The Restoration of Central City Alvar Aalto Library in Vyborg

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The restoration of the Central City Alvar Aalto Library in Vyborg is completed and was officially inaugurated on 23rd November 2013. The restoration has been a long process which started in 1991. The work was carried out as a Russian–Finnish joint cross–border project within the context of two different socio–cultural societies, customs difficulties, economic fluctuations and currency rates, which could change the situation overnight. The project has been a learning process for all who have participated during the past years.

The building is a world famous masterpiece of 20th century Modernism. The tectonic forms are a result of functions. The architectural values are composed of modern technical solutions, which are the essential object of preservation, conservation and restoration.

The goal of the restoration has been to restore the original architectural values of the building. Some fragments from the Soviet renovation 1955–62 are preserved as a historical layer and some new solutions have been necessary in order to provide modern spaces and technology for the library.

The Aalto Library is a potential site to be included to UNESCO´s World Heritage List. The WH selection criteria on authenticity of forms and design, materials and substance, use, techniques and function were bared in mind during the work.

In the beginning due to limited resources, the restoration was divided into sub–projects which were carried out in order of urgency to stop the further degradation of the building. First it was necessary to ensure the adequate functioning of the technical infrastructure, electricity, heating, fresh–water supply and drainage.

The Glass Façade 1994–1996

In order to propagate the aesthetic values of Modern architecture and as a manifestation of the restoration of Aalto's architecture the great glass wall was chosen. The original steel frame of the glass façade was conserved, as were the original brass hinges. All the metal parts were given rust–protection and painted and the wooden parts were protected with linseed oil. This method was later used to renovate all the steel windows, which mostly are originals from the 1930s.

The Former Library Caretaker's Apartment 1997–2000

The apartment was converted into a work studio as a pilot project for the restoration of the library interiors. All the surface materials (carpets, paints) of the floors, walls, and ceiling, as well as the building components, were removed as far as the bare structure. The walls and the ceiling were plastered with lime plaster to the original level and painted with Sax Tempera. The corners were given the traditional pencil rounding profile. The floor was levelled and covered with linoleum and rubber carpet. The new doors were built in accordance with the original specifications, measurements, materials and finishes.

The Roofs and Skylights 1996, 1999–2001, 2001–2003.

Already early in 1929 Aalto had studied flat roof technology and roof heating systems both in Finland and abroad in order to solve the problems of the library project. The original construction was probably an aerated concrete slab, with an insulation layer and concrete screed. The rainwater was led away along inner pipes and drains installed close to the eaves.

The restoration of the leaking roofs was important for technical reasons, but the roofs are also an essential characteristic of the architecture, and thus were a visible restoration object. The small

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roof terrace above the caretaker's flat was repaired in 1996 as a pilot project to test the restoration methods for the roofs.

The first major roof repair was the lecture hall wing roof in 1999–2001. The later deteriorated bitumen and insulation layers above the original bearing concrete slab were removed. The inclination on the roof slab was improved with cement screed K20 to a minimum of 1:100. New bitumen waterproofing was installed all the way to the edges of the eaves and by the vertical structures up to a height of 500mm. The original inner rainwater pipes were cleaned and new stainless-steel drains were installed.

As new thermal insulation, 50mm polystyrene was installed as a dense layer on top of the felt insulation. Filter cloth was installed over the insulation layer. A new reinforced frost-resistant concrete slab was cast on top. Special attention was paid to the installation of the 20x20mm pine battens to form the slab joints. The original height of the parapet of the lecture hall wing was restored and the eaves covered with copper sheeting.

The roofs of the lending and reading halls were the first ones where Aalto used a large number of skylights as the main source of natural lighting of the interior. Later, this became one of the characteristics of his architecture. The 58 skylights were reconstructed to the original form. However, modern laminated glass was used instead of the original roughcast glass, and an additional pane of laminated glass was installed in the skylight drums to improve energy efficiency.

The Exterior Stairs of the Lending Hall Terrace 2001

The stairs originally consisted of prefabricated reinforced concrete elements installed as beams cantilevered out from the brick wall. The concrete had deteriorated, the reinforcement bars had rusted and its bearing capacity had gone.

In the restoration, the carbonated concrete was removed, the reinforcement bars sandblasted and corrosion-protected, a few new reinforcement rods were added and new concrete was cast.

The restoration of this concrete structure is an example how to treat carbonated concrete, a problem which the restorers of modern architecture will face throughout the world.

The Entrance Doors 2001–2005

With the exception of the main doors, which had bronze door jambs, the entrance doors of the library were originally steel-framed glass doors with brass handles.

