



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study carried out a investigation of the characteristics of scallops formed on a plaster conduit and the dissolution rate of plaster as the scallops formed. The following conclusions have been made.

- The initiation of scallops starts at high flow rate sooner than at low flow rate.
- The population of scallops varies with water flow rate as a higher Reynolds number or higher turbulence promotes their formation.
- The population of scallops is reduced by an increase in pH.
- The water chemistry may influence the scalloping after the process has started.
- The population of scallops increases with increasing temperature.
- The decrease in temperature of the fluid decreases the formation of scallops. No scallops were observed at a low temperature and low flow rate.
- The dissolution rate increases with an increase in water flow rate.
- The dissolution rate increases with time in acid and neutral solutions but decreases initially before stabilizing in a basic solution.
- The dissolution rate of plaster appears to be controlled by diffusion transport at room temperature.
- The surface reaction appears to be rate-limiting at low temperatures. However, diffusion transport becomes the major mechanism as the process proceeds.
- The average dissolution rate decreases with decreasing temperature but it is little affected by pH.

5.2 Recommendations

Through the experiments, there are some recommendations for the future work.

- Other chemicals should be used to control pH to determine if pH is the only variable.
- The effect of pH on the dissolution rate and scalloping should be investigated in different ranges to confirm the overall effect.
- The effect of temperature on the dissolution rate and scallop characteristics should be investigated to determine the scalloping phenomenon at higher temperatures.
- The different ratio between water and plaster of Paris should be studied in the same conditions to observe the effect of this ratio on dissolution rate and scalloping under similar conditions.
- Other types of plaster of Paris should be investigated under the same conditions to determine if materials are a significant variable.