

Prevention of Sea-Water Pollution by Oily-Water Treatment

Ayoub Karimi Jashni¹, Solmaz Saadat²

Department of Civil Engineering, Shiraz University, Shiraz, Iran

Email address: ajashni@yahoo.ca Tel: 0917-3007901

ABSTRACT

Oil spills at sea are a major problem to the environment as they severely damage the surrounding ecosystems. Since crude oil is lighter than water, it floats on the sea surface. The initial treatment of an oil spill at sea includes mechanically skimming the water's surface, a mixture of floating oil, emulsified oil, tar balls, etc. will be taken onto the recovery barge and delivered for treatment and reclamation. A lab scale experimental research was conducted to investigate the effectiveness of different oily-water treatment technologies. This research investigated the effectiveness of Gravity Oil/Water Separation, Coagulation/Flocculation/Sedimentation, and Sand Filtration technologies. Effect of different parameters such as hydraulic residence time, type of coagulant, and coagulant dose were studied. It was concluded that more than 95% of oily compounds can be separated from oily-water waste which is an excellent step in preventing sea-water pollution.

INTRODUCTION

Oily-water waste are also produced from many industries, including: oil spills at sea, oil refining, collection points for disposable waste oils, petrochemical plants, crude oil storage, process operations, and tank cleaning services. The heavier hydrocarbon fractions of oily-water waste accumulate as bottom muck to kill plant and bottom dwelling animal life when released to surface waters. Dissolved or emulsified fractions act as toxic agents depleting the oxygen content of waterbodies. Floating fractions create fire hazards, and coat banks and boat hulls. They also contaminate the water, interfering with fishing and recreation.

The Persian Gulf represents a highly stressful environment due to a combination of both prevailing natural conditions and development pressures along its coastline. The Persian Gulf region has approximately two-thirds of the world's proven oil reserves and the eight riparian states (Iran, Iraq, Kuwait, Bahrain, Qatar, Saudi Arabia, UAE and Oman) currently accounts for approximately one-fourth of the world's oil production. Problem associated with oil pollution and non-living resources appear to be of greater significance in Persian Gulf compared with other regions. This region has undergone considerable development, and consequently urbanization, industrialization, port areas and refineries have become major source of pollution to the marine environment. Also, a combination of tanker traffic and either accidental or intentional spills have prevailed. The spills that took place during the 1991 Gulf war is one of the major events happened in the Persian Gulf. In 1994, two tankers collided spilling 16,000 tonnes of Iranian

¹ Assistant professor, Dept. of Civil Engineering, School of Engineering, Shiraz University, Shiraz, Iran.

² Ms. Student of Environmental Engineering, Shiraz University, Shiraz, Iran