

Adaptive Reuse as an Emerging Trend for Conservation of Structures

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Abstract: Adaptive reuse refers to the reuse of buildings for a purpose other than what they were originally built for. With the increasing scarcity of land, reusing old building for new use is one of the emerging trends in the field of conservation and sustainability. The new use of the structure can offer economic, social, and cultural benefits to the developer and society. There are various challenges involved in the process of adaptive reuse in terms of structural stability, suitability of new use, compatibility with surroundings, and user satisfaction. The challenges and approaches of the process of adaptive reuse are discussed in this paper.

Key words:

Adaptive reuse, conservation, Interior spaces, heritage, structures, non-heritage structures

Introduction:

Architecture is not just buildings. Architecture includes spaces in and around the buildings, building skin or envelope, and people and their activities. The type of architecture and use of spaces are related to various factors such as location, time, political and social context, and economic context. Over the years the political and social contexts change; there are advancements in technology, but the buildings remain the same. They are no longer required for the purpose for which they were built. Once an old structure becomes unsuitable for its functional requirements, adaptive reuse becomes a sustainable option since it conserves the original durable building materials. These new uses can offer economic, social, and cultural benefits to the society and environment. Adaptive reuse of interior spaces can transform the spaces and can enhance user experience.

Adaptive reuse refers to the reuse of buildings for purpose other than they were originally built for. Adaptive reuse mostly deals with issues of conservation and preservation of historic buildings, but it can be applied to modern buildings as well.

With the increasing scarcity of land, reusing old building for new use is one of emerging trend in the field of conservation and sustainability. As the old structure is to be conserved, most of the times the emphasis is on design of interior spaces. There are various challenges involved in the process of adaptive reuse in terms of suitability of new use to the existing structure, acceptance by users, and compatibility with the existing tangible and intangible aspects of the surrounding area.

To preserve the character and image of the building in context of the city's heritage is a challenge. Therefore, without disturbing the character of a building and its significance to the city, the existing space has to be utilised in innovative ways, so as to maintain the significant character of a building and ensure the survival of the building by way of retrofitting or restoration.

The process of adaptive reuse is not just restricted to the building; attention to the overall system surrounding it is required. It is not just the physical or spatial world. It comprises of people and organization of people. The reason and purpose for which the buildings were built becomes the past. The surroundings change, the people change, but buildings as physical entity remain constant. They are no longer relevant for the organization and hence they are used for some other purpose.

There are examples of Greek and Roman temples becoming churches, English monasteries becoming country houses, American mills and railway stations converted to shopping malls and hotels, Indian and Russian palaces converted to hotels and museums.

Though the concept of adaptive reuse is not new, it is necessary to understand the various approaches and challenges involved in the process.

The challenges and approaches of adaptive reuse for design of interior spaces are discussed in this paper on the basis of related literature and case studies. The discussion is based on following questions:

- What are the common types of buildings which undergo adaptive reuse?
- What is an adaptive reuse process?
- What are the benefits and advantages of doing adaptive reuse over demolition?
- What are the factors affecting adaptive reuse?
- How can there be a sustainable way of adaptive reuse?
- What could be the new functions for an adaptive reuse?
- Does adaptive reuse help create a new identity while maintaining the integrity of the building?
- What potentials does the building have for Adaptive reuse?
- How Adaptive reuse can be applied to non-heritage structures?

Material and Methodology

The Researchers have studied two cases in Mumbai- one is heritage and other is non-heritage- to see the difference in challenges faced by different building structures, where the heritage building is a century old, while the non-heritage building is a decade old. By observation and interview with the architects, the challenges of adaptive reuse have been discussed. Other than these, the researchers have carried out literature study to understand the general trends in reuse and to consider the options for reusing any structure. Various examples of reuse have been selected to get the variety of types and the possible conversion options.

Case Study 1: - MCGM's ENT Hospital, Fort, Mumbai.

ENT hospital is located in the heart of Fort area, Mumbai and has been designated as Grade II B in the heritage list. The structure, dated 1904, was designed by Charles Fredrick Stevens, and was built for the City Improvement Trust Office. It has a history of adaptive reuse and has developed various distresses in the structural fabric. In 1964, it was converted into an ENT Hospital. Initially the planning for Hospital was done haphazardly and now the restoration work with proper planning of space is being carried out by the VaastuVidhaan Architects, Mumbai. It is an ongoing restoration project where the whole approach is to reassign the interior spaces and make it user-friendly by adding modern services without disturbing the architectural elements. The facade has to be restored to its original state by reinstating a tower which was missing, but was shown in the archival documents.

Case Study 2: - MITR Hospital, Kharghar, Navi Mumbai.

It is a G+1 RCC framed structure located in Kharghar, Navi Mumbai. It was originally built as a shopping arcade, but due to its location, it was not feasible to use it as a shopping complex, and the project had to bear a huge loss as it was abandoned after the completion and it never functioned completely. Later, it was converted into a hospital as adaptive reuse by Shree Designs, Mumbai. The hospital was meant for minimal invasive treatment, and it was designed as a special hospital where minor surgeries take place and the patients don't have to stay longer than 3 days. MITR hospital was a feasible option considering the location, surrounding area and space availability of the structure.

Initially the floor plans didn't have any partitions; it was like an open hall with shutters on front facade. Due to large open space without any walls in between, it was easier for the designer to design and make partitions according to the hospital layout.

Challenges and approaches:

Based on the case studies and literature survey, various factors, approaches and challenges faced by the designer during the process of adaptive reuse are briefly discussed below.

