Design of Fishing Boat for Pelabuhanratu Fishermen as One of Effort to Increase Production of Capture Fisheries

To cite this article: Iswadi Nur and Purwo Joko Suranto 2018 J. Phys.: Conf. Ser. 962 012009

View the article online for updates and enhancements.
Design of Fishing Boat for Pelabuhanratu Fishermen as One of Effort to Increase Production of Capture Fisheries

Iswadi Nur¹, Purwo Joko Suranto¹
Study Program of Naval Architecture¹, Engineering Faculty of UPN "Veteran" Jakarta
Email: iswadinur62@gmail.com

Abstract Design of fishing boat for Pelabuhanratu fisherman as one of effort to increase production of capture fisheries. The fishing boat should be proper for the characteristic of its service area, as capacity of fishing boat up to 60 GT, the fishing boat has minimum 6 fish holds and location of fish hold in the middle body, the fishing boat hull has the bilge keel plate, and the material of hull fishing boat to be made of wooden, steel, aluminium, or fiberglass. Main dimension of fishing boat is Length Over All = 25.436 m, Breadth = 4.55 m, Draft = 1.6 m, Speed = 12.5 knots. The research had been known every thing that will be supporting the production of capture fisheries like; amount of fish production = 25.030 ton per day, the fishing port capacity approximately 268.957GT per day, the area of fishing port < 30 hectares, the zone of fish processing industry had not completed, therefore all data research result less than standard of Oceanic Fishing Port. So Pelabuhanratu National Fishing Port can not be changed to Oceanic Fishing Port.

Keyword : fishing boat, national fishing port, oceanic fishing port

1. Introduction
Design of fishing boat for Pelabuhanratu fisherman as one of the effort to increase production of capture fisheries. The research have to know ev ery thing that will be supporting the production of capture fisheries like; type of fishing boat fleet, total fishing boat capacity, service area, quay wall facility, port quay dimension, deep of sea water, total fish production, fishing port capacity, quality assurance facility of fish production, area of fishing port, and zone of fish processing industry, that all based on standard of Oceanic Fishing Port. Because there were several issue of news before that Pelabuhanratu National Fishing Port can be changed to Pelabuhanratu Oceanic Fishing Port, but it should be proper to the class characteristic regulation of KKP number 16, 2006. Related to the fishing boat that should be proper to the characteristic of its service area, so capacity of fishing boat, minimum speed, minimum fish holds, location of fish hold, stability of fishing boat, and the material of hull fishing boat like wooden, steel, aluminium, or fiberglass. Type of general arrangement should be suitable for fishermen culture, especially type of stem, location of deck house. Based on 4 class characteristic regulation of KKP number 16, 2006, therefore Indonesia has 6 Oceanic Fishing Port, 15 National Fishing Port, 44 Beach Fishing Port, and least 937 Fish Landing Quay

1.1. Research Objective
Design of fishing boat for Pelabuhanratu fishermen as one of the effort to increase production of capture fisheries.

2. Literature Study
Indonesia is archipelago country and Indonesia has many extraordinary resources as; 17480 islands, 95.181 km beach line, 5.8 million km² sea water area, that is consist of 3.1 million km² territorial ocean, and 2.7 million km² ZEE ocean, Lukito detiknews.com, 2009. In the ZEE ocean has many
important recourses like various of fish, coral, minning, maritime tourism destination, etc, thereof many important recourses will come up foreign exchange. Pelabuhanratu National Fishing Port has been landed up to 100 GT fishing boat, and production of capture fisheries come from tuna, yellow fin tuna, big eye tuna, albacora tuna, southern blue fin tuna, longtail tuna, eastern little tuna, bullet tuna, frigate tuna, cakalang, shrimp, etc, thereof of many recourses of fish will come up foreign exchange from foreign countries like Korea, China, Japan, etc.

