RESEARCH ON SHIP AND SYSTEMS FOR WASTE MANAGEMENT IN THE SEA

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ABSTRACT

Around 80% of waste in the sea comes from land, and through shallow water [1][2]. If we can catch them here, then the waste in the sea will not increase more. In this study, the ship was used as one of the solutions chosen as part of the waste management system in the sea. Ships function defined to collect plastic and solid waste, then processing waste will be carried out on land. The system of how to catch waste adopts from how the fishing boat catches fish.

WASTE IN INDONESIA SEA

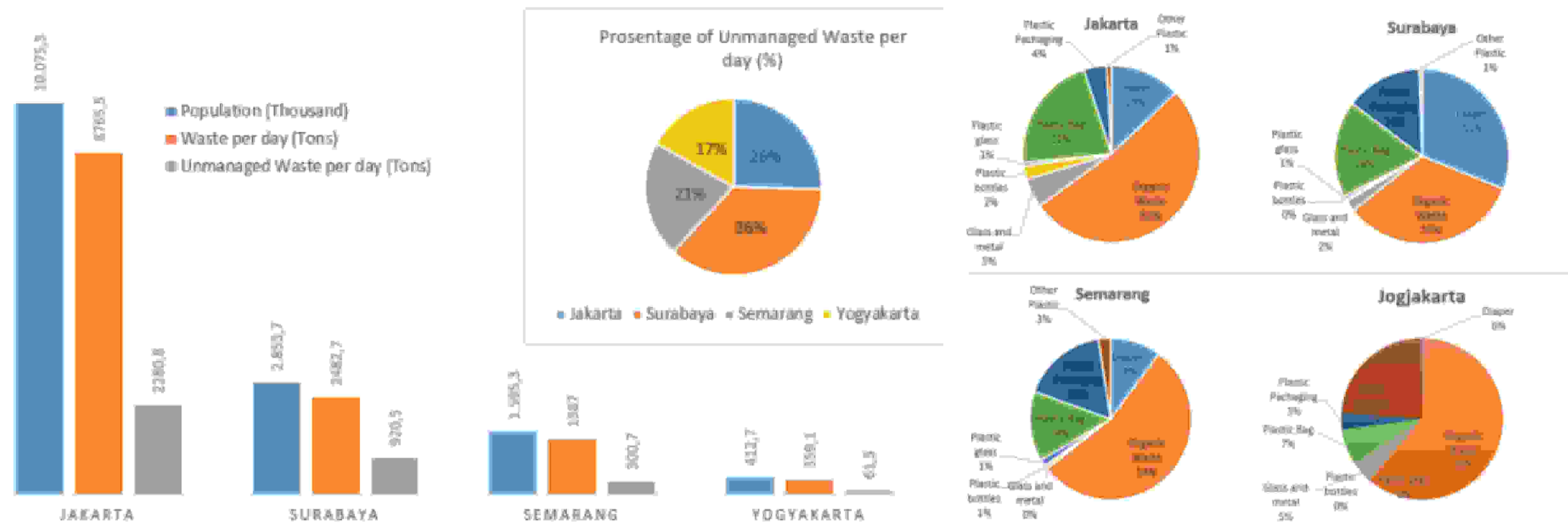*The highest production of waste per day was in Java, especially Jakarta and Surabaya [3].*

