

BOOK REVIEW

DEVELOPMENT IN SEWERAGE-1

RONALD E. BARTLETT (Editor)

Applied Science Publishers Ltd, London 1979, 180 pp.,

Index, 23 tables, 42 illustrations

The book, edited by R.E. BARTLETT, is comprised of seven chapters, written by various authors, covering the problems of materials, structural design of pipelines, surface water run-off, building drainage, instrumentation, storm sewage overflow systems and pretreatment of sewage in sewers.

The first chapter briefly describes developments in materials for pipe construction and novel methods of flexible pipe joints. Standards for vitrified clay pipes and uPVC pipes are given and followed by discussion of outline for selection of ductile iron pipes over cast iron pipes. Concrete pipes, asbestos-cement pipes, pitch-fibre pipes and glass reinforced plastic pipes and pipe joints are delineated.

The second chapter reviews the current procedures by which sewerage pipelines are generally structurally designed, both as regards pipes of rigid materials and those of flexible materials, and areas in which developments have taken place are noted. Theoretical formulae are given by which the loads imposed by the backfill under various conditions of installation may be determined and also the loads transmitted to the pipes from surface surcharges. Common methods of bedding the pipes are mentioned, and practical considerations including the effects of variations in workmanship are briefly discussed.

The third chapter describes the development and application of hydrograph method of storm sewer design based on the Transport and Road Research Laboratory (UK). It commences with a brief description of the research that led to the development in 1963 of the method for UK conditions and explains how it is used for practical design cases. The chapter then proceeds to outline the further development of the method for use in tropical conditions, based on research carried out in East Africa, the principal difference being that allowance is made for run-off from unpaved areas. Reference is made to a comparison of this design method with others.

Chapter four dwells on aspects of building drainage and the changes that occurred due to the introduction of novel technology and new materials and advanced inspection methods. Brief mention is made to how these elements affect the overall economy of building drainage construction.

Chapter five covers the topic of instrumentation of a sewage treatment plant and is confined to primary flow measuring devices. Basic flow measuring techniques are presented, with brief discussion of centralized control system and standard analogue signal telemetry. This chapter would be more exhaustive if it had touched upon subjects of feedback mechanisms at the treatment plant such as in flow-proportional-coagulant-metering, air supply control based on DO measurements or sludge flow based on density-level monitoring.

Chapter six defines the criteria for proper design of storm overflows as it was found that over one third of these structures was defective due to too low overflow settings. More recent types are better in both these respects. These include the stilling-pond overflow, for which an example of design calculations is given, the storage overflow chamber and the vortex overflow. The storage overflow chamber is designed to retain the first foul flush during a storm, and design principles are given in an outline. In the vortex

overflow, separation of polluting matter takes place through the centrifugal forces induced by circular flow. The use of siphon spillways, especially the air-regulated type, as an alternative to weirs for the control of stormwater flows is also discussed.

Chapter seven considers the nature, composition and polluting characteristics of sewage together with the decomposition of organic matter under aerobic and anaerobic conditions. Comparisons are made between the self-purification which takes place in natural stream and sewers. An illustrative example is used to demonstrate the use of predictive equations of Parkhurst and Pomeroy for the oxygen balance in sewers. Possible ways of enhancing in-sewer treatment and eliminating septicity are discussed. The chapter directs the reader's attention to a new and unexploited possibility of improving the quality of wastewater reaching the treatment plant. The chapter could be supplemented by discussing the recent Australian and German advancements with hydrogen peroxide in-sewer treatment.

This last chapter is perhaps the best in the book and the most fitting to the Development Series' goals. The whole book is unfortunately confined to only a brief description of the above mentioned topics. Several problems of the sewerage that have ripened recently across the urbanized world remained untouched and are awaiting a thorough treatment. These include: the economy of small community sewerage construction based on an analysis of effective distances of individual dwellings or subdivisions from the central sewerage versus tank hauling of septage, etc.; the problems of sewers under natural obstacles and coastal sewer design for optimum ocean disposal; the problem of pressure sewerage and its economy against the gravitational systems; and long distance wastewater transport to combined treatment plants. Naturally, satisfactory answer to all developing problems in modern sewerage is beyond the scope of a single book.

The object of this book was to bring together the various aspects of drainage and sewerage which have been the subject of considerable change in recent times. These goals are fulfilled to the extent that will satisfy the reader with basic engineering knowledge of the problems. The book is recommended to all practicing engineers and those willing to broaden their knowledge of sewerage design and efficiency.

Jan A. Oleszkiewicz