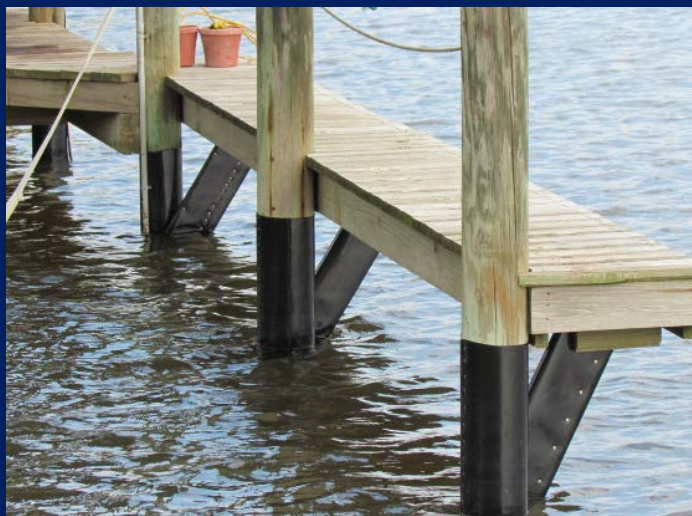


# USE OF TREATED WOOD AND ALTERNATIVE MATERIALS FOR BUILDING WATERFRONT & OVERWATER STRUCTURES

Vanessa Metz, Coastal Water Quality Program

California Coastal Commission

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# OUTLINE

## ❖ Protection of overwater & waterfront structures

- Treated wood & alternative materials
- Coatings & wrappings

## ❖ Use of treated wood

- Preservative types
- Preservative retention level
- Design features to minimize abrasion



Plastic-wrapped  
concrete piles



# OUTLINE, CONTINUED

- ❖ Where to avoid treated wood
- ❖ Preservative risk assessment
- ❖ Best Management Practices
  - Construction-phase
  - Post-construction



Treated wood decking, piles and structural framework



# OVERWATER & WATERFRONT STRUCTURES

## ❖ Overwater structure

- Pier, wharf, dock, boat ramp, or bridge

## ❖ Waterfront structure

- Bulkhead, esplanade, or boardwalk



# THREATS TO BUILDING MATERIALS

## ❖ Protect against:

Insects (termites)

Decay

Rust (steel)

Impacts & stress

Marine borers

Corrosive saltwater



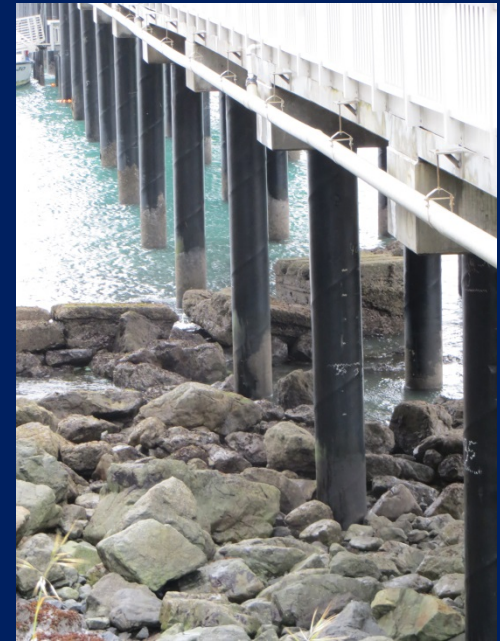
# PROTECTION OF BUILDING MATERIALS

- ❖ Pressure-treated wood
- ❖ Alternative materials
- ❖ Coatings & wrappings
- ❖ Design features



ACQ pressure-treated wood deck circa 2014

Treated wood decking



Wrapped steel-encased  
concrete piles



# WATER QUALITY IMPACTS OF TREATED WOOD

## ❖ Leach pollutants

- Copper & other chemicals
- PAHs (creosote)
- Dioxins (Penta)

## ❖ Aquatic impacts

- Water column & sediment
- Bioaccumulate
- Low concentrations impact fish & invertebrates



