

The Gandhi Bhawan, Panjab University

**Conservation Management Plan
General Summary**



I. Introduction / 基本介紹



Pierre Jeanneret and Le Corbusier (sitting)

Basic Information / 基本資訊

Location

Chandigarh, India / 印度昌迪加爾

Architects

Pierre Jeanneret / 皮埃爾·讓納雷

Bhanu Pratap Mathur (Local Architect)

Years

1960-1962

Program

A center dedicated to the study of the words and works of Mohandas K. Gandhi. 宣揚甘地的哲學與文化價值的校園中心

Others

Panjab University was awarded by The Getty Foundation to prepare the CMP for the Gandhi Bhawan in 2015.

旁遮普大學於2015年獲蓋提基金會的贊助作為 Gandhi Bhawan 的修復資金

CMP Goal and Following Stages / CMP的長遠及階段性目標

1. Documentation, research and establishing significance of Gandhi Bhawan.
2. Assessment of physical condition, use, services, management and testing of materials.
3. Developing conservation actions and strategies.
4. Detailing of individual proposals, secondary plans for the building, site and expanding on the implementation strategy.
5. Training and capacity building of staff.
6. Submission of plan after consultation with stakeholders and experts on Modern Architecture in India and technical experts on conservation of concrete.

1. 紀錄、研究，並訂定 Gandhi Bhawan 的文化價值條例
2. 評估既有現況、使用情形，並進行修復材料的試驗
3. 改善現有的保存修復策略
4. 建立細部計畫、次要計畫，以及建築和景觀的延伸與執行計畫
5. 招募及訓練建築管理員和員工
6. 與 Gandhi Bhawan 的管理方、印度建築/技術專業者協商，並訂定對混凝土的保存計畫

Historical Significance / 歷史性文化價值

- Nehru's invitation to Le Corbusier to build Chandigarh, which was the capital of State. Le Corbusier and his 3-member team, Pierre Jeanneret, Bhanu Pratap Mathur, with their work. **Gandhi Bhawan were executed with pre-fabrication and low-cost technologies with his experiment on materials but responding well to the local climatic and material context.**

- The Chandigarh team was not only instrumental in changing the general attitude and approach of Indian architects but can be also credited for transforming the unorganized profession of architecture in India into a professional framework.

- Gandhi Bhawan built by Pierre Jeanneret and Bhanu Pratap Mathur reflects the era of new Asiannation-states came into being with their own ranks of native "educated" architect.

- Chandigarh 是由印度第一任總理 Nehru 邀請 Le Corbusier 設計的聯邦首都。這座城市是由 Le Corbusier 和他的三名團隊成員：Pierre Jeanneret、Bhanu Pratap Mathur 所設計。**Gandhi Bhawan 使用預製和低成本技術進行施工，並進行了對材料的實驗，充分考慮當地的氣候和材料環境。**

- Chandigarh 規劃團隊不僅改變了印度建築師對建築的態度和方法方法，並且將印度的施工架構由一種無組織的狀態轉變為一個專業體系。

- Gandhi Bhawan 由 Pierre Jeanneret 和 Bhanu Pratap Mathur 設計建造，反映了新亞洲國家的時代，讓這些國家以這樣的交流方式培育了當地的建築師。



An archive image of Gandhi Bhawan within the University campus

II. Context and Content / 歷史背景與脈絡

About Chandigarh, India / 關於昌迪加爾

Historical significance / 文化價值

- **Partition** force the Panjab University moved from Lahore to Chandigarh establish by the East Punjab Government, which was the **earliest of such newly developed campuses** in independent India.
- Albert Mayer developed a superblock-based city interspersed with green spaces, emphasis neighborhood, Punjab University as a university town.

