

**Part I.**  
**ABSTRACTS OF SELECTED SCIENTIFIC PAPERS**

RESEARCH IN SELECTED SCIENTIFIC TOPICS

#### The quality and the reliability of agricultural machinery

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Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 13

Research efforts span the whole useful life of agricultural machinery and all related activities /including market research, plan targets, preparations for decision-making, design, manufacturing, trade and utilisation/. One of the results of the research effort is that the underlying processes can be described using systems theory modelling, by an energy flow equilibrium equation, or by a control equilibrium equation, therefore the activities involved can be analysed in a more exact manner. Important conclusions can be drawn on the basis of the parameters to be defined with the above equations concerning design, production, marketing activities, machine maintenance, is. the quality and the reliability of the machinery and equipment, which in an indirect way to qualify the standard of management and supervision.

#### The interrelationship between the size range and the rheological properties of alfalfa chop

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With the objective of finding a substitute to the assessment method based on the manual measurement of chaff lengths, which is highly labour-intensive and rather subjective, we have started to look for physical properties in sets of chopped green feed that may enable a hitherto more objective assessment of the set. The laboratory experiments have been conducted with large samples /approximately 30 kg/ collected during field tests/. In order to ensure repeatability, we have noted data regarding the development of the crop, the production region and the conditions of the harvest.

#### Test results of wheat harvesting procedure of two-height

DR. ISTVÁN SÖRÖS – SÁNDOR SALAMON  
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Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 17

Based on results from a wheat harvesting procedure using two-height cutting, it is to be noted that the grain throughput of combine-harvester can be substantially improved as compared to traditional methods of harvesting and cutting. Ultimately, this may lead to fewer combine harvesters required to harvest grains. The new procedure can be especially useful in harvesting crops with long and straight stalks or whenever conditions conducive to two-height cutting. Occasionally, straw generated as a result of two-height cutting would be smaller in volume and with shorter lengths.

#### Testing of front loaders for potatoes

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Tractor-mounted, or self-propelled front loaders are used to unload potatoes from potato stores. UNK-320 front loader was tested for unloading potatoes. Test results have indicated that damage to potatoes by the front loader is expected to be about 1% while the loading capacity varies between 20 to 40 t/h depending on the conditions. Front loaders are recommended for use in stores with solid floors.

#### Technological model for the mechanisation of apple production

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The technological model needs the active co-operation of approximately 40 people for a 100 ha orchard in the spring and autumn peak seasons. Without considering the approximately 30 people required for harvesting and manipulation, 5-10 people are required through the year to perform soil tillage, plant protection and other operations. As indicated by appraisals the value of storage and manipulation facilities per unit of area amount to approximately HUF 75,000 per ha. However, when using newly developed components, the value of the storage and manipulation facilities can be kept down to HUF 50,000, while the value of the harvesting machine is about HUF 20,000 per ha. Therefore, the new technological model does not increase specific capital costs. Incremental machine costs incurred in the harvesting phase are compensated by savings achieved in other phases of the operation.

#### The significance of hoof treatment and its economic impact on large scale beef production

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Due to environmental factors and the lack of exercise the rate of limping cattle with lesions on their legs may be as high 20% or over. The lack of exercise causes diseases of the legs not only as a result of physiological effects, it also hinders early identification of limpness since such status can be noted only if the beasts are allowed to walk around.

Investigations with respect to the prevention of damage to legs led to research into stable floors, the mechanical and tensile strength of hooves and a review of hoof treatment methods which was conducted either under laboratory or on-farm conditions.

#### Hydrothermal processing of grains

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– DR. MIHÁLY HERDOVICS

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The treatment of feed components /eg: different kinds of grain, etc/ prior to feeding is necessitated in animal husbandry in order to ensure complete decomposition in the animals' digestive tracts as well as to impede their poisonous and feed conversion blocking effects at least in some cases /eg: soya/. Under the hydrothermal grain processing issue, the Bocchi grain flaking technology, the MONEX 75/700 extruder and the Roast-A-Tron grain roaster were tested.

#### Developing a feeding technology for sows combined with identification

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Dr. LÁSZLÓ TÓTH (Hungarian Institute of Agricultural Engineering, Gödöllő)

Dr. JÓZSEF REIBLING (Agricultural Corporation of Szekszárd)

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A feeding technology has been developed for pig producers as well that uses a computerized pig identification system. Based on international and local experiences, the Hungarian Institute of Agricultural Engineering has initiated the development of a Hungarian experimental system.

When testing the Weda feeding stations under Hungarian conditions, it was found that 0.3 kg of feed could have been saved every day as compared to other, traditional sow feeding technologies.

The feeding stations are manufactured by the Agricultural Corporation of Szekszárd using the designs made by FARMTECH Ltd. All electronic component parts have been designed and installed by the Hungarian Institute of Agricultural Engineering. The feeding technology based upon sow identification can be used advantageously on large-scale pig farms and after reconstruction but it may prove to be a highly rational option even for small-scale and medium-sized farms as well.

