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Lines Plan of Purse Seine Ship in South Sulawesi

Irawan Alham[1*], Lendri[2]
State Agricultural Polytechnic of Pangkajene Islands, Pangkep, Indonesia[1,2]
email: irawan.alham@polipangkep.ac.id

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Abstract
Vessels used for purse seine fishing gear operations in South Sulawesi are made of teak wood (Tectona grandis), spinach with a length of 13 – 25 m, a width of 3.30 – 5.87 m and a height of 1 – 1.8 m. Based on the classification of durability and strength of wooden ships, types of teak and spinach are classified as durable class I and strong class II. Good wood for ship building is one that has a durable class I – II and a strong class I – II (Wibowo 1981 in Marlin, 2008). This means that vessels operating purse seine fishing gear in South Sulawesi are well used because they have relatively large durability and strength. Purse seine vessels in this area have a tonnage between 10 – 35 GT. GT calculation based on Director General of PERLA No, PY.67/1/16-02. The main engine used consists of two units of Yanmar brand, Mitsubishi and Yun chai with a power of 20, 27 or 30 PK. In addition, it is also equipped with a 15 PK Jian Dong brand roller machine.

Keywords: Lines plan, purse seine vessels, fishing gear

Introduction

Purse seine shipbuilding in South Sulawesi is still very simple in the sense that shipbuilding without design, the construction of purse seine ships is generally carried out in people's shipyards with the shipbuilding process carried out with hereditary habits without shipbuilding calculations so that the resulting ship is not guaranteed safety because the resulting ship has not been thoroughly tested for stability before the ship Declared seaworthy, besides that there are several weaknesses possessed by Purse Seine ships made at people's shipyards, namely (1) the shape of the hull is not smooth, (2) prone to leaking, (3) improper propulsion engine specifications, and (4) the fastening technique of each construction connection is weak, as a result of some of these weaknesses fishermen are more wasteful in operating their boats and insurance does not want to accept these vessels, so that the guarantee of fishermen's sustainability is very low.

According to Farhum, 2007 The success of the fishing business is largely determined by the technical feasibility of the vessel used as one of the most important vessel factors of the fishing unit component, therefore proper ship planning both is a vessel that is able to provide comfort and safety both during the voyage and carrying out the fishing process is the most important step in the purse seine fishing effort. Djodjo 2015 the death rate of fishermen in Indonesia is 118/100,000 fishermen, the cause of death of fishermen until now is not known for sure the cause of their death. Tingkat kecelakaan pada kapal purse seine yang terjadi di Kabupaten Takalar pada tahun 2006 berjumlah 3 kasus yang terdiri; Kapal terbakar sebanyak 1 kasus, kapal tenggelam/bocor 1 kasus, dan ABK yang mengalami musibah 1 orang, tahun 2007 jumlah kecelakaan sebanyak 7 kasus yang terdiri dari kapal terbakar 2 kasus, kapal tenggelam/bocor 2 kasus, ABK yang mengalami musibah 3 kasus, dan pada tahun 2008 total kecelakaan 10 kasus yang terdiri dari ; kapal terbakar 3 kasus, kapal tenggelam/bocor 3 kasus, dan ABK yang mengalami musibah sebanyak 4 orang.

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Based on research data of purse seine vessels whose fishing base in Barru regency it was obtained that the main dimensions of purse seine vessels in Barru regency have not met the safety requirements from all aspects that have been required by the International Maritime Organization (IMO) (Lendri 2010), this is due to the beginning of the shipbuilding without planning.

