

Field Maintenance Guideline on HDG Bolts

HDG Bolts (also applicable to Mechanical Galvanized Bolts)

The hot-dip galvanizing of bolts is to combat corrosion. A key feature of hot-dip galvanized (HDG) products is longevity in various environments. The time to first maintenance of hot-dip galvanized bolts is directly proportional to the thickness of the zinc coating; therefore, it is important to monitor any issue that may decrease the coating thickness. Like any material, it requires an inspection on a regular basis in line with provincial or municipal standards to ensure ongoing performance

Situation

The use of road salt began around the 1950's. It's use for safety is well documented, however the impact on the environment and materials buried below can be severe. The seepage of salt from above, on and into culverts and buried bridges through bolt holes, may cause corrosion to the bolts. Salt acts as an electrolyte allowing iron to lose electrons more easily and so speeds up the corrosion process. The pictures below show a structure that was installed in the early 2000's. The salt (chalky white substance) around the bolts in the overt have been there since day one. The old adage, "out of sight, out of mind" is apropos to this. No maintenance has been performed since the structure was installed. If this was above ground and public, maintenance would have been carried out long ago.



OVERT



DOWNSTREAM

Observations

Based upon a number of observations of bolt corrosion, it is believed little damage occurs on the soil side. The excess moisture on the soil side dilutes the ions, whereas the overt of pipes & structural plate only get a trickle through a crevice or bolt hole. This slow trickle concentrates the ions and the upper flanks on the water side of the pipe or plate never get the benefit of a good rinsing or diluting. If regular flushing from the water-side were performed, (just like washing one's car) this bolt corrosion would not be an issue.

Maintenance

To restore the protective value of the zinc coating, and improve the bolt appearance, apply a zinc-rich paint (affected area only) complying with ASTM A780. The bolts must be thoroughly brushed, rinsed and dried beforehand. After a

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period of time weathering will largely remove any difference in appearance between the zinc-rich paint and the original coating. Although this procedure refers to bolts, the same applies to affected plates near the bolt holes and at seam laps.

Resilience and Sustainability

This guide is a solution for in place structures (existing infrastructure), where salts are used on the roads. Typically, on average asphalt roads lifespan is 18 years. During rehabilitation, owners may want to consider installing a membrane under the road surface to protect the assets below. For information on this practice, please see the Geomembrane Guideline on the CSPI website in the resources section under the Technical Bulletins tab.