Automatic spilled oil collecting device for large area

KOREA COAST GUARD

KIST

SEOUL NATIONAL UNIVERSITY

With cooperation from KCG, the company is conducting a test on the real sea area of Pyeong taek port, Gwang yang Port

With cooperation from KIST, the company is conducting oil experiments on kerosene and bunker C oil at the REAL SEA in Yeongdo

With the cooperation of Seoul National University, it is jointly studying experimental and research projects with Seoul National University

Motive power is needed

A power pack using oil pressure, electric, and pneumatic motors is required as the activation method.

A water surface cleaning ship is needed

As more than 90% of mobillized ships do not have specialized equipment for the prevention of pollution and repeated manual work is carried out, there is a lack of pollution prevention.

Storage space id needed

Space to store collected oil spill is required, after collecting the spilt oil.

● Automatic spilled oil collecting device

Quick and effective response to oil spill accidents (high efficiency, wide area and automation)
All-in-one attachment/detachment system : spilled oil gathering-collection-storage

- Usable by installing in costal fishing boats, not existing disaster prevention ships.
- Spilled oil gathering, collection, and storage become easy with dismountable all-in-one system.
- Automatic spilled oil collecting device for large area can quickly and effiectively respond to spilled oil accidents.


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## ⊙ Automatic spilled oil collecting device for large area.

· Can quickly and effectively respond to spilled oil accients.
· Spilled oil gathering, collection, and storage become easy with dismountable all-in-one system.
· Usable by installing in coastal fishing boats, not existing disaster prevention ships.

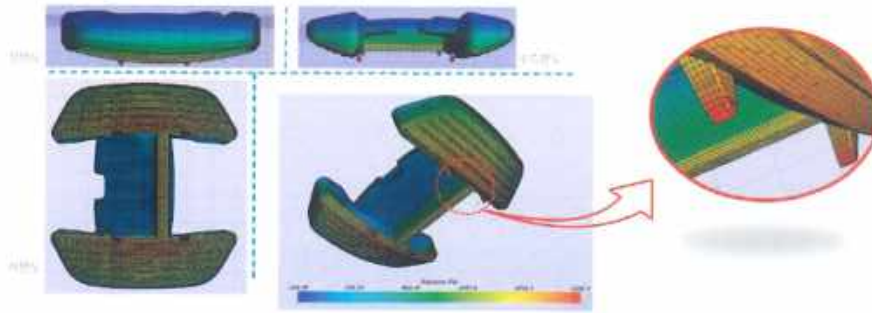## ⊙ Development process automatic spilled oil collecting device for large area.

서울대학교 항공공학부
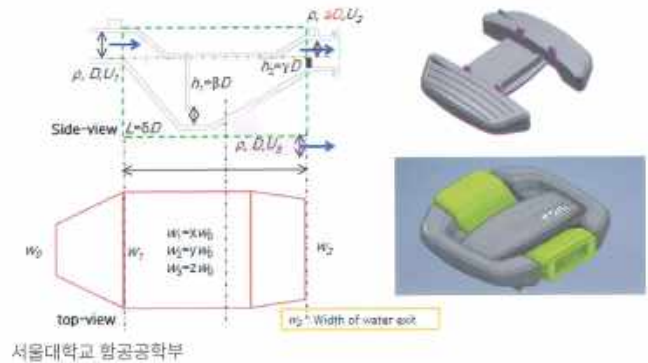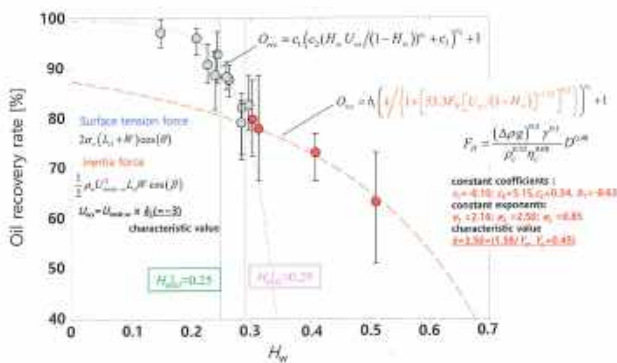
· Making an oil collection rate prediction model according to the operation conditions through an interface kinetics analysis
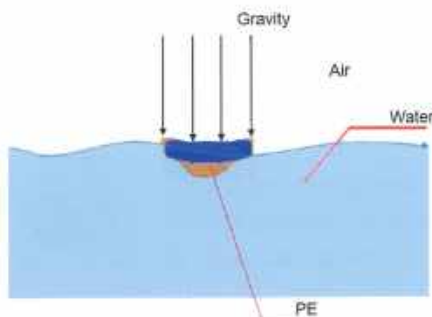
Models	Value
The force of gravity	9.81 m/s²
Density of water	1 g/cm³
wave	Heavy: 997.561 kg/m³ Light: 1.18415 kg/m³
Mass of the blue model	154.808 kg
Mass of the orange model	24.405 kg

· An interpretation is conducted through an implicit unsteady analysis,
  and the results are generated according to how much time passes (Maximum time step is 10sec)
· To achieve the "float" shape, select the Eulerian Multiphases model, select all domains,
  and make an make an interpretation by classifying all the domains into water and air
· The free motion in case of being shaken by a wave is realized with DFDI's 6-POF bodies model.
· Proceed with PE in terms of the modeling material property of all domains.

· The interpretation result of the buoyancy object is shown above.
· The part most affected by the buoyancy is the same as the part in the enlarged circular diagram.

▌ Product Development Progress

◉ Automatic spilled oil collecting device for large area

Date and time
Tuesday, September 24-25 Wednesday, 2019

Place
Marine pollution prevention filed of KCG Trainning Center

Test details
Checking the oil-water separation performance according to 1-2 knots towing speed
when there are waves and when there aren't waves

Experimental picture

Summary of oil-water separation performance test

(Test details and scope : Performance verification according to towing speed of 2-3 knots under wave situation)

Date
2019.10.21.-22

Venue
Linear Water Control Laboratory at Seoul National University

AUTOMATIC SPILLED OIL COLLECTING DEVICE FOR LARGE AREA Towing Test

Equipment assembly

spilled oil collecting system
(completion of assembly)

towing (2 knots)

Summary of oil-water separation performance test

Automatic spilled oil collecting device for large area

Date and time
Wednesday, October 23, 2019

Place
Pyeongtaek Marine Police Station Site

Test details
Performance Verification According to
2-3knots Towing Speed in Real Sea Area