一般論文
平成28年12月21日受理

Tectonics of innovating aluminum teahouse

Altering aluminum teahouse by means of new timber construction.
アルミ茶室革新のテクトニック アルミ茶室の木構造による改修

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● Key Words: Teahouse, aluminum architecture, modernism architecture, tectonic, renovation and renewal, tradition and innovation, spatial experience, projection mapping

要旨

本論文の著者上原雄史は、故貴志雅樹教授が本学部創設展にて設計したアルミ茶室を、本学部創立10周年記念祭のために設計製作した過程で、建築意匠研究に関する重要な点を見出したので、ここに記録し発表する。

林暁教授を長とする創立10周年記念祭実行委員会は、学部の方針「伝統と革新」のものとで学部の力を集結して準備を進め、記念祭を平成28年２月に成功裏に終えた。貴志は茶室をインスタレーションとして設計しており、我々が10年後にプロジェクションマッピングを組み込み、貴人を迎えた茶事に用いることは予期していなかったため、茶室は構造補強が必要であった。設計者は、テクトニック、即ち空間架構における芸術と科学、という思考方法に従い、その実現を拒む問題を解決するプロセスにこそ「伝統と革新」を視覚化する建築が生まれるという意匠仮説をたて、各段階でこれを具体的に検証し作業を進めた。ここで近代建築の「形態は機能に従う」という信条は限られた条件内で確認可能であること、また設計時の目的性を超えて構造物を活用できることが確認でき、歴史と共存する現代のまちづくりを要にする本学部にとって有意義な知識を残せたと考えている。

Abstract

In 2016, the University of Toyama Faculty of Art and Design celebrated its 10-year anniversary. The anniversary commission chose tea ceremony as the pivoting event with the idea to present the faculty by integrating in-house expertise, it imagined deploying video projection mapping in the teahouse thereby unfolding the aluminum teahouse of the faculty built one decade ago. Yushi Uehara worked on design and construction of this new teahouse.

Because the committee decided to use aluminum teahouse that was designed as art installation, the theme of this project has became science of construction in terms of art of design and use. I could only define materiality or newly employed geometry only because I focused on these tectonic aspects of this architecture. I put up hypothesis that a form of architecture is achieved in the process of realizing the art and the plight of the project and examine it at each process of design concretely. While public generally appreciate architecture via modernist credo form follows function, function, I recon, is a temporal phenomenon performed by limited group of users who establish the premise. I inspect congruence of form and its performances beyond such planned period.

The author believes that a concise paper on this project can deliver useful knowledge for architectural design of tomorrow.

1. Introduction

A decade ago, late professor M. Kishi designed an aluminum teahouse for the founding exhibition of the faculty[1)] . By building teahouse in aluminum, it corresponded to the motto of the faculty Tradition and Innovation. Seen in the photography it appeared it was ready to hold tea ceremony in it, yet it was a Manifesto Mobilia, built solely as viewing spatial object[*1]. The

Photo 1: The aluminum teahouse built for the Founding Exhibition of the faculty of Art and Design in 2006, designed by professor Masaki Kishi.

teahouse had a panel system and the panels were kept in place with the system of aluminum tubes atop of them just to prevent them from falling apart; and ceiling was meant to be kept in place by four self tapping screw fixture. This teahouse was an installation; it was designed just to stand; visitors were kept out-side.

For anniversary commission, the conversion was just an idea at the beginning. The decision was not made before the commission established the aim and understood pros and cons of each of three scenarios for it.

The commission formed the aim: to hold a tea ceremony in the teahouse that consists of the works of the faculty members; to represent one decade of developments that this Faculty of Art and Design has created; to pursuit engagement of tradition and innovation on the horizon of being a creator, a facilitator and a user. Under this light of thought, it was most logical to include Kishi's presence into our presence because it will present the notion of time.

Initially there were three directions: to make use of existing tearoom of the faculty; to build a new timber teahouse; to make changes on this aluminum teahouse. To create a new timber teahouse next to aluminum one will present the changes, yet it demand too large resources that is hard to find. A reformed tearoom next to the aluminum teahouse will make a project smaller, but it demands the ceremony to take place near the gymnastic hall, which is not representative. Changing the aluminum teahouse will lose original work of Kishi, yet it could offer unique spatial experiences where old intention to make a conversation with new architecture. Further more, it will kick off a decade-cycle of remodeling the teahouse.

Photo 3: new teahouse with video projection mapping. The image is taken at the Otaka teahouse of the region.

