

Part I.

ABSTRACTS OF SELECTED SCIENTIFIC PAPERS

Plastic formation, a method for component repair

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 13

Plastic formation technology is used for manufacturing machine parts. The benefits of the mentioned technology can be used for the overhaul of parts. Recently the plastic formation is used to repair parts as well in the GDR. The experience and the possible development are summarized in this paper.

Automatic quality control of hydraulic pump gears

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 15

Automatic quality control system was developed to measure 10 different dimensions of the gears with an accuracy of 1 to 2 μm . The system is operated via a computer, where the dimensions to be tested and the tolerances have to be programmed. The system rotates the gears and controls them one by one. The determined quality of the gear is displayed and the gears are grouped into classes according to the width of the gear.

Development of tobacco drying by air preheated by solar collectors

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 17

The solar collectors mounted on the dryers were developed on the basis of the results of the tests performed with tobacco dryers lately. Two modifications of the collectors were carried out. With one of the modifications black aluminium plate was used above the roof of the dryer and the plate was covered by the foil. With the other modification the surface of the collector was doubled by the means of the side walls of the dryer. The former modification was favourable for the air flow, however the latter one improved the energy saving.

Means and methods to reduce soil compaction

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 18

There are means and methods to prevent compaction of the soils, however the unfavourable compaction is unavoidable. The loosening of the soil is a well-known problem for the farmers. The extent and the timeliness of the soil compaction were measured and studied, to develop means and methods to eliminate the compacted layers. The development of new tillage tools and mounting devices show the first results achieved in this field.

Reduction of the loss of sunflower harvesting

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 20

The sunflower is one of the most important oil crops. The machines used for cereals and maize can be used for sunflower as well. The harvest is the main point of the sunflower production, the conventional combine harvester is used for the mentioned purpose. The grain loss is relatively low with sunflower both at the shuttler and at the sieves. However, the forward speed cannot be increased, because of the header loss. The FKA header was modified, it was equipped with rotating knives. Tests were carried out with the modified headers and the results are promising.

The development of fertiliser spinner for low rate fertilising

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 22

Low rate fertilizing can be performed as a result of the use of the tram line system. The use of a tractor mounted fertilizer is beneficial for the distribution of small quantity fertilizer /i.e. minimum 50 kg/, because high accuracy of the transverse distribution - maximum coefficient of variation 15% - should be achieved. A new spinner mechanism was developed that has conic spinners with "U" shaped blades, where the inner surface of the blade is smooth. Consequently the coefficient of variation of the transverse distribution is lower than 10 %.

High clearance sprayer for field crops

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 23

HP-01 high clearance tractor was developed that can be used with different implements to perform the jobs as follows:

- spraying, chemical weed control, leaf fertilizing of high crops and cereals, and the desiccation of sunflower and rape with the use of a spraying/spreading frame of 18 m width
- the injection of liquid nitrogen into the soil in the same operation with inter-row cultivation for row crops /especially corn/, with the use of injectors and inter-row cultivator
- inter-row spraying of high crops and liquid nitrogen fertilizer distribution on the soil surface, with the use of inter-row sprayer
- cutting out of the male row hybrid corn, with the use of row cutter mechanism.

Multi-Purpose irrigation with „hidrokonzol”

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 25

A multi-purpose machine was developed as a result of a joint project. The machine can be used as a winch type machine as well. It can be used for different conditions of the growing of the crop, such as for the shooting period, for conditioning and for water supply. The machine is a good means for surface irrigation and for raining/sprinkling, however the distribution of liquid chemicals and slurry can be carried out as well. The machine is easy to handle and install and its accuracy is independent on the wind.

Engine load monitor for tractors

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 27

Method and system were developed for tractors operated with different throttle setting to measure, to store and to indicate the engine load, the work performed /kWh/ and other operational data. The performance/speed characteristics of the engine are stored in the memory of the control system and the momentary performance of the engine is calculated from the stored characteristics and from the measured data of the engine speed and throttle setting. On the basis of the mentioned principle an engine load monitor and a kWh-meter were developed and tested under practical operational conditions. The results show that the use of the engine load monitor improves the workrate of the tractor and implement combination and the kWh-meter measures the work performed.

Test results of case IH-7130 magnum tractor

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 29

The performance of the four wheel drive tractor is 136 kW. The transmission can be shifted on-the-go. The lock of the front and rear differential is of electro-hydraulic operation. The closed centre hydraulic system of the tractor is fitted with a variable axial piston pump. The tractor can be used with the existing implements of the Hungarian large-scale farms. The workrate of the tractor and implement combination was favourable in ploughing, tillage and seedbed preparation as well.

Development of self-emptying containers

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 31

Self-emptying containers of roller type were developed. The containers were tested under laboratory and operational conditions. The test results and proposals for development are discussed in the paper.

