

# Design and Fabrication of Field Watering System

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**ABSTRACT:** It is used for irrigation system it is found in industrial residential safety and watering purposes the water sprinklers are used. its purposes never been analyzed before properly and we have try to analysis technology in the market available for irrigation purposes and the application of water sprinklers. We have studied the design and fabrication of water sprinkler system. In the abroad and some other countries as take place the application of water sprinkler system through the field survey system. The survey have been helped to convey the design of the rotatory type watering system and collected and developed the engineering data related to the designing of rotary type watering system and we used sprinkler as rotating unit used by standard engineering methods. We found that the newly designed watering system has found to be very efficient practically when compared to the normal watering practices. It also can be used wide area of application in the irrigation field

**KEYWORDS:** Sprinkler, Motor, Pump, Tyre, Bearings

## I. INTRODUCTION

In 1948 the first self propelled water sprinkling irrigation system is invented and in 1952 it is patented and founded by Frank Zybach in eastern Colorado. The modern self propelled field watering system and linear irrigation system are the foundation based on the early system. This method is very adaptive water application method has a big growth in the water sprinkler system around the world. It is very highly efficient and uniform water application. Due to high usage of automation it requires the less labour when compared to the traditional watering system or other irrigation methods. As a result A range of soil, crop, and topographic conditions can be cheaply treated with water and water soluble fertilizers. The following discussions is directed to the watering machines. The cost of machines depend upon the area of land and power consumption of machine and the water usage. The main cost of these machines are depend upon the power consumption..

## II. RELATED WORKS

According to Khadersab A [1] Rotating machinery is monitored using the vibration condition approach, which also extends its life. Numerous factors, including cyclic stress, tolerance limitations, insufficient lubrication, poor manufacture, and dispersed and localised flaws, are to blame for these failures. Analytical, numerical modelling, and experimental techniques may all be used to analyse the frequency characteristics of bearing defects in the inner and outer races. Other vibration analysis approaches are compared to the harmonics range of the frequencies at various speeds and circumstances. In this study, the signals are examined for ball bearing problems in rolling elements and then put via a quick Fourier transformation. Nirali hemant patel [2] A man-made method of applying water to soil to support

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the growth of crops is irrigation. It provides both immediate and long-term advantages, including higher agricultural yields, the raising of cash crops, rising land values, the creation of hydropower, and higher GDP. Sprinkler irrigation systems are appropriate for undulating terrain, dry conditions, sandy or shallow soils, and situations requiring consistent water application. The data is presented on the LCD as the centralised unit connects with the system through SMS or text. Once the motor is running, the soil moisture and water level are continuously monitored. The engine automatically shuts off once the soil moisture is at a certain level. Three level slow, medium, and high are shown by the water level indicator. A panchenko [3] The usage of orbital hydraulic motors, which have a hydraulic drive for active working tools on self-propelled equipment, in mechatronic systems with increased dependability has been suggested. The creation of a mathematical tool and calculation method was necessary to provide a three-dimensional representation of the zones with acceptable interfaces. T.keller [4] In this work, wheeling and a semi-analytical model were used to quantify and simulate soil stress under various loads. The propagation of vertical stresses in a layered soil is comparable to that observed in a homogeneous soil, according to the average  $\nu$  of 3.5, which differs slightly from Boussinesq's elasticity theory. A.h.nazemi [5] Omary and Sumner (2001) created a model to represent the consistency of irrigation and water application caused by overlapping spray nozzles set on a pivot. The main goal was to create a better model of water application by centre pivot spray sprinklers by accounting for wind effects, taking into account the actual circular path of the spray nozzles, characterising the water application pattern as a grid of observed irrigation depths, and rotating the application pattern with wind speed and direction. Jiao Wang [6] This research explores the present status of lightweight in machinery, concentrating on the four areas of material, structure, bionics, and manufacture. The emphasis is on the development of lightweight technologies for engineering applications, although it does not include all the relevant material. Sarfraz Hashim [7] The effectiveness of domestic and foreign floppy sprinklers in the agriculture industry was evaluated in this research. Distribution uniformity, application efficiency of the low quarter (AELQ), and uniformity coefficient (CU) were the three metrics evaluated. The system performed at its best in terms of CU, DU, and AELQ at 2.5 bar operating pressure and 10 ft riser height. Utilising an overlap simulation model, system efficiency was maximised. The research revealed that to avoid water loss and reduce system expenses, sprinkler overlap should be more than 65%.

### III.METHODOLOGY

The project's primary goal is to use field watering systems, have become essential in irrigating vast areas of farmland. To design and install these systems, it is necessary to have a well-planned methodology. In general, the process of designing and installing a field watering system involves assessing the soil type and the water source, determining the crop's water requirements, selecting the appropriate type of center field watering system, and installing the system. Before installation, system.

