A support structure made of precast concrete and a building thereof, comprising a building top portion and at least a support structure. Said building top portion includes at least a thin film solar cell and a steel frame lateral beam structure supporting said thin film solar cell. Each said support structure includes a support column and a base, said support column supports said building top portion, and said base is at bottom of said support column. Said support column and said base form integrally into one piece by means of concrete material.
SUPPORT STRUCTURE MADE OF PRECAST CONCRETE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a support structure and a building thereof, and in particular to a building having a support structure made of precast concrete, and with its top portion provided with thin film solar cells.

2. The Prior Arts

Along with the global concern about environment protection, and worldwide acceptance and implementation of the concept of “energy conservation and carbon reduction”, therefore, the development and utilization of regenerated energy resources has been the keypoint of development for various countries of the world. Among the regenerated energy resources, solar energy and solar cell capable of converting sunlight into electrical energy are of the most promising energy industry, since sunlight is available all over the world, and it would not create pollution to the Earth like other energy resources (such as nuclear energy, petrochemical energy).

In case that the solar cell is provided with a large light irradiating area, then it can produce relatively large amount of electrical energy for use by various devices. Therefore, quite a lot of manufacturers hope to incorporate the energy saving concept into daily life of ordinary people, such as utilizing reusable solar cell in replacing the conventional disposable battery cells, so as to reduce pollution to the environment. In addition, the concept of “green energy building” can be combined with the solar cell, namely, putting solar cells in a building, where they are most exposed and irradiated by sunlight, such that energy generated by solar cell can be used to compensate for the electrical energy consumed by the building.

Presently, solar energy is most needed for agricultural green house and machine rooms of communication servers where constant temperatures are required. It is essential that the installation cost of the solar cell can be reduced through mass production and change of installation means, and in this respect, the conventional solar cell support structure has much room for improvement.

SUMMARY OF THE INVENTION

In view of the problems and shortcomings of the prior art, the present invention provides a support structure made of precast concrete and a building thereof, wherein the support structure of the building is made of precast concrete, and having the advantage of low cost, increased stability, and wind resistant.

The present invention provides a support structure made of precast concrete, comprising: a support column and a base, the support column is used to support a building top portion, which contains at least a thin film solar cell. The base is disposed at the bottom of the support column, and the support column and the base formed integrally into one piece through utilizing concrete material.

In an embodiment of the present invention, the base is placed on the surface of the ground, or buried under the surface of the ground, so as to stabilize the support structure.

In another embodiment of the present invention, the diameter of the base can be from 30 cm to 60 cm, while the diameter of the support column can be from 5 cm to 20 cm.

In another aspect of the present invention, the present invention provides a building having thin film solar cell, comprising a building top portion and a plurality of support structures. The building top portion is provided with at least a thin film solar cell, and a steel frame laternel beam structure capable of supporting the thin film solar cells. Each of the support structures includes a support column and a base. The support column is used to support the building top portion, and the base is disposed at the bottom of the support column, such that the support column and the base formed integrally into one piece through utilizing concrete material. The support structures can be made in a precast way, and then transported to the site for ready and fast installations.

In a yet another embodiment of the present invention, the range of application for the above-mentioned building includes: an agricultural canopy, a building or a base station house having transparent top portion, and the building top portion provided with thin film solar cells.

Based on the above descriptions, in the present invention, the support structure of the building is made of precast concrete, such that the building top portion is provided with thin film solar cells. Compared with the conventional steel frame structure of the prior art, this kind of building having thin film solar cell is able to save cost, and can be made in advance for fast and easy installation. In addition, the base of the support structure is buried under the surface of the ground, hereby increasing the stability of the building, preventing the building top portion from being blown away by strong winds, such as typhoon, and preventing the building from tumbling down.

Further scope of the applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the present invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The related drawings in connection with the detailed description of the present invention to be made later are described briefly as follows, in which:

FIG. 1 is a schematic diagram of a support structure made of precast concrete according to a first embodiment of the present invention;

FIG. 2 is a schematic diagram of a building having thin film solar cells according to a first embodiment of the present invention; and

FIG. 3 is a schematic diagram of a building having thin film solar cells according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The purpose, construction, features, functions and advantages of the present invention can be appreciated and understood more thoroughly through the following detailed description with reference to the attached drawings. And, in the following, various embodiments are described in explaining the technical characteristics of the present invention.
Refer to FIG. 1 for a schematic diagram of a support structure made of precast concrete according to a first embodiment of the present invention. As shown in FIG. 1, the support structure 100 includes a support column 110 and a base 120, the base 120 is disposed at the bottom of the support column 110. In order to increase stability, the support column 110 and the base 120 form integrally into one piece through utilizing concrete material, on it it is not liable to be damaged or broken by winds or other outside force, and the support structure 100 can be made in a precast way to facilitate transportation and installation.

In the present embodiment, the support column 110 and base 120 are of cylinder shape, diameter L.B of the base 120 is from 30 cm to 60 cm, and the diameter L.N of the support column 110 is from 5 cm to 20 cm. However, to people with ordinary knowledge in this field, the support column 110 or base 120 can be of a hexagon, tetragon, or other shapes, so as to increase aesthetics and stability of the building. In addition, the diameter L.B of the base 120 should be greater than the diameter L.N of the support column 110, so that the weight of the base 120 or its contact area with the surface of the ground is sufficient to support the weight of the support column 110 and the structure it supports.

