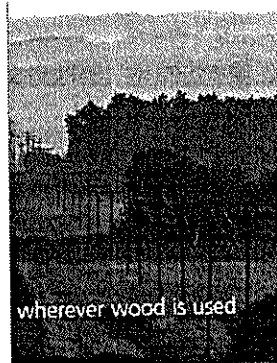


**Wood Pole Asset
Condition Assessment,
Program Design and
Management Plan**



Prepared by:

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Dr. Paul Cooper, Ph.D., University of Toronto*

INTRODUCTION

- Genics Inc. and Paul Cooper were commissioned to design and develop a management plan that would confidently address the needs of the customer, the power company and the regulators in achieving a sustainment plan that would be economically feasible, logistically possible and environmentally responsible.

PURPOSE

- The purpose of this study was to evaluate the Eastern Government Owned Utility (GOU) and Western Investor Owned Utility (IOU) pole plants and determine what processes would be needed to maintain reliability in their assets.

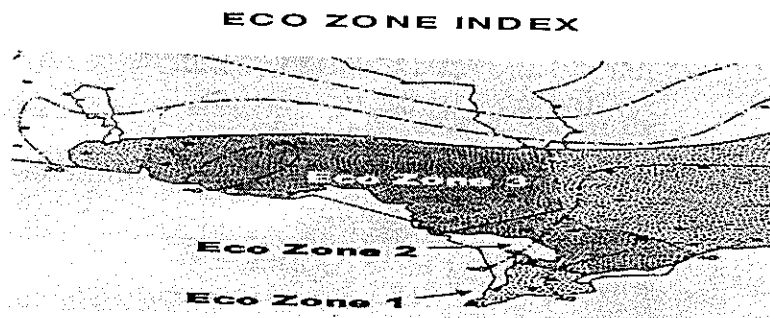
TESTING PLAN

- A sample pole population (varying in age, species and treatment) of approximately 22,000 poles was to be investigated.
- The sample was further dissected into three ecological zones representing decay indices developed by Dr. Paul Cooper.

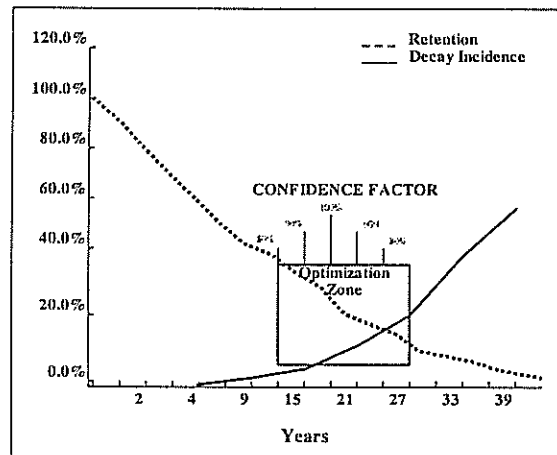
TESTING PLAN (CONT)

- Each eco zone was further referenced according to Agriculture Canada to further understand decay incidence dynamics.
- 800 poles in each eco zone (GOU) and 200 poles (IOU) were to be core sampled for preservative retention analysis.

TESTING PLAN (CONT)



PRESERVATIVE RETENTION



FIELD FINDINGS

- The 3 eco zones were dominated by 2 species of wood poles (pine & cedar) and three treatment types (CCA, Creosote, and Pentachlorophenol)
- The treatment types were further dissected into full length pressure treatments and butt treatments.

FIELD FINDINGS ECO ZONE 1

- 6.11 % Replacement Rate
- 2.4 % Carpenter Ant Infestation Rate
- 38.7 % Decay Rate
- 24.6 % Exhibited Excessive Checking

FIELD FINDINGS ECO ZONE 2

- 6.10 % Replacement Rate
- 3.0 % Carpenter Ant Infestation Rate
- 32.10 % Decay Rate
- 19.3 % Exhibited Excessive Checking

FIELD FINDINGS ECO ZONE 3

- 4.8 % Replacement Rate
- 5.0 % Carpenter Ant Infestation Rate
- 18.3 % Decay Rate
- 8.3 % Exhibited Excessive Checking

ECONOMIC JUSTIFICATION

- REMEDIAL TREATMENTS ARE JUSTIFIED TO EXTEND THE LIFE OF THE UTILITY POLES IF REMEDIAL TREATMENTS ARE 10% OR LESS OF THE CAPITOL REFURBISHMENT

