

Why is civil engineering important for solar energy projects?

Civil engineering plays a pivotal role in ensuring the success of solar energy projects by providing essential groundwork and structural support. It begins with meticulous site assessment, analyzing topography, soil composition, and environmental factors to optimize solar panel placement for maximum efficiency.

Do solar PV systems contribute to building sustainability?

Solar photovoltaic (PV) systems contribute to buildings' sustainability by reducing the need for electricity from the grid. However, the diffusion of PV systems installed in the built environment (BEPV) in Sweden has historically been slow (Lindahl et al., 2021) and has therefore been subject to research.

Can solar PV be used in construction industry?

Some scholars have studied PV as part of the construction industry (Wong and Cronin, 2019; Curtius, 2018), identifying challenges due to a lack of BEPV standardization in the industry. However, there is a gap in studies addressing the specific process of implementing solar PV systems in the professional construction industry.

Are solar PV systems an innovation in professional construction?

New knowledge of solar PV systems as an innovation in professional construction is collected, enabling the adaptation of management strategies for its implementation. This knowledge can also be applied generally to other challenges encountered in highly systemic innovation implementation.

Are actor-specific barriers associated with solar PV systems in construction?

Actor-specific barriers were identified and analysed using an abductive approach. In light of established definitions of systemic innovation, the process of implementing solar PV systems in construction involves challenges regarding technical and material issues, competencies, and informal and formal institutions.

Why are technical consultants unsure about integrating PV into their disciplines?

Technical consultants described this as the lack of a defined or routinized way to handle PV-related tasks in the design phase. Together with architects and PV experts, technical consultants described their uncertainty about how to integrate PV into their disciplines.

In this study the subject is addressed through experimental measurements and numerical assessment of a standard photovoltaic module under different conditions. Boundary layer wind tunnel tests were performed to determine wind loads over ground mounted photovoltaic modules, considering two situations: stand-alone and forming an array of panels.

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and 5 columns fixed photovoltaic support, the typical permanent load of the PV support is 4679.4 N, the wind load being 1.05 kN/m², the snow load being 0.89 kN/m² and the seismic load is 5877. ...

experimental tests on large civil engineering structure models with geometric scale of 1:500 to 1:100 to produce an aerodynamic model of SP subjected to wind load and mounted on ground. Mathew et ...

A significant issue for both researchers and stakeholders within the photovoltaic industry is the use of solar tracker systems to gain the most efficient degree of solar irradiance, by following the movement of the sun. This paper introduces a complete view of the main parts of solar photovoltaic technology, focusing primarily on structural and geotechnical aspects. Firstly, it ...

The photovoltaic solar energy is comprised of many engineering disciplines. Geotechnical engineering is one of those disciplines in which it has important functions in the solar photovoltaic technology and particularly for large scale projects which usually employed in open areas such as parks or deserts. The aim of this paper is to present in depth the role of the geotechnical ...

The results show that: (1) according to the general requirements of 4 rows and 5 columns fixed photovoltaic support, the typical permanent load of the PV support is 4679.4 N, the wind load being 1 ...

Extensive research has been conducted to address the issue of the reduced efficiency of solar photovoltaic (PV) cells at high temperatures. To address this problem, a hybrid cooling system has been developed. This system uses a thermal collector to convert waste heat into reusable heat. Selecting the best configuration and operational parameters for the collector is crucial for ...

A novel hydrodynamic theoretical model coupling of the macro-wave action, mesostructure, and micromaterial was established through this equivalent dynamics method. As an illustration, this hydrodynamic-structural-material coupled analytical model was utilized to design and optimize floating photovoltaic support structures.

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The potential of photovoltaic glazing extends beyond solar energy production. It also provides thermal and acoustic insulation, UV protection, and improved indoor lighting conditions. The versatility of this technology is ...

Coulbourne, W. L., & Stafford, T. E. (2020, April). Wind Loads: Guide to the Wind Load Provisions of ASCE 7-16. American Society of Civil Engineers. American Society of Civil Engineers. (2017, June).



Photovoltaic support civil engineering conditions illustration

Minimum design loads and associated criteria for buildings and other structures. American Society of Civil Engineers. Google Maps; MT Solar

The offshore environment represents a vast source of renewable energy, and marine renewable energy plants have the potential to contribute to the future energy mix significantly. Floating solar technology emerged nearly a decade ago, driven mainly by the lack of available land, loss of efficiency at high operating cell temperature, energy security and ...

Abstract Computational fluid dynamics (CFD) simulation results are compared with design standards on wind loads for ground-mounted solar panels and arrays to develop recommendations for a uniform design method. A case study solar farm built in two phases (phase 1 and phase 2) is considered under the impact of Hurricane Maria. The two phases ...

The main element in the photovoltaic glazing system is the photovoltaic module. Many individual solar cells are interconnected to form a module. These modules are strung together in a series with cables and wires to form a photovoltaic array. The sunlight shining on solar panels induces the photovoltaic effect.

ICE's energy briefing sheets provide an informative guide to the various sub-sectors, issues and challenges within the energy industry. Authored by members of our Energy Expert Panel, our briefings are updated regularly and are intended to provide accurate information to a varied audience. This briefing sheet focuses on solar energy.

and design of bracket foundations need to comprehensively consider various conditions, including the type of upper bracket structure, geological conditions, load conditions, hydrological conditions, construction technology, and should be optimized and adjusted in combination with project schedule requirements and local experience.

Platipus Anchors are the global market leaders in the design, manufacture and supply of Percussion Driven Earth Anchors (PDEA ®). Founded in 1982, we are renowned for providing some of the most innovative and cost-effective ground anchor solutions for the Civil Engineering and Construction industries.. The Percussion Driven Earth Anchor (PDEA ®) is a unique, ...

The development of China's photovoltaic industry is the most rapid, as of the end of 2020, China's cumulative grid-connected photovoltaic installed capacity of 253.43 GW to ...

PDF | On Feb 1, 2024, Chi Zhang and others published Development of compliant modular floating photovoltaic farm for coastal conditions | Find, read and cite all the research you need on ResearchGate

The current research used water base aluminium oxide (Al₂O₃) nanofluid as a coolant in a photovoltaic thermal system, and established a 3-dimensional CFD model to investigate the thermal performance of a



Photovoltaic support civil engineering conditions illustration

Photovoltaic system with and without cooling. Ansys software 18.2 is used to investigate heat transfer and fluid flow in the photovoltaic system.

We take the phase I engineering stage of a photovoltaic generation project in Daqing city, Heilongjiang Province, China, which is located in a high-latitude and low-altitude region as an example. Based on full-scale in situ experiments, a finite element simulation is performed using the ANSYS software to study the frost jacking effect of steel pipe screw piles.

Agrivoltaics is a relatively new term used originally for integrating photovoltaic (PV) systems into the agricultural landscape and expanded to applications such as animal farms, greenhouses, and recreational parks. The dual use of land offers multiple solutions for the renewable energy sector worldwide, provided it can be implemented without negatively ...

Evaluating the site-selection process for photovoltaic (PV) plants is essential for securing available areas for solar power plant installation in limited spaces.

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