HIGH COURT OF SINDH

RECOMMENDATIONS
FOR
CONSERVATION PROCEDURES
(Final Report)

Anila Naeem,
Assistant Professor, Department of Architecture and Planning,
NED University of Engineering and Technology, Karachi.

September 2003

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

ACKNOWLEDGEMENTS

On behalf of the Department of Architecture and Planning, NED University of Engineering and Technology, Karachi, the author of this report and the project team wishes to thank all persons, who have been instrumental in initiating and allowing the conduct of this study and preparation of this report. The University specially appreciates the interest taken by the Administration Committee of the Honorable High Court of Sindh, specially the Honorable Chief Justice and the Honorable Justice Sarwana for understanding the need for conservation of the High Court building and encouraging a research based approach for this attempted task.

The project team also wishes to thank the Registrar Sindh High Court, Mr Abdul Ghafoor Memom for his support and co-operation.

Special thanks are also due for Mr. Abdul Sabour, Administrative Officer, High Court of Sindh, for his kind co-operation and support at the various stages of documentation and field survey.

In the end the author wishes to thank the Chairman, Department of Architecture and Planning, Prof. Noman Ahmed, for his invaluable guidance and encouragement, and the students of Batch 1999-2000 namely Nida Mehtab, Nadia Alvi, Shaneela Akhtar, Sadaf Yousuf, Lailatul Qadr, Nazia Iftikhar, Bushra Siddiqui and Sabahat Hasan for the keen interest and hard work they have put into the first field studio carried out for data collection of this report during December 2002.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Table of Contents

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

1. Introduction

The High Court of Sindh is one of the most dominant landmarks and an important architectural heritage asset for the city of Karachi. The citizens of Karachi in general and the city administration and users of this building in particular bear on their shoulders the responsibility of maintaining this national heritage, and ensuring its survival into the future. As custodians of this important architectural heritage a conscious effort needs to be made to facilitate the passage of this important monument, on to the future generations, in its full richness and authenticity.

***The Need for Conservation*:** The term conservation implies regular maintenance and upkeep of historic buildings, failing which the buildings deteriorate, and damage beyond repairable limits. The High Court of Sindh has been fairly lucky in this regard as it has been in constant use since the time of its construction. Regular day to day upkeep rituals as well as occasional repair and maintenance procedures have made it possible for this historic monument to survive till the present day, in a relatively good condition. In addition to this the fact remains that the entire building has been constructed in pink Jodhpur stone, which is considered as the best quality building stone in the region.

However, dealing with historic buildings is not as simple as it might seem to be. Their materials of building and techniques of construction are unique to their time and no longer commonly used in present day constructions. Due to this fact, generally labor as well as common professionals are not aware of the qualities and behavior of these materials, thus tend to suggest interventions which in the long run prove to be harmful for the historic materials.

2. Scope and Purpose of Study

The building that presently houses the High Court of Sindh, has been in use as a court building since its inauguration in 1929. During the seventy-four years span of its use the building has undergone various changes and alterations, to accommodate the changing needs and activity developments. In order to keep the building in efficient use its continuous maintenance and regular upkeep processes were also undertaken by the successive management of the building. Since the regular maintenance and upkeep processes for historic buildings are not considered as areas of specialization in our country, several interventions undertaken in good faith turn into a hazard for the historic structure. This study has been undertaken to understand and identify the problems and shortcomings of the conservation process for the High Court of Sindh, with the objective to suggest possible guidelines for the betterment of the historic monument.

Since the study has been conducted under certain constraints and has its own set of limitations, thus its scope of work does not include the working of precise details for

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

the suggested recommendations. However, such an objective could be achieved if a long term, serious research based project is initiated as an outcome of this preliminary study.

Within the framework of the limitations (primarily time and funds) at this particular stage, more focus and concentration has been given to the main (original) block of the High Court complex. Although the entire complex consists of several other blocks also but under the time constraints of this study only the main block, which is also the most important block, has been covered in detail. The rest of the blocks are only dealt with on the site level.

3. Documentation and Data Collection
(Methodology and Constraints)

Prior to formulating conservation policy for any monument, a detailed survey and documentation of the existing status of the building has to be undertaken. The data collected in form of photographs, site observations, notes and sketches, are then sorted, evaluated/ analyzed and finally used for developing recommendations. The various stages included in a conservation project are;

- Documentation (photographic and measured survey)
- Identification of Problems
- Analysis of Problems
- Suggestions for Remedies

Once all the required information is gathered only then a comprehensive conservation plan can be formulated.

Documentation and data collection is the first and most important stage for initiating any conservation project. The purpose of documentation is to know the existing status and conditions of the monument, and be able to understand its problems in terms of materials, structural deformations and instabilities, deterioration and its causes, alterations, etc. The documentation surveys are carried out to know the monument and experience it in its exiting state. Information gathered at this stage needs to be done with precision and should be very authentic, because this is what the entire project is designed and based upon. Errors in this stage lead to problems at the implementation stages. The documentation stage is the most tedious and time taking exercise and requires patience and consistency. Carrying out a measured survey of the building/s at hand is the major component of the documentation stage. A Measured Survey includes precise documentation of building plans, elevations and sections. If such drawings already exist they are only verified on site, but if they are not available then the entire building has to be measured to be able to know its precise areas and sizes. This in itself is an extensive and time-consuming task that can only be accomplished with a properly trained team of professionals.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

In the case of High Court, there were no existing drawings of the building available for use as a base to build upon. Work on building plans and layouts had to be started from a scratch. Thus most of the field work duration (ten days winter vacation) was spent by the students team in making the building plans, thus less concentration could be given on the details and specific problem identification. The drawings prepared from sketches produced during the field survey are not measured drawings, because measuring the building was beyond the scope of this initiative. However, they can be taken as sketch plans drawn on approximate dimensions. Drawings of elevations, sections and details of the building also do not exist in any record at present, thus they need to be measured and drawn in the future if a serious project is to be developed as a follow-up of this initial exercise.

Besides preparation of sketch plans, the building was also documented through photography. The rest of the conclusions have been drawn on basis of visual observations undertaken during the site survey.

4. The Site and its Analysis

The High Court of Sindh is located within the hub of Karachi's city centre, having various offices of the Government of Pakistan within its immediate vicinity. Being an administrative hub the area is heavily populated during the working hours. The location of the court also lies near the major traffic arteries of Karachi, which have dense traffic volumes on them, comprising of both public and private vehicles. The setting of the building on site is such that it is distantly but clearly visible from the two main roads that form the two approaches of the site.

Although located within the active hub of the city, the complex of the Court buildings is detached from the adjoining activities due to the large site, which has its own defined boundaries, with controlled entrance points through only two gates. The front main gate is only for use by the judges and VIPs, whereas, the general public is allowed entry into the site through the back gate, after a security check. However, the security check does not serve as a barrier for anybody wanting to enter the site, mainly because of the nature of the building's function that requires free access to public.