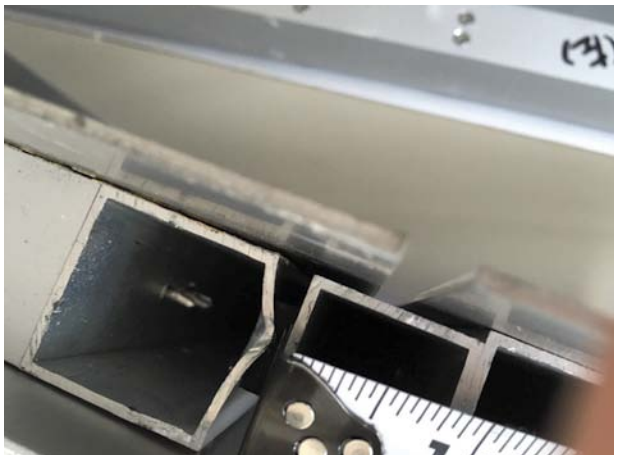

Photo 2: A damaged joint of the wall panel system.

2. Plight

For 10 year anniversary ceremony, the commission had no funding to order work to any external company. It became clear that the alteration must be payable in house; the method of construction must match the time and skills available at the faculty. The planning must be made to suit the on going education curriculum.

In April 2015 none knew where old aluminum teahouse was kept. Its original contractor Sankyo Tateyama Aluminum company (STA) near Takaoka told it was still on loan to the faculty[*2]. In June the commission begun to search where the aluminum teahouse might be until the faculty bureaucrat Nobuyuki Miura notified us that it is stored under the lecture hall.

Till now there is no original working drawing. There was not even a single design drawings left for us to plan the alteration. I have measured the dimensions of all parts that are visible by dismantling the system. Because the system was designed with certain philosophy of play spaces, I have to guess its logic in order to Reverse calculate the external dimensions.

The original contractors left us with no technical specification documents for the construction. The technical quality of Aluminum and the parts of old teahouse were uncertain. We can measure dimension of visible components[*3], but thermal performance of our fireplace was in question.

The firming up of construction was necessary for both aesthetic reasons and for a safe use of teahouse. It was found in a bad condition with visible damages on finish plates, the bended ceiling panels and frames.

Photo 4: A snap shot from video mapping tests, with the shutter.

In July 2015 the structure was reassembled at the foyer. The photographs on the bulletin showed the wall mounted flat, as peculiar to aluminum construction. But, the damage was so large that it had excessive play space. Consequently the ceiling panels could not be fixed in place anymore. I add the stiffening of the entire construction into my list of work. The interventions shall be kept hidden, because this will be a work to remodel Kishi's art.

In order to fit the video projection system, I had to add new roof quite visible from outside. The commission decided to break architectural envelope of original teahouse and mount four projectors on top, raised higher than the teahouse. To break envelope is a logical consequence to use full interior wall for projection mapping, yet this goes against a general outlook on preservation. Yet as it corresponds to the aim, it asked no question. New must not undermine the old and thereby proving that we innovate tradition to shape an ideal current form.

3. Art

It has then became clear that it was not a pure design quality but science on art, use and the construction method that will bring the project to success. I realized that this teahouse is about constructing environment of light with minimum resources. I concluded to locate tectonic aspect of architectural design atop of agenda: it is about the science or art of construction, both in relation to use and artistic design.

Even though sheltering function of teahouse is requisite for distinguishing a place for tea ceremony form a noisy surrounding, its physical shape is aspirated to become the subject of art of architecture, to display the awareness of value. I concerned with the both, the method and the logic of fitting two system of constructions in one body, and aimed to assert the reason of its presence as the mean to be aware of ever changing spatial experiences with it. For this reason I decided to study the conditions of diverse lights in this teahouse.

This is a small architecture, yet it put me in conversation with ancient tea masters. If I succeed in this project, this small box shaped architecture can give experiences of a guest encountering a larger sphere, be it a garden or seasons.

Act of creating a new teahouse can disseminate power; I tentatively consider a teahouse as a social condenser. I chose to juxtapose surfaces, of organic and inorganic. I have chosen to assemble new tectonic that timber frames act in its external shape more than interior. I kept three aluminum walls and chose to replaced one full wall of aluminum 'punching' metal panels. My hypothesis was to innovate experience of lights in the teahouse: from a traditional crawling through spots of natural lights to a full wall surface working as source of dimmed lights. For this aim traditional Shoji (障　子) seemed useful.

The tatami arrangement is the key parameter of a teahouse because it defines MA (間), man-to-man relationships, of the host and the guests. I have chosen for a two tatami mat configuration to place men around the fireplace (炉) in a square room. The most logical tatami-mat arrangement was that our host to serve tea in right hand (本勝手) on Forwarded Daime-Tatami arrangement with tea fireplace (一畳上台目) embedded in the middle timber stroke (中板). I chose to widen the tatami-mat for the guest (変 形 畳 み). I fill a stroke of timber board beyond host's place (向 板) as featured in Konnichi-an (今日庵) of Ura-Senke (裏千家). Tea alcove (床) was set opposite side of the guest entry (躙 口). In order to give form to the awareness of streaming time, I designed a pattern of timber panels that run across the floor like a river, with fireplace in its heart.