To be more specific, the support structure 100 is mainly utilized as a support means for the building 20 having thin film solar cell. Refer to FIG. 2 for a schematic diagram of a building 20 having thin film solar cells 230 according to a first embodiment of the present invention. As shown in FIG. 2, the building 20 includes a building top portion 210 and a plurality of support structures 100. The building 20 mentioned above is applicable to an agricultural canopy, a building or a base station house having transparent top portion, and building body 20 having its top portion 210 provided with thin film solar cells 230.

Refer again to FIG. 2, wherein, The building top portion 210 includes at least a thin film solar cell 230, and a steel frame lateral beam structure 220 capable of supporting the thin film solar cells 230. In the present embodiment, the thin film solar cell 230 is a transparent thin film solar cell, such that when in sunny weather and broad daylight, and sunlight L.1 is sufficient, red light, orange light, yellow light, and infrared light in sunlight L.1 are able to pass through the thin film solar cell 230, and reach inside the building body 20 for illumination. Meanwhile, thin film solar cell 230 absorbs the green light, blue light, and ultraviolet light in sunlight L.1, and converts them into electrical energy for supplying it to the building 20 in saving the expense on electricity, or even providing the surplus electricity to the Power Company to earn extra revenue. As shown in FIG. 1, each support structure 100 includes a support column 110 and a base 120, and the support column 110 is used to support building top portion 210. In the present embodiment, the base of the support structure 100 is placed on the surface of the ground, as shown in FIG. 2, so as to stabilize the support structure 100 and the building 20.

Compared with the prior art, the conventional building top portion 210 having thin film solar cell 230 utilizes steel frame as the support structure. However, the steel frame beam used for major support can not withstand the sudden strong winds caused by landform or weather, due to weight, stability, and wind resistance problems. For example, during typhoon or sudden strong wind in the coastal area, the conventional steel frame support structures are liable to be damaged or destroyed. In addition, the cost of steel frame support structure is far greater than that of precast concrete support structure; while the weight, shock resistant, wind resistant, outside force resistant capabilities of the support structure 100 made of precast concrete is far superior to that made of steel frame. Therefore, in the present embodiment, the support structure 100 made of precast concrete is used as the main support structure of the building 20, thus saving the installation cost and increasing the stability of the building 20.

Finally, refer to FIG. 3 for a schematic diagram of a building 30 having thin film solar cells 230 according to a second embodiment of the present invention. As shown in FIG. 3, the present embodiment is similar to the previous one, and their similarities will not be repeated here for brevity. However, the difference is that in the second embodiment, the base of the support structure 100 can be buried under the surface of the ground (as shown as dashed line in FIG. 3), and the support column of the support structure 100 is placed above the surface of the ground to support the building top portion 210, so that the support structure 100 is much more stable in supporting the building 30, and it is not liable to be affected by strong winds or other outside forces to be damaged or tumbled down.

Summing up the above, in the present invention, the support structure of a building is made of precast concrete, and the building top portion is provided with thin film solar cells. Compared with the steel frame structure of the prior art, this kind of building having thin film solar cell is capable of reducing cost, and can be made in advance to facilitate installation. In addition, the base of the support structure is buried under the surface of the ground to increase the stability of the building, thereby preventing the blowing away of the building top portions during typhoon or tumbling down of the building.

The above detailed description of the preferred embodiment is intended to describe more clearly the characteristics and spirit of the present invention. However, the preferred embodiments disclosed above are not intended to be any restrictions to the scope of the present invention. Conversely, its purpose is to include the various changes and equivalent arrangements which are within the scope of the appended claims.

What is claimed is:

1. A support structure made of precast concrete, comprising:
   - a support column, used to support a building top portion having at least a thin film solar cell; and
   - a base, disposed at bottom of said support column, such that said support column and said base form a integral piece by means of concrete material.

2. The support structure made of precast concrete as claimed in claim 1, wherein said base is buried under surface of ground to stabilize said support structure.

3. The support structure made of precast concrete as claimed in claim 1, wherein diameter of said base is from 30 cm to 60 cm.

4. The support structure made of precast concrete as claimed in claim 1, wherein diameter of said support column is from 5 cm to 20 cm.
6. A building having thin film solar cell, comprising:

a building top portion, including at least a thin film solar cell; and

at least a support structure, each said support structure including:

a support column, used to support said building top portion; and

a base, disposed at bottom of said support column, such that said support column and said base formed integrally into one piece by means of concrete material.

7. The building having thin film solar cell as claimed in claim 6, wherein said building is an agricultural canopy, a building or a base station house having transparent top portion.

8. The building having thin film solar cell as claimed in claim 6, wherein said base is buried under surface of ground to stabilize said support structure.

9. The building having thin film solar cell as claimed in claim 6, wherein diameter of said base is from 30 cm to 60 cm.

10. The building having thin film solar cell as claimed in claim 6, wherein diameter of said support column is from 5 cm to 20 cm.

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