WHY INSPECT

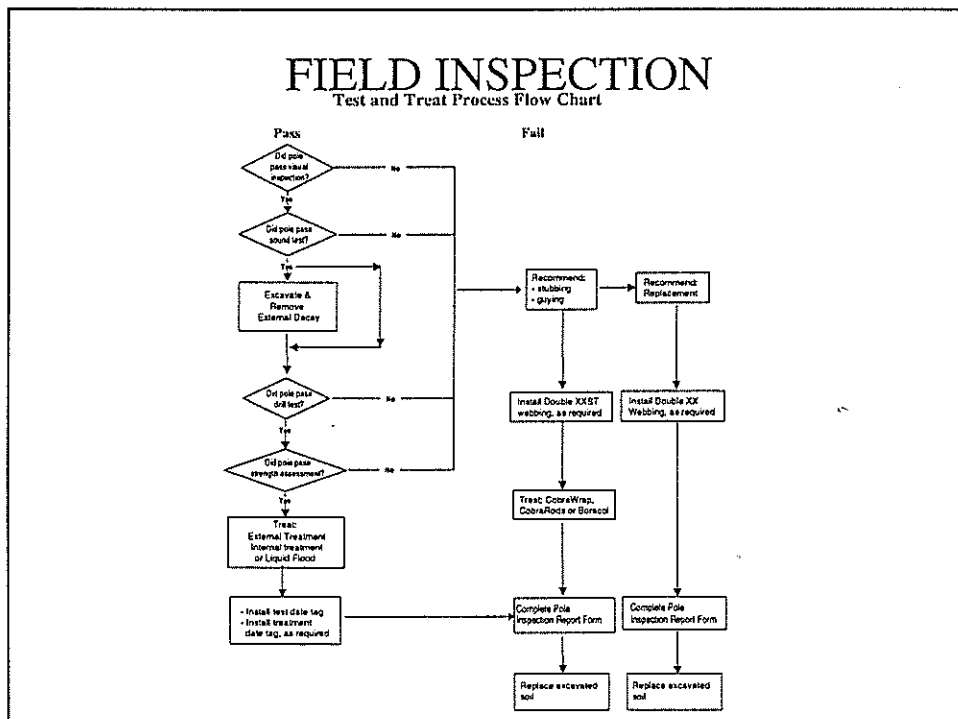
- CSA Mandate.
- Utilities with test & treat programs have achieved significant cost reductions through decreased replacement rates.

FIELD INSPECTION

- Test & Treat Flowchart

FIELD INSPECTION

Test and Treat Process Flow Chart



FIELD INSPECTION CATEGORIES

- Internal Damage
 - Hollow Heart (HH)
 - Enclosed Pocket (EP)
 - Internal Decay (ID)
- External Damage
 - Brown Cubicle Rot (BCR)
 - Shell Rot/Surface Rot Below Ground (SR)
- Roof Damage
 - Upper Roof Rot (URR)
 - Split Top (ST)

FIELD INSPECTION

CATEGORIES (Cont)

- Insect Damage
 - Ant Activity - Actually See Ants (AA)
 - Ant Evidence - Sawdust (AE)
 - Wood Borer (WB)

- Pest Damage
 - Wood Pecker Damage (WPD)
 - Rodent Damage (RD)

FIELD INSPECTION

CATEGORIES (Cont)

- Uncontrollable Damage
 - Excessive Checking (EC)
 - Shell Separation (SS)
 - Spur Cuts (SC)
 - Fire Damage (FD)
 - Mechanical Damage (MD)
 - Lightning Damage (LD)

FIELD INSPECTION

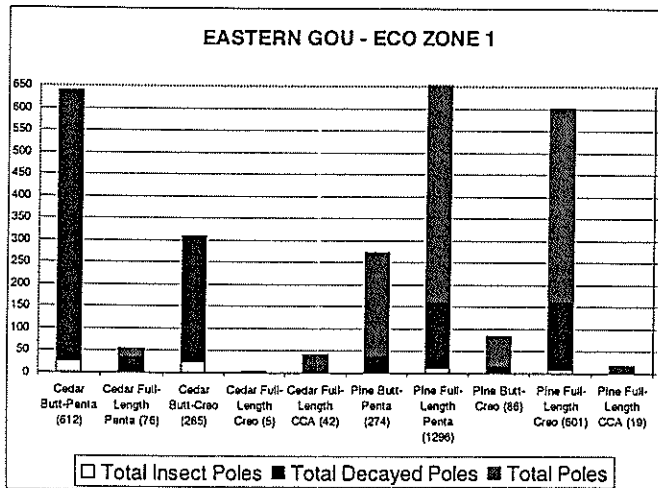
Sample Damage Report

DECADE SPECIES TREATMENT	INTERNAL DAMAGE			EXTERNAL DAMAGE		ROOF DAMAGE	
	HH	EP	ID	BCR	SR	URR	ST
1959 & OLDER CEDAR B/C	15	17	16	38	57	24	

