THE FINAL YEAR PROJECT REPORT
ADVANCED DIPLOMA IN CIVIL ENGINEERING
SCHOOL OF ENGINEERING
MARA INSTITUTE OF TECHNOLOGY

LABORATORY VERIFICATION OF CRITICAL MIXING POINT METHOD FOR CONSERVATIVE AND NONCONSERVATIVE POLLUTANTS.

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Synopsis

Ammonia nitrogen (NH_4^+-N) ,one of the constituents in the effluents from palm oil is studied in relation to its mixing capability. Laboratory verification in neutral pH will ascertain the critical distance from outfall and other relevant parameters . This project presents a steady state mathematical modelling technique to predict far field concentration distribution of pollutant in mixing zone in a uniform cross-sectional channel.

The models are based on the stream tube concept developed by Yotsukura and Sayre , and are modified by Gowda to account for the reach dependency of poluttant decay rate , tranverse diffusion factorand channel hydraulic parameters. A family of curves is developed for a range of dimensionless coordinates of the critical point. An expression for allowable effluent concentration of a poluttant is obtained in terms of critical concentration and water quality criterion. The application of the methodology is outlined in step-by-step design procedure and illustrated by an example for ammonia nitrogen from a particular shallow stream located in Kapar Selangor, which has been receiving effluent discharge from a palm oil mill.

In general the models presented in this project are applicable to conservative and nonconservative pollutants. The values of critical concentration and critical distance will be determine from the mathematical method.

Ammonia concentration experiments have been conducted in The Civil Engineering Laboratory by using a uniform cross-sectional channel.Water sample are taken had been analysed by using Indophenol Blue Colour Method.

CHAPTER 1

1.0 Introduction.

Rivers and streams are continued to be used as conveyance channels for the disposal of industrial, agricultural and domestic wastes. Waterways traditionally performed this function. All of these are called pollution of natural water; which have been defined as the state when the water is altered in composition or condition, directly as a result of the activities of man, so that it is less suitable for any or all of purposes for which it would be in the natural state.

A river and stream that is used for wastewater dilution depend on natural self-purification to assimilate wastes and restore its own quality. The capacity to recover from a waste discharge is determined by the character of the river. Self-purification of stable chemical wastes is almost entirely dependent on steram flow. In passage down a river, the concentration decrease with greater runoff provided by the increasing drainage area.

1.1 Background

The mixing zone is an area unavoidably polluted for blending of a water in a receiving stream. Since this zone may constitute a barrier that blocks migration of fishes and other aquatic organisms, it should be kept a short as possible. Where several discharges are located close together along the stream,the mixing regions should lie along the same side to allow continuous passage for aquatic organisms on the opposite side.