Bielski, A. Influence of Bio-degradable Wastewater Components on Oxygen Conditions of the Receiver – Case Study. *Ochrona Srodowiska* 2015, Vol. 37, No. 2, pp. 37–42.

Abstract: A method for analyzing impact of poorly treated wastewater on aquatic environment of a watercourse was presented. Long-term discharge of such wastewater has a long-lasting impact on bottom sediment properties. In order to assess changes in water environment that result from the waste discharge, kinetics of biochemical processes was studied. In a model of biochemical oxidation of organic carbon compounds, equations describing changes in total biochemical oxygen demand as well as content variations of dissolved oxygen in time were used. A sufficiently high watercourse velocity prevented accumulation of suspended solids from the wastewater, in the watercourse sediment. The accumulation did take place in the bottom sediments of the floodplains and the lake that the watercourse flowed into. It was demonstrated that the wastewater discharge contributed to a significant water deoxygenation, mainly in the floodplains and the lake. In addition, the bottom sediments demonstrated surface oxygen consumption at the same level that was typical for natural deposits with an addition of sewage sludge. Using a mathematical model describing changes in the dissolved oxygen and nitrogen concentrations (organic nitrogen, ammonia, nitrites and nitrates), surface rate of oxygen consumption by sediments, surface rate of organic nitrogen synthesis, surface rate of denitrification as well as the rates of nitrification of the first and second degree, denitrification and ammonification were determined. The method of modeling biochemical processes in aquatic environment enables estimation of kinetic parameters of selected processes, their rate as well as a degree of water pollution with biologically degradable organic substances.

Keywords: Aquatic environment, industrial wastewater, bottom sediments, oxygen demand, oxidation kinetics.