- **印巴分治**迫使在Panjab地區的旁遮普大學由Lahore搬遷至 Chandigarh，由當年東旁遮普政府成立。旁遮普大學成爲在獨立運動後的印度中，最早創立的新興校園之一。
- Albert Mayer 設計了以超大街廓爲城市的基礎、穿插著綠色空間並強調社區性的城市，將旁遮普大學城打造成一個大學城。

About Panjab University / 關於旁遮普大學

Location principle of Campus / 大學選址標準

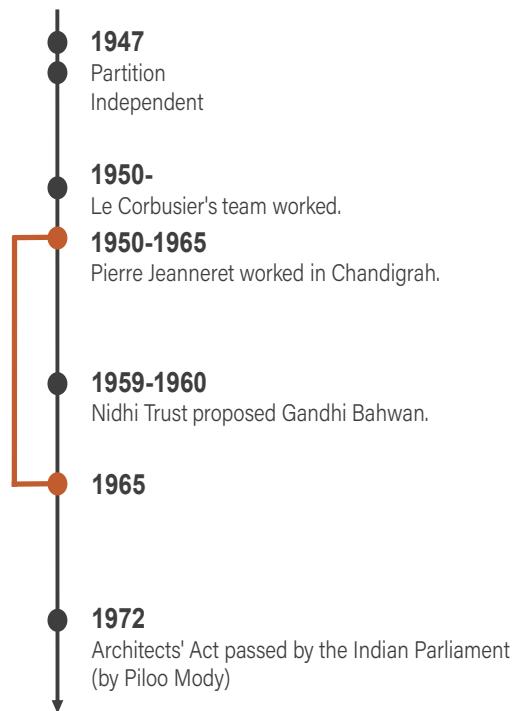
Campus is located at Sector 14 as a academic zone. Dormitory is located at Sector 25 as a university town. Gandhi Bhawan as a "Culture core" of the university intended to be one of the major activity zones and central axes of the University's Master Plan.

校園位於第14區作爲學術區域，宿舍位於第25區，屬於大學城的一部分。Gandhi Bhawan 作爲大學的「文化中心」，旨在成爲大學總體規劃的主要活動區域和中心軸線之一。

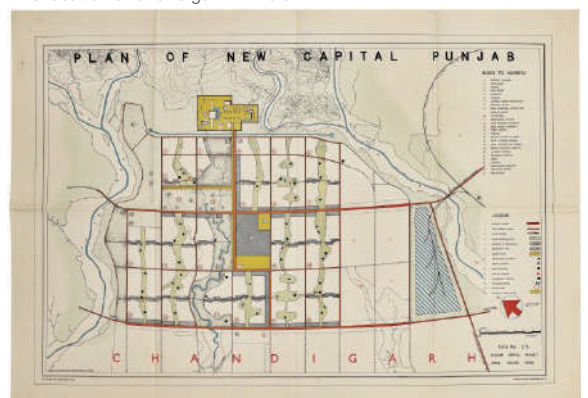
- University campus should not be far from the capital for better interaction with the state administration.
- Hoped to build a unique campus of its own in harmon with the natural site of 145 hectares was thus acquired in sector, west of Chandigarh.
- The university should have a campus of its own as this would not only facilitate the student population to interact easily amongst themselves, but also provide a healthier environment to work and thus increase both physical and mental efficiency.
- 大學校園不能遠離市中心，以便增加學生與行政機關的互動性。
- 希望在西側的 Chandigarh 購入的145公頃土地上，建立一個與自然和諧共存的獨特校園。
- 大學應該擁有自己的校園，這不僅有助於學生之間更容易互動，還提供了一個更健康的工作環境，和提高身心的狀態。

About Gandhi Bhawan / 關於甘地巴萬

- Gandhi Bhawan is a center aim to promote Gandhi's philosophy and spirit proposed by **Gandhi Smarak Nidhi**.
- **The skateholder** of the cost shared by 'Gandhi Smarak Nidhi' 'University Grants Commission' and 'Panjab Government' each Rs.100,000.
- Gandhi Bhawan是由Gandhi Smarak Nidhi基金會發起，旨在宣揚甘地的哲學價值
- 共同持有人會是由基金會，旁遮普大學委員會，以及東旁遮普政府各支付盧幣100,000



The location of Chandigarh in India.



The master plan of Chandigarh by Le Corbusier.

III. Building Complex / 理解與建立策略

About Structure and Exterior / 結構與外部

Gandhi Bhawan is an important example of modern architecture in India that simultaneously illustrates formal, materials, technology in Modernism to reflect post-independence ideals of nation building.

