

A Case Study :

Electronics based equipment and machineries in the field of agricultural engineering

S.V. AWARE , V.V. AWARE AND A.V. GAJAKOS

See end of the article for authors' affiliations
.....

Correspondence to:

V.V. AWARE

Department of Farm Machinery and Power, College of Agricultural Engineering and Technology, Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli, RATNAGIRI (M.S.) INDIA

Accepted : May, 2008
.....

ABSTRACT

Electronics plays very important role in developing various automatic machinery/equipments in the field of Agricultural Engineering. Mechatronics is the combination of electronics with mechanical systems. There are number of applications of electronics in the machineries required for the various Departments of Agricultural Engineering as, Department of Farm Machinery and Power, Agricultural Process Engineering, Irrigation and Drainage Engineering etc. Principle of working and applications of electronic based equipments as LASER leveler, Pulse Electric Field – non-thermal electro technology and Atomic absorption spectrometer are explained in this paper.

Key words : Laser leveler, Pulse electric field, Non-thermal electro technology, Atomic absorption spectrometer, Equipment, Machineries.

Electronics is widely developed branch of science with countless application in every field like medical, engineering, printing, music etc. Also, electronics plays very important role in developing various automatic machinery/equipments in the field of Agricultural Engineering. Mechatronics is the combination of electronics with mechanical systems. There are number of applications of electronics in the machinery required for the various Departments of Agricultural Engineering as: Department of Farm Machinery and Power, Agril. Process Engineering, Irrigation and Drainage Engineering etc. Some of them are as below:

Laser land leveler:

The introduction to laser leveling in 1970 produced a silent revolution that has raised potential of surface irrigation efficiency to the level of sprinkler and drip irrigation efficiency. Laser controlled land leveling equipment grade field to contour the land for different irrigation practices with sprinkler irrigation system, perfectly level fields conserve water by reducing runoff and allowing uniform distributions of water. Furrow irrigation system needs slight but uniform slope to use

water most efficiently. Laser leveling can reduce water use by 20 to 30% and increases crop yield by 10 to 20%. A field leveled with conventional equipment can attain a standard deviation of 20-30mm, while using laser leveling the technical limit extend up to 10mm. It is necessary to do topographic survey and plough the land before starting the laser land leveling process.

Types of laser land levelers:

- Manual leveling laser
- Semi self leveling laser
- Fully self leveling laser split beam
- Split beam lasers

The laser leveler involves the use of laser, that emits the rapidly rotating beam parallel to the required field plane, which is picked up by the sensor fitted to the tractor towards the scraper unit. The signal received is converted into cut and filled level adjustment and corresponding change in the scraper level are carried out automatically by the hydraulic control system. The scraper guidance is fully automatic; the elements of operator error are removed allowing consistently accurate land leveling.

Laser controlled grading technology is currently the best method to grade a field. The system includes a laser transmitting unit mounted on high platform like light house, emits an infrared beam of light that can travel up to 700m in perfectly straight line. The second part of laser system is receiver that senses the infrared beam of light and