Photo 5: view from guest's entry

Because I replaced aluminum floor and ceiling with organic construction, the cube[*4] is now configured as the two concepts interlocking U's. In one's mind, the materials coming face-to-face often associate opposing concepts coming together: Organic vs. inorganic, old vs. new or tradition vs. innovation. Even though this association cannot be fixed as language does, it is never the less useful in using architecture as a medium of mental contents. The aluminum panel system and a timber frame: my task is to design a complete spatial construction that adequate these two systems. I am working on a project that the aluminum construction is our heritage even though the material associates an innovative new technology.

The aim asks one vessel like architecture that the aluminum structure is engaged with a timber frame. Conceptually by unfolding this cube on a flat surface, it will form a figure-T, where organic and inorganic materials contrast in the right angle. This can be experienced in the teahouse especially where there is no video projection is active. Natural day light through paper wall illuminates aluminum wall in a peculiar nuance and create very pleasing sphere.

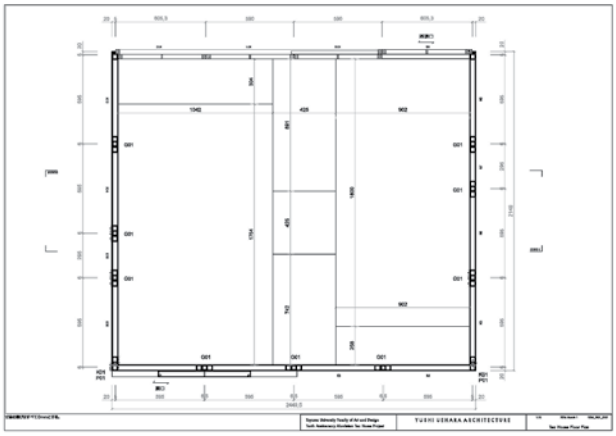

Figure 1: New floor plan showing the layout.

I have chosen to define this teahouse as a shelter of lights, both daylights as well as artificial lights. Inside, both the inorganic aluminum and a new to be installed organic material, will display its allure.

During tests of video projection system, I recognized that the corners with two aluminum walls works like a cloudy mat mirror, it subtly reflected the lights on the opposing wall, which gave illusion of depth. The corners appeared crisp where organic material met inorganic because organic surface reflected the image on the opposing wall very little. This may give a guest an impression that aluminum walls have rounded corners, while organic surfaces has edgy end, which is the opposite of men's expectation.

4. Method: Process

In June 2015 the dean Ryozo Takeyama of the faculty invited faculty graduates and Ura-Senke (裏 千 家) tea master Noboru Koizumi as the host of the ceremony. The list of invitee for the tea ceremony included the president of the Toyama University, Member of Parliament of Takaoka region, the major of the city of Takaoka as well as other honorable guests from the region.

Also in June 2015 the teahouse working group was formed and listed points of attentions including the site of the teahouse[*5]. In June 2015 the total budget was defined. In August I reviewed technical aspects of the teahouse and at the early September 2015, the commission decided to make changes to existing aluminum teahouse by adding elements that made of timber.

The planning depended on if STA can participate as voluntary contractor. In mid December I organized

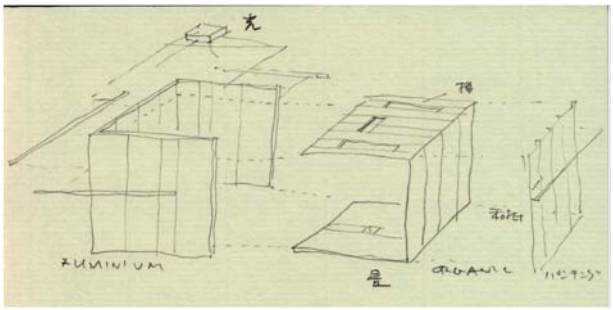

Figure 2: Sketch showing interlocking of aluminum and timber construction.

meeting with STA and HI[*6] who undertook the construction work of old aluminum teahouse. STA showed interests in participation, but declined to annihilate its costs for construction. In December 2015, I agreed with STA that STA named Ichiro Iwama as the structural engineer including new roof frame for hanging projectors and other electronic devices. HI puts the new aluminum parts for the alteration in production, the cost of it to be remunerated. The parts are given the identical finish specification to ten years ago.

The process of the teahouse construction proceeded as follow. S Hayashi took overall control. Y. Uehara designed the alteration of teahouse as I. Iwama as structural engineer. Y. Uehara reported the proceedings on daily basis to S. Hayashi till the delivery of the teahouse. S. Hayashi and Y. Uehara controlled the planning.

