Realty Byte

TIMESPROPERTY SUNDAY, OCTOBER 22, 2023

Building the future, resisting the hazard

An earthquake-resistant building is expressly designed and engineered to withstand the unnatural structural stress in the event of high seismic activity like an earthquake without compromising on safety of its occupants



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owadays, developers and builders are taking measures to ensure a quake-resistant building. An earthquake-resistant building is expressly designed and engineered to withstand the unnatural structural stress in the event of high seismic activity. Talking about how to make an earthquake-resistant building and the structural measures that can be taken for an earthquake-resistant building, Harsh Pareek, regional sales director, India, and SAARC, Trimble Solutions, says, "Fundamentally, advanced modelling and structural testing techniques are key to planning and constructing earthquake-resistant structures of all types. Adherence to sound structural engineering principles is also necessary for a building to be able to withstand regular earthquakes of moderate intensity and rare or infrequent earthquakes of high intensity. However,

new innovations in construction technologies and techniques are now helping construction companies not only build seismic-zone compliant (as per India's National Buildings code) and earthquake-resistant buildings at lower costs, but even retrofit existing buildings with components that can significantly enhance their earthquake resilience. Several structur-

al measures and changes are essential to achieve this resilience." For new buildings, the choice of construction materials is critical. Reinforced concrete or steel typically offer the strength and flexibility required to

endure various types of seismic stress. Advanced tools like Building Information Modeling (BIM) and 3D modeling facilitate the visualization and coordination of complex structural systems. These technologies allow engineers to optimize designs and identify potential weaknesses, ensuring the



building's earthquake resistance.

From an engineering perspective, it is recommended to integrate specific structural elements like shear walls, cross-bracing, and damping systems into the building's design for high seismic resilience. "Modern construction software from companies allows precise engineering and even analysis of these elements through finite element simulations. For earthquake-proofing existing buildings structures, cutting-edge and non-destructive structural testing tools like ground-penetrating radar and ultrasonic testing are particularly useful to assess their structural integrity," Pareek adds. Further, retrofitting them with new age materials like fiber-reinforced polymer (FRP) composites can add more rigidity to their columns and beams, improving their earthquake resistance.

managing director, People's Group, says, "Ensuring earthquake-resistant structures is paramount for the safety and resilience of communities. A comprehensive approach with various engineering and readiness strategies is required. This includes constructing a solid foundation, securely anchoring buildings to stable soil or bedrock, and reinforcing them with materials such as concrete and steel frames, shear walls, and cross-bracing to withstand seismic forces.

Rohit Pandit,

Saurabh Vohara, founder & CEO of ALYF, says, "The Indian subcontinent

is prone to severe seismic activity, which makes it essential to construct earthquake-resistant buildings by robust construction technology. The key factors that contribute to building stability in the event of an earthquake are construction quality, material choice, and design. Foundation and structure strength play a crucial role, and it is necessary to have strong, ductile connections between components. Non-structural elements should also be designed to minimize quake-related risks."

A comprehensive approach with various engineering and readiness strategies is required. This includes constructing a solid foundation, choosing the right steel type to ensure flexibility during quakes securely anchoring buildings to stable soil or bedrock, and reinforcing them with materials such as concrete and steel frames, and cross-bracing to withstand seismic forces.

Sarabjeet Kukreja, founder and CEO of Zeassetz, avers, "Designing earthquake-resistant buildings is a multidisciplinary endeavour that combines engineering expertise, innovative materials, and rigorous construction practices. Key structural measures include reinforced foundations, flexible framing systems, damping devices, and continuous monitoring to ensure the safety and resilience of the built environment in seismic regions."

Similarly, Rakesh Reddy, director, Aparna Constructions, says, "High-rise buildings are designed to carry vertical loads due to gravity, as well as lateral loads, such as those due to wind and earthquakes. Due to the extreme

lateral movement created by earthquakes, the key aspect of making an earthquake-resistant highrise structure lies in the building's ability to transfer the seismic vibrations to the foundation as quickly as possible. In the event of an earthquake, the structures that withstand the tremors typically possess three fundamental attributes: rigidity, strength, and ductility." Nikhil Jain, CEO, Qubik Infra, says,

"Today's science allows us to assess a location's vulnerability to earthquakes, assisting us in identifying seismically active zones. After the identification of seismic zones, several techniques, such as base isolation and damping, are deployed in the construction of buildings. Because of its low cost, base isolation is a popular technique. Flexible bearings are installed between the building's foundation and the superstructure, isolating the structure from the foundation and allowing it to remain stable during an earthquake while the flexible foundation shakes."

Damping is another popular technique used in the construction of earthquake-resistant buildings. Structures that absorb the kinetic energy of seismic waves, called dampers are installed. They convert the energy into heat and dissipate it into a hydraulic liquid. Other popular changes in construction that modern engineers have developed include reinforcers like shear walls and diappragme. which counter

aphragms, which counteract and push forces effectively.

Sustainable office: A roadmap

Energy efficiency is the buzzword today and developers are aware of the vitality of this trend



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Rapid advancements in technology have led to the development of innovative energy-efficient solutions such as smart building management systems, energy monitoring systems, and efficient HVAC (heating, ventilation, and air conditioning) systems. Over the years, the cost of installation of these have also reduced with an increasing number of developers adopting them for their commercial projects, enabling manufacturers to achieve economies of scale and pass on the cost benefit.

