

The Impact of Eco-Friendly Construction in Improving Life on Earth

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Abstract

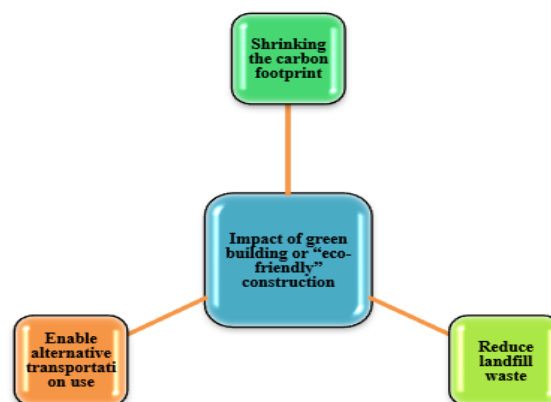
Green buildings are relatively expensive to construct at first. By reducing the use of polluting energy sources like coal, green buildings contribute to the preservation of a clean environment by reducing waste generation and the emission of harmful gases. Based on the secondary research in this study the impact and the advantages of eco-friendly construction can be evaluated. The house will have a higher value. In addition, savings of money on electricity and have a workplace that is healthier and more enjoyable. The management of construction sites can boost conservation efforts. The development of biodiversity and environmental settings can be improved through eco-friendly construction.

INTRODUCTION

Eco-friendly construction can be possible through the formation of green buildings. In the reduction of the wastage of water, green buildings also effectively enhance the water supplies, safeguard biodiversity, conserve natural resources, as well as enhances the quality of water and air. By reducing harmful air emissions, and waste production, green buildings contribute to the preservation of a clean environment by reducing the use of polluting energy sources like coal. It also aids in reducing the rate of climate change by lowering the amounts of carbon monoxide that are released into the atmosphere. The reduction of carbon emissions is one of the most notable advantages of employing environmentally responsible construction methods. Building development as well as activity processes create 39% of worldwide ozone-depleting substance discharges. Real estate values are lower and maintenance costs are higher for less durable structures. Green communities and buildings help prevent waste from ending up in

landfills, make it possible to use alternative modes of transportation, and encourage roof maintenance and the creation of green spaces. Green buildings with high performance, especially those certified by LEED, have a lower impact on the environment and their occupants. This eco-friendly construction is also effective in the reduction of electricity bills.

Figure 1: Impact of green building or “eco-friendly” construction



(Source: Self-created in MS word)

Research aim

The main aim of this research is the detection the impact of “eco-friendly construction” which is also called green building on the improvement of life on the earth. Due to eco-friendly construction, improvement of health can be possible, and the impact of this green building on the environment and its efficiency can be identified.

Objectives

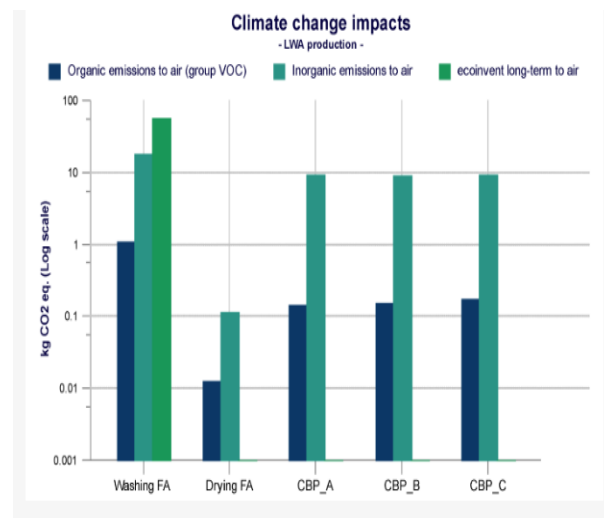
- To identify the impact of eco-friendly construction on the environment
- To detect the efficiency of this eco-friendly construction with IoT-based green buildings.
- To analyze the reduction level of carbon emission through “eco-friendly construction” .
- To enhance the quality of air and water within the construction.

