



## Adaptive Reuse and Refurbishment for Sustainability – Architect’s Role in Design Decisions

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### ABSTRACT

Society has an almost insatiable appetite for buildings which is met by the construction sector by raising new buildings on vacant sites, demolition of existing buildings and their replacement with new buildings and/or adaptation of existing buildings-options are of course innumerable. Increased environmental awareness which is advocated by all environmentalists should mean that, rather than throwing away, people can increasingly be told to recycle and re-use. This ethos is also being applied to buildings. Reuse of older sites and buildings for new uses are a sustainable choice in building and it can be fulfilled by adaptive reuse and refurbishment of buildings. The article throws light on the salient findings of a micro-level study done on the application of these principles, highlighting the role of the builders who had taken up refurbishment as a practice.

### KEYWORDS

Adaptive reuse, refurbishment, sustainability

### INTRODUCTION

The construction sector, an important part of India's economy, is steadily contributing about eight per cent to the national GDP over the last five years. Fuelled by strong economic growth, rising population and rapid urbanization, it is one of the fastest growing sectors in India today. The downside is the enormous carbon footprint of the sector. The sector emits about 22 per cent of India's total annual CO<sub>2</sub> emissions as it is the major consumer of all non-renewable resources mankind consumes. Impacts considered from building materials could be addressed at different stages; from processing and manufacturing to logging and storage through installation and use.

India is the fourth biggest emitter of greenhouse gases after China, the United States, and European Union as a whole. As a response to the global attention on climate change, the Indian Government pledged to voluntarily reduce domestic emission intensity levels relative to its GDP from between 33-35 per cent by 2030 (Nagrath, 2013).

Adaptive reuse, a special form of refurbishment is a potential opportunity to develop a solution that meets both the financial needs of owners and the functional needs of consumers through design that addresses the nuances unique to the customers.

- Adaptive reuse is the process of adapting old structures for new purposes. It is a phenomenon of saving old buildings from the demolition ball by recycling, often retrofitting them with the introduction of modern services to cater to a new contemporary usage (Kramer and Seltz, 2011).
- Refurbishment of Buildings is a process of giving outdated buildings an upgradation and reconfiguration that goes beyond the cosmetic (Riley and Cotgrave, 2011).

It helps to conserve land, save energy, money and resources, preserve the heritage and provide employment thereby satisfying the triple bottom line of sustainability – **Environmental, Economic and Social**.

Chairman of the IGBC Green Existing Building Rating System in 2014, suggested that the only solution to these existing problems is making the existing buildings green. By doing that it is estimated that India can save 20-30 per cent in energy, 30-40 per cent in water and at the same time, enhance great occupant health and comfort ([http:// www.business-standard.com/article/news-ani/usd-25-billion-retrofit-potential-of-existing-buildings-in-india-by-2025-114031900678\\_1.html](http://www.business-standard.com/article/news-ani/usd-25-billion-retrofit-potential-of-existing-buildings-in-india-by-2025-114031900678_1.html)).

In recent years, the trend to refurbish for adaptive reuse is gaining momentum as commercial centers and business enterprises are on the lookout for spacious structures which are functionally obsolete and capitalizing on zoning and building laws coupled with the real estate boom the practice has really reached its peak of recognition. This endeavor further obliges to the nation's call to preserve and reuse existing buildings citing environmental benefits. These factors inspired the investigator to launch a study – 'To assess the views of architects and interior designers on adaptive reuse of buildings'; to examine the trend in the type of adaptive reuse practiced in the City and to elicit information from architects and interior designers regarding the use of eco-friendly materials in refurbishment contributing to sustainability.

### METHODOLOGY

To decipher how far the concept of refurbishment and adaptive reuse had received acceptance in the region under study and the role played by Architects/Interior Designers who are the kingpin in executing such projects, a situation analysis was felt necessary to identify existing expertise in refurbishment. Hence, to facilitate collection of reliable data, 30 Architects and Interior Designers who were gainfully practicing for a minimum of five years and had successfully completed refurbishment projects were selected by adopting purposive sampling. To identify expertise in refurbishment and to know the processes followed by them, face-to-face interview method was chosen for use by the investigator in a person-to-person interaction.

**RESULTS AND DISCUSSION**

The construction of a new-build home is estimated to give off 50 tons of CO<sub>2</sub>; contrarily the refurbishment of an existing one emits just 15 tons of CO<sub>2</sub> thereby making an initial saving of 35 tons of CO<sub>2</sub> per property (Qureshi, 2008). Designing buildings for adaptive reuse would ideally expose the building's structure to minor changes while undergoing major refurbishment. While all the samples took up both new construction and refurbishment projects 63 per cent of the sample stated that it was very challenging to satisfy clients who demanded refurbishment and the rest felt that clients of new construction projects were difficult to please.

**A. Nature of Refurbishments Sought**

Latham's (2000) definition posited that adaptive reuse 'retains as much of the original as possible, upgrading performance to modern standards and changing user requirements'. In tune with this, after acquiring the building, in order to make its use rewarding and profitable, various levels of refurbishment were carried on as given in Table 1.

