

REHABILITATION OF THE TUNKU CANSELOR HALL, UNIVERSITY OF MALAYA, KUALA LUMPUR, MALAYSIA.

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ABSTRACT:

Built in 1965, Dewan Tunku Canselor (DTC) is a landmark for University Malaya. It is here that the convocation ceremonies for graduation have been held annually since August 1966 and to the hosting of numerous functions of the university including semester examinations, special studio class, theatres performances, seminars and conferences. DTC was designed with a strong influence of *Brutalism Architecture* and *Modernism Movement*. The two and half storey building was constructed mainly with off-form concrete structure using *egg-crate* reinforced concrete ceiling and '*beton brut*' images. On June 29th, 2001, a pre-dawn fire gutted the building and almost ninety percent of the building was destroyed. The Faculty of Built Environment, University Malaya participated in the effort of reconstructing the building to its original condition. This project reveals the background and significance of this building; the conservation approach and main stages of involvement in reinstating the building including preparation of appraisal report; preparing a condition survey of the building after the fire; identifying existing defects on site as well as documentation work of the entire building before and after the reconstruction works. As a whole, this effort is to ensure that Dewan Tunku Canselor was restored to its original state before the fire according to the concept of conservation work while at the same time upgrading the building services and facilities.

1. INTRODUCTION

1.1 University of Malaya Background

UNIVERSITI MALAYA, the first University of the country, is situated on a 750-acre (309-hectare) campus in the southwest of Kuala Lumpur, the capital city of Malaysia. The University of Malaya grew out of a tradition of service to the society. Its predecessors, the King Edward VII College of Medicine established in 1905 and Raffles College in 1929 has been established to meet urgent demands, one in medicine and the other in education. When the two came together to form the University of Malaya in October 1949, this was so that they might perform an even greater service - to help lay the foundations of a new nation by producing a generation of skilled and educated men. Hence the University of Malaya was established on 8 October 1949 as a national institution to serve the higher education needs of the Federation of Malaya and Singapore.

The growth of the University was very rapid during the first decade of its establishment and this resulted in the setting up of two autonomous Divisions in 1959, one located in Singapore and the other in Kuala Lumpur. In 1960, the government of the two territories indicated their desire to change the status of the Divisions into that of a national university. Legislation was passed in 1961 founding the University of Malaya on 1st January 1962.

The University motto, "Ilmu Punca Kemajuan" (Knowledge is the Key to Success) reflects the philosophy of the University in its constant endeavour to seek knowledge in all fields to produce successful graduates and a successful nation.

1.2 Dewan Tunku Canselor Historical & Architectural Significant

Being the first and the primer university in Malaysia, Tunku Canselor Hall (DTC) at University of Malaya is considered as an important landmark in the historical development of education in Malaysia. It was built in 1965-66. The Malaysia's first Prime Minister, Al Marhum Tunku Abdul Rahman Al-Haj officiated the opening on 25th June 1966. DTC was designed and constructed by Dato' Kington Loo of BEP Architect. It was designed with a strong influence of *Brutalism Architecture* and *Modernism Movement*. The building was constructed mainly with bare concrete structure using *egg-crate* reinforced concrete and '*beton brut*' images.



Figure 1: The Front View of Tunku Canselor Hall.

DTC is a two and a half (2 ½) storey building consisting of a great hall and a foyer area, connected to an Experimental

Theatre. A stage is located inside the great hall at the ground level. The foyer area serves as an entrance to the great hall. The mezzanine floor is actually a viewing gallery that forms a 'U' shape. Three projector rooms were originally located at the first floor, partly storing the graduating robes and accessories. The roof of the great hall consists of steel trussed structures and a reinforced concrete slab with up-stand beam forming the perimeter roofing system. Access to the different floor levels is provided by two spiral concrete staircases located within oval shaped shear walls.

The University Malaya convocation ceremony for graduation of students has been held yearly at the main hall of DTC since August 1966. In addition, it hosts numerous functions of the university including semester examinations, studio classes, theatre performances, seminars and conferences.

1.2 Building Condition After Fire

On Friday, June 29th, 2001, a pre-dawn fire gutted the building. Since then DTC had restricted entrance to the public. Almost 90% of the entire internal building was destroyed by fire and fire fighting efforts (See to Figure 2 & Figure 3).



Figure 2: Collapsed roof trusses into the Great Hall



Figure 3: View from the main foyer.