Review of literature

According to the author Colangelo et al. 2021, the innovative type of materials in Italy for the formation of sustainable and eco-friendly buildings can be evaluated. Areas that were previously classified as exempt from the possibility of seismic events of any magnitude are still covered by the recent regulations that can be acknowledged the existence of a general “seismic hazard”. This circumstance has brought to light the presence of even relatively recent construction projects on Italian soil (Al-Hasan et al. 2020). Built heritage necessitates not only demolition but also an adequate level of analysis as well as in planning for maintenance actions, including physiological deterioration of the structures along with the destructive nature of seismic events.

Rebuilding and dismantling preserve existing specific or limited issues. In the case of the presence of cement within the mix and, especially, clinker, which is effective for the formation of concrete material with a significant impact on the environment, “conventional materials” like cement and the technology used in construction have many advantages in the formation of eco-friendly construction (Colangelo et al. 2021). These advantages include the comparably low cost of raw materials. They can also be used in a lot of construction projects, but not all of them, and they can break down quickly. With the identification of climate change with eco-friendly construction, the release of carbon dioxide in the environment is also identified through the LWA process. Additionally, through graphical presentation air emissions can be identified in the “LWA process”.

Figure 2: Air emission due to climate change in the LWA process

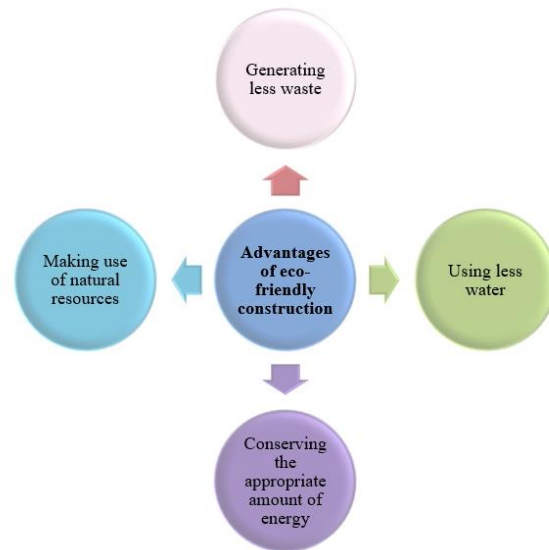


(Source: Colangelo et al. 2021)

According to the author Nadeem et al. 2021, the use of IoT for green building management can be provided. At various points, buildings have a significant impact on the environment. Buildings use raw materials. Buildings also use

water, energy, and resources at the time of construction, occupancy, redevelopment, reuse as well as destruction. They also produce waste and release toxic substances into the air. As a result, the spillover has a positive effect on the surrounding natural environment, weather, and building occupants' quality of life. The construction industry consumes a lot of energy (Nadeem et al. 2021). Buildings do not use much energy when they are being built, but they do use a lot of energy when the building is running and for things like lighting and air conditioning that people use every day. For civil engineers, builders, and architects, designing a building that uses fewer resources and is better for the environment is a daunting task. Green buildings, whose primary goal is to reduce buildings' impact on the natural environment through sustainable design, enable these difficulties. The green building design is practical and considerate of the environment. Because green buildings provide a healthier and more comfortable living environment for children by using less water, generating less waste, conserving the appropriate amount of energy, and making use of natural resources (Mahmood et al. 2021). The impact of toxic and non-renewable materials on buildings is rarely taken into consideration in conventional construction.

Figure 3: Advantages of eco-friendly construction



(Source: Self-created in MS word)

Literature gap

Based on the literature review some of the gaps in the literature can be identified.

