure 56. Oval opening.

Figure 57. Lever for the door.

There is a white plastic laminated plywood rack on one of the walls (fig. 54.).

6.7.2 Toilet

The toilet is only half of the size of the vestibule (fig. 58. & 63.). The toilet floor and fixtures are made from a single mold. They are made of hand laminated GRP in 1,5 mm thin (Genzel & Voigt 2005, 153). The floor piece is so wide that during the assembly it must be installed before the erection of walls. (Supply, interview 2.3.2010; Suuronen, interview 6.4.2010.) The fixtures consist just of a yellow-white toilet seat and a yellow basin (fig. 59. & 61.). A shower was never installed. The deck of the toilet seat can be removed as well as the bucket inside the seat at the time of emptying the bucket (fig. 60.).

The table top around the basin is also removable and can be lifted up. Under the rectangular deck behind the toilet seat one can see the floor and wall surfaces. A white opaque Perspex pane under the window can be lifted up as well and there is a small triangular recess (fig. 62.). The toilet lamp has probably been covered with a cloche made of white opaque glass as also in the kitchenette. In the ceiling there is an air outlet (fig. 64.).

Figure 58. The toilet.

Figure 59. The toilet seat.

Figure 60. Separate parts.

Figure. 61. Basin.

Figure 62. Uplifted table top decks.

Figure 63. The floor of the toilet.

Figure 64. Air outlet in the ceiling.

6.7.3 Kitchenette

The kitchenette is very small open room with one window (fig. 65.). The level of equipments in the kitchenette is low and there are only a steel basin without a faucet and open shelves built in place (fig. 66. & 68.). Below the basin is a cabinet with yellow sliding doors made of glossy Perspex (fig. 69.). Shelves are made of mixed veneer laminated with white plastic. Edges are protected with white plastic strip (fig. 68.). There is one socket on the table top (fig. 67.). The lamp is covered with a cloche made of white opaque glass. In the ceiling is an air outlet.

Figure 65. Kitchenette.

Figure 66. Basin and drainpipe.

Figure 67. Socket on the table top.

Figure 68. Shelves are made of laminated vaneer. Figure 69. Sliding doors of the capinet.

6.7.4 Living room

Figure 70. Bed-chairs can be pulled down.

Figure 71. Fire-place is in the centre.

Figure 72. Partition walls are slightly curved.

Figure 73. Fire-safety windows.

The living room is the biggest room of the house. There is a combination of a fireplace and grill in the centre of the room (fig. 71.). The grill consists of a yellow steel pot with two handles. There are steel rings at the bottom of the pot. The pot is portable so that it is easy to carry outside for cleaning the ashes although it is quite heavy. The fireplace itself is on the top of a two-level table which stands on four red-painted steel tube legs. The table tops are made of mixed veneer cut into an octagonal shape and laminated with white plastic. The edges are protected by a white plastic band. The band is attached into the grooves in the edges. Below the table there is a red-painted plywood box shaped as the table above. The box is probably meant to cover the opening in the floor deck and heating and fan mechanism below it.

Figure 74. Transparent shelves.

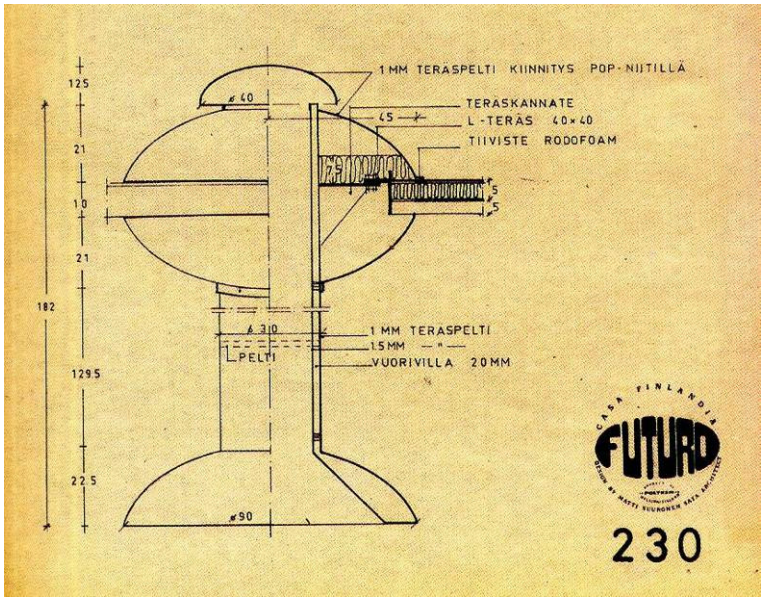


Figure 75. Cross-sectional drawing with dimensions of the flue, the hood and the cap. (Home & Taanila 2004)

Above the grill there is a red-painted steel sheet hood and flue, which is equipped with a damper. The flue leads the smoke directly to the roof, where there is a protective cap made of steel sheet. The figure x shows a cross-sectional profile of it. The drawing tells that there is rock wool insulation inserted between the two steel plates of the flue (fig. 75.).

There are six bed-chairs close to the exterior wall containing small lamps inside the armrests (fig. 80.). The openings of the lamps are covered with white opaque Pespex windows. The seats are made of plywood and seat legs are made of steel (fig. 79.). The seats are painted red. The armrests are made of 1,5 mm thick hand laminated GRP with yellow gel-coat finishing (Gentzel & Voigt 2005, 153; Suuronen, interview 6.4.2010). The seats are also known as horse-chairs as their design reminds the shape of horse. The bed-chairs save some space in already a small room. They can be folded down whenever needed as it shows in figures 78. and 81. Their paddings consist of three cushions which are made of soft foamed plastic and covered with green textiles (fig.76.). The background fabric has greyish, chequered pattern (fig. 77.).



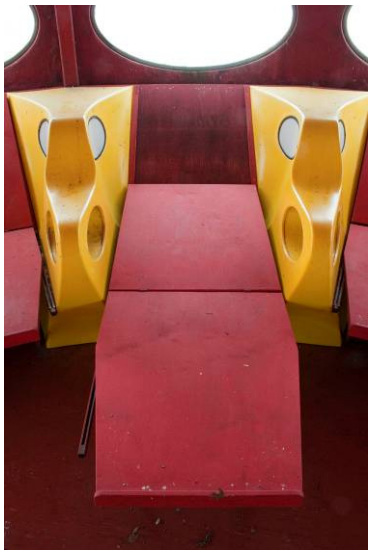


Figure 76. Padding with green fabric. Figure 77. Background fabric. Figure 78. Serves as a bed.

Figure 79. Bed-chair steel legs.

Figure 80. Light switches in the armrests.

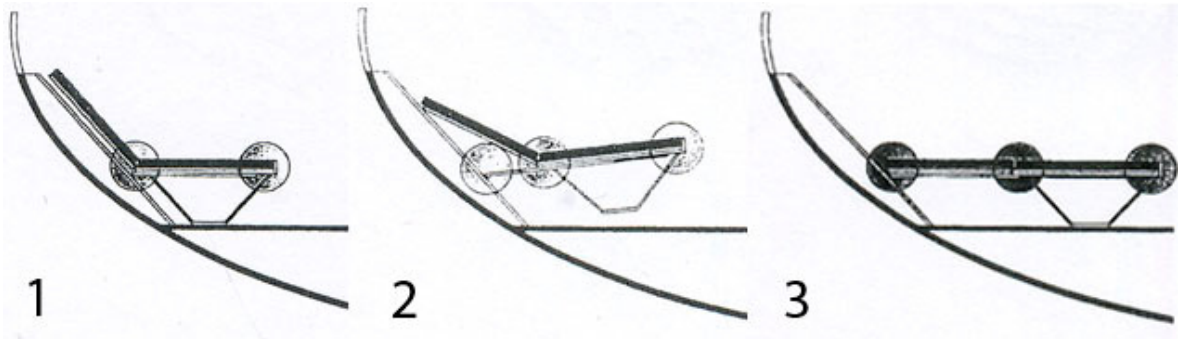


Figure 81. Bed-chairs can be used as chairs (1) or pulled down (2–3) as beds. (Rasier 2002)

There are also two shelves on both sides of the row of bed-chairs. The shelf close to the kitchenette is made of transparent Perspex and it has front edges. Below it is one laminated mixed veneer shelf. The other shelf is close to the dressing room and made of mixed veneer laminated with white plastic and edges covered with white plastic strip. There is a socket below the Perspex shelf. On the floor level both sides the entrance door there are channels for air and heat flow. The openings are protected with yellow plastic network.

6.7.5 Dressing room

The dressing room is same sized with the entrance hall (fig. 82.). Instead of door there is only a doorway. There are two windows. The dressing room fixtures consist of gradually rising open shelves on the side of the exterior wall (fig. 83.). The shelves are made of mixed veneer laminated with white plastic. The edges are protected with white plastic strip. There is a power cabinet in one corner of the room for managing all the electricity in the house (fig. 85. & 86.). Unfortunately that was never used because the electricity was never pulled to the house. Next to the power cabinet there is a rack which is made of the same plastic

laminated mixed vaneer as the shelves are. There is a socket for a phone cord below the shelves and a white cylindrical lamp made of plastic and opaque glass on the partition wall (fig. 84. & 87.). Its power cord leads to the light switches a little lower.


Figure 82. The dressing room.


Figure 83. Open shelves.


Figure 84. Cylindrical lamp.

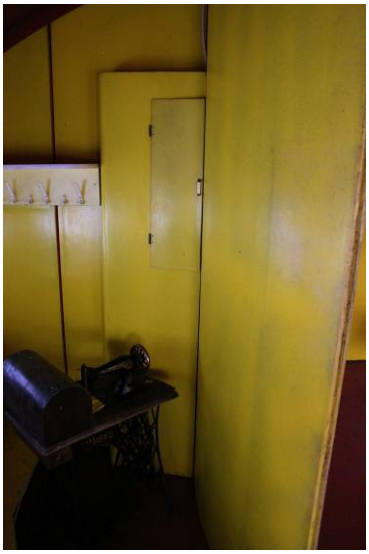


Figure 85. Main circuit breaker in the corner.


Figure 86. Fuses.


Figure 87. Socket for telephone.

7 CONDITION SURVEY

The condition survey of Futuro no. 001 was carried out in writing and in photographs. They form the basis for the demostrative damage mapping that was done on the pictures. All the mappings can be seen in the appendices. The damage mapping helps to see the locations and extents of the damages. The condition survey together with the previously made documentation forms an important basis for future decision making regarding Futuro house no. 001. Decisions may relate for example to making a conservation plan and choosing the most suitable conservation or restoration measures. These documents should be kept in a safe place so that they are available when needed.