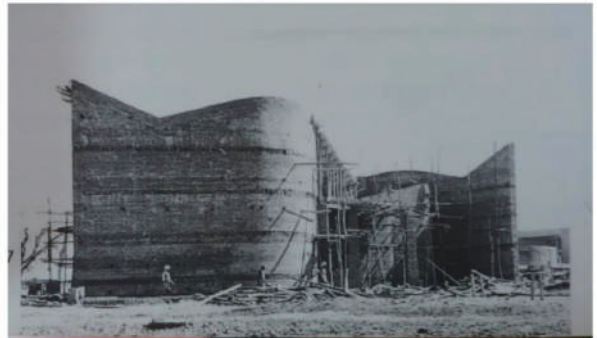
Gandhi Bhawan 是印度現代建築的一個重要例子，同時展示了現代主義中的形式、材料、技術，反映獨立後國家建設的理念。



the culture core in Panjab university

Features of the Wall / 牆體保存重點

- Extensively use with local materials: Ghagger sand, brick.
- Formwork were using bamboo scaffolding and timber.
- 600 mm thick wall are composed of brick infill within an RCC frame columns at 2.8 meters center to center distance and horizontal ring beams at approximately 1.8 meters.
- 廣泛使用當地材料：Ghagger 沙子、磚塊。
- 模板使用了竹腳手架和木材。
- 600毫米厚的牆由磚填充物組成，內有RCC框架柱，柱間距為2.8米，水平環樑約為1.8米。



An archive image of Gandhi Bhawan under construction

Features of the Roof / 屋頂保存重點

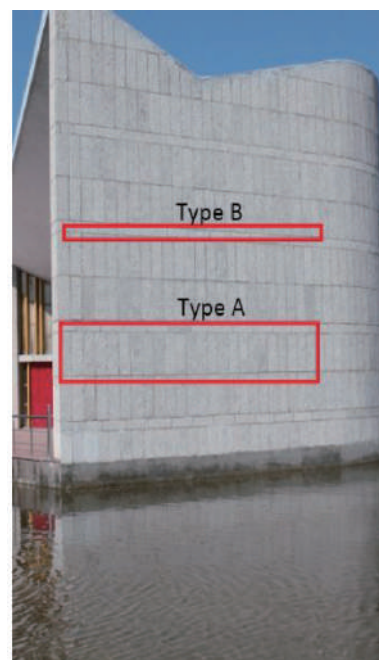
- Sandwich slab system in RCC: With brick-on-edge used within the gaps.
- The roof of the building is composed of a network of RCC beams placed in a grid, forming the unique structural system in roof with air cavities.
- RCC的夾層板系統：在間隙中使用磚塊。
- 建築物的屋頂由一個RCC樑網絡組成，排列成網格，形成帶有氣腔的獨特屋頂結構系統。



the repaired exterior roof of the Gandhi Bhawan

Features of the Envelope / 外牆保存重點

- Prefabrication: grit-finished concrete panels (dual-sides)
- Exterior: white marble and river stone chips set in white cement.
- 2 types cladding : 300 X 900, 40mm thick (type A)
600 X 230, 90 100mm thick (type B)
Walls are conducted in vertically 2 type A+ 1 type B
- 預製：磨砂混凝土板（雙面）。
- 外部：白色大理石和河石屑嵌在白色水泥中。
- 2種外裝飾：300 x 900，厚度40mm (A型)
600 x 230，厚度90-100mm (B型)
牆壁由垂直放置的2個A型和1個B型組成。



the exterior panel of Gandhi Bhawan

Policies / 保存政策

- The exterior wall panels should be retained in the original material that Mock-ups for the precast panels and precise approaches for fix in.
- 應保留外牆面板的原始材料，並對預製面板進行模型測試，以及確切的安裝方法。
- The outside area red sandstone flooring isn't authentic that for any future repairs of this flooring, only hand cut sandstone matching the original size and colour should be used.
- 外部區域的紅砂岩地板不是正宗的，因此對於將來對這種地板的任何修復，應僅使用手工切割的砂岩，以匹配原始的尺寸和顏色。



External panel mock-up

- The roof of Gandhi Bhawan has the intervention of water-proofing with the change of material and colour of roof as a "acceptable change" since its low authenticity it could be re-surfaced when required.

