

Restoration History

Authors: Thomas Zirlewagen, Fenna Yola Tykwer
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Introduction

This text details the conservation measures and technical modifications that *Liquid Time II* has undergone since its first presentation. On the basis of a description of the most important material and design factors that characterize its original condition, technical deficiencies of the video sculpture are highlighted. Even early on, conservation interventions and technical improvements were necessary and it has proved that the exhibition history of the work has been closely tied up with its restoration history.

In addition to necessary conservational measures, the term *restoration* also includes – as it is often the case in dealing with complex, technical artworks in contemporary art – modifications that reduce the daily effort of maintaining a work on display down to a reasonable level.

Condition during the First Presentation at the *Internationale Funkausstellung 1993 (IFA 93)*, Berlin (*Original Condition*)

The first presentation of the work took place between August 27 and September 5, 1993, on the occasion of the *Internationale Funkausstellung 1993 (IFA 93 – consumer electronics trade show)* in Berlin. It thus lasted ten days.

Those parts, which in the following years were subject to modifications over and over again are briefly described below.

Steel Construction

The components of the original steel construction were depicted in a list and a location drawing detailing all parts by Jochen Saueracker in 1997 (see fig. 1).

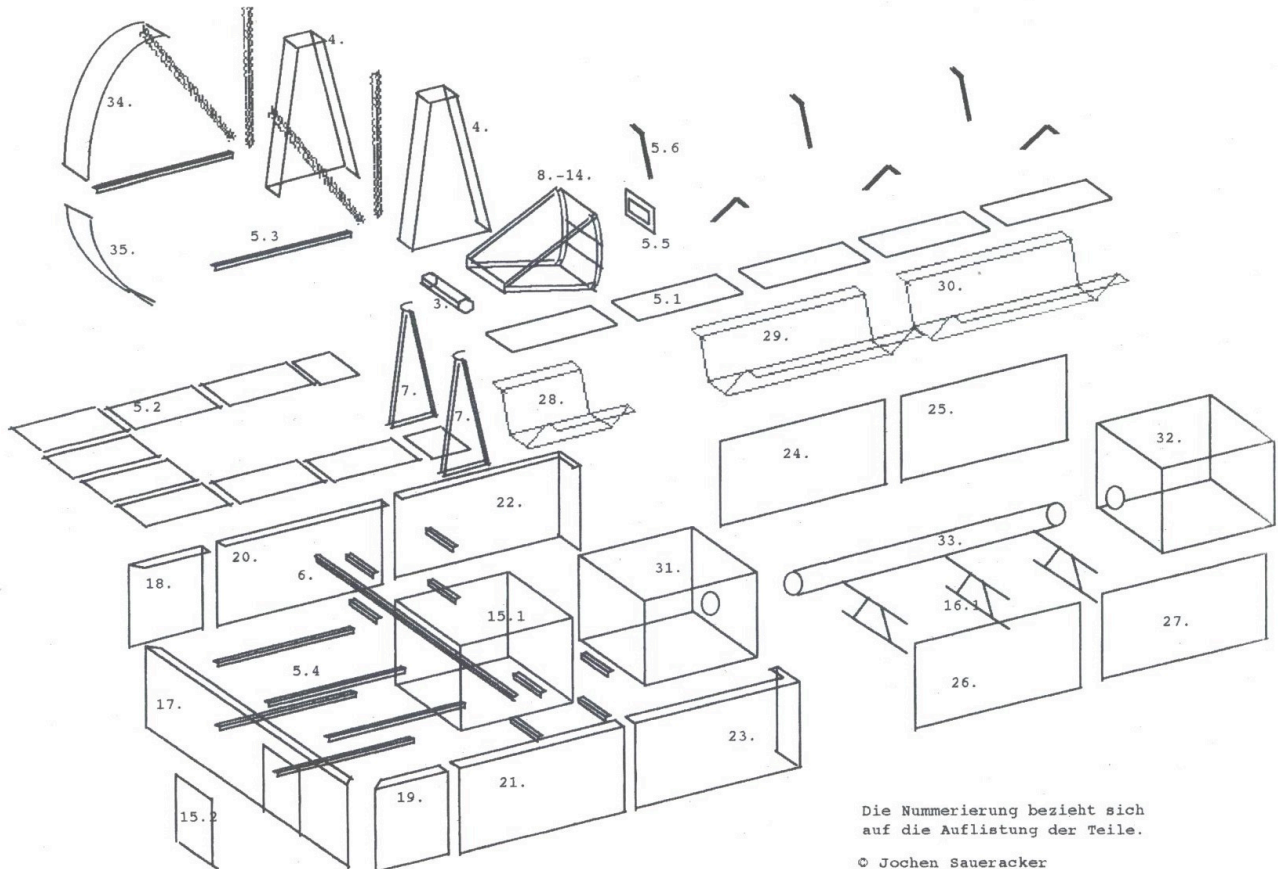


Fig. 1: Location drawing of the steel construction (illustration: Jochen Saueracker)

Channel component I (no 32) was one unit with a ca. 1 m long collecting basin underneath the tank panel over its whole breadth (see fig. 2).