Research Method

Equipment in Research

The material used is a purse seine ship that is carrying out repairs at the shipyard. The tools used for data collection are:

1. A meter that is 50 m long
2. Ruler
3. Water fitting
4. Purse Seine Ship
5. Strap
6. Maxsurf Software
7. Board
8. Sandpaper

Data Processing

1. Measuring the main dimensions of the purse seine vessel that is sampled, the results of these measurements are processed and analysis whether the main dimensions and hydrostatic parameters of the ship are in accordance with IMO standards
2. If the main dimensions of the ship do not comply with IMO standards, a purse seine ship redesign is carried out on Maxsurf software which is adjusted to IMO standards, and takes into account the characteristics of the waters and fishing gear and its auxiliaries, propulsion engines and ship stability

Results and Discussion

Main Size of Purse seine Vessel and Main Dimension Ratio of Vessel

The main sizes of Purse seine vessels in South Sulawesi and operating in Sulawesi waters are as follows:

Table 1. Data Main sizes of purse seine vessels

No	Ship Name	L (m)	B (m)	H (m)	T (m)	L/B	B/H	T/B	T/H	L/H
1	KMS. Matoanging	22.70	4.76	1.70	1.22	4.77	2.80	0.26	0.72	13.35
2	KM. Ical 02	23.59	5.15	1.50	1.13	4.58	3.43	0.22	0.75	15.73
3	KM. Bintang Timur	15.60	3.62	1.44	1.04	4.31	2.51	0.29	0.72	10.83
4	KM. Harapan Baru	16.12	4.24	1.23	0.90	3.80	3.45	0.21	0.73	13.11
5	KMS. Garuda Jaya	17.42	4.17	1.19	0.86	4.18	3.50	0.21	0.72	14.64
6	KMN. Minasate'ne	24.60	4.60	1.55	1.25	5.35	2.97	0.27	0.81	15.87
7	KMN. Samudra	18.50	3.95	1.30	0.75	4.68	3.04	0.19	0.58	14.23

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8	KM. Arta Jaya	17.86	4.10	1.45	1.20	4.36	2.83	0.29	0.83	12.32
9	KM. Jaya Laut	16.70	4.55	1.50	1.35	3.67	3.03	0.30	0.90	11.13
10	KM. Rosa Wijaya	15.95	3.80	1.05	1.05	4.20	3.62	0.28	1.00	15.19

Of the ten samples, only one ship met the criteria, namely KMN. Minasate'ne. KMN Minasate'ne will be used as a role model for redesigning the lines plan of purse seine ships in South Sulawesi

In general, purse seines in South Sulawesi have a V-bottom body shape at the bow. From the midship to the stern, the hull has two forms, namely, round bottom and U-V flat bottom.

Purse Seine Ship Line Plan in South Sulawesi

Lines plan (line plan) of a ship is a plan drawing of the ship's line on each water line and ivory which is contained in three drawings, namely: a ship's section view from the side, (profile plan), top view (half breadth plan), and view front (body plan). In this figure, the ship is divided into 10 longitudinal ordinates along the hull (after perpendicular to fore perpendicular), the line plan image is divided into five water lines from the base line to the highest draft (d) (load water line).

