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The Study of Port Capacity Development Plan In Wosu

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The Study of Port Capacity Development Plan In Wosu

M P Hatta[1], R Karamma[1] and H Fazry[2]

[1] Associate Professors, Department of Civil Engineering, Faculty of Engineering, Universitas Hasanuddin, Gowa, Indonesia
[2] Student, Department of Civil Engineering, Faculty of Engineering, Universitas Hasanuddin, Gowa, Indonesia Indonesia

*corresponding author: mukhsan_hatta@yahoo.com

Abstract. The development of the Wosu Port will be able to stimulate inter-regional trade and reduce logistics costs because goods from other islands to be marketed in Morowali Regency against agricultural goods from the hinterland of Wosu Bungku Barat Port can be sent directly to other islands. For this reason, data collection is needed so that it can be analysed for capacity development of Wosu Port. The purpose of this study is to determine the layout (lay out) of the Wosu Morowali Port and shipping lanes that are adjusted to the size of the draft ship plan, to determine the type and dimensions of the dock that are in accordance with the conditions in the Wosu area. The method used in this research is to conduct a field survey to collect primary data and secondary data obtained from websites that are processed using Ms Excel, Autocad, Ocean Data View. By knowing the topography, hydro-oceanography and economic data, alternative port development can be determined. This research produces topographic-bathymetric maps, water zoning maps, land and water DLKr / DLkp designs, short-term port development layouts where the planned jetty is a jetty which has a trestle length = 70 m and a width = 8 m having a pier floor elevation = 2 m and in areas with a depth of 10-15 m to allow general passenger / cargo ships (GT / DWT 500-1000 Ton) to dock.

1. Introduction

Port is a place consisting of land and waters around it with certain boundaries as a place for government activities and economic activities that are used as a place for ships to dock, dock, board and disembark passengers and / or load and unload goods, equipped with shipping safety facilities and port support activities. as well as a place of transfer between and between modes of transportation (National Harbor Order, Decree of the Minister of Transportation Number KM 53 of 2002) [1,5]. The development of Wosu Bungku Barat Port will be able to stimulate inter-regional trade and can reduce logistics costs because goods from other islands that will be marketed in Morowali Regency against agricultural goods from the hinterland of Wosu Bungku Barat Port can be sent directly to other islands. Wosu Bungku Barat Port can contribute to the smelter industrial area in Bahodopi.

In line with the increase of population number and the economic development, the land needs for non-agricultural activities tends to develop [2,3]. This trend makes the conversion of agricultural land difficult to avoid. Several cases show that if a land use change occurs, in a short time the surrounding land will also change its function progressively. This is caused by three factors. First, the construction of a residential or industrial area in a conversion land location, accessibility in that location becomes increasingly conducive to industrial and residential development, which ultimately encourages a huge

demand for land by other investors or land speculators so that the price of the surrounding land also increases [4]. Secondly, the increase in land prices can further stimulate other farmers in the vicinity to sell land. Third, the stakeholders who are purchasing land are usually not local residents, resulting in the formation of Guntai lands which are generally vulnerable to the process of the land conversion [6]. The purpose of this study is to determine the layout (lay out) of the Wosu Morowali Port and shipping lanes that are adjusted to the size of the draft ship plan, to determine the type and dimensions of the dock that are in accordance with the conditions in the Wosu area.

2. Research Methodology

2.1. *Location*

West Bungku Subdistrict is one of the sub-districts that are located in the middle of the Poso-Bungku Poros. The area of West Bungku Subdistrict is 758.93 km² or 13.87 percent of the total area of Morowali Regency. Morowali Regency which has a geographical location is at the position of 1 ° 31'12 "- 3 ° 46'48" South Latitude and 121 ° 15'36 "- 123 ° 15'36" East Longitude. The land area of Morowali is 5472.0 Km². West Bung Subdistrict's topography consists of land 58.5 percent, hills 19.5 percent, and mountains 22 %. The capital of West Bungku Subdistrict is Wosu, while the number of coastal and non-coastal villages in West Bungku subdistrict, namely nine coastal and 1 (one) village is not a coastal area. Sea breezes that are very influential in West Bungku, namely the East Wind and the South Wind, with the presence of global climate change, the wind season is uncertain. The current facility at Wosu Port is a port office that is no longer in operation.