#### Testing for normality of the tractive resistance of ploughs

BÉLA BORSA (Hungarian Institute of Agricultural Engineering, Gödöllő)  
Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 26

This paper deals with the distribution of the random variations of the tractive resistance of ploughs. The tractive resistance of a single plough bottom was found to be not of normal distribution. The logarithmical normal distribution can be used to approximate the process. Normal distribution can be used to approximate the distribution of the tractive resistance of the plough having more than four bottoms. The results can be used to determine the stress-conditions of ploughs.

#### Dynamic rheological tests

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DR. LÁSZLÓ FENYVESI  
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Our objective is to look into the impact of loads that undergo periodic changes. On the one hand, we have generated an analytical approximation by establishing a fairly simple model; on the other hand we have developed a stressing and measuring device. While devising the instrument, we have also developed a testing methodology including a way to evaluate results. Another of our objectives was to clarify the role of certain essential parameters. Some of the parameters at issue relate to the testing device and the measuring method, i.e. efforts are being made to develop a standard measuring technique. Another set of these parameters relate to vegetable substances, i.e. they may shed light upon plant behaviour, thereby providing information that may come in handy in the field of crop production or processing.

#### Development and testing of liquid fertilizer control devices

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Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 30

It is vital to use efficient and material-saving technologies for the distribution. The development, automation and instrumentation of plant protection machinery is effected in order to facilitate the savings. One can note that machines manufactured in western countries are all equipped with monitors and control devices. We are aiming at the development of a series of instruments, which contain diagnostic and control devices and display monitors alike. The diagnostic instrument measures volumetric flow /dm<sup>3</sup>/min/, operating pressure /bar/ and revolution per minute /l/min/. The monitor measures specific volume distributed /dm<sup>3</sup>/ha/, operating pressure /bar/, speed /km/h/ and area /ha/. The control device displays the same values as the monitor and controls too.

#### Electronic seed counter

GÁBOR FEKETE – DR. JÓZSEF KRIZSÁN  
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Our technologically-oriented production system /KITE/, has suggested that a seed counter should be developed. The objective of the design and engineering work; performed was to ensure

- counting of seeds with a diameter over 4 mm,
- a feeding rate of 5 seeds per second,
- an adjustable feeding rate subject to seed diameter, and
- a max. error rate in seed counting to be 0.1%.

#### New results in the development of machines in co-operation between ERTI and FALCO

DR. JÓZSEF PETHŐ (FALCO Wood Processing Corporation, Szombathely)  
Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 32

The paper reports on the development of machines for the silviculture to improve the efficiency of the operations.

#### Possibility to improve the service for the agricultural machines

DR. ISTVÁN HUSTI (University of Agriculture, Gödöllő)  
Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 33

Service comprises all the ancillary services to be provided by the manufacturer to ensure ease of selection, procurement, commissioning and longterm, profitable and safe utilisation of products by users. In the case of agricultural machines such service represents a set of co-ordinative technological, commercial and economic activities to guarantee the proper and reliable functioning of the machines.

#### Reduction of the costs of material handling and product distribution by logistic methods

DR. IMRE KNOLL (University of Agriculture, Gödöllő)  
Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 36

The mechanization and the proper organisation of material handling and product distribution, which represents a complex subsystem of the "production/consumption process", plays a decisive role in unit costs as well as sales prices of products. New logistic approaches to organisation and the continuous monitoring of interrelationship among such approaches, material handling and infrastructural factors have already brought positive results, considering both theoretical and practical studies and tests. Intensive application of such methods is recommended in all sectors of the economy.

#### How to cut harvesting losses over slopes

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The objective of the test was to define performance improvements /reduction in losses/ to be achieved with the new combine harvesters, suitable for grain harvesting over slopes; by comparing these figures with the higher machine price, the conditions for profitable operation of such combine harvesters can be stipulated.

**Computerized dairy farm management system developed in Hungary**

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The computerized dairy farm management system developed by the Hungarian Institute of Agricultural Engineering comprises three sub-units, such as the feeding, the milking parlour and the breeding sub-systems. The system has a modular, hierarchic structure, therefore any of the three sub-systems can be used independently of the other two.

**Fermentation and treatment of grape-juice under controlled temperature**

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The processing plants of the state farms, co-operating with the Institute on this project, have grape processing lines that can be operated either intermittently or continuously. Grape juice, produced by these processing lines, is then transferred into a fermenting unit complete with equipment facilitating fermentation at controlled temperatures where the optimum fermentation temperature can be guaranteed either by heating up grape juice or by cooling it down.

**Test results for grain cleaners**

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Hungarian Agricultural Engineering, Gödöllő (Nº 2. 1989.) ..... 44

Over the past five years substantial progress has been made in the production of grain cleaners in Hungary. There is a demand for reliable and up-to-date grain cleaners to cope efficiently with the cleaning of corn of 30-35% moisture content. In addition, there is ample demand for units to be used as post-cleaners. Based on our tests, the SHT-753, SHT-754 and SHT-1004 units, manufactured by AGRIKON of Kecskemét, were found to achieve cleaning capacities of 60, 80 and 100 tons per hour, respectively, when processing wheat. The SH-50 /by ÉLGÉP/, the DM-50 /by DIGÉP/ and the HR-50 /by Hidashát/ were classified into the 50 tons per hour capacity category as post-cleaners. Using test results and findings, recommendations have been made for the technological installation and the improvement of the cleaners.