2.1. Based on Regulation and Research Before

2.1.1. Abbas Salim, 2005, Many factors should be attention and consideration to development the fishing port as:

a. Growth of local economic of local government (hinterland) come from its port.

b. Growt of industry sector come from local government (hinterland)

c. Forcasting and Analysis data of commodities circulation.

d. Type and capacity of fishing boat that will come out to the port

e. Networking of train track and outer ring road to the port

f. Impact of port savety and environment

g. Analysis of economic and finance

2.1.2. The class characteristic regulation of KKP, number 16, 2006 for the oceanic fishing port. It has several condition, as: the fishing vessel fleet have service area in the ZEE territorial and the international Ocean, the quay wall facility > 60 GT, the port quay dimension has length > 300 m and deep of sea water > 3 m, amount of fish production 60 ton per day, the fishing port capacity > 6000 GT per day, it has the quality assurance facility of fish production, the area of fishing port > 30 hectares, it has the zone of fish processing industry

3. Research Method

Figure 1. Fishbone of Research Method
4. Calculation and Conclusion

Total Outboard Boat & Inboard boat frequency of Come Out

Table 4.1 : Total Boat Frequency of Come Out (0 – 50 GT)

| No | Type of Boat | Boat Frequency of Come Out (Boat/Year) | Capacity (GT/Year) | Capacity (GT/day) |
|----|--------------|---------------------------------------|--------------------|-------------------|
| 1  | Outboard Boat 2.5 GT | 20,962 | 52,405 | 143,575 |
| 2  | Inboard Boat 5 – 10 GT | 3,548 | 26,610 | 72,904 |
| 3  | Inboard Boat 10 – 20 GT | 47 | 705 | 2 |
| 4  | Inboard Boat 20 – 30 GT | 198 | 4,950 | 13,561 |
| 5  | Inboard Boat 30 – 50 GT | 50 | 2,000 | 5,479 |
|    | Total        | 24,805 | 86,670 | 237,519 |

Table 4.2 : Total Boat Frequency of Come Out (50 – 200) GT

| No | Kind of Boat | Boat Frequency of Come Out (Boat/Year) | Capacity (GT/Year) | Capacity (GT/day) |
|----|--------------|---------------------------------------|--------------------|-------------------|
| 1  | Inboard Boat 50 – 100 GT | 61 | 4,575 | 12,534 |
| 2  | Inboard Boat 100 – 200 GT | 46 | 6,900 | 18,904 |
|    | Total        | 107 | 11,475 | 31,438 |

Based on calculation data on table 4.2, thereby total inboard boat of 50 – 200 GT frequency of come out is very little, so local governance should be help Pelabuhanratu fisherman in order they have 60 GT fishing boat, its mean that the local government should be support to Pelabuhanratu fishermen to increase the fish production of capture fisheries. One of Pelabuhanratu fishermen said that ZEE area have not been exploited by Pelabuhanratu fisherman, but it have been exploited by Kalibaru fishermen come from Noth Jakarta, because they have 60 GT fishing boat

Table 4.3. Average production of capture fisheries for 3 years

| no | Month | 2013   | 2014   | 2015   |
|----|-------|--------|--------|--------|
| 1  | Januari | 637,257 | 941,617 | 1,048,216 |
| 2  | Februari | 439,013 | 619,133 | 514,008 |
| 3  | March  | 329,656 | 582,889 | 436,176 |
| 4  | April  | 469,653 | 701,496 | 572,952 |
| 5  | Mei    | 853,987 | 1,074,079 | 914,047 |
| 6  | Jun    | 945,444 | 1,240,977 | 1,168,243 |
| 7  | July   | 696,582 | 1,027,744 | 1,312,412 |
| 8  | August | 395,329 | 410,135 | 621,668 |
| 9  | September | 600,024 | 717,588 | 703,195 |
| 10 | October | 976,085 | 985,647 | 785,104 |
| 11 | November | 753,449 | 873,037 | 551,916 |
| 12 | December | 832,594 | 1,182,681 | 494,383 |
|    | Total   | 7,929,073 | 10,357,023 | 9,122,320 |
Data source: The Annual Statistical Report Capture Fisheries Year 2015
Average production of capture fisheries = \[\text{Average production of capture fisheries} = \frac{P_{\text{Prod.2013}} + P_{\text{Prod.2014}} + P_{\text{Prod.2015}}}{3}\] kg/year
Average production of capture fisheries = \[\frac{7,929,073 + 10,357,023 + 9,122,326}{3} = 9,136,138.667\] kg/year
Average production of capture fisheries = \[\frac{27,408,416}{3} = 9,136,138.667\] kg/year
Average production of capture fisheries = \[\frac{250,030.516}{3} = 9,136,138.667\] kg/year
This calculation result = 250,030.516 kg/day is less than standard of oceanic fishing port = 60 ton per day

