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AUTOMATED FLOOD DRAINING SYSTEM FOR AGRICULTURE

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Abstract

*"**Agriculture**" is the main aspects of India's Prosperous development. Floods caused by monsoonal and environmental effects causes destruction of crops by flooding. The focus of the project is to develop an automated system which analyses the increase in level of water quantity in fields through pressure factors and draining the flood may be to an underground **water reservoir** or a well.*

*The aim is to produce floating levels and incorporate it with **HYDRAULICS** and with a pressure valve release system. System could be made efficient through various studies made in agricultural fields and reference of papers to get absolute results. Float-type sensors can be designed so that a shield protects the float itself from turbulence and wave motion.*

*Successful implementation of this project in agricultural sectors will drastically **reduce the wastage of crops** along with substantial water control over the fields with respect to season and crop times could be accompanied with electronics. The idea also intends in serving rain water **harvesting parameter** so utilization of drained water improves and reserve get recharged.*

KeyWords:*WATER CONVEYANCE SYSTEM, FLOOD CONTROL WORKS*

1. Introduction

Floods impact on both individuals and communities, and have social, economic, and environmental consequences. The consequences of floods, both negative and positive, vary greatly depending on the location and extent of flooding, and the vulnerability and value of the natural and constructed environments they affect.

The consequences of floods, both negative and positive, vary greatly depending on their location, duration, depth and speed, as well as the vulnerability and value of the affected natural and constructed environments. Floods impact both individuals and communities, and have social, economic, and environmental consequences.

Flooding and wet weather are so costly to agricultural land because they cause delays in and reduction of crop harvest. Specialists in agricultural land drainage, is well aware of the necessity of farming land having the optimum amount of saturation to successfully yield crops. If soil is too wet it can result in poor conditions for the crops to grow.

2. Review of Literature

WATER CONVEYANCE SYSTEMand FLOOD CONTROL WORKS by J.M. Jordaan M.S (Wisconsin), Civil Engineer (MIT) and Sc.D. (MIT) presented paper on Canal design, Pipelines, Dams, Spill ways, Flood warning and Risk analysis.

In this article dealing with applied hydraulics and design of water control structures,

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two aspects are described. Firstly, the orderly control and conduction of water through conveyances such as canals and pipelines from source to area. Secondly, the mitigation of the effects of extreme flooding events by judicious provision and operation of flood control structures.

Discharge capacity is determined by means of head loss gradient/discharge equation, such as Manning, Chezy or Hazen-Williams.

Hydraulics calculations for flood cross drainage units are made using standard **STORM DRAINING** algorithms for small drainage areas. Depending on the terrain, cross-drainage structures consists of either super-passages or sub passages (culverts) and should recognize the natural drainage pattern of the area that existed before canals were built.

Although the hydraulic theory of conduit closed flow as found in single-line pipe systems (gravity main and rising main) is more straightforward than the hydraulic theory for free-surface flow canal systems (of variable cross sectional area), there are more design considerations associated with pipe flow on account of external loads and corrosion protection followed by aging effect.

3. Methodology

The methodology that we adopted to solve the problems of Agricultural flood is as follows

- Firstly, we developed a draining system design model through our conceptualization skills.
- But we came in with a problem of draining the water when the entire area is flooded.
- So, we found a solution of using super absorbent Sodium-Poly acrylate to act as a storing element.

We methodized to use hydraulics with a float to measure the raise in rain water level in fields. This Float will be connected to a shaft of a hydraulics cylinder may be having a threaded arrangement to monitor the level to be drained. The hydraulic fluid inside the ram gets pushed streamlined through a narrow passageway to the valve system that we designed as the float rises.

Due to the movement the drilled hole mates with the passage way and allows the water to get in contact with the absorbent silo. Sodium poly acrylate absorbs the water forms an inter-Ionic attraction and locks the water to forms a solid mass thus preventing the flood in the earlier stage. The formed water mass can be dehydrated by adding a pinch of concentrated common salt or Ethyl alcohol which help us to obtain water during draught. Maintainability of storing element ensures easy transportation through Lorries and trucks.

4. Draining System

Today's drainage systems must cost-effectively manage flooding, control stream bank erosion, and protect water quality. To do this, integrating flood control strategies for infrequent storms with three basic storm water quality control.

1. Infiltrate run off into the soil
2. Retain /Detain runoff for later release
3. Convey runoff slowly through vegetation

Integrated flood control/Storm water quality control design must meet a variety of engineering, horticultural, aesthetic and safety standards.

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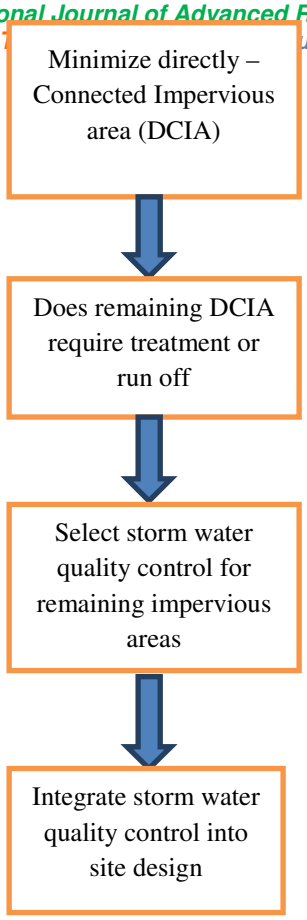

Fig 4.1 Draining and flood process control chart.

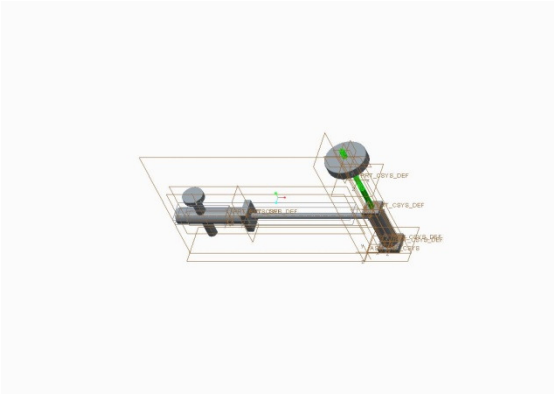

Fig 4.2 Solid model made on software-CREO

5. Design Procedure

MECHANISM 1:

- Design of plunger diameter for effective hydraulics displacement.
- Design of sliding contact bearing in hydraulics system.
- Selection of hydraulic fluid to satisfy float force produced.
- Discharge of water through pipe and satisfying the pipe diameter required.
- Design of a light load springs for retracting of plunger to the water level in the field.

MECHANISM 2:

- Design of rack and pinion system and material selection.

6. Storing Element

The storing component used for locking flood water in tanks or silos is implemented by Sodium Poly acryl ate-a poly crystalline polymer material.

Properties of the component:

Appearance	: faintly grey crystalline solid
Density	: 1.15 (30% aq.)
Melting Point	: 12.5^0 C
Boiling Point	: 141^0 C
Refractive Index	:n20/D 1.43
Solubility	: Miscible with alcohol and ether

7. Conclusion

The project could be able to solve draining problems in agricultural fields up to some extent which depends on the volume of the storing

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elements used and topographic characteristics of the agricultural land.

It can avert the adverse effects of flood on crops and its loss in agricultural areas. Due to low availability of time and storing material the display of the project was made as an imaginable prototype animating its various functions in draining systems.

Even though the display shows the use of the project to some extent, it is possible to implement the features of the system in real life situations. Foremost the draining systems can also be used in urban draining parameters also with some minor modifications made in its design and volume.

Increasing the power of the superabsorbent increases the efficiency of the model to great limits.

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