The doors to the periodicals room, Children's Library entrance and the Northern Entrance doors had most of the original 1935 steel profiles preserved. As originals, they were conserved in an as authentic state as possible; even original hinges were preserved and conserved. The handles were reconstructed according to the original drawings, old photographs and a comparison with similar handles used in the Paimio Sanatorium.

The Children's Library Entrance 2004–2005

The work entailed the restoration of both the interior and the exterior of the entrance. The exterior repair was the first test of exterior restoration of the whole building. It included rendering the walls with lime plaster and whitewashing them. The plinth was restored and the entrance flagstones were levelled. The ground around the entrance was lowered to its original height, which is a necessity around the whole building.

The Periodicals Reading Room 2004–2005

Nowadays, the newspaper reading room accommodates both readers and Internet users. The space was restored to an appearance close to the original interior. The room is equipped with electricity lines, a telephone line, a TV and computers. The lighting follows the original system whereby the light fittings hang from chrome-coated steel pipes. All the surface materials (paints and carpets) of the floors, walls, and ceiling, as well as the building components, were removed as far as the bare structure. Unlike other wall and ceiling finishes here the walls and ceiling were plastered with Knauf Goldband gypsum plaster to the original level and were painted with white Auro Natural Resin Oil Professional Paint.

The existing electric conduits were used as much as possible. New cable routes could be taken directly from the cellar without the need to make new channels in the structure.

The floor is covered with new marble-figured Norament Vario Rubber Carpet by Freudenberg.

The Lecture Hall and the Bay Window 2001–2003, 2006–2010

During the period 2001-2003 the lecture hall window was conserved and restored. The wall below the window was lowered to its original height and the corner detail of the window was reconstructed. The height of the frame was increased by 20cm, and is now 317cm, the single laminated glass panes being 315cm high. The ventilation grilles have been reconstructed in accordance with old photographs. The glazing beads of oak, in accordance with the old details were given a teak stain and oiled with linseed oil.

The restoration of the lecture hall, including the undulating wooden ceiling, began in January 2006. The work started with dismantling most of the 1960s constructions, the entrance wall, the wooden ceiling and the worn-out parquet flooring. The carbonated concrete was removed from the ceiling beams and slabs; the visible steel reinforcement bars were brushed clean and given two layers of an anti-corrosive cement coating.

The entrance wall was completely reconstructed. The lower part of the entrance wall was laid with brick. The ventilation ducts, which penetrate the concrete floor, were installed from the floor openings up to the new brick wall. The upper part of the wall consists of a wooden frame, covered with 12mm veneer boarding, which is faced with textile fabric. The boarding is removable and electrical and ventilation installations are hidden behind it.

All the walls have been given a lime wash finish. The steel pillars were brushed clean, corrosion protected, given lime-cement plaster and finished with natural oil paint. The floor required a thorough repair. The final floor covering is solid oak parquet placed over veneer sheet underlay.

The original ceiling was built on site probably by carpenters who normally specialised in boat construction. The ceiling was destroyed after the war and then rebuilt in 1958-1961; unfortunately without adequate knowledge about the original.The new wooden frame for the ceiling hangs from the covering slab by the preserved original steel clamps. Totally 9 kilometres of pine strips were needed for the ceiling panelling, which two skilful carpenters nailed to the frame. The ceiling was completed at the end of December 2008.

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Figures 1–13. Different views of the Central City **Alvar Aalto** Library in Vyborg. After being inaugurated in 1935, the most recent restoration process was finished on 23rd November 2013 after a 22 year process. Some of the images show the former state of the building and how the Russian–Finnish joint cross-border project has been a success despite the context of two different socio-cultural societies, customs difficulties, economic fluctuations and currency rates.

Images show the glass façade, the skylights, the exterior stairs of the terrace, the entrance doors, the children's library, the reading room, the lecture hall and the exterior final aspect of this learning process.

The side corridor was restored at the same time as the lecture hall.

The wall between the two spaces comprises the ventilation channels coming up from the cellar. The floor of the corridor is covered with Freudenberg's grey rubber marble carpeting.

The Big Break through December 2010

The Decree of the Government of Leningrad region from 29.12.2010 No 378 allocated 255.5 million Roubles (c. 6.5 million €) for the restoration works in the building of the Vyborg Central City Alvar Aalto library. Subsidy granted by the order of the RF Government 08.12.2010 No2196-r and the order of the Russian Prime Minister Vladimir Putin, running number 44-7269. The decision gave 2.5 years to complete the project.