Grain storage with ventilation of exhaust and forcing fan

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 32

The method for grain storage with ventilation of exhaust fan was developed in 1987 - 1989. In 1988 - 1989 comparative tests were carried out with ventilation systems of exhaust fan and with ventilation system of forcing fan. The results show that both systems can be used in the practice and the systems of one fan provide with a low perflation coefficient. Consequently energy saving is determined. The system of exhaust fan proved to be better for energy saving, however both systems should be fitted with an automatic ventilation control system to improve the efficiency.

Principal relationships for grinding and compacting of wet grain corn

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 33

Principal relationships were determined for the storage of ground wet grain corn to improve the quality of the corn and to improve the reliability of the storage. Relationships were found between the moisture content and the specific surface increase and the specific energy consumption; for the energy consumption; and for the energy consumption of the grinding. For the compaction in horizontal storage the influence of the compacting pressure, and the load on the density of the corn was evaluated. The effect of the moisture content, granule size and side wall pressure were studied as well.

Comparative test of milkmeters

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 36

Different milkmeters are developed to be connected to automatic management system of the dairy parlours. The Jame-2000, the Afi-milk MM-85 and the ME-2000 milkmeters were tested. The paper deals with the results of the tests carried out under laboratory and operational conditions.

Preventing the migration of contaminants in milking equipments

Dr. L. TÓTH—Dr. J. BAK, Hungarian Institute of Agricultural Engineering, Gödöllő

Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 38

The factors influencing on the flow rate of infective substances towards the teats were analysed. The purpose of the paper is to show the results achieved in this field. The effect of the teat and that of the teat cup size, the change in the teat cup status, the length and the diameter of the teat cup and the deformation of the teat cups were analysed. Consequently a relationship was developed between the teat cup movement measured and the speed of air flow in the short milk tube. One can conclude that the risk of infection increases when the diameter, capacity and the speed of the movement of the teat cup will be increased.

Mathematical statistical analysis of the ploughing resistance

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 40

For the stochastic model of the process of the variations in the ploughing resistance it is usually considered to be stationary and ergodic between certain limits. The assumption for the stationary and ergodic character was analysed. Tests were carried out to determine the first distribution of the measured process. According to the tests the process can be approximated by the logarithmic normal distribution.

Measurement of oil content of grain sunflower (Instrument: INFRAPID)

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 42

Spectrophotometric method was developed on the basis of the near infrared reflexion /NIR/ to measure the oil content of the sunflower grain. Before grinding the grain sunflower was mixed with CaCO₃ where the ratio was 1:1. The accuracy of the measurement was found to be 0,9 % by the means of the instrument Infrapid 61. The preparation of the sample and the measurement takes maximum 5 minutes, consequently the method can be considered to be a fast one.

Influence of specialization on tractor size and construction

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 43

The role of the market and its controlling effect is increasing in the agricultural production. Tractors of different size and construction are needed for the small-scale farms and for the large-scale farms, and different tractors should be used for orchards, vineyards and field crop production. The optimum mechanization is analysed and the future development of the tractors is predicted.

Influence of screen construction on fineness of grits made by hammer mills

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Hungarian Agricultural Engineering, Gödöllő (N° 3, 1990.) 44

Comminution experiments were carried out with a relatively small hammer mill under laboratory conditions. The purpose of the experiments was to analyse the comminution process. Several cereals were tested under different constructional and operational conditions.

Computer analysis of some spatial mechanisms

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Hungarian Agricultural Engineering, Gödöllő (N^o 3, 1990.) 46

The spatial mechanisms can be used to perform such forms of movement that cannot be done by planar mechanisms. Formerly - about hundred years ago - the spatial mechanisms were designed by the means of the trial and error method, because the lack of appropriate theory. The use of the computers encourages the development of the theory. By the means of vector functions the spatial mechanisms can be calculated and designed.

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Mechanization problems of horticultural soil mixtures

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A definite technology should be used to manufacture soil mixture for horticultural purpose. The mixture should be made of soil, peat, compost, micro-elements and fertilizers. The different components are mixed with the required proportion. The operations to be performed are as follows: preparation, chopping, sieving, mixing and packing. Consequently the quality of the product will be improved.

Simulation model for compression stroke analysis

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Hungarian Agricultural Engineering, Gödöllő (N^o 3, 1990.) 51

A simulation model was developed to analyse the compression stroke of Diesel engines. The model was used to determine how the compression pressure and the compression temperature are influenced by the ambient air pressure, by the engine speed and by the engine wear.

Measurement and evaluation of soil shear properties

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Hungarian Agricultural Engineering, Gödöllő (N^o 3, 1990.) 54

The direct shear box testing of soils was analysed. A direct shear box apparatus was compared to a simple shear box device. The principles of both testing devices were evaluated and the simple device was found to be better for the practical application.