Fig 1. Waste in big cities in Indonesia

Fig 2. Types of waste

SHIP DESIGN CONDITION

The ship will operate in minimum sea depth that varies greatly from 1.8 meters to 16 meters. The scenario of the position of the ship and the net can be done in two ways, the net in front of the ship and the net on the side of the ship. When the net forms a full circle, the diameter of the net is equal to the length of the ship.
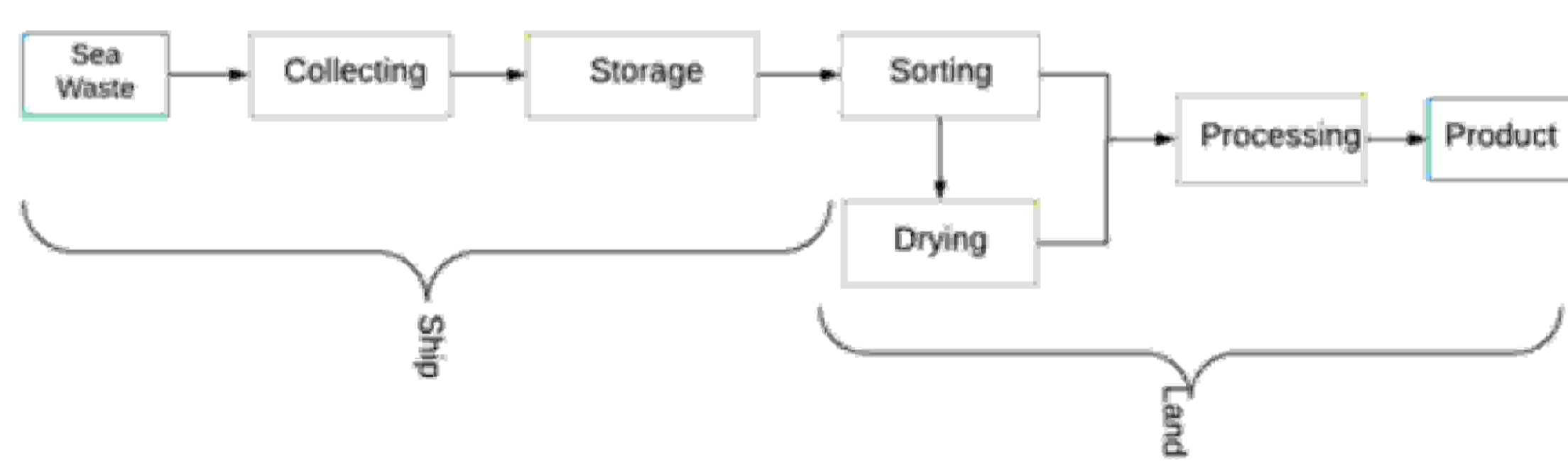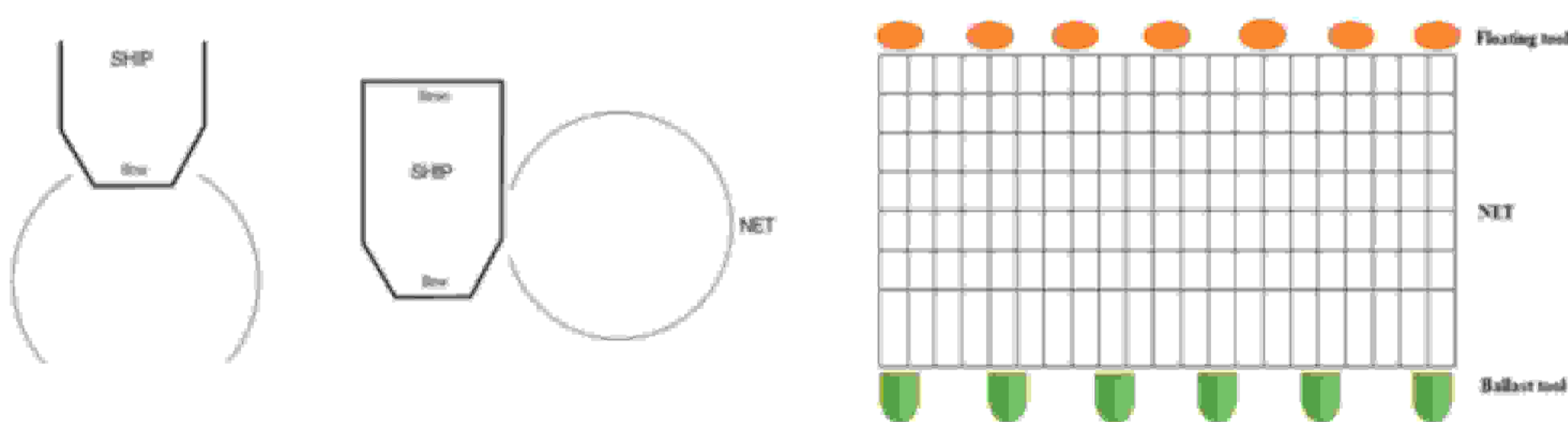

Fig 3. Waste flow

Fig 4. Ship and net position (left and center), net concept (right)

REFERENCES

[1] J. R. Jambeck et al, 2015, pp. 1655–1734 [2] C. Juying et al, 2016, no. 2011, pp. 1–34 [3] Work Bank Group, 2018, pp. 1–49 [4] E.V .Lewis, 1988 [5] G.V. Oormerssen. 1971, v.18 n.217.

