1ST EDITION

E-EXTENDED
ABSTRACT

INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM (i-AIS)

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Faculty of Plantation and Agrotechnology UiTM Cawangan Melaka Kampus Jasin

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ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY

The Faculty of Plantation and Agrotechnology was established in 2010 at Universiti Teknologi MARA (UiTM). The mission of the faculty is to play the vital role of producing well-trained professionals in all areas of plantation and agriculture-related industries at national and international levels.

Bachelor of Science (Hons) Plantation Technology and Management is a three-year program that strongly emphasizes the various aspects of Production Technology, Management, and Information Technology highly sought after by the agricultural and plantation sectors. Students in this program will be fully trained to serve as professionals in the plantation sector and related industries. They will have ample opportunities to fulfill important positions in the plantation industry such as plantation executives. This program provides a strong balance of technology and management courses essential for the plantation industry such as management of plantation crops, soil fertility, plantation management operation, plantation crop mechanization, and agricultural precision. As an integral part of the program, students will be required to undergo industrial attachment to gain managerial skills in the plantation industry.

The faculty is highly committed to disseminating, imparting, and fostering intellectual development and research to meet the changing needs of the plantation and agriculture sectors. With this regard, numerous undergraduate and postgraduate programs have been offered by the government's intention to produce professionals and entrepreneurs who are knowledgeable and highly skilled in the plantation, agriculture, and agrotechnology sectors.

PREFACE

International Agrotechnology Innovation Symposium (i-AIS) is a platform to be formed for students/lecturers/ staff to share creativity in applying the knowledge that is related to the world of Agrotechnology in the form of posters. This virtual poster competition takes place on the 1st of December 2022 and ends on the 8th of January 2023. This competition is an assessment of students in determining the level of understanding, creativity, and group work for the subject related to agrotechnology and being able to apply it to the field of Agrotechnology. The i-AIS 2022 program takes place from December 1, 2022, to January 8, 2023. The program was officiated by the Dean of the Faculty of Plantation and Agrotechnology, namely Prof. Madya Ts. Dr. Azma Yusuf. The program involves students from faculties of the Faculty of Plantation and Agrotechnology (FPA)and HEP participating in i-AIS 2022, namely, the Faculty of Education and Pre-Higher Education. This program involves the UiTM student and some of the non-UiTM students which come from the international university and the local university. Two categories are contested, namely UiTM and non-UiTM. To date, students from these programs have shown remarkable achievements in academic performance and participation in national as well as international competitions.

This competition is an open door for the students and lecturers to exhibit creative minds stemming from curiosity. Several e-content projects have been evaluated by esteemed judges and that has led to the birth of this E-Poster Book. Ideas and novelties are celebrated, and participants are applauded for displaying ingenious minds in their ideas.

It is hoped that such an effort continues to breed so that there is always an outlet for these creative minds to grow.

Thank you.

Dean
On behalf of the Organizing Committee
Conference Chair
Universiti Teknologi MARA
Faculty of Plantation and Agrotechnology
http://fpa.uitm.edu.my

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HYDRAULIC RAM PUMP

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ABSTRACT- A form of energy called hydraulic energy makes use of the flow of water. It is frequently referred to as "water energy," and it allows us to produce electricity by using the kinetic and potential energy from waterfalls and currents. Utilizing the power of streams, rivers, and waterfalls is a clean and sustainable energy source. Typically, hydroelectric power plants atop dams and reservoirs come to mind when we think about hydraulic energy. The most common application of hydraulic energy nowadays is to create electricity. To give us an indication, 17% of the power produced in Spain comes from hydraulic energy plants. The goal of this research is to create a water pump that transports water to higher land using natural hydro energy as the driving force. The only pump that simply uses the kinetic energy of the moving water to pump water is the Hydraulic Ram Pump. The water hammer effect is the main process that enables a hydraulic ram to pump water without the aid of outside energy. Ram pumps do not require electricity since they are powered by the kinetic energy of the falling water. You save energy when you use a ram pump to carry water into your house or farm. Energy conservation increases the amount of money you save on electricity costs. Additionally, conserving power helps protect the environment by halting future pollution.

