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Advance Parking System for DYPU, Pune

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ABSTRACT: In recent years, the upturn demand of electricity and the generation of electrical power demand from fossil fuels are increasing day by day which results in environmental impacts on the atmosphere by greenhouse gases, and a high cost of electric power from these sources makes it unaffordable. The use of renewable energy sources can overcome this problem. Therefore, in this work, I present a solution by implementing the solar car parking lots. A detailed work has been done for solar car parking site selection and maximum solar electric power generation and its capacity effects with the shading of nearby trees and buildings by using the Helioscope online software developed by Folsom Labs.

A detailed optimization and selection of car parking canopies are performed at different standard tilt angles to produce maximum solar photovoltaic energy, and it is analyzed that the monoliths canopy is the best to mount at solar car parking lots at a tilt angle of 10° . I have done a detailed economic analysis which shows that 14% electricity cost was offset by the installation of a solar car parking lot with 17% reduction in annual energy consumption from the grid at the proposed site. The total investment cost of the parking structure and the photovoltaic (PV) system can be paid back in 6-7 years.

The main reason for selecting this project is to find the most efficient way and to face the current challenges that are faced nowadays due to the unavailability of the parking facility in the said campus.

I. INTRODUCTION

A parking lot is an area that is assigned for parking. Normally, the parking spaces are in open ground and or basement of the building marked on the ground with white or yellow lines that forms squares that each fit one car. But in advance parking system we are going to replace normal roof with solar panel and base with pervious concrete and a proper drainage facility.

Solar parking provides valuable parking lot shade while generating clean energy for reduced utility costs.

It can also significantly improve a parking area's overall lighting. This is since the lighting is now closer to the ground, with a reflective material located above the parking lot's finished surface. When landscaping is incorporated around solar carports, your new energy generating facility can also become a wonderful addition to the property.

Now a days as the number of vehicles are increasing in our campus DYPU, Pune we are facing lots of problem like shortage of space and proper incoming and outgoing in parking area. And as the number of student increases, power consumption is also increasing because of all these factors. We are willing to construct an advanced parking system in our campus which has solar panel on the roof to generate electricity as per its capacity.

We are providing a sloppy base for rainwater runoff, pervious concrete to provide proper drainage system as well as which are going to be helpful for ground water recharge. A tank is provided at the lower inclination of base to store rainwater for various purposes such as WC, Gardening, etc.

II. OBJECTIVES

- To provide spacious and advanced parking facility for DYPTC.
- Providing solar panel in parking lot we can utilize the land for various purposes like producing electricity, ground water recharge and storing water as well for further use.
- To utilize free land for rainwater harvesting.
- To shade vehicles during summer.



III. STUDY AREA OF THE PROJECT

- India has tremendous scope of generating solar energy. The geographical location of the country stands to its benefit for generating solar energy. The reason being India is a tropical country and it receives solar radiation almost throughout the year which helps to convert solar energy into electricity.
- To help vehicle owner for easy incoming and outgoing to parking area.
- To achieve an architectural milestone.

IV. METHODOLOGY

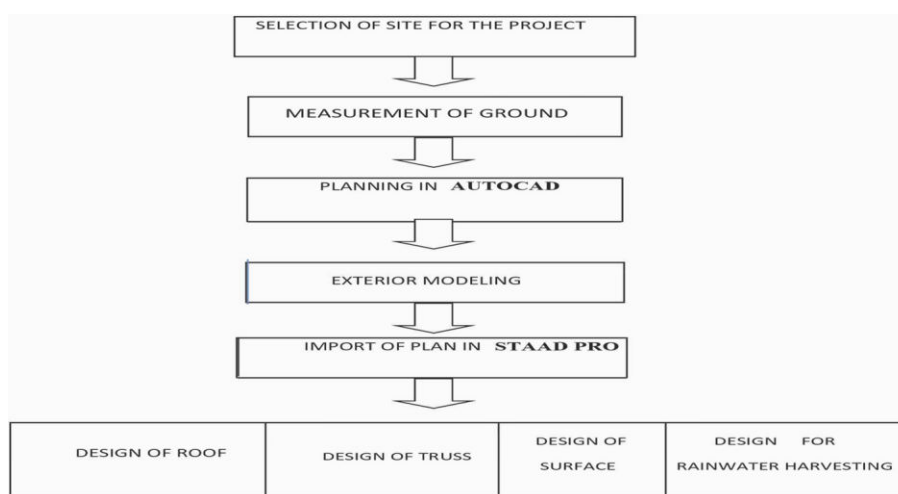


Fig 1: Process Chart for Methodology

V. DATA COLLECTION & ANALYSIS

For suggesting any idea regarding power consumption, it is essential to know consumption in detail. For this, I went to each department, hostels, library, labs and detailed information about appliances was collected. Many appliances were mentioned rated values on name plate, but actual power consumed is measured by power analyzer. Some other useful information was also obtained with interviewing electricians working in the institute.

