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CONCEPTUAL DESIGN OF GREEN FACADE TO PROVIDE THERMAL COMFORT

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***Abstract*—The principle concern of this paper is to assess the effective design of green facade to reduce HAVC load and to provide thermal conform to user ,is computed by the detail analysis and stimulation. Building Integrated Green Facade (BIGF) offer new possibilities from the sustainable construction point of view, especially in energy savings and reducing the external solar radiation. green facade to intercept solar radiation was confirmed, observing differences up to 18 ºC in surface temperatures between sunny and shade areas on the wall of the building. The experiment carried over the college building (Kings College of Engineering ,Thanjavur, Tamilnadu ,India) In a first step only the South wall was covered by provisional green facade because it comparatively have more solar radiation.**

Keywords—Green Facade; Thermal Comfort; Building Integrated Green Facade

I.INTRODUCTION

Buildings are responsible for a large proportion of the carbon emissions in developed & developing countries, the HAVC utilized the maximum energy in the building it can be reduced by using the greenery vertical system GVS is nothing but green facade . The green facade fulfil the four principle of sustainability building .the four principle of sustainability of building are given below they are

1. Environmental protection
2. Economic effectiveness
3. Social inclusion and participation
4. Cultural adequacy

A.ENVIRONMENTAL PROTECTION

Structure should be planned, constructed and used in a way that minimizes environmental impact and promotes environmental sustainability. structure that contribute to reducing the carbon emission of buildings throughout their life-cycle, from design, material supply, manufacturing, and construction, to use, maintenance, refurbishment, and demolition. Resilient urban settlements which, when possible, use renewable energy, and proactively take into account climate change.

B.ECONOMIC EFFECTIVENESS

Design what we planed must be economical one and it also to be eco-friendly .To reduce the HAVC load and to provide the Thermal comfort to the users of our structure we have to find the more economical solution ,if we go with the side of solar cladding or solar facade it may break the second principle of sustainability of building, so we need to go with the other side if we made detail study we can find the only think which can fulfil the all four principle its one and only green facade

C. SOCIAL INCLUSION AND PARTICIPATION

The human benign are have high social relationship between the plants and it place the major in our day to day life . we need an participation of plan to lead the peaceful life ,the green facade made it true and increase the relationship nature and human in effective manner

D. CULTURAL ADEQUACY

The green facade gives the natural elevation for the structure and it merge with our cultural aspects and it enhance the emotional wellbeing of people. the green facade that takes into consideration the background and culture of inhabitants.

II.OBJECTIVE

The Green Facade has enormous significance for

both indoor climate and energy consumption as there are many energy-flows both ways over this boundary between the external and internal environments. The main role of the façade is to protect the indoor environment from the outdoor environment and the optimization of this function includes control of (leaving out many other functions as noise, security, etc.):

- Heat transmission from inside to outside
- Solar load from outside to inside
- High utilization of passive solar gains
- High utilization of daylight
- Protection against glare from outside
- Air flows between inside and outside (both ways)
- Allow for a view to the outside
- Allow for privacy

III.METHOD OF ANALYSIS:

amount of solar radiation over south elevation of the building in the year cumulative analysis it have

month	Amount of radiation KWh/sq.m
January	465
February	399.5
March	286.1
April	205.3
May	86.26
June	67.34
July	68.9
August	151
September	294.9
October	371.8
November	460
December	441.6

523.6 KWh/sq.m

IV.ASSESSING ENVIRONMENTAL REQUIREMENTS

As the result form analysis the block II have the high indoor temperature due to the external solar radiation ,the building have south elevation form that side it receive more radiation and it main factor affecting the thermal comfort of the user ,as the analysis taken in the college building it majorly affect the student and it made impact on their health and even in the exam result. hence the south side of building need a protection for the solar radiation and its provide by the Green Facade