Table 4.4. The concept design of fishing boat for the Pelabuhanratu fisherman, it should be suitable from the characteristic of Pelabuhanratu ZEE ocean, as:

| No. | Subject Research | Ship Design Consideration |
|-----|------------------|--------------------------|
| 1.  | Fishing Boat Capacity ≥ 60 GT | The fishing boat capacity ≥ 60 GT, it means the fishing boat should be operated in ZEE sea area, where it has many fish resources will come up foreign exchange. |
| 2.  | The main dimension of fishing boat ≥ 60 GT | This fishing boat main dimension for 60 GT capacity, should be many correction like stability, trim, manouvering, and main dimension ratio. If L/B ratio is expand, therefore the fishing boat has bad manouvering, on the other side if L/B ratio is small, the fishing boat has good manouvering. If L/H ratio is expand, therefore the fishing boat has bad hull strength, on the other side if L/H is small, the fishing boat has good hull strength. If H/T ratio is expand, therefore the reserve displacement should be increased, on the other side if H/T ratio is small, the reserve displacement should be decreased. |
| 3.  | The minimum speed = 12.5 knots | This minimum speed is dicided in order to speed up the operational voyage to ZEE area. |
| 4.  | The fish hold is in the middle ship, and it has 6 numbers of fish hold. | The fish hold is in the middle ship, it means that the draft immersion of fishing boat should be even keel. The fishing boat has 6 numbers of fish hold, therefore the fishing boat has many bulkhead of fish hold. This bulkhead will protect the fish from ship motion. |
| 5.  | Amount of fishermen on boat = 20 – 30 persons | Amount of fishermen on boat should be suitable of general arrangement layout or boat capacity. |
| 6.  | Hull of boat should be installed the bilge keel | The function of bilge keel will retard the rolling period of fishing boat, therefore the fish in cold storage will save from rolling motion. The fish will not shake from rolling motion. |
| 7.  | Material of boat made of steel, wooded, or fiberglass. | Selection material of fishing boat should be depended many matters as; the fishermans culture for maintaining hull boat, cost consideration, boat material life time consideration, and boat material strength. |
| 8.  | Type of general arrangement based on result of observation in many local government of Indonesia. | General arrangement should be suitable form fisherman culture, especially type of stem. The super structure or deck house of fishing boat to be on after deck, the store hold to be in fore hull of fishing boat, and the engine room to be in after hull of fishing boat. |
9 The General Arrangement of 60 GT fishing boat, see figure 2
   Loa = 25.436 m, B = 4.55 m, H = 2.60 m, T = 1.60 m

10 The Lines Plan of 60 GT fishing boat, see figure 3
   Loa = 25.436 m, B = 4.55 m, H = 2.60 m, T = 1.60 m

|   |   |
|---|---|
| 9 | The General Arrangement of 60 GT fishing boat, see figure 2 |
|   | Loa = 25.436 m, B = 4.55 m, H = 2.60 m, T = 1.60 m |
| 10 | The Lines Plan of 60 GT fishing boat, see figure 3 |
|   | Loa = 25.436 m, B = 4.55 m, H = 2.60 m, T = 1.60 m |