The adjoining and access roads of the site have heavy traffic volumes on them and the pollution created by them, both in terms of noise and exhaust lead fumes, is of extreme levels. But this does not directly effect the building, as the building itself is placed centrally on a plot of 15.2 acres, and the vast expanses of open space around it act as buffers between the building and the traffic outside. The factors diversely effecting the building fabric and its construction materials are more localized and originate from within the premises, thus can be easily controlled with proper and effective planning and regulation of the entire site.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

The site of the High Court spreads over an area of approximately 15.2 acres (664047.4 sq.ft.), demarcated by a low height boundary wall. Within this approximately 25.6% area (170010.9 sq. ft.) is covered or built-area, the remaining area is all open space, primarily used either for vehicular parking or as soft landscaped (green) areas. Only 25% area is actually green, whereas 49.2% of it is all paved and asphalt surface that reflects and generates high degree of solar radiation thus increasing the temperature levels around the building to highly unbearable extent, specially during the summer season.

The High Court Complex consists of five to six separate blocks, out of which the main original building and the two blocks flanking the public entrance gate are the earliest blocks, constructed in stone. The remaining blocks are more recent constructions, including two annexes and two or three small-scale structures for a bank, a clinic, and other ancillary activities of the court. All these structures are separate independent buildings, accessed through the open spaces in between them.

According to the statistical figures provided by the High Court administration, approximately 1200-1500 vehicles enter the grounds of the high court daily. Out of these approximately 500 are parked at one time.

The High Court of Sindh caters to approximately 350 persons daily. Out of this a large number is of are regular visitors (Lawyers and their office staff) and more than 300 persons are the permanent staff employed by the court administration. During the morning hours the court premises bustles with activity, whereas the afternoons are more peaceful as public activity in the form of court hearings are carried out only during the earlier half of the day (between 8:30 am till 2:00 pm).

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

5. High Court Building Main Block

5.1 A Brief History and Background

The present building of the High Court of Sindh was originally constructed as the Judicial Commissioner's Court, and later on got raised to the status of the High Court of Sindh.

> *"In deference to the clamor for the creation of another province, that would finally separate Sindh from Bombay and permit Karachi to gain due prominence, the Judicial Commissioner's Court was designed for the city in 1923. This was the first building of importance built in the 200-acre Artillery Maiden Quarter, after the removal of the arsenal, the Horse Keeper's Line and the gun sheds etc. Placed at the axis of a new road known as King's Way (now Shahrah Kamal Ataturk), the design was prepared in the office of the Consulting Architect to the Government of Bombay, and the construction carried out by the Karachi Building*

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Division of the Public Works Department. Work on the building was commenced in September 1923 but a paucity of funds may have been the reason why it took six years to complete, finally being declared open on November 22, 1929, by Frederick Hugh Sykes, Governor of Bombay. The original sanction was for Rs. 3,975,248, but, the final cost, in spite of the delayed construction schedule, was only Rs. 3,055,000.

The design was a joint effort by Woods Hill, A.J.A. Illingworth and George Wittet, who died in 1926 while the building was still under construction. The Judicial Commissioner's Court is not quite a Wittet design, but then his Karachi Port Trust Offices building is also very different from his Anglo-Mughal ventures. In the case of the Court, however, it is possible that Wittet is mentioned as one of the architects only because of his position as Consulting Architect.

When completed, the Judicial Commissioner's Court was considered the most imposing building of Karachi, and it possesses an extremely impressive presence even today. However, the "diverse external influences," and the combined attempts of several architects, are reflected in the use of certain disparate elements. While part of the façade is simply treated, as in Wittet's Port Trust Offices building, elsewhere neoclassical features are liberally applied. Thus, a high podium and Classical portico with Ionic columns and triangular pediment are combined with simple fenestration. The Court is one of the earliest buildings of Karachi in which Jodhpur stone is used liberally to very good effect. Jodhpur stone was used by Swinton Jacob when he built his Anglo-Mughal buildings in Jaipur, and the stone's pink hue caught the fancy of many architects including George Wittet." Y. Lari, "Karachi: The Dual City During the Raj".

5.2 Type of Activities

The activities taking place inside the main block of the High Court buildings complex can broadly be categorized as follows;

- Offices / Chambers for judges and lawyers
- Administrative Staff Offices
- Facilities for Lawyers (Bar Room, Libraries, etc.)
- Services Spaces (Toilets, Storage, Pantries, etc.)
- Public Access Areas (Court Rooms)

The circulation corridors of the building are very clearly divided into two categories. The corridors and staircases on the front (main entrance) side of the building are reserved only for judges, whereas the corridors and staircases on the inner courtyard side of the building are for public access. Thus most of the courtrooms as well as the administrative staff offices lie along these inner corridors and are accessible only from this side. (Refer to Drawings 1, 2 and 3).

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Drawing 1: Ground Floor: Space Usage

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Drawing 2: First Floor: Space Usage

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Drawing 3: Second Floor: Space Usage

5.3 Alterations and Changes

Alterations and changes are a part of any monument or historic building that has survived to present day under certain usage. These should be considered as part of the historic development of the building and should not be disregarded under any conservation policy. The High Court of Sindh is also an example where a lot of changes in the original layout were done over the years, basically to accommodate the growing needs and changing technologies. Since all these changes were undertaken to make the functioning of the premises of the building more efficient and comfortable, there is no reason to propose any kind of reversal. All these alterations and changes should be given importance, but on the other hand they need to be examined for any diverse effects to the building fabric. If such cases are identified their possible rectification should be proposed under a well formulated program.

6. Identification of Problems and their Suggested Remedies

Any site that comprises of more than one building, that is a group or complex of independent structures, with open spaces in between has to be dealt with at three different levels. The first is being macro level where the entire site and its outdoor spaces should be taken into consideration. Then comes the building level, where each building on the complex needs to be looked into at two different levels, exterior and then interior. Exterior links with outside and interiors deal with factors within.

In the case of this study, the entire site has been taken into consideration, but among the buildings, only the main block has been dealt with. Remaining blocks were not covered due to lack of time and limited scope defined in the objectives at the beginning of the study.

6.1 Site Level

The site of the High Court of Sindh is spread over approximately15.2 acres of land, out of which 25.6% area is built-up, whereas the remaining area is either used as parking lot or for landscaped green spaces (lawns). Since the building houses an important civic amenity it is visited by hundreds of visitors and users daily. The function of the building also requires a high degree of security check, especially during the morning hours. At present all these activities are taking place within the site but they are chaotic and unplanned. The daily users (lawyers and staff of the High Court) as well as general visitors they all go through a similar security check and cars of all these are allowed to enter well into the High Court grounds. It is also speculated that the public cars coming to places in adjoining areas and having difficulty in getting parking, also come and park within this premises.

