Building Standardized Bidding Template for Jetty/ Pier Project as the Basis for Database Automation [1, 2]

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ABSTRACT

This paper aims to improve the management of jetty/pier construction projects at Pertamina Patra Niaga by addressing persistent issues of project cost and schedule overruns. The key research questions focus on identifying the most effective format for bidding templates and determining the necessary information to ensure accurate bids that reflect site-specific conditions. The research employs a comparative approach, benchmarking the company's current practices against the U.S. National Park Service's Class A Cost Estimate Template. The methodology involves evaluating the existing Work Breakdown Structure (WBS) and the bidding process to propose a more standardized and efficient framework. The study concludes that adopting a standardized bidding template aligned with a detailed WBS can significantly enhance project management, reduce cost overruns, improve resource allocation, and streamline communication between contractors and project control. This is expected to serve as a foundation for database automation to improve front-end loading. These findings underscore the need for systematic performance monitoring and the introduction of KPIs to ensure successful implementation.

Keywords: Bidding Template, National Park Services, AACE, Cost Estimation, WBS Structures, Jetty/ Pier Project, OmniClass Table, Coding Structures, Database Automation, Project Management

INTRODUCTION

A. Importance of Jetty/ Pier for Indonesia

Indonesia is the fourth most populous country in the world, with an estimated population of 270 million[3]. Given its vast population, oil and gas continue to be the predominant energy sources across different sectors, with consumption totaling 477.82 million BOE in

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[2] This paper was originally prepared during a 6-month long Graduate-Level Competency Development/Capacity Building Program developed by PT Mitrata Citragraha and led by Dr. Paul D. Giammalvo to prepare candidates for AACE CCP or other Certifications. https://build-project-management-competency.com/our-faqs/
[3] Badan Pusat Statistik. (2021). *Hasil Sensus Penduduk 2020.*

2022[4]. Data on oil final consumption by product in Indonesia from 2000 to 2021 indicates a consistent annual increase in energy consumption[5].

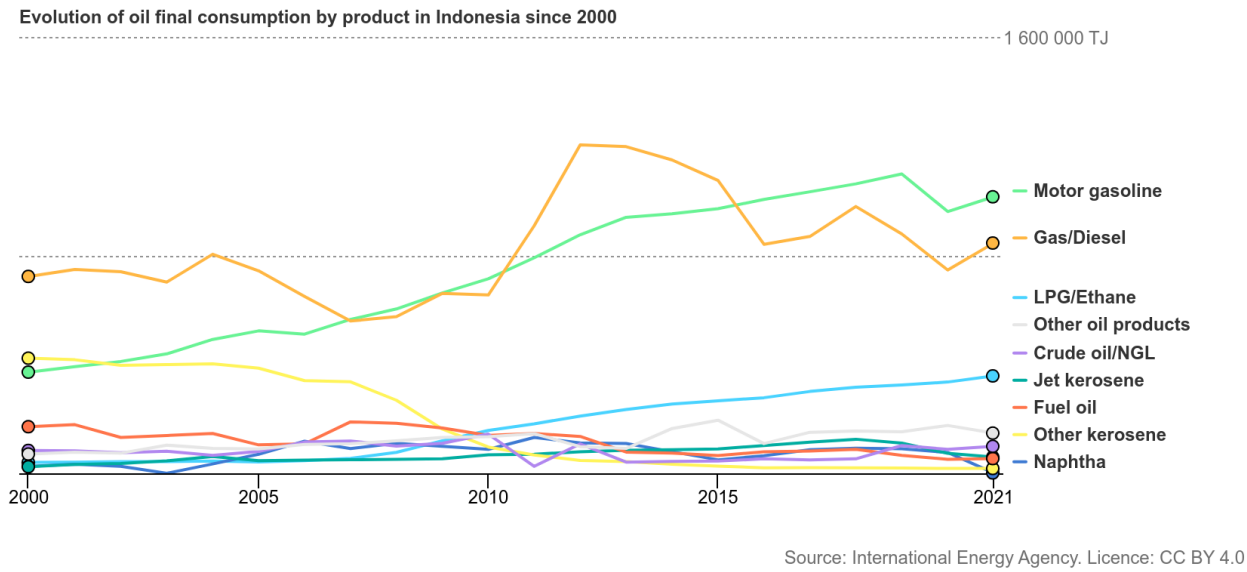

Figure 1 Oil final consumption by product in Indonesia from 2000 to 2021[6]

In addition, Indonesia is one of the world's largest archipelago countries, with approximately 13.558 islands[7] and two-thirds of its area is made up of water[8]. As a result, jetties/ piers are crucial in the oil products supply and distribution chain, with continuous maintenance and the construction of new jetty/pier facilities designed to improve supply reliability across Indonesia. As mentioned above, the rising demand for energy, particularly in oil and gas, significantly impacts investment decisions for jetty/piers development, focusing on increasing supply capacity and extending coverage.