5. Method: Program of Demand

The design process proceeded by defining the physical conditions of built structure that human activities demand: program of demands. In the recent past, Program has been the key notion to design contemporary architecture. Tea ceremony is a clear example of programing in a sense that it is prescribed to embrace unforeseen event; during tea clremony every human activities consists of precisely prescribed bodily movements and both host and guests are expected to master them so that they can enjoy unforeseen eventful conversation during the ceremony. The key to this project is how far the teahouse be conducted by this fashion. Obviously for us the crux of the matter was not form but light that we applied to in this teahouse.

The commission was aware with the fact that the projection system will not remain in place after the ceremony. It was lamented, yet not looked as a loss because the commission did not believe that a loss of projection function does not mean the loss of spatial quality. During the test of the system, the commission also recognized that the teahouse possesses pleasant spatial experiences.

It was anticipated that the tea ceremony to be one authentic event. The principle to design a teahouse is the belief that the two dimensional pattern of floor defines the fundaments of a ceremony: man-to-man relationship. Because Kishi's teahouse was constructed with other intentions, an authentic solution was demanded.

In general a teahouse demands unique condition of natural lights, as a teahouse is a dark space for privacy. In the most teahouses the configuration of windows expand this from form to spatial experiences. Here, we have to work within the confinement of our heritage, i. e. tea ceremony and the virtual lights.

The commission introduced the notion of virtual garden by utilizing advanced video projection system. This artwork can give impression that this tea ceremony is in a virtual garden virtually outside of this campus. The theme of the contents is four seasons of Takaoka[*7], the contents on four walls are fully synchronized to enhance the impression of movements. Because the floor must be free of obstacles, it can only be projected from the ceiling in order to map video image all around the interior. The target was to present our guest's spherical experiences of the transforming faculty: past, present and the future.

The tea ceremony, in general, demands certain privacy. Men in the teahouse desire to focus with all senses on the proceedings of the event. Because etiquette of tea ceremony is meticulously defined, the arrangement of floor must prepare condition that

Photo 6: the projection mapping wraps up the place around the fireplace (ro).

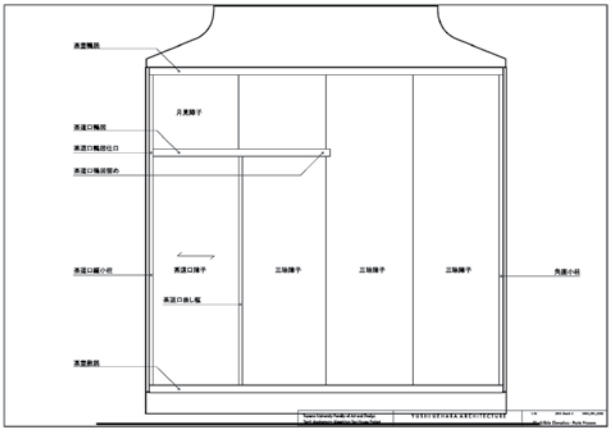

Figure 3: New elevation showing new hosts entry (sadou-guchi) in the new paper covered wall (shoji).

both the host and the guest could perform all codes of behaviors fluently. Obviously the structure must make human activities possible.

Commission decided to put the fireplace (炉) in use to make real tea in the teahouse, and not supply tea that was made outside of the teahouse. This implicates to structure of the teahouse, it may result in damage due excessive heat generated by burning charcoal. We discussed if tea will be created in the teahouse or brought in from out side. The reason to hold the ceremony was discussed and decided that tea to be made in the teahouse. The commission preferred to burn charcoal, because charcoal produces odor that add liveliness to a ceremony.

The equipment of tea ceremony is known to be expertise items for which the commission collected items from the region. Among which the two items were excellent; tea utensil (薄 茶 器) from the faculty, a fresh iron tea ceremony pot (茶釜) was donated from the local metal cast by Shunsai Hata.

A teahouse has unique entry system for a host: Sado-guchi(茶 道 口). Because the old teahouse was not equipped with this, it was placed on top of the list of demand. Because I could not perforate any window on none of the aluminum panels, it was desired that the replaced fourth wall to have an exceptional luminous properties that which creates new alcove that is specific to this teahouse of lights. The new roof and ceiling mounts source of artificial video projection lights, yet it was not desired to expose the installation. Acoustically this was a concern as projectors usually create fan noises. The day as we expected will be a busy day for which we could tolerate a room not being completely silent.