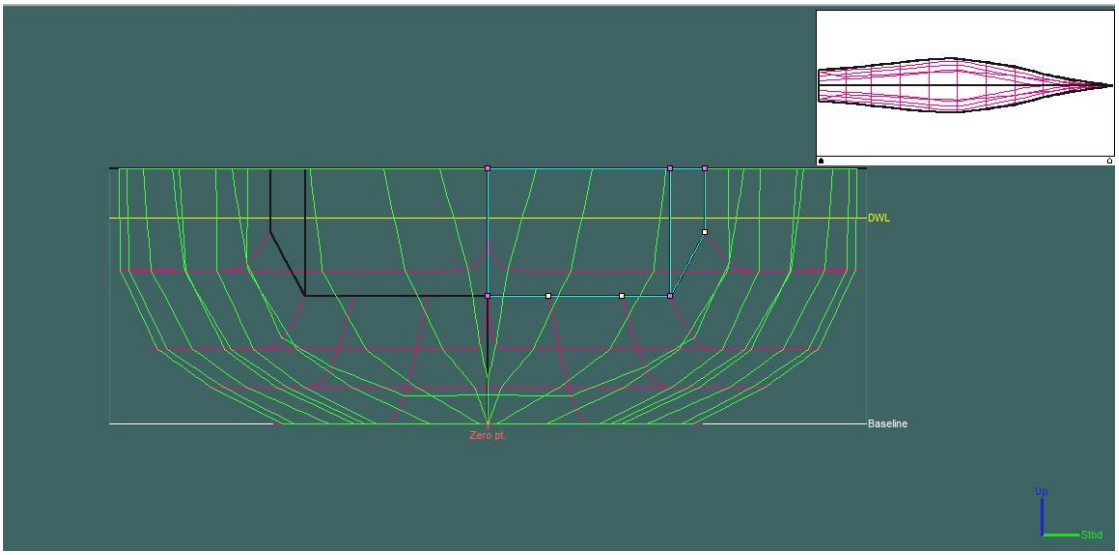


Figure 1. Body Plan

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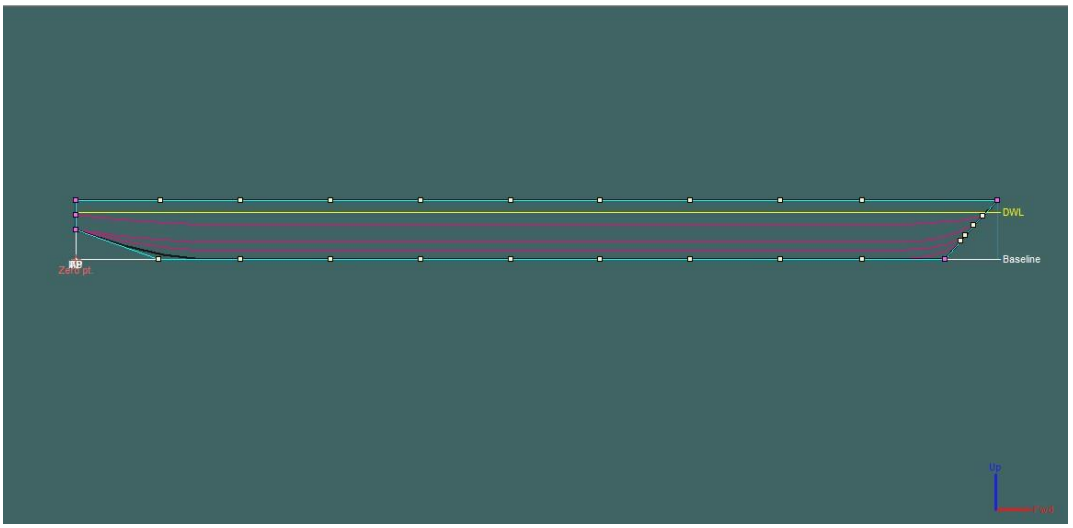


