

Assessment Oil Spill at Port Sudan Sea Ports

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Two Simulation packages (GNOME and ADIOS 2) were used to obtain the best anticipated course and weather factors affecting the oil spilled from the Iranian oil tanker accident in the Red Sea. The results of GNOME showed that the shape of the patch expanded depending on wind speed (10 knots) and direction of North east, became larger and spanned a distance of 100 km until the third day of the spill. While the results from ADIOS2 explain that weather factors and properties of the oil also affect the amount of leakage, the viscosity of the oil and the density increases then it becomes constant according to emulsification which has ceased to increase on the third day. Evaporation and dispersion percent stopped increasing after the third day due to a decrease in the percentage of oil remaining. This means that after 3 days from the accident, the oil spill evaporated, dispersed and diminished. Therefore, the oil spill will not reach the sea ports of Sudan.

مستخلص اطروحة مقدمة لنيل درجة الماجستير في سلامة العمليات الصناعية و الهندسة البيئية

تقييم الانسكاب النفطي في موانئ بورتسودان البحرية

إيمان عبد الله شنقراي

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كلية الدراسات العليا

تم استخدام برنامجين (GNOME, ADIOS 2) للحصول على افضل مسار متوقع والعوامل الجوية التي تؤثر على النفط المتسرب من حادث ناقلة النفط الإيرانية في البحر الأحمر. وأظهرت النتائج برنامج جنوم أن شكل البقعة توسع اعتمادا على سرعة الرياح (١٠ عقدة) واتجاهها (الجنوب الشرقي)، وأصبحت كبيرة ممتدة إلى مسافة 100 كم حتى اليوم الثالث من الانسكاب. اما نتائج برنامج اديوس2 اوضحت ان العوامل الجوية وخصائص النفط تؤثر أيضا على كمية التسرب. لزوجة الزيت وكثافته قد زادت حتى اصبحت ثابتة وفقا للمستحلب الذي توقف عن الزيادة في اليوم الثالث. نسبة التبخر والتشتت توقفت عن الزيادة بعد اليوم الثالث بسبب انخفاض في نسبة المتبقي من الزيت. وهذا يعني ان بعد 3 أيام من الحادث، تبخر النفط المتسرب، وتفرق وتضاءل. ولذلك فإن التسرب النفطي لن يصل إلى موانئ بورتسودان.

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5.1 Conclusions

1. Although insufficient data about oil spills is unavailable, the Sudanese coast has been exposed to an influx of oil into the waters of various areas on the coast of Port Sudan, particularly the port of Bashiar, the southern port of The North Port and the surrounding areas. All these accidents happened in the past years (2010 – 2018).
2. The Simulation packages used show that the spread of oil over the sea surface and its movement depends to a large extent on weather factors as well as on the type and characteristics of the oil spill. In GNOME, the results show that the movement of the spot is affected by the speed, wind direction, and tidal currents, as the spot expanded and increased in size to cover a large area (100 km) of water. In ADIOS, the analysis of the modeling results showed that the characteristics of the oil spill change in the first hours, as the evaporation and dispersion ratio is large and may reach and decrease after that, which leads to an increase in both the viscosity and density of the oil slick. Over time, the amount of remaining oil will decrease until it disappears. Accordingly, with the assurance that the oil spill exceeded the direction of the south, the oil spill will not reach the sea Ports of Sudan.

5.2 Recommendation

1. To conduct a study that help the decision makers comply with maritime laws to protect the marine environment and monitor ships accurately while implementing strict measures and penalties for those who violate the laws or cause pollution.
2. Increasing knowledge and raising awareness among the interested person and community in dealing with the marine ecosystems directly about the dangers of oil and its sources in the Sudanese coast. Also about the safety precautions that should be followed in the case of pollution.
3. Providing ports with the latest facilities for ships and the latest means and systems to control oil leaks such as marine observatories, sensing techniques and beach surveillance cameras.
4. Use test models to facilitate the process of handling leaks and to assist in future decision-making in the event of similar incidents.