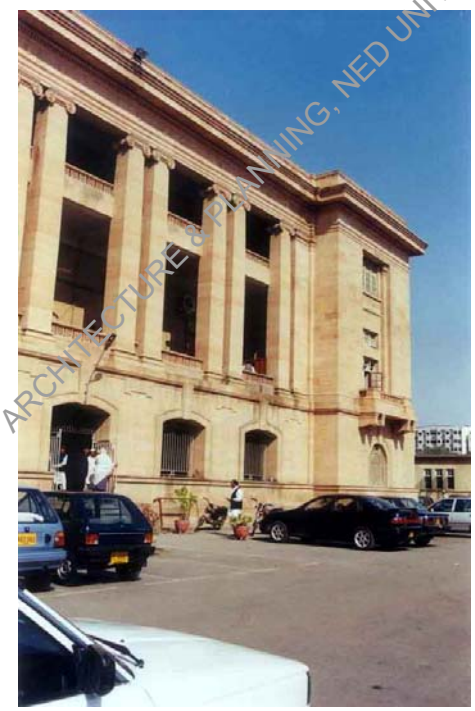
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Being a civic amenity in an urban centre it is important that the entire site of the High Court is developed in a proper manner to accommodate the requirements of its use as well as to facilitate the hundreds of users that visit the building daily. At present the site lacks any zoning or planning for the efficient use of the plentiful open spaces, to the extent that they have been reduced to merely being a huge incoherent parking lot.

6.1.1 Screen and Bifurcate the Vehicles Entering the Site

The vehicles entering the High Court premises are at present divided into two categories. The VIP and judges' cars that have their own separate entrance, and the general public cars including lawyers and the staff of the High Court. Since the building requires a high degree security around it, it is recommended that the public vehicles entering the site should be further controlled and bifurcated. Vehicles belonging to the general public/ visitors should not be allowed beyond a certain point, preferably closer to the general public entrance gate, whereas only the cars of lawyers and the staff/ officers of the High Court should be allowed to penetrate further into the site. This would ensure a greater level of security as well as reduce the number of vehicles going into closer proximity of the building, thus helping in reducing the negative effects of vehicular pollutants and vibrations on the building.

6.1.2 Design Proper Parking Lots



In the present state all the open spaces around the building, starting right from the building line, are covered with asphalt and used for vehicular traffic as well as for parking purposes. There is no buffer between building and the vehicular traffic flow. Cars basically dominate the environment all around the building, and at rush hours as one enters the site of the High Court all one sees is cars parked everywhere. In order to make the environment of the High Court premises more humane and comfortable it is necessary that the vehicles be tucked away to the peripheral areas of the site, preferably in smaller pockets, obscured from the vision through landscaping. For this purpose properly designed parking lots are a must, that not only give a shaded parking space for the vehicles but also provide for sitting niches for waiting the drivers.

Three levels of parking lots are proposed for consideration. P1 type for the general public located along the main access road on both sides. P2 type for the lawyers and

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Drawing 4: Suggested Zoning and Demarcation for Parking Lots

High Court Staff on the two far sides of the building, and smaller pockets behind the annexes. And P3 type exclusively for the judges. (Refer to Drawing 4 suggesting zoning and demarcation of limits). All these parking lots should ideally be linked to the various activity zones with strong and comfortable pedestrian links

6.1.3 Develop Proper Pedestrian Access and Links

A majority of users coming into the High Court daily are dependent on the public transport system, either buses or taxis and rickshaws. Since the public transport is not allowed to enter inside the grounds of the court these users are dropped off at the nearest bus stops or at the main gate drop-off point, from where they have to walk into the buildings complex. The High Court has large open areas around it, thus these pedestrians have to walk substantial distances to reach their destination points within the complex. In addition to this the inter-linking activities of the various buildings of the complex also generate pedestrian flow from one block to the other.

In the present situation there is completely no concept of properly designed pedestrian paths that segregates vehicular and pedestrian traffic. Pedestrians and vehicles always come into conflict with one another, and vehicles being given superiority due to access everywhere, the pedestrians are intimidated. In addition, the possible (presently non-existing) pathways lack any kind of shade or comfortable pavements, to facilitate a smooth and uninterrupted pedestrian environment.

Developing a strong pedestrian network from public access entry points as well as between the various blocks of the complex should become one of the greatest requirements of any site development undertaken for the High Court Complex. These should be designed with sensitivity towards pedestrians, creating zones where they would be given priority over vehicles. These areas should have properly designed pavements and landscaped to provide semi shade to protect the pedestrians from the excessive heat. Light foliage ornamental trees as well as green shrubs etc. in a combination with clay finish tiles and surface treatments help a great deal in reducing the outdoor heat of any surrounding, by creating a micro climate of their own.

6.1.4 Develop Open Spaces as 'Urban Spaces' Catering to the Comfort of Users

At present the open spaces between buildings in no way contribute towards enhancing the outdoor environment of the complex. Open spaces between buildings that have close inter linking functions play a vital role in giving an integrated feeling to any complex. Specially, in cases where the complex holds a public function, with hundreds of visitors everyday. High Court grounds do not have any shortage of space. They are huge and could absorb the large number of people with ease and comfort. All that needs to be done is to redesign and landscape the open spaces for the comfort of its users and under proper urban design principles. A combination of soft and hard

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

landscaping elements, with appropriately designed benches, waste paper bins, telephone booths, drinking water spouts, etc. could completely transform the presently harsh and un-welcoming environment into a relaxing and comfortable outdoor space.

Landscaping around the building should be done with carefully selected species of plants and trees that help in creating vistas to the monument rather than hiding it with their voluminous growth. More voluminous and shady trees should only be planned on the outer periphery and parking lot areas.

6.2 Building Level

Any restoration project should take into consideration the different stages of development of a building. Such developments are part of the history of a building. But any alterations (specially additions) that destroy the authenticity of the original layout or those which are analyzed as harmful to the fabric of the building, should be reverted.

If the function inside a space requires certain changes, then it should be done with materials that do not damage the building and are easily identified as part of the restoration intervention. Such interventions should be carefully designed and detailed so that they do not deface or destroy the building's exterior appearance. In addition to this such interventions should be easily reversible.

The problems identified on the building of High Court are divided into two groups, the exterior and the interior. Among those listed under exterior only the ones which effect the building in terms of it architectural features and elements and the general aesthetics of appearance are included. The problems related with building stone have been separated under section 7 of this report.

©HERITAGE CELL, DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

6.2.1 Exterior

The exterior of the building is generally well kept and does not have severe alteration or modification problems on it, especially on the front façade. However, the rear facades that actually form the front of building for public access are quite defaced due to certain alterations listed and discussed in detail in the following sections.

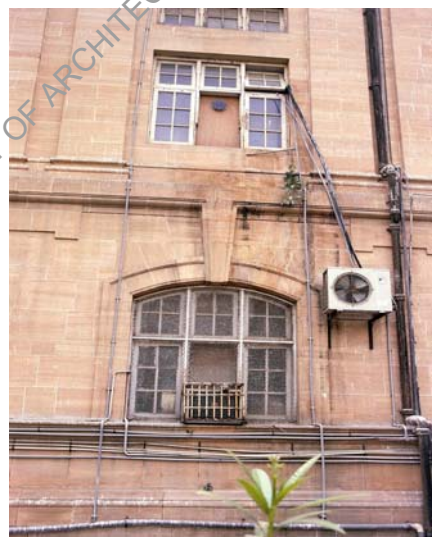
These problems identified on the buildings' exterior facades need to be rectified at the earliest to prevent further deterioration and damage caused by them on the building stone.