7.1 Structure

The structure of the elements was studied from the outside by visual observation. The condition of surfaces so far was considered to give enough clues for assessing the structural condition. For a deeper research some invasive research methods would be needed. The opening of the floor plates by screwing would give an opportunity to see the condition of the floor structure but there is a risk that the adhered plastic carpet would damage in the process.

The wall and floor structures seemed to have kept their strength and durability and it seems to be safe to walk inside. Below the house there are some small holes that seem to have purpose to let the air and water flow. Some rusty water has come out from these holes and the surface has discolored. The rust probably comes from the structural metal compounds that lay on the centre of the floor structure leaving an opening for the heating and ventilation mechanism. The rusty traces indicate that water has penetrated inside the structure. There was no information from the owner regarding the length of the time that the rusty traces have been there.

There are many gaps without any proper gaskets so these are the places where the water may have entered the structure (fig. 88.). There are two caps on the roof that protect the air outlets from rainwater. Both of them have fallen down and water may well enter the structure. Both caps are now inside the Futuro house (fig. 89.). The house has been tried to cover with a protective plastic sheet that already shows already in the picture taken for the *Futuro - Tomorrow´s House from Yesterday*, the first edition of which was made in 2002. The plastic cover sheet is still hanging loosely on the house having not much longer protective effect.

Figure 88. Many gaskets are cracked.

Figure 89. Protective cap of the air outlet has fallen down from the roof.

According to the intention of architect Suuronen, the condensed water was aimed to slide down the convex inner surface and come out through the opening and probably through the small holes in the bottom (fig. 24.). If that idea has worked, the water has not stood too long in the structures and may not have caused any bigger damages to the wooden supports or to the PUR foam. It could be assumed that for example in spring time in Finland, the melting snow on top of the roof enters the structures through the cracked gaskets and freezes during the still cold nights. Water and ice may cause stress to the structure. The GRP plastics have a good resistance to water and weathering according to Waentig (2008, 261–263). Their aging characteristics are known to be good among all polymers. As every material they also have their limits but it is hard to find any uniform aging behavior within

the GRP plastics. The mechanism of aging differs if the compared GRP plastics have different components or processing methods. (Waentig 2008, 261–263)

There were some areas in the interior wall surface that show some stretching. When the interior wall surface was touched it could be felt moving inwards. There might be an empty cavity without much insulation foam left inside the wall element in that spot. The degree of degradation of the PUR foam insulation is probably quite high, although the PUR foam has constantly been protected from the sunlight, which is known to damage it most. According to Waentig the speed of the photo-oxidation of the PUR depends also on the products used in the manufacturing. Humidity accelerates the ongoing photo-oxidation. Termites and microbiological organisms might also attack the deteriorated PUR foam. (Waentig 2008, 304–305.)

7.2 Steel leg foundations

Figure 90. Steel ring is dirty and paint layer is coming off.

Figure 91. Corroded steel ring.

The surface of the steel legs is very dirty in some places (fig. 90.). The paint layer of the steel legs is coming off at some parts and rusted steel is shown (fig. 91.). Some screws are missing, which fasten the body of the house to the steel ring. Over one third of them are missing. The metal of the screws might have corroded and the screws may have fallen down. It is also possible that the steel legs have moved so much that the screws have loosened and fallen down. Detailed places of the damages are illustrated in the damage mapping (app. 1–3).

7.3 Exterior and interior surfaces

The exterior gel-coat surface has become very dirty especially in the areas around the windows (fig. 92.). The exterior surface has been exposed to the weathering and UV radiation which have led to the fact that the smooth and glossy gel-coat finishing has begun to wear off and porous surface has begun to gather black deposit (fig. 94. & 96.). Some micro-organism like mosses is growing on the surface (fig. 93.).

Figure 92. Dirt is concentrated mainly around the windows.

Figure 93. The edge of the small shelter has worn away. Some micro-organism was detected.

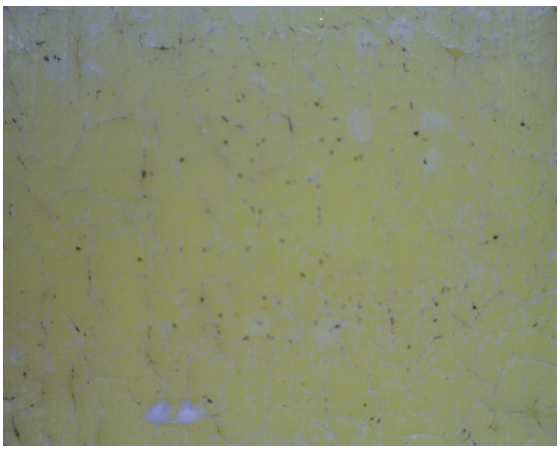


Figure 94. (left) The exterior wall surface has lost its gloss and become non-translucent. Fine cracks shows. (60-fold magnification)
Figure 95. (right) The surface of the partition wall element is still glossy and in good condition. Only some small particles of dirt are present. (60-fold magnification)

Waentig writes on her book called *Plastics in Art* that "GRP plastic looses its shine relatively quickly, and in the course of time the surface becomes matt and cracks. A small cracks allows moisture to penetrate, which in turn weakens the adhesion of the resin to the glass and in extreme cases the glass fibres, pigments or filler are exposed." (Waentig 2008, 262)

The crack has become larger in the case of the entrance hall wall, around the windows as it can be seen in figure 97. The red paint layer has come off and the yellow gel-coat is exposed. These are the areas where the water and ice have stayed longer periods causing mechanical stress by entering the cracks deeper.

Figure 96. (left) Crack on the gel-coat on the bottom of the house.
Figure 97. (right) Red paint layer has crumpled and so has the yellow gel-coat surface. The glass fibres are exposed. The small particles are dirt. (200-fold magnification)

Some cracks were detected above the entrance door. They are most likely caused by mechanical stress (fig. 98. & 99.). Outside, slightly above the level of the steel ring, between the two rooms, the toilet and the kitchenette there is quite a large fracture in the gel-coat (fig. 96.). It has most likely been caused by a mechanical impact that may have come from outside. It can be so that the surface has got a strong impact from inside during the assembly of the partition wall and fixtures of the toilet and kitchenette. It is also possible that the fracture in the gel-coat finishing has been caused by water that has entered the structure.

Figure 98. Some cracks are visible above the door.

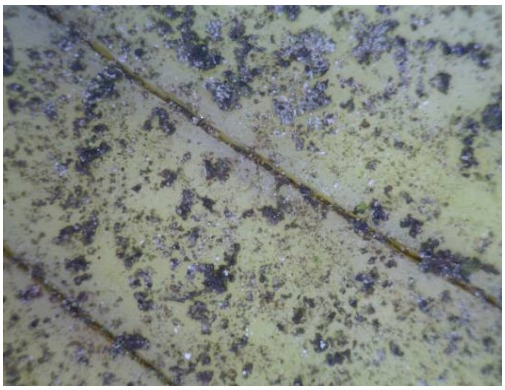


Figure 99. Cracks and deposits above the entrance door. (200-fold magnification)

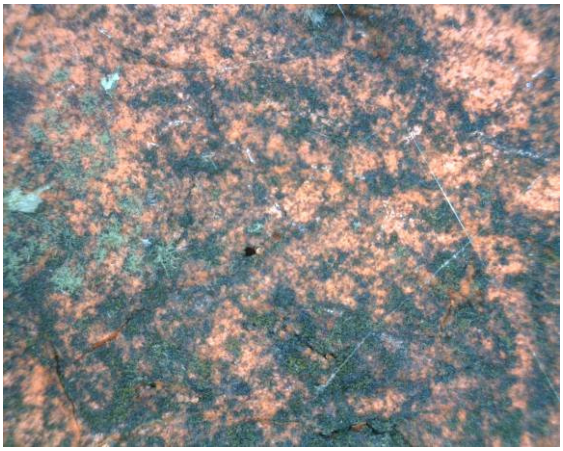
The top of the house surface was observed by a photograph taken in September 2009 shows part of the roof (fig. 100.). By the time of survey a record amount of snow covered the roof (fig. 101.). The condition of the Geissler Futuro's roof reported to be very porous and chalking in the Tim Bechthold's paper from the conference held at the London's Victoria & Albert Museum in 2007 titled *Plastics - Looking at the Future and Learning from the Past* (Bechthold 2008, 32). The photograph gives a similar impression of Futuro no. 001 roof condition. The roof top is exposed to the sunlight, rainwater and heavy snow depending on the time of year.


Figure 100. (left) A photograph taken in September 2009 shows the roof condition.
Figure 101. (right) Snow covers the roof.

The exterior wall surface from the inside is covered by some black deposit (fig. 102. & 104.). A closer look reveals that the dirt has settled in the small hollows between the exposed glass fibres that can be seen in figure 105. The small dirt particles seem to be loose and easily removed mechanically. At some areas the deposit consists also of moss and algae growth. The dirt on the interior wall surface collects humidity and offers a good ground for micro-organism growth now and in the future if the dirt is not removed. The strongest moss growth was detected under the windows on some of the bolted edges where the roof and the floor elements encounter (fig. 107.). On these edges lay also dead injects. Only a few small areas of mechanical damages on the wall surfaces were detected. In these areas fine cracks are formed and the cracks have turned dark probably due to the moist and dirt penetration inside the cracks.

Figure 102. Some elevated areas on the living room ceiling and black deposit.

Figure 103. Red paint layer is coming off and gel-coat is exposed.