- With the help of analysis of the literature, the identification of the efficiency of eco-friendly construction by using “natural resources” and the improvement of the quality of air with the reduction of carbon emission can be evaluated (Gao et al. 2021). But the reduction of electricity bills is not evaluated in the literature.
- The high levels of the initial cost for eco-friendly construction are not mentioned in the literature.
- As natural sources are used the eco-friendly construction for this the amount of energy can be dependent on the condition weather.
- As high levels of technologies are used for eco-friendly construction this appropriate

education, as well as training, is important that is not evaluated in the literature.

- The proper implementation process for the formation of green buildings by the team of project management is not identified in the literature.
- The use of IoT is effective but the cost and the challenges of security in the application of technologies are not identified in the literature (Hernández-Barco et al. 2021).
- The standard of literature is high that is not so easily understood.
- Based on the review of the literature, analysis, and methods can be evaluated that are not present in the review portion of the literature.

Materials and Methodology

Research design

For the research, the materials and methodology are required to be evaluated. Based on the proper methods the evaluation of eco-friendly construction can be possible. With the help of identification of the literature, the impact of green building that is eco-friendly construction on the environment as well as in the life of the people on the earth can be detected. For this, it can be stated that this research is based on qualitative design, and by this research, the impact of eco-friendly construction and the components used in eco-friendly construction can also be identified (Shim et al. 2019). The detection of a proper method is also necessary for the identification of the proper effectiveness of the research.

Research method

The method is important for the maintenance of the proper process of the research. Based on the identified gaps in the literature it can be stated

that the secondary research method of the research is useful for gathering knowledge about the impact of eco-friendly construction on the earth. Different types of chemicals that are used in the construction can be evaluated and with this, the impact of the component on the environment can be identified through this research.

Research strategy

Research strategy is important for the identification of the proper process of the research. With the use of the proper literature, the accuracy of the literature can be evaluated. Some of the keywords can be used for the identification of the journals and literature. The databases are required to be used for the literature (Ni et al. 2020). With the use of the literature or the journal papers, the accuracy of the literature can be effectively used. The main database that is used in this research is Google scholar. Some of the keywords can be used for the identification of the proper literature from the database. The keywords can be “Identification of the impact of eco-friendly construction”, and “Role of IoT in eco-friendly construction”. With the use of IoT-based high levels technology, the use of natural resources can be possible. With this, the reduction of the used electricity can be used by the natural resources for energy.

Research ethics

The maintenance of some rules is required throughout the research. These rules are required for the maintenance of ethics at the time of the research. At the time of the collection of the information, the citation is important to be based on the selected and included literature in this research (Karimah et al. 2021). The avoidance of plagiarism is important in this research. This is required for

the maintenance of proper ethics as well as the academic integrity of the research.