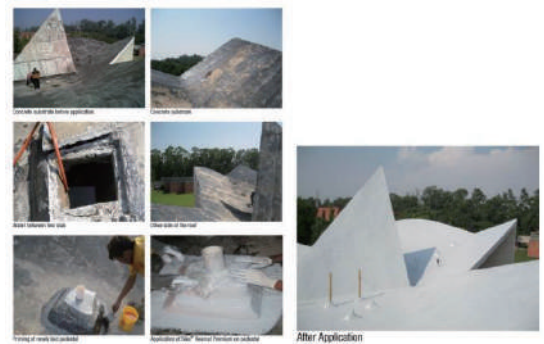
- 甘地宮的屋頂經過防水處理，屋頂材料和顏色的變更被視為“可接受的變更”，因為其低真實性，可以在需要時進行重新表面處理。



the red sand stone pavement

- Doors and Windows of Gandhi Bhawan are retained as original and should be cleaned and monitored for any damages in future.

- 甘地宮的門窗被保留為原樣，應該進行清潔，並定期檢查是否有損壞。



roof repairing



the damaged window with seepage

CMP Implement / CMP執行要點

- Condition assessment with vsual inspection classified distresses to conduced a exterior and interior glossary
- 以目視視察受損的情形並加以評估，分類，並加以整理成資料庫

- Condition assessment with Infrared (IR) scanning and presiced the distresses location

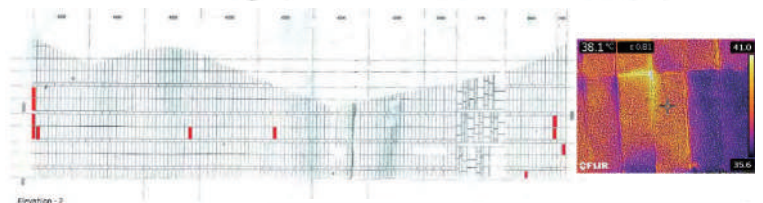
- 透過紅外線掃描確認破損類型位置並在立面上定位與編號



OPEN JOINT

PREVIOUS REPAIR

EXPOSED REBAR



Elevation - 2

- Levels of intervention and priorities for intervention have been identified based on a five-level framework for future restoration
- 將受損部位的嚴重程度分類出整修的先後順序並加以控管安排未來整修計畫



3D model of analysis external panel on Gandhi Bhawan

About Landscape / 景觀

The large reflecting pool surrounding the Gandhi Bhawan shows the perspective of Landscape Design during the Modern Movement in India. The design of the pool also symbolically supports the metaphor of Gandhi Bhawan as a lotus.

環繞 Gandhi Bhawan 的大型倒影池展現了印度現代運動中的景觀設計視角。這個池的設計也象徵性地支持了 Gandhi Bhawan 作為蓮花的隱喻。



An archive image of Gandhi Bhawan within the University campus

Features of the landscape / 景觀保存重點

"To the northeast of the library stands a small building in a pool of water. Rounded forms and a lotus flower-shaped roof distinguish the Gandhi Bhawan from the surrounding building... the building has been placed in the pool of limpid water to create a quiet and meditative atmosphere."

“在圖書館的東北方，矗立著一座小樓，周圍是一個水池。圓形的形狀和蓮花狀的屋頂使甘地宮在周圍建築中獨具特色... 將建築物置於清澈水池中，創造了寧靜且沉思的氛圍。”

- The pool layout delineates both the physical and visual extents shallow pool offers the Gandhi Bhawan a reflective counterpoint.
- The pool was originally intended to be much deeper, six feet (1.8 meters) instead of current two feet. (0.6 meters)
- The exterior material use (white marble & stands strong contrast to other building in "culture core" which are in red sandstone facade.
- 水池的佈局勾勒出物理和視覺範疇，淺水池為甘地宮提供了一個具有反射對比的元素。
- 最初池子的設計意圖是更深，為六英尺(1.8米)，而不是目前的兩英尺(0.6米)。
- Roystonea Regia的種植形成了一個視覺走廊。
- 外部的材料選用(白色大理石)與“文化核心”中其他建築的紅色砂岩立面形成鮮明的對比。



