Bulletin of Electrochemistry 6 (6) June 1990, pp 576–577

Corrosivity levels in metropolitan city of Madras (India)

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Relative corrosivity levels at five locations selected in Madras city are presented. Results indicate feasibility of preparing corrosion map for the city.

Key words: Pollution, corrosivity level, corrosion map

EXPERIMENTAL

The sites represent marine, industrial, commercial and residential areas of Madras city. These four sites were compared with a site in rural area free from pollution. Scope and methodology of experimental procedures were similar for all the five sites. Preparation of steel specimens, method of cleaning, method of exposure, removal of corrosion products, determination of corrosion rates were carried out as per standard testing procedures [1]. Salinity measurements at all the five sites were made every month using wet candle method [2].

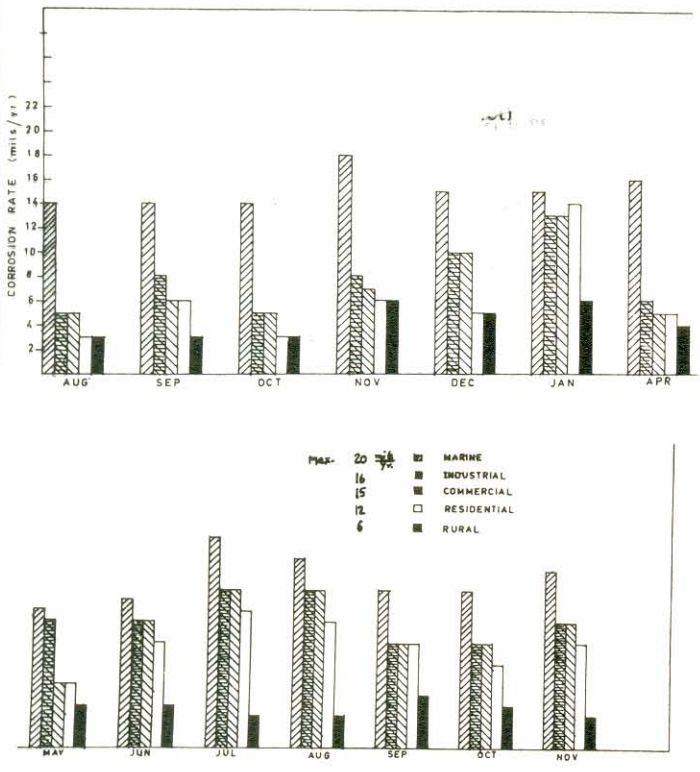

Fig. 1: Corrosion rate at five sites

RESULTS AND DISCUSSION

It may be seen from Fig. 1(a & b) that corrosion is high during July at all sites except at rural site; high corrosion occurs at rural site during May and June; similarly high corrosion is seen at all sites during November - January. It can therefore be inferred that maximum corrosion rate occurs at all sites during the months of S-W and N-E monsoons.

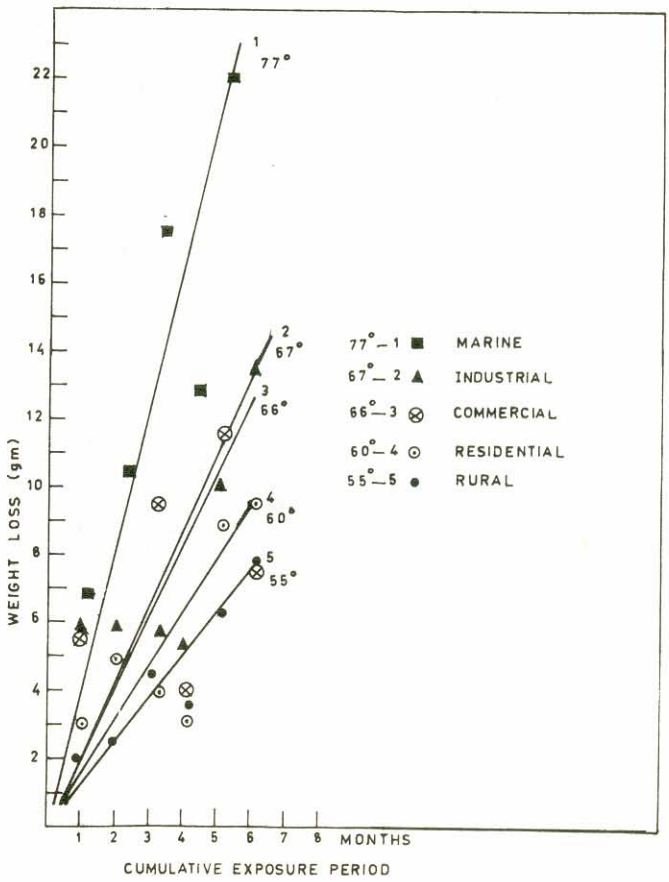

Fig. 2: Weight loss vs exposure period

Figures 2 and 3 show the weight loss with exposure period. Slopes of the curves in Fig. 2 are higher than those

in Fig 3. In other words, the specimens of mild steel were found to undergo significant increase in corrosion when they were exposed to the atmosphere from August as against from April. This could be due to higher humidity during the monsoon.