6.2.1.1 Defacing of Building Façade

The facades of the two perpendicular wings of the building, facing the central courtyard have been defaced by several alterations. These mainly include alteration of doors and windows and a series of exposed electrical wiring and plumbing lines running along the entire lengths of the façade. At a few places the windows have been blocked with ply sheets or their panes have also been painted to cut off natural light inside the room. All these alterations give an unaesthetic appearance to the external façade.

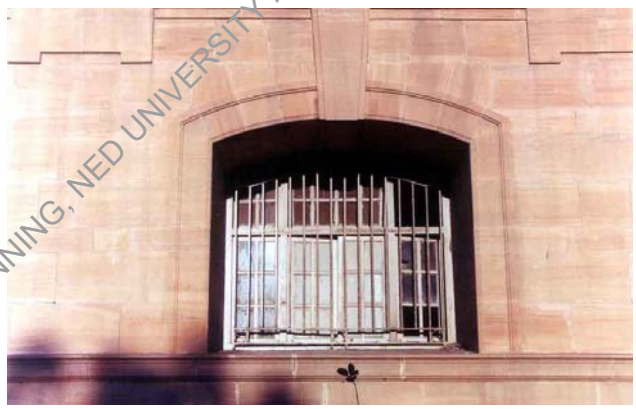
Unsightly and unplanned light lamps have also been installed on various locations, mostly near entrances.

All these defacing interventions should be reverted in order to give back the building its aesthetic and visual appeal. The necessary requirements such as electric fixtures, wiring, etc. should be done with proper planning and detailing through concealing ducts and channels.



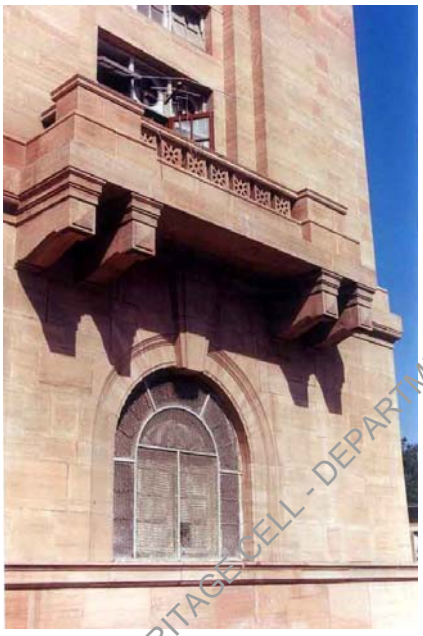
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

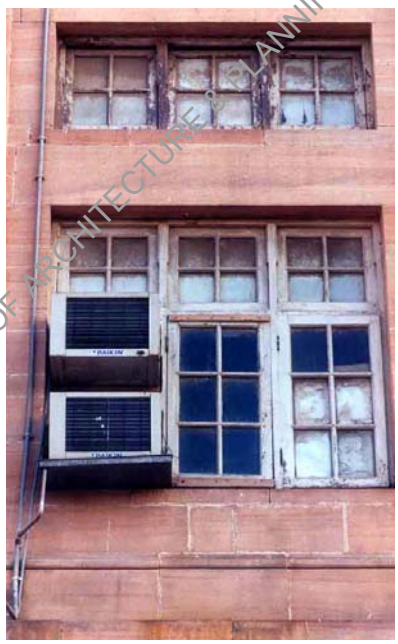
6.2.1.2 Altered Doors and Windows



The existing doors, windows and ventilators of the building are made of timber, with glass panes. Quite a large number of them have been altered in various ways either to accommodate the fixing of AC units or for putting in an exhaust fan or just to cut off the natural daylight from the room. These alterations vary from opening to opening and look untidy and incoherent, giving an overall of ugliness on the otherwise impressive exteriors.

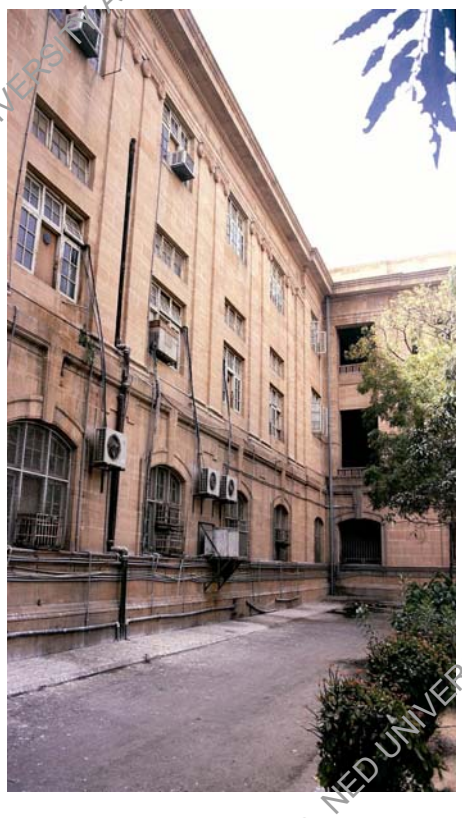
In addition to this, only a few doors and windows have their original polished finish still maintained, rest of them have been painted with several layers of white oil based paint. This accumulated layer of paint should be scraped completely, to the extent that the original color and texture of wood is exposed. This cleaned wood should then be polished with clear lacquer polish, which is then maintained through regular upkeep measures.





©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

6.2.1.3 Haphazardly Placed AC Units



The major problem identified in the building is the haphazard and unplanned air conditioning of the various rooms and areas of the building. Form the pattern of fixtures and installations it is evident that the entire air-conditioning has been accomplished through piecemeal efforts from time to time.

Air-conditioning units all over the building are a major reason for the defacement of the building and the serious cause of deterioration in the building. These units are placed everywhere without any concern to the impact they are having on the exterior as well as the interior of the building. Most of these units arbitrarily jut out from window openings, or are hanged on the buildings' face on iron angles. Even to the extent that the corridors of the building, specially the ones used by the judges and VIPs, have AC units placed along them. These not only exhaust the hot air into the corridors but also cause water puddles due to improper drainage. Event he units placed along the external façade do not have properly installed drainage pipes in them, with the result that water washes over the building surfaces causing micro and macro biological growth. The standing water on all horizontal surface causes seepage and damage to stone masonry as well as structural members.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

The inappropriate approach towards installing air- conditioning system into the building has caused major damages to the building, and these are still at work. It is very important that a proper long-term plan for air conditioning is planned that aims either for central air-conditioning through ducting or a cleverly worked out placement of outdoor units at the roof tops. This would eradicate the root cause of most of the problems identified on the buildings' interior as well as exterior.

6.2.1.4 Repair of Open Masonry Joints

The stone masonry of the building is of a very fine quality with dressed stone finish. The mortar joints in between the stone units are very thin and barely visible. The mortar joints are mostly in condition, completely sealing the joint against water penetration. Only in a few areas where water has penetrated into the masonry, mostly due to some localized reason, the mortar joints have been damaged or loosened. The entire building facades should be inspected closely for any damaged or open mortar joints. Any loose mortar should be brushed off, and the open joints should later be repaired with lime or gypsum mortar.