As Indonesia's largest national oil and gas company, Pertamina Patra Niaga plays a crucial role in distributing oil and products across the country. The reliability of jetty facilities in transporting oil products is crucial to ensuring that Pertamina's operations run smoothly. Most jetty/pier types built by the company are Dolphin Jetties. A Dolphin Jetty

[4] Ministry of Energy and Mineral Resources Republic of Indonesia. (2023). *Handbook of Energy & Economic Statistics of Indonesia.*
[5] International Energy Agency. (2021). *Evolution of oil final consumption by product in Indonesia since 2000*. https://www.iea.org/countries/indonesia/oil
[6] International Energy Agency. (2021). *Evolution of oil final consumption by product in Indonesia since 2000*. https://www.iea.org/countries/indonesia/oil
[7] Andréfouët, S., Paul, M., & Farhan, A. R. (2022). *Indonesia's 13558 islands: A new census from space and a first step towards a One Map for Small Islands Policy*. Marine Policy, 135, 104848. https://doi.org/10.1016/j.marpol.2021.104848
[8] Anton Setiawan. (2023, July 26). *Menyiapkan Tata Kelola Laut Berkelanjutan*. https://indonesia.go.id/kategori/ragam-ais-forum-2023/7295/menyiapkan-tata-kelola-laut-berkelanjutan?lang=1

is characterized by its use of dolphins—cylindrical or pile-like structures made from concrete, steel, or other materials. These dolphins are integral to maritime engineering, guiding ships or boats safely into docking areas. Typically, a Dolphin Jetty features a series of these structures arranged strategically to assist with vessel navigation and mooring. The specific design and layout of Dolphin Jetties are tailored to the needs of the terminal where they are used.

Figure 2 Typical Dolphin Pier/Jetty used in Pertamina Patra Niaga[9] [10]

In line with the growing energy demands, to ensure the reliability of these jetty facilities, the company also plans to undertake several strategic projects to construct new jetties and perform maintenance on or retrofit the existing ones. According to the company's plans, 19 new jetties will be built by 2032, with a total capacity reaching 495,500 DWT[11].

On the other hand, according to the paper written by Rizkia Arifani Zain[12], based on the company database, most of the company jetty/ pier projects are behind schedule and over budget. More advanced, "the problem of project overruns in the construction industry is a global phenomenon."[13] KPMG & Australian Institute of Project Management surveys found that in 2022, only around 36 percent of the projects are on budget, and 32 percent are on time[14]. This is getting worse, as in 2020, 40 percent of the projects were delivered on budget, and 42 percent were delivered on time[15].

[9] PT. Pertamina Energy Terminal [@pet.pertamina]. (2023, October 25). Dolphin Jetty. https://www.instagram.com/p/Cy01OItS8zQ/?igsh=MTN3ZHY3dTRpOXBiaw==
[10] Zain, R. A. (2024). *Developing Parametric Modelling for Class 4 Estimate of Pier and Jetty Construction by Analyzing Historical Databases using AI Tools & EVM Techniques*; PM World Journal, Vol. XIII, Issue IV, April.
[11] Task Force Roadmap Infrastruktur – PT Pertamina Patra Niaga. (2022). *Roadmap PIIM (Pertamina Integrated Infrastructure Masterplan) Pertamina C&T 2022-2032*.
[12] Zain, R. A. (2024). *Developing Parametric Modelling for Class 4 Estimate of Pier and Jetty Construction by Analyzing Historical Databases using AI Tools & EVM Techniques*; PM World Journal, Vol. XIII, Issue IV, April.
[13] Sambasivan, M., & Soon, Y. W. (2007). *Causes and effects of delays in Malaysian construction industry*. International Journal of Project Management, 25(5), 517-526. https://doi.org/10.1016/j.ijproman.2006.11.007.
[14] KPMG & AIPM. (2022, November). *The state of project management in Australia 2022*
[15] Ibid

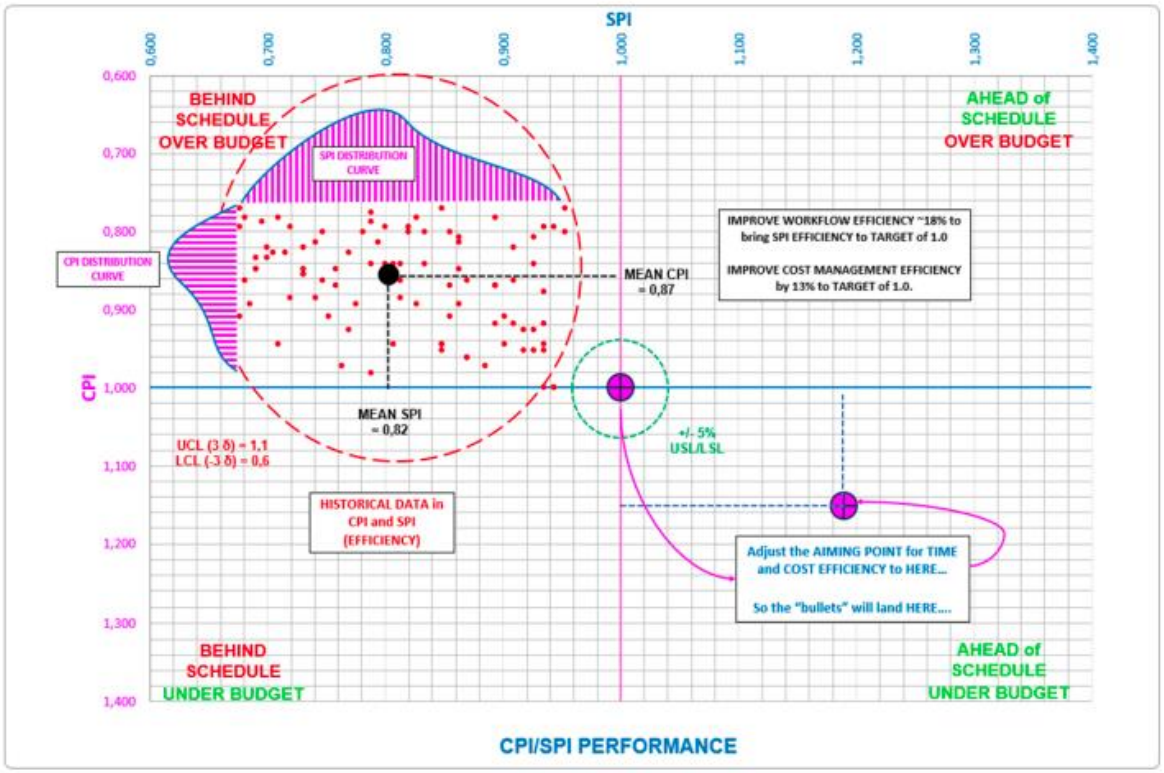

Figure 3 Scatter Plot from Historical Data of The Company Jetty/ Pier Project[16]

