

# **PROTECTO-CAPS™**

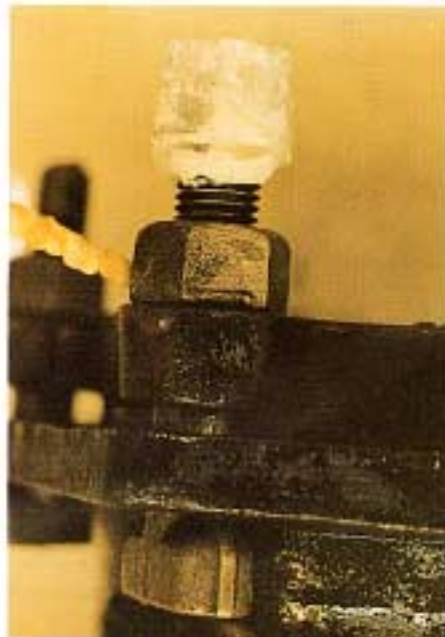
Use of "PROTECTO-CAPS" SACRIFICIAL ZINC ANODES  
for PROTECTION of IRON MECHANICAL JOINT FITTINGS

## **PROBLEM**



Control Tee after immersion for 1004.5 hrs. & removal from bath. Close-up of ductile iron bolt showing corrosion.

## **SOLUTION**



Elbow protected with 2 zinc caps after immersion in salt solution for about 1100 hrs. Solution drained. Close-up of ductile iron bolt with zinc cap after rinsing off silt & flange, but not from zinc cap. Note complete protection of ductile iron nut, bolt, & flange.

## **PROTECTO-CAPS**



Close-up of 2 representative zinc caps from protected tee after immersion for 1004.5 hrs., & rinsing off of non adherent coating of zinc corrosion products. Note absence of corrosion inside caps

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## **CONCLUSIONS**

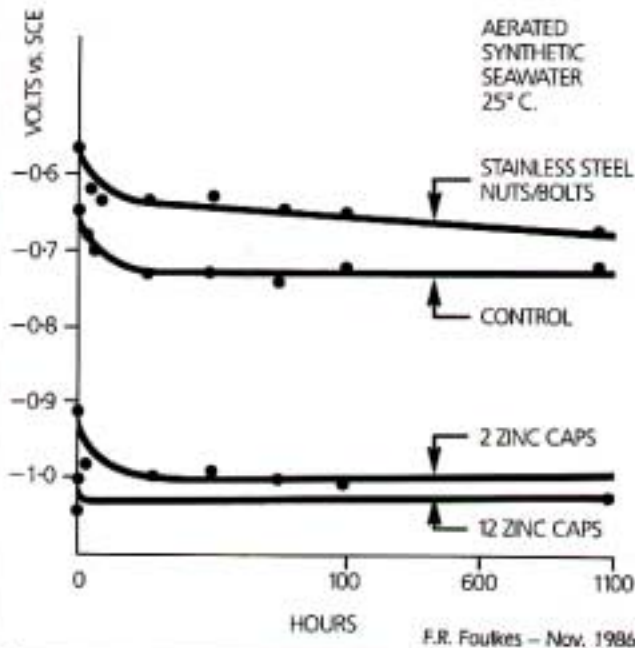
1. Zinc Caps confer excellent cathodic protection to iron mechanical joint fitting and gland ring assemblies.
2. Increasing the number of Zinc Caps marginally increases the degree of protection conferred to the Iron.
3. Increasing the number of Zinc Caps used, greatly increases the length of protection.
4. Stainless steel nuts and bolts should be avoided for use with Iron assemblies, since such nuts and bolts will accelerate the rate of attack of the iron assemblies, especially at the flange areas in the vicinity of the stainless steel components.

Frank R. Foulkes, Ph.D. P.Eng. & James T. Hinatsu (November 1986)

