Prescriptive Approach to Inspection and Remedial Treatment

November 13, 2025

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A successful program will utilize a treatment formulation that allows preservative to migrate into the heartwood.

Inspection Methods

- NDE (nondestructive tools)
- Visual with Sounding
- Traditional Methodology's
  - Sound and Bore
  - Partial Excavation
  - Full Excavation
- Specialty Inspections
  - Repaired Pole
    - Steel stubbed
    - Fiberglass Wrapped

- Who should determine what type of inspection are performed?
- Who and what should drive the cycle times?
- How do you determine what size drill hole and depth shall be drilled into your poles?
- Who should determine what remedial treatments should be used?

Remedial Treatment History

Western States has traditionally employed the use of wood pole **fumigants** to effectively extend the useful service life of their wood pole structures.

Active Ingredient	Application Form	Conversion to Mitc
Metam Sodium	Liquid	33% Metam sodium – 18% Mitc
97% Mitc	Solid-Melt tube	97% Mitc
Dazomet	Granular	98% Dazomat – 45% Mitc

Mitc = methylisothocyante (preservative agent)

- Wood pole fumigants produce **vapors** that move within the pole both vertically and horizontally from the application holes, helping to eliminate wood-destroying fungi and insect attack.
- **Fumigant applications can help control incipient decay and help to prevent future fungal attack.**

Concerns with Fumigants Performance in Dry Climates

- Locations in a hot arid climate with little rainfall and low ground moisture.
  - In-service wood pole moisture contents have been measured to be as low as 10% below groundline and only 7% above ground.
- It has been observed that granular dazomet experiences very little decomposition
- **In the absence of moisture, Dazomet will experience very little decomposition resulting in low *mitc* production.**
- **Public Perception**
  - PPE
    - Splash Goggles
    - Rubber Gloves (Entire Sleeve)
    - Apron or Tyvek Suit

Alternative to Fumigants

Diffusible Biocides

- **Diffusion**, as it relates to wood protection, is the ability to cross through the wood cell wall (Borates).
- A **biocide is** defined as a chemical **substance** intended to destroy, deter, render harmless or exert a controlling effect on any harmful organism (life form) by chemical **means**.
- Types of Diffusible Biocides
  - Liquid – CuB & Hollow Heart CB
  - Rods – Cobra, Impel, & Bor8
  - Gels – Jecta
- Borates are the safest and most environmentally friendly method of wood preservation.

Types of Diffusible Biocides

- **CuB:**
  - 9.10% Disodium Octaborate Tetrahydrate (DOT)
  - 0.89% Boric Acide
  - 0.99% Copper Hydroxide
  - 89.02% Other (Inert)
- **Hollow Heart CB:**
  - 6.25% Disodium Octaborate Tetrahydrate (DOT)
  - 7.31% Copper Ethanolamine Complex
  - 86.44% Other (Inert)
- **Jecta:**
  - 40% Disodium Octaborate Tetrahydrate (DOT)
  - 60% Ethylene Glycol (preservative carrier)
- **Rods:**

Cobra Rod
90.6% DOT
4.7% Boric Acid
2.9% Cupric Hydroxide
1.8% Other (Inert)

Impel Rod
100% Anhydrous Disodium Octaborate

Bor8 Rod
96.7% ADO
3.3% Other (Inert)

National Pesticide Information Center (NPIC)

	TOXICITY CATEGORY (Signal Word)[2]			
	High Toxicity (DANGER/Danger-Poison) Category I	Moderate Toxicity (WARNING) Category II	Low Toxicity (CAUTION) Category III	Very Low Toxicity (Optional Signal Word = CAUTION) Category IV
Acute Oral LD_{50}	Up to and including 50 mg/kg (≤ 50 mg/kg)	Greater than 50 through 500 mg/kg (>50-500 mg/kg)	Greater than 500 through 5000 mg/kg (>500-5000 mg/kg)	Greater than 5000 mg/kg (>5000 mg/kg)
Inhalation LC_{50}	Up to and including 0.05 mg/L (≤0.05 mg/L)	Greater than 0.05 through 0.5 mg/L (>0.05-0.5 mg/L)	Greater than 0.5 through 2.0 mg/L (>0.5-2.0 mg/L)	Greater than 2.0 mg/L (>2.0 mg/L)
Dermal LD_{50}	Up to and including 200 mg/kg (≤200 mg/kg)	Greater than 200 through 2000 mg/kg (>200-2000 mg/kg)	Greater than 2000 through 5000 mg/kg (>2000-5000 mg/kg)	Greater than 5000 mg/kg (>5000 mg/kg)
Primary Eye Irritation	Corrosive (irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or other eye irritation clearing in 8 - 21 days	Corneal involvement or other eye irritation clearing in 7 days or less	Minimal effects clearing in less than 24 hours
Primary Skin Irritation	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	Mild or slight irritation at 72 hours (no irritation or erythema)

