

THE USE OF TREE GROWTH REGULATORS AT FLORIDA POWER & LIGHT COMPANY¹

by John B. Tamsberg

Florida Power & Light Company's service territory extends along the east coast of Florida from the Georgia line south to Miami around the peninsula, and up the west coast to Sarasota. We serve 3.1 million customers and have a generating capacity of 13,622 megawatts. The line clearing departments operating out of five divisions maintain 36,000 miles of overhead distribution and 5,500 miles of transmission. We are a growth company, which has sustained a growth of 21.1 percent over the last 5 years.

Florida is a picture of vegetative contrasts. The north half of the state is comprised of typical southern pine flatwoods, mixed with cypress and hardwood swamps and upland oak ridges. The south half of the state is more typical of the tropical vegetation found in the Caribbean Islands with common species such as coconut palms, Australian pine, and mahogany.

The transition from a temperate climate to a subtropical one provides a year-round growing season, many rapid-growing species, and a greater species diversity than found elsewhere on the North American continent.

FPL became involved with tree growth regulator test plots in 1984. Initially, we tested Clipper; and later, Cutless. In 1986 when Clipper was labeled for use, three one-man injection crews were put on in the Eastern Division. In 1988, a system-wide program was developed and put in place. In 1989, we injected 46,763 trees.

Most utilities have experimented and tested TGR's. Few have gone beyond testing to full TGR injection programs. FPL began a TGR program as part of an overall system-wide Line Clearing Improvement Program. This was part of a Total Quality Commitment Philosophy adopted by our management. This philosophy demands extensive evaluation of data before adopting new management action.

The total number of primary interruptions had risen from a low of 11,028 in 1985 to 13,893 in 1987 (Figure 1). Tree related interruptions went

from the third highest cause to the number one cause with 1752 interruptions in 1987 (Figure 2). We clearly had to do something.

Further study of the situation indicated that the interruptions per 100 miles of line was increasing in all divisions (Figure 3). A consultant's study indicated that we had a system-wide average of 147 trees per mile; well above the national average of 75 (Figure 4). Analysis of the growth rates of our predominant tree species indicated that half exceeded our eight foot trim standard in the second year. By the fourth year, all but four of the predominant species exceeded our eight foot trim standard (Figure 5).

Our consultant developed work load figures and compared them with the available resources. With annual expenditures of \$17,699,488 in 1987 (a cost of \$27.50 per tree) and 5,126,600 trees in the system, our best possible cycle was 7.9 years. The current three year trim cycle was not achievable with the resources allocated.

After reviewing these data, we stopped and clearly defined our problem. In 1987, our customers experienced 1752 primary interruptions due to trees. Using a cause and effect diagram we established four root causes to our problem (Figure 6): 1) higher than normal tree population, 2) fast tree growth, 3) line clearing not scheduled consistently throughout FPL and 4) inexperienced FPL contractors.

We then established countermeasures for each root cause and defined practical methods for each (Figure 7). Tree growth regulators were only one of nine solutions to our problem. To reduce the number of fast growing trees we planned to use TGR's, incorporate a more aggressive removal policy, and change our trimming standard to ten feet. All are practical solutions to the same problem. Before implementing a TGR program we completed a cost benefit analysis using data from our test plots and the program in effect in the Eastern Division. Over a four year period we had achieved an average growth reduction of 10.7

1. Presented at the annual conference of the International Society of Arboriculture in Toronto, Ontario in August 1990.

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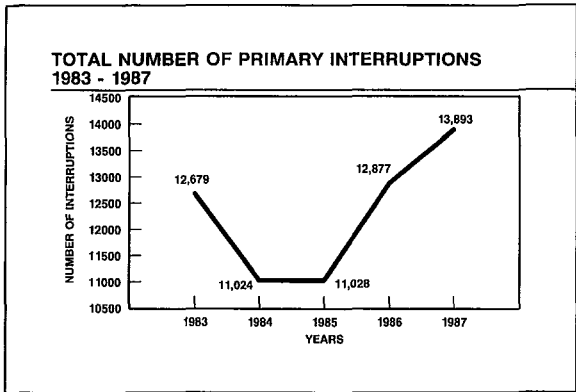