Please refer to **"Appendix I"** of this report for preparation of lime mortar.

6.2.1.5 Repair of Cornices, Windowsills, etc.

The stone structure has horizontal cornice bands running along the entire length of the building. The soiling patterns under the cornices suggest that the water instead of dripping off the cornice washes over the surface of the walls. Thus the damaged drip course of cornices also needs to be repaired with lime or gypsum mortar.

6.2.1.6 Screeding of Roofs

A brief examination of the ceiling on the second floor indicated water seepage stains at various locations. These point towards the fact that the flat roof of the building has improper surface water drainage. Due to this the rainwater stands on the roof and finally seeps through the slab, damaging the structural reinforcement during the process.

In order to eliminate this problem proper screeding of the roofs needs to be done. For this purpose the entire roof should first be properly checked for the areas where the water stands and does not drain off properly. These areas should then be properly treated with a layer of screeding. While the screeding is being done the gradient for flow of water towards the drainage outlets should be effectively maintained. If desired, treatment for water proofing can also be done so that the water penetration is further eliminated.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Similar water seepage stains are also observed on the first and ground floor ceilings, which at places also show damages in form of cracks and disintegration of clear cover from structural members such as floor slab and beams. These damages are more common along corridors, which indicates that the rainwater, penetrating inside the colonnaded corridors might be standing on the floors and finally seeping through. But in addition to this the cause for water penetration in these two floors could also be the seepage through drainage lines and the puddles of AC drain water especially along corridors. All these factors need to be thoroughly investigated and the source of water penetration should be eradicated before any repair measures are taken on the damaged areas.

6.2.2 Interior

The interior of the building has been surveyed for its various uses and their impact on the physical environment, mostly form the point of view for the convenience and efficient functioning of the building. The sets of problems identified here are generalized and broadly applicable for all interior spaces.

Identification of specific problems has not been possible within the limited scope of this study. In order to understand and evaluate these a detailed study must be undertaken which deals with each specific space according to its use and users.

6.2.2.1 Scattered Service Areas

One major problem in the building is the scattered location of service areas, mainly the toilets. Attached toilets to judges' chambers as well as several other officers of the High Court, added as need occurred, are a major source of water penetration into the building masonry. As these facilities are scattered in small pockets they have not been provided with a service shaft or duct through which their water supply and drainage pipes could pass through. Thus at some places these pipes run along the outer wall, whereas at other places they are embedded inside the floor, or are concealed with an exposed duct. The plumbing in most of the cases is faulty and leaking pipes have become a source of water penetration onto the stone masonry.

The service areas need to be reorganized carefully such that they clutter together thus could be accommodated with sharing service ducts. In addition to this the toilet/ wet spaces should come above each other in consecutive floors so that a duct can be punched through the slabs allowing a clear vertical shaft for all plumbing to pass through.
Besides toilets provision of water coolers and other service areas like pantries, etc. are also a cause of localized problems identified at various locations of the building. All

©HERITAGE CELL, DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL, DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

these need to be rationalized and placed within the overall scheme in a proper manner under certain zoning for efficient usage.

6.2.2.2 Under-utilization of Space

The main block of High Court covers an approximate area of 88423 sq. ft. and has three floors, of the same floor area. An initial survey of the space usage of the entire building shows that a lot of spaces in the building are either not in active use or underutilized. At some locations large spaces accommodate only one or two users and at other places small spaces are cramped with many people. Furniture inside the spaces is also very haphazardly placed giving an impression of over crowding and shortage of space.

If furniture and space layouts are properly done almost 30% to 40 % occupancy of the each space can be increased without any problem. The rooms have large volumes in terms of height. If need arises the floor area of any room can easily be increased by adding an extra floor deck, thus accommodating more users within the same premises. Proper interior design approach with emphasis on efficient space utilization is needed, through which occupancy of the building can be increased to a great extent. The unused spaces should also be utilized with appropriate functions.

6.2.2.3 Damaged Structural Elements

The building shows some minor damages in structural members at a few locations, where the clear cover has disintegrated and fallen off. This disintegration of clear cover is due to the damages done by water penetration through the roof/ ceiling slab especially along corridors. Once the slab is treated for water proofing, necessary repair of clear cover could be done according to the structural consultants' recommendations.

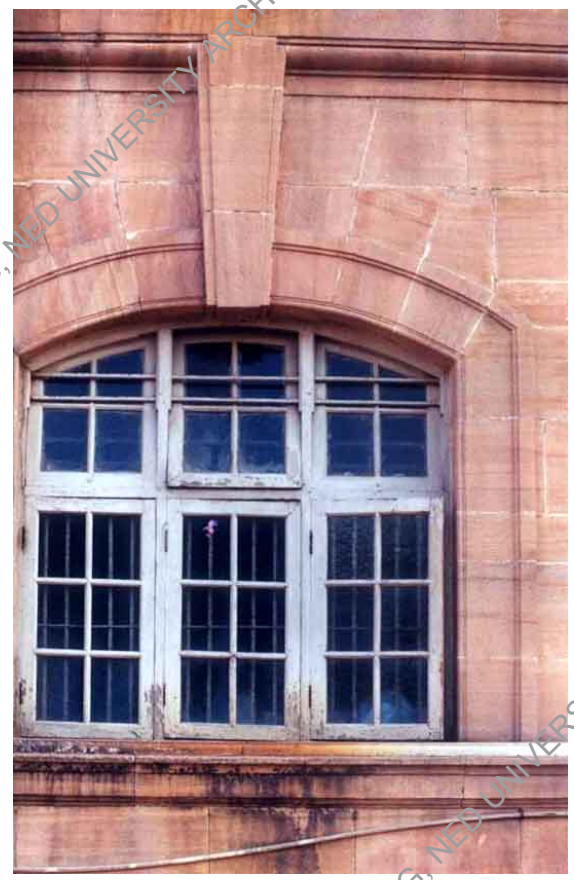
6.2.2.4 Electrical Works

All electrical fittings (fans, lights, etc.) at present have exposed wiring. In order to make these aesthetically a part of the interior scheme, proper measures to make it concealed wiring need to be worked out. For this purpose a comprehensive electrical plan needs to be chalked out that accommodates the present as well future requirements of electrical fittings. These should be worked out on basis of the usage and layout of each space.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

6.3 Problems of Building Stone



The High Court building is ideally located within a huge site with ample open spaces around it, thus heavy vehicular traffic, especially busses and other public transport does not have any direct adverse effects on it. Hence the stone of the building is better preserved than many other stone buildings of the city. However, the stone façades need to be cleaned as they show soiling due to dirt accumulation and bird droppings, especially on horizontal surfaces such as cornices, windowsills, etc.

Besides general soiling due to consolidation of atmospheric dust, various locations of the building façade also show another form of stone deterioration i.e. the black crust formation. This is a combination of run off bio-film, dried pigeon droppings and dust accumulation, seen on vertical surfaces where rainfall striking on damaged horizontal surfaces, produces a run off film down the wall. When dry this film turns into black crust adhering to the stone. The black crust is most likely to cause excessive weathering of the stone during humid climatic conditions, when water content in air is very high. Black crust is seen on the building façade at places where water washes off the surfaces either from the Ac units, or any other localized source such as water cooler, etc. This black crust is also seen under windowsills and cornices.

