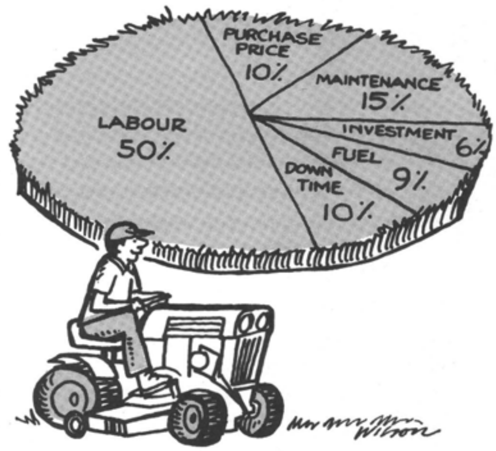
# Mowing Co$t Breakdown

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Grass cutting is the most time consuming of the maintenance programs conducted by a sports turf manager and the most important from the aspect of the appearance of a turf area. Proper selection of the mowing equipment is essential for success. Purchasing decisions are often reached without knowing the long term effect the equipment may have on your budget. This article addresses some of the factors you should consider before signing the purchase order.

Industry people say the *total cost per acre* should be the determinate to be employed in equipment selection. The total cost per acre is made up of several components; each will be discussed separately with an estimate of how much each component contributes to the total cost.

## The Purchase Price (10% of the cost per acre)

A wide choice of models and designs are available. They may be classified into two basic cutting actions - shear or impact - and four systems - reel, rotary, sickle and vertical. The desired height of cut, the degree of contour following required (wooded, rough, swampy, hilly or formal), the type of vegetation, the desired finished appearance, each have advantages and limitations which should be considered.

The first consideration, however, is the productivity of the unit - the rate at which work is performed; usually in acres per hour. Published specifications generally indicate straight ahead mowing at average speed with no allowance for stops, overlaps, turns, trimming or manoeuvring of any kind.

In order to save money, but not necessarily cut capital costs, the unit must minimize time and labour costs: Does the unit have engine power to cut heavy grasses at high ground speed?; have trimming capacity?; float to avoid scalping?; have adequate traction and side hill stability?; have a sturdy frame construction?; provide operator comfort such as sufficient leg room, comfortable seats, automotive speed control devices to lessen operator fatigue?.

## Maintenance Costs (15% of the cost per acre)

Depreciation, accelerated by new product lines, creates obsolescence. As a result there is little need to save old machines, even parts. Duration of the warranty and availability of parts and service for a new machine should be considered. Down time costs money.

During an eight year period , under normal conditions, 100% of the purchase price may be spent on the maintenance of a unit. Under severe conditions, as little as three to four years is required. Two kinds of maintenance are a given - 1) oil changes, blade sharpening, motor tune-ups and 2) engine replacement. Records are useful in determining the costs on a per hour basis and may serve as a basis for repurchasing a similar unit.

Remember properly adjusted belts, chains, bearings, and shafts will reduce friction, resulting in more power for more output per acre.hour.

## Fuel Costs (9% of cost per acre)

Fuel costs equal fuel consumption X fuel prices. Over the life time of a machine the latter may change drastically and lead to an early consideration of replacement.

The type of machine should be matched to the application. Purchase the largest machine for the job that is practical. Larger mowers require less man hours per acre. Generally they are built for heavy duty use, are equipped with water cooled engines which run quieter and cooler and use less fuel per acre cut. They last several times longer than the equivalent horse power in an air cooled engine under demanding situations. The initial cost penalty of $1600, or more, may be saved in overhaul and replacement. However, if the machine is to be used for trimming the demand on the mower may not be so heavy and a lower horse power machine may be adequate.

With a sound preventative maintenance program, a hydraulic/mechanical system will give greater operator convenience and safety, will increase machine productivity and versatility and operating economy for rotary and reel mowers from 5 - 15 feet. Raising and lowering the reels and cutter decks by hydraulic power is less tiring on the operator and a hydraulic mower blade , set to turn at a selected speed rather than ground speed, can be energy efficient.

A hydraulic system delivers more power in a smaller package, resulting in reduce weight of the equipment and increase fuel economy. Tubes and hoses are easily routed to the point of need and are located more conveniently. The units are smoother and quieter in operation. Because of the reduced weight there is less compaction with its adverse effect on aeration, resulting in healthier turf.

Generally a hydraulic unit will require more horsepower per foot of cut to drive the blade. Bearings and hydraulic seal maintenance can be high. Nevertheless the limitations are outweighed by the versatility of a hydraulic unit.

## Down Time (10% of the cost per acre)

Excessive down time may result due to poor equipment design, abuse of the machine and the incorrect use of light duty mowers. The result may be a high level of overtime and transportation costs and the bureaucracy of new equipment purchases. A significant part of the cost associated with down time is the disruption of the mowing schedule. The increase in inventory to offset down time is also worthy of consideration.

