International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.317

Functionality Development of Field Bund Mechanism

A.Siddiq[1], E.Satheesh[2], A.Nirmal[3], M.R.Mohamed Riyas[4]

UG Scholars, Francis Xavier Engineering College, Tirunelveli, Tamilnadu, India[1,2,3,4]

ABSTRACT: Fully automated robots are designed for the cultivation process. It has specific features for the field ridge leveling process and soil preparation. This is used in the fret mechanism of this particular process. The ATmega328p microcontroller is used throughout the control mechanism. It is powered by the required rated battery. The movement of this robot is done by installing the appropriate motor. The overall mechanism is well tuned by the transmitter and receiver.

KEYWORDS: Bund, Microcontroller, Mechanism, Rating, robot

I. INTRODUCTION

In paddy cultivation, bunds are very important and play very significant role to store the water in basin made by using bunds, for cultivation of paddy required lots off water from seedling to maturity. Bunds store water in basin formation and all the practiced required for paddy cultivation done in the basin structure. For best paddy cultivation sufficient water available in the paddy field throughout its whole lifecycle, and the good bunds achieved this, with minimum seepage and percolation. High water loss and the weeds on the bunds are restrict aeration resulting weeds causes huge reduction in crop yield as well as increase cost of cultivation, decreases input efficiency, interfere with agricultural operations, damage quality, act as alternate hosts for several insect-pests, diseases, disturb aesthetic appearance of the ecosystem, native biodiversity, also affect human and cattle health. In traditional method, bunds are usually done in two steps at the beginning of each crop season. First the bund should be cleared from weeds and grass before initial ploughing. Then the bund should be plastered with a layer of mud after the second plough ha with an average productivity of 3.0 t/ha.

II. PROPOSED SYSTEM

In mechanized farm, bund is prepared by a bund former either operated by tractor or animals for irrigation purposes and also to demarcate the fields. Tractor operated bund formers are normally either disc -or mold board or forming board type. If bund is formed with the help of traditional bund former, however, shaping and packing of bunds is done manually using spade and feet. This activity is time consuming and labor intensive. To overcome the drudgery, involve in these operations, a tractor operated bund former-cum-packer was designed and developed. An attempt is made for enabling the combined operations of bund forming and packing in single pass that can save fuel, time and other resources further. The bund former-cum-packer consisted of commercially available disc type bund former, rectangular tool bar frame, and packing unit (concentric cylindrical roller, drive shaft, conical discs, compressive shanks etc.). The bund formed by bund former-cum-packer was field tested and found neither water seepage nor breakage of bund during flood irrigation. The field capacity with the equipment was 1.4 ha/h at tractor speed of 2.93 km/h in 2nd low gear. The bund former-cum-packer can reduce about 96% dependency on labor requirement for packing the bund. Overall use of the equipment is having potential to increase the resource productivity by 38 %.