Due to the restriction of time-space, the commission decided to omit building bespoke kitchenette for the new teahouse (水屋). A full tea ceremony includes dinner and deserts; it endures several hours. A host goes back and forth to his kitchen to prepare his hospitality. For these reason a host has own modest entry, slightly taller than the one for guest, that does not disturb the guest in the tea house. Yet in order to serve more guest than one tea ceremony can serve, the commission choose only to undertake Usucha (薄茶). The full ceremony equipment including for Koicya (濃 茶) and Kaiseki (懐 石) was not necessary.

The heat of fireplace cold have consequence of structural damage. We assumed that our Aluminum frame material is 6063 quality. The ignition temperature of coal may rise above 1000 degree Celsius[*8], but we did not know the insulation value of our fireplace. The fabricator said that it mostly applies copper on a fire resilient material Calcium silicate board[*9]. A generic model keeps its external temperature under the ignition temperature of a timber, which is about 220 degrees Celsius. Anything that insulates better demanded too large installation space to fit in our construction. Because aluminum 6063 begins to creeps at 150 degrees Celsius, we decided to use an electric furnace.

As Japan being a land of earthquake the demand was set to improve constructive firmness. The video system, new ceiling and a proper roof construction add up an additional 100kg weight on the panels, while original construction had no preparation for it. I could not trust the anchor system on the foundation, because it was a series of 50mm long 15x17mm t=1mm aluminum box profile, the type of aluminum alloy was uncertain. I have to setup alternative structural system that does not end up in distressing the heritage. The new system must be

Photo 7: preparing foundation for rotating the walls

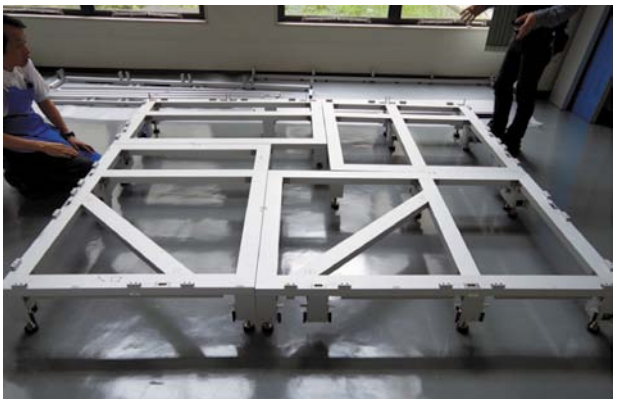

Photo 9: the foundation of the teahouse. Thee are 900mm to the right hand of the fireplace 2050 to its left side.

invisible yet effective. The special attentions on detailing design work were demanded.

As is often the case with a remodeling project, the external shape of the old teahouse is the subject to remain untouched. Tenshin Yokoyama functioned to review this process and joined as critic. For this point of view, the positions, heights and the mounting methods of four projectors were critical because they required very large volumes and many cabling system. It obviously disturbed either the shape or interior of cubic volume.

6. Designing solutions

Because the tea ceremony had some contradicting demands to its original construction system, it required a smart strategy for alteration. The key to the solution was the pattern of the floor. It can turn the structure into a machine-for-experience from an installation-to-watch.

Because the decision was made to confine tea ceremony within the envelope of existing teahouse, the section and the plan could be designed in a parallel process. But, considering the whole project is about revealing the participatory nature of our faculty, the crux of the matter was about designing the concealed construction system and about the detailing that stipulated attentions as it dictated the appearance of wall as screen. Because it will create direct confrontation of what existed and what is new.

I concluded to rotate the entire buildup above the foundation[*10] 180 degrees. In this way I gave more space to our hospitality. Original floor plan is about 2.4m x 2.1m envelope[*11]. The geometrical layout of it consists of two nested square territories, of tatami and of house, touched at one corner where the guest entry of teahouse (躙　口) is placed[*12]. Wider residues spaces of 565mm was an embellished tea alcove (床) with aluminum floor. If no rotation was to made after the alteration, the guest to sit on 900mm space and the host on an undesired wider space[*13] of 1050mm. Obviously dividing this host's space into two parts, 900mm tatami plus 250mm timber stroke did not make guest's space wider or made architectonic sense or in reference to the history of teahouse and therefore would still undermine the guest. Only solution was the guests to enter on 1050 mm tatami space and for this the entire walls have to be rotated[*14].

I initially aimed to confine new use in an old envelope, this choice raised discourse[*15] regarding oppressive feeling caused by lower ceiling. To keep roof construction in halfway will still creates an oppressive interior. To raise the entire roof construction above the façade to form flat ceiling surface was the only solution. The consequence was the visible roof, but considering that the original roof construction was none other than

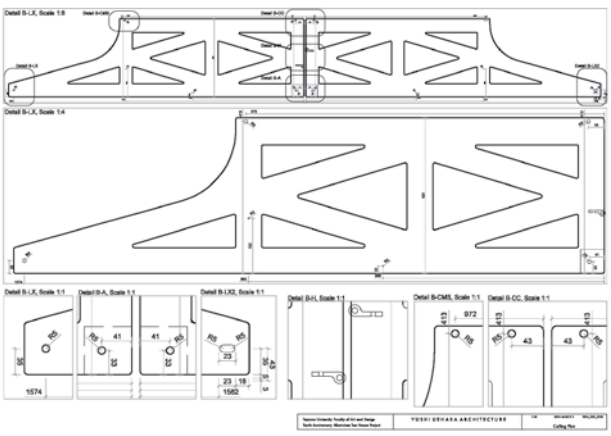

Figure 4: Drawing of new duralumin roof beams.