2. BUILDING CONSERVATION WORKS

The Faculty of Built Environment was given the task to involve in three main stages as follows:

Phase I: Preparing report and carrying out a condition survey of building after fire and existing defect on site.

Phase II: Giving professional advice in the rehabilitation work to ensure the building original structure and elements, cleaning work, interior design and services installation.

Phase III: Advising the preparation of documentation work of the entire building before and after the rehabilitation works including scaled photographs and compiling the detail information of the entire process.

2.1 Building Condition Survey

The building condition survey is based on progressive visual inspection to ascertain the extent of fire to the building. The dilapidation report was done after the first cleaning by identifying the defects and damages that need to be rectified. In order to report the condition of the building, a systematic approach was used. The building was divided into sectors. For further detailed inspection, the sectors were divided into elements and inspection was carried out from bottom to top. The drawing was done by architects and a team of building surveyors had inspected the defects after the fire and after the first cleaning. Coding and references were used for easy identification.

Based on the inspection and findings, the followings are recommended:

1. The fishes in the pond to be relocated before any cleaning work commences.
2. The burnt elements such as timber frame for doors and window panels, curtain railings, parquet flooring, to be totally removed from the building before the second cleaning work commences.
3. Furniture such as tables and chairs to be removed and placed off-site from the building. This is to ensure that the furniture will not be further damaged during the second cleaning work.
4. The debris from the fire such as timber panels for acoustics, speaker brackets and nails should be taken down and removed from the wall surfaces.
5. The soot marks to be cleaned by using high-pressure water jet and not chemical base detergent. This is to ensure that the bare concrete surface is not damage due to chemical reaction.
6. The water from the cleaning to be drained out from the building as soon as the cleaning work finishes.
7. All growth plants and debris from roof to be cleaned from all the rain water outlets.
8. A new and appropriate design for fire fighting equipment; passive and active, to be implemented to avoid and further damaged in the future to the building.
9. The rainwater down pipes and outlets to be redesigned in to the perimeter drain to avoid any overflow or clogging.

Last but not least, a more scheduled maintenance programme should be implemented to avoid future damage to the building as a whole.

2.2 Conservation Approach

Before the commencement of any conservation work, a building survey and appraisal report after fire was prepared in order to diagnosis the building defects. Structural Analyses especially for the defective structure was carried out by the structural engineers and reported for further action in structural repair. In order to retain the authenticity of the building original design, the principles of conservation were applied and recommended to be carried out to:

- i) provide temporary protection on the site to ensure that the existing building elements and spontaneous plants were not further damaged during construction. (See Figure 4 & 5)



Figure 4: Temporary protection for the spiral staircase



Figure 5: The spontaneous plants on the building facade

- ii) use appropriate construction methods and material that will retain the authenticity of the building in terms of design, materials, workmanship and setting. Replacements should be as close as possible to the original materials.
- iii) consider the conservation principal of minimum intervention, even though it is hardly appropriate for a re-building project. In order to upgrade the facilities, it was necessary to comply with the latest services and law requirement such as fire fighting equipment, accessibility and facilities for disabled people, mechanical and electrical system, sewerage and piping facilities, stage facilities etc.

2.3 Construction Period

The initial work of the building reinstatement started in August, 2001 when the building teams were appointed. The entire project took almost a year (initial concept to hand over) and the construction period was 4 months and 3 weeks (handing over in August 2002). The entire project cost was estimated of about Ringgit Malaysia 13.8 million. The building was officially launched for its second time on 20th August 2002 by the Malaysia Deputy Prime Minister, Datuk Seri Abdullah Ahmad Badawi.

2.4 Construction Stages

a) First Stage – Structural Repair, Crack Repair & New Roof Design

The damaged structural elements such as column and beams were repaired to their original state. The structural repair for all the concrete elements was done carefully in order to retain the authenticity of the original design. The methods used were not only to regain the structural strength as designed and verified by the structure engineers, but also to regain the original appearance of the elements.

After hacking and repairing the steel reinforcement bar of the concrete and beams (refer to Figure 6), a few layers of bonding agent called ‘Nittobond EP’ were placed to cover the exposed structure (refer to Figure 7). Then the formwork was prepared from layers of timbers line up to produce a textured surface as to its original design. The ‘Renderoc LA Concrete’ was filled up and hardened until the required strength about 60KN was achieved. Once concrete hardening, formworks were removed and surfaces were refined.



Figure 6: Hacking of the damaged concrete surfaces.



