IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, January 2026
Impact Factor: 7.67

Design and Fabrication of Solar Powered Waste Oil Skimming Boat

Prof. Sujit Sali, Maajid Z Shaikh, Majeed Z Shaikh, Mallikarjun I Alabal, Shrishail S Hiremath
Angadi Institute of Technology and Management, Belagavi

Abstract: *An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity, and is a form of pollution. The term is usually given to marine oil spills, where oil is released into the ocean or coastal waters. An oil spill poses major threat to life in general. Our oceans are believed to be the earth's lungs. The ocean produces over half of the world's oxygen and absorbs 50 times more carbon dioxide than our atmosphere.*

Keywords: *oil spill*

I. INTRODUCTION

An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity, and is a form of pollution. The term is usually given to marine oil spills, where oil is released into the ocean or coastal waters. An oil spill poses major threat to life in general. Our oceans are believed to be the earth's lungs. The ocean produces over half of the world's oxygen and absorbs 50 times more carbon dioxide than our atmosphere.

Selection

Today world required speed in each and every field. Hence rapidness and quick working is most important. Now days for achieving rapidness, various machines and the equipment's are being manufactured. In such a modern era of liberalization, small-scale industries are contributing in a big way to the growth of our country.

The engineer is constantly confronted with the challenges of bringing ideas and design into reality. New machines and techniques are being developed continuously to manufacture various products at cheaper rates and high quality. Taking into account the above contribution we have tried to manufacture such equipment, which is the accessory of machine tool to have the treatment to the cutting fluid after having used as a coolant. Because the coolant after having continuous use, gets mixed up with the lubricating oil and its property gets changed. Hence it becomes necessary to separate the oil from the mixture of the oil and the coolant.

What is oil skimmer?

The oil skimming is the operation of removing or separating the oil from the oil polluted coolant. The oil and the coolant in the mixed form is collected in the containers. And one of the following classified methods are adopted to separate the oil from the coolant.

- By separating the oil from the coolant by violently pouring the upper layer of mixture in another container
- By soaking the oil layer using oil-soaking element.
- By skimming oil using flat belt arrangement

The first two methods are not accurate also these are time consuming and it requires sort of skill for its execution. The later one is simple and the oil can be separated with out any fatigue and the process is accurate.

Oil being the lighter element as compared to coolant mixed with the water, it floats over the coolant. The endless belt running over the roller is adjusted such that the belt will violently smash the layer of the mixture coolant. The oil being the lighter and sticky will stuck to the belt. The belt then is rubbed against the resting scoop or the container where the oil is collected after separation.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, January 2026
Impact Factor: 7.67

II. LITERATURE SURVEY

[1] Oil skimmer is used to remove the floating oil from liquid medium. The oil floats on the water since it has less density than water. The water molecules are more attracted to each other than oil molecules since they don't mix each other. Here we use the skimming medium as Belt & Metal disc. The skimming medium runs over the surface of water in which oil brought out with little amount of water. The main purpose of this fabricated skimmer is to purify the water from various dirt oils. The skimmer is more cost efficient and simple in design in comparing to costly treatments like membrane filters and chemical treatments. The oil is removed from the metal disc and belt through wiping blades. The floating grease or oil has formed into solid mats our apparatus can be used to break the mats and remove them. This will reduce water pollution.[2] Oil Skimmer Robot is a device which can be used for ocean purification by removing the oil from water surface. The system uses a photovoltaic powered conveyor belt to propel itself and collect oil. The flexible conveyor belt softly rolls over the ocean's surface, absorbing oil while deflecting water because of its hydrophobic properties. The photovoltaic cells generate enough electricity to keep the fleet moving for several weeks and provide the energy to propel the vehicles forward. As the head moves through the water the conveyor belt constantly rotates and sucks up pollution. The belt is then compressed to remove the oil. As the clean part of the belt comes out of the head it immediately begins absorbing oil, making the collection process seamless and efficient. This process is more streamlined than current ocean-skimming technologies because the robots can operate autonomously and don't need to return to the shore for constant maintenance.[3] The oil skimmer is used to separate oil from mixture of aqua and oil. It causes highly acidic alkaline and salty environment remains a great challenge to aquatic organism and also polluted the coastal areas. Every year 706 million gallons of waste oil enter the water resources and pollute the environment. Sea water has been polluted due to oil spillage it also affect the water bodies. If the oil spill increases it result in serious damage to the environment. About 90%of contaminated oil can be removed by continuous separation of oil by skimmer belt. This setup use polyurethane belt, bearings, supporting L-angle frame and scraper. This work implemented to improve the separation efficiency of the skimmer belt at manual speed. The belt absorbs the oil from water which can be scooped out and collect in to a vessel by providing piping arrangements. The collected oil can be reused for many purposes.