The pool around the Gandhi Bhawan

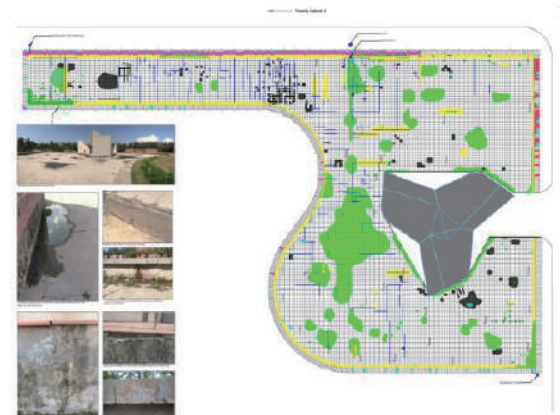


The culture core in Panjab University

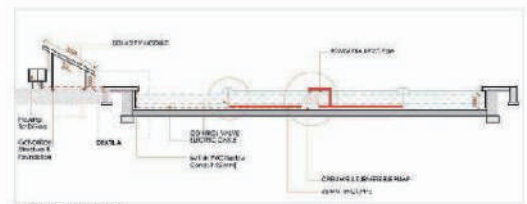
Policies / 保存政策

- The Gandhi Bhawan pool is integral to the building. The two elements, the building and the pool, have a strong thematic and geometric interrelationship which will be retained while keeping in line with the environmental sustainability.
- There should be no intervention that visually obstructs or diminishes the setting of Gandhi Bhawan and the pool such as railing or other utility fixture, the plantation with palms create clear visibility.
- Appropriate repair works for the physically deteriorated masonry and concrete pavements along the pool periphery should be undertaken, with transparent waterproofing layer on pool surface to retain the material texture.
- Water should be regularly maintained in the pool to ensure the continued reflection of Gandhi Bhawan the analysis of the volume of pool vs annual rainwater harvest from the roof top to find the efficiency of water use.
- External service is required to serving the pool and be maintained by guarding.
- Grassing of areas with exposed raw earth in the surrounding should be retained.

- Gandhi Bhawan 的水池是建築物的一部分。建築和水池這兩個元素之間存在著強烈的主題和幾何關係，這將在保持環境可持續性的同時得以保留。
- 不應進行任何視覺上阻礙或減弱甘地宮和水池環境的介入，如欄杆或其他實用設施，種植的棕櫚樹創造出清晰的可見性。
- 應對水池周邊的物理損壞磚石和混凝土路面進行適當的修復工作，並在水池表面加上透明的防水層以保留材料的質感。
- 應該定期保持水池中的水，以確保持續反映甘地宮。對於水池體積與屋頂年雨水收集的分析應進行，以找出水的使用效率。
- 需要外部服務來維護和保安水池。
- 應保留將周圍裸露的原始土地草坪化的區域。



Water seepage identify and location



Water pumping supply

CMP Implement / CMP執行要點

- **Assessment of the pool**
 1. Pool base structure deterioration.
 2. Pool size rationality analysis. (rain water and maintaining quality)
 3. Vegetation assessment prevent risk of soil erosion and air pollution.
- **Repairing the pool**
 1. Monitoring the water level drop for analysis water seepage.
 2. Remove plaster by cutting construction joints.
 3. Drilling deep hole to insert nipples.
 4. Manual pump imply pressure grouting.
- **對於水池的基本評估**
 1. 水池基礎損壞程度
 2. 水池尺寸與自然供水的合理性分析
 3. 周邊植被分析避免土石崩塌與空氣汙染
- **修復水池**
 1. 觀察水位變化並分析滲水程度
 2. 切除泥作還原疊砌的接縫
 3. 鑽孔在接縫處並置入導管接頭
 4. 手動灌入加壓水泥填塞



The repair process for the pool

About Interiors and Furniture / 室內空間及家具

The interior design of the Gandhi Bhawan lives up the Modernist tradition that introduced in Chandigarh by Le Corbusier.

