ADAPTIVE REUSE OF HERITAGE BUILDINGS

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ABSTRACT

Heritage buildings are old architectural structures that have withstood the test of time and tell stories about fascinating pasts, architectural facts, and histories. Architectural heritage represents heritage conservation efforts within a social framework and is essential to tracking the evolution of metropolitan areas.

India is a nation whose history dates back thousands of years. The world's most inventive architectural heritage sites are gifts from our predecessors. There are two main types of these heritage sites. The first ones are the locations that, due to their original purpose of drawing tourists and their nature, scale, and design, acquired historical significance over time. The second group consists of unlisted historic sites, such as palaces and havelis, that have not been able to draw visitors due to their lack of historical and cultural significance. Therefore, it is critical to maintain these historically significant structures by using them for regular purposes. In order for the next generation to profit from it and be conscious of historical landmarks and our own heritage.

KEYWORDS- Heritage Site, Adaptive reuse, Sustainable, Historic Site, Heritage Value, Heritage culture, Site Value

INTRODUCTION

For preserving cultural identity for future generations, heritage buildings are essential. A new use that contributes to the preservation of the history can be suggested when the original purpose of a heritage building is no longer needed. The technique of repurposing an old structure or site for a use different from the one for which it was intended is known as adaptive reuse. Reuse makes a building viable as a communal asset and permits it to be used indefinitely. A heritage building is any structure that has historical, architectural, cultural, artistic, or ecological significance that needs to be preserved. In general, heritage provides us a sense of our past and our cultural identity. It connects us to history and the wonderful past we inherited to preserve and convey to our next generations. Adaptive reuse is a technique in architectural conservation that tries to preserve a building's legacy while repurposing it to fulfil modern demands without compromising the structure's architectural legacy. It is a planning movement aimed at preserving historic sites and monuments to connect a community's past to its present. We are currently facing a fight for environmental sustainability in our nation. Recycling is now a common way to solve problems. We can make everything sustainable, including cars, cartons, bottles, plastics, glass, and even structures, by using RRR, or reduce, reuse, and recycle. It is recommended to reuse non-recyclable materials for similar purposes or to use them for new ones in a same vein, structures are recycled and repurposed to prolong their lives. We refer to this technique as adaptive reuse. It's not new for old structures to be converted into new ones. There have been a number of structures throughout history that have undergone adaptive reuse. Numerous ancient structures served as base camps and hospitals even during hostilities. Even after industrialization, many shuttered industries were converted into schools, hospitals, and even places of worship. Royal palaces are now well known among the public and are even utilized as hotels and resorts.

I.AIM

The aim of this paper is to identify and analyse the various strategies that are used in the adaptive reuse of a building and why we need to reuse our heritage by building.

II.OBJECTIVE

To study the heritage building their feature and effective reuse of that building.

III.SCOPE

To learn about the various facets of adaptive reuse, how it is used, and why the idea of adaptive reuse in buildings is important and beneficial to society. To research how buildings adapt to new uses while keeping most or all of their original features.

IV. LIMITATIONS

Cost of construction

Typical construction and structural detail

V.RESARCH METHODOLOG

The methodology involves study of heritage buildings and the possibilities of adaptive reuse.

WHAT IS HERITAGE AND ITS IMPORTANCE?

Heritage is something that we have received from our ancestors, from our past, to value, enjoy in present, and pass it to upcoming generations. Heritage Comprises of-

- Tangible- Historic sites, buildings, artefacts even objects from museums.
- Natural- Landscapes, trees, birds, animals, woodland, waterways.
- Intangible- Music, Sports, Dance, Crafts and traditions.

Our heritage is significant because it shapes who we are and becomes a part of who we are. It emphasizes our importance and value as well. Our heritage provides hints about the past and the evolution of society. Examining our customs and culture helps us become more conscious of who we are.

Our culture and traditions are built on our heritage, which also has a significant impact on business, politics, and society. History sites should be preserved because it is vital to keep historical artefacts intact and because it helps the Heritage Council in its efforts to get the local community involved in the preservation and development of history. The foundation for economic growth in industry, tourism, agriculture, and entertainment is provided by the preservation of our historic landmarks.

