

PREFACE

The importance of experimentation works besides class-room instructions in technical education can hardly be over-emphasized. Laboratory works help elucidate, test or verify text-book principles and build-up faith of students in workability of these principles in practice. In particular, the polytechnic students need full awareness of this complementary aspect of laboratory investigation. Therefore, it is necessary that the polytechnic curricula emphasize the need for physical verification of theoretical concepts and verify truth of statements and results besides inculcating the ability to appreciate the limitations of idealizations often introduced in analytical derivations.

Thus, the design of laboratory experiments needs careful planning to suit the ability of students admitted to polytechnic courses. These students need to have well thought and designed sets of experiments. It has been a common experience that hydraulic laboratory experiments in most undergraduate engineering colleges are designed to calibrate flow measuring devices, to measure flow through orifice or Venturi-flume or to measure frictional losses in a pipe. Performance tests of a pump or turbine usually cover the curricula in hydraulic machines. Therefore, it is necessary for the polytechnic students that they have a minimum exposure to the basic elements of these experiments. Some experiments can however be open-ended to allow the students sufficient freedom to plan and execute their experiments. To this end, students are required to undergo training in the class-room as well as laboratory for how to plan a set of experiments and analyze and interpret data supplied or collected.

The manual covers experiments on Bernoulli theorem, Venturimeter, orifice, laminar/turbulent flow, losses in conduit transitions, friction factor, current meter, and flow through notches. The study of pumps, impulse/reaction turbines, pressure gauge and mechanical flow meters is included. The units and fluid properties and conversion factors are appended. It is hoped that the manual will be useful to both students and faculty of polytechnics and engineering colleges.

Here, it is desirable that lectures, tutorials, and laboratory experiments are planned and interwoven in such a way that their order of presentation in class rooms and verification in laboratory falls in sequence. Supply of too many details in the design of experimental apparatus has been intentionally avoided to enable the laboratory instructor to use his ingenuity to fix, remove, and reassemble different apparatus in the available laboratory setup, such as laboratory flume or pipe network with maximum expediency and minimum cost.

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