Artikel Incitest 2020

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Submission date: 29-Oct-2022 01:32PM (UTC+0700)
Submission ID: 1938524148
File name: Fattah_2020_IOP_Conf._Ser.__Mater._Sci._Eng._879_012145_1.pdf (1.11M)
Word count: 1685
Character count: 9138

Utilizing Technology of Dynamic Faces on Buildings

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Abstract. This research aims to describe utilizing the technology of dynamic faces on buildings. It used a descriptive method for depicting dynamic facades and literature review. This research described that the development nowadays is getting faster and receiving many demands for job simplification. It is the same as in building materials called material technology. This technology emerged because of the insistence on human needs and awareness of taking care for the environment. One of them is a dynamic facade which has a futuristic concept that uses sophisticated technology yet environment friendly. With the dynamic facade, it is expected to be an educational material for the public to think more visionary and care for the environment. The dynamic facade is also very helpful to humans in terms of saving human labour. The results of this study were that buildings could integrate with the environment and utilize abundant natural resources.

1. Introduction

The world population is increasing worldwide, and so is the developments in the city or suburbs to support human life. The more development, the higher the demand or demand for energy and materials will be. Natural resources that cannot be renewed are almost extinct because they are exploited by humans who do a lot of development without thinking about environmental aspects [1]. So, the inventors who refer to the concept of green are competing to create material technology that produces products that can help people, the environment, and the earth. A product that is capable of transforming renewable natural resources into energy sources for buildings is needed. One of these natural resources is sunlight. In buildings that are usually in direct contact with outside areas where there is sunlight are facades. Research on the use of dynamic facades continues to be carried out to produce the optimal.

Previous studies have shown that dynamic facades are able and successful as sun shading in buildings where the facades reduce 50% of the sun's heat and save CO2 emissions. It is also a matter of public education to stop relying on artificial energy such as lights by maximizing existing light [2]. Dynamic facades have succeeded in reducing the use of non-renewable resources by utilizing technology and sunlight. With research on the use of dynamic facades, it can be emphasized that there are still ways to care more about the environment and start reducing the exploitation of natural resources. It is hoped that this dynamic facade can be the answer to buildings that want to have an energy source to meet their needs but are not excessive and visually quite iconic. The dynamic facade is also the identity of a building with advanced technology but is still on the green concept reference.

The purpose of this study is to describe the use of dynamic face technology in buildings. This study uses descriptive method to describe dynamic facades and uses literature review which are previous research journals to complete this research.

2. Method

This research method uses a descriptive method for depicting dynamic facades and uses a literature study that is a prior research journal to complete this research.

3. Results and Discussion

3.1 Facade

Facade is the first visual and identity of the building [3]. Facade characterized the typology of each building function. It also reflected the inside of the building. So, facade was very important in the design. It also had variety of materials, namely wood, ACP, aluminium, glass, and many others (See Figure 1).

Figure 1. Façade of row building

The picture above, shows us about façade of row building impacting the dynamic of the essence.

3.2 Dynamic

Dynamic is a state in which something moves to adjust to its surroundings. Usually the shape and system follow the environment [4] (See Figure 2).

Figure 2. Dynamic Façade

The picture above showed that dynamic façade around the building ensuring the penetrating of sunlight and air flow.

3.3 Bioclimatic

Bioclimatic was a concept of adaptation to the surrounding climate. This bioclimatic relied on the energy in nature and stopped to rely on energy that produces detrimental waste to our environment [5] (See Figure 3).

Figure 3. Bioclimatic building

Bioclimatic building as picture above provided by the architect Ken Yeang.

3.4 Dynamic Facade

The dynamic facade was a facade that could move or change from shape or colour to adjust to the climate. These were usually applied to buildings to reduce the use of artificial energy [6] (See Figure 4).

Figure 4. Dynamic Façade

Dynamic Façade that can be easily adjust to changing in environment as we seen in the picture above.

3.5 Use of Dynamic Facades

This dynamic facade technology existed as an answer to utilize the surrounding natural resources and used them as a substitute for artificial energy in buildings. This dynamic facade also had high aesthetic value with a bioclimatic concept. Moreover, it had the ability to adapt to the climate by the concept of bioclimatic. This was to achieve the level of user comfort [7]. This dynamic facade was concerned with visual, technological, thermal and air circulation aspects [8]. In a building, dynamic facade would open during the day, so the building did not need artificial lighting because the facade had maximized sunlight as building lighting. This dynamic facade would open and close according to user needs. Apart from being a medium for incorporating sunlight, dynamic facades could also function as sun shading by filtering out sunlight with certain patterns. Usually, this dynamic facade was set manually by human power for small scale and automatically by software for large scale [9]. This dynamic facade worked manually or automatically and only moved the facade materially or in shape without affecting the main structure of the building [10] (See Figure 5).

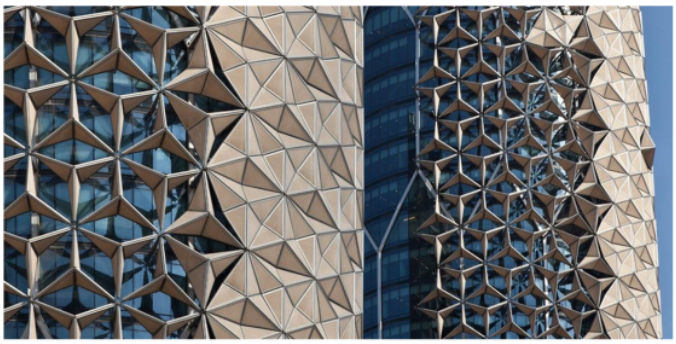

Figure 5. A complicated Dynamic Façade

A complicated dynamic façade in the picture above also became the attractiveness and beauty of the architectural aspects.

4. Conclusion

The results of this study were that buildings could integrate with the environment and utilize abundant natural resources. Although integrated with the environment, this facade could still be directly proportional to modern technology and visually appealing and sophisticated system. This dynamic facade technology was expected to help buildings that would save energy by using it especially in tall buildings.

Acknowledgement

The author would like to thank all those who have been involved in this research, helped find ideas and helped find related data so that the author could finish writing this research properly.

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