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Solar Operated Automatic Fish Feeder Machine for Bio Floc Farming

Prof. S.K. Aher¹, Miss. Jaanvi S. Sahoo², Miss. Pratiksha Jagtap³,

Mr. Sumit M. Chavan⁴, Mr. Vijay S. Chouke⁵

Professor, Department of Mechanical Engineering, Sandip Foundation's Sandip Polytechnic, Nashik,
Maharashtra, India¹

Student, Department of Mechanical Engineering, Sandip Foundation's Sandip Polytechnic, Nashik,
Maharashtra, India^{2,3,4,5}

ABSTRACT: Fish farming is one of the most important aqua cultural activities, but farmers are facing many serious problems like diseases partly due to problems with the fish having to cope with poor water quality during cultivation. After the long survey with the farmers in different regions about their practices in farming methods. Existing fish feeder system having uneven distribution of fish food in the water. underfeed or overfeeding of food that causes loss of fish food and its quality. Auto Switch Aqua Feeder with new technologies replace with automation of the farming methods with their traditional practicing methods unchanged, The design was based on specific parameters which included capacity of culture tank, stocking density, fish biomass, diameter of the feed, angle of repose and bulk density and designed a user interface convenient and compactable for farming. User interface design, and timer controls are implemented for automation of feeding methods and substantially reducing the labour cost and improve the quality of commodity. Water quality will directly affect the growth of aquaculture objects which affects the production and economic benefit. Automatic fish feed system which will work automatically after set equal interval of time to save time, effort, and cost of fish feeding. This project may have better future in small fish farm in India, which will be required low cost and more energy efficient way to make solar power fish feeding system.

KEYWORDS: Fish Farming, Automatic feeding, low cost, automation etc.

I. INTRODUCTION

India is the one of the fastest growing countries in the world and has tremendous development scope in aquaculture field. India has second large share in shrimp farming. The lots of things which are necessarily done are tied to the shrimp farming. In which shrimp feeding is one of the most important processes. And side by side the water quality management is also mandatory thing in fish farming. The aim is to improve design of feeder machine and make them more efficient. In this project concepts are generated through the research on existing patents to improve its limitation the new design will compact and more efficient .it is design to distribute the accurate amount of food in the pond it is run on electricity there are many different design and brands on auto fish feeder in market but some limitations are improved by this project One of the major challenges in aqua culture is feeding. Overfeeding and under feeding is common in aquaculture.

The former wastes feed and degrade water quality while the later results in poor growth which eventually leads to low productivity. Feed delivery in the correct form, at the right time and appropriate amount is expedient to increase and maintain a successful aquaculture production. Drudgery involved in manual feeding discourages aqua culturists, as it consumes time and human capital. In view of these problems, an automatic fish feeder was developed with the aim of increasing fish production that will lead to higher economic returns, that will improve timeliness and precision operation, which will reduce labor requirement and minimize losses of feed and drudgery associated with hand feeding. Application of modern technology and changes in the structure of fish farming leads to development of automated fish feeder. This development has been grooming and improvements had been done by applying various approaches and methods to satisfy the fish owners either for those rearing fish as hobby or those involved in aqua farming.



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Advancement of such fish feeder is highly on demands of the fish owners because they are facing difficulties in having their fish fed on time especially when they are away.

II. METHODOLOGY





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III. CONSTRUCTION & WORKING

Construction

3.1. Hopper:

Hopper is used to store the fish food which is to be fed to the fish. It is cut with the help of saw and stick by using adhesive to form the shape of hopper.



3.2. Feeder Pipe:

This is the pipe component through which the food will get spread the purpose is to properly distribute the feed over a sprayer fan through which, larger part of the pond, tank or cage.



3.3 Rotor:

When the rotor rotates it distributes the fish food evenly in the feeder & in the measurable quantity.





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3.4 Splitter Disc:

In feeders a unit for spreading of the feed is attached underneath the distribution mechanism called as splitter. Splitter is place within the feeder & ensures the equal distribution of food in the feeder.



3.5 Ball Bearings:

These are used to carry the load of the rotor disc while allowing the rotary movement. The detailed of a ball pedestal bearing is shown in image below. The rotation of the bush inside the bearing housing is arrested by a snug at the bottom of the lower brass.



3.6 Bearing Bush:

These bushes are used to Basically Prevent the Bearings From the dust particle which if enters will decrease the bearing life and will cause severe problems is smooth functioning.





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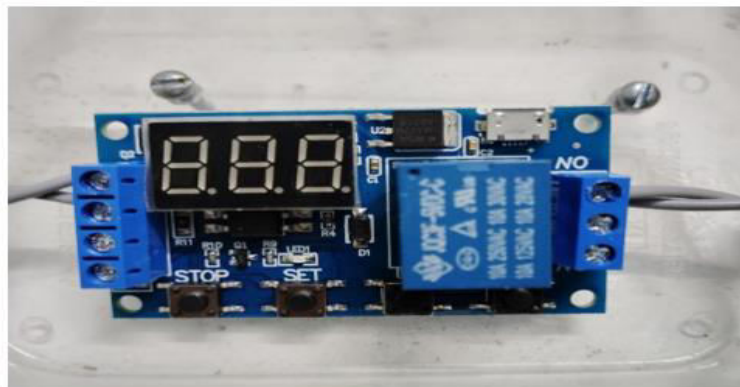
3.7 Feeder Motor and Rotor Motor:

These are used to basically to act as a prime mover for the system, Feeder motor will be connected to the feeder to provide the necessary rotational motion to it and the rotor motor will be used to rotate the rotor. It is used to rotate the Splitter Disc & sprayer for fish feed as per application basis. A DC motor is a mechanically commutated electric motor powered from direct current (DC). The stator is stationary in space by definition and therefore so is its current. The current in the rotor is switched by the commutator to also be stationary in space. Different connections of the field and armature winding provide different inherent speed/torque regulation characteristics. The speed of a DC motor can be controlled by changing the voltage applied to the armature or by changing the field current. The introduction of variable resistance in the armature circuit or field circuit allowed speed control.