The furniture in Gandhi Bhawan follows the same principles as observed in Jeanneret's design of furniture across the Panjab University. The simple vocabulary established the foundation for a more comprehensive approach to the furniture in later public buildings across Chandigarh.

Gandhi Bhawan 的室內設計秉承了 Le Corbusier 在 Chandigarh 引入的現代主義傳統。

Gandhi Bhawan 的家具遵循了 Jeanneret 在旁遮普大學各處設計的家具中觀察到的相同原則。這種簡潔的風格為後來 Chandigarh 各處的公共建築中的家具提供了更全面的基礎。

Features of the interiors / 室內保存重點

The interior spaces of the Gandhi Bhawan initially bring visitors upon entering the large foyer, which immediately directs the visitors to the ante-spaces of the three wings: the Committee Room, Lecture Theatre, Auditorium, Library on the left; the Lecture Theatre, Auditorium in the centre; and the Library on the right.

進入甘地宮的大門廳後，首先引導訪客進入室內空間，將其引導至三個翼的前廳空間：左側的委員會室、講堂、禮堂、圖書館；中間的講堂、禮堂；右側的圖書館。

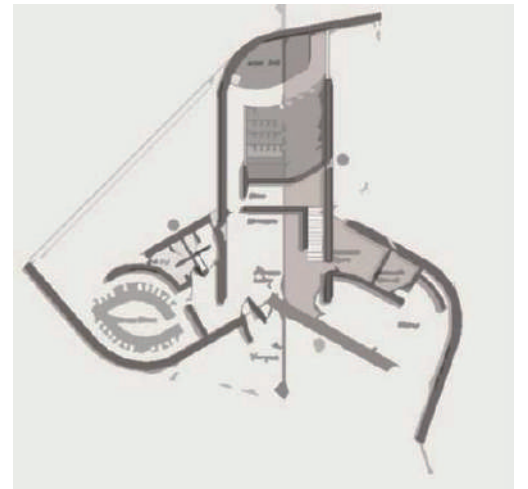
- The window openings are located within concrete fins that have glass fixed between these fins.
- A triangular skylight is also present in the auditorium area.
- The building is covered with white cement terrazzo flooring. Black cement terrazzo is present on floor as well as walls in the auditorium area.
- 窗戶開口位於混凝土翼之間，玻璃被固定在這些翼之間。
- 在禮堂區域還設有一個三角形的天窗。
- 建築物採用白色水磨石地板覆蓋。在禮堂區域，地板和牆壁上都使用了黑色水泥水磨石。

Features of the Furniture / 家具保存重點

- Jeanneret created furniture based on his observation of traditional Indian crafts, made of bamboo, straps, and cord.
- Jeanneret devised a range of cane chairs with a compass base cafeteria table and illuminated library table.
- Jeanneret 根據對傳統印度工藝的觀察，創作了以竹子、帶子和繩子為材料的家具。
- Jeanneret 設計了一系列椅子，底座使用指南針形狀的餐廳桌和照明圖書館桌。



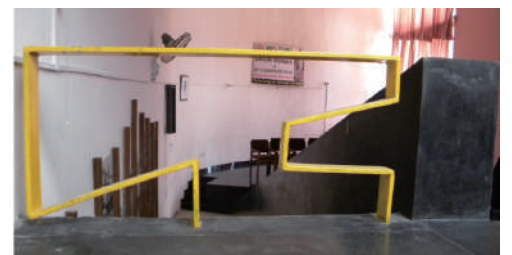
The special interior detail in Gandhi Bhawan



The plan of Gandhi Bhawan



The skylight and seepage condition of the ceiling in auditorium.