Light intensity was measured using luxmeter. Some approximations were taken while there was lack of information or sometimes loads were neglected considering very small fraction of total load.

Main problem was faced during the data collection concerned with time usage of electrical appliances hours per day and days per year. To sort out this problem, data collection was verified with electricians, students in hostel, wardens, chief warden and office workers.

DYPU is established in 2008 and it is one of the top engineering colleges in PUNE providing technical education. The institute has 1 boys hostel, 1 girl hostel, 6 academic blocks, 1 administrative block, 1 library, 1 sewage plant. As on the date, the student strength of the institute is about Approx. 5000 with total faculty plus staff strength of about 300 and over an area of about 90 acres. The institute load demanded is 1667 KVA and annual electricity bill keeps up around 2.8 crore.

The objective is to promote the idea of energy saving, reducing the electrical energy consumption, also it was opportunity for the students to feel practical problems and difficulties in performing energy audit calculations.



MONTH	UNIT CONSUMPTION
MARCH	244137.7
APRIL	224194.5
MAY	224697.2
JUNE	155113.8
JULY	112204.1
AUGUST	246777.06
SEPTEMBER	246777.06
OCTOBER	202243.2
NOVEMBER	183166.8
DECEMBER	144482.5
JANUARY	181374.9
FEBRUARY	182199.2