Figure 1. Location of the beach Wosu Kec. West Bungku Kab. Morowali

2.2. *Research Variables*

Topographic measurements are carried out along the coast or along the Coastal Protection Area Unit and as wide as the coastline (taken 30 ha of land area) which includes the coast in the Wosu area. Before starting the survey activity, first a field orientation was carried out. Field orientation activities carried out consist of:

1) Report to local government
2) Coastline tracing.
3) Reference point determination.
4) Testing measuring tools.
5) Preparation of facilities and infrastructure that support measurement work.

2.3. *Type and Data Source*

It is hoped that the Wosu Port Planning Technical Survey will improve the results of research which is an important part of port development in the future. The research method used in this study is primary

data collection with the field investigation method, and secondary data processing with analysis methods, and data analysis using the help of computer / software applications. To get good and directed results, work steps are made to be carried out in the form of a flow chart as in the following figure 2.

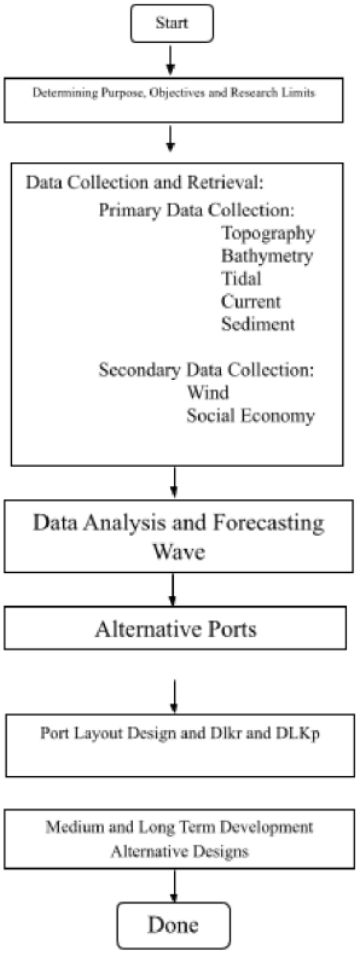

Figure 2. Flowchart of Methodology

Measurement of the flat slice is carried out at each stake and BM, the measurement method is by means of a double stand, the implementation of measurements is tied to the binding (leveling) of BM on the tidal peilschaal. The method used in this measurement is the raai method. The data taken is the position of roads, houses, rivers, coastal boundaries, the position of the existing port, the density point ± 25 m. Bathymetry measurements use the GPSmap Sounder tool where the elevation of the sea depth and the coordinates of the elevation points are taken, tracking is also carried out to obtain a depiction of the path from the bathymetric measurements. The bathymetry survey was carried out with

measurement lines taken at 25-50 meters intervals with a save tracking interval every 10 meters. During bathymetry measurements, tide observations were made every 10 minutes as depth correction. The tide observation itself is tied to the elevation of all land-based BMs, so that the bathymetry data has the same datum reference as the tide data. It is hoped that the Wosu Port Planning Technical Survey will improve the results of research which is an important part of port development in the future. The research method used in this study is primary data collection with the field investigation method, and secondary data processing with analysis methods, and data analysis using the help of computer / software applications.

3. Result and Discussion

The projection system used for topographic mapping in this work is the Transverse Cylindrical Projection introduced by Mercator and is Universal or called UTM (Universal Tranvers Mercator). This system has been standardized by BAKOSURTANAL as a national mapping projection system. Indonesia's territory is located in 9 zones, namely from zone 46 to zone 54 (the middle meridian is between 93 east longitude and 141 east longitude.

Figure 3. Grid boundary of the UTM Zone in Indonesia

The location of topographical measurements along the coast which is administratively located in the area of Namrole City, the measuring polygon is in the 51M zone. The coordinate system used is the UTM coordinate system, with an ellipsoid of WGS 84. The X and Y coordinates of the reference are used for BM observed using GPS with the static point tracking method. The coordinates are obtained by simple alignment of 1 point and the coordinates of BM 01 are in the UTM zone 51S, X = 371702.00 mE Y = 9740128.00 mS. Furthermore, BM.01 coordinates are propagated to other BM-BM as well as all polygon net benchmarks on land topography.

