

REVIEW ON HYDRAULIC TRACKING OF SOLAR PANEL

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Abstract - This paper deals with the Tracking of Solar Panel Hydraulic System, Nowadays solar power considered as reliable energy source for power generation and for many other applications. We were planning for design and developing a solar tracking system which will utilize mechanical energies for the tracking operation. At present situation, the solar tracking system use electrical energy for tracking operations and this electrical energy for operations is supplied by same solar panels or by external electrical storage or supply lines, this reduces efficiency of the solar panels. Using mechanical energy for tracking will increase the output of solar panels and remove the constraint on the location of the tracking system.

Key Words:

Solar Panel, Hydraulic System, Electric Power, Tracking, Mechanical Energy.

1. INTRODUCTION:

There can be no denying in the fact that solar energy is an effective source of power, one that is going to serve us for long. Despite the need to harness this energy, very little re-research has been conducted to make photovoltaic cells cost effective and thereby available for utilization by masses for their various devices. Photovoltaic cells use sunlight and convert it directly to electricity without leaving any residual elements that can pollute the environs, and is therefore believed to be energy source that could be available to mankind. Besides being used in power generation, photovoltaic cells find applications in other non-space application programs. The ability of solar cells to help produce significant quantities of hydrogen, which has been difficult to produce on a substantial scale till now, is an encouraging sign as it indicates the possibility that hydrogen could be used as an alternative fuel source in future. Given this scenario, many people wonder why the scientific community is not aggressively promoting this naturally and abundantly available energy source.

2. LITERATURE REVIEW

Prof. S. K. Kusekar, Mr. Ajinkya Patil, Mr. Sachin B. Patil, Mr. Prasad Rajmane. "Tracking of solar panel with the help of hydraulic system." IJIFR Vol-2 Issue-8 Apr-2015.[1]

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the solar panels. Using mechanical energy for tracking will increase the output of solar panels and remove the constraint on the location of the tracking system Available solar energy is often expressed in units of energy per time per unit area, such as watts per square meter (W/m²). The amount of energy available from the sun outside the earth's atmosphere is approximately 1367 W/m². Some of the solar energy is absorbed as it passes through the Earth's atmosphere. As a result, on a clear day the amount of solar energy available at the Earth's surface in the direction of the sun is typically 1000 W/m². The level of solar radiation a region receives depends on latitude and local weather conditions.

Akshay Khandave, Shubham Kadam, Amol Shinde. "Design and Development of Hydraulic Solar Tracking System". IRJET Volume: 04 Issue: 06 | June -2017.[2]

The basic problem associated with conversion of solar energy into useful form is that the solar modules used are stationary so during the morning and evening hours the sun rays falls at an angle upon the module.

This decreases the efficiency of system. Thus the conversion efficiency of solar panel to charge the batteries in solar farm is not up to the mark. There are many problems associated with conventional solar panel because they are fixed in one direction. The positions of the sun keeps on changing every day, along with the sun, solar panel have to move in same direction. The other system also used for solar tracking but they consumes most of the energy produced by solar panels for tracking, which effects the efficiency of solar panel.

Ahmed Abu Hanieh. "Fluid Power Control for Sun tracking of Solar panels: Modelling and Simulation" IJAMEC. ISSN: 2147-8228.[3]

This paper focuses on discussing a hydro-pneumatic hybrid (Gas/Oil), passive technique for sun tracking and orientation of solar panels, collectors and food dryers. The technique depends on utilizing the natural expansion of gases caused by temperature increase. The pressure produced by gas expansion causes a force exerted on hydraulic oil contained in the same vessel with the gas and separated from it by a diaphragm. Hydraulic fluid is used here for the stroke control because of its advantage over gas in terms of incompressibility and controllability. The exerted force caused a 50 mm displacement of the actuator which can be improved by decreasing the bore diameter of the piston and by using gases with higher expansion coefficient.

A review of principle and sun-tracking methods for maximizing solar systems output by Hossein Mousazadeh, Alireza Keyhani, Arzhang Javadi, Hossein Mobli Karen Abrinia, Ahmad Sharifi -Department of Agricultural Machinery Engineering, University of Tehran, Iran[4]

Non-concentrating applications don't require tracking but using a tracker can improve the total power produced by the system. Photovoltaic systems using high efficiency panels with trackers can be very effective. There are many types of solar trackers, of varying costs, sophistication, and performance. The two basic categories of trackers are single axis and dual axis.

3. MATERIAL AND METHOD

These are basic concepts of the mechanics. These concepts are not truly defined; they should be accepted on the basis of our intuition and experience and used as mental frame of reference of our study. The concept of space is associated with the notation of the position of a point P. the position of P may be defined by three lengths measured from a certain reference point, or origin, given in three directions. These lengths are known as co-ordinate of P. To define an event, it is not sufficient to indicate its position in space. The time of the event should also be given. The concept of mass used to characterize and compare the bodies on the basis of certain fundamental mechanical experiments. Two bodies of same mass, for example, will be attracted by earth in the same manner; they will also offer the same resistance to a change in translational motion. A force represents the action of one body on another. It may be exerted by actual contact or at a distance, as in the case gravitational forces and magnetic forces. A force is characterized by its point of application, its magnitude and direction. A force is represented by a vector.

The mechanism selected for tracking system is based on lever principle. The type of lever used manipulate the required load is Second type lever. Basically, a lever is rod or bar capable of turning about a fixed point called fulcrum. It is used as a machine to lift / transmit a load by the application of small effort. The ratio of load lifted to the effort applied is called mechanical advantage. A lever may be Straight or curved and the forces applied on the lever (or by the lever) may be parallel or inclined to one another.

4. CONCLUSION

It is observed that the designed mechanical tracking system is a system, which consumes no energy for operation and contributing towards increasing the productivity of the solar panels. This is the first attempt made towards utilizing the gravitational energy as a driving force for solar tracking systems and also in providing a suitable tracking system for the remote places.

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