Table1: This table is formed based on different electricity bills of MSDCL

Total Electricity consumption annually 2347368.13 kwh



Fig 2 : Two Wheeler Parking

PLANNING IN AUTOCAD SELECTION OF TRUSS

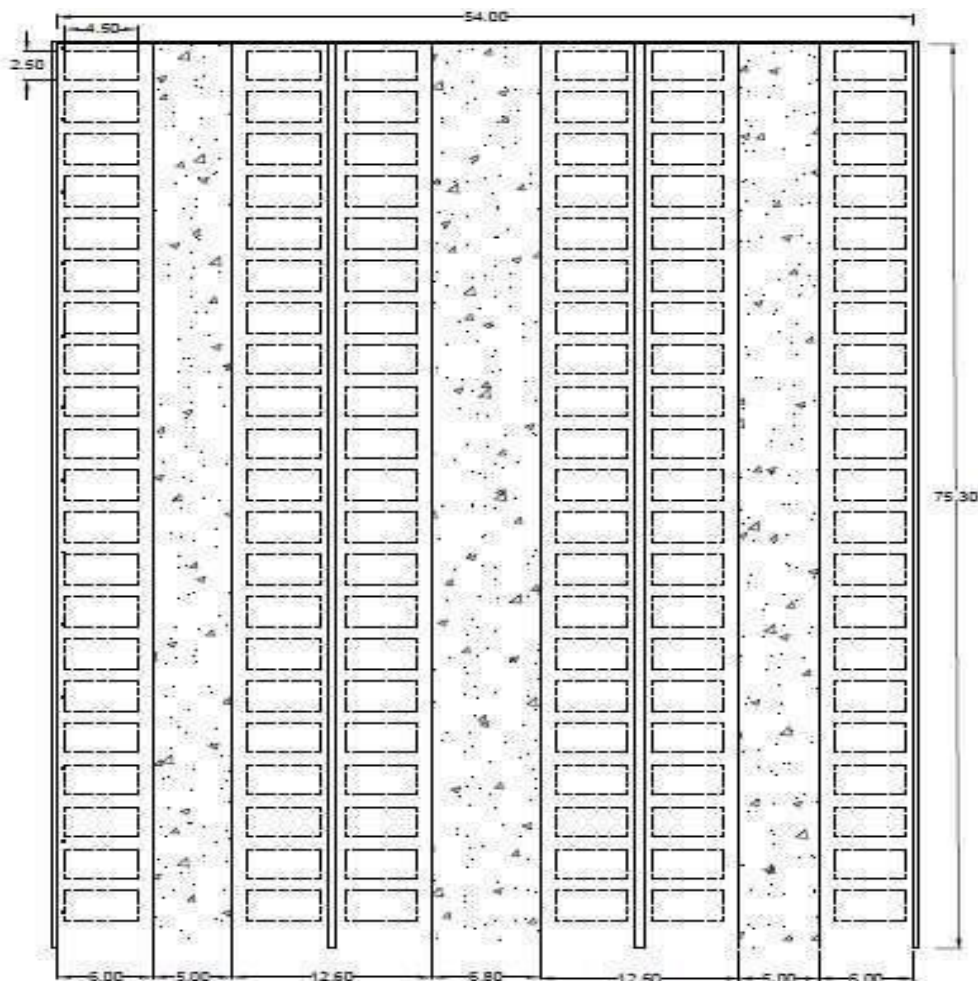


Fig 3: AutoCAD Plan View for the proposed parking

VIEW OF PARKING SITE

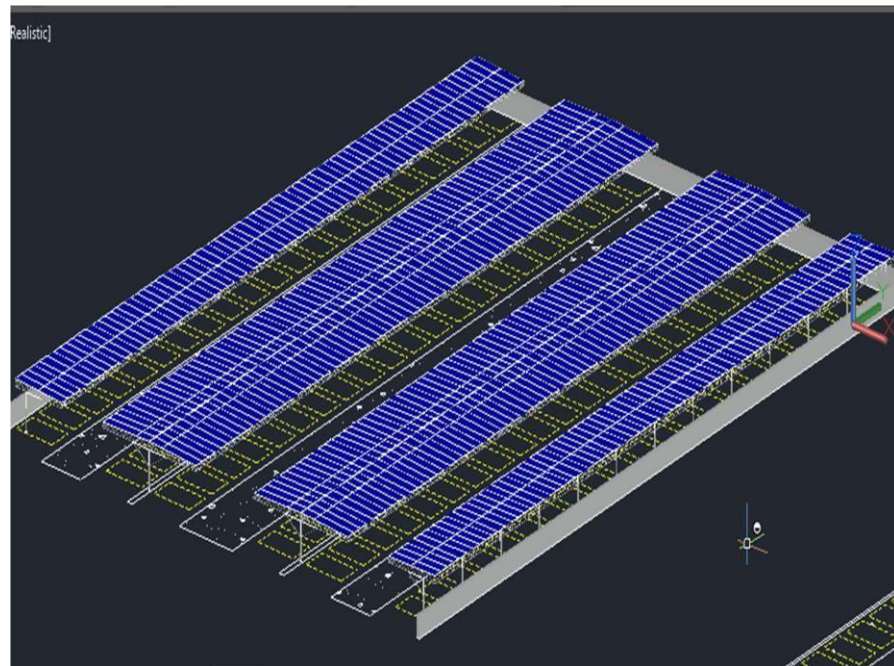


Fig 4: View Of Parking Site

VI. RESULTS & CONCLUSION

- **TRUSS** (section used ISA40x40x6, ISMB 150)

Weight of steel required for truss = 215481 kg
Cost required for steel = RS 9157942.5

- **SOLAR PANEL**

NO. of solar panel required (2592 sq.m) = 288 no's
Cost required for solar panel = RS 20365715
Electricity produced annually = 468328 Kwh
Electricity required annually = 2347369 kwh.

Weight of solar panel

Wt. of panel P1,P2 – 225KG
Wt. of panel P3,P4 – 225 KG

Dead load UDL of 28.125 kg/m (on all side of support of panel)

- **PCC (Pervious concrete)**

Area = 4066.2 sq.m

Cost of pcc = RS 4437760

- **Underground water tank**

Capacity = 1 lakh liter
Cost required = RS 404313

- **Rainwater harvesting**

water collected Annually = 7493700 liter (74.9 lac liter)
water required Annually = 15029520 liter (1.5 cr liter)

Solar car parking lots provide shade to cars and solar photovoltaic (PV) energy. It is beneficial for consumers as it can offset their monthly energy demand from the grid and dependency on the grid. In this research work, a detailed shadow analysis is done before the installation of solar car canopies to avoid the unwanted shadow of trees and nearby



buildings and to allow the maximum utilization of solar photovoltaic energy since the shadow of trees can decrease 23.8% efficiency to the nominal rating of six car parking lots. Optimization of different car parking canopies is performed at their standard tilt angles, and it is analyzed that the monopitch canopy facing towards south at a tilt angle of 2° has the highest efficiency for the installation of new solar car parking lots.

REFERENCES

1. Khan, B.H ; Non – Conventional Source of energy, 5/e, Mc Graw Hill Education (India).
2. Milliman, Jacob & Christos Halkias: Integrated electronics, 2/e, Mc GrawHill Education India.
3. J.B Gupta; Electronics Devices & circuit, 3/e Vikas Publication.
4. Ashfaq Hussain: Electrical Machine, Dhanpat Rao Publication.
5. S Salivahanan & S.Arivazhagan: Digital Electronics, Vikas publication.
6. Muhammad H.Rashid “Power Electronics” Pearson.
7. Marcelo Bertalmio, Luminita Vese, Guillermo Sapiro Osher, “Simultaneous Structure and texture Image Inpainting,” IEEE Transactions on Image Processing, Vol.12, No. 8, 2003.



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