In the first stage of cleaning all dry and loose dirt particles will have to be brushed off with nylon brush. After this, general washing of the entire façade will have to be done with mild soap and distilled water. Only after this initial cleaning, the more stubbornly adhering dirt patches, such as black crust formations etc. will be treated. For a detailed, recommended process of stone façade cleaning, please refer to **"Appendix II"** of this report.

6.3.1 Bird Droppings

As the site of the High Court is surrounded by large trees, inhabited with hundreds of birds in them, the problem of bird droppings is very severe in the building. The most

seriously effected façades are the ones around the courtyard, there reason being the close proximity of trees to it. In some locations this problem is so high that the entire façade is completely covered with white stains.

In order to reduce this menace measures need to be devised that discourage the birds from settling on to the ledges and horizontal surfaces of the building. A few commonly used techniques include;

- Stretching a synthetic mesh of unobtrusive color across potential roosting sites such as capital, deep ledges, window openings, etc. But these can have an unaesthetic appearance on the building. Products of various designs are available with a few companies dealing with restoration materials, which can be contacted for providing the supply.

- Strips of gel applied on ledges where birds may roost. This provides an insecure footing, discouraging the birds from settling down. But once the gel dries off it can become a nuisance in itself, because it adhere to the surfaces rigidly and could not be easily taken off.

- Low voltage wires, with small electric charge, can be stretches between insulators along the ledges.

- Other known methods are trapping birds and removing them from site, shooting or scaring them away by producing noise. But these methods seem cruel and could be criticize by the bird lovers.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

6.3.2 Growth of Micro and Macro Plants

Biological growths such as algal slimes and acid secreting lichens cause deterioration of building materials. Lichens also assist the establishment of mosses, small plants and even trees.

Surface soiling by organic growth can be removed simply by dry bristle or soft wire brushing, or jetting with high pressure, low-volume. Water lance. However, rapid re-colonization is most likely if the source of moisture is not eradicated. Use of mild toxic wash can be effective for delaying the reoccurrence.

Macro plants growing in joints or pockets of masonry can be killed by spraying with an appropriate weedkiller. It is important to kill the roots and remove any humus which may encourage future growths, and any pockets should be filled with mortar.

6.3.3 Dirt Accumulation and Soiling on Horizontal Surfaces

Dirt and other atmospheric pollutants suspended in air deposit more on the horizontal surfaces of the buildings, such as the widow sills, cornice bands, etc. These surfaces get soiled more that the vertical surfaces of the buildings, which is apparent by a change in coloring of stone along these horizontal ledges.

After normal homogenous washing of the entire facade with suggested mile treatments, these more soiled areas can be dealt with in more detail by use of chemicals etc.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

6.3.4 Beetle-Nut Spit Stains

Beetle nut spit stains are a common problem and a major nuisance in most of the public buildings in Pakistan. These stains adhere to the buildings surfaces and are very difficult to clean. The main cause for this problem in buildings is the lack of awareness and realization for the importance of historic and cultural property. People in our society lack a sense of ownership towards public buildings, which is basically due to a lack of civic sense in our society. A careless gesture of spitting causes an unsightly appearance of the building. In order to control this problem strict measures should be taken by the administration, by instructing the staff to keep a close vigilance on the users of the building. Any person spotted spitting on the premises should be fined heavily or given equivalent penalty. Most of the culprits might even be within the administrative staff of the building. Strict action should be taken against such staff members.

6.3.5 Moisture Stains

Moisture inside buildings penetrates either from the subsoil or from any other localized source inside the building. The High Court building does not show any signs of rising damp from the ground, but at certain locations moisture stains have been observed on the external masonry surfaces. These are mostly due to localized sources such as around toilets, or in areas where water coolers are placed. In case of toilets the leakage in plumbing is causing the water penetration. Whereas in case of water coolers the casual spilling of left over water in the glass over the balcony or

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

onto the floor is causing this problem. Both these sources of water can easily be controlled through proper detailing.

The third cause for such water stains inside or on external surfaces is the water draining from the air conditioning units. This problem and its remedies have already been discussed in earlier sections of this report.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

7. High Court Building as an Ongoing Research and Academic Exercise for Architecture and Conservation Students

The High Court building is an important monument and a valuable architectural heritage of the city. Due to a lack of any institution or a bureau (either private or in the public sector) specializing in the area of conservation, and actively working for safeguarding the cultural property in Karachi, most of our architectural heritage has suffered to the extent that a lot of it is already lost forever. The seriousness of the issue can be understood from the fact that for a building as important as the High Court of Sindh, not a single documentation drawing existed in any of the government offices responsible for the maintenance. This proves that till now all the work carried out on the building had been planned arbitrarily without any foresight.

The NED University is the first educational institute in Pakistan that has recently started the training of students in the area of architectural conservation. The Department of Architecture and Planning in this regard aims to initiate and get involved in the conservation of important architectural heritage sites of Karachi. This

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

initial study on the High Court was also carried out with the intention that it might develop into a long-term research based conservation project, providing an opportunity for onsite training for its students. A thorough measured survey of the building can also become a part of this long-term plan. The Department of Architecture and the Sindh High Court can collaborate on this project facilitating the realization of each other's objective.

8. Conclusions

Maintenance of historic buildings is not an easy task. In order to take the right decisions it is necessary to have a detailed and thorough knowledge of the building (monument); vis-à-vis its materials of construction, its structural system and behavior, its defects and problems and their causes, etc. Only on basis of all this knowledge can one take proper conservation decisions that would prove to be beneficial for the building, instead of having adverse effects on it.

For historic buildings as important as the High Court of Sindh, a comprehensive conservation plan needs to be chalked out. Such conservation plans should be developed in accordance with the internationally accepted principles and standards of conservation, adopted all over the world.

In short a good conservation policy should ensure that;

- the original layout and overall scheme of the building is not being tempered

- any later additions or phases of development in the life of the monument are respected as part of its history (only those which deface or negate the fabric should be removed)

- all repair and maintenance interventions should have sensitivity and respect towards original materials (use of any incompatible material to be discouraged)

- the monument and its surroundings are treated as a comprehensive part of each other and should be treated to compliment one another

With these basic considerations or international guidelines a long-term comprehensive action plan should be formulated which should have training of people responsible for the maintenance and upkeep of the building as an important part of the scheme. Trained professionals as well as labor should be involved. In order to ensure that the interventions done on the building are not harmful they should always be first presented to a board/ committee of members including technical personnel. Only after an approval from the committee should these interventions be allowed for implementation, and that too under strict supervision and scrutiny.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

General Recommendations: On basis of the observations and identified problems of the Sindh High Court building, a few general guidelines can be formulated at this stage that would facilitate and enable the administration in taking up a certain line of action for the future conservation of the monument. These recommendations are however, only a basic suggestion and need to be worked out in detail before any implementation is started. These are mentioned in order of priority, as follows;

- The first and foremost importance should be given to developing an awareness and training program for the employees of the High Court who are directly responsible for the daily upkeep and maintenance of the building. This program should focus on developing a sense of responsibility among these personnel, making them realize the importance of their job and the role they play as custodians of a heritage monument.

