THE USE OF TREE GROWTH REGULATORS AT FLORIDA POWER & LIGHT COMPANY[1]

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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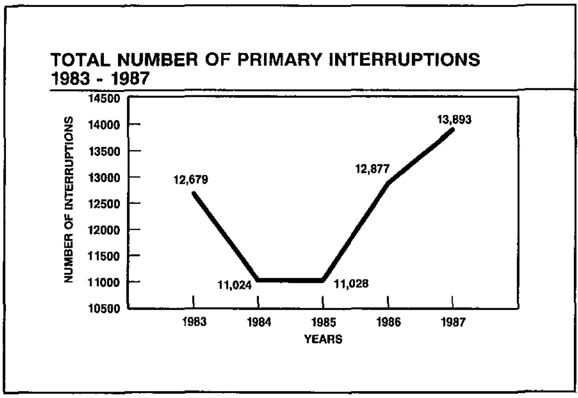

Figure 1

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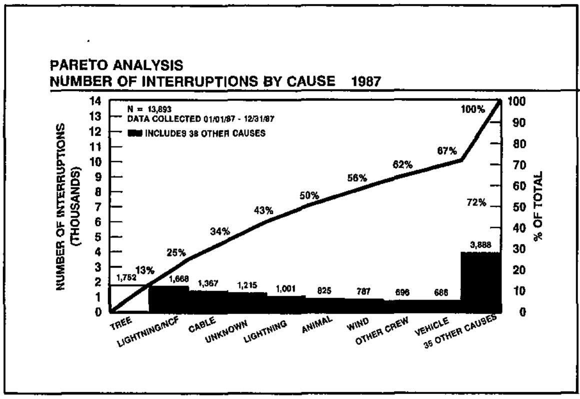

Figure 2

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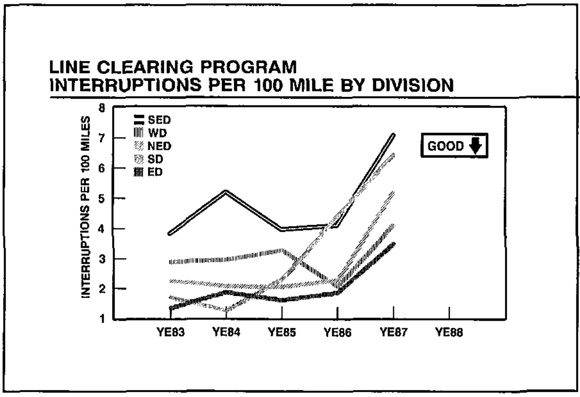

Figure 3

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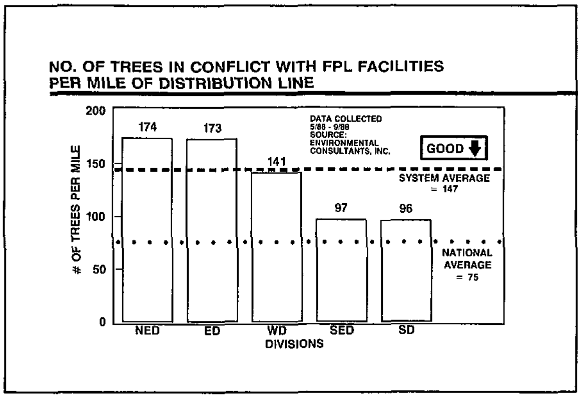

Figure 4

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GROWTH PATTERNS OF FPL's PREDOMINANT TREE SPECIES

SPECIES	AVERAGE TOTAL GROWTH IN FEET AFTER TRIMMING				
	1-YEAR AFTER	2-YEAR AFTER	3-YEAR AFTER	4-YEAR AFTER	% OF SYSTEM
AUSTRALIAN PINES	6	10	12	13	7.7
AVOCADO TREES	4	6	8	9	*
BLACK CHERRY	8	14	15	16	*
BOTTLE BRUSH	5	6	7	8	*
FICUS TREE	4	6	8	10	4.4
FLORIDA HOLLY	8	12	13	14	8.6
LIVE OAK	4	6	7	7	9.7
MAHOGANY TREE	4	5	6	7	4.9
MELALEUCA	6	10	14	15	4.5
NORFOLK ISLAND PINE	3	4	5	6	*
SLASH PINE	2	4	7	8	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 APLM	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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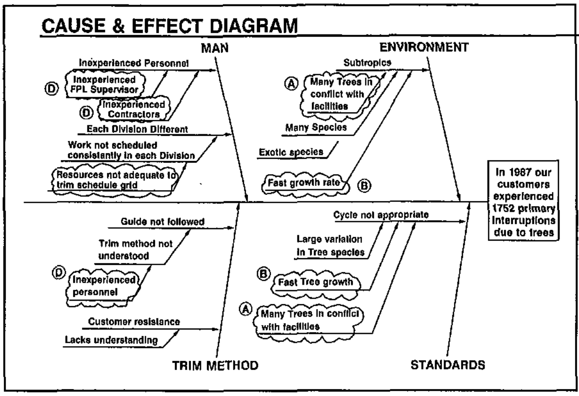

Figure 6

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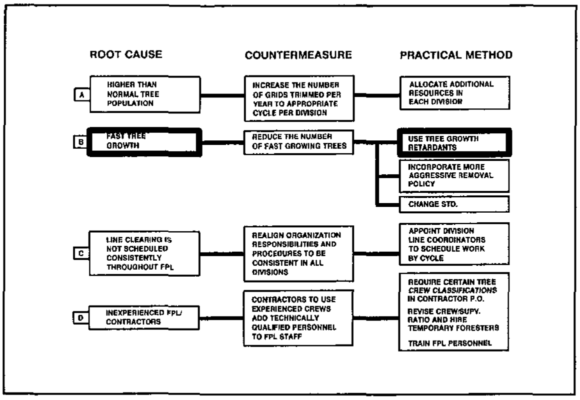

Figure 7

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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'	8'	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 - 1986				

Figure 8

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 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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