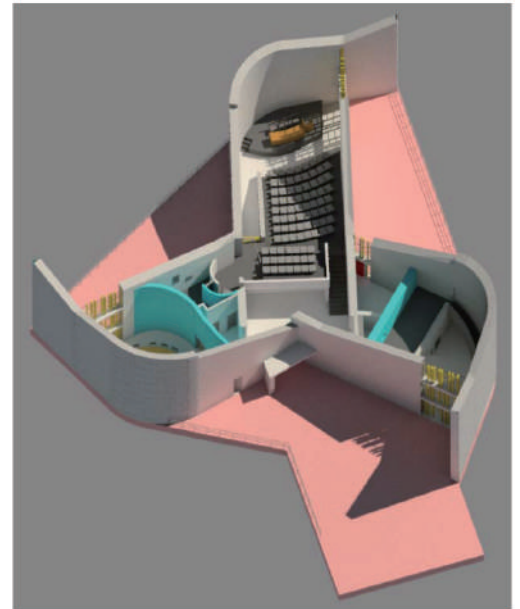
The special detail railing and terrazzo flooring



The furniture in committee room made by Perrie Jeanneret

Policies / 保存政策

- The interior layout of spaces is extremely significant and needs to be retained. Any later changes that have impacted the original design need to be reversed to bring back the design to its original form.
- Reinstated the original colour schemes and fabric schemes of the in-situ furniture as it is an integral part of Gandhi bhawan's architectural design and vocabulary.
- 恢復原始的配色方案和就地家具的織物方案，因為這是 Gandhi Bhawan 建築設計和詞彙的一個不可或缺的部分。
- 空間的內部佈局非常重要，應予以保留。任何後來的變更如果對原始設計造成影響，應當進行逆向調整，將設計還原至其最初的形態。



The 3D interior of Gandhi Bhawan

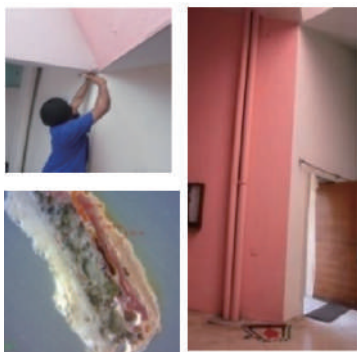
- Require utmost care to protect the existing flooring which is customised terrazzo because it is unique and very difficult to reproduce now. For places where it has been modified, the mock-ups of matching terrazzo should be prepared.
- The movable furniture which has been repaired, re-upholstered extensively and changed physically should be put back in each space as per the original plan.
- 需要極大的注意來保護現有的地板，因為這是定制的水磨石，由於其獨特性，現在很難再次複製。對於已經進行修改的地方，應該準備匹配水磨石的模型。
- 已經經過修復、重新翻新和實質改變的可移動家具應按照原始計劃重新放置在每個空間中。



The terrazzo condition in Gandhi Bhawan



The movable furniture inventory



The paint analysis of skylight and entrance lobby

- The interior wall and ceiling finishes have undergone several changes. However, the paint analysis carried out for interior spaces and archival records/ photographs need to be studied for material specifications and colours to make informed decision on final paint specifications.
- 室內牆壁和天花板的裝飾經歷了多次更改。然而，為了對最終的油漆規格做出明智的決定，應對室內空間進行的油漆分析以及檔案記錄和照片進行研究，以瞭解材料規格和顏色。

About Archive Resource / 建築圖面保存

Original drawings of the Gandhi Bhawan is the communication of the significance of Modernist architecture in India and in Chandigarh.

Gandhi Bhawan 的原始圖面是在印度和 Chandigarh 傳達現代主義建築重要性的物品。

Policies / 保存政策

- The original documents should be safeguarded from future weathering and secured from vandalism and misuse. All archival material, thus, also needs to be stored in appropriate storage situation.
- Research on collections should be encouraged and disseminated. One of the specific objectives of conserving Gandhi Bhawan is to establish benchmarks and systems for the documentation, assessment and conservation of twentieth century architecture in India.
- 原始文件應該被保護免受未來風化之害，防範破壞和濫用。因此，所有檔案資料也需要存放在適當的儲存環境中。
- 應鼓勵並推廣有關收藏的研究。保護甘地大廳的具體目標之一是建立在印度二十世紀建築的文資化系統、評估和保護方面的基準和系統。