INTRODUCTION TO HERITAGE CONSERVATION

Heritage conservation is a "movement" as much as a subject. It aids in our understanding of the significance of historic sites in the modern world; it is about raising awareness and doing our part to preserve it. It is about giving these abandoned buildings a second lease of life, which justifies them by restoring their former significance. Conservation looks to the past as well as the future.

Beyond creating legacies into the future, conservation will inevitably continue in this era of dwindling architectural norms. Here, artefacts demonstrate sufficient capability without sacrificing their fundamental characteristics. Conservation is both economical and necessary. It is not just about appearances. It also refers to our core beliefs.

Depending on the kind of damage, various conservation strategies have been tried. By maintaining a building's original shape and architectural components, restoring them, and re-creating its scale, time, and character, heritage conservation aims to raise the value of the structure.

The goal is to protect and improve the current structures and elements rather than to develop new ones. The restoration of historic structures should involve site inspections, cultural significance assessments, a grasp of the technology and construction methods used, as well as an assessment of the types of damage and defects. Adaptive reuse is one of the best methods used worldwide to restore and maintain historic sites.

CRITERIA FOR HERITAGE BUILDING

Understanding these three fundamental ideas is necessary to decide if a property is good enough to be listed.

• Historical importance A property's historic significance refers to its bearing on the history, architecture, archaeology, engineering, or culture of a locality, state, or country.

• Respect for the past The preservation of physical traits that were present during the property's historic era serves as proof of the historic integrity of a certain location. The property must maintain its historic appearance while preserving the physical components, architectural elements, and construction details that date back to the time when it gained significance.

• Historical background Information on historic properties and patterns grouped by a significant theme in a neighbourhood, region, or country's history during a specific time is known as historic context.

DIFFERENT APPROACHES TO CONSERVATION

There are three major approaches to conservation

1. **Preservation-**It's a component of cultural property preservation, which guards historic monuments by regulating their surroundings to stop deterioration. As a result, maintaining proper humidity, light, and temperature is part of preservation.
2. **Restoration**- It refers to the reversion to the previously known form in the absence of new ingredients. The primary motto aims to revitalize the initial idea by safeguarding and exposing its historical significance. Many methods of restoration are used, depending on the state of the building. Restoration also includes reproduction, such as the need to replicate lost parts in order to restore the original identity. This example also includes reconstruction; in the event that a building is damaged by an earthquake, fire, or other natural or man-made calamity, fresh materials will need to be employed in its place.
3. **Adaptive Reuse** -At the time of conservation, it depends upon many factors such as:

- Historical Value
- Sociocultural Significance
- Physical Condition

Buildings can only be preserved or restored when they are able to fulfill their original purpose or become popular tourist destinations. The only way to conserve or preserve a building that does not fit into one of these two categories is to keep it in use, or utilize adaptive reuse.
When historic buildings begin to lose their significance and their intended purpose, it is necessary to adapt to the changing circumstances by continuing to utilize them for their new purpose without causing harm to the historic structures. In the constructed environment, harmony and change are essential. Structures need to adapt in order to survive. When its original purposes are no longer needed, the building nonetheless chooses to change its use.

Adaptive Reuse

The concept of heritage conservation in adaptive reuse is not new; it dates back to the 1800s. Reusing historic neighbourhoods and locations makes financial sense and is a practical way to preserve architectural history by incorporating traditional ways. It highlights preservation as the best approach, but the ultimate objective is to extend

the life of heritage monuments by preserving as much of them as feasible. Adaptive reuse revitalizes buildings by transforming them into functional spaces for establishments such as restaurants, hotels, hospitals, and schools, among others.

Adaptive reuse is important because:

It preserves cultural legacy Adaptive reuse is a type of historic preservation in locations that contain historic sites. It repairs historically significant locations that may otherwise crumble or be destroyed.

