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DEPARTMENT OF CIVIL ENGINEERING
MATERIALS OF CONSTRUCTION LABORATORY
CIVL 484 REPAIR & MAINTENANCE OF CONCRETE
GAZIMAGUSA



Experiment No : #4

Name of the Experiment : Corrosion Potential Measurement

ASTM CODE : ASTM 836-09

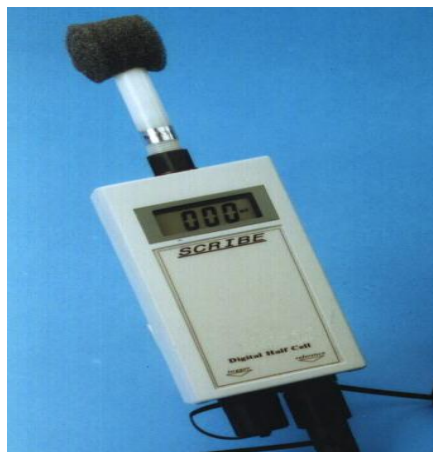
Corrosion Potential Measurement

I. Object and Scope

It is a simple inexpensive and virtually nondestructive technique to assess the corrosion risk of concrete by measuring concrete surface electrical potential using standard reference electrode and predetermined grid .such diagnoses identifies the areas where corrosion is present or about to proceed long before any physical damage is visible. hence it could locate the areas in which reinforced concrete is in need of repair or other protective treatment and eventually reduces the maintenance cost as well before the corrosion develops so bad and replacement become necessary.

II. Apparatus

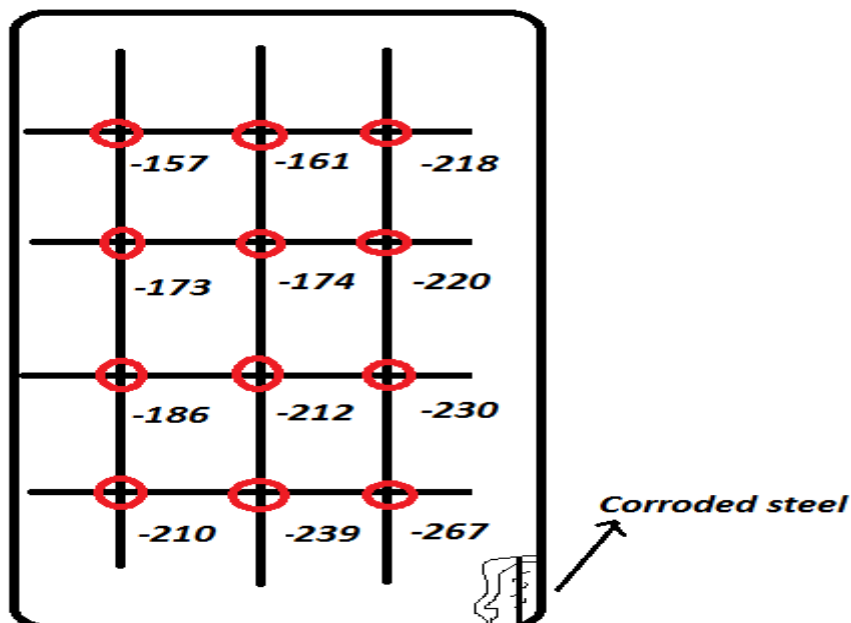
Digital half-cell , AC line ,drill



III. Test Procedure

1. Choose a column that has a corroded part.
2. Mark the column by means of squares(grid) to be surveyed. Consider almost 12 intersection point on the grid. the distance between each point is better to be equal
3. try to locate the exposed reinforcement t the center of the grid.
4. Clean the corroded part of steel by the help of sandpaper that will be in contact with the cable of measurement tool to ensure proper electrical contact. if the rebar is corroded it is recommended to drill a small hole on the bar and try to make a contact with cable through inside the rebar.
5. connect the cable of digital half cell to cleaned part of reinforcement.
6. replace the solid cap on the cell with one of the sponge head and moisten it with clean and slightly soapy water .
7. dampen the surface of grid map or just intersection point with the same soapy water
8. place DHC electrode on the first test point with very mild pressure
9. Read the values from tool's screen
10. Construct a table and evaluate the result of readings.

IV. Results



Corrosion potential is tabulated as follows:

Negativity	Percentage risk of corrosion
-350---- -500	% 95
-200---- -350	% 50
Less negative than -200	% 5

With the help this method potential of corrosion of steel reinforcement is detected.

V. Discussion of Results

According to the values obtained, it can be seen that the places which are close to the corroded steel have higher potential of corrosion than the further places. by the way this method only indicates the probability of corrosion presents at the time and does not indicate the extent or the rate of corrosion. The measured values of the half-cell potential fluctuate due to several factors. The temperature, the type of reference electrode, and the pre wetting time. However the negative potential area on the equipotential counter map corresponds to high chloride content and localized corrosion. The numerical criteria disagree with the corrosion condition of steels. Hence the equipotential counter map is more reliable tool for detecting localized corrosion than numerical criteria. Even if there is no sign of deterioration due to corrosion in the concrete surface. Corrosion of steel in the concrete is a global problem for concrete structure. And so many structures have suffered from corrosion due to chloride from the sea water.