3.8 Controller:

It is part of a automation unit, which is basically timer which will get ON Or OFF as per requirements.



3.9 Solar Panel:

It is power producing element in system, which convert solar energy to electrical energy. The photo-voltaic effect can be observed in nature in a variety of materials that have shown that the best performance in sunlight is the semiconductors as stated above. When photons from the sun are absorbed in a semiconductor, that create free electrons with higher energies than the created there must be an electric field to induce these higher energy electrons to flow out of the semi-conductor to do useful work. A junction of materials, which have different electrical properties, provides the electric field in most solar cells for the photon interaction in a semiconductor.



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3.10 12Volt Battery:

It is power storing element in system, which supply electrical energy to components of fish feeder controller & motors during operations. The batteries are used as a storage device for solar energy which can be further converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage, for small units with output less than one kilowatt. Batteries seem to be the only technically and economically available storage means. Since both the photo- voltaic system and batteries are high in capital costs, it is necessary that the overall system be optimized with respect to available energy and local demand pattern.



3.11 Solar charger:

The power charge regulator is also known as charge controller, voltage regulator, charge-discharge controller or charge-discharge and load controller. The regulator sits between the array of panels, the batteries, and the equipment or loads. By monitoring the voltage of battery, the regulator prevents overcharging or over discharging.





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3.12 Shaft:

Shaft is a common and important machine element. It is a rotating member, in general, has a circular cross-section and is used to transmit power. The shaft may be hollow or solid. The shaft is supported on bearings and it rotates a set of gears for the purpose of power transmission.



3.13 Fasteners:

As nuts and bolts are not perfectly rigid, but stretch slightly under load, the distribution of stress on the threads is not uniform.



Working

The system is consisting of four important parts which are hopper, rotor, motor, and feeder. They are described in detail as follows. Hopper is one of the most important parts which collects food granules in required quantity and ensure uniform dropping of food granules in rotor slot. Rotor is the heart of the feeder because it plays very important role like even distribution and create measurable quantity of food it consists of slots and it is mounted on MS shaft which has connected to motor of speed 10 rpm the function of rotor is when food is dropped from hopper it collects into slots and carried the food along with each rotation of rotor and dropped it on splitter which is mounted into feeder. Feeder is consisting of two sub component like splitter and distributor fins. When food granules dropped on splitter it distributes food in equal two streams which going to pass through fin then it distributed to adequate distance. The food in the hopper passes over the rotor mechanism which is having low speed 10 rpm. For equal distribution of food low speed is necessary. The gap between rotor blade and outer casing is to avoid jamming of food and slowly equal distribution of food. Then the food is transfer to another small hopper. Hopper having up word conical shape to avoid material spillage in spinning .and inner radius is given for smooth entry of material in throwing tube there is diverter shape as shown in fig to divert a material towards wall during spinning. The extended length of throwing tube is for better throw of material. The lower motor having the speed of 1000 rpm to cover the long distance and fast distribution of food.



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IV. ADVANTAGES

1. Energy-efficient
2. Sustainable
3. Cost-effective
4. Reliable
5. Automated
6. Durable
7. Low maintenance
8. Eco-friendly
9. Independence from grid
10. Easy installation

V. CONCLUSION

The existing project deals with the study, design & fabrication of a solar power automatic timer-based fish feeding system. During age of global energy crisis, the objective of this project is to use of solar energy for the development of fish feeding system which is fulfil in this system. This new automatic fish feeder system having wide coverage of area of feed distribution without Spoiled water quality. New automatic fish feeder system fish feeder system having even distribution of fish food which avoid overfeeding of food that causes detriment of fish. This project may have better future in small fish farm in India, which will be required low cost and more energy efficient way to make solar power fish feeding system. The objective of this project is to reduce the labor cost, time & efforts during fish feeding is fulfil. This project will to make solar power automatic fish feeder system for providing feed for fish. This system will helpful for built up in various capacities fish feeder system as per requirements. Automation of fish feeder will be made by using electronic components like timer & remote operation for fish feeder with solar power. While concluding this report, Needless to emphasis here that we will lift no stone unturned in our potential efforts during literature review, design, fabrication and assembly work of the project model to our entire satisfaction to solve the problem in agricultural field specially in fish farming for social welfare. Hence, we selected the topic "Solar Power automatic fish feeding system. The project model developed by us is fulfil to our entire satisfaction to solve the problem in fish farming field for social welfare. After successful testing of project is observe that it reduces or eliminates the efforts of fish feeding because of the operation of automatic fish feeding time is fixed/set as per fish feed requirements. After using this project in future, Farmer working becomes comfortable as his efforts in fish feeding will be eliminated. Unskilled farmers can be assigned the work so it saves the cost of manpower also for fish feeding. The operation of fish feeding is



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well controlled and approximately has higher benefits that of old method in low-cost application automation. After some modifications this system will be complete all requirements of fish farmers.

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