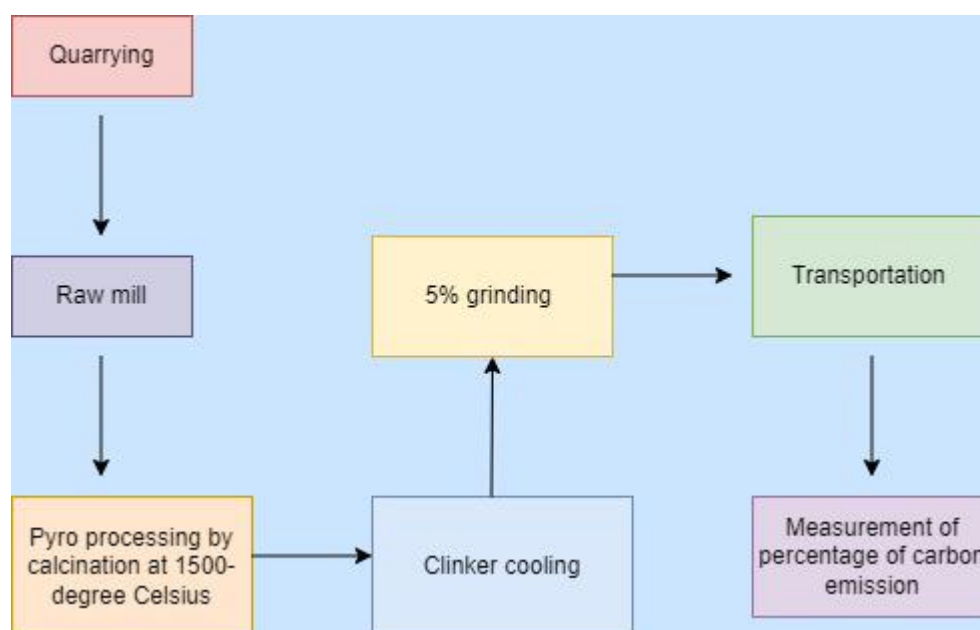
Results and Discussion

Results

In this part, the impact and the identification of the components used in eco-friendly construction can be possible. With the evaluation of the impact of this type of construction, the source of the carbon emissions can be identified in the case of sources through man-made. After China and the United States, the cement industry would be

the third largest global emitter of carbon dioxide (CO₂) if it were a nation. 5% to 8 percent of all man-made carbon comes from the production of “Portland cement (PC)”. The emissions of greenhouse gases or 0.6 kilograms to 0.8 kilograms of CO₂ for every kilogram produced worldwide. With the presence of eco-friendly construction, the reduction of the use of water, solid waste, emission of carbon into the environment, and use of energy can also be possible (Yu et al. 2020). The percentage of the reduction of these factors can also be identified. [Referred to Appendix 1]

Figure 4: Identification of the percentage of carbon dioxide emissions



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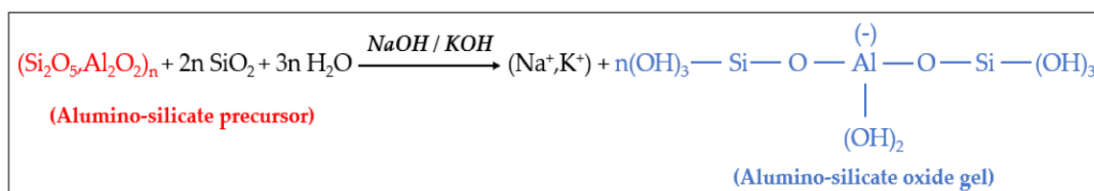
An alumino-silicate cement material known as GC, or geo-cement, is the product of an inorganic nature of “polycondensation” reaction between “solid alumino-silicate” precursors and an “alkaline hydroxide” solution. This process is referred to as “polymerization” or concentrated silicates like “sodium silicate” which is “Na₂SiO₃”, “potassium silicate (K₂SiO₃)”, and “potassium hydroxide (KOH)”. In a strong alkaline

solution, the reaction of “alumino-silicate” oxides that is Si₂O₅, Al₂O₂ breaks “Si-O-Si” bonds and introduces “Al atoms” into the “Si-O-Si” structure. The initial precursors of the “geopolymers” used in polycondensation are the produced “alumino-silicate oxide gels” based on the “Si-O-Al block”. The material that calls for thermal cross-linking treatment in the temperature range of 25 to 90 °C is suitable given the material's good progress in

polymerization and the attribution of mechanical resistance properties. Polysialate structures make up geopolymer networks, with sialate representing the Si-O-Al building unit. The final nature of the “lattice structure” and “crystallinity” of the “geopolymer binder” is significantly influenced by the “Si/Al” atom ratio. Fine particles known as “fly ash (FA)” are produced when exhaust gases from power plants or at the time of separation of bituminous coal. The conditions of combustion and the characteristics of the original coal mineral influence the chemical composition (Sambucci

et al. 2021). “Fly ash” is produced in large quantities as a result of the high demand for energy in both domestic and industrial settings. The process's use of either anthracite or lignite, a coal-based raw material, is primarily to blame for the resulting variations in composition. FA-based geopolymer does not need to be treated at high temperatures or use a lot of energy, unlike the precursor Metakaolin which is abbreviated as MK. the equation for the “hydrolysis reaction” can be provided below based on the precursor of aluminum-silicate.

Figure 5: “Hydrolysis reaction” for the precursor of aluminum-silicate



(Source: Sambucci et al. 2021)

Discussion

Cloud computing can be one of the important technologies for the physical infrastructure of smart cities. A distributed type of open-source network as well as a decentralized cloud are required for the deployment of smart cities. Applications for smart cities rely heavily on cloud computing services. Due to this, cloud computing is required for handling the large amounts of heterogeneous data gathered from various devices in smart cities. The terms “smart city” and management of “natural resource” both refer to high levels of quality of life. Green IoT solutions include lowering IoT power consumption and lowering CO₂ emissions to create a sustainable and smart world (Almalki et al. 2021). The creation and operation of eco-friendly aspects are included in green IoT. Development of computing devices, energy efficiency, communication protocols, and network architecture are all

components of green IoT design. For green IoT in smart cities to become user-friendly and sustainable, IT plays a crucial role. ICT can use up resources, cut costs, and cause less pollution. With this, it also utilizes city services as well as raises the standard of living (Iucolano et al. 2019). Automation, IoT-enabled automated security threat isolation, simplification, and scalability all contribute to smart city adoption. From this, it can be stated that eco-friendly construction impacts the formation of smart city formation. [Referred to Appendix 2]

Conclusion and future scope

Conclusion

From the overall analysis, it can be concluded that the maintenance cost of buildings can be reduced with the use of this eco-friendly construction. The cost at the beginning is comparatively high for the formation of green

buildings. As the reduction of carbon emissions can be reduced through this green building the level of pollution as well as the percentage of solid waste can be reduced. For this, the development of the environment, as well as the maintenance of biodiversity, can be possible through the formation of green buildings can be possible.

Future scope

The future scope for eco-friendly construction can be the presence of the sustainable nature of architecture. By standardizing renewable, energy-efficient, and even carbon-offsetting structures where appropriate, sustainable architecture presents an important opportunity to revolutionize carbon-free construction (Wijayaningtyas et al. 2019). However, it still promotes employment, housing, and numerous other benefits. The home will be worth more. In addition, the money can be saved on electric bills and enjoy a healthier and more pleasant workplace. Additionally, it may be able to attract tenants who are more qualified. People who want to live or work in an eco-friendly environment will benefit most from green buildings.

Recommendations

Some of the recommendations can be evaluated in the formation of eco-friendly construction and its impact on the environment and earth.

- The materials that are generally used for the formation of green buildings or eco-friendly construction can be limited in amounts for the reduction of waste.
- The management of waste can be possible by taking the proper process of waste management as well as recycling the waste materials (Prabagar et al. 2022).

- The conservation efforts can be improved through the management of construction sites.

- Through the adaptive reuse of the projects, the transformation of the old buildings can be possible.

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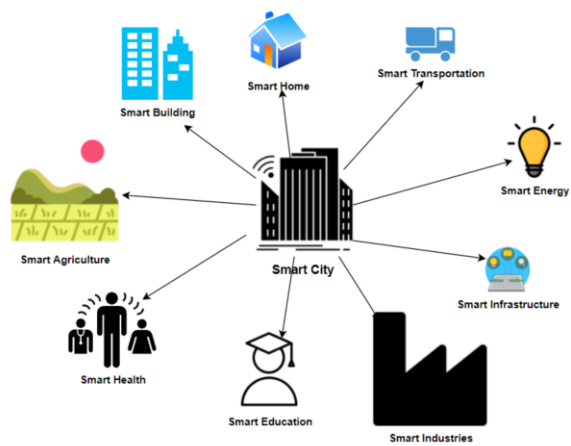
Appendices

Appendix 1: Reduction of factors through green buildings



(Source: <https://iqubx.com>)

Appendix 2: Adaptation of smart city



(Source: <https://www.mdpi.com>)