Figure 2. Profile Plan

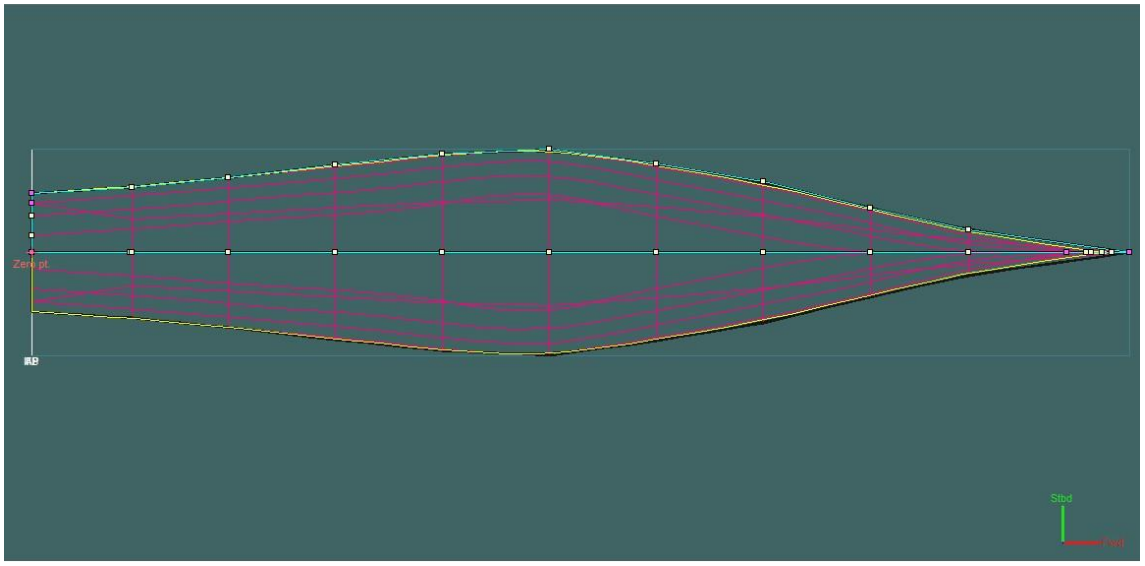


Figure 3. Half Breadth Plan

Hydrostatic Data of Purse Seine Ship in South Sulawesi

Hydrostatic parameters are values that describe the static performance of ships consisting of the value of displacement volume (V), ton displacement (Δ), water plan area (Aw), mindship area (Ao), coefficient of fineness (Cb, Cp, Cvp, Co, Cw) ton per centimetrer immersion (TPC), Longitudinal centre of buoyancy (LCB), virtual distance of buoyancy center (KB), vertical metacentre radius (KM) and longitudinal (KML). These values are obtained based on the offset value of the purse seine vessel.

The purpose of the Hydrostatic value is to provide an overview of changes in the hydrostatic value of each ship's waterline (draft). The hydrostatic value can be seen in the picture below.

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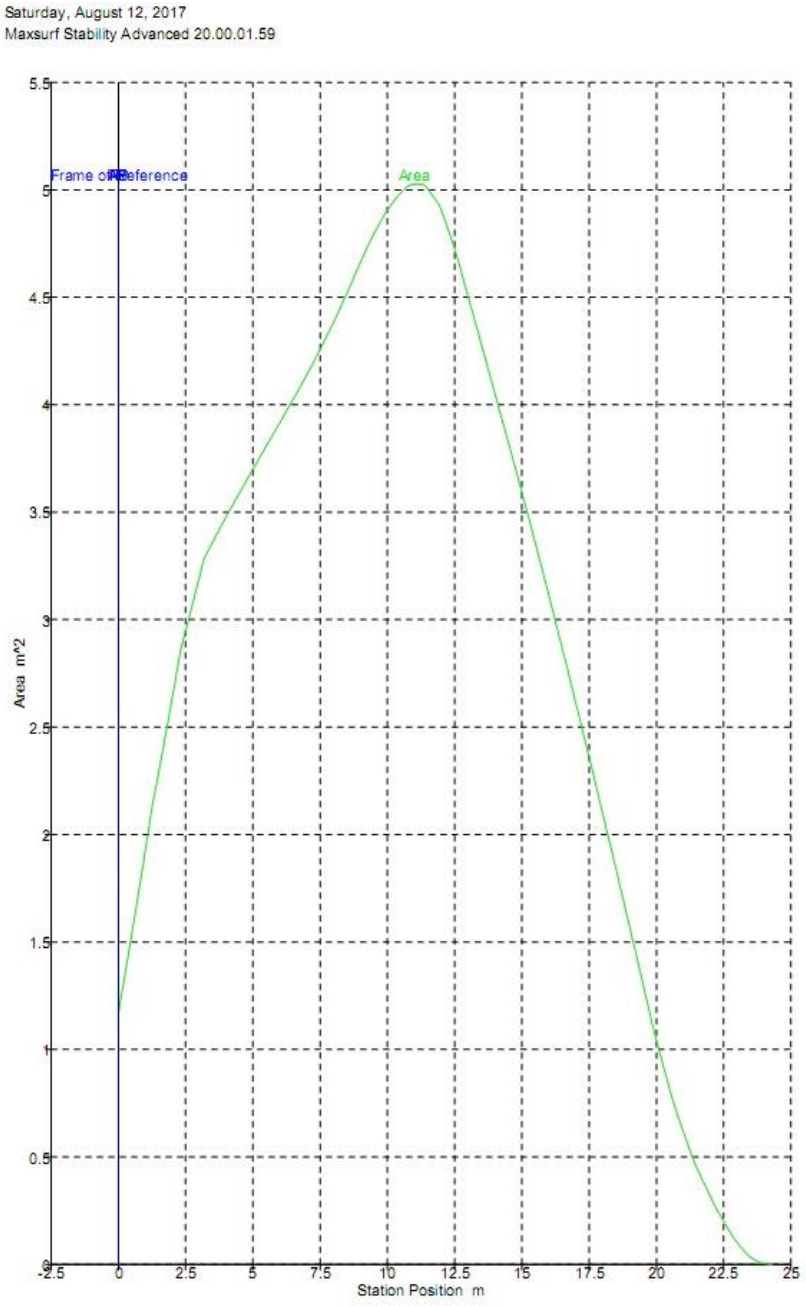