- Addition of services: - The current building norms require some services to be incorporated compulsorily. For heritage buildings it becomes quite challenging to retrofit new services as there are restrictions as per the heritage rules. Other than the heritage rules there are other factors as well, which makes it pretty difficult to incorporate the new services because of restriction of maintaining original character and minimal intervention, and non availability of designated space for services, etc. In most of the cases a service block is added mainly for the elevator. For non-heritage buildings, sometimes there is availability of space and addition is simpler as compared to heritage buildings.

- Planning of space as per new use: - Adaptive reuse is not universal, it depends on the compatibility of new space requirement with existing layout of the structure. As discussed in one of the interviews, conversion of shopping arcade to a hospital was possible in one case because of the existing layout without barriers, while it was not possible for some other shopping arcades, as the lay out was not compatible.

- Selection of new use: - Adaptive reuse happens when the building is left abandoned and is no longer suitable

for the purpose it was built for. The new use should be selected by taking the feasibility survey.

- Change in occupancy load: By the passage of time, structure starts deteriorating if not in use for a long period of time. Whenever there is a change in use, there is also change of user and due to that the load on structure varies, which cannot be neglected and accordingly, the load distribution has to be calculated and due provisions should be made.

- Retrofitting of structures: Adaptive reuse process is a holistic approach and the structural stability has to be taken into consideration while planning. Addition of spaces and modern services should follow the ethics of conservation in case of heritage structures. This is one of the major challenges.

- Maintenance of original architectural features and materials: Use of original materials for restoration while conversion of building is necessary. Restoration of some missing elements becomes important to connect it to the past. In the case of the ENT hospital, designers found that one of the towers had collapsed long back. It is proposed to reinstate the tower with its original characteristics as discovered from archival photographs to give back the old identity. This will reinstate the original character, and it will also create an extra space for interior planning of the hospital.

- Visual character and Façade treatment: It depends on the grade of the structure on the heritage list. There are restrictions on the alterations on the building skin or facade and it has to be restored as it was. Compatibility of the visual character of the building with its adaptive reuse is important for acceptance by the users. In case of non-heritage structures the facade treatments are carried out according to the new use. Like in MITR hospital, whole facade has been changed as the height of the windows was not appropriate, there were shutters in front facade, the elevation was very simple, there were no ramps, etc. All these alterations were necessary to treat the facade and give it a new look.

Results and Tables

Adaptive reuse has some benefits in terms of economics, sustainability, and user satisfaction. This is the reason for which the adaptive reuse is an emerging trend in the field of conservation of structures. There are some barriers which restrict and limit the process. Some of the drivers and barriers for adaptive reuse of structure have been summarized here, based on the case studies and available literature.

Drivers for adaptive reuse

- Social, economic, and environmental benefits;
- Increase in lifespan of buildings;
- Sustainable option over demolition as it conserves the original durable materials;
- Retention of Architectural character in case of Heritage buildings;
- Retention of cultural heritage;
- Less wastage of materials.

Barriers for adaptive reuse

- Preference for the new build structure;
- Building regulations and planning restrictions;
- Some compromise on space planning with the existing building layout;
- Maintaining the structural integrity of older buildings may be difficult;

- Maintenance costs may be higher than those for a new building.

Trends of Reuse compiled from the various examples studied for adaptive reuse as shown in Table no. 1

CATEGORY	TYPOLOGY	POSSIBLE CONVERSION
Religious	Church Chapel	Orchestral hall Art and cultural activities Libraries, Bookshop Old age home Academy of performing arts
Industrial	Workshop Warehouse Factory shed	Performing art center Artist studio College Exhibition centers
Semi-public Buildings	Town hall	Library Cafe
Commercial	Shopping malls Shopping arcade Shop houses	Schools Office Hospital Restaurant and pubs
Residential	Palaces	Hotel Museum Boutique hotel and restaurants College of art and design
	Houses	Headquarter of community movement Community center

Table 1:- Typology of building reuse options

Analysis based on the case studies and literature survey

SWOT Analysis has been carried out to check the strength, weakness, opportunities and threat which are generally faced by the client and designer for taking the decision for reusing any structure. The analysis is shown Table No. 2.

<p>STRENGTH</p> <ul style="list-style-type: none"> • Increase in lifespan • Sustainable option for conversion • Cost effective than demolition and rebuilding • Enhance the aesthetics of the built environment 	<p>WEAKNESS</p> <ul style="list-style-type: none"> • Wastage of space in case of original large spaces • Not a universal thing • Not suitable for every type of building
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Helps the economy • To connect to the past • Increase the demand for conserved buildings • Reduction of land consumption and urban sprawl 	<p>THREATS</p> <ul style="list-style-type: none"> • Structure failure • Non-acceptance by users • Threat to cultural heritage

Table 2:- SWOT analysis for adaptive reuse

Characteristics of types of structure which makes reuse suitable are summarized based on the examples of reuse.

Industrial

- Large built up area with large spans– easy to add partitions for new use
- Large spans and large volume allows for design for assembly areas.

Religious buildings or Semi-public buildings

- Good location
- Conserving the cultural heritage
- Open structure allows for spaces for public gathering

Commercial

- Central location
- Flexible partitions make it easy for inserting new functions

Residential

- Existing services make it easier for certain new uses
- Converting a palace into hotel is a challenge in terms of services required for every room.
- Adaptive reuse of a palace into a museum is always a good option as there are larger spaces or gardens around to accommodate tourist activity.

Conclusion

Adaptive reuse as an option for conservation has been in practice for many years but still it is not much used for contemporary buildings. Researchers here have tried to summarize the various options of reuse for different types of buildings. It is not necessary to conserve only the heritage structure but the non-heritage structures can also be conserved, which will otherwise be demolished and redeveloped.

The feasibility survey is an important aspect of understanding why the initial function of the structure fails and what can be the new functions that suit the existing structure and surrounding environment.

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