Summary

The complex problem of water hammer pressure evaluation with or without surge tank has become a continued interest for hydraulic engineers because of its importance in hydro-electric projects. But the governing equations of continuity and momentum for the flow are non-linear in nature. Therefore, methods of numerical solution with finite difference scheme are essential. Three such different numerical solutions have been developed in this study. Parallel investigations have also been made in this study on how the transient friction factors of the pipe have played a dominant role to damp down the inertia pressure. The result obtained by the numerical solution has been assessed by the experimental data. A close agreement has been seen in the comparison.

The non linear equations of continuity and momentum in unsteady situation without surge tank are solved by method of characteristics (MoC) and Lax diffusive finite different scheme. The equations are developed in simplified form to calculate steady pressure head and discharge. The result of the proposed solution at different pipe section is presented in graphical format. The inclusion of resistance equation has shown considerable result in this study. The correct assessment is done and it was modified with better numerical treatment and more experimental data to include better resistance equation in unsteady transient flow.