Figure 4. MSD area

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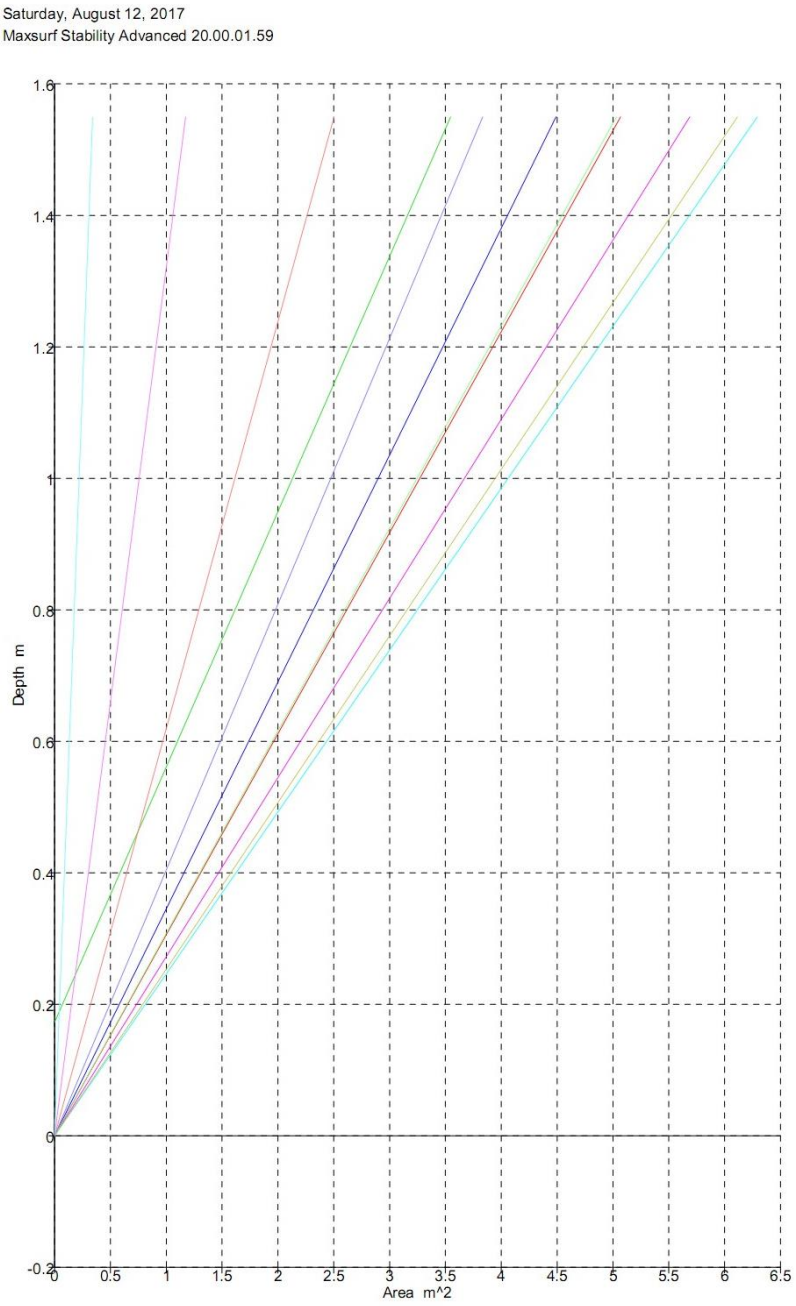