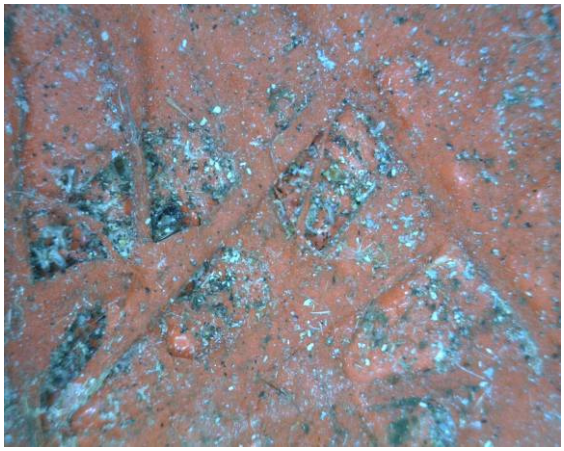
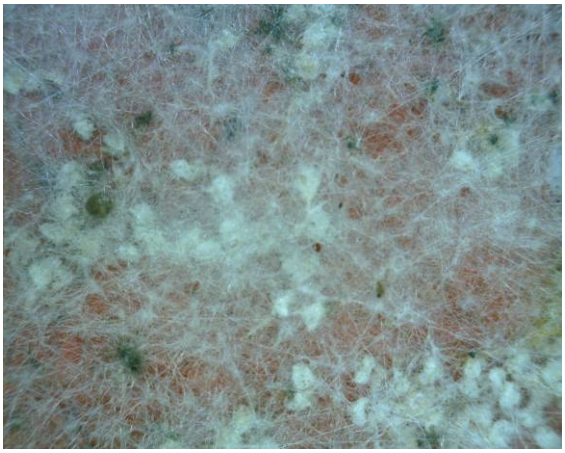


Figure 104. (left) The interior wall surface is covered by black deposit and with biological growth like moss. (60-fold magnification)
Figure 105. (right) The black and whitish deposits on the interior wall surface.
The deposits stay easily on the out showing glass fibre. (200-fold magnification)



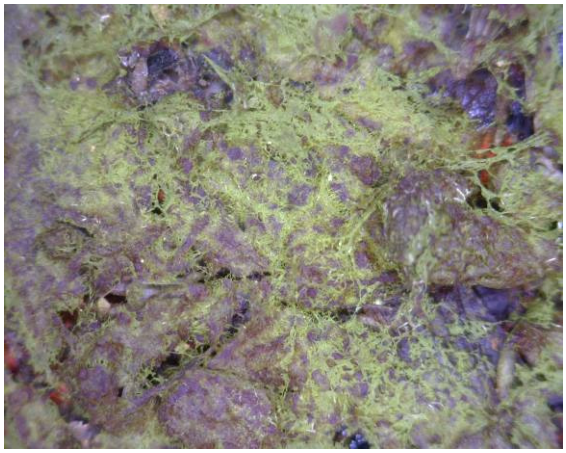


Figure 106. (left) White spots turned out to be spider nets. (60-fold magnification)
Figure 107. (right) Moss growth on the top of the bolted edge where the roof and the floor elements encounter. (200-fold magnification)

Some white spots were detected overall the interior wall surfaces. First, they were considered to be mould but a closer look exposed that they were spider nets. It seemed like there were a punch of spider eggs laid in the surface and covered with a net structure (fig. 106.). A further investigation revealed many dead spiders hanging in the ceiling. Other whitish dirt is the traces left by trickle water running down the dirty surfaces. When the water evaporates the dirt stays in the surface. On some places on the walls there are some whitish bird faeces.

The partition wall surfaces are in relatively good condition. They have retained their glossy gel-coat finishing well compared to the exterior gel-coat surfaces. Figures 94. & 95. show the difference between these two surfaces. In some areas, gel-coat finishing has become slightly thinner and some greysh colour is showing under the surface. (fig. 108.). Some loose dirt particles can be found on the partition walls but these have not penetrated tight into the surface. It can be seen also some very fine scratches, which may have occurred already during the transportation and the assembly. There are a few fractures in the edges of the lowest corners of the partition walls and on the door frames caused by mechanical stress (fig. 109. & 110.). These may have developed during the transportation and assembly but also due to the impact of another object. Detailed places of all of the damages are illustrated in the damage mapping (app. 1–8).



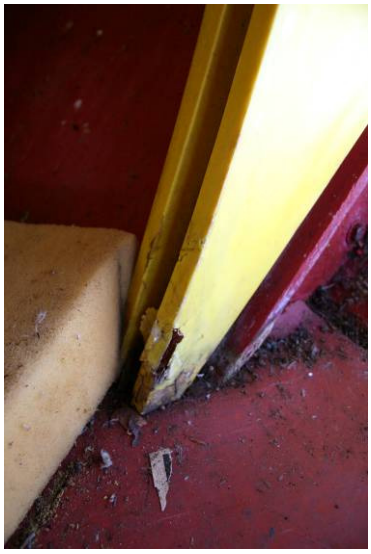


Figure 108. (left) Gel-coat layer is becoming thiner.
Figure 109. (middle) Door frame of the living room is dirty and its parts are slightly detached.
Figure 110. (right) Fracture in the kitchenette partition wall.

7.4 Floors

The plywood floor deck under the adhered plastic carpet was not investigated by removing the carpet. Removing the carpet from the adhesion would have damaged the carpet. Nevertheless, the plywood floors seemed not be fragile. The opening and the small holes below the house probably guarantees an air flow under the floor deck that would keep it dry. The plastic carpet is in quite good condition. It is untidy due to the dust and dry leaves that have come into the house (fig. 44. & 45.). The floor has been wiped every now and then. The plastic carpet is adhered from several precisely cut pieces. Some of the carpet edges have come up probably due to the adhesive having lost its adhesion. Carpet pieces are illustrated in appendix 10.

7.5 Windows

The windows are generally in quite poor condition. They have gathered dirt and dust on their surface especially on the outside. Many windows have become opaque. All of them are covered with fine scratches. By the time of research many of the windows had gathered water between the double panes. By the winter time of survey there were some windows whose lower part was covered with ice (fig. 111.).

The rubber seals have all become uneven and started a deformation process as it can be seen in the 60 fold magnified figure 112. The gaskets are exposed to UV radiation as well as to water and ice that cause a huge stress to the rubber material. The window seals have canopies in the middle for rubber bands. The rubber band has snapped almost in every window and they are not keeping the window panes tightly in their places (fig. 113.). Also the fire-safety window seals have snapped even though their seals are different. This has already led to the fact that a couple of window panes have fallen down. One fallen inner window pane is from a small fire safety window in the living room and another is an inner window pane from one of the two windows in the dressing room (fig. 114.). In fact there is a third loose window pane in the living room that is probably going to fall down next. All the fallen window panes are stored in the dressing room of the Futuro house.

Figure 111. Ice on the window seal.

Figure 112. Window seal surface has altered from smooth to uneven. (60-fold magnification)

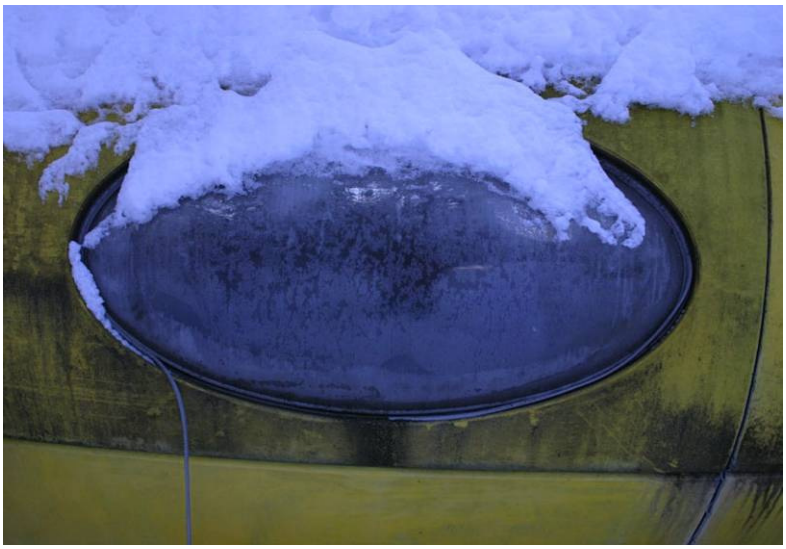


Figure 113. Window seal is loose.

Figure 114. Fire-safety window.

7.6 Rooms

All the rooms are generally in surprisingly good condition. A point worth noting is the fact that they are, in authentic appearance according to the owner. No changes or restorations have been done. (Kuusla, interview 25.3.2010.) The rooms are a little untidy and each room also has dirt in the walls as mentioned earlier. The dirt contributes to the fact that the outer door has been left open for a long time, about five years, remembers the owner. The door

was left open after the house was broken into by breaking down the door. The only regular cleaning method has been wiping the floor with a cloth. (Kuusla, interwiev 25.3.2010.)

7.6.1 Entrance hall

The lower section of the entrance wall element is in poor condition. Black deposit and whitish traces of dirty tricklewater are visible. The wire is broken and the door is constantly left open for security reasons. The door hinges are rusty and loose and there is a danger that the door would fall down if it were opened. Now the door is tied with a cord to two boards which are set across the doorway. The door leading to the living room does either not close properly. The entrance hall side door handle is missing. The door opening has some breakages in the edges. Some of them have been filled with yellow putty which is slightly darker that the original GRP surface. It is not known when the putty is added to the breakages (Kuusla, intewiev 25.3.2010) The breakages may have emerged during the assembly and were most likely filled at a very early phase, possibly soon after assembling the house. Detailed places of all of the damages of the entrance hall are illustrated in the damage mapping (app. 4).

7.6.2 Toilet

All surfaces in the toilet are in quite good condition. No major dirt can be seen except on the floor surface which is covered by dust and dirt including dry leaves. A few breakages were detected in the fixtures. One is in the back of the toilet seat and one is in the right side of the basin in the corner of a deck. There is a small chink towards the kitchenette in the corner of the partition walls. On the partition wall between the toilet and the entrance hall is a small elevation of the GRP surface in the near-by exterior wall. It moves a little when touching and its colour has changed to reddish and grayish. It is possible that water has entered the element structure through the broken outside gasket. Detailed places of all of the damages of the toilet are illustrated in the damage mapping (app. 5).

7.6.3 Kitchenette

Moss and algae growth can be detected under the window in the lateral structures where the wall elements are bolted together. The kitchenette fixtures were in poor condition. The shelf-construction was most damaged. The laminated mixed veneer shelves have received moisture, and inside the vaneer sheets are darkened, swollen and detached from each other. The plastic edge strips are loose and hanging. White mould was detected in some parts of the wooden frame of the shelf. On the top of the shelves there were some fragments of the papers glued and traces of rusty tins and screws. The sliding door cabin unit is in good shape. There was one of the bed-chair soft foam cushions without fabric laid on the floor. It has adhered onto it very tight. Detailed places of all of the damages of the kitchenette are illustrated in the damage mapping (app. 6).


Figure 115. Loose edging strip.


Figure 116. Rusty stains on the surface of the shelf.

7.6.4 Living room

Under the window in the lateral structures where the wall elements are bolted together, water has accelerated some moss and algae growth. The red paint of the steel hood and fuel of the combined grill and fireplace is flaking and rust has formed into the steel surface. Yellow paint layer is also exposed under the red paint layer (fig. 117). Perhaps it was initially intended to be painted yellow and later repainted red which matches the red colour tone of the walls. The edges of the grilling table are also a little loose. So are the edges of one of the laminated plywood shelf as well (fig. 120.).