Figure 2. General Arrangement of Fishing Boat

Figure 3. Lines Plan of Fishing Boat

4.1 Conclusion
a. The result of research had many factors that had not been proper to the KKP regulation, as; amount of fish production = 25.030 ton per day, the fishing port capacity approximately 268.957 GT per day, the area of fishing port < 30 hectares, the zone of fish processing industry had not completed, so Pelabuhanratu National Fishing Port can not be changed to Pelabuhanratu Oceanic Fishing Port
b. Fishermen Group of Pelabuhanratu Nasional Fishing Port have the fishing boat fleet, but generally the capacity of fishing boat is ≤ 30 GT. The various of fish that have been captured as; yellow fin tuna, big eye tuna, albacora tuna, southern blue fin tuna, longtail tuna, eastern little tuna, bullet tuna, frigate tuna, cakalang, shrimp.
c. The area of Pelabuhanratu fishing boat to be ZEE ocean that more than 50 sea mile from the beach line. Pelabuhanratu ZEE has many important recources of fish. ZEE area have not been exploited
by Pelabuhanratu fisherman, but it have been exploited by Kalibaru fishermen, they come from Noth Jakarta, because they have 60 GT fishing boat.

d. The local governance should be help Pelabuhanratu fishermen in order they have 60 GT fishing boat, it means that the local government should be support to increase the production of capture fisheries.

e. The main dimension of fishing boat of Pelabuhanratu fishermen is: Fishing boat capacity ≥ 60 GT, Length Over All = 25.436 m, Breath = 4.55 m, Draft = 1.6 m, Speed = 12.5 knots, Inboard Machineries System, Handline Fish Capture Appliances, 6 Cold Storage in the middle area, The Fishing Boat has Bilge Keel, Amont of fisherman = 20 – 30 persons.

5. References :

[1]. Aep Saepurahman, Pengembangan Pelabuhan Perikanan Di Pelabuhan Ratu, 2012, Hasil Penelitian. (Aep Saepurahman, Development of Fishing Port of Pelabuhanratu), Research Report (unpublished)

[2]. Baheramsyah, Kementerian Kelautan Dan Perikanan Soroti Perkembangan Perikanan, 2012, www.infopublik.kominfo.go.id (Baheramsyah, Ministry of Marine and Fisheries Attention to Fisheries Development), 2012, www.infopublik.kominfo.go.id

[3]. Daniel dkk, Model Pengembangan Industri Perikanan Berbasis Pelabuhan Perikanan di Makassar Sulawesi Selatan, 2011, Jurnal Penelitian UMI Makassar. (Daniel et all, Development Model of Fishery Industry Base on Fishing Port in Makasar South Celebes), 2011, Researh Jurnal of UMI Makasar.

[4]. Helmi Yusuf dkk, Dampak Pengembangan Pelabuhan Perikanan Terhadap Penyerapan Tenaga Kerja Dan Pendapatan Masyarakat, 2005, www.jurnal.ipb.ac.id (Helmi Yusuf et all, Impact of Fishing Port Development for Absorption Labor and People Income), 2005, www.jurnal.ipb.ac.id

[5]. Kementerian Kelautan dan Perikanan, Pusat Informasi Pelabuhan Perikanan (PPIP), April 2015 (Ministry of Marine and Fisheries Fishing, Port Information Centre), April 2015

[6]. Kementerian Kelautan dan Perikanan Profil Pelabuhan Perikanan Nusantara Pelabuhanratu, 2009, www.kkp.go.id (Ministry of Marine and Fisheries, Profile of Pelabuhanratu National Fishing Port), 2009, www.kkp.go.id.

[7]. Kementerian Kelautan dan Perikanan, Profil Pelabuhan Perikanan Samudera Nizam Zachman Jakarta, 2012, www.kkp.go.id (Ministry of Marine and Fisheries Profile of Nizam Zachman Jakarta Oceanic Fishing Port), 2012, www.kkp.go.id.

