ENGINEERING

Chairman: JOHN A. SPOONER, School of Civil Engineering
Purdue University, Lafayette, Indiana 47907

ALDO GIORGI, School of Civil Engineering
Purdue University, Lafayette, Indiana 47907
was elected Chairman for 1976

ABSTRACTS

An Investigation of the Oxygen Sag Equation and a Modified Mathematical Explanation for Studying Stream Assimilative Capacity. ROBERT H. L. HOWE, West Lafayette, Indiana.——The dissolved oxygen sag equation deficit and its relation with time, pollution loads of both carbonaceous and nitrogenous components and reaeration development is modified and discussed in order to indicate the proper dissolved oxygen coordinate significance along the river or stream studied or surveyed, when plotted graphically or computed statistically.

A revised interpretation for determining the reaeration coefficient K_2 with respect to temperature changes is introduced. The meaning of the reaeration kinetics involving $(D)_R = D_0 e^{K_2 t}$ is emphasized, where D_0 is the dissolved oxygen deficit at time $t = 0$, and $(D)_R$ is the quantity of dissolved oxygen introduced into the water by reaeration due to stream flow.

The significance of the dissolved oxygen deficit is replaced by the term $C_s - C$, where C_s is the dissolved oxygen saturation concentration and C is the dissolved oxygen concentration measured. Thus, the dissolved oxygen deficit equation is expressed by all factors involved.

The critical time t_c can now be solved by either a first order expression or a second order derivation as desired.

Classical work on the subject is discussed, reviewed and compared.

Persistence in Daily Rainfall Occurrences in Indiana and Probabilities of Droughts. J. W. DELLEUR and M. L. KAVVAS, School of Civil Engineering, Purdue University, West Lafayette, Indiana 47907.——The long-term trends, the cyclicities, the covariance structure and the clustering of daily rainfalls are identified by the rate of occurrence function, the intensity function, the variance-time function and the spectrum of counts of daily rainfall and by the log-survivor function of the interarrival times. These statistics are used to calibrate a cluster model of daily rainfall occurrences from which the probabilities of drought can be obtained.