III. BLOCK DIAGRAM
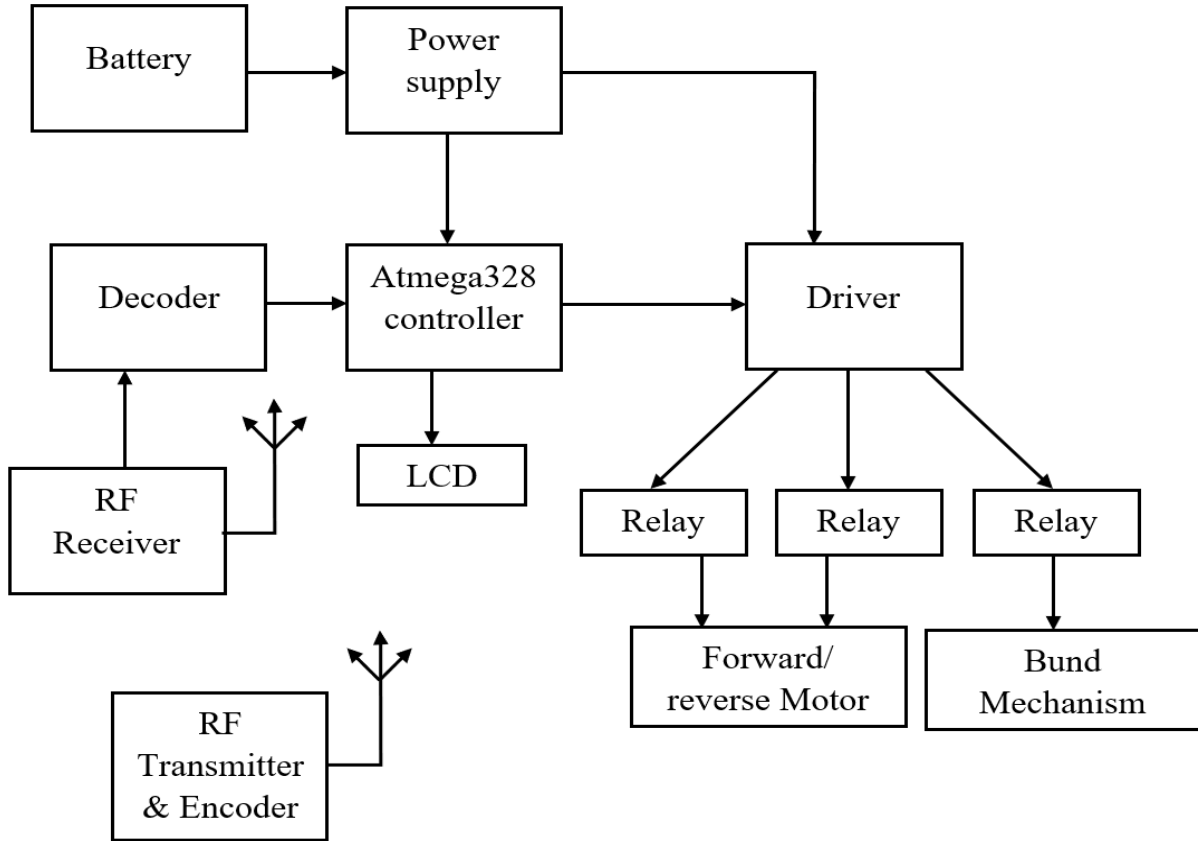
BLOCK DIAGRAM DESCRIPTION

In this project consists of atmega328 controller, battery, driver, relay, motor and bund making mechanism. Battery is used as power source for whole unit. The supply is connected to controller and driver unit. Controller we used Atmega328 controller. It consists of 28 pins, and it has inbuilt ADC. In this project to control the mechanism by using RF communication. It consists of RF transmitter and receiver. It is remote control technique. RF transmitters send data to RF receiver. Receivers receive the data and send to controller. Controllers control the mechanism and motor direction by using driver unit. Driver used ULN2003. It is used to drive motor in forward and reverse direction and also control the bund making mechanism through relay. Relay is act as a switch. It is used to drive the motor. Three relays are used. Two relays used for direction control for forward and reverse direction and remaining one relay is used to control the mechanism model. LCD is used to display the short messages.

COMPONENTS USED

ATMEGA 328:

ATmega328 is an 8-bit and 28 Pins AVR Microcontroller, made by Microchip, takes after RISC Architecture and features a streak sort program memory of 32KB. It has an EEPROM memory of 1KB and its SRAM memory is of 2KB. It has 8 Pin for ADC operations, which all combines to make Port-A(PA0 – PA7). It moreover has 3 builtin Clocks, two of them are 8 Bit clocks whereas the third one is 16-Bit Clock. You must have listened of Arduino UNO. UNO is based on atmega328 Microcontroller. It's UNO's heart. It works extending from 3.3V to 5.5V but regularly we utilize 5V as a standard. Its fabulous highlights incorporate the fetched productivity, moo control scattering, programming bolt for security purposes, and genuine clock counter with isolated oscillator. It's ordinarily utilized in Implanted Frameworks applications.