2.1 Oil Spill Incidents

The Atlantic Empress Oil Spill (1979)

The Atlantic Empress disaster released an estimated 90 million gallons of oil into the Atlantic Ocean some 16 km (10 miles) off the islands of Trinidad and Tobago. The collision between the VLCCs Atlantic Empress and Aegean Captain on July 19, 1979, during a tropical storm created the largest tanker spill on record. Both ships caught fire, and the fire ignited an oil slick, but the Atlantic Empress caught the worst of the collision.

The Atlantic Empress was towed away from land, and it burned for two weeks before it sank. In contrast, the fire aboard the Aegean Captain was extinguished, and the vessel was towed to Trinidad. Despite the enormous volume of oil released during the accident, the spill caused very little environmental damage to the beaches on nearby islands; winds pushed most of the oil out to sea, where it dispersed. However, 27 sailors died during the accident.

The Oil Ennore Port Chennai (2017)

A tanker named MT Coral Stars berthed at the Kamarajar Port in Ennore near Chennai suffered an oil spill in the early hours of Sunday, said authorities with the Indian Coast Guard and the port.

An official statement from the Kamarajar Port is expected by Sunday evening. Coast Guard authorities told ET that patrolling vessels were despatched to the location to assess the damage. Authorities said the spill happened at 5: 30 a.m. Sunday within the port limits in Ennore. The Indian Coast Guard has also despatched a Pollution Response Vessel from Visakhapatnam towards Ennore.

A Coast Guard official told ET that the spillage was less than one tonne, adding, however, that a clear image of the extent of damage can be obtained through the evening on Sunday. "We may get an exact estimate once the two ships we have sent there get back with information," said the official. An official of the Port said top executives have arrived at the spot. "We should send out a statement on the incident by evening," the port official said.

In January 2017, a ship leaving the port collided with an inbound oil tanker named MT Dawn Kanchipuram. It led to an

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 1, January 2026 Impact Factor: 7.67

oil spill that spread across Chennai's coastline, washing up oil slick and dead turtles on the beaches along the southern city's coast. The Indian Coast Guard, in a press statement three days after the January 2017 spill, had said over 20 tonnes of oil had gone into the sea as against 2-3 tonnes in the initial reports. On February 3, 2017, the Indian Coast Guard had said "a total of 24 tonnes of oil sludge and 09 tonnes of water sludge were collected on 03 Feb 17".Marine services experts said the usual procedure after an oil spill was to ring-fence the oil slick in sea and deploy a skimmer, which essentially sucks out the oil sludge layer off the surface of the sea.

2.2 Problem statement

- Due to oil, it will affect the fishes
- Due to which it pollutes the water
- The useful oil becomes waste
- Difficulties to collect
- Dangerous to collect and have to travel to place to collect it
- The oil may burn and cause accident

2.3 Objective

- To make a complete mechanical device.
- To make a device which is suitable economical for small Scale industries: taking in to consideration the cost factor this device is suitable for small scale as well as big scale industries.
- Taking safetyas prime consideration: This device is safer in all respects.
- This machine is used for separation of oil from sea water.
- To build a device which is remote controlled.
- Oil recovery and water separation.
- Environmental protection.
- Pollution control.
- Operational efficiency.
- Safety enhancement.
- Cost reduction / Revenue generation.

