EFFECTS OF TRANSMISSION TOWERS ON ANNUAL TOBACCO PRODUCTION COSTS

by
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Since the early 1900s, tobacco production in Ontario has developed into a major cash crop industry. In recent years the farm value of the crop has been in the neighborhood of $250,000,000 and is grown on approximately 150,000 acres involving about 2,700 farmers. In comparison to other cropping enterprises, tobacco production is quite involved and complex.

Previous research has investigated the effects of transmission lines on field crops (Ontario Hydro, 1977), orchards, and vineyards (Genge, 1977) in Ontario, but no information was available on the effects of transmission towers on the production of tobacco. To assess the annual cost to the farm operator, Ontario Hydro funded a research study conducted by George Klosler, Fanshawe College, Oxford School of Agriculture (Klosler, 1980).

Numerous tower sites in tobacco fields were examined through ground and air inspection. Some of the more significant observations can be listed as follows:

(a) Large areas were left unproductive around each tower so that equipment could maneuver easily.

(b) In many instances where towers had been erected some years ago, the producers rearranged their fields in such a manner that towers were in headlands or on edges of fields.

(c) Weed infestation was a problem, particularly when towers were located in the middle of fields and tillage could not be employed, once the tobacco had reached a certain size.

(d) No attempts were made to utilize the area under the tower for tobacco production.

(e) The patterns that farmers followed in working around towers varied somewhat, the amount of land taken out of production remained fairly constant.

(f) Whenever towers were located on sloping terrain the headlands were significantly larger than on level ground.

(g) The size of unproductive areas was determined by the maneuverability of the largest piece of equipment.

In some parts of the United States, tobacco farmers leave every fifth row vacant for equipment travel. The occurrence of this practice depends on field size and type of equipment used (i.e., tractor-drawn equipment). In Ontario, the almost universal use of self-propelled priming aids or harvesters does not require vacant rows any closer than every 50 or 60 rows. The study, therefore, did not consider vacant rows.

To analyze the effect of a tower on tobacco operation, two components were analyzed in a simulation study. Land loss and extra machine time involved in working around the towers were examined by simulating the various field operations.

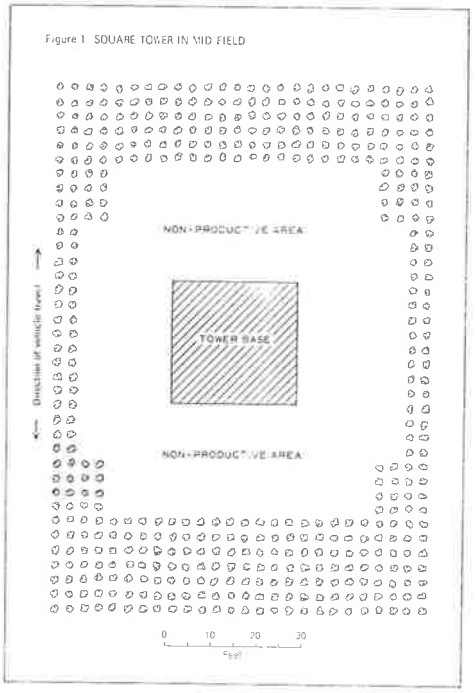
The amount of land removed from production depends upon the location of the tower and its orientation to the rows of tobacco. Figures 1, 2, and 3 illustrate the pattern found in field observations and duplicated in the simulation study.

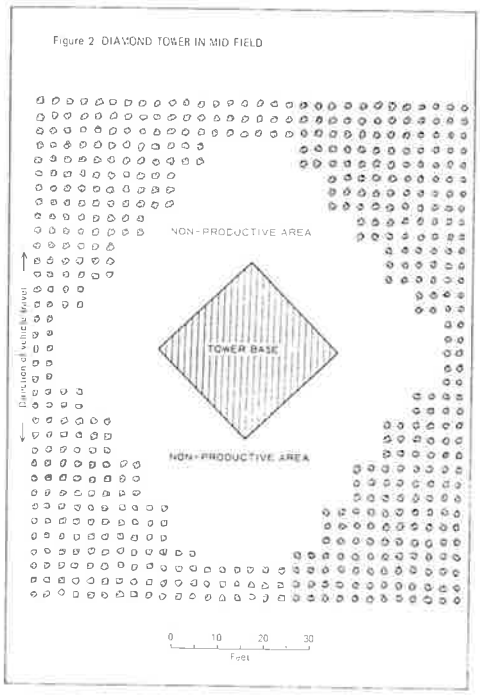
Most field observations indicate that eliminating plants from each side of the tower is normal procedure. This results in higher land costs and lower machine costs than would be incurred if only one transportation corridor was provided.

