



Analysis on Comparative Study of Conventional and Smart Building Material

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ABSTRACT

Smart materials are developing now-a-days which responds to environmental stimuli such as pressure, temperature and wind. Smart materials used in construction technology includes self-healing coatings, smart concrete, shape shifting metals, transparent metals, etc. The many different functions smart materials can achieve led to the composing of smart material systems. Due to lack of knowledge about smart building materials we don't use such materials. Control over quality and sustainability of finished building. Justification of the environmental cost of manufactures. These systems are composed of a number of smart materials and can do multiple functions as well as being able to sense the change that triggers the actuation. There has been a significant attempt to circumvent these constraints by developing various techniques and materials. The research aims to explore qualities and advantages of smart material in Construction field, to understand the better use of smart materials adaptive measures. For this project there is use of software for developing, analyzing and designing the reinforced concrete building.

INTRODUCTION

The term "smart materials" describes a group of material systems which has unique properties which gives more benefits against conventional materials. Some materials systems do not exhibit a shape change, but rather have significant properties are also called smart materials. Now a days, there are no. of building materials invented in market which gives overall cost effective, strength effective, better applicant result etc. As compare to conventional building material. but because of lack of knowledge about smart material, they are not get used so we are going to show actual difference between conventional material building & smart material building with respect to all manners. There are several new-age "smart" building materials which are cost effective and long lasting and which would help build or rebuild smart buildings, as a more eco-friendly and sustainable habitat. Building material is any material which is used for construction purposes. Many naturally occurring substances, such as clay, rocks, sand, and wood, even twigs and leaves, have been used to construct buildings. Apart from naturally occurring materials, many man-made products are in use, some more and some less synthetic. The manufacture of building materials is an established industry in many countries and the use of these materials is typically segmented into specific specialty trades, such as carpentry, insulation, plumbing, and roofing work. They provide the make-up of habitats and structures including homes.

LITURATURE SURVEY

1. **Yahya S. Abdullah¹, Hoda A.S. Al-Alwan² (2019):**The past decades have witnessed a growing interest in the knowledge acquisition of smart materials and their applications in different fields, especially in the field of architecture and building technology. Smart materials may not be relatively new, but researchers work to develop smart materials and compose a system that controls and guides the materials to create a living environment with more adaptive qualities and less negative impacts. The research aims to explore the qualities and advantages of smart material systems in the field of architecture, to better understand the impact smart material systems have on the design and construction processes, and to explore the way to create architecture with better adaptive characteristics, to ultimately reach the state of "adaptiveness", providing the optimal environment for the users, reflected on the structural, climatic, and architectural performances.[1]
2. **Yeganeh Mohammad Hosseini (2020):** The research aims to explore the qualities and advantages of smart material systems in the field of architecture, to better understand the impact smart material systems have on the design and construction processes, and to explore the way to create architecture with better adaptive characteristics, to ultimately reach the state of "adaptiveness", providing the optimal environment for the users, reflected on the structural, climatic, and architectural performances.[2]

3. **Dr. Abber Samy Yousef Mohamed (2017):** This research aims to study the terms of smart materials and their impact on architecture to investigate the role and function of smart materials as a flexible approach in architectural materials in order to reduce energy consumption which will reduce environmental emissions from the construction. Using analytical-descriptive methods, investigates various aspects of materials in construction and architecture then studies their effect on sustainable environment and reduction of pollution.[3]
4. **Hesham H. Sameh1, Gamal El-Din A. Nasa2 (2019):** The study aims to discuss the applications of nanotechnology in architecture, especially in Office buildings. Nanotechnology is one of the most important modern applications that directly affect the characteristics and behavior of the smart materials used in the buildings, which have a direct impact on the use of materials in the internal and external environments.[4]
5. **Seema Nihalani1, Dr. Unnati Joshi2, Ashish Meeruty3(2019):** "Smart Materials" have a crucial role in construction technology. These innovative materials constitute an important part of smart building systems that are capable to detect its surrounding so that the smart materials behave similar to living systems. The design of smart materials involves highly integrated components and requires interdisciplinary knowledge. Smart materials are capable of adapting to their exterior surrounding. They alter their properties by applying exterior physical stimuli and thus adapt to their external environment in the best possible manner. In the process of adapting to their external environment, they involve various energy conversion processes. This mechanical energy is converted into electrical energy and vice versa by smart materials during their functioning. This paper discusses various types of smart materials used in the construction industry, their characteristics and applications in smart infrastructure.[5]

WORK/SYSTEM

Smart material is capable to adapt their surroundings. Now-a-days smart material are used as an alternate material to conventional material which are stronger, easy to handle, economical and environmentalfriendly. Conventional materials like bricks, cement, mortar, concrete, steel etc. are normally required in huge quantities in any form of construction. Smart material required less quantity of material as compared to Conventional material. Smart materials have applications in the design of smart buildings. Smart materials are used for vibration control, noise mitigation, safety and performance. In this project we are going to understand the comparison between the Conventional and the Smart building material. We have to complete it in a step-by-step manner such that it will fulfill all the criteria we considered for it. Methodology is way in the form of steps to complete project. In this following flowchart shows the methodology of project.

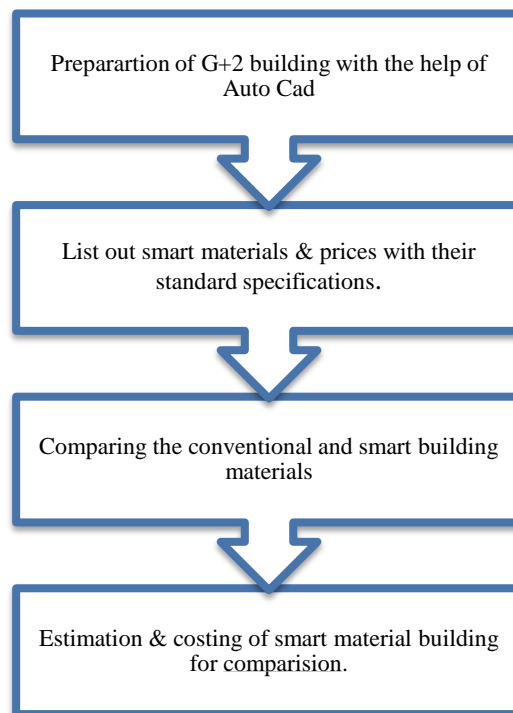


Fig. no- 1

- **List of Materials**

Sr. No	Conventional Materials	Smart Materials
1.	Concrete	Self-healing Concrete
2.	Teak Wood	Transparent Wood
3.	Stone	Volatile organic compounds (VOCs) Paints
4.	Textile	Shape shifting materials
5.	Tiles	Vinyl tiles
6.	Glass	VG Smart Glass
7.	Brick	AAC block
8.	Kevlar	Ready mix Plaster
9.	Steel	Smart Wrap
10.	Paints	Brick Masonry Adhesives

Table No.- 1

CONCLUSION

- Smart Materials shall provide a huge thrust to sustainable design.
- If we use Smart materials then our cost, time of construction will be reduced, instead of using conventional materials.
- The present study describes the use of such materials and their importance in the field of civil engineering for sustainable development.
- There are a great number of smart materials that exhibit unusual behavior and can be successfully used in actual projects to reap the benefits of their advanced features.

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