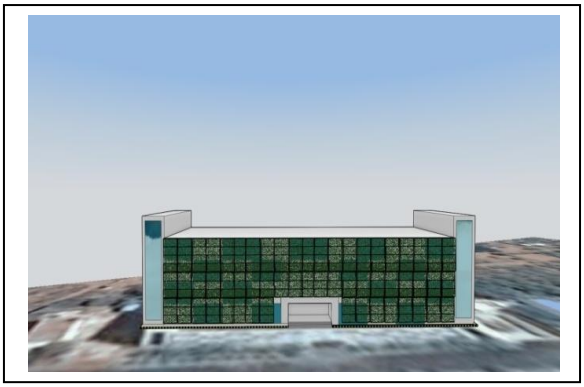

FIG.1.GREEN FACADE IN THE SOUTH ELEVATION

V.HEAT PROBLEM DUE HIGH TEMPERATURE

The healthy human body should be maintaining its body temperature around 37°C. Variations, should not more than 1°C, the change will occurs time of the day and level of emotional or physical activity. Change in body changes occurs only during the time of illness or when the surrounding temperature change in high level

When the surrounding temperature increase the human body also tends to increase the internal temperature. The internal temperature of a body is maintained by process of thermostat which pumping the more blood to the skin by increasing production of sweat. By this way, the heat loss is increased by the human body due to heat burden. The heat grain is more than the heat loss due to high temperature in surrounding. The internal body temperature will arise when the surrounding temperature is high

As the temperature or heat burden increases, people may feel:

- Increased irritability.

- Concentration reduced to do mental task
- Amount of mental stress will increase which affect the efficiency of work

VI.RESULT

The analysis carried over the south elevation after the installation of green facade there was an major change can be visualized .

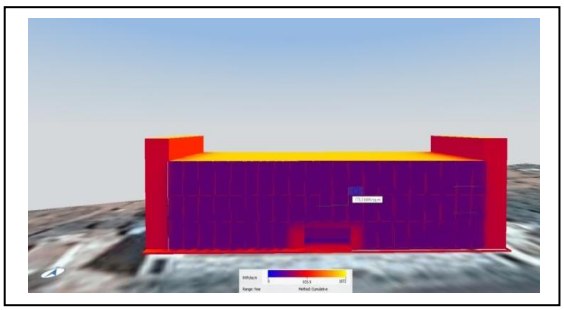

FIG.2.THERMAL ANALYSIS AFTER THE INSTALLATION OF GREEN FACADE

Table 1

Method of analysis	Before installation	After installation
Year cumulative	523.6 KWh/sq.m	173.3 KWh/sq.m

comparative analysis of the results between without & with Green Facade

the analysis is carried by using monthly peak analysis and the result is compared below, the huge amount solar radiation decrease in year cumulative analysis

VII.CONCLUSION:

The building integrated green facade BIGF in recent years has evolved conceptually from a primarily aesthetic design, gardening, or of artistic expression by the designer or the manifestation of economic power by the promoter, no a "vegetated architecture" in which the vegetation is another element of the building, with specific functions to develop the building as well as its relationship with the environment (energy aspects, acoustic protection material, support of biodiversity, provide thermal comfort).

the green facade reduce the HAVC load and give the oxygen by the process of photosynthesis

a vertical vegetation cover could lower the temperature of a facade wall and buffered its fluctuation with time, leading to reduced power loading air-conditioning. Time lag in temperature increase reflected that a vegetated cladding could mitigate the potential impact of solar heat that continued to affect the indoor space after sunset.

With a green plant cover on a facade over south elevation wall, student could be benefited by a physical and mentally and get good result in exams . The management can have cheaper electricity bill in addition to the ecological merits of the vertical green panels.

In general, the use of vegetation, so well designed and managed, can be a useful tool for passive thermal control of buildings with the consequent energy saving. This can occur in four ways, often related, thermal insulation, and the interaction with solar radiation, ie shade, evaporative cooling, and the variation of the wind on the building.

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