Figure 5. Bonjean curve

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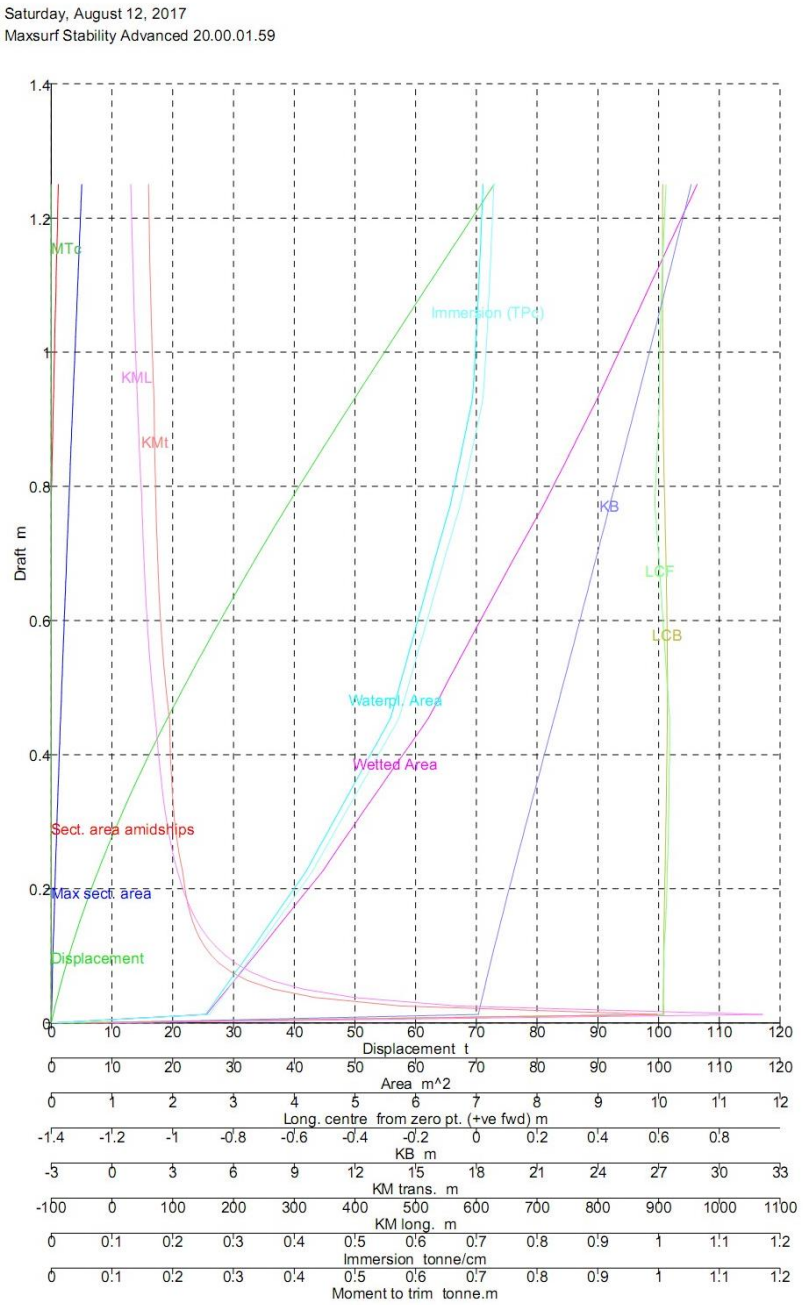