- The High Court at present does not have a complete measured survey of the building and the whole site. It is important that a detailed measured survey of the entire complex is undertaken, which would not only be a resource as archival material but would also help in developing exact working details for any intervention that is carried out on the building in the future. This survey should have all plans, sections and elevations of all the structures on site, and also a complete site plan, including all trees, infrastructure network, etc.

- The most important and destructive implementation that the building has undergone in the past years is the installation of the A/C system. Since this is done in a piecemeal fashion, proper ducting for drainage as well as wiring has not been planned. As a result the entire building is being damaged severely. What needs to be done at this stage is to first identify all the spaces that are air conditioned at present or would be air conditioned in the future, and work out a complete master plan for the whole system. This should include proper locations for the A/C units, their drainage ducts, and wiring conduits. Preferably the system should be worked out either on a central A/C program or using split units. Window type units should be avoided, as they are the major cause for the defacing of the building facades.

- The service spaces inside the building, such as toilets and other wet areas, are also planned without paying any heed to the negative impact they are having on the building. These should also be reviewed with a technical approach and planned properly for functionality and maintenance ease.

- It is very important that any changes or alterations in terms of change in usage of any space, etc. should first be planned on paper with proper working drawings before their implementation on site. These proposals should ideally be reviewed by a combined committee of professionals and High Court administration, which should be able to critically review the project before permitting its implementation.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

- On a macro level a proper site plan should be worked out for the entire site, which should incorporate solutions to problems identified earlier in Section 6.1 of this report.

These are only the major issues that have come out as the main causes for the decay of the High Court Building. Once these are tackled with a larger and broader perspective, i.e. chalking out a principle approach for dealing with them, then only a comprehensive restoration can work successfully on the site. Unless the major causes of the decay are not eradicated, investing on just cosmetic cleaning of the façade will be of no use. Cleaning of the façade should only be taken up after the factors causing decay are resolved. Anything planned for the building should have a long term approach to it; an approach that should be consistently implemented in the future.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

APPENDIX I

LIME MORTAR TREATMENTS

Lime mortar treatments are to be done for damaged or decayed mortar joints, as well as for re-pointing and filling of gaps in masonry. It can also be applied as a protective or sacrificial layer on horizontal surfaces, for prevention against further deterioration. Lime mortar of specified composition should be used for this purpose.

Preparation of lime mortar for repair: The lime mortar to be used for repair works should have higher porosity and water absorption capacity, whereas less density and strength than that of stone. According to a research done on repair plasters of historic buildings in Karachi by Yasmeen Cheema, it was found that these were lime plasters of a high water absorption capacity and porosity, and low density. Their binder-aggregate ratio was also different from the ones normally used. Generally, binder and aggregate ratio in mortar is 1:2 or 1:3. Whereas, laboratory tests of old plaster samples of British period repair lime mortar, show lime (binder) : sand (aggregate) ratio of 3:1. This lime mortar has better cohesive properties, thus recommended for use in all repair works.

The lime mortar prepared for repair of joints, filling of gaps, and protective coating of horizontal surfaces should ideally have a ratio of 1:3 (lime : aggregate) in which two parts of the aggregate should be of crushed stone of the same type as used in the construction of the building. This mortar should have higher porosity and water absorption capacity, whereas less density and strength, than that of stone used in the building.

In order to achieve a better color compatibility of newly applied mortars with the original stone fabric it is necessary that various samples using different proportion of sand and stone crush are prepared and allowed to dry completely. After this the best matching sample should be approved and applied.

In addition to this the mortar samples collected from the site should also be sent for an analysis of their composition and properties and the repair mortar prepared in accordance to the findings.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

APPENDIX II

CLEANING OF STONE FACADE

The stone facades of the buildings show dirt accumulation as well as black crust formations at various locations. To clean the entire facades, chemical cleaning by the following process is recommended.

Proposed method for cleaning of stone:

Step 1:

- Gently brushing off all loose particles; sand, dust, etc. Mapping of loose fragments as well as dislodged pieces of stone should also be done at this stage. The particles or pieces of detached stone that are of substantial size should be examined for strength and if found in good state are recommended to be fixed to their original location by grouting and joining techniques.

Step 2:

- Temporary filling or repairing of the open mortar joints and decayed pointing is to be done before starting wet cleaning.

Step 3:

- Gently spray distilled water on the surface of masonry (starting from upper parts). Scrub with sponge or nylon brushes and rinse off the surfaces with spray of distilled water. Let the masonry dry off. If black patches of dirt or black crust are still observed then clean only these parts with an ammonium bicarbonate poultice, in the following way.

Step 4:

- Cleaning of soiling and black crust with ammonium bicarbonate solution. Before deciding upon the concentration of the solution to be used, treatment test samples should be done. The selected sample treatment areas should be characteristic of the deterioration or soiling found on the building. Sample areas should ideally be as inconspicuous as possible. It is recommended to adopt a sequential approach, starting with the least aggressive methods first and gradually increasing the applications until an acceptable level of cleaning is achieved.

- If the biofilm is wet, it should be allowed to dry first. Dried bio-film will be brushed and the surface applied with the ammonium bicarbonate poultice.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

Preparation and Application of the Poultice:
Prepare 10% solution of Ammonium Bicarbonate in water.
Dissolve the particles thoroughly, and sieve the solution through very fine fabric (e.g nylon stockings).
Add paper pulp to the solution till it gives a thick paste.
Brush off and clean the trial surface area.
Take the pulp in hand and squeeze off extra solution, then throw on the surface and gently spread with fingers.
Leave the poultice on surface, for a while, checking at each 10 to 15 minutes interval.
Take off the poultice at a time when the desired level of cleaning is achieved.
Brush the surface and wash off with water.

It is recommended that the sample cleaning should be started with the least concentration of solution i.e. only 10% with minimum time of application i.e. 15-30 minutes. If the crust does not remove then only the concentration and time is gradually increased. But the concentration of solution should never go beyond 30% as this is the level of saturated solution. In case the higher concentration solutions also do not work then a sample with very small percentage (only 5%) of EDTA (Ethylene-diamine-tetra-acetic acid) can be attempted.

Poultices should be prepared; first those with a solution in water of 10% ammonium bicarbonate then gradually increasing in concentration if the 10% solution does not give effective results. 25% ammonium bicarbonate up to 30% saturated solution of Amonium bicarbonate.

If the poultice is required to be left for a longer time span then it should be covered with a sheet of polythene and left for a few hours. It is then cleaned by a sponge, dipped in distilled water.

If algae persist in certain spots, these can be treated with biocide treatment. This is done with a solution of 10% benzyl chloride or 2% zefiran in water. But this should be done after the necessary repair works.

Step 5:

Repair work, where deemed necessary should be undertaken after cleaning with gel and before biocide treatment. The lime mortar used in all repair works must be prepared according to the specifications given in Appendix II.