Figure 4 Project delivery performance based on KPMG & AIPM Report[17]

[16] Zain, R. A. (2024). *Developing Parametric Modelling for Class 4 Estimate of Pier and Jetty Construction by Analyzing Historical Databases using AI Tools & EVM Techniques*; PM World Journal, Vol. XIII, Issue IV, April.
[17] KPMG & AIPM. (2022, November). *The state of project management in Australia 2022*

Therefore, a strategy for ensuring the projects are managed well, especially pier construction projects, must be implemented. This situation presents a great chance to make the process of designing and keeping track of the new jetty/ pier project easier than before. One of the plans to achieve this, particularly during the planning/designing and procurement phases, is to implement a "Standardized Bidding Template" as a follow-up to the "Standardized WBS Template," making the entire process much more straightforward and efficient.

B. Jetty/ Pier Project Standardized Bidding Template

The author believes that the three things that need to be addressed vehemently are:

1. Standardization of Jetty/ Pier Specification/ Design

The purpose is to minimize the uncertainty in the design of the jetty or pier so that the company can shorten the planning process and determine the necessary specifications more efficiently.

2. Standardized Work Breakdown Structure (WBS) for Jetty/ Pier Project

“WBS is a structure that separates the project into manageable work packages, components or WBS elements to provide a standard mechanism for scheduling scope, costs, distribution of responsibilities, communication, risk assessment, monitoring, and control."[18] A standardized Work Breakdown Structure (WBS) can create a reliable database that can be used for recurring products. This could help reduce one of the leading causes of cost overruns: “Omit Probable Scope from Estimate and Omit Probable Risk from Analysis.”[19]

3. Proper Jetty/ Pier Project Bidding Template

A well-designed bidding template can streamline the estimating process for both the project owner and the contractor. This ensures that the estimated project cost covers all necessary aspects of the project, such as the construction of a jetty/ pier facility. A well-designed bidding template can benefit companies in the following ways:

a. “Project costs can be better managed to stay within previously authorized and appropriate limits.
b. Project costs and scope changes will be easier to manage and track through the planning, design, and construction process.
c. Increasing the reliability of early cost estimates can reduce the redesign necessary to bring projects within budget.

[18] Al Farizi, S., & Latief, Y. (2018). *Development of Standardized WBS (Work Breakdown Structure) For Planning the Schedule Based On Risk In Steel Bridge Construction Projects*. http://www.ieomsociety.org/ieom2018/papers/167.pdf

[19] Giammalvo, P. D., & PTMC (2022). Unit 10 - Managing cost estimating and budgeting. https://build-project-management-competency.com/1-4-1-10-unit-10/

d. Improved estimate documentation may improve review efficiencies and shorter review cycle times.
e. Facilitate development and maintenance of The company's cost database. Which can be used to help plan and estimate future projects."[20]

Steps 1 and 2 above have already been developed and used by the company. Still, until now, for step 3, the company's bidding template for the jetty/ pier projects has not been evaluated or benchmarked against other best practices bidding templates, such as those used by the National Park Service or other top institutions. So, in this paper, the author will build a new standardized bidding template for the jetty/ pier project. It will help the company to adopt "best tested and proven practices" and develop specific recommendations to improve its bidding template.

United States Department of the Interior
National Park Service
Class A Construction Cost Estimate

BID ITEM COST SUMMARY

Project: Oso Comida Trailhead Improvements:
Park: Bear Arbor NRA
Park Alpha: BEAR
PMIS Number: XXXXXX

Estimate By: YtB
Date: 01/12/11
Reviewed By: BBB
Date: 01/17/11

Bid Item Number	Asset / Project Element / Description	Size/Count	Units
BID ITEM 1	Construct Wet Comfort Station	1000	SF