**Table 1: Nature of Refurbishments sought**

Particulars	Percent responding (n-30)*
Services	50
Minor/cosmetic	27
Structural	23
Major	23
Complete	7
* Multiple Response	

Architects and interior designers stated that 50 per cent of the clients approached them when they had to change or upgrade services like replacement of heating, ventilation and air-conditioning plant along with its pipe work, ducting, terminal units, controls and insulation. Minor or cosmetic refurbishments were next in line of demand which included tasks like improving lighting, replacing floor coverings, exterior painting and repair plus minor changes to the fittings. It is evident therefore that a building over a period of time requires attending to some flaws and consequent changes periodically. The findings have proved that a building always is a component requiring sustained maintenance expenditure, because they are prone to different types of obsolescence.

**B. Reasons for Refurbishments**

Whilst some elements in occupied buildings are not changeable, such as location, other aspects can be readily upgraded to improve working and organisational conditions as well as to maximise asset/rental income value. A point to be remembered also is that refurbishment is significantly less time-consuming than demolition and rebuilding, perhaps taking only two thirds of the time. The reasons for refurbishment stated by clients are given in Table 2.

**Table 2: Reasons for Refurbishments sought after by Clients**

Reasons for refurbishments	Percent responding (n-30)*
Improve building aesthetics	67
Need to upgrade services	47
Increase the usable floor area	43
Changes in use	30
Comply to change in regulations	10
Spaces are not feasible to vastu	7
* Multiple response	

Improving building aesthetics, need to upgrade services and expanding usable floor area were the major reasons sought by clients, which architects diligently executed in their projects.

While a good 30 per cent of the clients had proposed change in use of the building, 10 per cent requested to make changes to abide by regulations. However, architects and interior designers had well defined reasons for accepting the projects.

Nevertheless, a good 87 per cent of them agreed that refurbishment projects required professional/technical acumen and skilled workers who could execute the project – a challenge for architects which also paved the way for technical expertise in employment and subcontracting/outsourcing options.

**C. Criteria Considered for Change of Systems**

Building energy services include all the energy consumption associated with a building-such as space heating and space cooling, ventilation fans (interior supply and exhaust, parking garages), lighting (interior and exterior), refrigeration, water heating, elevators, and escalators, as well as operation of electric and electronic equipment (Liu et al., 2010). These service systems require continuous maintenance and sometimes change.

Client specificity (60%) followed by upgradation (40%) was the major criteria considered for changing existing systems during refurbishment. Conditions of dilapidation (37%) and having undergone major wear and tear (37%) had forced the clients to go for change of such systems. A meager 20 per cent had requested change as they found literally no functional requirement for these.

**D. Difficulties Faced during Project Execution**

Nature of difficulties extended from practical ones like loss of previous drawings/documents to difficulties related to those of human behaviour, for e.g. a nagging client. Maximum sample (60%) stated that frequent inputs from clients during the execution of the project disturbed the flow and schedule of the work. Almost 57 per cent of the sample faced budget constraints and 40 per cent felt that they were always pressed for time as the clients demanded projects to be completed in minimal time. Fifty three per cent were stressed due to dearth of skilled technicians and workers who could meticulously execute directions.

**E. Awareness of the Green Technology Concepts**

Sixty per cent of the surveyed samples were aware of the concept and consequences of the carbon footprints caused by the construction process. They suggested the use of eco friendly and green certified materials and planting more trees as possible measures to reduce carbon foot print thus caused. Yet, none of them had kept track of or calculated the carbon emissions caused during construction.

**F. Eco Friendly Techniques Used**

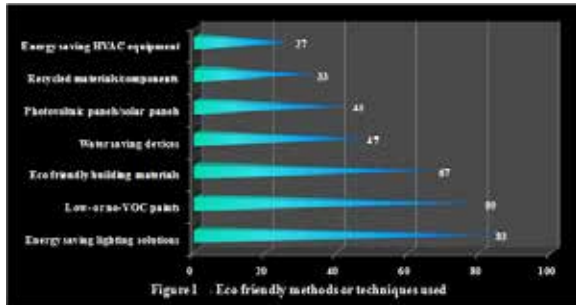
Adaptive reuse transforms underused buildings and sites into locations that are economically useful; hence, building reuse is technically environment friendly. This effect can be two fold if, refurbishment of the structure is made eco-friendly and green technology is incorporated to make the reuse sustainable.

Sixty seven per cent of the surveyed sample (architects/interior designers) assured that they used eco-friendly materials and techniques for both refurbishment and new construction projects. While 23 per cent tried to implement them in new construction projects alone, the others (10%) failed to do even that; they also stated that they did implement such techniques if specified or requested by the client. It is evident that this concept of national concern is yet to take off well in the concerned locale.

**G. Eco Friendly Methods or Techniques Used**

As depicted in Figure 1, a vast number (83%) of samples had suggested use of energy saving lighting fixtures like LEDs featuring BEE star labels. Eighty per cent used either 'low' or 'no VOC' paints. Water saving devices (water efficient fixtures and automatic water level controller circuit) and solar powered devices (solar water heaters) were used by less than 50 per cent of the sample. Thirty three per cent managed to recycle mate-

rials and components to reuse them in the projects. Evidently focus on saving electrical energy received priority.



## CONCLUSION

Today, high vacancy rates, deferred maintenance, and in many cases abandoned spaces have left gaping holes in the fabric of the urban communities. Adaptive reuse is the ultimate end game for empty, abandoned space in metropolitan and cosmopolitan areas. This study showcased architect's and interior designer's perspective on the concept of refurbishment, adaptive reuse and green technology. It has been a narrative of their personal experiences for having taken up the projects, which in the long run could contribute to sustainability.

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