RF Communication Module:

RF communication works by making electromagnetic waves at a source and being able to choose up those electromagnetic waves at a specificgoal. These electromagnetic waves travel through the discuss at close the speed of

light. The wavelength of an electromagnetic flag is converselycorresponding to the recurrence, the higher the recurrence, the shorter the wavelength. Frequency is measured in Hertz (cycles per moment) and radio frequencies are measured in kilohertz (KHz or thousands of cycles per moment), megahertz (MHz or millions of cycles per moment) and gigahertz (GHz or billions of cycles per moment). Higher frequencies result in shorter wavelengths. The wavelength for a 900 MHz gadget is longer than that of a 2.4 GHz gadget. In common, signals with longer wavelengths travel a more prominentremove and enter through, and around objects superior to the signals with shorter wavelengths.

RF Module can be categorized into two parts:

- Transmitter
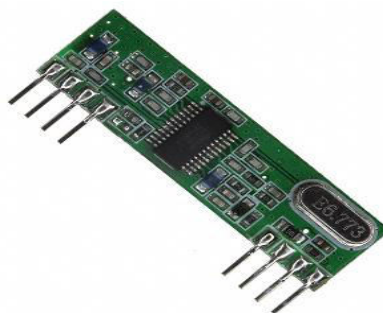- Receiver

RF TRANSMITTER

This wireless data is the easiest to use, lowest cost RF link we have ever seen! Use these components to transmit position data, temperature data, and even current program register values wirelessly to the receiver. These modules have up to 500 ft range in open space. The transmitter operates from 2-12V. The higher the Voltage, the greater the range. We have used these modules extensively and have been very impressed with their ease of use and direct interface to an MCU. The theory of operation is very simple. What the transmitter 'sees' on its data pin is what the receiver outputs on its data pin. If you can configure the UART module on a uC, you have an instant wireless data connection. The typical range is 500ft for open area.
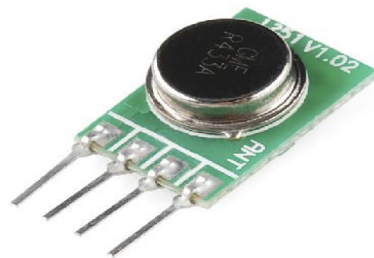
RF Transmitter

RF RECEIVER

This receiver type is good for data rates up to 4800bps and will only work with the 434MHz o 315 MHz transmitter. Multiple 434MHz or 315MHz receivers can listen to one 434MHz transmitter or 315 MHz transmitter. This wireless data is the easiest to use, lowest cost RF link we have ever seen! Use these components to transmit position data, temperature data, and even current program register values wirelessly to the receiver. These modules have up to 500 ft range in open space. The receiver is operated at 5V. We have used these modules extensively and have been very impressed with their ease of use and direct interface to an MCU. The theory of operation is very simple. What the transmitter 'sees' on its data pin is what the receiver outputs on its data pin. If you can configure the UART module on a uC, you have an instant wireless data connection. Data rates are limited to 4800bps. The typical range is 500ft for open area. This receiver has a sensitivity of 3uV. It operates from 4.5 to 5.5 volts-DC and has digital output. The typical sensitivity is -103dbm and the typical current consumption is 3.5mA for 5V operation voltage.

RF Receiver

DRIVER:

Driver is used to drive the relay.   ULN2003A IC is used as driver. This IC has some special features

➢ Seven Darlington's per package
➢ output current 500ma per driver (600ma peak)
➢ output voltage 50v
➢ integrated suppression diodes for inductive loads
➢ outputs can be paralleled for higher current
➢ ttl/cmos/pmos/dtl compatible inputs

RELAY:

Relays are switching devices. Switching devices are the heart of mechanical electronic frameworks. When a hand-off is energized or enacted, contacts are made or broken. They are utilized to control ac or dc control. They are utilized to control the grouping of occasionswithin the operation of a framework such as an electronic radiator, counter, welding circuits, and X-ray gear, measuring frameworks, alertframeworks and communication. Electromagnetic transfers are shapes of electromagnets in which the coil current produces aattractiveimpact. It pulls or pushes leveldelicatepress armatures or strips carrying hand-off contacts. A fewrelays contact can be workedto inducea fewconceivable ON/OFF combinations.