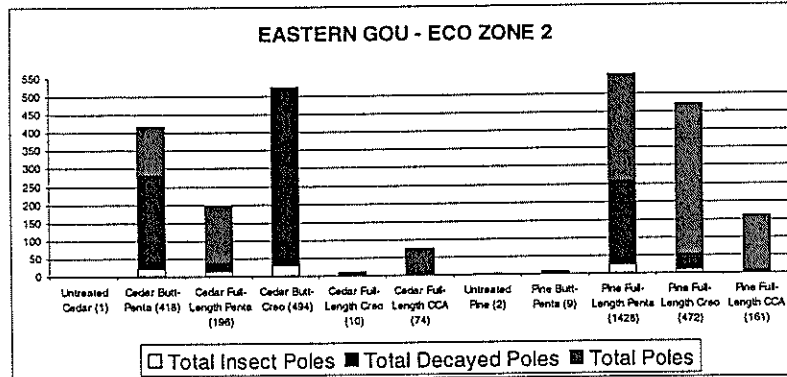
DECADE SPECIES TREATMENT	INSECT DAMAGE			PEST DAMAGE		UNCONTROLLABLE DAMAGE					
	AA	AE	WB	WPD	RD	EC	SS	SC	FD	MD	LD
1959 & OLDER CEDAR B/C	11	37	1	2	1	75	10	18			

FIELD INSPECTION

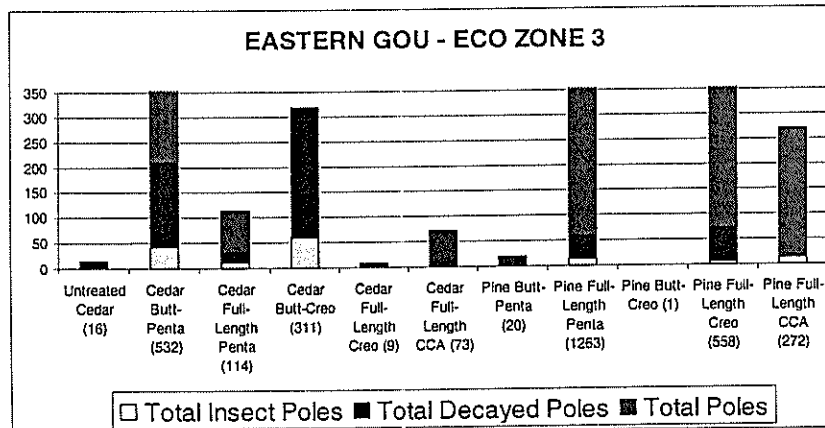
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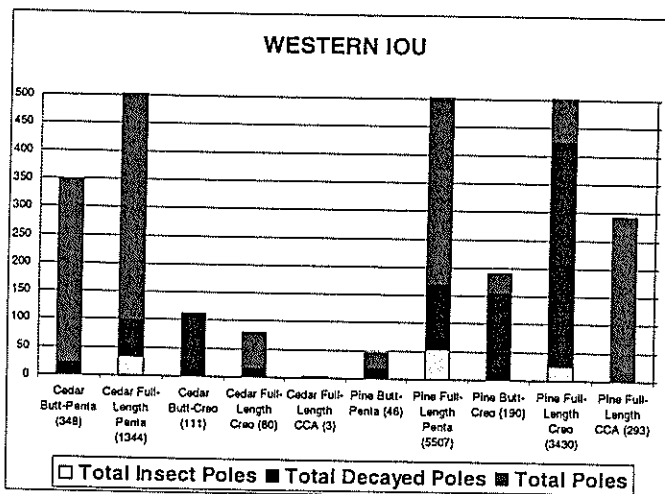
FIELD INSPECTION (CONT)