Item No.	WBS	Description	Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Direct Cost/Unit	Total Direct Costs	NET Cost/Unit	Total NET Costs
1	A10	Foundations	$ 30.03	$ 30,028	$ 33.08	$ 33,082	$ 7.29	$ 7,293	$ 70.40	$ 70,402	$ 109.26	$ 109,256
2	A20	Basement Construction - INC. IN FOUNDATION	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
3	B10	Superstructure	$ 15.62	$ 15,622	$ 13.20	$ 13,198	$ 0.46	$ 460	$ 29.28	$ 29,279	$ 45.44	$ 45,438
4	B20	Exterior Enclosure	$ 35.99	$ 35,992	$ 29.48	$ 29,477	$ -	$ -	$ 65.47	$ 65,469	$ 101.60	$ 101,600
5	B30	Roofing	$ 18.47	$ 18,471	$ 8.71	$ 8,706	$ -	$ -	$ 27.18	$ 27,176	$ 42.17	$ 42,174
6	C10	Interior Construction	$ 25.57	$ 25,573	$ 9.31	$ 9,308	$ -	$ -	$ 34.88	$ 34,881	$ 54.13	$ 54,131
8	C30	Interior Finishes	$ 4.48	$ 4,476	$ 13.42	$ 13,424	$ -	$ -	$ 17.90	$ 17,900	$ 27.78	$ 27,778
9	D20	Plumbing Systems	$ 26.65	$ 26,655	$ 16.12	$ 16,121	$ -	$ -	$ 42.78	$ 42,776	$ 66.38	$ 66,383
10	D30	HVAC	$ 1.27	$ 1,269	$ 1.17	$ 1,170	$ -	$ -	$ 2.44	$ 2,438	$ 3.78	$ 3,784
11	D50	Electrical	$ 8.75	$ 8,753	$ 9.37	$ 9,365	$ -	$ -	$ 18.12	$ 18,118	$ 28.12	$ 28,117
12	F20	Selective Building Demolition	$ 0.46	$ 463	$ 1.99	$ 1,990	$ 3.86	$ 3,863	$ 6.32	$ 6,315	$ 9.80	$ 9,800
13	G10	Site Preparation	$ 2.19	$ 2,188	$ 4.36	$ 4,362	$ 6.95	$ 6,952	$ 13.50	$ 13,502	$ 20.95	$ 20,953
14	G20	Site Improvements	$ 8.90	$ 8,900	$ 7.30	$ 7,300	$ -	$ -	$ 16.20	$ 16,200	$ 25.14	$ 25,140
15	G30	Site Mechanical Utilities	$ 86.21	$ 86,213	$ 32.58	$ 32,582	$ 44.54	$ 44,543	$ 163.34	$ 163,337	$ 253.48	$ 253,479
16	G40	Site Electrical Utilities	$ 5.00	$ 5,000	$ -	$ -	$ -	$ -	$ 5.00	$ 5,000	$ 7.76	$ 7,759
17	XX	General Conditions	$ 31.90	$ 31,900	$ 101.20	$ 101,200	$ 18.61	$ 18,610	$ 151.71	$ 151,710	$ 235.44	$ 235,435
18	XX		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
19	XX		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Subtotal Direct Construction Costs	$ 301.50	$ 301,501	$ 281.28	$ 281,284	$ 81.72	$ 81,720	$ 664.50	$664,505	$ 1,031.23	$1,031,229
		Total Value of Government Furnished Property (GFP) Inc. in Direct Cost		$46,000.00		$ -		$ -	$ 46,000	$46,000	In most cases GFP is normally zero - see footnote-	
		Direct Cost Subtotal without GFP	$ 255,501		$ 281,284		$ 81,720			$618,505		
		Design Contingency	2.00%							$12,370	Notes & Comments:	
		Total Direct Construction Costs								$676,875	Building only direct cost = $308.44/sf	
		Standard General Conditions	0.00%	Applied to Total Direct Construction Cost less GFP						$0	Building total NET cost = $474.28/sf	
		Government General Conditions	3.00%	Applied to Total Direct Construction Cost less GFP						$18,926	GFP Septic King Treatment System Pre-Purchased by Government = $46,000	
		Subtotal NET Construction Cost								$695,801		
		Overhead	8.50%							$55,233		
		Profit	10.00%							$64,980		
		Estimated NET Construction Cost								$816,014		
		Contracting Method Adjustment	15.00%							$122,402		
		Inflation Escalation	32	Months	Annual Rate =	3.60%				$92,812		
		Total Estimated NET Cost of Construction								$1,031,229		

GFP costs only apply when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

Figure 5 Example of Bidding Template used by National Park Service (Best Proven Method)[21]

In conclusion, this paper aims to address the following research questions:

1. What is the most effective format for bidding templates for the Jetty/ Pier Project?

[20] National Park Services. (2023). *Construction Cost Estimating Requirements Handbook*. National Park Service (NPS) - Denver Service Center (DSC).

[21] National Park Services. (2023). *Construction Cost Estimating Requirements Handbook*. National Park Service (NPS) - Denver Service Center (DSC).

2. What information should be provided to bidders to ensure their bids accurately reflect the specific conditions of the jetty/ pier project site?

By addressing these questions, this paper aims to contribute to developing a new bidding template for the jetty/ pier project, particularly in the context of the company's plan to build a large number of jetty/ pier facilities and provide practical insights for Pertamina Patra Niaga and other oil & gas industry players.

METHODOLOGY

An illustration of the developing methodology is shown in the graphic below:

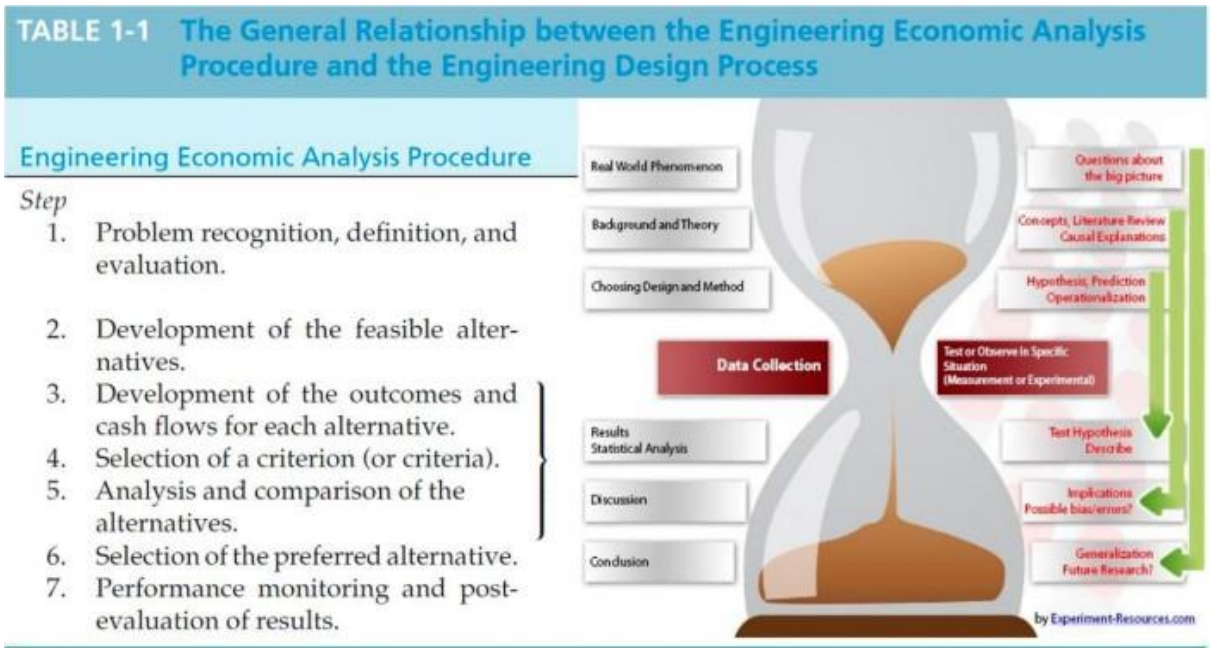

Figure 6 Engineering Economic Analysis Procedure[22] & Steps of the Scientific Process[23]

Step 1 - Problem Recognition, Definition, and Evaluation

The majority of the company projects face project overrun. Referring to Zilikram[24], project overruns can be further processed and separated into cost and schedule overruns. From

[22] Sullivan, W. G., Wicks, E. M., & Koelling, C. P. (2020). *Engineering Economy (Seventeenth Edition)*. Pearson Education Limited.
[23] Shuttleworth, M. (2008, February 2). *What is research?*. Retrieved from https://explorable.com/what-is-research.
[24] Zilikram, M. F. (2021). *Benchmarking Indonesia's Downstream Oil & Gas Construction: Evaluating Project Scheduling and Cost Estimating Processes Against Global "Best-Tested and Proven" Practices*. PM Word Journal, 12(10).

Figure 7, out of 37 pier projects, we can see that only 22% of projects are on budget, and 67% run into more than 20% cost overruns. Meanwhile, when looking at the schedule, 70% experienced schedule overrun.

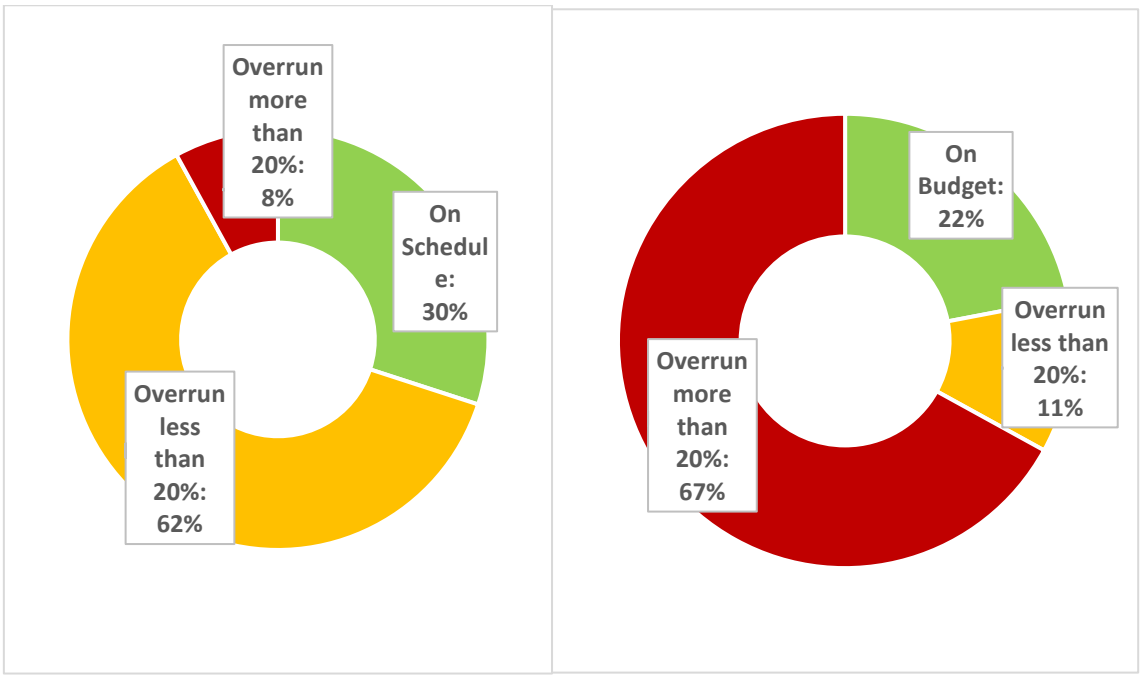

Figure 7 Company Jetty/ Pier Project Performance[25]

As mentioned in the previous section of this paper, three things that need to be addressed to solve the problem are Standardization of Jetty/ Pier Specification/ Design, Standardized Work Breakdown Structure (WBS) for Jetty/ Pier Project, and Proper Jetty/ Pier Project Bidding Template. The company has already developed the 1st and 2nd steps [26]. The Standardized WBS of the Jetty/ Pier Project from Omniclass Tables 11, 21, 22, 23, 31, 32, and 33 can be seen in Appendix 1, along with the detail of WBS Elements from Omniclass Tables in Appendix 2.

According to the company's current practices, all bidding activities conducted at Class 2 Estimate Class, where project maturity is between 30% and 75%, adhere to the guidelines outlined in AACE Recommended Practice 18R-97.