[8]. Kementerian Kelautan dan Perikanan, Peraturan Menteri Kelautan dan Perikanan nomor: Per.16/Men/2006, Tentang Pelabuhan Perikanan (Ministry of Marine and Fisheries, Regulation of Minister of Marine and Fisheries Number: 16/Men/2006, about Fishing Port)

[9]. Keputusan Menteri Perhubungan nomor: KM 53 Tahun 2002, Tentang Pelabuhan Nasional (Ministry of Transportation Number : 53, Year 2002, About National Port)

[10].Kementerian Kelautan dan Perikanan, Peraturan Menteri Kelautan dan Perikanan nomor 2 tahun 2015, tentang Larangan Penggunaan Alat Penangkap Ikan (API) Pukat Hela (Trawl) dan Pulat Tarik (Seine Nets) di Wilayah Pengelolaan Perikanan Negara Republik Indonesia. (Ministry of Marine and Fisheries, Regulation of Minister of Marine and Fisheries Number 2 Year 2015, About Warning to Fishing Gears for The Trawl and The Seine Nets in Ocean of Indonesia).

[11].Peraturan Menteri Kelautan dan Perikanan nomor 56 tahun 2014, tentang Pelarangan Berlayar Bagi Kapal Eks Asing (Ministry of Marine and Fisheries, Regulation of Minister of Marine and Fisheries Number 56 year 2014, About Warning to Voyage of Secondhand Fishing Boat From Abroad)

[12].Pelahun Perikanan Nusantara Pelabuhanratu, Buku Laporan Tahunan Statistik Perikanan Tangkap Tahun 2015 (Pelabuhanratu National Fishing Port, The Annual Statistical Report Capture Fisheries Year 2015)
[13]. Pramudya Edy dkk, Analisis Efisiensi Pelabuhan Perikanan Dan Strategi Pengembangan Pelabuhan Perikanan Samudera Cilacap, 2006, Universitas Diponegoro, Semarang (Pramudya Edy et al, Efficiency Analysis of Fishing Port and Development Strategy of Cilacap Oceanic Fishing Port), Diponegoro University, Semarang (unpublished)

[14]. Rizald Max Rompas, Garis Pantai RI Terpanjang Keempat Di Dunia, 2009, www.antaranews.com dan www.goblue.or.id (Rizald Max Rompas, Indonesia Has Beach Line 4th Longest in The World, 2009, www.antaranews.com and www.goblue.or.id)

[15]. Salim H.A. Abbas Manajemen Pelayaran Niaga Dan Pelabuhan, 2005, Cetakan Kedua, Dunia Pustaka, Jakarta. (Salim H.A. Abbas Management of Trading Shipping and The Ports), 2005, Second Edition, Dunia Pustaka, Indonesia.

[16]. Kementerian Kelautan dan Perikanan, UPT Dirjen Perikanan Tangkap, 2012, www.kkp.go.id. (Technical Implementation Unit Directorate General of Capture Fisheries, List of Indonesia Fishing Port). 2012, www.kkp.go.id.
CURRICULUM VITAE

Personal
Name : Iswadi Nur, born in Langkat North Sumatera, 24 February 1962

Educational:
Bachelor 3 years of Naval Architecture of Maritime Academic of UPN ”Veteran” Jakarta
Bachelor 4 years of Naval Architecture of Darma Persada University Jakarta.
Magister of Sea Transportation of Institute of Sepuluh Nopember Surabaya

Lecturer Experiences:
Lecturer of Naval Architecture Study Program of Engineering Faculty UPN ”Veteran” Jakarta since 1993. Subject lecture ; Ship Design, Ship Vibration, Production & Operation Management.

Job Experiences
Secretary of Naval Architecture Department, Head of Naval Architecture Department, Vice Dean Of Academic Affair