Figure 4. BM.1 as a reference for the horizontal position

The sea level elevation used as the reference datum is LLWL (Lowest Low Water Level) which is obtained from tidal observations for 15 days. To get the height of BM, the benchmark and BM were tied to the peilschaal. From the tidal observation data, the LLWL value is obtained on peilschaal, so that by determining LLWL = 0.000 m, the height of BM to LLWL will be obtained. 1 BM installed following the polygon path. The value of the coordinates and elevation of BM can be seen in the table 1.

Table 1. Position and elevation of BM

No.	Point Code	UTM coordinates			
		Zone	X (meter)	Y (meter)	Z (meter MSL)
1.	BM.01	51M	371702.00	9740128.00	2.65

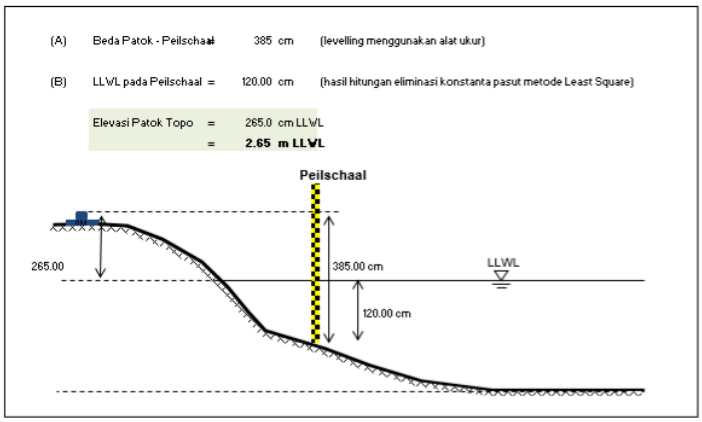

Figure 5. Reference BM to LLWL level

The results of the bathymetric survey which was carried out on 30 June-2 July 2014 using a GPS map Sounder to produce data on the depth of the sea in meters. The low tide level used as reference is the LLWL mean water level, with the LLWL elevation calculated based on the tidal observation data of 15 piantan using the Least Square analysis method.

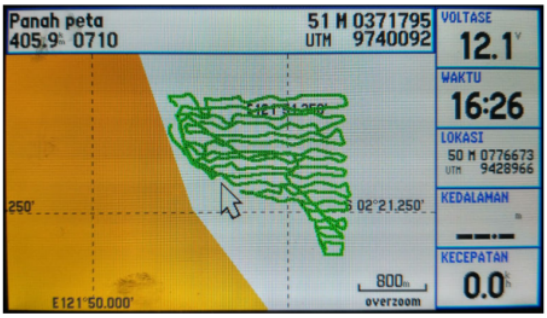

Figure 6. The Port Data of Wosu Beach using **Echo Sounder GPS**

The process of drawing a bathymetric map is carried out in several stages. The result data is transferred from the GPS echo sounder to the computer via the Garmin basecamp software, the coordinates and depth data are then transferred to Ms. software. Excel for depth corrected by MSL ordering. XYZ data from Ms. software. Excel is then processed using Autodesk Land Desktop or Surfer software to draw contour lines based on interpolation of adjacent depth values. The results of the 15-day tide observation (26 July - 9 August 2017) with a time interval of 0.5 hours, with a water level reading based on the zero point reference is the zero point of tide (peilschaal).