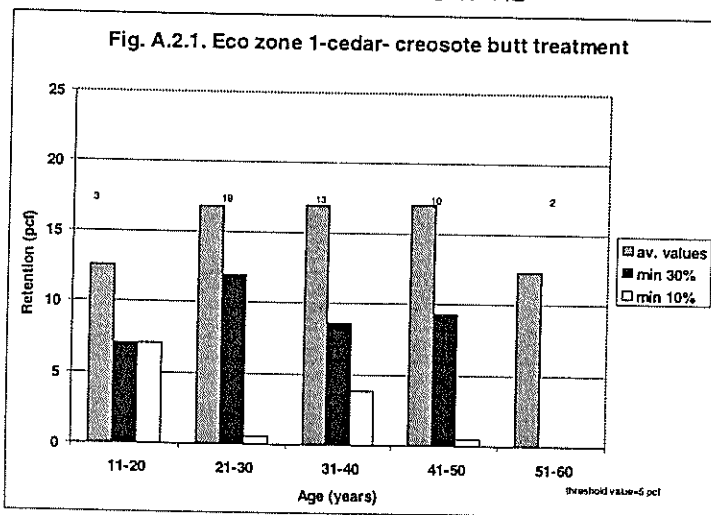
FIELD INSPECTION (CONT)



FIELD INSPECTION (CONT)

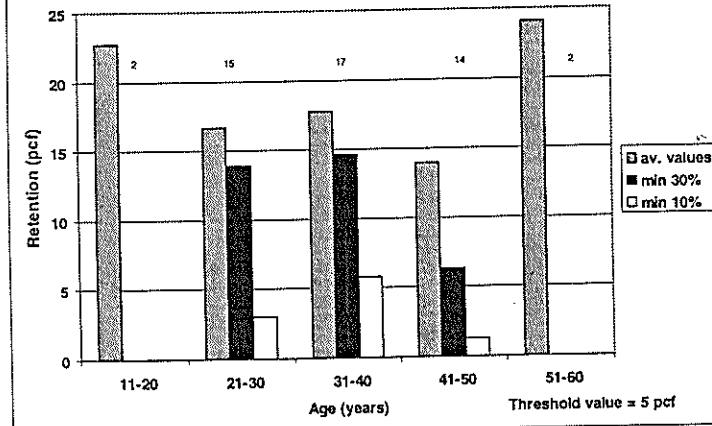


PRESERVATIVE RETENTIONS



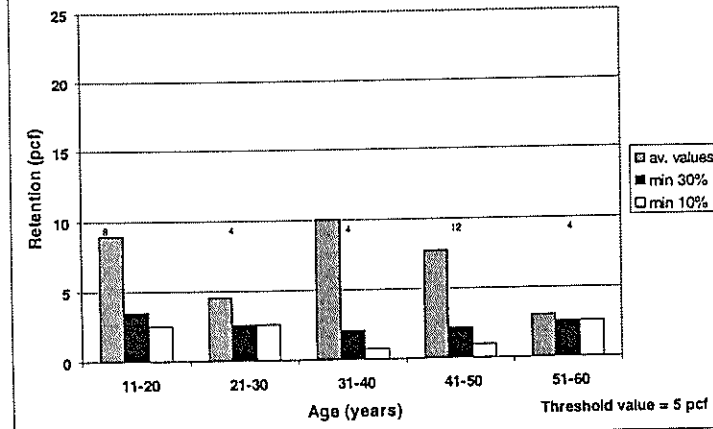
PRESERVATIVE RETENTIONS

Fig. A.2.2. Eco zone 2-cedar-butt treatment



PRESERVATIVE RETENTIONS

Fig. A.2.6. Eco zone 3-pines-full treatment



RECOMMENDATIONS BASED ON RETENTIONS

- Creosote Cedars- treated internally on an as-needed basis
- Creosote Pine > 30 yrs- wrapped and internally treated
- All Penta poles > 30 yrs- wrapped & internally treated
- Newer Penta- treated as needed
- ACA & CCA-internal treatment program

RECOMMENDATIONS BASED ON FIELD INSPECTIONS

- 15 separate recommendations were developed based on eco zone, treatment, species, and vintage
- Due to the impracticality of implementing this many different recommendations, the following conclusion was adopted.

RECOMMENDATIONS BASED ON FIELD INSPECTIONS

- All poles >20 yrs- receive routine external & internal treatment with wraps and rods as part of a maintenance program.
- All poles <20 yrs- receive internal treatment with rods as part of an inspection maintenance program.