● It becomes slower Urban Extension Builders sometimes select land farther outside of cities because land inside of them is either significantly more expensive or is occupied by older structures. Urban sprawl, a phrase used to describe the growth of metropolitan regions, is accelerated by these factors and has negative effects on the environment, including air pollution.

● It establishes a fresh collective symbol. Adapting the reuse approach in the adaptable building allows for the production of a beautiful and unique structure that acts as a new cultural beacon in the city. Adaptable reuse is both attractive and functional.

ADVANTAGES OF ADAPTIVE REUSE

Sometimes the builder or contractor may not be persuaded to restore and preserve a historic site despite its aesthetic and historical worth. There are other advantages to adaptive reuse to take into account. We also benefit from cultural, social, economic, and environmental factors.

Cultural Historic building preservation raises awareness of historical culture and aids in the understanding of cultural variety. Culture must be preserved and ought to be taken into consideration when choosing a location. The architectural design is another way that culture and customs are expressed. The idea and development of tourism are influenced by various cultures. This location serves as a turning point in understanding cultural values.

Social Reusing historic buildings has various advantages. By preserving their uniqueness and raising public awareness of cultural or heritage sites, adaptive reuse can help restore the relevance of these sites. Sites that are conserved and maintained will benefit future generations, as will their heritage values.

Economic The idea of adaptive reuse is highly cost-effective. In structures that have already been built, the cost of new construction is just two thirds that of new construction. Because old buildings were constructed using materials that were readily available in the area, they can be used for restoration and adaptation, which will save prices and provide jobs for locals.

FACTORS AFFECTING ADAPTIVE REUSE

Economic consideration

Economic considerations includes development costs, project costs, investment returns and market.

Capital investment

It includes development and construction costs, marketing and maintenance costs. The majority of adaptive reuse initiatives rely on the building's current physical layout and condition to establish their viability from an economic standpoint.

Asset condition

This covers the consequences both during and after the building's adaptive reuse, such as material deterioration, lack of structural stability, and the building's inability to satisfy user needs.

Regulations

There are few guidelines in building codes pertaining to adaptive reuse, and state and local governments do not support the implementation of these solutions or the ability to award buildings that have undergone reuse with high-energy star ratings.

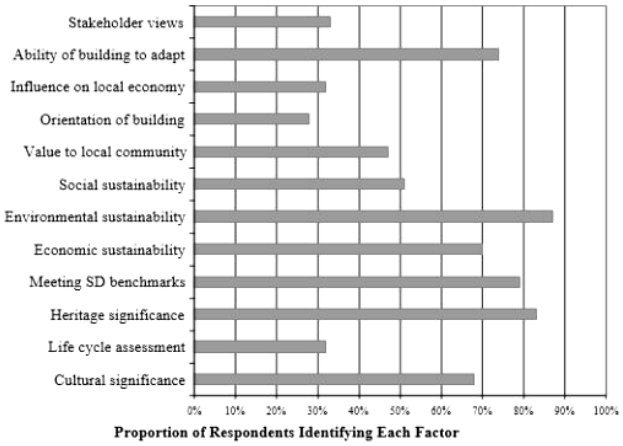
Social consideration

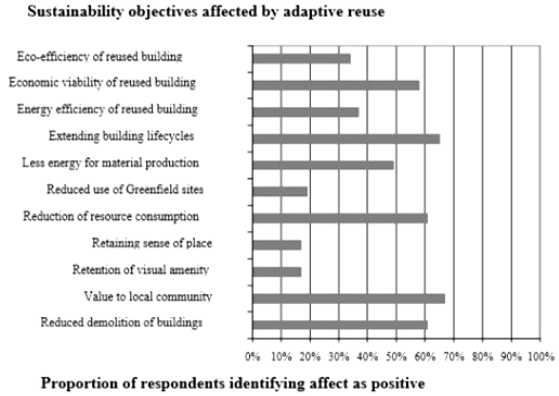
The foundation of society and the source of people's survival are its buildings. To prevent abandonment, a building needs to be properly maintained and reused.