### Labour Costs (50% of the cost per acre)

This is the highest portion of the cost per acre to cut grass. The cost may vary from minimum wage to over $16 per hour and depends on the geographic region. Labour costs include the time to load and unload or otherwise transport the mower and the fuelling and daily service of the mower which reduce the time for mowing although the operator is paid for an eight hour day. It is generally considered that only 6.5 hours are spent mowing out of an eight hour day.

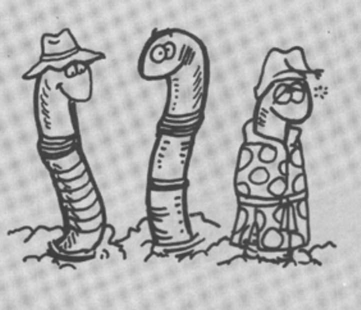
In addition to the base wage of the operator are the fringe benefits such as medical plans, pension schemes, workmen's compensation, federal and provincial taxes, educational and training allowances, and even safety shoes and hearing protection.

### Investment Costs (6% of the cost per acre)

This is an allowance for the value of the money which could be invested and the mowing done by contract. Generally a mower will last for 8 to 10 years during which it will operate about 6,000 hours.

## GRASS CLIPPINGS

Although 7,000 species of earthworms have been identified in the world, only three, the garden worm, the red worm and the night crawler are the most common types. Earthworms do not feed on living plants but are effective in reducing the accumulation of organic residues on the soil surface. Thus pesticides which reduce earthworm populations result in increased thatch accumulation.



# GTI RESEARCH HILITES

The efficacy of many insecticides depends on the placement of the material relative to the zone of activity of the insect. An example is the control of the European Chafer whose larvae or grub feeds on the crown and surface roots of turf species. Insecticides left on the surface are not effective, therefore a system for moving the material into the active feeding zone is required.

The most common system is to water the insecticide in, but often insufficient water is applied to move the material to an adequate depth or an irrigation system is not available. The presence of a thatch layer increases the difficulty of moving the insecticide downward.

Prof. Mark Sears of the Dept. of Environmental Biology examined subsurface injection systems for the placement of insecticides below the turfgrass thatch layer for the control of the European Chafer at two locations in 1992. Prof. Sears applied emulsifiable concentrates or flowable formulations of Diazinon and Chlorpyrifos (Dursban) to plots at recommended and half rates. He used a conventional sprayer system applying 4.5 L water/100 $m^2$, a Toro Hydraject Liquid Pulse Injector at a rate of 57 L water/ $m^2$, and a Pattison Bros. Liquid Spoke Injector at the same rate. At a location on the OVC lawn he also applied a insect parasitic nematode with the sprayer system and with the Spoke Injector.

Three weeks after application the plots were examined for live grubs within a 0.33 $m^2$ area. The results of his findings are recorded in Table 1.

Both the commercially available insecticides were effective in controlling the grubs when applied with a sprayer at Cambridge where there was a high grub numbers. Less consistent data was found on the OVC lawn where Dursban 480EC was the better material.

The use of the two types of injectors did not consistently improve the efficacy of the insecticides. The potential for the Toro Hydraject system to relieve compaction in addition to providing a system for applying an insecticide is an additional benefit where a combined problem of grubs and compaction exists.

Significant control of the Chafer was obtained with the insect parasitic nematode. The nematodes applied with a conventional sprayer appear to be more effective than those injected with the spoke system. This non chemical approach to control is worthy of further investigation.

**Table 1.** The percentage reduction in grub numbers due to insecticide applications by three systems in 1992.

| Application System | Insecticide | Rate | Cambridge* | OVC Lawn* |
|---|---|---|---|---|
| | | (kg a.i./ha) | (% of check) | |
| Toro | Dursban 480EC | 1.8 | 79.4 | 33.3 |
| Toro | Dursban 480EC | 0.9 | 80.4 | 45.8 |
| Toro | Diazinon 500EC | 4.5 | 93.8 | 91.7 |
| Toro | Diazinon 500EC | 2.25 | 60.8 | 50.0 |
| Spoke | Dursban 480EC | 1.8 | 95.9 | 16.7 |
| Spoke | Dursban 480EC | 0.9 | 90.7 | 50.0 |
| Spoke | Dursban 50 WSP | 2.25 | 80.4 | 58.3 |
| Spoke | Dursban 50 WSP | 1.13 | 68.4 | 37.5 |
| Spoke | Diazinon 500EC | 4.5 | 93.8 | 70.8 |
| Spoke | Diazinon 500EC | 2.25 | 66.0 | 37.5 |
| Spoke | Nematode | Full | - | 54.2 |
| Sprayer | Dursban 480EC | 1.8 | 80.8 | 95.8 |
| Sprayer | Dursban 50 WSP | 2.25 | 92.8 | 45.8 |
| Sprayer | Diazinon 500EC | 4.5 | 94.8 | 0.0 |
| Sprayer | Nematode | Full | - | 83.3 |
| Sprayer | Nematode | Half | - | 54.2 |

*Grub Number in Control: Cambridge = 24; OVC Lawn = 12.