- Re-pointing and filling of gaps with permanent lime mortar. The mortar is to be applied with metal spatulas, firmly pushed into the gap and further compacted with a hard sponge. The extra mortar on surface should be cleaned with a wet sponge.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

- If there are any deeper cracks or fissures these should be filled with mortar using hydraulic lime.

- All horizontal surfaces of windowsills and cornices to be sealed, by covering the whole surface with a layer of lime mortar. Once the surfaces are sealed the water will drip over the edges of these surfaces. These areas should be regularly monitored and repaired whenever required.

Step 6:

If salts have penetrated inside the building, they will start to appear on surface in the form of efflorescence once the masonry is dry. These can be cleaned by paper pulp technique. This should be done after the problem of dampness penetration has been dealt with. First the building will be aired and allowed to dry completely. Salt deposits/ salt crusts or efflorescence that appear on surface after drying, can be simply brushed off. The remaining salts can be cleaned with paper pulp technique. In this method, blotting paper sheets or paper pulp wetted with distilled water, are applied on areas that have crystallized salts. The paper is left to absorb all soluble salts, and then taken off.

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018
©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

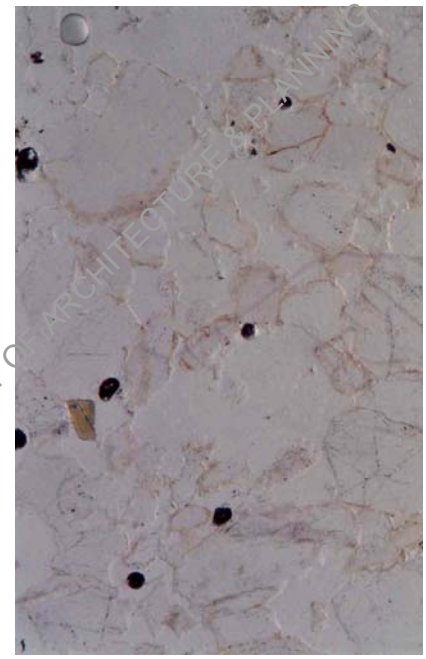
APPENDIX III

THE BUILDING STONE AND ITS PROPERTIES

The High Court Building is constructed with sandstone brought from Jodhpur. Thus it is commonly known as the Jodhpur Stone. The stone has a light pink hue, and it has proved to be of good quality showing high durability against climatic factors and weathering conditions. The problems today seen on the stone surfaces are mostly due to deficiencies in the maintenance of the building.

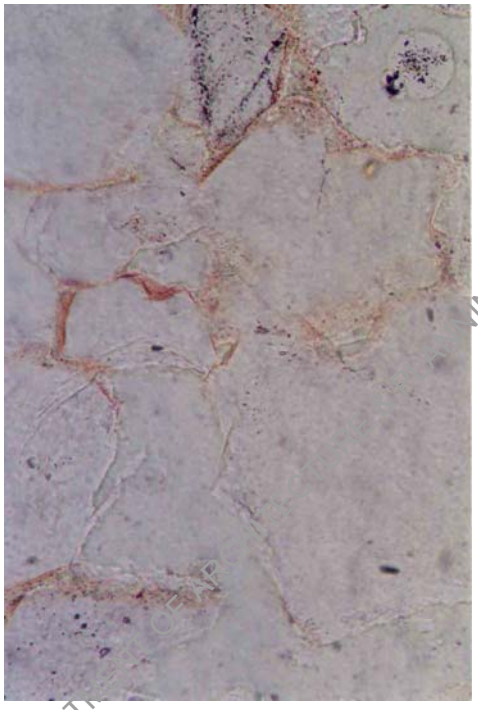
Scientific Analysis of stone samples taken from the building show that it has a 99% of Quartz content, with only 1% of plagioclaise and Hematite. The technical name for the stone is "Quartzarenite". Quartzarenites usually have a predominantly quartz environment, with mineral clusts (isolated crystals) as well as their cementaceous material derived from altered quartzites.

A thin section prepared from the sample of stone taken from the building, and examined under a Plarizing Mcroscope and the Scanning Electron Microscope, reveals a very dense quartz fabric. Thus the stone shows very low porosity. The greenish crystal seen in the image is a chloride crystal (twined plagioclaise) in a quartz fabric.



Thin Sections @ N+66X Magnification

©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018

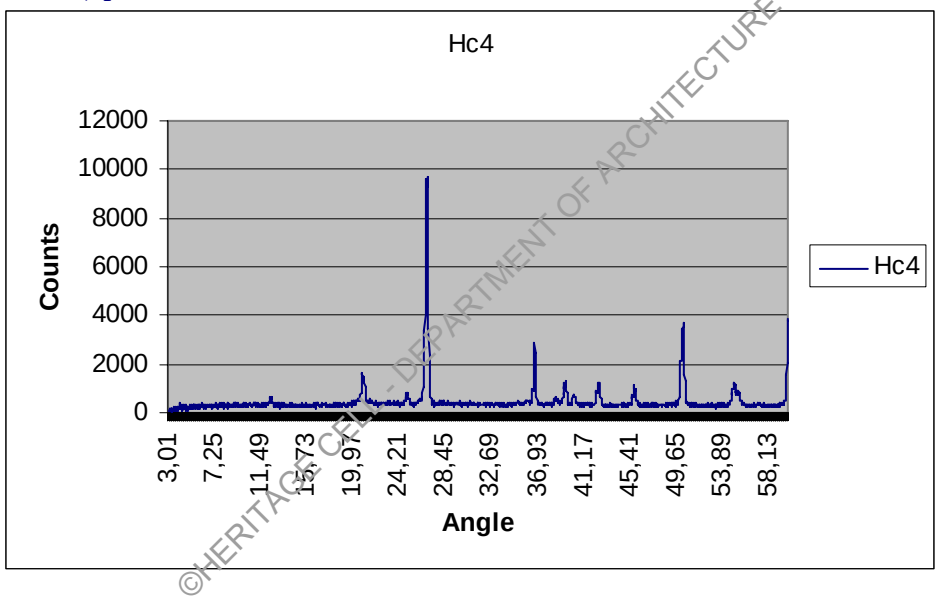


Thin Sections @ N+266X Magnification

The cementateous materials of this stone shows presence of Hematite with a small amount of silica. In addition to this there is presence of a very small amount of chloride, and Sodium Feldspar. The rosy coloration is due to the presence of the Hematite (Iron) in the clastic compounds.

Silicatic rocks (as that of High Court) are more resistant and stable. But they are also prone to hydraulic attacks. Their speed of deterioration is dependent on the intrinsic characteristics and mineralogical and chemical properties. Water penetration and its repeated cycles of wetness and dryness can cause the stone to develop internal fissures, finally leading to disintegration of the stone. Thus to prevent the stone from deterioration it is very important that it is protected from water penetration from any source.

The mineral composition of the stone was further verified by "X – Ray Diffraction" test carried out on a sample of fine powder prepared from a piece of the stone sample. This further confirmed the high percentages of Silica and Silicatic compounds (minerals) present in stone.



©HERITAGE CELL - DEPARTMENT OF ARCHITECTURE & PLANNING, NED UNIVERSITY ARCHIVES 2018