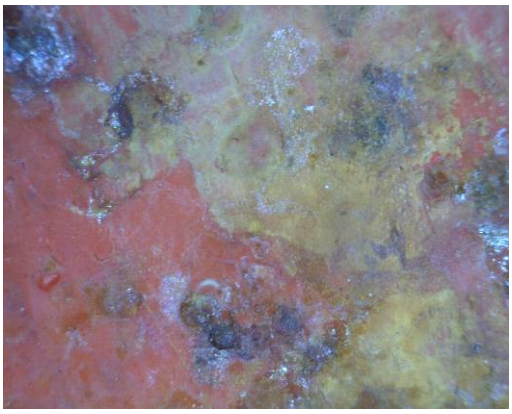


Figure 117. The yellow paint layer under the red paint layer of the steel hood of the fireplace. (200-fold magnification)

The bed-chairs are all functioning in the way they were intended. The gel-coat finishing of the GRP armrests have been damaged at the level of the seats due to mechanical stress. The seat edges have hit the gel-coat surface when they have been pulled down. Some of the edges of the light switch openings in the armrests have damaged as well but are filled with a yellow putty. It is not known why and when the damages have emerged (Kuusla, interwiev 25.3.2010). These damages may have come up already at the time of assembly but fixed straight away so that they would not stick out. Two of the bed-chair upholsteries are not in their places but they are stored by the owner (Kuusla, interwiev 25.3.2010). The fabric of one padding has been torn out and its three different sized cushions lay all over the house. One cushion lays on the kitchenette floor, the second lays on one of the shelves in the living room and the third leans against the entrance hall's exterior wall (fig. 117.–119.). The paddings of the other bed-chairs are intact but the fabric has been torn a little. Some pieces of the edging strip of the shelves are missing (fig. 120.). Both gratings of the ventilation holes both side the living room door are detached and loose (fig. 121.). One of them is broken in two pieces. Detailed places of all of the damages in the living room are illustrated in the damage mapping (app. 7a, 7b & 9).



Figure 117. (left) Cushion on top of the shelf in the living room.
Figure 118. (middle) Cushion on the kitchenette floor.
Figure 119. (right) Cushion in the entrance hall.

Figure 120. Missing part of the edging strip.

Figure 121. Loose grating on the ventilation hole.

7.6.5 Dressing room

There are several dead spiders hanging on the dressing room ceiling. The shelves in the dressing room seem to have the same deterioration process going on. There are a few strips of the plastic edges loose and deformed so that they look like waves. Soon the moisture might penetrate inside the mixed veneer sheets and cause further damage. The right shelf leg at the floor level has white mould growth on it. The main circuit breaker in the corner has rusty hinges. Detailed places of all of the damages of the dressing room are illustrated in the damage mapping (app. 8).

8 OTHER FUTUROS IN FINLAND



Figure 122. (left) Picture from Kauhava Futuro before it was assembled. (Home & Taanila 2004)
Figure 123. (middle) Picture from Marimasku's Futuro. (Home & Taanila 2004)
Figure 124. (right) Picture is taken of the Ålands Islands Futuro. (Home & Taanila 2004)

It is known that at least four Futuro houses exist in Finland according to Marko Home and Mika Taanila's research done for their book and Taanila's film (Home & Taanila 2004, 37). One is Matti Kuusla's Futuro in Hirvensalmi, the subject of this thesis. Three other Futuros are at Kauhava, Merimasku and in the Åland Islands. All the owners were interviewed on the telephone. They were asked mainly the questions dealing with the current condition of their Futuro houses. It was also inquired if they had made any alterations or repairs to their Futuros. No names of the owners are published in this thesis, due to source protection.

8.1 Futuro at Kauhava

The Futuro at Kauhava is owned by a private collector. He also has architect Suuronen's restored plastic service stations in his yard. His Futuro is painted light blue and stands by the time of interview without furnishing (fig. 122.). The furnishing has also been painted and waits the time of assembling. Some people have been willing to film the assembly.

Kauhava Futuro has previously been painted white and it has been exhibited in The 7th International Istanbul Biennial (September 22–November 17, 2001) together with the documentary film by Taanila entitled Futuro - A New Stance for Tomorrow (1998). The house was set in the gardens of the Ottoman Mint at Topkapi Palace. (Home & Taanila 2004, 43.) "After the Biennial the house was in a need of some repairing", told the owner (Owner, interview 29.3.2010). It had suffered from wear and abrasion.

The owner restored the house by himself and used the following methods:
The biggest holes he filled with glass fibre filler and glass fibre mat. After curing he sanded them and applied the epoxy based priming coating. The finishing layers he painted twice with the light blue paint which he says is used also in painting trucks. He could not give more exact information at that time. He has marked that the paint surface has begun to fade in the sun and assumes that he should have spread more layers onto it. (Owner, interview 29.3.2010)

The steel legs he has treated as well. Those he sandblasted and applied epoxy based priming coating and a finishing paint. The floor construction he told to have renewed almost totally because they have gone out of repair due to the sixteen years of abandoned outside, disassembled. He replaced the deteriorated wood construction with new ones.

The fact is that if the Futuro house is assembled and disassembled several times the bolt holes will wear out and get larger. This has been noticed in Kauhava Futuro and in Futuro prototype. This may be solved by making new holes next to the old one as it was earlier done in the prototype, or as the Futuro owner in Kauhava who decided to support the previous holes with plywood board ”handles”. (Owner, interview 29.3.2010; Supply, interview 2.3.2010.)

It is described in the book *Futuro - Tomorrow´s House from Yesterday* that Kauhava Futuro would have previously been as a ”UFO Café” in Luumäki, Finland (Home & Taanila 2004, 38). The owner perceives that his Futuro would have rather been in Kuhmoinen and served as a café of a motel. Later it would have served as a flower shop close to the market square in Kuhmoinen and also as some kind of a meeting place. The owner says that his Futuro has been light blue in the beginning and been painted white later. According him the Luumäki Futuro was exposed in the fire and would no longer exist. (Owner, interview 29.3.2010) It seems that many instances have been interested in his plastic house collections. He mentioned that a couple times the Building Fair of Finland has been asking to exhibit his Futuro. There have also been some exhibitions in the Helsinki metropolitan area where his Futuro was required. (Owner, interview 29.3.2010)

8.2 Futuro at Merimasku

The white Merimasku Futuro (fig. 123.) has been owned by the current owner of approximately ten years. Before that the house has been owned by several owners. Originally, in the 1960s it was an office of the Student Union in Turku, Finland. The house did not have furnishing. Today Futuro is located on the cottage site at Merimasku, Finland. The Futuro was thrown into the bargain when the current owner bought the cottage site. The interview revealed that the Futuro attracts regularly some visitors to look at it. There have also arrived architects from abroad to see it. (Owner, interview 17.5.2010)

According to the owner, the house is in rather good condition, but still needs a little repairing. He says that the steel legs seem to be in good shape, but the exterior surface has some dirt on it. In his opinion, the biggest damages are the cracked sealants between the elements and the deteriorated window sealings. The owner says that the house has been cleaned from the outside and the inside by using water. The floor is covered by fitted carpet. The carpet has been partially removed because it had some mold on it due to water which came through the joints of the flue. The owner seemed to be interested in restoring his Futuro house someday. (Owner, interview 17.5.2010)

8.3 Futuro in the Åland Islands

The Futuro in the Åland Islands has been used as a fishing hut since the 1971 (Original owner, interview 6.4.2010). It was painted brown to fit better into its surroundings on a rocky island. (Home & Taanila 2004, 38.) In fact it looks a little like a rock itself in figure 124. The current owner is the daughter of the previous owner. The Futuro house has not any identification sign attached to it. (Original owner, interview 6.4.2010.)

According to the original owner, the Futuro is in good shape (Original owner, interview 6.4.2010). The original owner's friend, Goldy Olander, a former Futuro hostess, confirmed that the house has stayed in very good condition (Olander, interview 6.4.2010). There has been several times the need for repainting the steel ring below the house due to the peeling paint layers and corroding metal. The corrosion has been removed and the steel legs painted

again. The fabrics of the bed-chair paddings have been changed to a new one. According to the original owner, the old fabrics have bleached in the sunlight. (Original owner, interview 6.4.2010.)

9 FUTURO'S FUTURE AND THE NEED OF PROTECTION

Futuro house no. 001 has reached the age of forty-two. Among men the forty-two years of age would be called middle-age. The Futuro house manufactures Polykem Ltd. promised that Futuro would last for over thirty years. It has been proven that the life span can be extended by regular maintenance of the house as, for example, in the case of the Finnish Futuros in the Åland Islands and Kauhava. The Hirvensalmi Futuro shows that even without constant maintenance it can persist for more than the promised time but its appearance has changed from shiny yellow to dull and dirty. It seems that he technical life span is longer that the aesthetical life span. It is hard to say if the Futuro plastic house is in its mid-life and has still other forty years to go. While some people are trying to prevent their aging process, why not try the same with the Futuro house?

The whole story of the Futuro house raises up a topic of the preservation of the 1960s and 1970s buildings. Soon many of those buildings are going to be renovated and there is a risk that renovations are done without respect for the original materials and intentions and that they would change the overall look and feel of the houses. The Futuro house may also face similar problems. Municipalities and the owners are responsible for the architectural heritage but the Finnish Constitution states that the responsibility for the environment and cultural heritage belongs to all citizens. (National Board of Antiquities and Historical Monuments.) This study attempts to raise the plastic house appreciation as a cultural historical target and aims to raise a conversation the preservation of increasingly rare item, Futuro house.

9.1 Futuro's protection?

No plastic house is protected by law in Finland. There is one by Matti Suuronen-designed service station in Simonkylä, Vantaa (fig. 10.) which is in the Vantaa City Museum inventory list of modern buildings and classified as the first-class protection target. (Eskola 2002, 194) The City Museum has given some recommendations and guidelines when the current owner asked for permission to do alterations and repairs for their service station. The objective of the statement is to encourage the owners to preserve as much as possible the original appearance of the service station. (Spåre, statement 13.9.2001). The Finnish National Board of Antiquities considers it and other service stations designed by Suuronen as a nationally valuable protectorate (Eskola 2002, 194). The statement reveals that the City Museum aims to protect the station by planning and wants it to have a protection label. The statement also reminds that protecting the building by law may come into question if the service station is at risk to be treated inappropriately. (Spåre, statement 13.9.2001.)