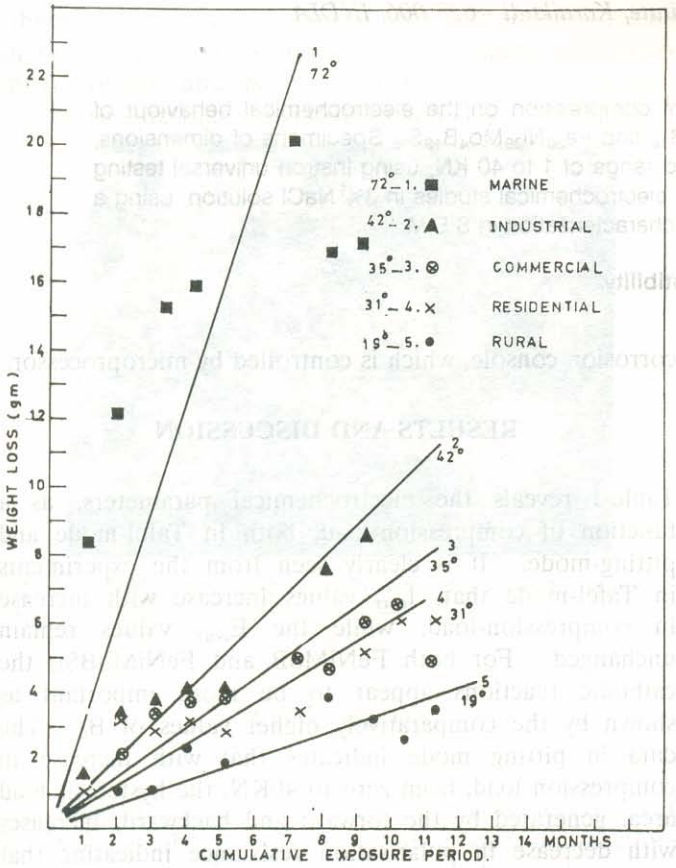

Fig. 3: Weight loss vs exposure period

Relative corrosivity levels (Fig. 4) could be obtained at the sites where the above studies were carried out.

From the figures, the order of corrosion may be seen as: rural site < residential site < commercial site < industrial site < marine site. The figures show higher corrosivity level

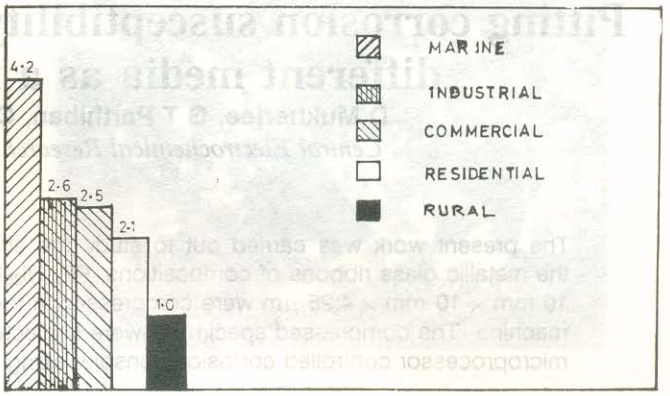

Fig. 4: Relative corrosivity level

at commercial site even though the residential site is nearer to seacoast than the commercial site. This is probably due to proximity of polluted rivers forming the source of other sulphur related pollutants such as hydrogen sulphide. The industrial site showed higher corrosion rate due to salinity as well as pollution by sulphur dioxide emanating from the adjoining industries like fertilizers, refineries, thermal power plants, etc.

CONCLUSION

This preliminary study shows that similar studies could be extended to other locations in Madras city and that corrosion map for the metropolitan city of Madras and its neighbourhood could be established for evaluating the effect of pollution on corrosion and for choosing the best corrosion protection of materials used.

REFERENCES

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2. H R Ambler and A A Bain, *J Appl Chem*, **5** (1955) 437