Design of cable structure photovoltaic flexible support

What are the characteristics of a cable-supported photovoltaic system?
Long span,light weight,strong load capacity,and adaptability to complex terrains. The nonlinear stiffness of the new cable-supported photovoltaic system is revealed. The failure mode of the new structure is discussed in detail. Dynamic characteristics and bearing capacity of the new structure are investigated.

What is cable-supported photovoltaic (PV)?
Cable-supported photovoltaic (PV) modules have been proposed to replace traditional beam-supported PV modules. The new system uses suspension cables to bear the loads of the PV modules and therefore has the characteristics of a long span,light weight,strong load capacity,and adaptability to complex terrains.

What is a supporting cable structure for PV modules?
Czaloun (2018) proposed a supporting cable structure for PV modules,which reduces the foundation to only four columns and four fundaments. These systems have the advantages of light weight,strong bearing capacity,large span,low cost,less steel consumption and applicability to complex terrain.

What are the characteristics of a new cable-supported PV system?
Dynamic characteristics As the new cable-supported PV system has the characteristics of a smaller mass and greater flexibility,vibration suppression is one of the key factors of the new structures. Therefore,the mode shapes and modal frequencies are important parameters in the structural design of the new cable-supported PV system.

What is a PV support structure?
Support structures are the foundation of PV modulesand directly affect the operational safety and construction investment of PV power plants. A good PV support structure can significantly reduce construction and maintenance costs. In addition,PV modules are susceptible to turbulence and wind gusts,so wind load is the control load of PV modules.

What is a large-span flexible PV support structure?
Proposed equivalent static wind loads of large-span flexible PV support structure. Flexible photovoltaic (PV) support structure offers benefits such as low construction costs, large span length, high clearance, and high adaptability to complex terrains.

Cable-supported photovoltaic systems (CSPSs) are a new technology for supporting structures that have broad application prospects owing to their cost-effectiveness, light weight, large span,...

Wind-induced response and critical wind velocity of a 33-m-span flexible PV modules support structure was investigated by using wind tunnel tests based on elastic test model, and the effectiveness of three types of

stability cables on enhancing the critical wind velocity of the flexible PV modules support structures was carefully examined.

In this paper, the new flexible photovoltaic support structure is summarized, and the related research articles on the structural design model and wind-induced effect of the flexible photovoltaic support structure in recent years are summarized, so as to provide a reference for subsequent research. ... Keywords:Photovoltaic Support, Cable ...

In recent years, a flexible photovoltaic support structure composed of a pre-stressed cable system has been widely used [1] ~ [6], and its span is generally 10m~30m. The structural design of flexible photovoltaic support has also attracted extensive attention. The structural arrangement of the flexible photovoltaic support is shown in Figure 1.

The wind-induced response and vibration modes of the flexible photovoltaic (PV) modules support structures with different parameters were investigated by using wind tunnel based on elastic test model. The results show that 180° is the most unfavourable wind direction for the flexible PV support structure. For double-cable flexible PV supports,

Photovoltaic (PV) system is an essential part in renewable energy development, which exhibits huge market demand. In comparison with traditional rigid-supported photovoltaic (PV) system, the flexible photovoltaic (PV) system structure is much more vulnerable to wind load. Hence, it is imperative to gain a better understanding of the aerodynamic characteristics and ...

4 ???· In recent years, the flexible photovoltaic module support system, as one of the support forms of the photovoltaic modules, has been widely concerned and applied due to its characteristics such as large span, low cost, and can be used in complex scenarios [29] 2008, Bartholet et al. first proposed a "Solar Wing" single-layer flexible photovoltaic module support ...

Flexible support. Suspension cables. Vibration characteristics ... and self-excited forces and was expected to complement aeroelastic modeling as a convenient and efficient design tool. ... It provides an excellent supplement to the traditional structures. The cable-supported PV structures have a long-span, are lightweight, can bear strong ...

At present, the design standard " Guide for design and installation of photovoltaic flexible support structure." points out that the stiffness design criterion of the cable support photovoltaic module system should be controlled at 1/50, but the stiffness control criterion has no theoretical basis, and the stiffness control standard adopted by Li Shouying et al., 2023 ...

Wind load factor is an important parameter for the structural design of the flexible PV support structure. The time history of the maximum displacement in each row of the test model is used to obtain the wind load

factors, in which the peak factor is 2.5. ... Subsequently, the transient response of the cable-support structure and the wind field ...

In order to respond to the national goal of "carbon neutralization" and make more rational and effective use of photovoltaic resources, combined with the actual photovoltaic substation project, a fixed adjustable photovoltaic support structure design is designed. By comparing the advantages and disadvantages of the existing support, an innovative optimization design is proposed, and ...

In this paper, we mainly consider the parametric analysis of the disturbance of the flexible photovoltaic (PV) support structure under two kinds of wind loads, namely, mean wind load and fluctuating wind load, to reduce the wind-induced damage of the flexible PV support structure and improve its safety and durability. The wind speed time history was simulated by ...

As the most important part of the flexible PV modules support structures, the cable is prone to wind-induced vibrations due to its small mass and low frequency (Li et al., 2014, ... Wind load factor is an important parameter for the structural design of the flexible PV support structure. The time history of the maximum displacement in each row ...

The proposed formulas are validated as both accurate and practical, effectively reflecting the changes in wire rope forces with varying prestress levels. This study provides valuable insights for the mechanical analysis and structural design of flexible PV mounting systems, offering a robust reference for future engineering applications.

Wind-Induced Response of Flexible Support Photovoltaic System. Atmosphere 2023, 14, 731.https:// ... [10,11]. However, it is also equipped with cable structure bearing (see Figure2), smaller cable ...

Analytical studies of a parabolic line concentrator utilizing an aluminum honeycomb support structure and a thin glass reflector laminate. nasa sti/recon technical report n; 1981. ... Tao HX, Wang XD, Wei ZL, Dai HL. Research and application of structural design of new photovoltaic square array bracket. Journal of Baotou Vocational and ...

Web: https://arcingenieroslaspalmas.es