As far as it is known any of the Futuro houses does not belong to any inventory lists of the cities where they are situated. A topic raises a wide range of questions. Should Futuro be protected by some kind of planning or laws? Does planning change the intention of the architect of the portable and mobile house? Can the building itself be protected but the site could be anywhere? What makes Futuro so valuable that it needs to be guaranteed that it lasts for the next generations?

One reason for planning or protection is the fact that there are very few Futuros anymore existing in Finland. At least one of them could be protected as an example of the space-age architecture. After the planning or the protection label only preserving measures could be carried out. The other reason could be Futuros uncommon amount of plastics used as a structural material. In the Futuro houses plastic has become the main building material and it is allowed to show. In Futuro house the plastic is not trying to imitate any other material. Futuro is an honest plastic house with its bright colours. There are already many wooden, stone and concrete buildings which are highly appreciated and considered cultural heritage. There is a very low number of plastic houses ever protected. The third reason for preserving Futuros is the exceptional interest and enthusiasm about Futuros around the world. Why not

trying to preserve something that has such a strong impact on people. Futuro no. 001 belongs to one of the most interesting Futuro houses thanks to its history. It is the second ever produced Futuros in the world. What makes it interesting from a conservator's point of view is the authentic appearance and mode that it has preserved through 42 years.

9.2 Conservation approaches

Conserving and restoring Futuro house no. 001 is highly recommended. If there is a desire to conserve the house, the conservation approach must be considered first before any decision can be made. According to Yvonne Shashoua (2009) there are two approaches of conservation. These are preventive and interventive conservation. Preventive conservation aims to mitigate the damages without interfering the object. Interventive conservation includes also interfering acts such as cleaning and adhering. Shashoua prefers the word inhibitive instead of preventive conservation when we are dealing with plastic conservation. She writes in *Conservation of plastics: is it possible today?*: "Once initiated, degradation of plastics cannot be prevented, reversed or stopped, but only inhibited or slowed." (Shashoua 2009, 15–16)

Inhibitive conservation in the case of Futuro house would mean minimising the deteriorating agents around the house. For example removing the trees near the house so that they would not scratch the house surface. This operation would also reduce dripping of the leaves and needles from the trees to the roof top. Inhibitive conservation applies also disaster management so that there would be an action plan for every kind of disaster circumstances. The most ultimate action would be to build a protective cover around the house or just to move the house into an interior with a controlled climate.

Interventive conservation of Futuro would mean cleaning the surfaces and adhering the brakes and delaminated layers of gel-coat and paint. That would also mean fixing the cracked gaskets between the elements outside and adhering the delaminated shelves and inside the house. The window seals would also be repaired and loose window panes put back into their places.

9.3 Options for the use of Futuro no. 001

The options of the usage of the Futuro house have been various since the beginning of the production. It has been used as a café, shop, cabin and bank and many others. The idea of this chapter is to discuss some possible options of the usage when the house is considered as a culturally valuable object.

Letting the Futuro house continue its life as a summer cabin not in use is always an option. That means that no conserving treatments are done. Yet it may still last for a few more decades until its structure gets weaker. It will probably continue attracting visitors around the world as it has done so far according to owner Matti Kuusla (Kuusla, interview 25.3.2010). The question is: when does it become so fragile that the visitors are taking a risk entering it?

Another option is to carry out a few conservation measures. Some interventive treatments will be done like cleaning the surfaces and fixing the gaskets and the loose parts and filling the cavities of the surface. Proper maintenance in the future is needed. The house appearance will meet the designer's intent better and has better chances to preserve longer.

There is an option to make a plan for large-scale conservation and restoration of the Futuro house. All materials of the house are treated if necessary. All the treatments can be done in situ or in a spacious location, indoors. The Futuro can be transported dismantled by truck or as a whole, lifting it by crane onto a proper vehicle and be transported as a wide transport. It is not to be forgotten the helicopter transportation that was the original intention of the production group. After conservation and restoration Futuro could be brought back to its original place which gives it more value. In the original place it represents best the intentions of the architects and the whole co-operative group. It was the first Futuro after the prototype and it was transported into this particular place and given to the famous TV celebrity for certain reasons: to benefit his publicity in the hope of getting keen buyers.

A little inconvenience is that the original place is difficult to access. And while there will always be interested people willing to visit the Futuro it was considered to discuss another

alternative. What if Futuro would go there where the people are? Move from countryside to the city. The ideal would be a permanent place in a museum where it could be regularly monitored and it would stay in a steady environment with constant temperature and humidity. There it could be seen by thousands of people and serve as an attraction of the certain museum. If the public entering the Futuro house is considered a risk for the house, a ladder around the house could be built from where people could look inside every room.

10. CONCLUSIONS

The documentation and condition survey of Futuro house no. 001 proved to be more challenging task than expected. The survey was carried out during a winter time, when days are short and only a little daylight is on offer. This particular winter in Finland in 2009–2010 also snowed more than in many years. The snow complicated the access to the Futuro which was surrounded by the untouched snow. Since the electricity was never pulled to the Hirvensalmi Futuro there were no possibilities to turn any heating or lights on.

The house form as a rotation of an ellipse means that the exterior walls are round. Also the partition walls inside have been rounded from their exterior wall side. Each doorway as well has curved shape openings. Infact, there are not any straight walls in the house. Due to the curved wall elements there were difficult to distinguished the border between the wall and the ceiling. That makes it challenging target to documentate so that others would understand it. The photographing of each wall separately in Futuros small rooms requires some wide-angle lens and still there are walls which are almost impossible to photograph in a traditional way. The photographs taken by fisheye lens. and attached together by the panoveawer stiching programme, show panoramic images of each room. The Easypano the Virtual Tour Way programme allows the observation of them in 360° panoramic view so that it feels like one would really rotate in the room.

By the study of Futuros design, construction, materials and purpose, the initial estimate of Futuros value was confirmed. The Futuro house is rare in Finland but also around the world. It seems to be desired object to buy and one of them was sold to some European country in

Christie's auction in Paris with 140 000 euros (HS.fi 2007). The Futuro house offered for sale is one of the few directly produced by Polykem Ltd., executed under Belgian-Benelux license in 1968–1969 (Artfact). But the question arises: Would there still be enough buyers today than there were forty years ago if the Futuro house production would start again? There is most likely coming an oil crisis again because the oil is running out in the oil reserves.

Out of any monetary value, the Futuro house could be considered to having a high historical and architectural value. There came various reasons at why it should be preserved. One is the rarity, a second is the known history that reveals that it is the first Futuro house ever produced after the prototype. There should be recommendations of not believing only the identification sign attached to the house because what was interesting, not all houses have an identification sign. For example the Åland Islands Futuro in Finland does not have such according to its original owner (Original owner, interview 7.4.2010). As well the Kauhava Futuro's owner has his doupts if the sign on his Futuro is showing a correct number (Owner, interview 29.3.2010). Kuusla Futuro no. 001 has so far a clear history because it has beeb in its first owner since the assembling. The third thing which gives the Kuusla Futuro more value is the authenticity of the construction and the appearance. No repairing or altering actions have been taken place.

After being forty-two years outdoor in a rough climate it is still in quite stable condition. Very early film material in Taanila's film shows the young architect Matti Suuronen explaining that the Futuro house does not need much repairing, just washing its surface every now and then (Futuro - A New Stance for Tomorrow 1998). This statement is presumably leaning to the fact that the time of use was estimated to be around thirty years. It was probably thought to be carried to the rubbish tip after the date expired. The idea of disposable housing units was introduced also by Archigram-group. Nevertheless we are facing the the cleaning of the surfaces is probably not enough. Futuro house no. 001 has come to the state where its gaskets and window seals have stated to crack and snap.

The house was documented and the damages were mapped. This work belongs to every conservator's routines. The conservation and preservation of Futuro no.001 is highly recommended based on the survey. Some interventive conservation measures may be

carried out in the main objective to prevent the water going inside the element structures. That would be achieved by repairing the gaskets between the elements and ensuring the window seals fitting tight. A solution should be found also to the protection of the exterior gel-coat surface from further deterioration. Before that it should be cleaned carefully noticing the fact that the moist may penetrate into the porous gel-coat surface and accelerating the glassfibres and resin separation from their adhesion. Cleaning is essential due to the fact that dirt particles often collect moisture and more dirt into it, which may have a damaging impact on the surface. There is good to assess the words of Waentig when considering the cleaning. She reminds that also plastics may form patina which is sometimes worth of saving. According to Waentig the patina should be removed if it has damaging effects on the material. She admits that is often hard to notice the boundary between patina and deteriorating surface. (Waentig 2008, 137.)

The aim of this thesis in addition to study The Futuro house in Hirvensalmi is to participate in the discussion of plastic architecture in favor of maintaining it against the dismantling of it. There was published a text in the magasine of the architecture students of Matti Suuronen-designed the CF-10 kiosk, still in use as a grill kiosk. Matti Pirttimäki wished that the CF-10 kiosk would be preserved and restored. He compared the kiosk to the Finnish plastic furnitures from the 1960s that have become into fashion again. The small kiosk is standing in the middle of the famous Finnish architect Alvar Aalto-designed main building of the Aalto University School of Science and Technology and other appreciated architects Raili and Reima Pietilä-designed Dipoli. (Pirttimäki 2009, 7.) There it shall stand proudly next to the other buildings, and wait for the day when some conservation and restoration mesures are taken at last. Also Futuro house waits for that.

