



Anode Life Case Study

Summary

In 1998, a specimen Anotec chill cast 2 in. x 60 in. (EHA) solid stick anode was recovered from natural seawater by West Coast Corrosion after 24 Ampere-Years of service at 4.86 Amps (average). The specimen, without failing in service, weighed 13.75 lb when recovered. Inspection indicated that an additional 4 to 5 pounds could have been utilized, indicating 75% utilization. The 65% utilization factor often assumed for ground bed design seems conservative.

The figure below shows the as-recovered anode beside a new 44 lb equivalent.



**Anotec
Industries Ltd.**

5701 Production Way
Langley, BC, Canada

604.514.1544

info@anotec.com



Full Report

The high silicon cast iron (EHA) anode (shown in photographs below) was recovered by West Coast Corrosion in 1998 after 24 Ampere-Years of service suspended freely in sea water, operating in the range of 4 to 9.3 Amps.

The as-recovered anode weighed 13.75 lb, equivalent to 69% utilization of the original 44 lb weight.

Based on the 24 Ampere-Year service, consumption equates to 1.28 lb/Ampere-Year at the current densities experienced (1.5 to 3 Amps / sq. ft. based on the original 2.6 sq. ft. surface area of a virgin EHA anode). [Note: Consumption rates of 0.75 to 1 lb / Ampere-Year are normally projected for high silicon cast iron operating at discharge current densities up to 1 Amp / sq.ft.]

It is our considered opinion that the anode would have continued to operate until another 3 - 5 lb of mass had been consumed, equivalent to a utilization of 75 to 80%. [Note: A 65% utilization factor is often assumed for solid rod anode groundbed design.]

Effects of consumption (refer to the photographs below):

- Length of the anode decreased by 2% (from 59.7 in. original length, to 58.5 in. as-recovered length).
- The end of the anode, opposite to the cable connection, which was originally a hemispherical tip of 2 in. nominal diameter, eroded away to 5 in. long tapered point.
- Mid-length diameter decreased from 1.9 in. to 1 in.
- The cable connection (expanded head end) showed "necking-in", spanning about 3 in. of head length, commencing about 0.5 in. from the epoxy cap. This resulted from the Polyken tape epoxy-mold, but was enhanced due to the location of the (sand) pouring cup (compared to the rest of the anode being in direct contact with the metal mold). As a direct result of this finding, the sand pouring cup was relocated to the other end of the anode.



Certified to
NSF/ANSI/CAN 61-G



ISO 9001
QMS-SCI Global