



Using Weibull Probability Distribution to Calibrate Prevailing Wind Applying in Oil Spill Simulation

M. A. Badri*
Assistant Professor

In the Persian Gulf, the major source of oil pollution is related to the transportation of tankers, offshore production and discharges by coastal refineries. The water dynamical field has been obtained using a new hydrodynamic model. Local wind is recognized as the principal driving force combining to the water dynamic field to determine oil drift on the sea surface. The Weibull probability distribution is considered to adjust the prevailing wind obtaining by data from measurements and compared with other data, displaying fairly good conformity. To model the advection and dispersion in the Persian Gulf which is a shallow water area, random walk technique has been used. Comparison of the actual and simulated oil spill trajectory based on real wind field was found acceptable in the Iranian waters.

Keywords: Weibull distribution, Probability wind field, oil spill modeling, Persian Gulf

1 Introduction

The control over properties and behavior of fluid flow and relative parameters are the advantages offered by Computational Fluid Dynamics which makes it suitable for the simulation of the applied engineering problems [1]. Over the past three decades simplified empirical formulae contributed greatly in a rapid evaluation of the pollutant dynamics spreading and drifting. Modern models can utilize more accurate and physically relevant mathematical formulations. In the majority of cases, a mathematical modeling may be a strong and available tool not only for a rapid computation of the pollutant fate but for simulation of the various cleanup operations as well [2]. The computer simulation of complicated marine environment problems has become one of the interesting areas of the research works by development of efficient and accurate numerical methods suitable for the complex flow domain. Numerical models are widely used as an important component of contingency planning and coastal management. Such models act as a real time prediction tool to support in combating and prediction of contaminant movement in order to preserve the region's coastal resources.

The step of choosing the model is informed by experience, personal intuition and a degree of explicit dynamical reasoning. It is important to emphasize that once the model is chosen, the proper tests of its usefulness can come from the systematic, logical and precise working

*Assistant Professor, Research Ins. for Subsea Sci. & Tech., Isfahan Univ. of Tech., Isfahan, Iran, malbdr@cc.iut.ac.ir