

6th APRIL 1951 :—Morning Session

Mr. A. M. Malik, Hony. Secretary, made an announcement, inter alia, that K. B., M. A. Hamid had developed a new design of fall, model of which, he said, was working in the Irrigation Research Institute.

Members desiring to have a look at it were welcomed.

PAPER No. 288

S. IRSHAD HUSSAIN—Corrosion Control Investigation at Attleboro, Massachusetts (U.S.A.)

S. Irshad Hussain read his Paper.

Sh. Abdur Rauf :—The author said that there are two methods for corrosion control but there is a third one also, which consists in using R. C. C. or concrete pipes instead of ferrous pipes and is best suited for a country like Pakistan where iron is scarce.

The author has pointed out that 80% of the cost of a watersupply project is spent on distribution system. By use of this nonferrous material we could effect a saving of 50% in cost of pipes or about 40% in the total cost of a project e. g. cost of B Class R. C. pipe at Karachi would be Rs. 2/4/- per ft. instead of Rs. 4/- per ft. for cast iron pipe of the same diameter. The weight of 6" S and S. B. Class C. I. pipe is approx. 31 lbs per ft. and cost is reckoned at Rs. 15/- per cwt. This would besides effecting economy save valuable foreign material. Incidentally I may mention that two estimates based on cost of C. I. & R. C. pipes were prepared at the cost of Rs. 25/- and 15 lakhs rupees respectively.

However if the R. C. pipes are manufactured locally the cost would be considerably reduced. The Public Health Branch is shortly setting up two factories at Rawalpindi and Multan and the cost would be reduced by 25% through eliminating profit.

Oxygen is generated in aeration process in the Mechanical filters of pressure and gravity type and this nonferrous material is ideal for these conditions.

Corrosion also occurs in metallic strainers and blind pipes in tubewells as well as in pumps. Some other suitable material shall have to be found.

For high pressure mains Hume steel pipes with arc welded joints could be used with advantage. The rivetted joints in big mains are entirely eliminated, which are the points where rusting actually starts. Besides the thickness of steel shells will be reduced to about 50%.

Chemical or Mechanical treatments of existing pipe lines is costly and in case of smaller diameter pipes is impossible.

Very few big pipe lines exist in Punjab. Due to corrosion the life of mains in Rawalpindi and in salt range areas is over. They should be replaced entirely.

Mr. I. A. Zafar :—"Corrosion control investigation at Attleboro Massachusetts U. S. A." Heading of the paper is rather misleading. By corrosion the author should mean corrosion in specific metals like mild steel, cast iron, wrought iron, black iron, galvanized iron etc. The corrosion study is to be made on defined structures and based on the functions they perform like pipes carrying water or liquid fuel oils or other steel structural works constructed at various localities for various purposes. However, after going through text of the paper it is found that the subject deals with corrosion control in water carrying pipes. The author appears to have presumed that the members of the Congress are fully aware with his investigations on a particular subject in U.S.A. This is rather too optimistic of him.

Page No. 26 Chemical treatment :—In town water supplies, sterilization leaves residual chlorine where sometime excessive charge beyond the break point is administered in water. Similarly there is a possibility to have excessive doses of chloramine and both gases act as corrosive agents in pipes which have been ignored by the author who concentrated mainly on oxygen and carbon dioxide.

Page No. 27 :—Removal of oxygen from industrial waters is best achieved by adding doses of tannin which is an organic compound of benzene. N. W. Railway is using this chemical for water treatment for supplies to locomotives to achieve successful softening.

Effect of turbidity contents of a water sample on corrosion in pipes is not considered anywhere. It is to be investigated whether a coating of sediment deposited to a reasonable limit will check the rate of corrosion, even though tendency for the encrustation will be there to develop.

The following appear to have been lost sight of while conducting the research:—

- (a) Velocity of flow.
- (b) Hammer blow.
- (c) Positive head behind water supply system.
- (d) Composition of the metal under examination and relative comparison of various metals for corrosion effect with a water of a given pH value.
- (e) Variation of maximum and minimum flow in the pipes.
- (f) Variation of temperature.
- (g) Corrosion as connected with draw off concentration in the distribution system and percentage concentration of the service connections.
- (h) Whether outside corrosion of pipes when buried underground especially in the damp soils has any influence on the interior corrosion because of electrolytic

action set up. Variation of the Corrosion depending upon depth of the pipes below the ground surface and of the moisture contents.

- (i) At high temperatures the chemical action of corrosion might proceed at a high rate but there might be a relative reduction in concentration of gases like CO_2 , O_2 . Has any study been made with this point in view ?

The author is requested to study practical application of his research to the conditions in Pakistan with various limitations and suggest useful remedial measures for control of corrosion in pipes. In fact field of the investigation should be further extended to cover the study of pipes carrying not only water but liquid fuel oils, gases steam etc. as well.