



# Research Notes

Oregon Department of Transportation

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## Bridge Washing to Reduce Salt

Reinforced concrete bridges on Oregon's coast are exposed to chloride ions from marine salt that penetrate into the concrete and cause the reinforcing steel to corrode. The corrosion causes the concrete to spall from the bridge in addition to reducing the cross section of the steel bars. Repairs include removing the damaged concrete and rust, replacing badly corroded steel, restoring the dimensions of the beam, and applying cathodic protection to stop further corrosion. Repair and mitigation is expensive, but if left unchecked, the structural capacity of the bridge is diminished. In extreme cases, the bridge is replaced.



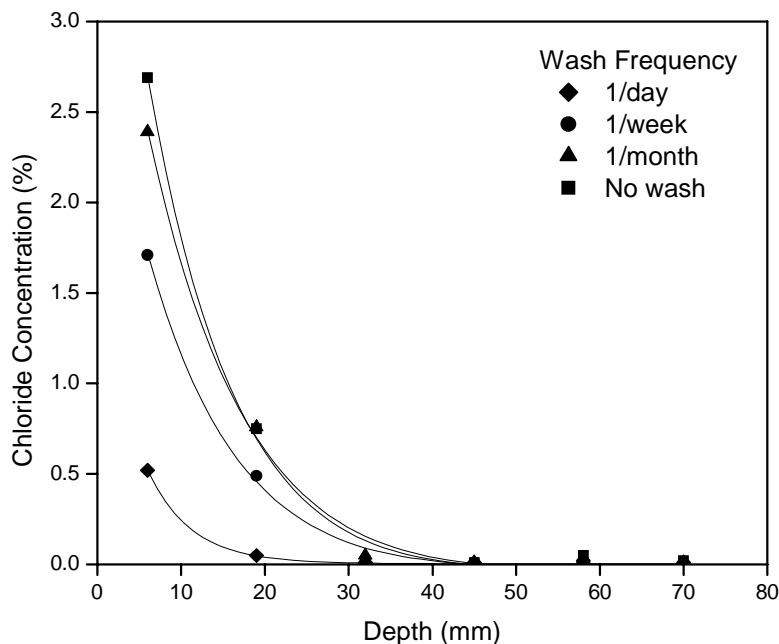
Set up for laboratory washing experiments

The Oregon Department of Transportation investigated periodic bridge washing as a way to possibly remove chloride from the concrete and stop further uptake of chloride ions. Washing trials were conducted over a 4-year period on concrete blocks to determine whether chloride ions can be removed from the concrete or at least prevented from entering the concrete. The results showed that washing did not reduce the chloride content once the chloride had defused into the concrete, but washing once a day with 11 liters of fresh water per square meter reduced the uptake of chloride ions by

86%. Washing once per month reduced the uptake of chloride ions by only 5%.

The research indicated that pressure washing reinforced concrete once or twice per year, though useful for removing debris, will have little or no effect on reducing corrosion damage. Frequent washing is necessary to achieve any beneficial effect with respect to corrosion, but frequent washing by hand is not practical. An automated sprinkler system would be needed if a bridge owner wanted to use washing to reduce corrosion in reinforced concrete bridges.

The Bridge Washing report can be downloaded from the ODOT Research Unit website at: [http://www.oregon.gov/ODOT/TD/TP\\_RES/publications.shtml](http://www.oregon.gov/ODOT/TD/TP_RES/publications.shtml)



Effect of washing frequency on the uptake of chloride ions. All conditions were sprayed once per week with salt water as the source of chloride ions.

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