SHIP MODEL

Regression method is used to determine ship main dimensions. The data of the ship is taken from the data of the fishing boat in Java sea. Ship can collect 25 tonnes with 16 .5 m length, 4.8 m breadth and 1.2 m draft.
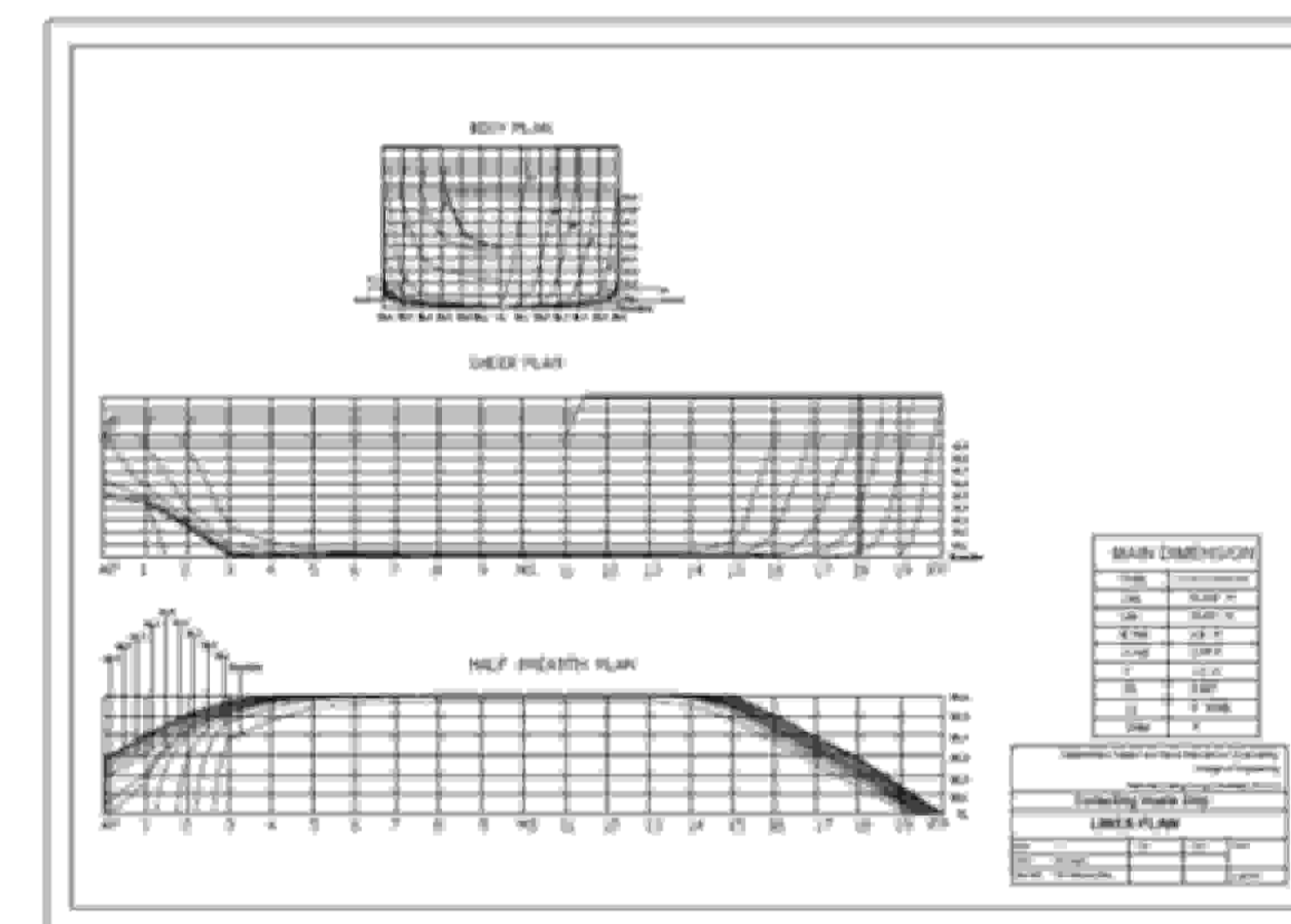