Channel components II and III could be broken down into the following individual parts: two side frames apiece (no 24 - 27) which were connected with a total of three crossbeams (no 16.1) on which two tank panels (no 29 - 30) lay.

Likewise channel component IV was one unit (no 31, see fig. 3) with a continuous floor and a partition wall to component III, only half of the tank panel (no 28, to channel component V) was removable. Together with channel component V (no 15.1), IV formed a second collecting basin under the tank panels into which the pump's intake socket protruded.



Fig. 2: View into channel component I with one part of the reflux tube (1993) (photo: Jochen Saueracker)

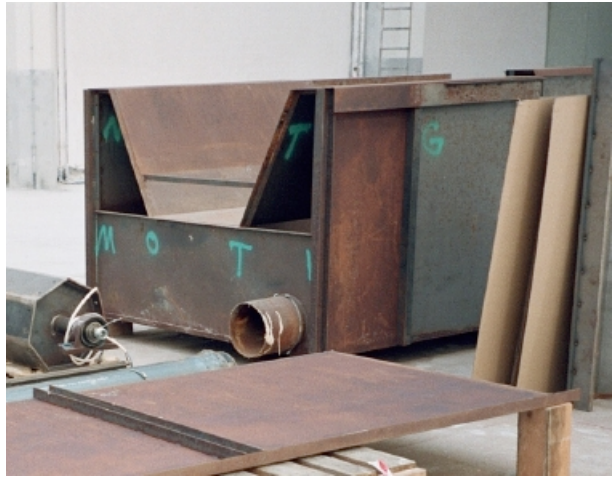


Fig. 3: Channel component IV: Under the tank panel one can see the partition wall of the second basin and the entrance of the reflux tube (1993) (photo: Jochen Saueracker)

Water Circulation

The water reflux underneath the upper panel (corresponding to the tank panels) originally proceeded in the following manner:

Water falling from the tank was caught in channel component I in a rectangular basin (no 32). From there it flowed through a pipe (no 33) into a second basin (no 31) consisting of channel components IV and V. At the rear end the water was sucked through the intake socket (no 15.1) and pumped back into the upper channel of the tank panels (no 28 – 30).

All the joints in the water circulation were sealed with silicon after assembling the steel construction, both the joints between the basin and the reflux pipe as well as the connections between the tank panels. These joints, however, soon became leaky and so dripping water reached the underbody around channel components I, II and III. Provisional gutters made of plastic had to be placed under the connections and a small hose to the basin in order to secure these problem areas (see figs. 6 and 7).

The original lighting of the water channel consisted of two spotlights on metal tripods standing on the left and right side of the pump. The spotlights shone into the channel through two small holes covered with glass (portholes) at the end of the channel under the wheel (see figs. 4 and 5).



Fig. 4: View of the original lighting: white spotlights with green painted tripods (1993) (photo: Jochen Saueracker)



Fig. 5: Portholes at the end of the water channel (1993) (photo: Jochen Saueracker)

Video Equipment

The video material was saved onto a laser disc produced by Philips Consumer Electronics Deutschland for the Berlin presentation. The video signal was fed from a laserdisc player over the slip ring unit into the wheel and to the TV monitors. High-frequency (HF) cabling was used. The video signal was looped over each antenna input through all monitors and every monitor had to be set with a remote control when turning them on.

Condition during the Second Presentation at the *MultiMediale* 1993 (ZKM), Karlsruhe

After the ZKM purchased the piece, the second presentation of the work took place in November 1993 on the occasion of the *MultiMediale* in Karlsruhe. Here the work was again exhibited for around ten days. Amongst others, Rolf Schmidt, Jochen Saueracker and Hartmut Bruckner, who also took charge of the supervision and maintenance of the installations during the *MultiMediale*, took part in its assembly. Besides a few temporary measures, the work was displayed in a state largely unaltered from its Berlin presentation.