The restoration works still remaining in the end of 2010 were the main entrance and vestibule, the interiors of the lending and reading hall, the children's library, the office corridor and rooms, the two office stairs, the book storage in the basement, most of the wooden and some of the steel windows, and the rendering and whitewashing of the exterior walls. The whole building needed fire alarm and security devices and heating and ventilation installations in the cellar. Also some of the above mentioned restored parts needed maintenance. Also the necessary and urgent work of lowering the ground level around the building awaited implementation.

Aalto Library which was going to manage the works, agreed with the Finnish Committee about consulting, granting of the iconographical materials, original documents, restoration design, technical and architectural supervision on the restoration works and presence at the library once a week during the construction period. The library functions, which had continued in Aalto Library during the slow renovation process, were obliged to move to a provisional space in a nearby block.

The experiences gained during the 20 years efforts helped now to handle the fast works. The tested methods of repairing floors, walls, ceilings, windows, doors, fittings and installations were used.

The supply of building materials similar to 1930s originals gave the project real international character. To get lime from France and Finland, lime paints from Germany, rubber carpets from Germany and France, linoleums from Germany, fittings from Finland, Estonia, Sweden and Russia, lamps from Germany, Finland and Russia, handles and hinges from Finland and Russia caused additional challenge with customs duties. Modern standards and norms, official certifications, demands of fire security and alarm devices needed creative solutions and negotiations with the authorities.

The final works were executed in two phases. After a tender the public company Soyuzstroirestavratsiya based in St. Petersburg was chosen and started the restoration of the most difficult part of the library in 2011.

The Lending and Reading Halls 2011–2012

The works of the lending and reading department started in the beginning 2011 and were finished in May 2012. To renovate the ceiling heating system of the lending and reading halls took one year. The dense network of new heating pipes was hanged with the preserved original steel clamps and additional new clamps and cowered with thick c. 80-100mm plaster. Galvanized steel nets were used inside the four layer lime plaster. Originally Finnish kiln lime was planned to be used bu due to bureaucracy only bagged dry lime was available. French St. Astier Natural Hydraulic Limes were used. The necessary level of temperature and humidity was maintained in the halls to ensure proper setting of the plaster.

Brick walls were plastered with three layer St. Astier-lime plasters. Old loose and damaged plasters (on top hard soviet cement plasters and partially under old Finnish lime plasters) were removed from walls.

The book shelves, lending hall counter, the book lift and its wooden cowering, the stair railings were reconstructed according to Aalto's original specifications, drawings and photographs from 1930's. Floor and stair coverings are DLW linoleum and Artigo Rubber, Multifloor/DN-UNI carpets. Great amount of work was needed to recreate the original architectural features of the lending and reading halls and equip them with modern library technology, Wi-Fi, fire alarm system, video etc.

The Final Works 2012–2013

The final works included all the parts of the library, which were not yet restored, started in October 2012 and were finished in November 2013. At best there were over seventy workers labouring in the labyrinth of scaffoldings, corridors, stairs and spaces of the building.

The Renovation of the Basement and Cellar

The works in the cellar began with the dismantling of the jungle of old pipes and heating systems.

The trench around the whole basement was excavated. New external double ground water drains were installed around the library. The work contained drains and pipes and water wells, from which sub water is pumped to the city rainwater system, the height of which is higher than the basement level of the library. For outer thermal insulation and vertical drainage system Isodrain sheets were installed outside the cellar walls and Xypex waterproofing treatment on inside surfaces. New heating and ventilation machines were installed. The sprinkler system was installed on the ceiling of the book storage, which was entrusted with Compact bookshelf system. The original entrance ramp from Suvorovsky Street to the cellar, which was out of use after the Soviet repair, was reopened and its original concrete surface was conserved. The original fire-door, which was found under the Soviet cellar floor construction, was conserved and installed to its original place.

Children's Library

Reconstruction of the interior was restored to its original state according to original drawings and original building descriptions. The photos taken in 1941 by the Finish army gave also useful information about the original interior and furniture. The ceiling heating, walls, floors and steps were treated on same manner as the ceilings and walls in lending and reading halls. The original steel frames of the large windows were cleaned and corrosion treated and painted and thermal glass panes were assembled to these frames, which slightly altered the details. New sun blinds with electric steering according to the original photos were installed. Most of the furniture was bought from ARTEK. The handmade parchment lamps were produced in St Petersburg according to original photographs.