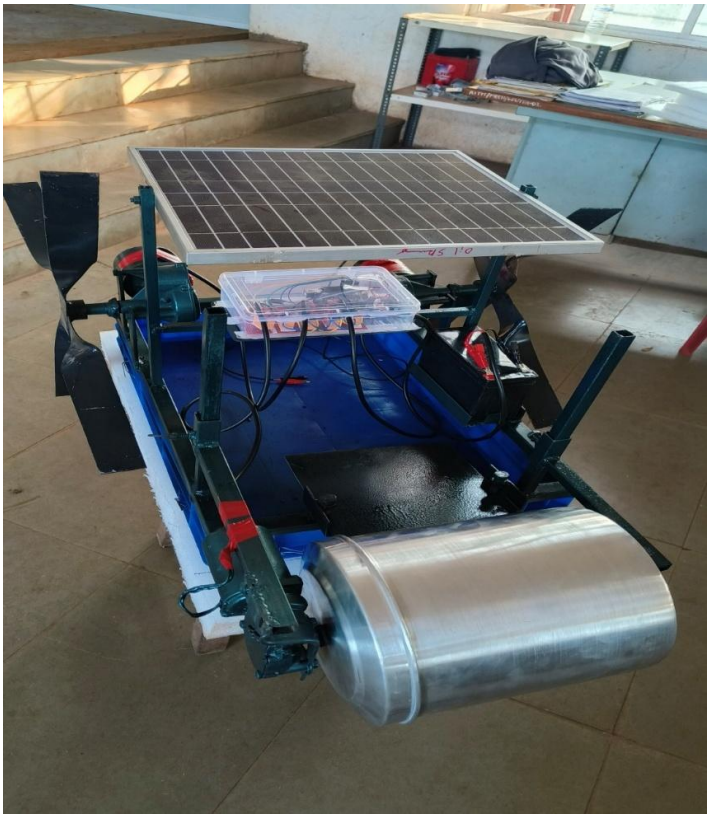
III. WORKING PRINCIPLE

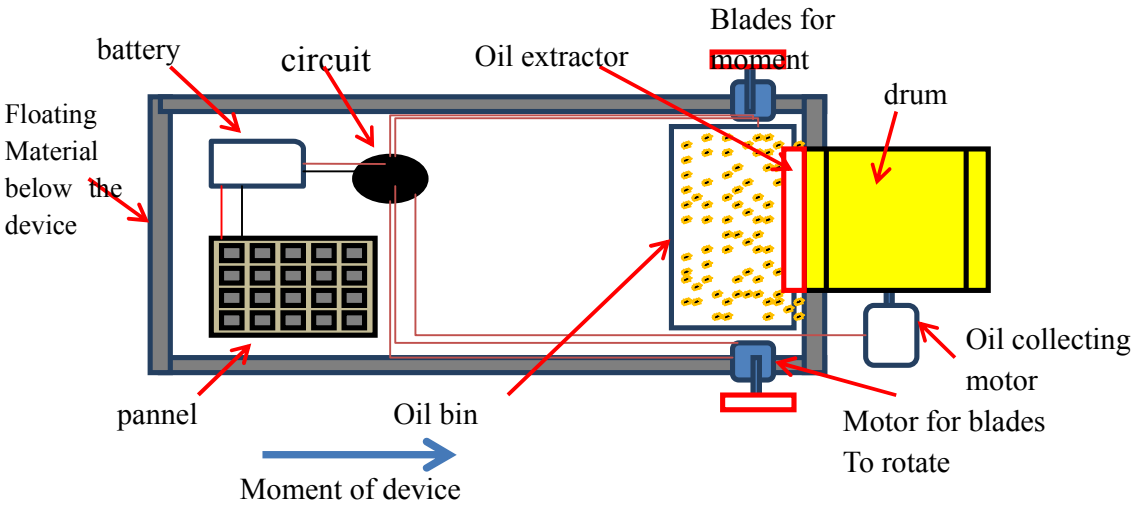
Oil Skimmer is a machine, which separates the OIL from water as name suggests. The aluminum disk is attached to A DC motor which is fixed at the top of the frame. The 2 motors are fitted in order to control the moment of the boat below the boat floating material is attached in order the boat floats on water the control of all the three motors are done wireless which is run with the help of Bluetooth through the android mobile the oil skimming motor is started when oil has to skimmed and collected in vessel the oil which is floating on water sticks on the aluminum plate and then with the spiller it is extracted in a vessel, the boat is operated wireless with the help of power source as battery and the battery gets charge by the solar panel the mechanism is very simple and with very low cost oil which is wasted in water can be used and save the water from polluting and saving the fishes.

1. The drum were rotated through the belt, and the oil will be collected on the drum wall and then removed by using the scraper. Oil flowed from the drum, down the scraper, where the oil to collection tank.
2. The oil skimmer's main body is made of aluminium alloy and a stainless-steel box frame. It is resistant to seawater corrosion and has a strong and durable structure.
3. The floating box is sealed with foam filling. The buoyancy is stable and reliable, and the anti- crushing performance is strong.
4. The flexible oil scraper can automatically compensate for the gap with the oil skimmer turntable. This can improve the collection effect of low-viscosity oil
5. The power type can be selected from solar power to battery charge DC motor start.