**CAP IT – BURY IT – FORGET IT**

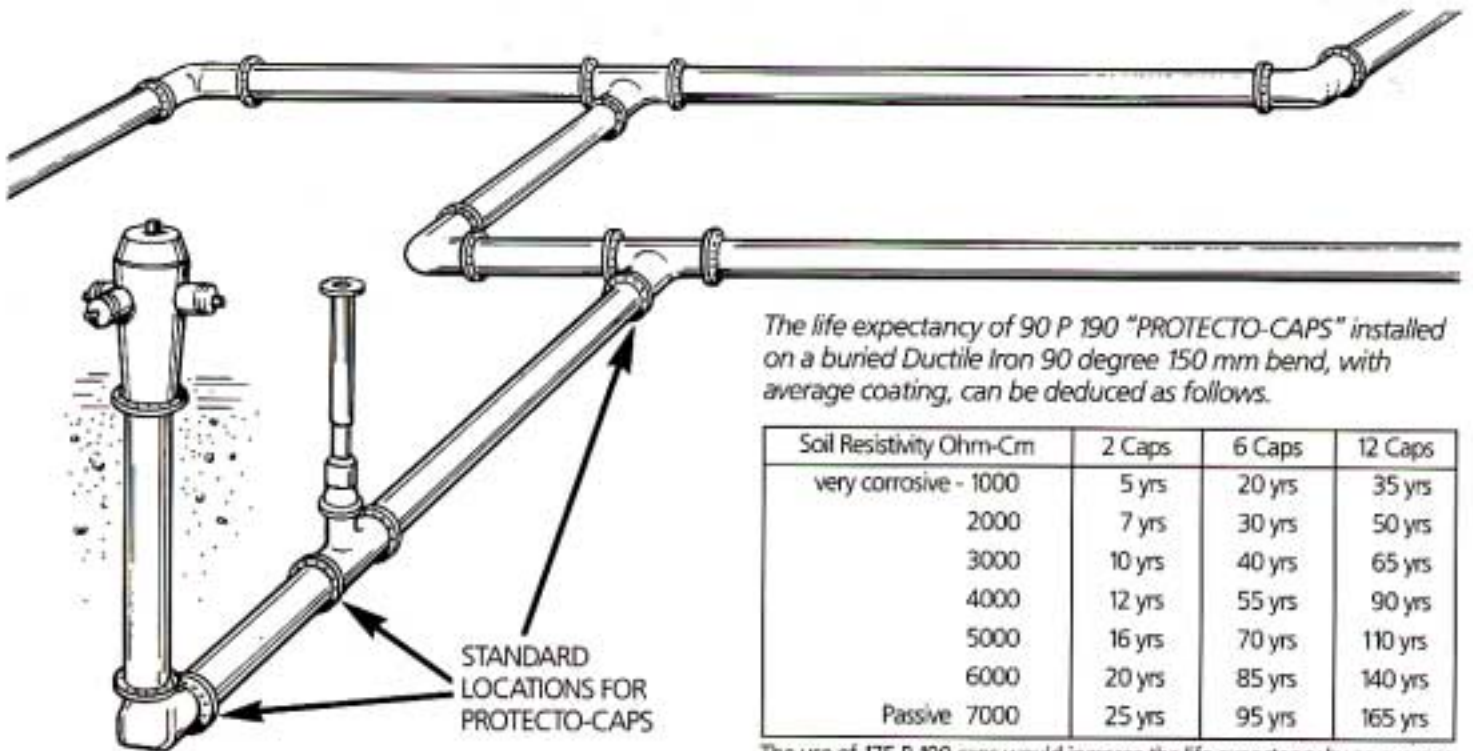
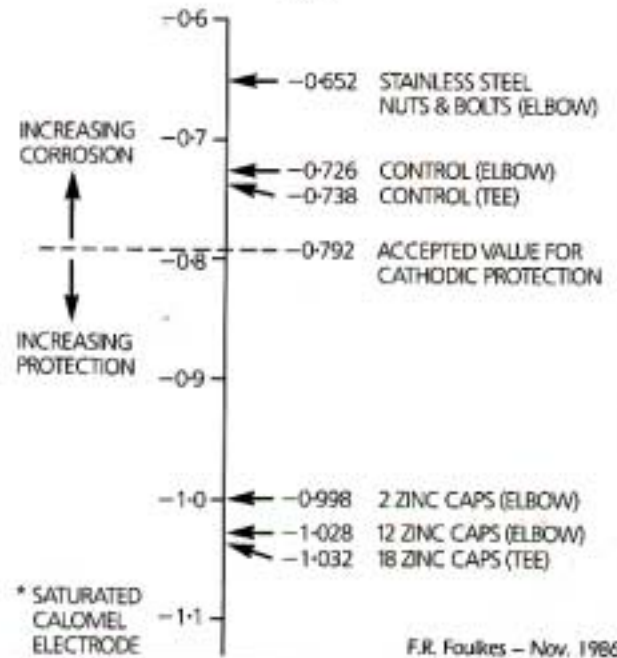
### ELBOW POTENTIALS (V. vs. SCE) vs. IMMERSION TIME

FIG. 2



### PIPE POTENTIAL (VOLTS vs. SCE\*)

FIG. 3



The life expectancy of 90 P 190 "PROTECTO-CAPS" installed on a buried Ductile Iron 90 degree 150 mm bend, with average coating, can be deduced as follows.

Soil Resistivity Ohm-Cm	2 Caps	6 Caps	12 Caps
very corrosive - 1000	5 yrs	20 yrs	35 yrs
2000	7 yrs	30 yrs	50 yrs
3000	10 yrs	40 yrs	65 yrs
4000	12 yrs	55 yrs	90 yrs
5000	16 yrs	70 yrs	110 yrs
6000	20 yrs	85 yrs	140 yrs
Passive 7000	25 yrs	95 yrs	165 yrs

The use of 175 P 190 caps would increase the life expectancy by an average factor of 1.65.