DC MOTOR:

The direct current motor or the DC motorincorporates apart of application in today's field of building and innovation. Beginning from an electric shaver to parts of automobiles, in all little or medium sized motoring applications DC engines come helpful. As a result of its wide extend of application distinctiveutilitariansorts of dc engine are accessiblewithin theshowcase for particular requirements.

DC Motor

CIRCUIT DIAGRAM:
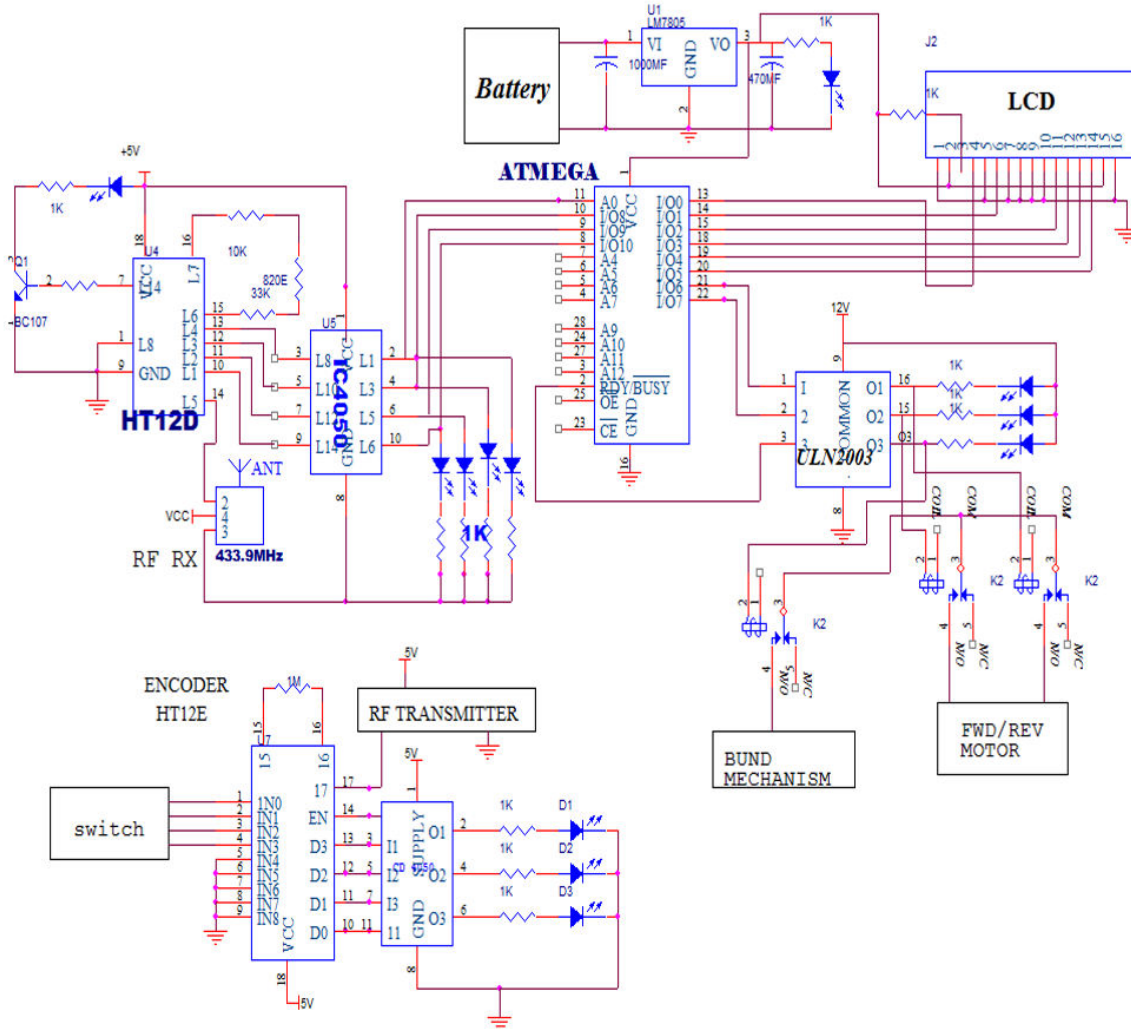
CIRCUIT DIAGRAM DESCRIPTION:

Power supply gives supply to all components. Battery is used as power source. LM 7805 regulator is used to maintain voltage as constant. Load will be LED and resister. LED voltage is 1.75V. If voltage is above level beyond the limit, and then it will be dropped on resister. In this project used atmega328 controller. To control the mechanism through RF communication. Switches are connected to encoder (HT12e). It is sends data to RF transmitter. RF transmitters send to data to RF receiver through serial communication. Receivers receive the data and to send controller via decoder (HT12d). It is connected to controller port A0, A1, A2 and A3. Controllers control the mechanism through driver unit. Driver we use ULN2003. It is connected to controller ports. Drivercontrol the motor through relay. Three relays were used, which are connected to driver output port. Two relays are used to control the motor forward and reverse direction. Another relay used to control the bund making mechanism. LCD is also interfaced to controller. It is used to display the short messages.

LCD DISPLAY:

The LCDs have even started replacing the cathode ray tubes (CRTs) used for the display of text and graphics, and also in small TV applications. LCD display use of our project title message and information message. Our project connects to a microcontroller unit data line connected to a 'PORT 2' and control lines connected to a P3.5,P3.6,P3.7.
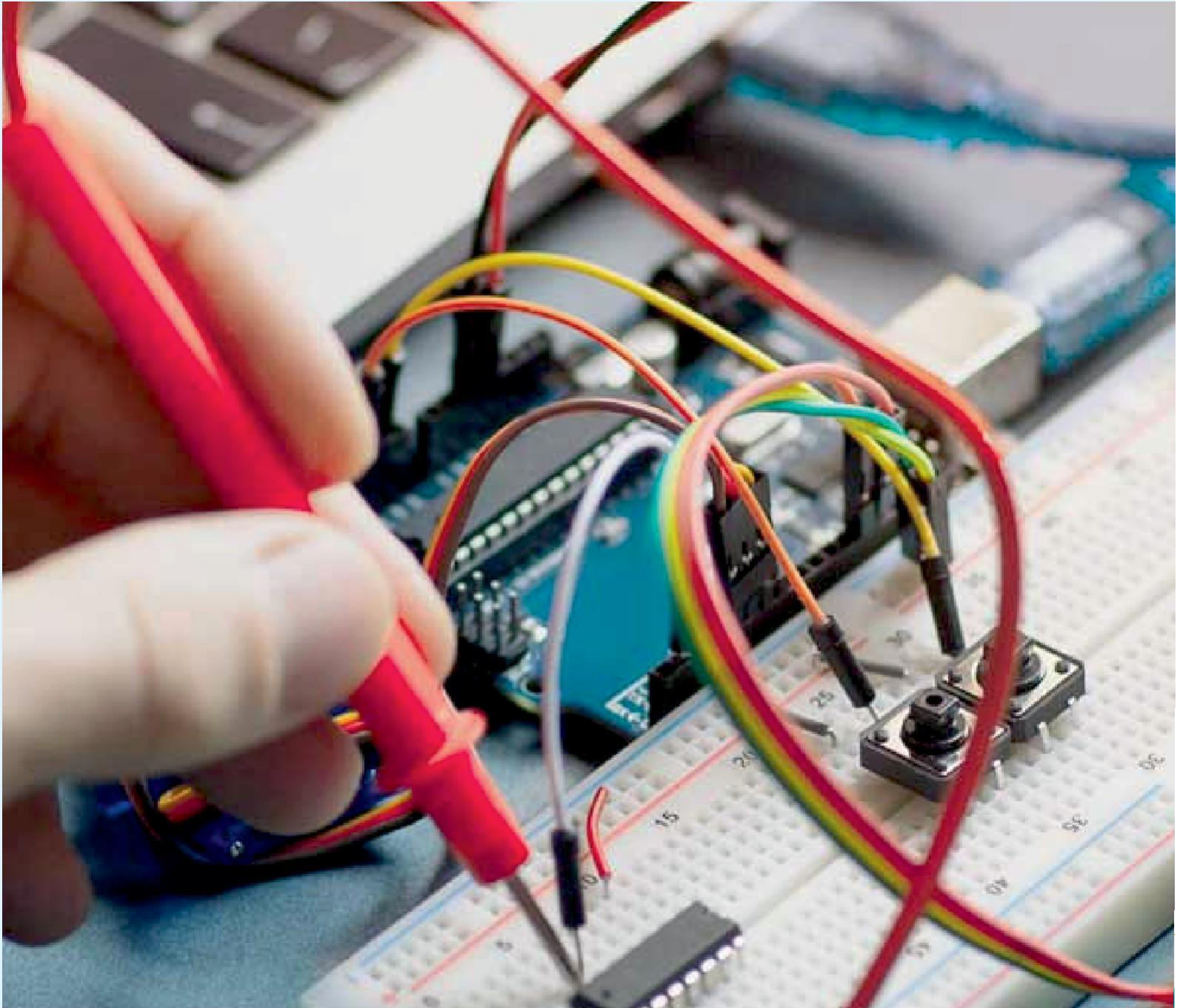
Liquid Crystal Display