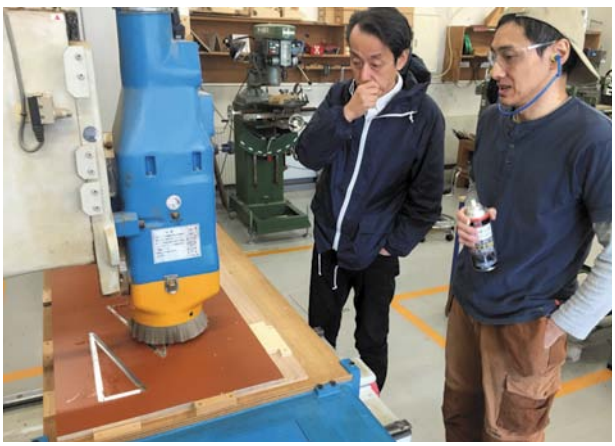

Photo 8: cutting out Duralumin beam at the faculty's workshop

Photo 11: New roof beam

a sheet of 2mm ceiling panel, this decision maintains the volumetric properties of the main chamber. I chose to raise new roof above original height in order not to create oppressive space. I designed the beam to fit the four projectors within its height[*16].

For the novel situation where we find video projectors on our head, I decided to omit attic and to expose the system. The aesthetic of raw machine justifies its reason of presence, visualizing novelty convincingly. The roof is about light, notion of perspective towards future; its form shall be of a cone.

For the new roof beam, I choose triangle frame system to mount projectors on top of existing structure. Triangle form does not belong to the original teahouse, but it transforms it into a stable structure. Theory says to deploy beam across a shortest distance -2.1m - parallel to external shell, which results in #-shaped system because the projectors are in the middle. Trouble is this may cut ray of projection light. To design beam along side the corns of projection light makes the beam longer but forms stable triangle form. 9mm thick duralumin is exceptionally stable to materialize this beam and by binding the beams well with the corners of the new square horizontal frame the new roof construction forms triangulated geometry that does not deform.

In order to avoid disturbing appearance, I tapered the top outside end of the new roof beam in a hyperbolic curve, which is a section of trigonometric functions and describes a vector's periodic phenomena; a cyclical logic. Considering that we work on the theme of tradition and innovation, this aluminum construction is a heritage of our faculty. I rated this notion of periodic phenomena to fits the quest. I castrated the duralumin beams in a corresponding triangular pattern to its planner layout that allow looking through between the reflecting surfaces.

I designed the new top tube on the walls as lintel and fixed it with roof beam with bespoke bracket to bring load to the foundation. Because I choose to ignore anchors[*17] on the foundation due its weakness, I chose four corners of aluminum panel for the load path and treated as column. The columns get cushions[*18] on both ends to focus the load path. The lintel frame also fixed the new timber wall. I chose to design all new details around 35mm square aluminum pipe that slide into the butt ends of existing panels.

In order to stabilize panels I made use of stable property of aluminum honeycomb construction and I chose to treat them as a continuous surface rather than infill of frame. In this way I avoid implementing super frame. I observed that the original construction system had 5mm play space between two panels. This was true to the wall and foundation and wall and beam. For three directions I let 35mm square pipes slide into the U-profile[*19] into the cavity at the butt end of the each panel and fix the panels by self-tapping screws, only along the panel joints. Only at the two corners where two aluminum panels meet, because the joint has to fit

Photo 10: looking towards new host's entry in the paper wall.

Photo 12: New timber-paper facade of the aluminum teahouse.

walls angled in 90 degrees angle, I joined them with bespoke lips.

I designed the new timber wall detail with the principle of modern curtain wall system and applied appearances of traditional timber sliding doors. It is a timber panel system, that the top frame of the panel is directly screwed on the lintel, which takes T shape here to save space. The timber frames fixes the panels as is the case in Japanese wall system. The sliding door top rail (框) of Sado-Guchi , the new entry for a host (茶道口), is pinned directly onto the stile.

