

Solar Tracking by using Hydraulic System and Dead Weight

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Abstract: *In this project work, with the title "solar tracking by using hydraulic system and dead weight" we are planning to tilt the solar panel in the direction of sun for receiving maximum radiations through the sun from sunrise to sunset. To produce maximum energy as compare to ordinary solar panels. At present, Fixed solar panels are used which receives solar radiations but they are unable to affect throughout all panels to produce the energy. Using mechanical for tracking will increase the output of the solar panels and remove the constraint on the location of the tracking system.*

1. Introduction

The purpose of solar panels is to meet the growing demand for renewable energy resources. In the modern world, the demand for electricity has grown at alarming rates to meet the needs of society. Many other benefits to solar energy include the lack of pollution directly created by these systems and their inexpensive and practical nature in the long term. As the demand for solar panels grow, so will the need for ways to optimize their energy collection. Tracking systems are designed to orient solar panels toward the sun. By adding a tracking system, the energy a solar panel can output could be increased by up to 50% during the summer months. This project is very practical and feasible as there are many types solar tracker designs in industry today. In addition, a similar senior project was done in 1994 on the "Sun Luis solar racer 101" electric car by a physics major, David Babbitt. However, the 1994 project dealt with manual panel adjustments given sensor data.

A solar tracker is a device for orienting a solar photovoltaic panel, day lighting reflector or concentrating solar reflector or lens toward the sun. Solar power generation works best when pointed directly at the sun, so a solar tracker can increase the effectiveness of such equipment over any fixed position. The solar panels must be perpendicular to the sun's rays for maximum energy generation. Deviating from this optimum angle will decrease the efficiency of energy generation from the panels.

2. Literature Review

One-Axis Trackers – Improved Reliability, Durability, Performance, and Cost Reduction - Final Subcontract Technical Status Report - 2 May 2006 – 31 August 2007 by J. Shingleton Design, LLC Auburn, New York – page 7:

The work effort focused on reducing the total cost of electricity generated by single-axis tracking solar energy systems for utility and other large-scale commercial applications.

Developing a factory assembled, modular tracker, while building on the strengths of the existing technology, resulted in improved performance and reliability and reduced installation time, cost, and environmental impact.

Solar energy principles of thermal collections and storage, second edition by S. P. Sukhatme director IIT, Mumbai, published by- Tata McGraw-Hill Publishing Company Limited, New Delhi. Concentrating collectors- Page 197.

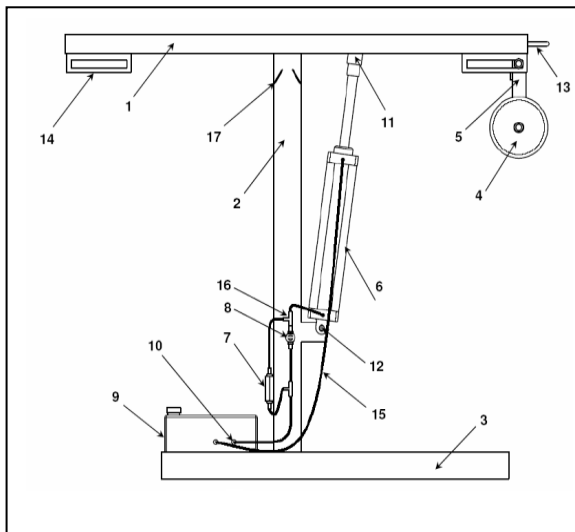
The term "concentrated" will be used only for the optical subsystem which directs the solar radiations onto the absorber, while the term "receiver" will normally be used to denote the subsystem consisting of absorber, its cover and other accessories.

Hydraulics and pneumatic fluid power by S.V.Shaikh D.M.E, B.E.(mech), published by R.K. Publications, Maharashtra. Volume 1, section 8,

Flow control valve are used to regulate flow of fluid in hydraulic system. The speed at which actuator moves is decided by the flow.

3. Proposed work

In this project iron angles 3mm thick 1200mm in length & 600mm in breadth is divided in three equal parts & welded by 600mm angle in three parts. The frame of project that is a angle of 1200mm length & 600mm height is welded at the centre. The smart sun tracking mechanism described in our project is designed and constructed to enable the solar receptor to track the sun for 1200 hour angle (roughly from 8am to 4pm).



- [1] http://www.canren.gc.ca/tech_appl/about_solar_energy.htm.
 [2] http://www.palmdalewater.org/alternative_solarenergy.htm.
 [3] http://www.careercornerstone.org/careers_for_mechanical_engineers

1. Panel seat	10. Filter
2. Column	11. Rod end mounting
3. Base	12. Piston end hinge
4. Weight	13. Handle
5. Weight holder	14. Counter weight platform
6. Double acting cylinder	15. Connecting hose
7. Check valve	16. T-Connector
8. Flow control valve	17. Stopper
9. Sump	

4. Objective of work

1. To compare with the ordinary solar system.
2. Results and discussion.

5. References

[5.1] PUBLISHED PAPER REFERANCE

One-Axis Trackers – Improved Reliability, Durability, Performance, and Cost Reduction – Final Subcontract Technical Status Report - 2 May 2006 – 31 August 2007 by J. Shingleton Shingleton Design, LLC Auburn, New York

[5.2] BOOK REFERANCE

- [1] Hydraulics and pneumatics fluid power by S.V.Shaikh .R.K Publications, volume 1.
- [2] Machine design by R.S.Khurmi and J.K Gupta.
- [3] Vector mechanics for engineers by F.B Beer.
- [4] Solar energy by sukhatme

[5.3] WEB REFERANCE

We have followed several links on the internet's which are as follows: