Alaska Department of Transportation & Public Facilities

Creosote Treated Timber in the Alaskan Marine Environment

Volume II

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13. ABSTRACT (Maximum 200 words)

ADOT&PF is responsible for many structures that incorporate wood pilings and other timber in Alaska waters. Most are treated with preservative to inhibit marine borers that will quickly destroy unprotected wood. Creosote is generally the most economical preservative and has been used for over a hundred years. Creosote contains many toxic chemicals and some governments and organizations are limiting its use. This project reviewed current science regarding use of creosoted wood in marine waters and the current regulatory matrix that controls its use, and developed recommendations for its use. Even with best management practices, polycyclic aromatic hydrocarbons from new creosote timber will be transferred to the marine environment. Laboratory tests and field observations show that PAH chemicals slowly diffuse from the wood into the water column. The heavier PAH chemicals sink to the bottom directly, or adsorb to organic or inorganic moieties in the water and then sink, incorporating into the sediment. The lighter PAH chemicals are quickly volatilized and oxidized. Scientific observations of creosote behavior in meso-scale tests verify that the concentrations of PAH from marine piles in the water column are negligible after the first few weeks. The fate of PAH in the sediment depends on the oxygen status of the upper sediment layers. If the sediment is not anoxic, the PAH will be oxidized. With sufficient oxygen in the upper layers of sediment, the PAH concentration will initially rise, then decline. With timber treated according to best management practices, if the sediments are not anoxic and the surrounding waters are not stagnant, and the area is not already contaminated, creosote marine timbers are unlikely to have a significant long-term effect on the environment. Further, meso-scale testing indicated that effects were confined to a region close to the structures themselves.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
	NOTE: volumes greater than 1000 L shall be shown in m^3			
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE (exact degrees)		
^oC	Celsius	1.8C+32	Fahrenheit	^oF
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003)

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