INTRODUCTION

A hydraulic ram pump, sometimes known as a ram pump, is a tool used to move water from low-lying terrain, such as a valley, to higher terrain, such as a hill. Because it automatically extracts water from its source without using power or diesel, it differs from other water pumps. This is feasible because it uses the water hammer effect, which raises the water over the pump by building pressure. The phenomenon known as the "Water Hammer Effect" uses the incompressibility of water to raise its own internal pressure. If you think of the water as a rigid body moving at a given speed, if the water were to suddenly halt, the entire system would experience an abrupt pressure shock since the water is incompressible. This could be harmful to the system because if the water were to move at a fast speed and abruptly stop, it could harm or possibly blow up the whole thing. However, in the case of a hydraulic ram, the water hammer effect is not always detrimental. The concept of a ram pump is not new. John Whitehurst created it for the first time in the UK in 1772, but it wasn't until Joseph Michel Montgolfier utilized it to deliver water to his paper mill in 1796 that it was made into an automated mechanism. Engineer Josiah Easton acquired the patent rights by 1820, and his family went on to commercially produce the invention for usage in the UK. At the time, Easton's corporation supplied water to numerous homes, farms, and communities.

Later, Green and Carter bought the company. Joseph Cerneau received the first ram pump patent in the US in 1809, but it wasn't until 1840 that people began to take notice and several companies began to profit from its production and installation. By the end of the 19th century, the popularity of electric pumps had surpassed that of ram pumps. Ram pumps, however, once again came to light as a result of a renewed interest in environmentally friendly technologies.

MATERIAL AND METHOD

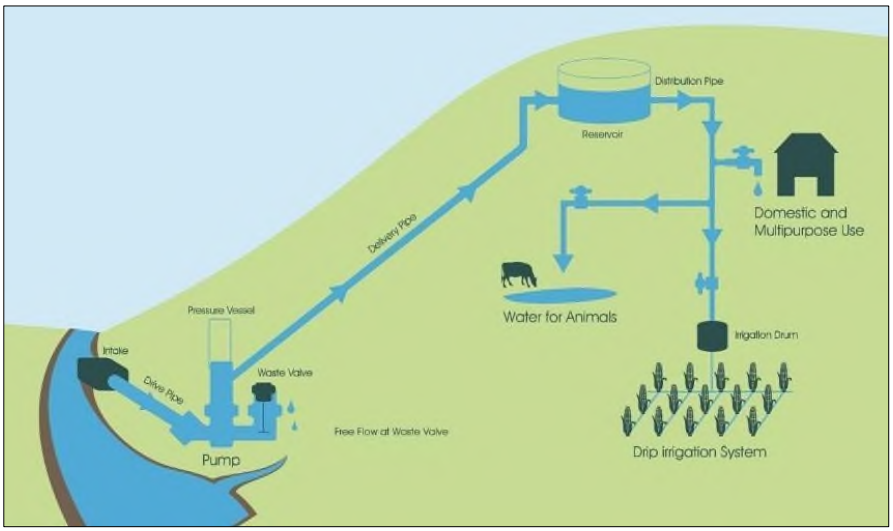


Figure 1: Basic component

Dam

A concrete barrier known as an intake box (dam) was constructed to prevent the water source from being contaminated or dirty, which would have a negative impact on the water's quality, particularly if it were to be used for drinking. The goal of this dam is to capture more water from modest spring sources. At the end of the drive pipe inside, there is a filter that collects any foreign objects, including wood and leaves, to prevent clogging of the pump. To maintain sustainable pump operation, water resources must be accessible all year long.

Drive pipe

It supplies the ram pump with water. It must be rigid to withstand the high pressure caused by the ram pump's water hammer action.

Pump

Pumps must be situated below the water source since they require the force of falling to function. Since there is no fall, ram pumps cannot be used on wells. The amount of water flowing at the source determines the size of the ram pumps. Small ram pumps also result from small water sources.

Delivery pipe

Channelling the water to the water tank from the ram pump. For delivery pipes, polyethylene, also known as PE, is suggested due to its strength and flexibility.

Water Tank or Storage

The water from the ram pump can be stored in either a below- ground or an elevated tank.