Figure 1

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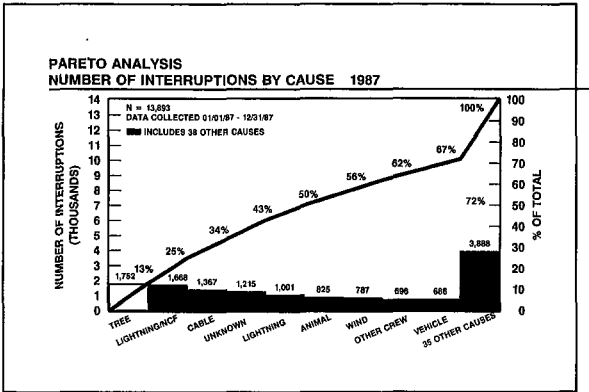


Figure 2

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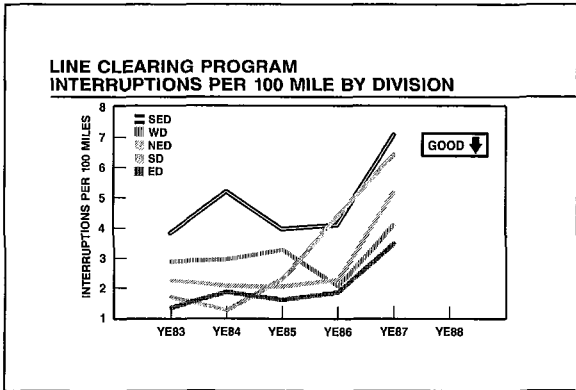


Figure 3

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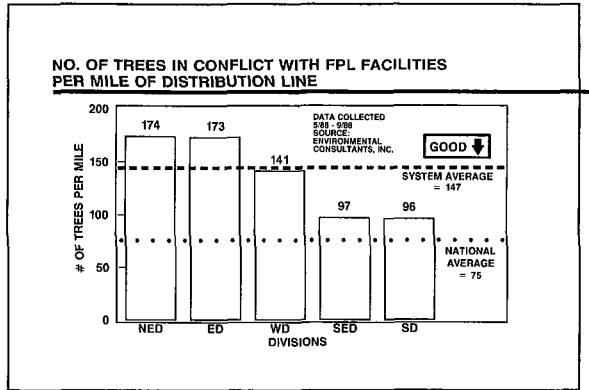


Figure 4

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GROWTH PATTERNS OF FPL'S PREDOMINANT TREE SPECIES

| SPECIES | AVERAGE TOTAL GROWTH IN FEET AFTER TRIMMING | | | | | % OF SYSTEM |
|---------------------|---|--------------|--------------|--------------|------|-------------|
| | 1-YEAR AFTER | 2-YEAR AFTER | 3-YEAR AFTER | 4-YEAR AFTER | | |
| AUSTRALIAN PINES | 6 | 10 | 12 | 13 | 7.7 | |
| AVOCADO TREES | 4 | 8 | 8 | 9 | * | |
| BLACK CHERRY | 8 | 14 | 15 | 16 | * | |
| BOTTLE BRUSH | 5 | 6 | 7 | 9 | * | |
| FICUS TREE | 4 | 6 | 8 | 10 | 4.4 | |
| FLORIDA HOLLY | 4 | 12 | 13 | 14 | 8.0 | |
| LIVE OAK | 4 | 6 | 7 | 7 | 9.7 | |
| MAHOGANY TREE | 4 | 5 | 6 | 7 | 4.9 | |
| MELALEUCA | 8 | 10 | 14 | 15 | 4.5 | * |
| NORFOLK ISLAND PINE | 3 | 4 | 5 | 6 | * | |
| SLASH PINE | 2 | 4 | 7 | 9 | 21.3 | |
| UMBRELLA TREE | 3 | 5 | 6 | 7 | 2.3 | |
| WATER OAK | 4 | 5 | 6 | 9 | 5.8 | |
| COCONUT PALM | 17 | 17 | 17 | 17 | * | |
| QUEEN PALM | 15 | 15 | 15 | 15 | 2.7 | |
| ROYAL PALM | 16 | 16 | 16 | 16 | 2.9 | |
| SABLE PALM | 10 | 10 | 10 | 10 | 10.5 | |
| ALL OTHER SPECIES | | | | | 14.5 | |

NOTE: THESE ARE THE SYSTEM AVERAGE, THE FIGURES VARY BY DIVISION.

