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SUMMARY REPORT

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FIELD TRIALS OF THE SPINSLICER MOWER

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This report is a condensation of the results of field trials by Georgia Tech and by the Georgia State Highway Department. Seven areas of interest are discussed. (I) cutting ability, (II) safety, (III) drive system, (IV) mountings, (V) operating positions, (VI) maintenance, and (VII) contouring.

I. Cutting Ability

The Georgia Tech trials showed the Spinslicer to have unusual capabilities for mowing exceedingly heavy second growth of kudzu, briars, dog fennel, Bermuda grass, cottonwood bushes and sweet gum. None of the mowed material was shredded or chopped and was left in well defined swaths. In these tests no comparison was made between the Spinslicer and a sickle-bar mower. Experience and prior observations indicate that sickle-bar mowers would have had major difficulty attempting to mow this material.

During the Georgia State Highway Department field trials, the Spinslicer was compared with two sickle-bar mowers. The three mowers worked on shoulders and slopes of roads north of Atlanta. The following was observed:

1. No delay was incurred by the Spinslicer because of striking tin cans, bottles, pieces of sheet metal, a 4 by 8 foot piece of beaver board, small saplings (one inch diameter) or pieces of asphalt paving material.
2. Low forward-speed impacts with concrete and heavy metal obstructions did not damage knives severely enough to cause uncut streaks.

3. At one point the Spinslicer was mowing the shoulder next to the highway with the sickle-bar mowers offset and following. The Spinslicer struck a loosely coiled length of 6 gauge wire and cut its way through, wrapping a one foot length around the inboard end of the shaft. Upon hitting wire from the same coil the sickle-bar mowers were stopped and required blade repair.
4. With the tractor on the highway and the Spinslicer cutting the first swath, an excellent mowing job was obtained using third gear. Neither of the tractors carrying sickle-bar mowers could exceed second gear. One trial pass was made in fourth gear and no difference was noted in the Spinslicer cutting ability.
5. In narrow areas and in cutting to steep banks, the 7 foot long Spinslicer outboard end "dug-in" more readily than that of the sickle-bar mower. The cutter-head was shortened to a 6 foot length and this problem was eliminated.
6. The Spinslicer was somewhat slower than the sickle-bar mower when both were required to clear obstacles.
7. The Spinslicer production (area cut per unit time) was significantly higher than that of the sickle-bar mowers (minimum of 50% greater).

II. Safety

The Spinslicer and the sickle-bar mowers both have, as integral safety devices (1) an over-load or slipping device on the drive train, and (2) a breakback coupling device that allows the out-board end of the cutter head to swing back into a semi-trailing position in the event of striking an obstruction.

In addition to these two basic safety features, the Spinslicer has four features not found on sickle-bar mowers.

1. An electric clutch on the drive line to prevent over-loading.

The electric clutch cannot be tampered with, is not subject to slipping when wet, does not tend to rust together after long periods of storage, and is not subject to torque variations from wear. The maximum torque of the electric clutch is pre-set and does not vary with wear.

2. A switch that immediately disengages the electric clutch when the cutter head "kicks" back. Because of lack of significant momentum, rotation stops quickly, eliminating the potential of additional damage. The coupling on conventional mowers relies on a slip clutch to stop the mower and prevent damage during kick-back.
3. The Spinslicer is electrically controlled and automatically stops when the tractor engine is switched off. Should kick-back occur, the mower stops quickly. After repositioning it is activated by operating a switch located on the dashboard at the operator's finger tips.

The operator of a conventional mower must disengage the power take-off, a slow procedure due to flywheel momentum, before realigning the mower blade; then reengage the power take-off.

4. Sector guard enclosing the upper rear quadrant facing the outboard end of mower shaft.

III. Drive System

Conventional mowers are driven from the power take-off and must be removed before any other equipment can be mounted at the rear of the tractor.

The Spinslicer is driven from the engine crank shaft and is located at the front of the tractor. The rear mounting fixtures and power take-off assemblies are free at all times for additional equipment. The front drive system is "live" at all times regardless of the transmission position of the tractor. This arrangement also permits positive adjustment of ground speed to the mowing conditions, without significant variation in blade speed.

IV. Mounting

As indicated above the Spinslicer mounting differs from that of conventional mowers. However, the following comments are pertinent:

1. The Spinslicer drive system must be removed to use a front loader, snow plow, front mounted planter or a front mounted cultivator.

2. The Spinslicer and carriage frame are easily attached by use of three pins, plugging in the hydraulic and electrical systems and attaching the tumbler drive shaft.
3. The conventional mower must be completely dismantled, (including the drive attachment) before any other equipment, front or rear mounted, can be attached.
4. With the Spinslicer arrangement one tractor can be used for a variety of jobs with minimum time consumption for changing equipment.
5. The Spinslicer arrangement permits dual operation without involving special adaptors.

V. Operating Positions

Both the Spinslicer and highway type sickle-bar mowers can be positioned to cut at angles from minus 45 degrees to plus 90 degrees above the horizontal plane and to cut over curbs up to 12 inches in height.

The Spinslicer uses a dual hydraulic control system to move to various positions. Most highway type sickle-bar mowers operate with one.

VI. Maintenance

Daily maintenance of the Spinslicer consists of greasing 6 Zerk fittings, checking the oil level in the gear box, and replacing blades that may have been damaged. Periodical maintenance involves checking mounting bolts and tightness of drive belts.

Daily maintenance of a conventional sickle-bar mower consists of greasing a minimum of 8 Zerk fittings, checking gear box oil level, sharpening dull knives, replacing knives that may have been damaged, adjusting and lubricating wear-plate shims. Periodical maintenance includes checking drive belt tightness, skid shoe wear, blade cutting angle and guard wear.

In the Georgia State Highway Department tests, blades used on the Spinslicer averaged greater than 40 hours life. A maximum of 8 hours is obtained from a set of knives on a sickle-bar mower.

The Spinslicer blades do not require replacement until blades become badly mangled. An occasional bent, broken or chipped blade does not significantly effect the Spinslicer cutting ability. A moderately damaged sickle-bar mower blade must be repaired or the machine will skip-cut and tend to lodge.

VII. Contouring

The Spinslicer has rigid cutter head and relies on the vertical travel of the lift frame and the cutter hinge for adjustment to contour change. On high points or crowns the Spinslicer tends to create a peaked effect and on depressions to plane over them; the roller prevents "scalping." The sickle-bar mower has a moderately flexible cutter head which tends to "follow" minor contour variations.

The trials showed that the Spinslicer is superior to the sickle-bar mower in five of the seven areas of interest (cutting ability, safety, drive system,

mounting and maintenance); inferior in two (operating positions and countouring). The Spinslicer is capable of duplicating each of the operating positions required of highway mowers; however, the sickle-bar mower can be positioned somewhat faster. This disadvantage can be overcome by redesign of the control system. The cutter head of the Spinslicer is inherently rigid and thus not subject to redesign for improvement in contouring ability. However, the Georgia State Highway Department did not consider this to be a significant disadvantage in view of the high production and low maintenance features of the Spinslicer mower.