Office Rooms, Corridor and Stairs

Additional soft board insulation was necessary on the concrete wall in the North West office room. Walls and ceilings were plastered with pure three layer Kiln lime plaster and painted three to four times with Auro Natural Resin paints. Wooden window frames in office rooms and corridor were renewed and modified from the original drawings. Flax is used as insulation between the frames and the building body. The terrace door was renewed and modified from the original drawing. Original fresh air inlets under windows were cleaned, repaired and assembled back. Floors were levelled in two phases and after a proper time for drying and a new 2.5mm DLW Armstrong Linoleum Granette carpet was assembled with push joints according to the original building description. The doors of the corridor have original steel frames, and are rebated pine frame doors with birch veneer sheets on according to original drawings. The office wing staff stair with its wooden railing was restored to its 1960s appearance and the main entrance staircase's new wooden railings were produced according to the original drawings. The marble mosaics of the both stairs were repaired. Fire detectors, security cameras etc. in the corridor were assembled asymmetrically on neutral places not to disturb the corridor's original minimalistic appearance.

Main Entrance and Lobby

The exterior granite steps were removed; the concrete base was partly renewed and the old granite steps were installed back. The old foot scraper grilles were used and if needed the new parts were produced according to the older ones.

The black polished granite stone cladding from the Soviet period was removed and new soap stone cladding was built following the original appearance. The soap stones were excavated from the same quarry than the original ones in the 1930s although much deeper. Main entrance doors from the Soviet era were dismantled and new bronze doors were reconstructed according to the original design. All glass parts were strengthened with 6mm safety glass.

In the main lobby and the drought chamber there is ceiling heating which was renewed on the same manner than in other spaces. Ceilings and walls were rendered and painted with lime plaster and natural resin paints. New toilets were built in the original places. The cloth storage space from the 1960s renovation was preserved. A new information desk was built and the Soviet steel and glass doors preserved at the entrance to the reading and lending halls. A new connection from the lobby to the children's library was opened. The main lobby floor was covered with french Dalsouple rubber plates.

Paimio lamps on the ceiling of the lobby and the drought chamber were cast and produced in St Petersburg according the original lamps borrowed from the Paimio hospital.

The Exterior

The exterior plasters and paints were badly damaged. Like on the inside, in the early 1960s the whole exterior was plastered with hard cement plasters on top of remaining Finnish lime plasters and painted with various organic paints. The whole exterior was renewed with St. Astier lime plasters and painted with lime paint.

Most of the window sills were made of copper sheets 0.7mm thick and edges were curved according to the original details. Exterior doors were maintained according to the old restoration descriptions. The North entrance door extra frame and handles were dismantled and replaced with a new one following the original appearance. The fresh air inlets on the southern façade were renewed and profiles were produced according to the original totally rusted ones. All the roofs and skylights were maintained.

It deserves to be mentioned that in Russia there are still good craftsmanship. This made it possible that the goal to keep high quality was achieved and the well-trained working team managed to bear this demanding job to a successful result.

The official opening of the Alvar Aalto Central City library took place on 23 November 2013 attended by President Tarja Halonen and the chief of the office of the President of the Russian Federation Sergey Ivanov and the governor of the Leningrad Oblast Alexander Drosdenko.

Notes

1. Maija Kairamo did her Master of Architecture at the Helsinki University of Technology and has specialized in restoration planning and design. She has been the Conservation Architect at the National Board of Antiquities of Finland, Office Engineer at the Finnish Ministry of Education, Lecturer at the Faculty of Architecture of the Helsinki University of Technology, and has had her private architecture practice with Erkki Kairamo.
She has been committed to the restoration of several office buildings from 1977 to 1998 such as the Turku Dome (1977-79), the Turku Naval Museum (1978-85), the Palace of the State Council (1982-85), the Paimio Sanatorium (1993-98), and the Helsinki Olympic Stadium refurbishment project (1991-94). She has been a member of the board and design team of the Finnish Restoration Committee of the Viipuri Library since 1994 and is a member of the Finnish Association of Architects and of **docomomo** International.
Tapani Mustonen graduated in architecture from the Tampere University of Technology. He subsequently worked as an architect at Alvar Aalto Architects Ltd (1989-1994), before founding his own practice in 1991 (Architects Livanainen & Mustonen, known since 2002 as Mustonen Ltd). He also undertook research and advisory work in restoration and renovation projects at the Alvar Aalto Foundation (1995-1998). His main expertise lies in the conservation and restoration of architecture of the Modern Movement. He has published and lectured on the subject throughout Finland and elsewhere in Europe. The restoration of Villa Tammekann in Estonia, executed under his guidance, was awarded a Europa Nostra Medal in 2002. He has been a member of the board and design team of the Finnish Restoration Committee of the Viipuri Library since 1994. He is also a member of the Finnish Association of Architects and of **docomomo** International.