

Research project

There are many ways of disturbing re-bar corrosion in reinforced concrete (RC). Impressed current cathodic protection (ICCP) is one of them. The principle of ICCP is to apply external current through concrete to steel and cathodically polarize steel to a more negative potential, at which corrosion is unlikely to occur thermodynamically. In the literature, it was proved that ICCP method protect rebars even in concrete made from sea sand.

However, ICCP only prevent further corrosion of rebar and can't recover the strength of rebar corroded seriously, so other way is needed to recover the loss of loading capacity of concrete members. Then ICCP-SS intervention method that combine ICCP and structural strengthening (SS) technic has been proposed recently. This method takes advantage of ICCP and SS, by preventing the further corrosion of rebars and improving the loss of structural strength of RC. In the literature, it is proven that ICCP-SS is effective for extending a service life of RC.

During ICCP-SS method, current induce negative influence. For instance, material for anode(it also plays a mechanical role) will be degraded instead of cathod materials(re-bar),and concrete near cathod materials also become easily to be degraded. This mechanism is not understood completely.

In my study, I concentrate on the anode-concrete interface during ICCP-SS method. It's about different w/c ratio and current density makes what difference in specimen. The specimen shows at following figure.