Figure 6.Hydrostatic Curve

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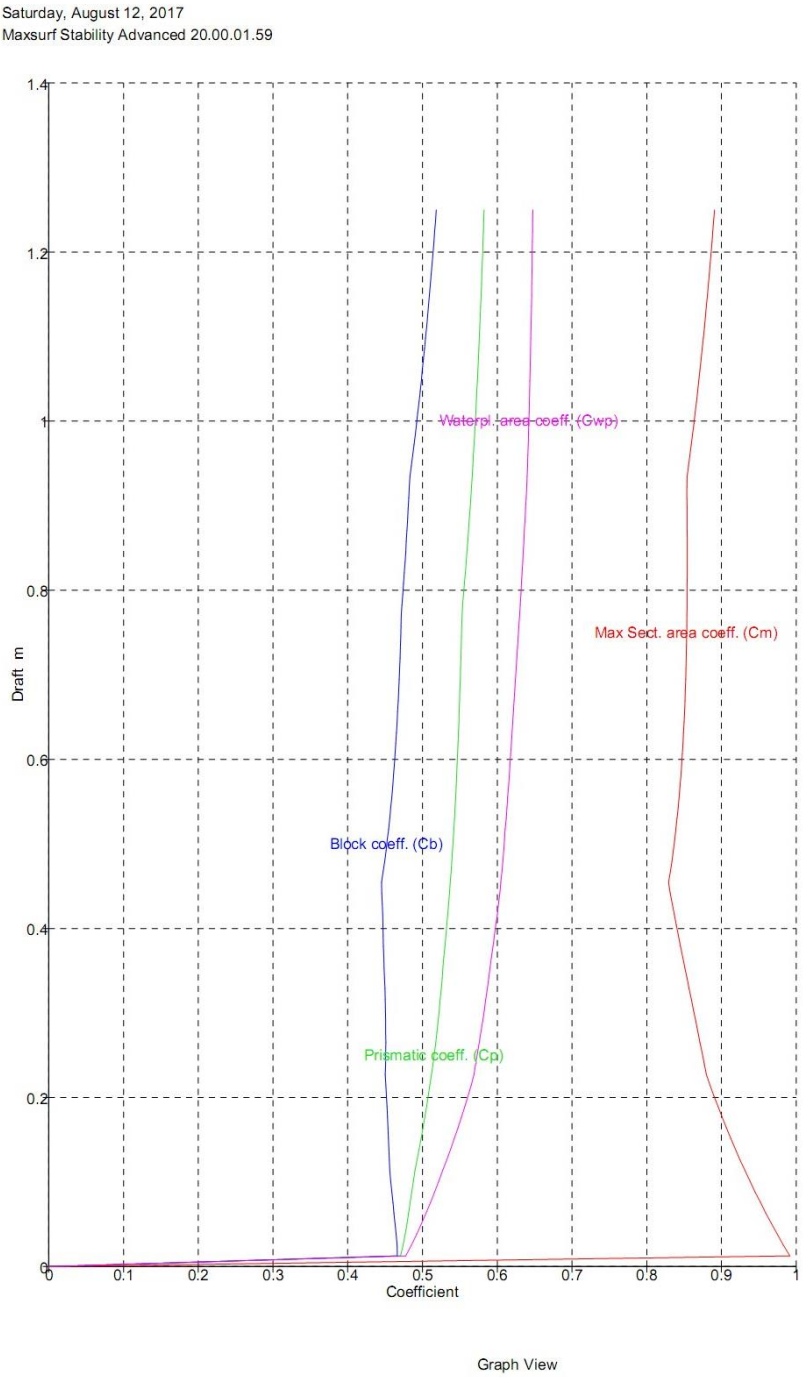


Figure 7. . Hydrostatic Curve (coefficient fineness)

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Conclusion

The results of the purse seine ship design analysis are based on the analysis of the main dimensions, hydrostatic parameters, ship resistance, motion and ship stability, namely The shape of the ship's hull on the bow forms a letter / model "V-bottom", and in the midship to stern has two forms of ship hulls, namely, Round bottom, and U-V flat bottom.

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