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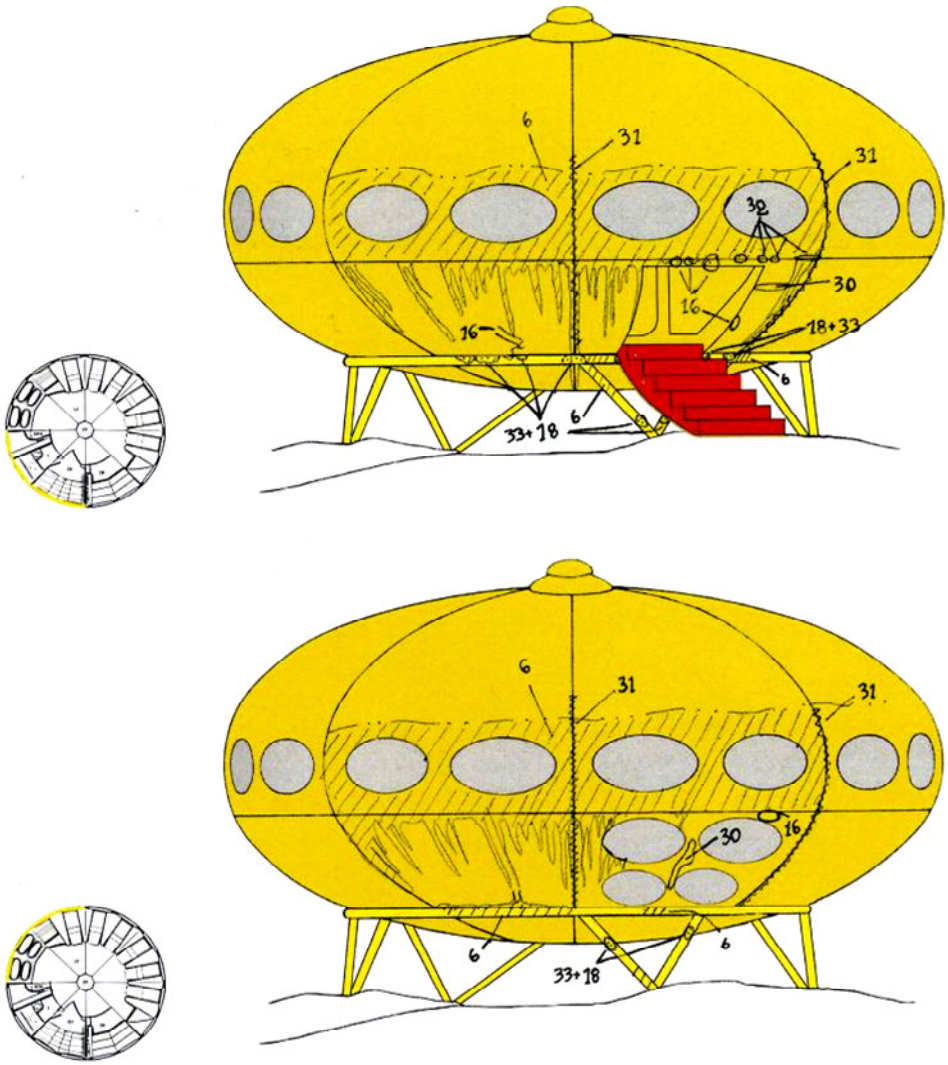
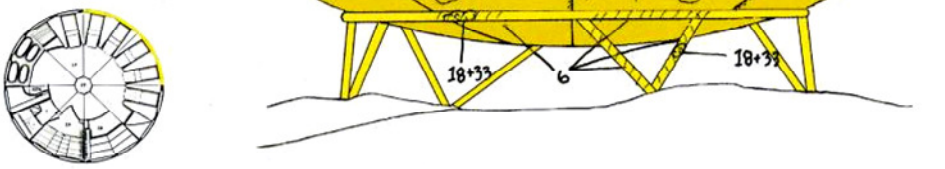
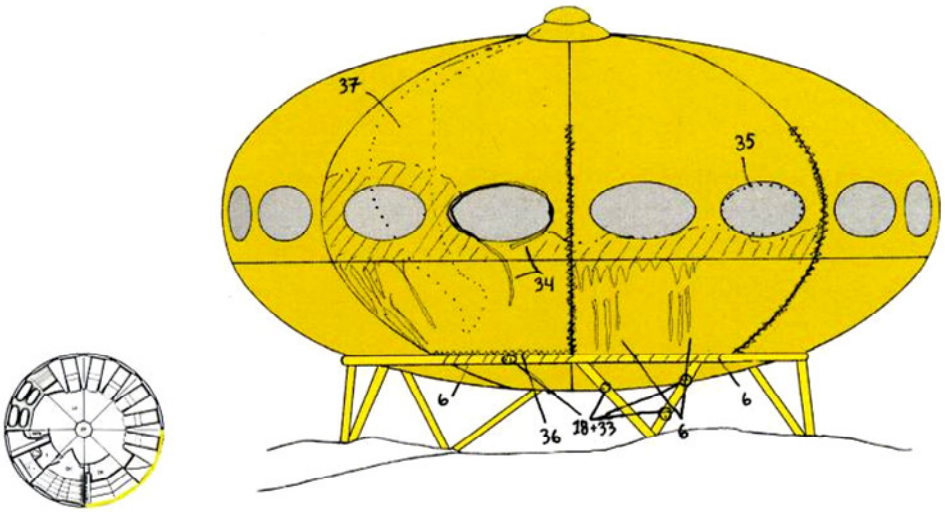
APPENDIX 1 – DAMAGE MAPPING OF EXTERIOR SURFACES



3	Whitish gloom	32	Fracture
6	Black deposit	33	Paint coming off
16	Crack	34	Loose window seal
18	Corroded	35	Missing rubber band
30	Gel-coat become thinner	36	Crumbled plastic foam band
31	Gasket		

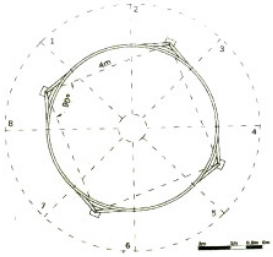
APPENDIX 2 – DAMAGE MAPPING OF EXTERIOR SURFACES

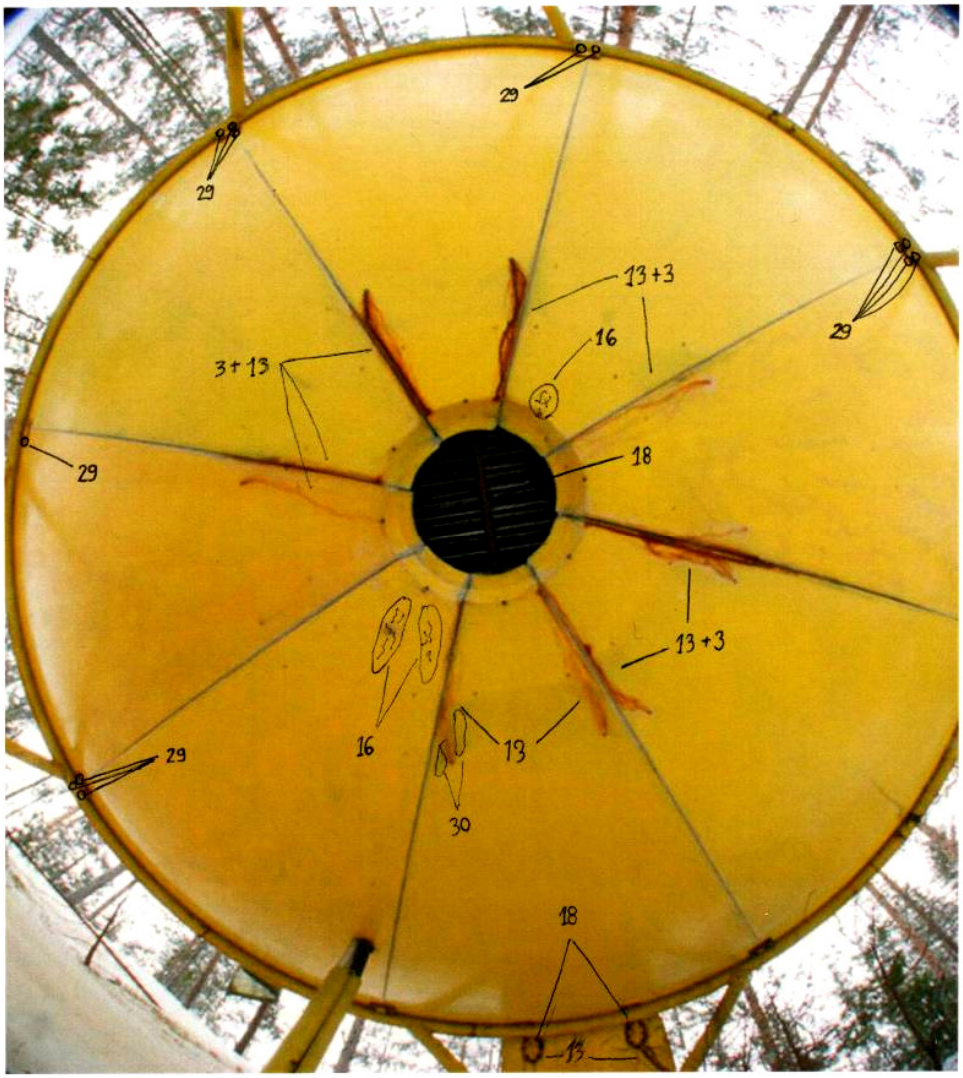




3	Whitish gloom	32	Fracture
6	Black deposit	33	Paint coming off
16	Crack	34	Loose window seal
18	Corroded	35	Missing rubber band
30	Gel-coat become thinner	36	Crumbled plastic foam band
31	Gasket	37	Plastic sheet cover

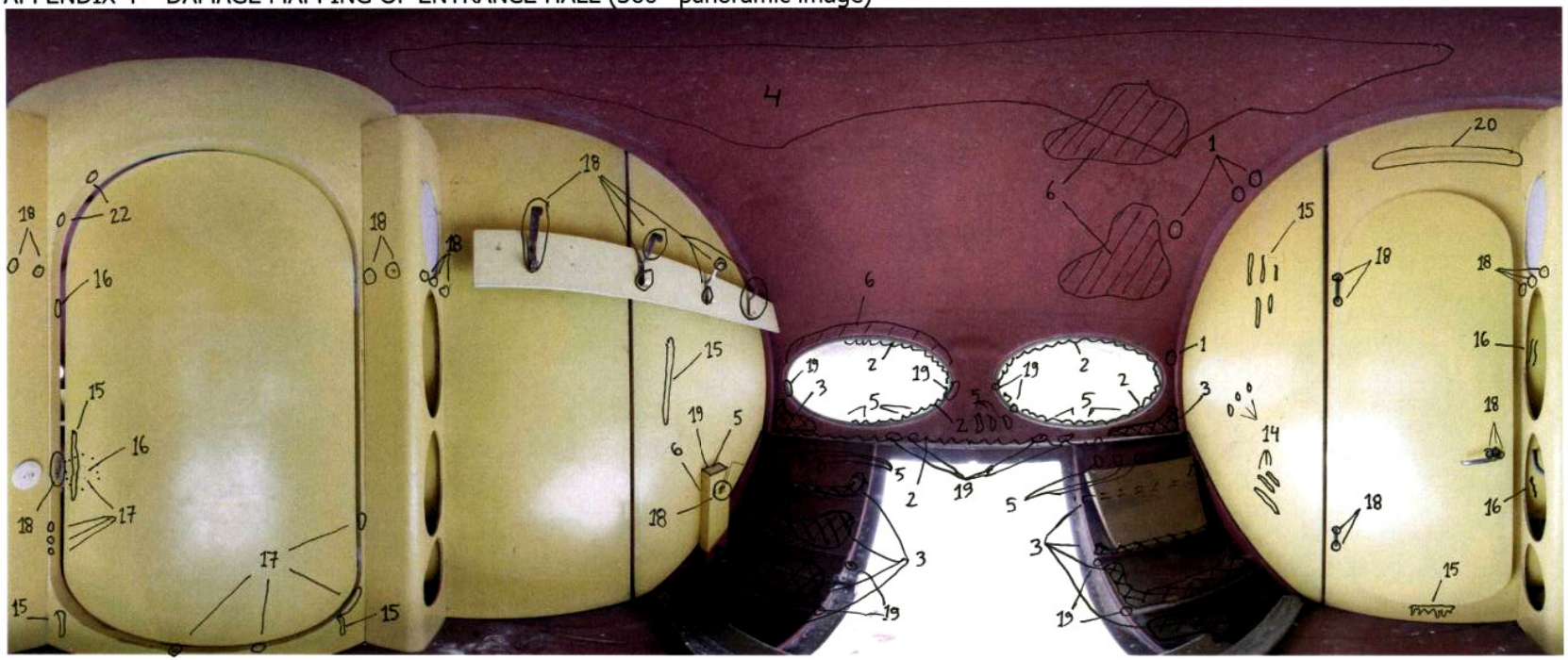
APPENDIX 3 – DAMAGE MAPPING OF THE BOTTOM