[25] By author
[26] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April. https://pmworldlibrary.net/wp-content/uploads/2024/04/pmwj140-Apr2024-Andrian-building-an-econometrics-model-for-pier-construction.pdf

Table 1 Cost Estimate Classification Matrix for Process Industries[27]

	Primary Characteristic	*Secondary Characteristic*		
ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges at an 80% confidence interval
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

As outlined in the preceding analysis, all Work Breakdown Structures (WBS) necessary for the New Jetty/ Pier project, as detailed in Appendix 2, should be reorganized and integrated into the company's standard bidding template.

Our company's bidding template typically organizes project scopes of work into specific disciplines, such as Mechanical, Electrical, Instrumentation, Civil and Soil, Health, Safety, and Environment (HSE), and Marine Civil, although preparation work and engineering & project management are excluded in this criteria. This categorization is shown in Figure 8. The bidding format shown in Figure 8 further supports this disciplinary-based approach to asset scope of work.

[27] AACE International. (2020). *AACE International Recommended Practice No. 18R-97 Cost Estimate Classification System – As Applied in Engineering, Procurement, And Construction for The Process Industries*.

Bill of Quantity/BoQ

Project Title

Revision ... Date ....

No	Work Detail	Volume	Units	Unit Price		Total Price	
				Material	Services	Material	Services
I.	**PREPARATION WORK**						
1	Mobilitation and Demobilitation	xxx	xx	0	$	0	$
2	Permit & Engineering	xxx	ls	0	$	0	$
3	.....	xxx	ls	0	$	0	$
	Total I					0	$
II	**CIVIL WORK**						
1	Conrete	xxx	xx	$	$	$	$
2	.....	xxx	xx	$	$	$	$
	Total II					**$**	**$**
III	**MECHANICAL**						
1	Piping	xxx	xx	$	$	$	$
2	.....	xxx	xx	$	$	$	$
	Total II					**$**	**$**
IV	**CLOSING**						
1	Commissioning & Testing	xxx	xx	0	$	0	$
2	.....	xxx	xx	0	$	0	$
	Total IV					**$**	**$**
		SUM OF MATERIAL + SERVICES (I+II+III+IV)				**$**	**$**
		CONTRACTOR PROFIT AND RISK (8% OR 10% OR 15%)					**$**
		TOTAL					**$**

Figure 8 The Company's Bidding Template[28]

In the current process, the company builds the bidding template using the following flow chart shown in Figure 9.

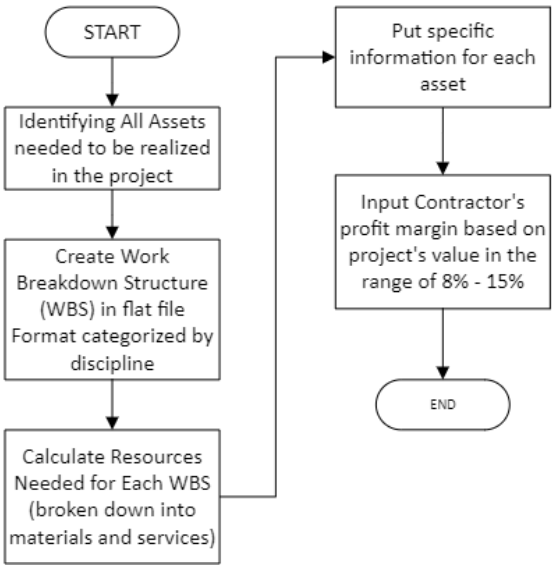

Figure 9 Company's Current Process for Building Bidding Template[29] [30]

[28] Ardiansyah. (2017). *Indonesian State-Owned Oil and Gas Company Cost Estimating against GAO and NPS Best Practice: A benchmarking study*. PM World Journal, VI(XI), 24–44.
[29] By author
[30] Pradibta, I. (2024). *Developing a Standardized, Multidimensional WBS/CBS Coding Structure for Storage Tanks*; PM World Journal, Vol. XIII, Issue III, March.

Structuring the Work Breakdown Structure (WBS) at the top level (level 1) by disciplines has presented challenges in tracking project resources and facilitating the bidding process. This approach fails to clearly delineate the quantity of materials and labor required for each asset, thereby hindering the accurate calculation of asset costs and limiting the reproducibility of these calculations. Such a configuration can be particularly cumbersome for both owners and contractors.

Step 2 – Development of Alternatives (United States National Park Service Bidding Template)

A perfect illustration of a bidding template that effectively caters to the contractor's perspective is the one employed by the National Park Service (NPS) of the United States[31]. The NPS bidding template serves as a recommended estimation format for all estimators working with them. Notably, the U.S. NPS Cost Estimation Handbook outlines various levels of estimates based on their intended usage, resulting in several template formats.

Table 2 NPS Estimate Classification and Accuracy[32]

Department of the Interior **DOI Estimate Type**	**AACE Class**	**Typical Use**	**End Usage**	**Project Definition**	**Low Expected Accuracy**	**High Expected Accuracy**
Class C	Class 5	Predesign	Concept Screening	0% to 2%	-20%	+50%
Class C	Class 4	Schematic Design	Study or Feasibility	1% to 15%	-15%	+30%
Class B	Class 3	Schematic Design	Budget Authorization	10% to 40%	-10%	+20%
Class B	Class 2	Design Development	Control	30% to 75%	-5%	+15
Class A	Class 1	Construction Documents	Check Estimate	65% to 100%	-3%	+10

As outlined in Table 2, the National Park Service (NPS) recognizes three distinct estimation classes: Class C, B, and A. These classifications are determined by the level of design detail underlying the estimate.

1. **Class C Construction Cost Estimate**

   Class C Construction Cost Estimates, commonly referred to as conceptual estimates, are approximate assessments (0% to 15%) that offer a preliminary overview of the services or assets involved and their associated business case. These estimates are derived from various factors, including General Management Plans (GMP), Condition

[31] Giammalvo, P. D., & PTMC (2021). *Unit 4 - Managing Scope*. https://build-project-management-competency.com/1-4-1-4-unit-4/
[32] National Park Services. (2023). *Construction Cost Estimating Requirements Handbook*. National Park Service (NPS) - Denver Service Center (DSC).

