learned to optimize lighting, greenhouse temperature and CO_2 levels. Thus, at certain times of day and seasons of the year, surplus generating capacity is available. Falso points out that in some situations, a useful option is to sell surplus electric energy to local or regional utilities, particularly at time when renewable sources such as solar or wind generation are not available or adequate. In this way, cogeneration units can continue to operate at optimum levels. He notes that GE Jenbacher engines are well suited to load-following or frequent start-stop operations, allowing them to be gainfully used in commercial greenhouses or other applications.

And in conclusion, for optimal greenhouse plant growth and production, there are numerous variables, including plant species, air temperature, moisture supply, light levels and duration, soils or hydroponic nutrient levels, and CO_2 levels. Temperature, light levels and duration and CO_2 levels can all be controlled by a CHP-CO_2 system. Individual owners must consider the cost of optimizing growing conditions, but today many are including these systems in their evaluations. It may be your time to look into investing for a more productive greenhouse.

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UDC: 631.3

OPERATING COSTS OF AGRICULTURAL MACHINERY

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Abstract. The article deals with the basic concepts necessary to determine the operating costs of agricultural machinery. A lot of attention is paid to the costs of used machinery.

Keywords: operating costs, repair costs, fuel costs, lubrication costs, labor cost, ownership costs, depreciation, interest, taxes, insurance, housing.

Machinery and equipment are major cost items in farm businesses. New technology, higher prices for parts and new machinery, and higher energy prices have all caused operating costs of farm machinery to rise in recent years.

Good solutions are needed to require accurate estimates of the costs of owning and operating farm machinery.

Farm machinery costs can be divided into two categories: annual ownership costs, which occur regardless of machine use, and operating costs, which vary directly with the amount of machine use.

The true value of these costs cannot be known until the machine is sold or worn out. But the costs can be estimated by making a few assumptions about machine life, annual use, and fuel and labor prices.

Ownership costs (also called fixed costs) include depreciation, interest (opportunity cost), taxes, insurance, and housing and maintenance facilities.

Depreciation. Depreciation is a cost resulting from wear, obsolescence, and age of a machine. The degree of mechanical wear may cause the value of a particular machine to be somewhat above or below the average value for similar machines when it is traded or sold. The introduction of new technology or a major design change may make an older machine suddenly obsolete, causing a sharp decline in its remaining value. But age and accumulated hours of use are usually the most important factors in determining the remaining value of a machine [1].

Before an estimate of annual depreciation can be calculated, an economic life for the machine and a salvage value at the end of the economic life need to be specified. The economic life of a machine is the number of years over which costs are to be estimated. It is often less than the machine's service life because most farmers trade a machine for a different one before it is completely worn out. A good rule of thumb is to use an economic life of 10 to 12 years for most farm machines and a 15-year life for tractors, unless you know you will trade sooner. Salvage value is 10 % purchase price of the machine [2].

Interest. If the operator borrows money to buy a machine, the lender will determine the interest rate to charge. But if the farmer uses his or her own capital, the rate will depend on the opportunity cost for that capital elsewhere in the farm business. If only part of the money is borrowed, an average of the two rates should be used [2].

TIH. Taxes, insurance, and housing (TIH) are usually much smaller than depreciation and interest, but they need to be considered. Insurance should be carried on farm machinery to allow for replacement in case of a disaster. If insurance is not carried, the risk is assumed by the rest of the farm business.

There is a tremendous variation in housing provided for farm machinery. Providing shelter, tools, and maintenance equipment for machinery will result in fewer repairs in the field and less deterioration of mechanical parts and appearance from weathering.

The estimated costs of depreciation, interest, taxes, insurance, and housing are added together to find the total ownership cost.

Operating costs (also called variable costs) include repairs and maintenance, fuel, lubrication, and operator labor.

Repairs and Maintenance. Repair costs occur because of routine maintenance, wear and tear, and accidents.

Repair costs for a particular type of machine vary widely from one geographic region to another because of soil type, rocks, terrain, climate, and other conditions. Within a local area, repair costs vary from farm to farm because of different management policies and operator skill. The best data for estimating repair costs are the operator's own records of past repair expenses. Good records indicate whether a machine has had above or below average repair costs and when major overhauls may be needed. They also will provide information about the operator's maintenance program and mechanical ability.

Fuel. Fuel costs can be estimated by using average fuel consumption for field operations in liters per hour. Those figures can be multiplied by the fuel cost per liter to calculate the average fuel cost per hour/hectare.

Lubrication. Surveys indicate that total lubrication costs on most farms average about 15 percent of fuel costs. Therefore, once the fuel cost per hour has been estimated, one can multiply it by 0.15 to estimate total lubrication costs.

Labor. Because different size machines require different quantities of labor to accomplish such tasks as planting or harvesting, it is important to consider labor costs in machinery analysis. Labor cost is also an important consideration in comparing ownership to custom hiring.

Repair, fuel, lubrication and labor costs are added to calculate total operating cost.

After all costs have been estimated, the total ownership cost per hour can be added to the operating cost per hour to calculate total cost per hour to own and operate the machine.

Costs for implements or attachments are estimated except that there are no fuel, lubrication, or labor costs involved.

Used Machinery. Costs for used machinery can be estimated by using the same procedure shown for new machinery. However, the fixed costs will usually be lower because the original cost of the machine will be lower. And repair costs will usually be higher because of the greater hours of accumulated use. Therefore, the secret to successful used machinery economics is to balance higher hourly repair costs against lower hourly fixed costs. If you misjudge the condition of the machine such that your repair costs are higher than you anticipated, or if you pay too high a price for the machine so that your fixed costs are not as low as you anticipated, the total hourly costs of a used machine may be as high or higher than those of a new machine [1].

In conclusion, we can say that operating costs of farm machinery can be estimated by making a few assumptions about machine life, annual use, and fuel and labor prices.

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УДК: 631.354.2

ИНТЕЛЛЕКТУАЛЬНЫЕ СИСТЕМЫ, ПРИМЕНЯЕМЫЕ НА ЗЕРНОУБОРОЧНЫХ КОМБАЙНАХ

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Аннотация. В статье представлены интеллектуальные системы, применяемые на зерноуборочных комбайнах мировых производителей. Основное внимание уделено системам информационного контроля, мониторинга и автоматического управления.

Ключевые слова: зерноуборочный комбайн, технология, дисплей, телеметрия, мониторинг, адаптация, диагностирование.

Одним из условий повышения эффективности использования зерноуборочных комбайнов, роста их производительности является оснащение этих машин средствами информационного контроля, мониторинга и автоматического управления.

Для получения оптимального соотношения производительности и качества при уборке различных культур и в различных условиях фирмой Claas разработана система Cemos Auto Threshing, осуществляющая автоматическую настройку узлов и агрегатов зерноуборочных комбайнов серии Lexion 700. Это первая система, которая автоматически настраивает тангенциальную систему обмолота на соломотрясе и гибридных машинах.