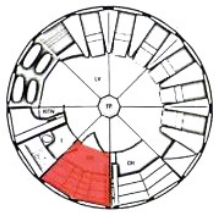


3	Whitish gloom	18	Corroded
13	Rusty stain	29	Missing bolt
16	Crack	30	Gel-coat become thinner

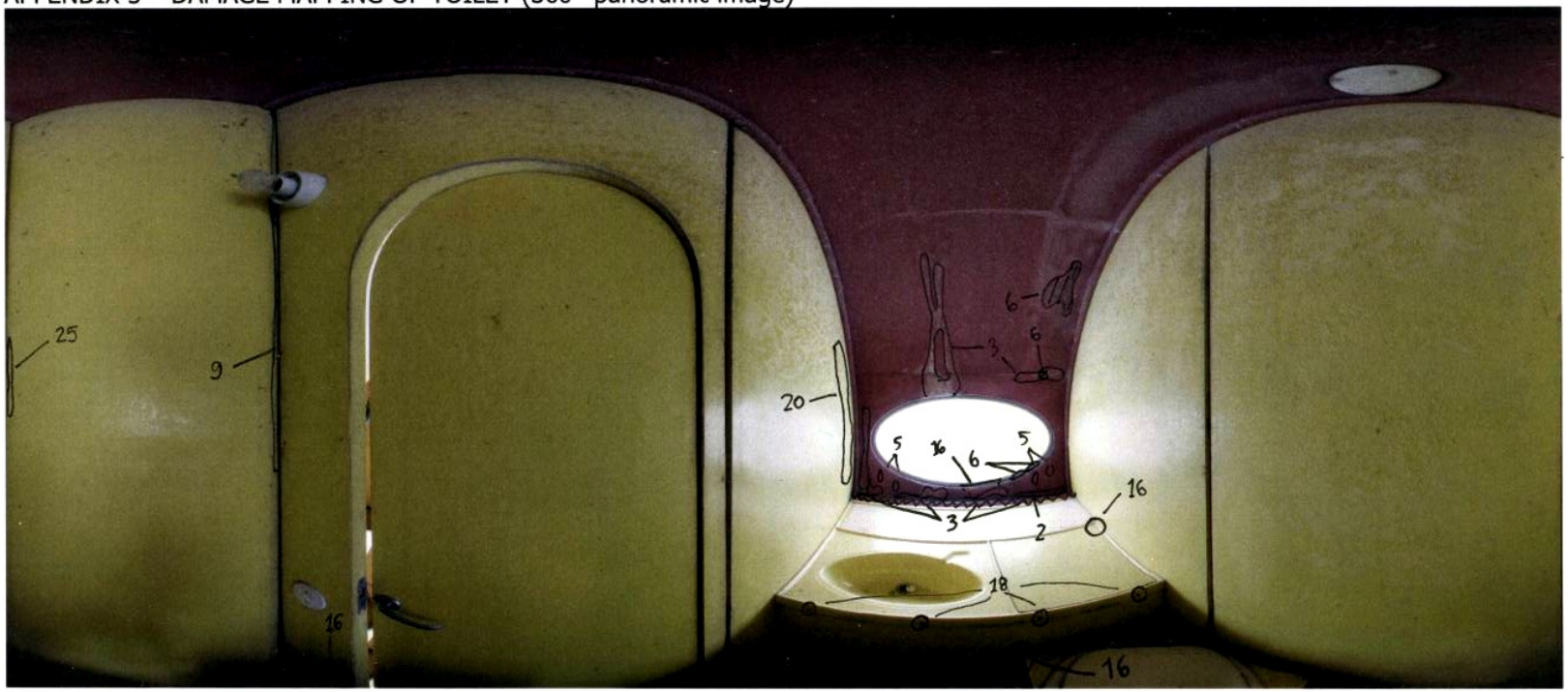
APPENDIX 4 – DAMAGE MAPPING OF ENTRANCE HALL (360° panoramic image)



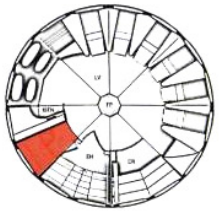
1	Cobwebbed	16	Crack
2	Algae	17	Missing part
3	Whitish gloom	18	Corroded
4	Frost	19	Paint coming off, gel-coat is exposed
5	Bird faeces	20	Elevation of the surface
6	Black deposit	21	Missing Perspex
14	Stain	22	Putty
15	Dirty trickle water stains		



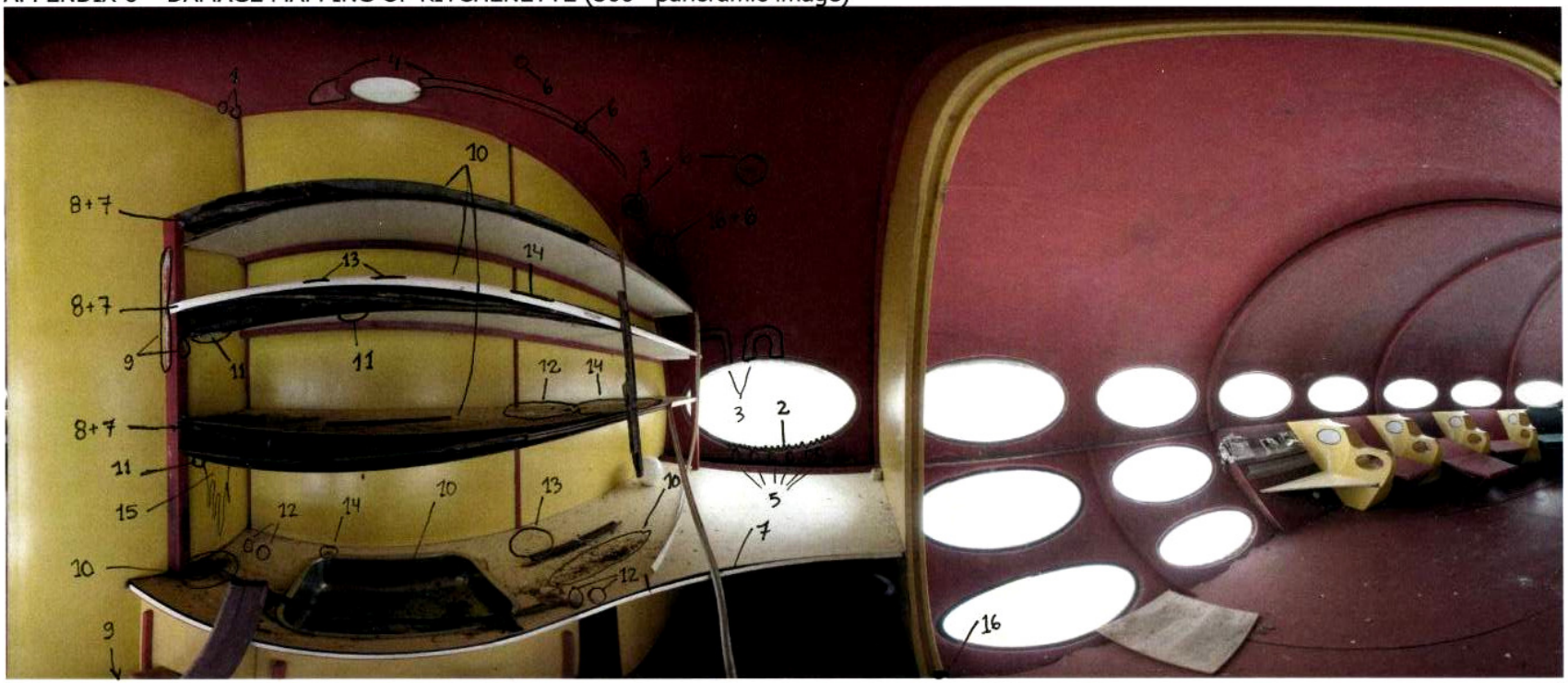
APPENDIX 5 – DAMAGE MAPPING OF TOILET (360° panoramic image)



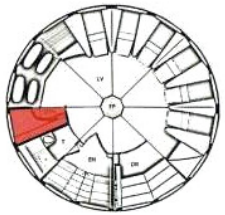
2	Algae	16	Crack
3	Whitish gloom	18	Corroded
5	Bird faeces	20	Elevation of the surface
6	Black deposit	25	A chink on the wall
9	White mold		



APPENDIX 6 – DAMAGE MAPPING OF KITCHENETTE (360° panoramic image)

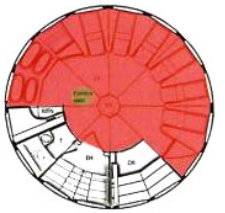


1	Cobwebbed	9	White mold
2	Algae	10	Littered
3	Whitish gloom	11	Moss
4	Frost	12	Paper stuck to surface
5	Bird faeces	13	Rusty stain
6	Black deposit	14	Stain
7	Loose edging strip	15	Dirty trickle water stains
8	Moisten and swollen shelf	16	Crack