Assessments Cost (CAC) estimates utilizing FMSS and CESS, preliminary cost estimates for project initiation and entry into the Project Management Information System (PMIS), Pre-Design (PD) programming estimates to define project scope and validate PMIS estimates, and Schematic Design (SD) concept estimates for comparing design alternatives in Value Analysis studies during the early Schematic Design Phase. Class C estimates are characterized by an accuracy range of -20% to +50%.

2. **Class B Construction Cost Estimate**

   Any cost estimate that falls within the range of 10% to 75% of the definition of a statement of work (SOW) can typically be categorized as a Class B cost estimate, also known as a budgetary estimate. The minimum design requirement for Class B estimates is submitting the preferred design alternative from the Schematic Design (SD) phase, along with Design Development (DD) submittals or other intermediate design level documents intended for budgetary purposes. Class B estimates are characterized by an accuracy range of -10% to +20%.

3. **Class A Construction Cost Estimate**

   Class A Construction Cost Estimates, commonly referred to as actual estimates, are applicable when the definition of the work scope (WBS) reaches 65% to 100%. These estimates can be achieved with the availability of 100% Draft Construction Documents (Draft CD), 100% Complete Construction Documents (Complete CD), or Final Construction Documents. Class A estimates are characterized by an accuracy range -3% and +10%.

The Class A format emerges as the most appropriate estimation class that effectively incorporates the contractor's perspective on the project scope. These formats advocate for the comprehensive definition of the scope of work, with a minimal reliance on lump sums or allowances for resources. This approach implies that most resources required for the asset are explicitly identified and predetermined.

Table 3 shows the template for Class A Level Construction Cost Estimate used by the U.S. National Park Service.

Table 3 National Park Services Bidding Template (Class A Construction Cost Estimate)[33] [34]

Bid Item No.	Bid Item Description	Total Material Cost	Total Labor Cost	Total Equipment Cost	Total Direct Construction Costs	Design Contingency 0,00%	General Conditions 0,00%	General Contractor Overhead 0,00%	General Contractor Profit 0,00%	Contracting Method Adjustment 0,00%	Inflation Escalation APR 0,00% / Months 0	Bid Item Total
Bid Item: 1	Asset / Project Element 1					TOTAL VALUE OF GOVERNMENT FURNISHED PROPERTY (if any):						$ -
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
Total - Bid Item 1	Asset / Project Element 1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Bid Item: 2	Asset / Project Element 2					TOTAL VALUE OF GOVERNMENT FURNISHED PROPERTY (if any):						$ -
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
Total - Bid Item 2	Asset / Project Element 2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Bid Item: 3	Asset / Project Element 3					TOTAL VALUE OF GOVERNMENT FURNISHED PROPERTY (if any):						$ -
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
Total - Bid Item 3	Asset / Project Element 3	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Bid Item: 4	Asset / Project Element 4					TOTAL VALUE OF GOVERNMENT FURNISHED PROPERTY (if any):						$ -
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
Total - Bid Item 4	Asset / Project Element 4	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Bid Item: 5	Asset / Project Element 5					TOTAL VALUE OF GOVERNMENT FURNISHED PROPERTY (if any):						$ -
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
	WBS L2 WBS Description	$ -	$ -	$ -	$ -							
Total - Bid Item 5	Asset / Project Element 5	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Total Bid Items 1-6	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Step 3 – Development of Prospective Outcomes

Following an analysis of the information presented in Steps 1 and 2, a fundamental disparity becomes evident between the NPS Bidding Template and the company's current Bidding Template. This primary divergence centers on how the Work Breakdown Structures (WBS) are organized.

The NPS Bidding Template categorizes all WBS under their corresponding assets or services, while the company's Bidding Template organizes WBS by discipline. This distinction holds significant implications when considering the preferences of stakeholders.

While the company's Bidding Template structure may be suitable for those seeking discipline-specific information, it is not inherently optimal for effective communication between the contractor and the company's Project Control personnel. In this context, with

[33] National Park Service. (2021, May 27). Class A Construction Cost Estimate Template. NPS.gov (U.S. National Park Service).
https://www.nps.gov/dscw/upload/ClassAConstructionCostEstimate_Template_5-27-21.xlsx

[34] Pradibta, I. (2024). *Developing a Standardized, Multidimensional WBS/CBS Coding Structure for Storage Tanks*; PM World Journal, Vol. XIII, Issue III, March.

its asset- or service-based organization, the NPS Bidding Template is deemed more intuitive and advantageous.

Given these considerations, the author concludes that the NPS Bidding Template, aligned with the NPS Class A Estimate format, is the most suitable choice. The company should adopt this Class A Estimates format as the primary communication tool between the contractor and the company's Project Control personnel.

Step 4 – Selection of Decision Criterion (or Criteria)

As previously noted, the NPS Class A Cost Estimate Template systematically categorizes all Work Breakdown Structures (WBS) within the framework of their respective assets or services. A comprehensive listing of these services and their associated assets can be found in Table 4 below.