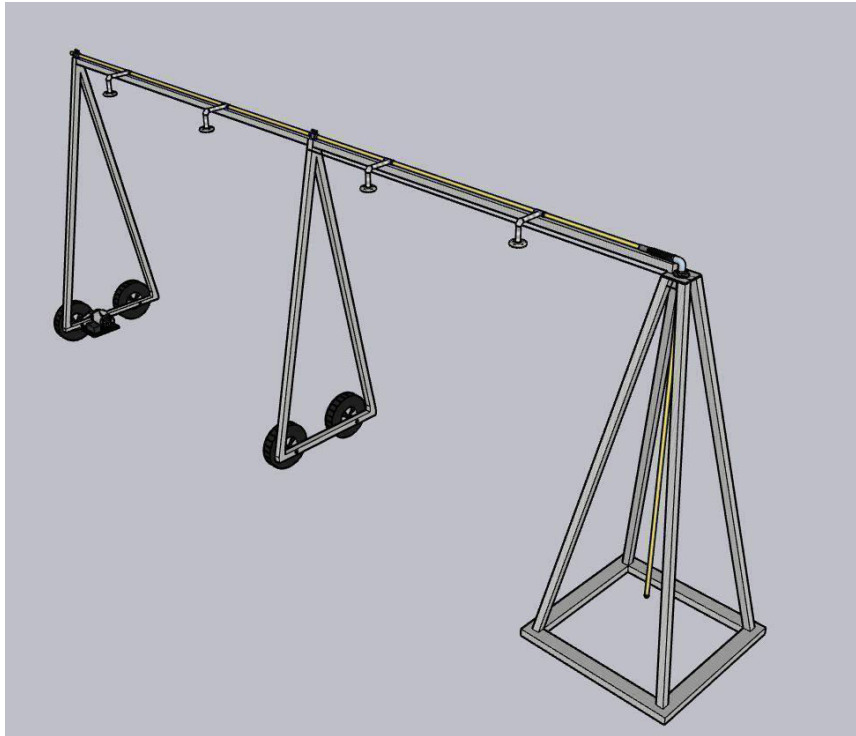
The most crucial aspects in this article are the techniques necessary to irrigate a land. These steps include determining the size and shape of the field, determining the water requirements, selecting the appropriate nozzle type and spacing, selecting the pump and power source, determining the center point location, designing the center arm and tower layout, installing the pipeline and electrical wiring, installing the center arm and towers, installing the nozzle and control system, testing and calibrating the system, and maintaining the system. The center point location should be set according to the field layout, terrain, and closeness to water and power sources. The center arm and tower architecture should be built to span the complete field, with correct tower spacing and location. The pipeline and electrical wiring should be built according to the design specifications, including pressure regulators and control valves.

The center arm and towers should be set and leveled, with adequate clearance for the crop. The nozzle and control system should be installed according to the design specifications, including the control panel, sensors, and automation features. Test and calibrate the system to ensure optimal working and water application rate. Maintain the system to assure optimal operation and water application rate.

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#### IV. EXPERIMENTAL RESULTS



The performance of a field water system might vary based on several variables, such as soil type, climate, crop variety, and management approaches. However, some typical experimental outcomes of field watering systems include enhanced crop production, consistent water application, energy efficiency, decreased labor needs, and possibility for salinization. Field watering systems are intended to provide water equally across a broad area, eliminating water wastage due to over- or under-irrigation and ensuring all plants get the essential quantity of water. They also utilise less energy than conventional irrigation technologies, needing less water to be pumped, and providing water directly to the crop instead of being lost via evaporation or runoff. However, if the water utilised is rich in salts, there is a danger of salinization of the soil over time, which may lower crop production and quality and need expensive remediation efforts. Overall, field watering systems have demonstrated to be a successful and efficient technique of irrigating crops, although their efficiency relies on numerous conditions.

#### V. CONCLUSION

This system can offer a low quarter average application rate of .27 in/day, according to the test, but its max design usage rate of .325 in/day is higher. This means that the lower 14 area of the field won't have enough moisture unless one or more of the following things happen: a larger water source is developed; the pivot's sprinklers are modified; irrigation schedules are adjusted so that the soil profile is full when usage reaches .27 in/day; or the difference is made up by rainfall. The amount of water that will be insufficient in the bottom 1/4 is shown by the area under the crop coefficient curve, which is crosshatched. For the sake of comparison, a curve (curve 4) for a system that could only deliver .225 in/day is presented. A deficiency of 1.7" is shown by the comparison curve, which must be made up by precipitation during this time. According to Weather Bureau data, if the pivot system curve had not been altered, this would not have occurred six times in the past 33 years.

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