Document restoration



Digital microscropy analysis



Example of storage for the collection

About Signage, Services, and Lighting / 標示、服務、照明

Policies / 保存政策

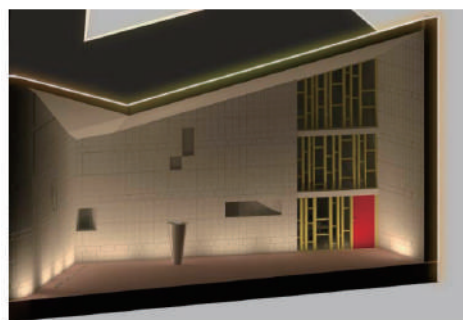
- Proposal the **"Universal Access Plan"** for the Gandhi Bhawan, which supplies the easy way to access to the building and all the murals, paintings and photographs within the building.
- Installing new services and revamping the lighting plan to fit in present need and use, including required lights, CCTV, air-cooling and a coustical treatment. These alterations should follow the recommendations based on the assessment.
- 提出《多元參訪計劃》以供 Gandhi Bhawan 使用，該計劃提供了輕鬆進入建築以及閱覽建築內所有壁畫、繪畫和照片的方式。
- 安裝新的服務設施並修改照明計劃以滿足現有的需求和使用，包括所需的照明、閉路電視、空調和聲學處理。這些更改應該遵循基於評估的建議。



The plan and Standards for Accessible Design



Lighting service with special detail



External lighting option



Ceiling A.C. unit in auditorium

Risk Management / 風險管理及預防

Risk management integrates concerns of disaster risk with identification of both nature and human induced hazards that include slow pace and emergency situations, with the aim of reducing the risks to both life and the identified values of the site.

風險管理整合了災害風險的擔憂，包括自然和人為引起的潛在危害，其中既包括緩慢性及緊急狀況，旨在減少對生命危險和損害建築文化價值的風險。



Risk management workshop staff training

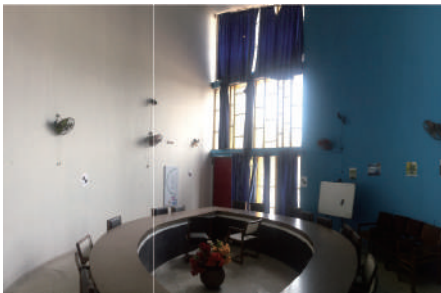
Interpretation and Use Plan / 使用計畫

The building Gandhi Bhawan was designed with the intent to serve as a memorial to Gandhi and interpretation for the visitor to understand the significance of Gandhi Bhawan as an architectural and cultural marvel.

Gandhi Bhawan 作為甘地的紀念館，將制定計畫為訪客提供解釋和引導，以理解 Gandhi Bhawan 作為一個建築的重要性和其文化。



Workshop



The condition of the committee room



The proposal of the committee room



The using of the committee room

Workshop Agenda / 研討會議程

2015/12/04, 05

Modernism in South Asia: Pierre Jeanneret's Gandhi Bhawan

Organizer: Panjab University in association with DRONAH

Intended to engage professionals and academics in a discourse on Modern Architecture in South Asia, with a specific focus on India, introduced the subject to a larger audience and raise awareness about the significance of twentieth century architecture.

“南亞洲的現代主義:皮埃爾·讓納雷的甘地巴萬”

策劃人: 旁遮普大學與 DRONAH

旨在促使專業人士和學者就南亞地區的現代建築進行對話，特別聚焦於印度，向更廣泛的觀眾介紹此主題，並提高對二十世紀建築重要性的認識。

2016/04/28,29

Conservation of Cement concrete and modern heritage in India

Organizer: Panjab University in association with DRONAH and IIT Madras

Targeted the conservation professionals within the country who are currently ill equipped generally to handle conservation of twentieth century structure. The workshop also highlighted issues of maintenance and upkeep to staff and management of not only the University but also other sites contemporary to the Gandhi Bhawan.

“印度現代主義文化資產與混凝土保存”

策劃人: 旁遮普大學 DRONAH 以及 IIT Madras

目的是提供國內建築專業人士所缺乏的對於二十世紀現代主義建築，混凝土保存的研討會，此研討會不只是針對此大學的甘地宮，也提供一個範例給其他擁有甘地宮的大學。