Figure 5

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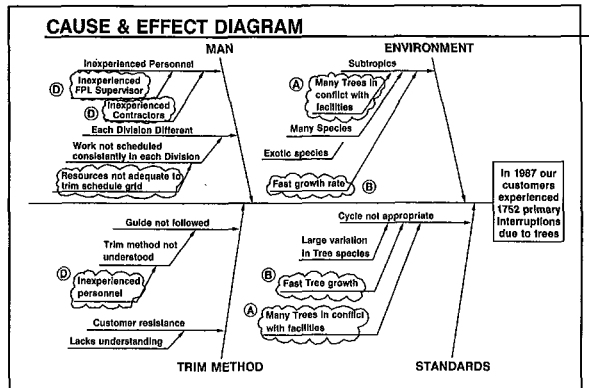


Figure 6

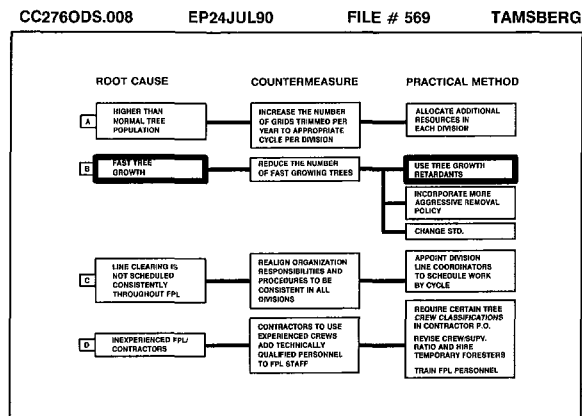


Figure 7

feet (Figure 8).

The program pays off in two ways. First, the growth of many of our species exceeds our trimming standard of ten feet before we can come back on the next maintenance cycle. TGR's will hold many of these species out of the wire until we get back, thus preventing an interruption. Our goal is to prevent interruptions. We see trimming a fast growing species without injection to be counter-productive.

The second payoff comes in reduced time you return to retrim. On a recent cost evaluation, we found the re-trim cost of treated Australian pine hedgerow to be \$96.14 less per one hundred feet than untreated sites. We have not found it necessary to inject a second time. The trees continue to hold with the exception of a few breakouts.

Since then we have learned a lot about TGR's and their application. Despite what the chemical companies say TGR injection does damage trees; but so does pruning. The application techniques must be precise. Sloppy injection procedures can

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| LOCATION | # OF TREES | AVERAGE GROWTH OF TEST TREES | AVERAGE GROWTH OF CONTROL TREES | PER CENT GROWTH REDUCTION OF TEST TREES |
|-----------------|------------|------------------------------|---------------------------------|---|
| MIAMI | 135 | 3' | 6' | 62.5 |
| MIAMI | 75 | 2' | 10' | 80 |
| MIAMI | 152 | 2' | 9' | 77.8 |
| MIAMI | 130 | 3' | 14' | 78.6 |
| BOCA | 100 | 4' | 12' | 66.7 |
| FT. LAUDERDALE | 50 | 3' | 9' | 66.7 |
| LANTANA | 70 | 2' | 20' | 90 |
| WEST PALM BEACH | 50 | 2' | 18' | 88.9 |
| WEST PALM BEACH | 200 | 2' | 14' | 85.7 |
| WEST PALM BEACH | 100 | 3' | 13' | 76.9 |
| WEST PALM BEACH | 350 | 2' | 18' | 88.9 |
| WEST PALM BEACH | 200 | 3' | 15' | 80 |
| JUNO | 175 | 2' | 12' | 83.3 |
| TOTAL (AVG) | | 2.5' | 13.2' | 81.0 |

DATA COLLECTED: 1981 - 1988

Figure 8

severely damage or kill a tree. Not every tree is injectable. The person injecting must consider species, size and condition. The person responsible for the program must insure that the crews are trained and watch for environmental conditions such as freezes and drought. This is not a program that can be started and forgotten.

In the future we look hopefully to the possibilities of bark-banding and soil injection. We have experimented with both and find them to be much more desirable than trunk injection.

In conclusion we expect to continue the program. We feel that our TGR program is a valuable component of our overall line clearing program.

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