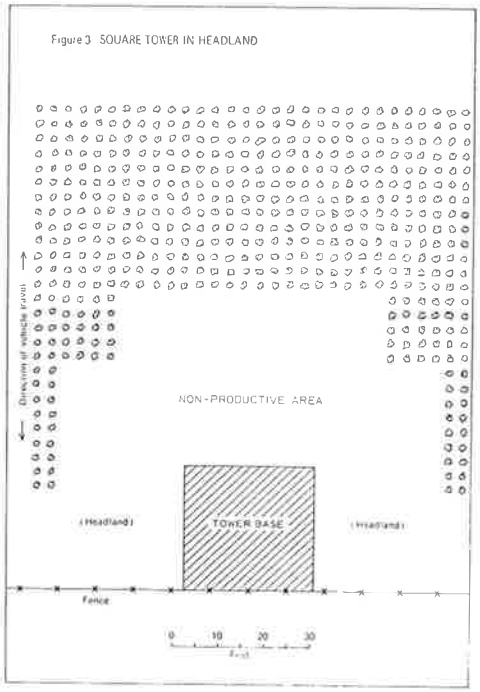
Table 1
Cost of a Transmission Tower in a Tobacco Field*

	Mid Field		*Tower in*
	Square	*Diamond*	*Headland*
Extra Machine Time Cost**			
Plowing	$ .93	$ 1.24	—
Discing	2.00	2.20	$1.00
Cultivating	1.35	1.90	—
Fumigation	.05	.15	—
Planting	.69	.73	—
Hoeing	1.14	.51	—
Hilling	.13	.10	—
Spraying	.13	.22	—
Priming	47.86	56.11	—
Stalk Cutting	.15	.12	—
Total	$54.43	$63.28	$1.00
Land Cost			
Land removed from Production (sq ft)	5936	5656	2576
Value of lost Production (@$2,206/acre)	$301.71	$286.34	$130.46
Total Cost of Tower	$356.14	$349.62	$131.46

* Annual cost to the producer for the study year.
** Cost of extra time required to operate around the tower.







Within the tobacco field, total land removed from production by a square tower was 5,936 square feet, and 5,656 square feet for a diamond tower. When the tower is located in the headland, the area unavailable for production is reduced to 2,576 square feet (for a square tower).

As indicated above, the orientation of the tower determines the number of rows of tobacco affected. A square tower will interrupt 22 rows of tobacco while a diamond tower will interrupt 26 rows. For each of the operations required in the production of tobacco, the extra time required to manipulate the equipment around the two types of towers was determined. Custom work rates were utilized to calculate the cost of the extra time required. This information is summarized in Table 1.

A tower located in the headland of a tobacco field results in virtually no extra time involved in performing the unique operations associated with the crop. A tower in this location results in shorter rows of tobacco but does not cause a significant increase in machine time required to perform operations. Therefore, extra time costs resulting from a tower located in the headland were assumed to be zero. The only exception to this is the extra cost involved in discing headlands for weed control, estimated from field studies to be $1.00 per tower.

As other studies of this type have shown, the cost of a tower is closely related to the value of the crop being produced around the tower. The higher value crops have proportionately higher costs associated with land removed from production. Higher value crops also have a proportionately higher percentage of total costs attributed to the land component. The value of lost tobacco production ($2,206/acre) was arrived at by calculating the value of gross sales less any costs that would have been incurred.

The study demonstrated that transmission towers located in the midst of tobacco production areas interrupt the normal production practices. Specifically, the towers take out of production land that has a high opportunity cost. Additionally, towers located in tobacco fields make the use of equipment less efficient.

The best location for a tower was apparently in the headland area where the area is normally unproductive. The amount of land lost from production in this location was less than half of the area lost when the tower was located in mid-field. Of the mid-field locations, the square orientation created a five percent greater loss of land than the diamond orientation.

The cost of lost time for mid-field tower locations averaged approximately 15 percent of the total cost, but was higher for the diamond orientation. Since approximately 85 percent of the total operating cost of a tower in a tobacco field is due to the amount of land taken out of production, it is obvious that trends to larger equipment will necessitate larger headlands and unproductive areas around towers.

Based on the findings of this study, the following recommendations were made.

- With consideration given to all relevant factors in route and tower location, attempts should be made to avoid tobacco field locations.
- In the event that a tobacco operation cannot be avoided, headland and fencerow locations are preferable.
- Towers to be located in tobacco lands should be designed and oriented in such a way as to minimize land loss and equipment conflict.
- Written information and assistance regarding compensation policies should be readily available through local offices.
- A procedure should be developed to ensure that findings from current research into transmission line impacts are incorporated into the route selection/tower location process.

Literature Cited

Genge, R. A., 1977. *The Economic Effects of Hydro Transmission Towers on Orchard and Vineyard Operations in the Niagara Peninsula*. A report submitted to Ontario Hydro, Department of Transmission Environment. 105 p.

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