I have to abandon some intervention because of lack of technical information; I chose to blank an idea of Shitaji-mado (下 地 窓) that challenges an authentic opening type which is specific to a Japanese teahouse. This window shows sub-construction. It is as if the wall became transparent and reveal its skeleton. Because I was tempted to design this new teahouse window, I needed to know the build up and materials of this wall. Each panel of teahouse is a honeycomb construction put together by mainly glued fixture[*20]. I postulated consequence of an autopsy; I had no knowledge on inside of the panel, so I could damage constructive integrity of the panel that could end up in replacement of entire panel. We had no resource for it. I enquire property of this glue to Hirokami Industry (HI) who manufactured it for STA. The president was cagy about its identity. One decade ago, most honeycomb panels were often glued with thick light yellow two to three component glues; exposing it would not please one's eyes, therefore it will not become a new style of Shitaji-Mado.

7. Execution

At the beginning of the project, none knew if the original construction drawings of the teahouse existed. In the most cases of a building construction, practicality and technical possibilities demands changes to the detail design; knowledge on the actual structure was crucial. Therefore I have taken all the measurements of the teahouse. I have drawn all working drawings and the shop drawings for the new parts that I have designed for this project.

With professor S. Hayashi, I have build most of the new building parts of the project. Aluminum profiles are produced according to my shop drawings. The execution proceeded as it was drawn. The quality of execution as an architectural project is excellent.

8. Sum

Here, I have worked on the teahouse project under the theme of tradition and innovation. We placed a cutting edge artificial lighting system into it and I have lifted the roof above the old cube. We programmed the whole system as a media, even if it is just for one-day event. Now, this teahouse remains with us without this system, yet it still pleases our eyes. The ray of artificial lights that filled the teahouse was just one of the modus of how light penetrates this architecture. This function was a temporary state of the teahouse. The commission knew, obviously, that a new technology will require yet another space. The true plot to reincarnate this teahouse is to let this teahouse be one integral part of faculty' s education program; to create place to research the reason d'être of our faculty through working on tea ceremony.

120 years have gone by since architect of Chicago School Louis Sullivan made the most known modernist credo, *Form Follows Function*. Many movements have occurred and left their own credo; post modernism, deconstruct-ism and the recent computational architecture: Fun, Patchwork, Program, Deconstruction and so forth. Yet the credo *Form Follows Function* is still globally the most known and still work as the key notion to explain what modern architecture shall be for the most public. The question raises; what use do form has to us?

This is a renovation project. The teahouse still stands in our faculty with no video mapping system and pleases the eyes of visitors. Old structure has own logic of form and remains it after the renovation as a part of an integral form. We might consider this project as

an experiment and review it if the credo Form Follows Function is applicable also for a renovation. The original form of teahouse was not made to serve our current purpose. Kishi, obviously, was not aware that we would use his teahouse for actually holding a tea ceremony under the artificial lights of projection mapping. This shape of this original function has not restricted our new function. In other words, we know how to inhabit given space with new demands: use followed form.

It is a known issue that an antique Japanese timber built town houses possesses impressive form; yet it can hardly accommodate any contemporary climate installations. Obviously practice knows the ways to deploy new technologies in such an authentic town houses. In such case, would the Form Follows Function? Far from it; new demand dismount the ancient structure in the most cases. Doors, fixed walls and raised kitchen. I feel need to note my opinion that it will be important to let the technology suits the house with authentic tectonic: Function Follows Form. But in reality, inhabitants often prefer to discontinue this tectonic trend and replace it with new that suits technology; a prefabricated house replaces an authentic timber house thereby interrupts an authentic cityscape. At the time when a Japanese local city shrinks a local city needs to make use of this authentic structure. Yet the fact is, even the current mode of houses, that supposed to improve short comings of that authentic house, will soon be replaced by the mode that suits the latest, future, trend of installation.

If a true functionalist architect aim to inject new function into an old structure and thereby realize renovation project, he, most certainly, choose to smash down a part of the heritage, to say the least, or mount an alien looking volume on top of the heritage. Form Follows Function is a belief that a new demand will take a new, in other words 'a foreign', shape or else the new function will not come alive. This is the reason as to why we now witness the modern works of prominent avant-garde architects confronting a demolition giving way for updated demands. Modern architecture is destined to vanish after one cycle of a man's belief. In the age of modernity, there will be no heritage project left for our city.

I do believe this is not a preferred tendency: to transform modern masterpiece architecture into an ice cream on noodle recipe[*21]. This started already: the

Photo 13: a scene from Autumn Virtual Garden

masterpieces of the post-WWII era are the subject to be dismounted and replaced by something. What is then left for a suffering local city to promote itself with?