Fig 5. Lines plan (left), ship model (right)

RESISTANCE AND POWER

Determination of resistance and ship power carried out using Holtrop method [4] and validation with Van Oortmerssen method [5].
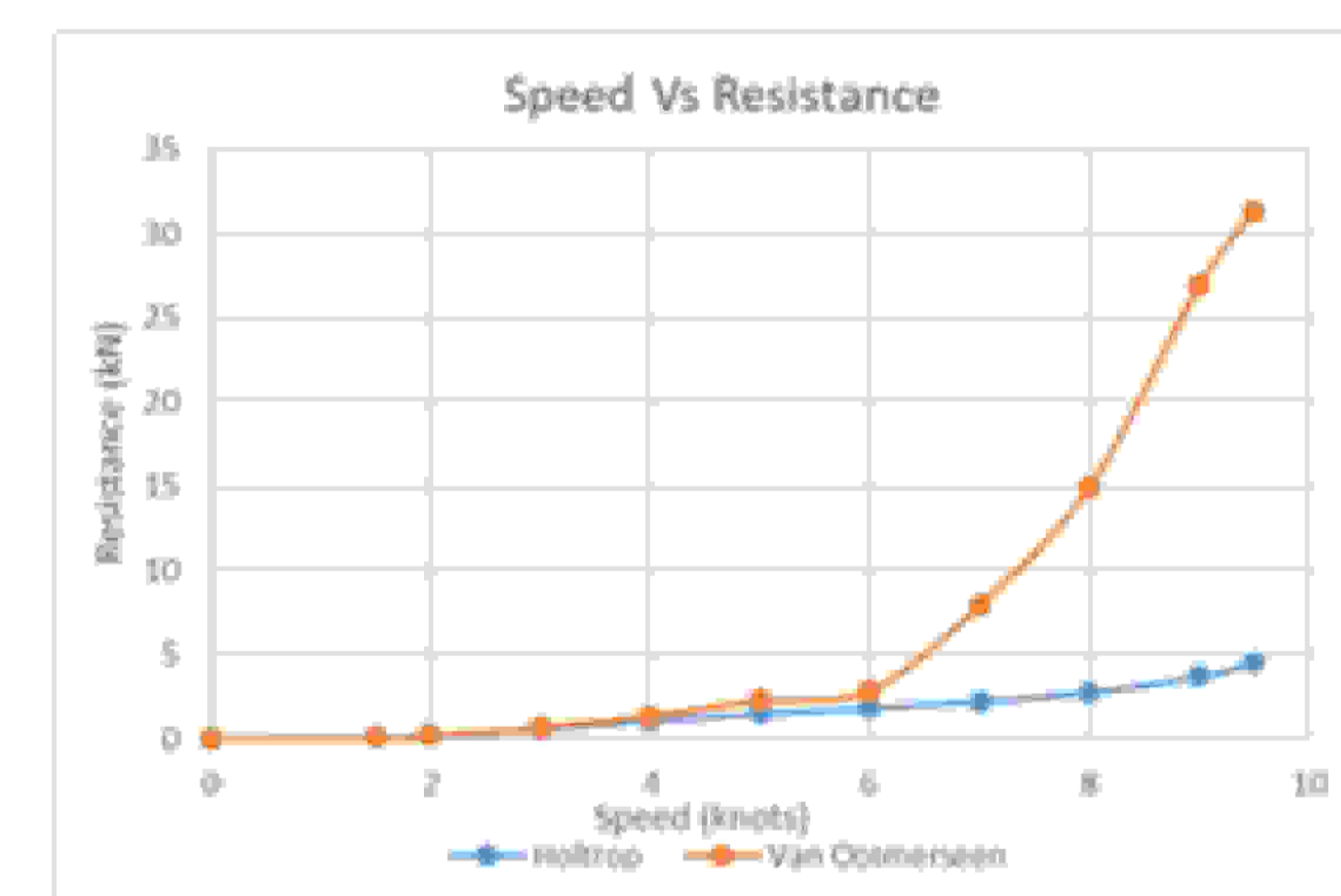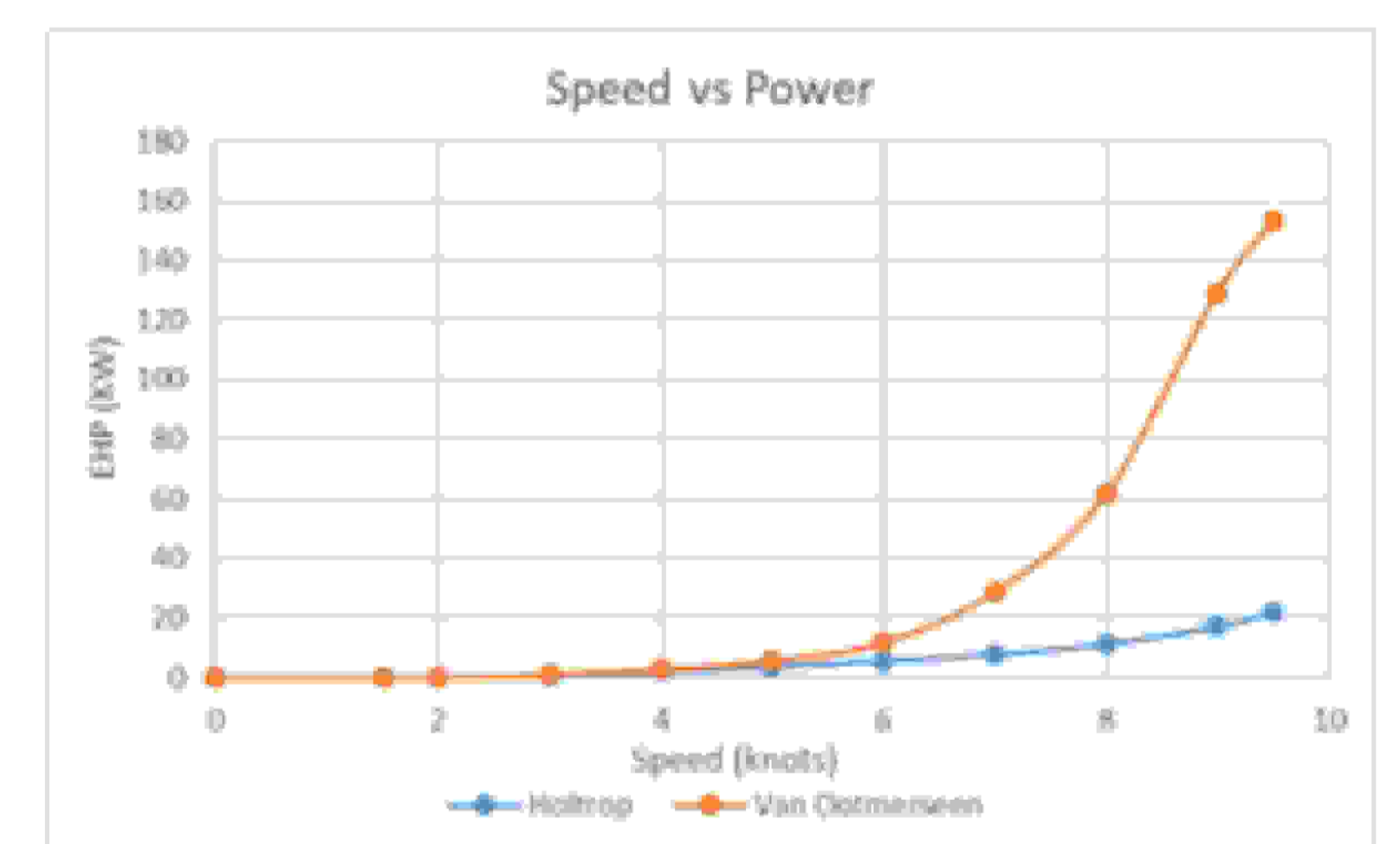

Fig 6. Resistance

Fig 7. Power

CONCLUSION

This study shows the possibility of using ships for waste management at sea not only considers the ability of ships to carry waste at sea. However, it also collects waste scattered in the sea and drives it onto the ship. Technical considerations such as resistance and power of ships are also carried out to support ships that can be provided according to the expected mission.

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