IV. CONCLUSION

The developed prototype ridge plastering machine is viable technology to reduce cost of operation compared to manual trimming/formation of bunds and also reduces the human drudgery, the ridge plastering machine has an output of 833 m/h. The developed prototype machine is most useful for small scale farmers as the cost of the machine is around Rs. 1,00, 000/-. It saves the cost of operation about Rs.5000-7500/- over traditional methods.

The created concept ridges grouting machine has an output of 833 m/h and is a practical technological advancement that can lower operating costs as compared to hand trimming and bund creation.   Small-scale farmers would benefit the most from the built prototype equipment because it only costly. On the design, development, and testing of precision technologies for crops and orchards, researchers are now performing experimental investigations.

The researcher is also undertaking simulation modelling studies to boost productivity and enhance design for better use. However, further research is still required to lower the hazards to human health when applying pesticides to orchards.

REFERENCES

[1]. Barger E L, Liljedahl, J B, Carleton W M and McKibben E G. 1967. Tractors and Their Power Units, 2nd Edition, p 400. Willey Eastern Private Limited, New Delhi.

[2]. Bosoi E S, Verniaev O V, Smirnov E G and Sultan-Shakh E G. 1990. Theory, Construction and Calculations of Agricultural Machines, Vol. 1. Bosoi E S (Ed). Oxonian Press Pvt Ltd, New Delhi.

[3]. Singh Surendra, Singh R S and Singh S P. 2014. Farm Power Availability on Indian Farms. Agricultural Engineering Today 38(4): 44–52

[4]. Krutz Gary, Thompson Lester and Claar Paul. 1984. Design of Agricultural Machinery, p 10. John Wiley & Sons, New York. Michael A M. 2009. Irrigation: Theory and Practice, p 555. Vikas Publishing House Pvt Ltd, Delhi.

[5]. MoraesMoacirTuzzin de, Debiasi Henrique, CarlessoReimar, Franchini Julio Cezar and Silva Vanderlei Rodrigues da. 2014. Critical limits of soil penetration resistance in a rhodic eutrudox. Brazilian Journal of Soil Science 38: 288–98

[6]. Singh S P. 1991. Development and Performance Evaluation of Powered Harrow Plough. M Tech. thesis, Department of Farm Machinery and Power Engineering, G B Pant University of Agriculture and Technology, Pantnagar

[7]. Singh S P, Singh Pratap and Singh Surendra. 2012. Design and development of hand operated maize dehusker-sheller for farm women. Agricultural Mechanization in Asia, Africa and Latin America (AMA) 43(3): 15–21

[8]. Singh Surendra. 2007. Farm machinery – Principles and Applications. Directorate of Information and Publications on Agriculture, Indian Council of Agricultural Research, New Delhi.

International Journal
of Advanced Research

in Electrical, Electronics and Instrumentation Engineering