Environmental

Consideration Buildings consume high amounts of energy during their life cycle. New construction requires new building materials and other resources, which possess high-embodied energy.

FACTORS THAT AFFECT THE ADAPTIVE REUSE DECISION PROCESS





ISSUES TO BE CONSIDERED IN ADAPTATION

1. To preserve the building's integrity and cultural relevance

While reusing the historic site one must not impact its original cultural significance. Even if there is use of different material, buildings should not lose its original significance

2. To maintain visual importance in regional context

While visiting the place original character of the building should not be affected. Even after changes have made. Buildings should be associated with its location, and should be retained not observed. Building should maintain a harmony with nearby surroundings.

3. It should have compatibility with historic character

If buildings is reused new services such as wiring, plumbing needs to be installed, architectural features should not be spoiled.

4. New Volume and finishes

Any new volume, materials, or finishes used should be in line with modern concepts; they should not deviate from the historic site's existing portion and should instead balance the site's surroundings.

BARRIERS OF ADAPTIVE RE-USE

1. Physical restrictions: Existing floor layouts, number of columns/walls and structural system layouts
2. Financial factors Costs associated with conservation, both direct and indirect
3. Social considerations: Intangible and non-economic perspectives of maintaining day-to-today lives of people who are attached to the place.
4. Building rules, laws, and other restrictions: Compliance with current construction norms, rules, conservation principles, licensing requirements, and planning criteria
5. Insufficiently skilled craftspeople and limited supplies. Compatibility issues between new and existing materials, as well as a lack of locally available people with the necessary skills for conservation work
6. Limited response to sustainability agenda: Limited support received from building owners and commercial property markets to make buildings sustainable.
7. Complexity and technical challenges: Innovative solutions, technical installations, and refurbishment methods are needed.
8. Maintenance issues High cost of maintenance and repair due to physical deterioration and defects
9. Inaccurate data and illustrations: Absence of comprehensive details regarding defects, dimensional irregularities, and blueprints of historical buildings
10. Creative worth in comparison to redevelopment: the building's exterior design and craftsmanship.

METHODOLOGY

- **Building condition** assessment the condition of existing building must be thoroughly assessed.
- **Survey of neighbourhoods** Survey of neighbourhood must be done to know the potential use and function of the building in the region.
- **Financial considerations** Budget is prepared based on surveys taken and finance can be approached from insurance companies, foundation and funds etc.
- **Architect's contract** in most of the adaptive reuse projects, architect is the leaders that work towards the success of project with deep involvement.
- **Detailed study of structure** 1.foundation and basement 2.structural system 3.floor system 4.mechanical and electrical equipment 5. Roof and waterproofing 6. Stairways and exits 7.exterior wall
- **Designing to save energy**

Building envelope - a building's envelope protects it from the external weather conditions. To prevent the effects of extreme climate mechanical heating and cooling systems are used.

Windows and doors The largest energy wasters in an external wall assembly are the fenestration, which includes windows and doors. Low-e coatings on the glass and several multilayer-glazing techniques can help regulate this to some extent.

Roofs - an exposed roof is the greatest source of heat loss during cold months and heat gains during hot months, roof insulation is very important.

Floor - the only floor that need be considered is the bottom floor. It may be a slab on grade or built over a crawl space.

LITERATURE STUDY

TOWN HALL

In the Indian city of Kolkata, the British constructed Kolkata Town Hall in 1813. The Palladian-Doric Roman style in which it was designed reflects the physical and operational nature of the city at that time. The primary goal of building such a wonderful work of art was to provide Europeans with a place to hold their varied social events. A special committee was established to oversee the operation of the hall under particular guidelines, and it was partially open to the public.

During the 20th century, it also housed the Kolkata Municipal Corporation (KMC) offices and the municipal magistrate's courts. Eventually, the structure was mishandled and abandoned, leading to a proposal for its removal in 1980.At the time, a number of people protested the government's decision and spread awareness among the public, which led to the decision to demolish being rescinded. The Justice occupied the Town Hall for Peace and Improvement of the Town department of the municipal authority, followed by the Bengal Legislative Council, the Municipal Magistrate's Office, the Municipal Service Commission, the West Bengal Public Service Commission, and a temporary rationing office during World War II. These days, it serves as a museum, a place to hold events, and a public library.