RESULT AND DISCUSSION

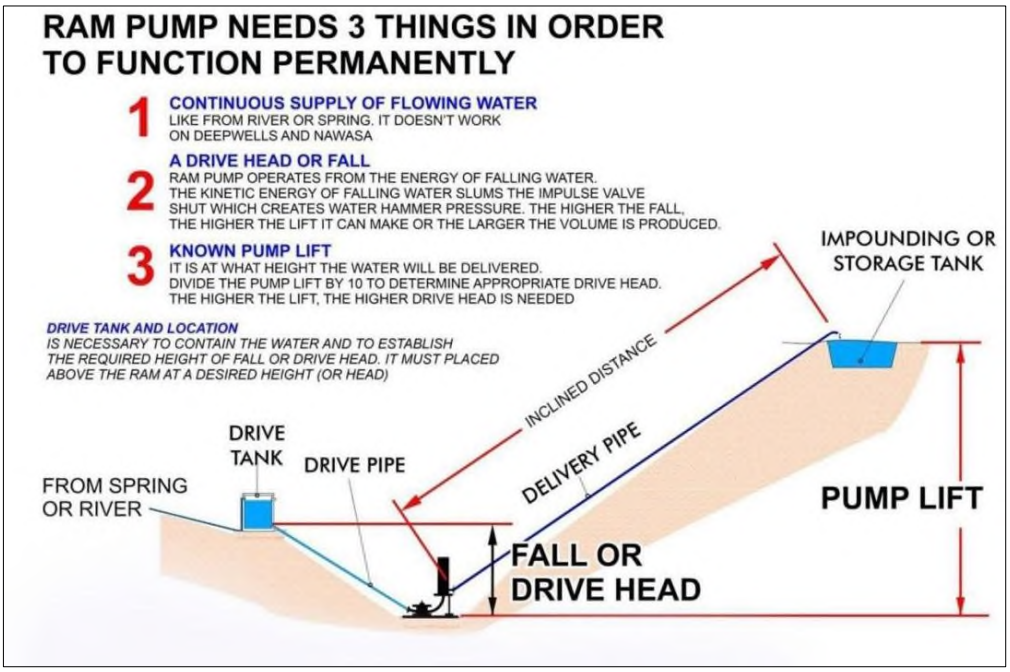
Water flow rates can be accommodated by hydraulic ram pumps in a variety of ways. A modest pump will do the job if the water source, such as a spring, has a low flow rate. The driving pipe's diameter determines the size of the pump. Small water sources, for example, are best served by small drive pipes. Therefore, take into account two criteria while deciding the size of the ram pump. Finding the water flow rate that the ram pump can use is crucial in the first place, as is budgetary consideration. Large pumps are costly and demand more money for installation. Below is the specifications of Hydraulic Ram Pump.

WATER SUPPLY NEEDED, liters per minute (lpm)	RAM PUMP SIZE MODEL	PIPE SIZE, Diameter, Inches Nominal	
		Drive Pipe	Delivery Pipe
7-20	RP75	3/4″	1/4″
15-60	RP100	1″	1/2″
45 - 90	RP125	1 1/4″	1/2″
75 - 105	RP150	1 1/2″	1/2″ - 3/4″
96 - 180	RP200	2″	3/4″ - 1″
135 - 240	RP250	2 1/2″	3/4″ - 1 1/4″
180 - 480	RP300	3″	1″ - 1 1/2″
300 - 720	RP400	4″	2″
600 - 1500	RP600	6″	2″ - 3″
1200 - 2400	RP800	8″	2″ - 4″

ELEMENT OF RAM PUMP OUTPUT (IMAGE)

The outputs of ram pumps vary widely from one area to another. Three elements dominate in determining ram pump outputs. Which are:

1. Water Supply – the more water is fed to the ram, the more water is delivered.
2. Height of Fall or Drive Head
3. Height of Lift or Pump Lift



CONCLUSION

Electricity or gasoline/diesel oil are often the sources of power for general water pumps. Areas and agricultural activities created in areas far from electricity and water supply and cultivation on hills will make it difficult for entrepreneurs to provide essential needs such as water to crops to the maximum. The old method that is still used today by farmers who face this problem is simply to collect rainwater into barrels or tanks to supply water to crops. This method is usually seen in fruit orchards located in hilly areas. This water supply is very important for plant growth and its use such as using drip fertilization or for poisoning activities. Therefore, the use of the

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