Table 2. Tidal observation data for the Port of Wosu

No.	Tanggal	Jam Pengamatan																					
		00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
1	26 Juli 2017	153	200	233	247	238	212	191	163	152	141	145	173	194	220	239	253	253	210	175	125	86	75	77	102
2	27 Juli 2017	133	179	215	232	232	208	198	185	159	139	128	140	175	196	217	244	245	231	201	158	123	107	81	95
3	28 Juli 2017	114	149	181	197	225	220	203	194	176	156	131	124	140	173	193	212	232	228	218	196	157	148	116	102
4	29 Juli 2017	115	137	186	217	231	225	212	203	182	152	128	118	127	145	166	188	207	217	223	202	176	164	140	113
5	30 Juli 2017	119	121	144	169	202	218	214	202	190	180	141	120	118	121	143	165	178	198	213	218	199	174	161	131
6	31 Juli 2017	125	142	161	184	195	209	223	212	199	190	173	145	120	125	117	134	152	177	195	201	212	195	177	163
7	01 Agustus 2017	145	146	159	177	192	204	214	226	221	202	185	163	136	127	119	126	137	157	173	190	207	225	192	168
8	02 Agustus 2017	168	162	157	168	177	197	209	224	223	216	201	181	173	146	126	115	123	131	152	164	178	194	192	180
9	03 Agustus 2017	166	154	137	159	182	200	214	229	226	217	209	183	168	157	128	116	102	117	135	161	177	196	209	215
10	04 Agustus 2017	214	202	187	183	168	169	185	195	206	215	196	185	170	152	142	128	104	108	132	148	168	212	238	214
11	05 Agustus 2017	192	177	168	158	149	135	172	202	202	207	210	220	212	180	160	142	122	108	99	137	170	212	226	219
12	06 Agustus 2017	215	221	234	232	224	216	206	205	181	189	197	217	218	208	194	163	136	112	94	108	122	133	148	157
13	07 Agustus 2017	174	198	220	247	228	202	182	163	148	159	179	204	214	217	217	191	158	128	101	92	101	122	153	168
14	08 Agustus 2017	172	209	229	236	209	192	171	162	152	162	185	198	206	214	222	201	179	140	112	106	99	88	113	149
15	09 Agustus 2017	182	220	238	240	227	204	174	159	147	141	160	184	213	232	235	222	204	156	132	109	92	93	129	161

From the data above, if it is plotted in graphic form, a tidal envelope pattern will appear as shown below.

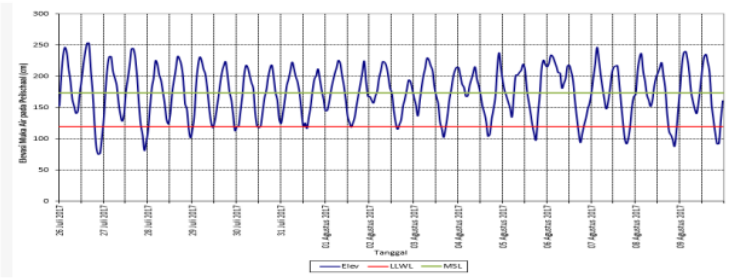

Figure 7. Tide chart for Wosu Harbor

The back area or port hinterland is an important thing to consider in port planning. A port hinterland is the land, infrastructure and population data that a port should cover. To determine the hinterland area of West Bungku Subdistrict to sub-districts in Morowali Regency based on the inter-regional interaction approach, it shows that the sub-districts that have interaction are 4 sub-districts including Bungku Tengah, Bungku Timur, Witaponda and Bumi Raya Districts. Meanwhile, other sub-districts have less interaction

4. Conclusion

Based on the results and discussion of the layout planning for the development of the capacity of the Manga Dua sea port which is located in the UTM zone coordinates UTM 51S, X = 371702.00 mE Y = 9740128.00 mS has been implemented in accordance with the specified work period. After carrying out field data collection and data analysis, the planning and development strategies that can be implemented are planning for cargo and passenger feeder ports for the short term. The planned jetty is a jetty with a trestle length of 70 m. and width = 8 m has a dock floor elevation = 2 m and in an area with a depth of 10-15 m, which allows passenger / general cargo ships (GT / DWT 500-1000 tonnes) to dock.

References

[1] Central Bureau of Statistics 2016 *Morowali Regency in Figures 2016*, CV. Rio, Morowali
[2] Central Bureau of Statistics 2016 *West Bungku District in Figures 2016*, CV. Rio, Morowali
[3] Triatmodjo B 1996 *Pelabuhan, Beta Offset*, Yogyakarta.
[4] Triatmodjo B 2010 *Port Planning, Beta Offset*, Yogyakarta.
[5] Murdiyanto B 2004 *Fishing Port. Department of Fisheries Resource Utilization*. Faculty of Fisheries and Marine Science. Bogor Agricultural Institute.
[6] Aldin M 2014 *Final Project Planning for Alternative Safety Building for the Beach, Normale, District*. South Buru - Maluku, Hasanuddin University, Makassar.

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