So, while building commercial spaces for clients, they cannot miss this ingredient of a commercial growth story. Talking about the challenges associated with pursuing energy efficiency in commercial buildings, Abhishek M. Garodia, managing director - Garodia Group, says, "One of the primary challenges in achieving energy efficiency in commercial buildings is the high upfront costs involved. However, builders often hesitate to embrace these advancements as the benefits are primarily enjoyed by the occupants and society at large, rather than directly benefiting the builders themselves." Another challenge arises from the



incorporation of energy-efficient features like cross ventilation and natural lighting. While these strategies contribute to energy conservation, they can result in a substantial loss of Floor Space Index (FSI) for builders. FSI regulations limit the permissible built-up area and accommodating energy-efficient elements often reduces the available space for construction. Energy efficient commercial real estate to unlock billion-dollar opportunities for India. As India experiences rapid economic growth, there has been a significant increase in the demand for enabling infrastructure and subsequently power consumption

Shivam Agarwal, VP – Strategic Development, Sattva Group, says, "A

high-performance building is distinguished by its cutting-edge facade, carefully engineered to enhance energy efficiency and ensure optimal comfort. Inside, it incorporates energy-efficient lighting and HVAC systems, meticulously designed to minimize energy consumption. This sustainable design is further bolstered by a robust energy management system equipped with intelligent controls for precise oversight." Water Conservation initiatives: Such an initiative involves installing lowflow water-saving fixtures, including faucets and toilets, to significantly reduce water consumption. The installation of sensor-equipped and pressure-controlled water taps further contributes to water conservation efforts. Waste Reduction and Recycling Programmes: Within the office premises,

a robust recycling system has been established, featuring dedicated bins for paper, plastic, glass, and organic waste. Employees are actively encouraged to participate in various initiatives aimed at reducing waste generation and increasing awareness about the potential for converting waste into valuable resources, emphasizing the concept of "waste to wealth."

Walkable campus: This design prioritizes walkability, ensuring comfortable and safe pedestrian access to public transportation. The outdoor spaces are thoughtfully crafted to provide an engaging and pleasant environment for recreational use. To mitigate the urban heat island effect and promote biodiversity, native greenery is maximized throughout the area, creating a more sustainable and inviting urban landscape.

CRE energy savings: "Despite the challenges, several exciting opportunities exist for promoting energy efficiency in commercial buildings. One particularly promising avenue is the potential government initiative to link property tax rates with green building ratings. By implementing this policy, the government can incentivize the development of greener buildings and reward owners with reduced property tax rates. This financial benefit not only encourages the adoption of energy-efficient practices but also provides cost savings for building owners, making energy efficiency a financially attractive proposition," Garodia adds.

Energy-efficient buildings have lower operational costs over time due to reduced energy consumption, resulting in long-term savings for occupants and owners.

Talking about the huge potential of energy-efficient commercial space, Kishan Govindaraju, director, Vaishnavi Group, says, "Energy efficient commercial real estate to unlock billion-dollar opportunities for India. As India experiences rapid economic growth and has been the fastest growing economy in the world for several years now, there has been a significant increase in the demand for enabling infrastructure and subsequently power consumption. This in turn puts pressure on precious natural resources and poses a significant challenge to the environment."

Peripheral growth: Defining realty

Peripheral areas are attracting more investment due to their affordable nature and robust amenities

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The real estate growth story in the recent past has been scripted not by the city centres rather by the peripheral locations. The peripheral areas are more affordable as well as well-connected. The allure of peripheral areas as prime investment destinations for homebuyers has captured the real estate market's spotlight. Garvit Tiwari, director and co-founder – InfraMantra, elaborates, "These suburban and outlying regions, once overlooked, are now emerging as the hottest prospects for those seeking to secure their dream homes. Several key factors are

driven by several factors, such as:

Affordability: Those seeking more affordable choices are drawn to peripheral locations due to their comparatively lower home costs. **Developed Infrastructure**: Peripheral areas are a desirable option since they provide a more peaceful atmosphere. According to data from the Institute of Civil Engineers India, during the past ten years, expenditures in peripheral area infrastructure have grown by 30 per cent.

Greener and Healthier Living: Peripheral areas provide better air and a closer bond with nature is found in peripheral areas, protecting them from pollution, inadequate water supply, and loss of green and natural



driving this remarkable shift, and they are redefining the real estate landscape. First and foremost, affordability stands out as the primary magnet drawing prospective buyers to peripheral areas. Escalating property prices in major urban centres have left many home seekers in search of more budget-friendly options." Another critical factor is improved connectivity. Modern infrastructure investments have bridged the geographical gap between these areas and city centres.

Mohit Jajoo, CEO and director, Shubhashish Homes, maintains, "The demand for houses in peripheral areas has noticeably increased in recent years. These once unpopular and remote locations are currently seeing a rise in popularity. This demand has shifted the real-estate market encouraging urban growth as well as remote growth altogether." This growing tendency is being spaces. According to the World Happiness Report, peripheral areas residents often report higher life satisfaction compared to their urban residents.

Gaurav Mavi, co-founder of BOP Group, avers, "Peripheral areas offer buyers more affordable options, making homeownership a reality for a broader segment of the population. Another crucial factor is the ongoing development and infrastructure improvement in these regions. New projects and initiatives are making peripheral areas more accessible and attractive. Improved connectivity, transport links, and the availability of essential resources are transforming these locations into vibrant residential hubs."

Thus, peripheral regions are emerging as the next big thing in real estate, providing a viable option for people looking for a more sustainable and better way of life.