Can we drop the credo Form Follows Function all together? If we could, what credo can I present to convince public that the ancient belief that architecture is about use, firmness and aesthetic[2)] is still alive? Modern architecture operates on the belief that architect produces precise knowledge that form is a derivative of use. Men are aware that functionalism is a narrow method, which defins that a well-being of a modern man is to confirm architects' prescription. On the contrary, in reality a modern men love acting freely while being stylish. We have seen metropolitan efforts to dine on top a tower and turned architect into a profession who can perform a magic of metropolitanlife. But in doing so, have we created an alternative credo on Vitruvian Virtue that allow such structures to remain longer than a life of a man?, or longer than his idea on its use?

The roof is lifted as the didactic decision to promote our faculty. Injecting new video projection system was not just a work of art, an indispensable function of an authentic tea ceremony or a logical innovation that tea ceremony must go through. I had to produce knowledge that this novel event envisions the virtue of our faculty, of architecture and of tea ceremony. Form envisages virtue. Because virtue counsels men's behavior, the knowledge on form shall construct our house of tomorrow.

Credit of photography
Kaori Ichikawa, Photo 1
Keiichi Suzuki, Photo 2,5,6,9, 12, 13
Yushi Uehara, Photo 3,4,7,8,10,11

References

1) Tradition and Innovation - Takaoka City of Craft, Founding exhibition of the Faculty of Art and Design, University of Toyama, 2006. Reports on Bulletin of the Facultuy of Art and Design University of Toyama, Vol.1, 2006, p16~21.
2) Vitruvius, Architetura libri decem, ~40BC

Notes

*1 While Kishi plotted his design of the aluminum teahouse to change our daily life, he did not let man undertake a tea ceremony in there. I cold only assume this reason that he chose visual manifesto above experience; it is quicker, demands no hosts, less costs and even seduces men with no etiquette. It is a semiotic editing, which would achieve larger impact to larger public than an exclusive experience. In doing so, Kishi applied tea ceremony as media; it enhanced performance of disseminating the art of tea ceremony.

*2 Sankyo Tateyama took current company structure in 2006, which is after they have built old teahouse.

*3 The old floor construction system allowed no additional heat insulation as just 345 mm NET wide square opening for fireplace. The old teahouse was equipped with standard fireplace for tearoom in a apartment, with 20mm thick wall construction and finished with metal sheets that resembles to copper.

*4 The cube has six sides: three sides are newly installed organic material and the three sides consist of original inorganic aluminum panels.

*5 The commission considered to place tea house outside university perimeter including in Kojo-koen under cherry blossum.

*6 It was made possible through Kenji Kusu of Aluminum Industry Association, in the occasion of my visiting lecture at the annual meeting of aluminum association.

*7 Haruki Nishijima, his students and Kazumi Uchida made the digital moving images.

*8 The ignition temperature of tea ceremony coal may become higher than 1000 degree Celsius. Its stable combustion temperature is about 850 degree Celsius. We aimed 30min tea ceremony for several groups of guest in total several hours at least.

*9 Because the fireplace was produced one decade ago the fabricator could not provide us with thermal performance of the unit we have in our hand.

*10 Kishi choose to compose foundation out of four loose aluminum basement frames on adjustable feet. They were positioned like a fan, but not fixed, and he positioned the fireplace in the center; the fireplace sat on all four basements.

*11 Currently popular arrangement is four and a half Tatami (四畳半) in an about 2.7m square floor plan. Senno Rikyu (千 利 休), the tea master, favored the smallest, but intricate space, that fit all in 1.8m square plan or 1.8m x 2.7m.

*12 The fireplace is placed at the irregular position within four 900mm x 900mm Ryukyu Tadami (琉球畳) mats

*13 Because the Nijiri-guchi faced the corner and because the perimeter of the cube was neither a multiple of 900mm nor 450mm, the fireplace divided the interior asymmetrically. This means the guest to sit on 900mm wide tatami while the host to sit on 1050mm wide space.

*14 Altering wall panel was not an option because none of the combination fits. Even if it was, it did not create an authentic floor pattern.

*15 Because ceiling becomes about 50cm lower it ends up in oppressive interior; Even if we use short focus video projectors projected image will be significantly lower.

*16 The system is partly hidden behind the new contoured ceiling and partly exposed with roof construction. This accentuates spatial depth by reflecting daylights. For projectors, Hayashi and I designed unique shutter system with which the image projection can be squeezed to an oval shape.

*17 Anchors are attached both on top of foundation as well as at the bottom of panels. It s 50mm aluminum profile, t=1 17x5mm landed on two lips of 1mm thick. Type of aluminum alloy was unknown.

*18 I chose 6063 quality 5mm thick adding square aluminum cushion of 35mm.

*19 I searched the list of available aluminum profiles and found a profile t=2.4mm, U 6063 30x40mm.

*20 Bulletin of the Faculty of Art and Design (紀　要), University of Toyama, Vol.1, December 2006, page 21.

*21 Toyo Ito on a Dutch cutting edge cuisine, 2000.