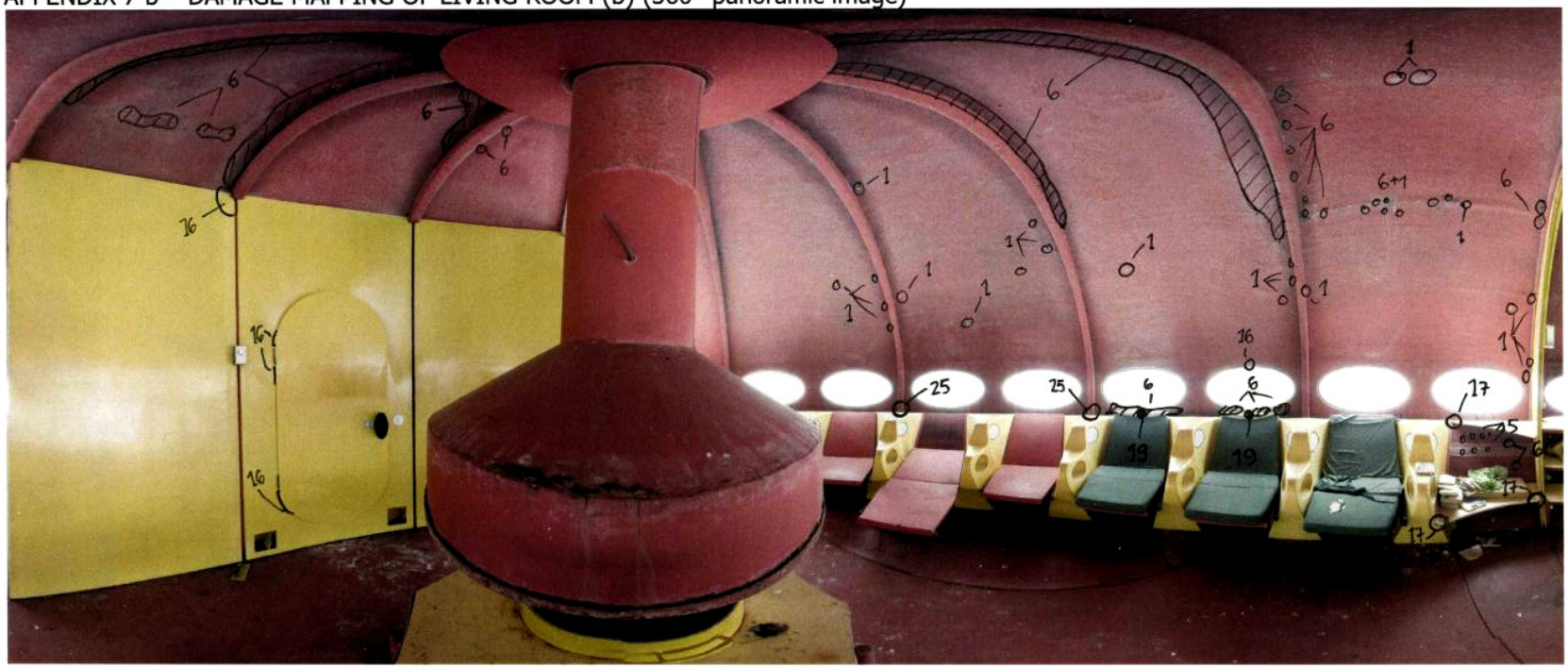


APPENDIX 7a - LIVING ROOM (a) (360° panoramic image)

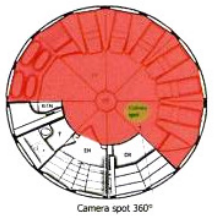
1	Cobwebbed	10	Littered
2	Algae	16	Crack
3	Whitish gloom	17	Missing part
5	Bird faeces	19	Paint coming off, gel-coat is exposed
6	Black deposit	22	Putty



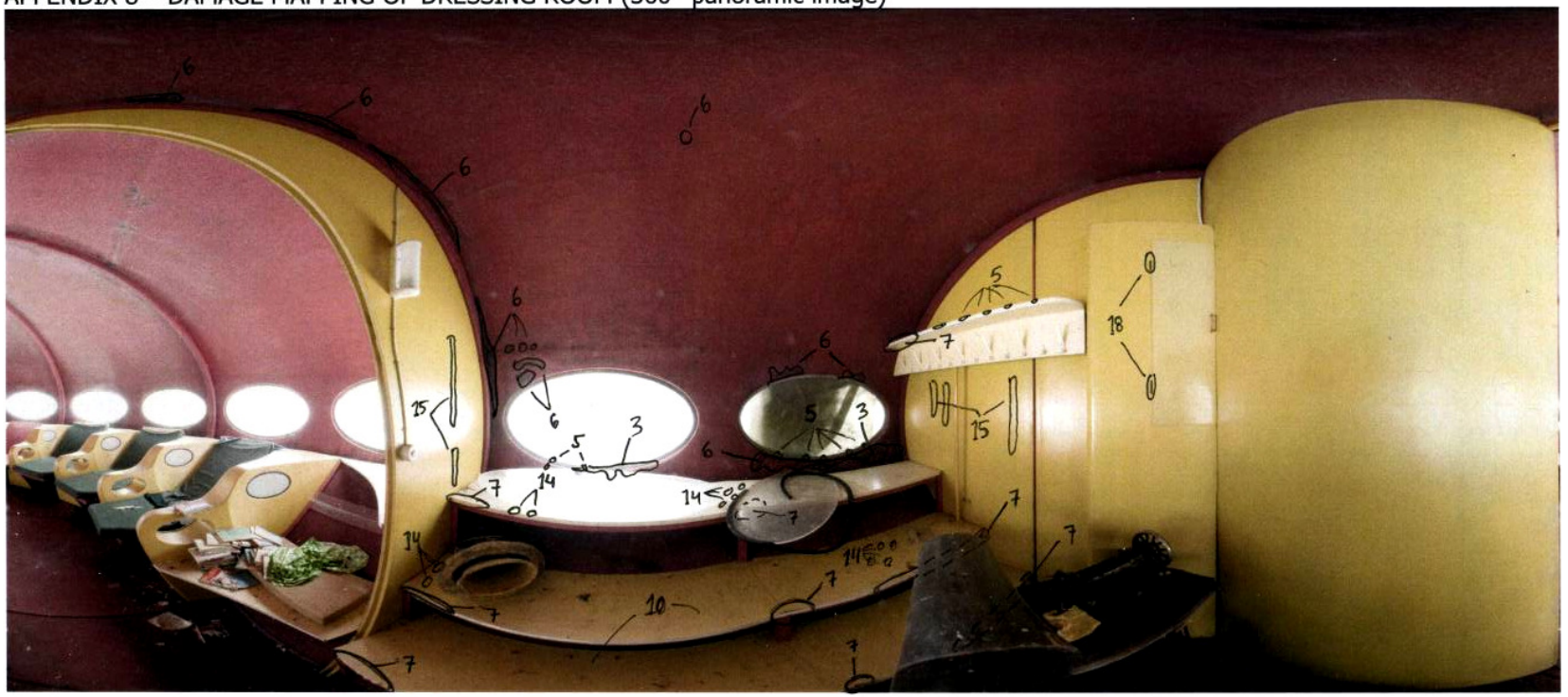
APPENDIX 7 b – DAMAGE MAPPING OF LIVING ROOM (b) (360° panoramic image)



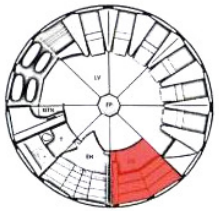
1	Cobwebbed	16	Crack
5	Bird faeces	17	Missing part
6	Black deposit	19	Paint coming off, gel-coat is exposed
10	Littered	25	A chink on the wall



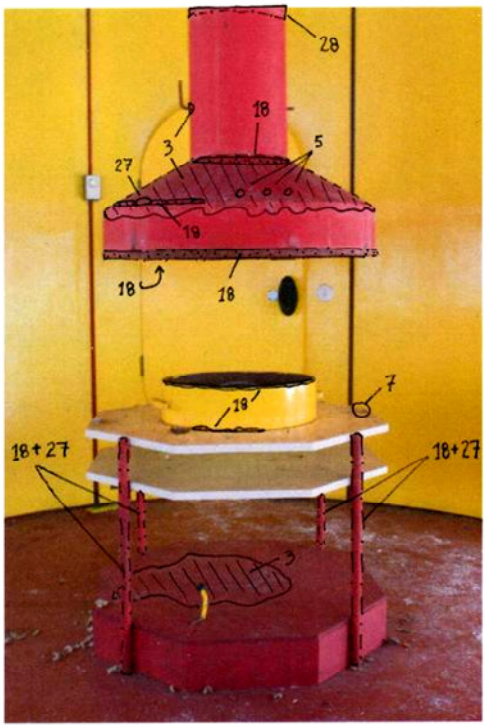
APPENDIX 8 – DAMAGE MAPPING OF DRESSING ROOM (360° panoramic image)



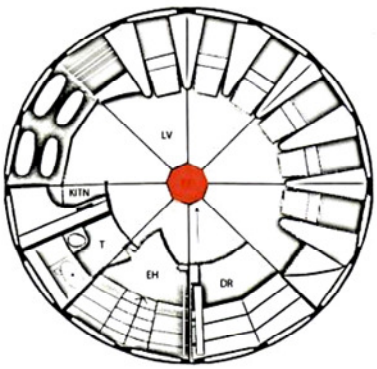
1	Cobwebbed	9	White mold
2	Algae	10	Littered
3	Whitish gloom	14	Stain
5	Bird faeces	15	Dirty trickle water stains
6	Black deposit	17	Missing part
7	Loose edging strip	18	Corroded

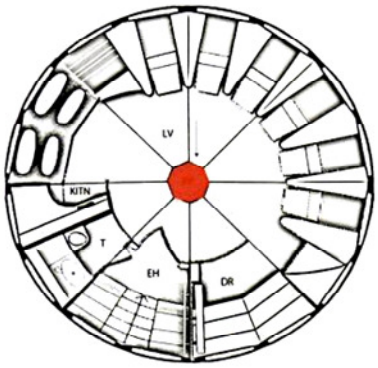


APPENDIX 9 – DAMAGE MAPPING OF FIREPLACE



3	Whitish gloom	18	Corroded
5	Bird faeces	26	Bruise
7	Loose edging strip	27	Paint coming off, yellow under paint is exposed
10	Littered	28	Paint flaking off
17	Missing part		





APPENDIX 10 – BORDERS OF THE CARPETS