Signal Word

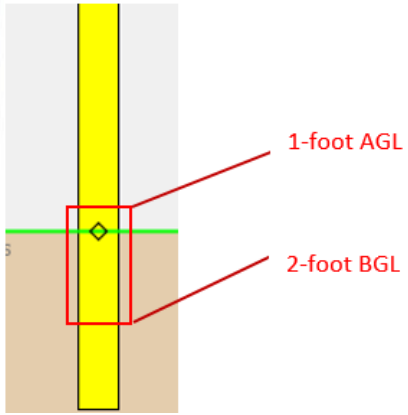
CAUTION (CuB, Hallow Heart CB, & Jecta): means the pesticide product is slightly toxic if eaten, absorbed through the skin, inhaled, or it causes slight eye or skin irritation.

DANGER (Fumigants): means that the pesticide product is highly toxic by at least one route of exposure. It may be corrosive, causing irreversible damage to the skin or eyes. Alternatively, it may be highly toxic if eaten, absorbed through the skin, or inhaled. If this is the case, then the word "POISON" must also be included in red letters on the front panel of the product label.[2,4]

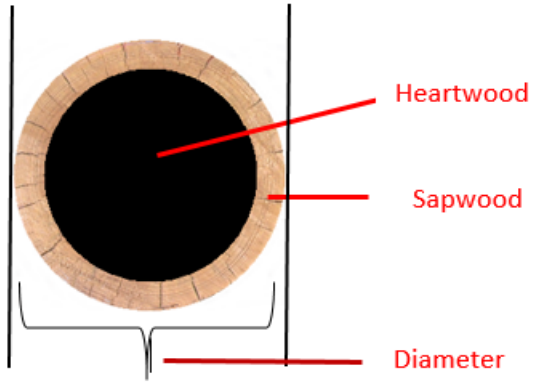
Treatment Loading

Variables that need to be considered:

- **Area** of pole that needs to be treated
  - 1. Vertical Height to protect



  - 2. Internal Diameter



  - Calculated Area:

= (Radius – estimated sapwood)^2 * π * Vertical height
= (((Diameter/2)-1)^2) * π * 36”

- **Treatment** (BAE) **needed** to protect this area
  - Grams BAE needed (Multiplier)

= Area * 0.03277

- How many grams BAE / oz in treatment
- How many borings will it take to achieve proper loading

Treatment Efficacy Tables

Treatment	% DOT	Weight per gallon	weight (lbs.) per oz.	lbs. to Grams coversion (454g per lb.)	DOT * Grams conversion (g DOT / oz.)	DOT to BAE conversion (1.19 multiplier) Grams BAE / oz
CuB	9.10%	10.6	0.08	37.60	3.42	4.07
Cub-20	19.98%	10.9	0.09	38.66	7.72	9.19
Jecta	40.00%	11.1	0.09	39.37	15.75	18.74
Hollow Heart CB	5.00%	9.044	0.07	32.08	1.60	1.91

ROD	1/3" X 2 5/8" Rod to fluid Oz	1/3" X 2 5/8" Rod to Weight Ounces Oz	BAE Equivalent	Oz to Grams conversion (28.35) Grams BAE / oz
Cobra	0.127	0.291	0.40449	11.47
Impel	0.127	0.23	0.3335	9.45
Bor-Rod	0.127	0.26	0.364	10.32

Prescriptive Approach

- Evaluate the presence of Mitc within poles throughout the entire service territory.
  - Random core samples throughout the service territory on poles treated with Dazomat
    - 4 to 5 years ago
    - 7 to 8 years ago
  - Timber Products Laboratory, OSU, MSU… to evaluate Mitc in two parts of the core.
- Examine and evaluate the past 10 years reject rates by location
- Sub-divide your service territory into Microclimates based on precipitation, Ambient Temperature, relative Humidity…
- Evaluate and look for trends

Questions