Physical condition and problems

Roof The roof concrete had bond failure and allowed rainwater to penetrate in many areas. Sections of concrete detached from the ceiling in many parts. There was excessive vegetation growth on the roof and exterior walls. Skylights were damaged.

First floor the floor was inadequately supported below and unsafe for public gatherings. Some timber planks were decayed creating dangerous gaps. Diagonal and vertical cracking was found to some arches and walls in various areas**.**

Ground floor severe dampness, efflorescence, saltpetre, decayed plaster and cracks to many parts of the walls, arches and on circular staircases were present. Much of the marble floor finishes were damaged.

Basement Evidence of rising damp with efflorescence, crystal formation and decayed plaster was found to entire basement walls. A poor site drainage system and broken rainwater pipes allowed flooding in the basement. Items stored in the basement had blocked many of the air vents**.**

Doors and windows the Venetian timber doors and windows showed severe damage with missing or broken frames, styles, louvers and lock-bolts. Many glazed shutters were damaged with broken glass panes.

Service systems the electrical wires were found laid in a way, which severely damaged ornamental details throughout. Toilets with leaking fixtures to the first floor had damaged the superstructure. The sanitary and plumbing pipes were aged and damaged.

PROCESS OF RESTORING

- Take out all the trash and weeds from the structure.

- Restore all skylights by replacing decayed materials with new matching ones where necessary. - Restore all ornamentations in entablature and portions of broken cornices, detail of the column capitals, columns and pilasters.

- Repair all damages to columns, entablatures, ornamentations, walls, and ceiling and re plaster first floor.

- Major structural strengthening of the entire first floor by two rolled-steel joists of suitable length and section would be inserted between each existing primary and secondary timber beams.

- If needed, replace or repair deteriorated first-floor timber planks.

- Reinstall electrical installation to conform to proposed interior functions without damaging architectural details.

- Paint the building's exterior and interior surfaces.

- All masonry walls in basement, ground and first floor were to be strengthened by filling voids by through grout injections using a slurry of cement with epoxy-based polymer and a grouting pump.

- Repair and restore all windows and doors, including those with glass panes; remove any old paint using a blowtorch and other methods; and apply fresh paint.

The process of adapting the building for reuse included many stages such as surveying existing condition, exploring the building materials, examining structural system conditions, estimating and tendering, assigning contractors, assigning restoration funds and managing the process.

CONCLUSION

The study's conclusion is that adaptive reuse of historic buildings can have major positive social and economic effects on society and is necessary for sustainable development. The study intends to analyse the opportunities and difficulties of converting historic buildings for modern use, assess the advantages and difficulties of adaptive reuse in historic buildings, find creative design solutions and cutting-edge technologies that can help transform historic buildings for modern use, and examine quality standards and regulatory frameworks for adaptive reuse projects in historic buildings. The goal of this research is to provide methods for the successful adaptive reuse of historic structures while causing the fewest possible disruptions to their current shapes. It proves that in addition to their preservation and restoration, they should also be modified to serve new purposes that closely resemble their original intentions. Newer forms that are based on older forms but modified for modern usage are the outcome of adaptations for contemporary application. Preserving the current shape and space's nature is another important finding of the research. For example, the original window frame and building envelope are preserved and enhanced by adding double glazing to the windows and insulation to the walls. It may be an upgraded version of the old, but the new addition's use of modern materials keeps its historical character while yet being a product of contemporary technology. The original qualities of a structure are preserved through this material preservation of the elements. Lastly, this procedure considers a neighbourhood’s long-term viability; more precisely, it suggests changing the usage of various building types.

The recycling idea of the structure and location, where the legacy is preserved and passed on to future generations, is known as adaptive reuse. Since this has a good effect on sociocultural and economic values, it is imperative that this idea be promoted in the modern society.

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