Figure 7: Applying layers of bonding agent Nittobond EP’

Ninety percent of the existing concrete elements surfaces were covered with soot mark and they required to be cleaned. Appropriate methods of cleaning were used. At the beginning, water jetting system was used to the entire surfaces (See Figure 8). It was found that the soot mark were embedded into the surfaces and difficult to remove especially at certain elements and remote area such as concrete fins, slab soffits, staircases

and foyer areas. The second part of cleaning was applied, using scrappers, sponge and a metal hard brush, by scrubbing it manually. Very little Liquid Organic Cleaner (LOC) was used to enhance the process (See Figure 9).



Figure 8: Water jetting



Figure 9: Manual cleaning of soot marks.

The entire pitched roof over the great hall was replaced with new steel frame and water-proof roof membrane). The design basically reflected the original design with several improvements in terms of acoustic, structural strength and quality (Refer to Figure 10 & Figure 11).



Figure 10: New roof trusses installation



Figure 11: Completed new roof finishes

b) Second Stage – Architectural, Interior Design & Services Installation

The important architectural features in DTC were retained and the original design maintained. The main foyer area, the granite flooring, facades and slab soffits, the services and mezzanine level, spiral staircases and concrete handrails were retained (See Figure 12 and Figure 13).



Figure 12: Replacing the broken granite floors.



Figure 13: Refining the existing concrete handrails.

The Interior Design Work was based on the new requirements for new services systems and facilities in order to ensure that

DTC can cater for all functions required to be held in the building such as convocation ceremony, musical and stage performances, conferences and seminars, as well as examinations hall. The design input from all consultants involved ensured that the new standard established for the hall could be satisfied. This included the reconstruction of a bigger stage area with additional features such as extended and movable stage, new durable timber flooring system, timber windows with double glazing system, new design for toilets facilities, relocating the audio-visual room, and better facilities added to the hall such as the ramp, new changing areas, new electrical and mechanical system, built-in-fittings and furniture (see figure 14).



Figure 14: View of the new stage

For the foyer area, the main features were retained with minor intervention of the areas. Improving and repairing works were done including replacing damaged timber framed and broken glass windows and doors, new M&E system with fire protection facilities (sprinklers), repairing the concrete wall finishes and adding new features for exhibition proposes. At the exterior part of the building, upgrading the facilities for disabled and pavements layouts and a new landscaping was designed to complement the building (See Figure 15).



Figure 15: Additional accessible ramp for the disabled.

3. ISSUE AND PROBLEMS

Conservation project is still a new phenomenon in the local architectural scene. This project was successfully done as it achieved the client's aim to hold the important ceremony of the 2002 convocation ceremony on time. The approach on the building reconstruction considerations objective was different from normal construction since it involved existing/old building. The project also had a very tight time constraint. Some equipments and materials were unable to be delivered on time. Certain elements had to be replaced with products or materials that were available at the time required to replace the actual specifications.



Figure 16: Assessment of ramp design during construction.

With close monitoring and constant guidance from all the project consultants, the project contractors and workers developed a very good understanding of the work involved and improved the construction methods and procedures (See Figure 16). The project was also required efficient site management and close supervision during the entire work. The success of the project was largely attributed to close supervision and high spirit of teamwork among the consultants, contractors, University of Malaya top management and the internal development and maintenance department (see figure 17 & figure 18).



Figure 17: Consultants' site visit



Figure 18: The top management's site visit

Conducting weekly technical meetings and biweekly consultants and contractors meetings on-site throughout the project were very important in order to keep track of the work schedules and to solve technical problems on site. Record and documentation approach was implemented in this project to monitor the work in progress. Documentation was properly done before, during and after it was completed in order to record the entire construction process for future references.

4. CONCLUSION

The conservation and rehabilitation work of the Dewan Tunku Canselor has posed a great challenge to many, particular to those directly involved in the conservation of University of Malaya alma-meter. It has exemplified positive efforts by the top management of University of Malaya in conserving a notable and heritage buildings for future posterity and historical development. The successful rehabilitation of the Dewan Tunku Canselor project has breathed new life and hope for future buildings such as this to retain their authenticity. A proposal to have a gallery and exhibition areas in the building to encourage more educational and research activities, and to hold further functions is being actively pursued. It is envisaged that the rehabilitation of DTC would rally more interest and support for conservation within University of Malaya and the nation.



Figure 19: The perspective view of DTC

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