

RC Robot DustO 1.0

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Abstract— Solar modules are the integration of photovoltaic cells. PV cells convert the solar energy from the sun to electric energy. These solar modules or solar panels are a non-conventional alternative source of energy. As these modules/panels are exposed to the sunlight in atmosphere, there is a constant accumulation of dirt on their surfaces. This causes a loss in the EER (energy efficiency ratio) of the modules/panels. Therefore, it is a need to keep the modules/panels clean. But it is not possible to clean these modules/panels manually when in large numbers or on a commercial scale. So, DustO is a remote controlled robot that reduces these human efforts for cleaning solar modules/panels.

Key words: Robot, DustO

I. INTRODUCTION

The solar modules/panels need to be cleaned on a regular basis in order to increase the power generation. DustO is a series of robots designed for the specialized cleaning/dusting of the solar modules/panels. DustO 1.0 is the basic model of vertical axis for the cleaning of the solar modules/panels in a rotary motion with microfiber cloth in order to keep the solar modules unharmed by the cleaning procedure.

The existing methods include cleaning solar modules with manually by hand, using nylon brush, using wipers, using water jets, etc. these methods may harm the solar modules.

II. CONSTRUCTION

DustO 1.0 is a wired remote controlled robot. It consists of two struts which are driven by a chain and sprocket mechanism. There is an arrangement of chain and sprocket mechanism on each end of the robot. This mechanism is operated by a DC motor on each side. The struts control the movement of the cleaning unit. The cleaning unit consists of four box nuts, i.e. two on each strut for the transverse movement of the cleaning unit; and a motor for cleaning purpose. This motor in the cleaning unit has a circular plate attached to it which has a microfiber cloth cushion which is the dusting component in the robot. There is a winding mechanism made of pipe and ball bearings fixed on the top of the cleaning unit. This winding mechanism is provided so that there is no entanglement of the wires of the motors with the cleaning unit. Hence, providing convenience to operate the robot easily, even when it has the connection to the remote through wires. There are two motors for the sideways movement of the robot. There are wheels with friction lining connected to these. These clamp and hold the solar panel.

III. WORKING

DustO1.0 is a wired remote controlled robot. A remote is used for operating the robot. This remote has three channels for the

robot- one for the cleaning wheel, one for the transverse movement of the robot and one for the sideways movement.

The struts act as the power screws thereby helping the easy movement of the cleaning unit with the help of box nuts. The struts are of 1000mm each and have their threading removed for 50mm from each side. This is done to mount the sprockets and the legs. The sprockets have a chain mounted on them for their driving; the legs have the rollers at the end which helps in supporting the robot on the solar panel and thereby preventing the damage of solar panels which might have been caused by the struts. The proposed layout of the design is given in Fig. 1. The actual design is shown in Fig. 2.



Fig. 1: Proposed layout of DustO 1.0



Fig. 2: Actual model of DustO 1.0

IV. ADVANTAGES

The main motive of DustO is to increase the energy production rate. Cleaning can be done only once in a year. It saves time as it is semi-automated. It is easy to operate and user friendly robot. After cleaning is done, we get higher efficiency from solar panels. Also, it requires less power to operate.

V. FUTURE ADVANCEMENTS

It is proposed that future work should concentrate on replacing the automated cleaning system by the use of various sensors. We are looking forward to make advancements in the

working hours of the machine so that the robot does not use the energy generated by the solar modules for its operation

ACKNOWLEDGMENT

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