Summary of the Experiences Gained in 1993 While Operating the Work

Both the relatively brief presentations already revealed some grave, technical deficiencies in the video sculpture:

The tank circulation proved to be leaky so provisional gutters under the intersections of the individual tank panels had to be installed which were connected to the first collecting basin via a hose system (see figs. 6 and 7).



Fig. 6: Detail of channel components I und II (left site): Provisional sealing of the tube and gutter for dripping water (1993) (photo:: Jochen Saueracker)



Fig. 7: The dripping water was led through a thin hose to the basin. (1993) (photo:: Jochen Saueracker)

The fastening of the TV monitors within the wheel was inadequate. The TV monitors were secured in the monitor compartments of the wheel using pieces of Polystyrene, with the result that the Polystyrene was compressed by the rotation of the wheel, so that they no longer lay tight enough to the housing. This resulted in damage to the housings due to abrasion from the continual turning.

In addition, the plug connections from the electric and video signal supply came loose for several times and entailed a loss of picture on individual or several TV monitors.

Restoration measures and modifications 1997

For the opening exhibition of the ZKM in October 1997 *Liquid Time II* was for the first time to be exhibited under museum conditions over a period of several months. In order to avoid damage to the wood parquet floor from escaping water, technical solutions had to be found that guaranteed a completely watertight construction and reliable operation – above all the video equipment – for extended periods.

In 1993 the untreated inner sides of the steel construction were, in several parts, coated with traces of corrosion caused by escaping water.

Moreover, transportation from Berlin to Karlsruhe had clearly resulted in deformations to the larger channel components that needed to be restored.

The ZKM thus asked Jochen Saueracker to devise a concept for the modification of the artwork. The concept contained the following points:

- Fundamental change to the water reflux: replacement of the basin-pipe-basin construction with the installation of a continuous truck tarp tank which is supported by an easily dismantled wooden structure
- Connection of the side frames and crossbeams of the channel to two units (channel components II and III)
- Rust protection of all non-visible surfaces of the steel construction (inner sides)
- New, fitted mount of the TV monitors in the wheel construction
- Replacement of the original electrical and video signal cabling in the wheel construction with new cables and video distributors with secure plug-in connections

As a result, numerous measures were carried out that are described here individually:

Steel Construction

Overview of the measures to the steel construction by Hofmann Systembau GmbH and Jochen Saueracker:

- Removal of the basin at the start and end of the water circulation by cutting out the partition walls in channel components I and IV
- Connection of the side frames (no 24 – 27) and the connecting beams (no 16.1) in channel components II and III into one unit (welding)
- Modification of the inner beam construction as support for the tank panels and attachment of a continuous rail for hanging the truck tarp tank
- Insertion of a basic construction made of coated plywood (wooden tank) on the floor of the whole channel (channel components I to V) and insertion of a continuous truck tarp tank
- Coating of all metal surfaces inside with brown rustproof paint
- Replacement of the lighting around the water outlets (channel component V)
- Water wheel: additional fastenings for the monitors as well as an overhaul of the electrical supply and distribution for the monitors

The Measurements in Detail:

Channel Components I to V

The connection of the side frames and the connecting beams in channel components II and III were welded into whole units.

When modifying the inner beam construction for the inserted tank panels, the former connecting points between the outer walls and beams were reused.

- Welding on of additional crossbeams that attach onto the upper edge of the outside walls and follow the bevel of the walls of the tank and meet the original, horizontal beams
- Separation of parts of the original, horizontal beams between the area of the tank floor and the outer wall
- Underneath the new beams for the tank panels, square pipes are welded on lengthwise on which the truck tarp tank can be hung ("rail")
- Rust removal from the non-visible surfaces inside by hand
- Coating of all metal surfaces on the inside with rustproof paint (Inertol 88, RAL 3009)

Channel Component IV

Until now, the lower part of the water circulation (reflux channel) was only accessible when at least one of the elements of the tank panels was taken out. Thus in 1997, it was decided to fit an inspection opening between the machine room and the reflux channel under the tank panels: A part of the side wall of channel component IV was removed for the inspection opening.

Channel Component V

Replacement of the lighting in the area of the water outlets:

- Dismantling original spotlights on green metal tripods behind the rear wall of the tank left and right of the pump and the protective glass / portholes (see fig. 4).
- Sealing of the openings in the in the basic construction using welded 4-mm-thick plates
- Attachment of two small halogen spotlights with one panel shade apiece over the water outlets

Tank Panels

- The brown rustproof paint in the gutter underneath the covering grille was probably already present in its original condition and was restored in 1997 (CWS WERTLACK, Satiné Buntlack seidenmatt, RAL 8011 nussbraun; some spare paint is still left).

Construction of the Wheel

- Additional, fitted clasps for the TV monitors were produced and installed: The housings of the monitors were secured with two brackets apiece behind the appliance, two wedges apiece underneath as well as two elbows apiece under the front of the monitor and two small plates on the upper edge;
- Reattachment of the monitor shades: The original panel screws were replaced with bolts (M6) and rivets with threads in the construction of the frame.

Video Equipment

- Upgrading/replacement of the HF cabling with black coaxial cables RG59 with BNC plugs (by Jochen Saueracker and Hartmut Bruckner)
- New video distributors were installed in 1997 (Hartmut Bruckner)
- Modification of the TV monitors so that the auto-start function (automatic switching to AV channel) becomes active on connection to the mains voltage, i.e. separate switching on and definition of menu settings for each individual TV monitor are no longer necessary. Therefore, the eighth position of the SCART plug connection of the TV monitor was connected via a diode (1N 4148, 100 V block voltage, 100 mA rectified current, 500 mW power loss) to the power supply.
- The network cable connections in the wheel were fitted with Wieland plug system. Most of the safety brackets on the plugs were removed, however, because the plugs are, in part,

enclosed deep in the steel construction of the wheel and are very difficult to access and to detach for maintenance measures such as the replacement of TV sets.

Mobile Bridge Crane

As a tool for the assembly of the video sculpture, an easily dismantled, mobile bridge crane with hoist was designed and constructed. It can be used to position the large (and heavy) channel components and the segments of the wheel when assembling the wheel.

Modifications during Assembly in August – September 2004

After being in storage for more than five years, *Liquid Time II* was exhibited again from September 2004. The fourth presentation took place in the exhibition *Meisterwerke der Medienkunst* (Masterpieces of media art) in ZKM / Media Museum.

On the occasion of its construction, work commenced on collecting materials for a detailed documentation of the piece. As with previous presentations, this assembly also involved several repairs and adjustments that are described in the following sections:

Channel Component V

The connection between the intake pipe and foil or wooden tank represents a critical point with respect to impermeability and has to be regularly monitored. At the same time, this area is largely covered by the rear wall of channel component V and barely visible. For this reason the opening at the outlet of the intake pipe to the pump was expanded to increase accessibility. To that end, part of the steel panel was removed during the 2004 assembly with the cutting wheel.

TV Monitors

Two of the monitors proved to be defective in testing before the fitting. They were replaced by spares and sent for repair (Sauter und Gut, Karlsruhe).

The auto-start function of the spare monitors still had to be modified to conform to the other TV monitors (Autostart function).

Individual rivets with threads for the monitor shades or monitor brackets were loosened and turned with the rest. They were secured with additional nuts.

The TV monitors were fixed using additional tension belts in the construction of the wheel.

Water Circulation

Twelve Polystyrene blocks were slid in between the blue truck tarp and the black pond film in order to reduce the volume of water in the reflux channel. This reduced the required volume of water from circa 5,000 liters to around 3,500 liters.

Pump

After the water circulation was filled, water escaped from the pump at the joint to the pump-motor, and on the first attempt at a test run the pump did not start. After five years of storage, the propeller of the pump jammed due to corrosion and old chalk deposits. The reason for the escaping water was a defect to the rotary seal between the motor axel and the housing of the pump. The pump was repaired by external technicians (Kögel & Ernst). The motor block of the pump was removed and partly disassembled so that deposits of rust and chalk could be removed from the propeller and split ring with copper brushes and fine glass paper. As a result the propeller gyrated once more. After the defect rotary seal was replaced and a new flat seal (paper seal) for the housing was inserted, the pump could be reassembled and mounted.

An electronic water sensor was fitted in the floor area under the intake pipe (model „ALLSCHU 480 P“ control unit; 230V AC; VEKA 10, connection-type GAZ-1 and water sensor GWF-1S/5m). It was equipped with an alarm direct to the security office in the ZKM.

Remark

Restoration measures and changes carried out to the work since 2004 are detailed in the document “Conservation Strategies.”

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Authors: Thomas Zirlewagen (conservator), T.Zirlewagen@gmx.net
Fenna Yola Tykwer (conservator), tykwer@zkm.de

Translation: Steven Lindberg

Center for Art and Media Karlsruhe
Lorenzstr. 9
D - 76135 Karlsruhe
<http://www.zkm.de>