Creosote  
treated  
piles in  
center



# ALTERNATIVES TO TREATED WOOD PILES

- Reinforced concrete, steel, or fiber-reinforced polymer composites
- ✓ Recommend: Construct piles of alternative materials unless engineering reason for treated wood



Precast concrete piles



Fiberglass polymer piles



# ALTERNATIVES TO TREATED WOOD DECKING

- Concrete, fiberglass, metal, plastic, wood-plastic composites (Trex), or naturally decay-resistant wood (redwood, red cedar, ipe, or greenheart)
- ✓ Recommend: Prioritize use of alternative materials for decking, where feasible



Composite decking on redwood frame

Metal  
grating in  
foreground,  
plastic  
decking  
beyond



# PILE COATINGS & WRAPPINGS

- Wrappings: Plastic, fiberglass
- Coatings: Polyurea, epoxy
- ✓ Recommend: Seal treated wood piles with inert coating or wrapping
- ✓ Recommend: Coating or wrapping on steel or concrete piles must be inert



Epoxy-filled fiberglass jacket



# COATING ON TREATED WOOD DECKING

- Penetrating sealer, semi-transparent stain, or durable epoxy
- ✓ Recommend: Consider applying toxic-free, water-based sealer to treated wood decking
- ✓ During maintenance, must minimize release of treated wood particles



# WOOD PRESERVATIVES FOR SALTWATER OR BRACKISH WATER IMMERSION

## ✓ Recommend:

Metal-arsenate preservatives:

✓ **ACZA:** Readily available

Ammoniacal Copper Zinc Arsenate

✓ **CCA:** Less available/more restricted

Chromated Copper Arsenate

**X** Avoid – due to aquatic toxicity:

**X** **Creosote:** Leaches toxic PAHs



# WOOD PRESERVATIVES FOR FRESHWATER OR SALTWATER SPLASH

- ✓ Recommend if wood NOT in human contact:  
Metal-arsenate preservatives:
  - ✓ ACZA: Readily available
  - ✓ CCA: Less available/more restricted
  
- ✓ Recommend ONLY if frequent human contact:  
Arsenic-free preservatives:
  - ✓ ACQ: Alkaline Copper Quaternary
  - ✓ CA: Copper Azole
  - ✓ CuN: Oil-based Copper Naphthenate



# WOOD PRESERVATIVES TO AVOID FOR FRESHWATER OR SALTWATER SPLASH

**X** Avoid – due to aquatic toxicity:

**X** MCQ: Micronized Alkaline Copper Quaternary

**X** MCA: Micronized Copper Azole

**X:** Pentachlorophenol

**X** Creosote



# OTHER TREATED WOOD USE TIPS

## ❖ Preservative Retention Level

- Ensure does not exceed minimum for use conditions

## ❖ Treated wood BMP-certified for aquatic use

- Where available

## ❖ Design features to minimize abrasion of treated wood

- Bumpers or protective wear surface



# WHERE TO AVOID USE OF TREATED WOOD

## ❖ Low water circulation or flow rate

- Typically 0.3 ft./sec. or less

## ❖ Especially copper-sensitive aquatic life

- Salmon, trout, herring, Dungeness crab, blue mussels, abalone, oysters, sea urchins, certain zooplankton

## ❖ In waters impaired by preservative chemicals

- Copper, etc.



# PRESERVATIVE RISK ASSESSMENT

## ❖ Screening assessment:

- Amount of treated wood (in-water & above-water), preservative type, saltwater vs. freshwater, water flow rate

## ❖ Site-specific intermediate risk assessment:

- If screening raises concern
- Or exceed 30 piles and/or 3,000 ft<sup>2</sup> above-water treated wood
- Requires expanded environmental parameters
- On-line modeling tool



# BEST MANAGEMENT PRACTICES

## ❖ Construction-phase:

- Include BMPs specific to treated wood:
  - Sawdust & wood fragments
  - Field-applied topical preservatives

## ❖ Post-construction:

- Long-term use, repair, monitoring, maintenance
- Include BMPs specific to treated wood:
  - Avoid sanding, scraping, & pressure-washing
  - Avoid deck cleaners & brighteners