DOI: 10.48175/568

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, January 2026
Impact Factor: 7.67

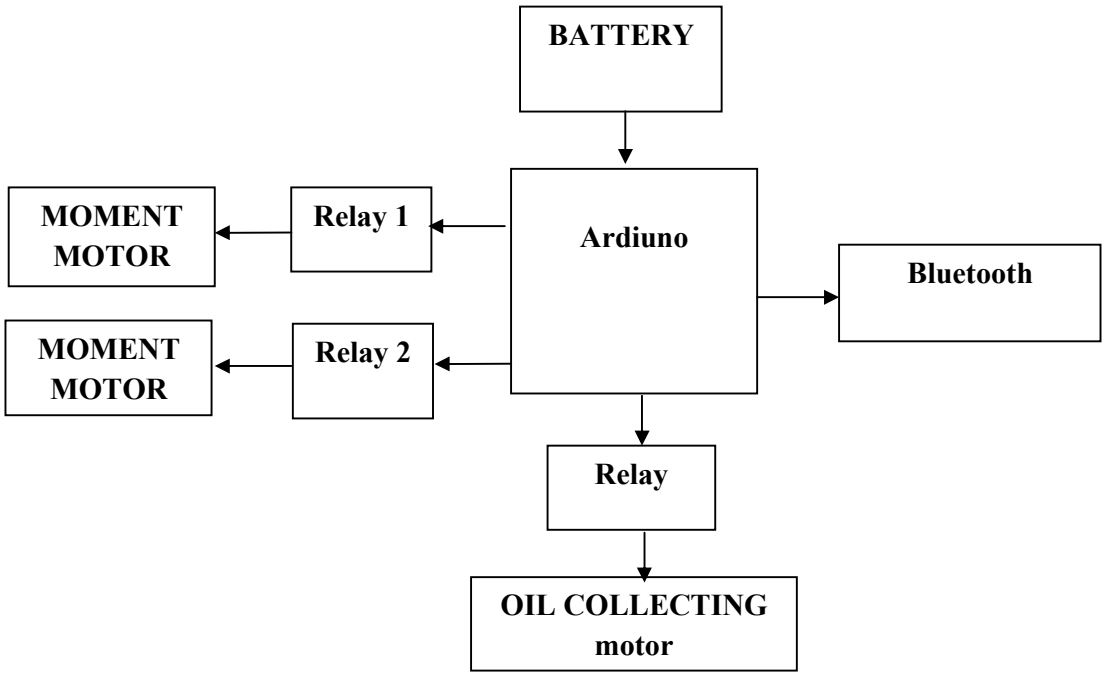




DOI: 10.48175/568

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, January 2026
Impact Factor: 7.67

Block Diagram



IV. CONCLUSION

We have taken up this project as real challenge, as we were not experience in this field. We started our work on this project facing new hurdles initially. After the completion of the project work we tried its working in our college machine shop and we were pleased to note that it does meet the requirements for what it is meant.The maneuverability of the device is quite good and the handling is quite simple. For commercial purpose one can improve the efficiency of the device effectively by increasing the size of the device.

REFERENCES

[1] Design and Fabrication of Oil Skimmer M. Abdul Rahman, S. Manojkumar, M. Seenivasan, G. M. Sivaa, R. Vignesh, Special Issue – 2018, Department of Mechanical Engineering, Nandha College of Technology, Erode-52, Tamil Nadu, India.

[2]Fabrication of Solar Powered Oil Skimmer Robot Nirmal Joshua Mathews, Tesbin K Varghese, Prince Zachariah, NinosAjiChirathalattu, Volume: 05 Issue: 05 | May-2018 IRJET.

[3]Floating Oil Skimmer With RC Jabir P.P, Vyshnav V.K, Muhammad Ashiq K, Muhammed Midlaj K, Muhammed Juraij C.T, Muhammed Badhusha P, Muhammed Fayas U, Volume: 07 Issue: 04 | Apr 2020 IRJET.

[4] 'Victoria Broje' and 'Arturo A keller', "improved recovery of oil spills from water surfaces using tailored surface in oleophilic skimmers, Donald Bren school of Environmental Science & Management, University of California, Santa Barbara.

[5] 'S.H. Schwartz', "Performance tests of four oil spill skimmer, in: proceedings of the International Oil spill Conference", American Petroleum Institute, Washington, DC, USA ,1979, pp,493-496.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, January 2026
Impact Factor: 7.67

CAD MODEL