Table 4 Jetty/ Pier Project Scope of Works[35]

Group of Attributes	Purpose	Item
Design	These attributes are intended to assess the efficacy of the WBS standard in comprehensively describing the work packages required for the Pier/Jetty Project during the Design Phase.	Survey Report
		Design
		Shop Drawing & Datasheet
Construction	These attributes constitute essential components that must be meticulously constructed and inspected throughout the construction phase. The author aims to evaluate the extent to which the WBS standards can effectively address these specific attributes. They represent the fundamental criteria that the WBS should fulfill.	Dredging and Dumping
		Jetty Head
		Breasting Dolphin
		Mooring Dolphin
		Catwalk
		Civil Offshore
		Mechanical Equipment
		Electrical Equipment
		Instrument Equipment
		Safety Equipment
Finishing	These attributes encompass the activities required for the final testing that must be completed during the commissioning and handover phases.	Testing
		Commissioning

FINDINGS

Step 5 – Analysis and Comparison of the Alternatives

Prior to developing the bidding template, it is crucial to establish a detailed Work Breakdown Structure (WBS). For the Jetty/ Pier Project, the author already put the structure of the WBS in Appendix 1, while Appendix 2 provides a comprehensive list of

[35] By author

components for the Jetty/ Pier construction, categorized according to the OmniClass WBS system.

Subsequently, the person in charge, designated as the author, determines the appropriate WBS elements. These elements are outlined in Table 4. Following the identification and organization of these details in Table 4, they are integrated into a Bidding Template, a standardized document designed to facilitate bidding processes for various interested Bidder; refer to the NPS Standard Bidding Template, as shown in Table 3.

The actual bidding templates, as depicted in Table 5, have been developed upon completion of this process. These bidding templates serve as essential reference documents for companies seeking to participate in the bidding process. They provide a comprehensive overview of the project requirements, enabling companies to understand the scope of work and develop informed proposals thoroughly. This standardized approach fosters a level playing field, ensuring transparency and competitiveness among bidders.

Table 5 Bidding Template for Jetty/ Pier Construction Project[36]

Bid Item No.		Bid Item Description		Total Material Cost	Total Labor Cost	Total Equipment Cost	Total Direct Construction Costs	Design Contingency	General Conditions	General Contractor Overhead	General Contractor Profit	Contracting Method Adjustment	Inflation Escalation		Bid Item Total
													APRX	Months	
								0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0	
Bid Item :	1	Engineering/ Design Phase						TOTAL VALUE OF COMPANY FURNISHED PROPERTY (If any):							Rp -
		22-02 21 00	Survey Report	Rp -	Rp -	Rp -	Rp -								
		22-01 33 16	Design	Rp -	Rp -	Rp -	Rp -								
		22-01 33 23	Shop Drawing & Datasheet	Rp -	Rp -	Rp -	Rp -								
Total - Bid Item	1	Engineering/ Design Phase		Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -		Rp -
Bid Item :	2	Construction Phase						TOTAL VALUE OF COMPANY FURNISHED PROPERTY (If any):							Rp -
		22-35 20 23	Dredging and Dumping	Rp -	Rp -	Rp -	Rp -								
		22-35 31 26 13 1	Jetty Head	Rp -	Rp -	Rp -	Rp -								
		22-35 31 26 13 2	Breasting Dolphin	Rp -	Rp -	Rp -	Rp -								
		22-35 31 26 13 3	Mooring Dolphin	Rp -	Rp -	Rp -	Rp -								
		22-05 51 36 13	Catwalk	Rp -	Rp -	Rp -	Rp -								
		22-13 42 00	Civil Offshore	Rp -	Rp -	Rp -	Rp -								
		21-04 30 10	Mechanical Equipment	Rp -	Rp -	Rp -	Rp -								
		21-04 50	Electrical Equipment	Rp -	Rp -	Rp -	Rp -								
		21-06 10 80	Instrument Equipment	Rp -	Rp -	Rp -	Rp -								
		21-04 40	Safety Equipment	Rp -	Rp -	Rp -	Rp -								
Total - Bid Item	2	Construction Phase		Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -		Rp -
Bid Item :	3	Handover Phase						TOTAL VALUE OF COMPANY FURNISHED PROPERTY (If any):							Rp -
		22-33 08 00	Commissioning	Rp -	Rp -	Rp -	Rp -								
Total - Bid Item	3	Handover Phase		Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -		Rp -
Total Bid Items 1-3				Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -		Rp -

Step 6 – Selection of the Preferred Alternatives

The NPS Bidding Template consists of two primary templates. The initial templates, as illustrated in Table 5, are employed for Request for Quotation (RFQ) activities. In the context of the procurement/ tender process, this phase occurs during the Bidding Phase, where multiple companies or service providers compete for the project as Bidders[37] [38].

[36] By author
[37] Giammalvo, P. D., & PTMC (2021). Unit 4 - Managing Scope. https://build-project-management-competency.com/1-4-1-4-unit-4/
[38] Pradibta, I. (2024). Developing a Standardized, Multidimensional WBS/CBS Coding Structure for Storage Tanks; PM World Journal, Vol. XIII, Issue III, March. https://pmworldlibrary.net/wp-content/uploads/2024/03/pmwj139-Mar2024-Pradibta-Standardized-Multidimensional-WBS-CBS-for-Storage-Tanks.pdf

Upon the conclusion of the bidding process and the emergence of a Winning Bidder, the contractor is obligated to provide a detailed breakdown of their price calculations, as depicted in Table 5. These details serve as the basis for negotiations whenever a change order is requested.

To ensure the seamless continuity of the Bidding Template for the Winning Bidder, the author has taken the proactive step of introducing a detailed Bidding Template, as illustrated in Appendix 3[39].

The detailed tables presented in Appendix 3 – Part A provide a comprehensive breakdown of the Work Breakdown Structure (WBS) for Bid Item 1, focusing specifically on the various Engineering Design activities. The Engineering Design phase entails the creation of detailed specifications, datasheets, and drawings for the Jetty/ Pier, referring to International, National, and Company Standards, drawing upon the field data collected in the preceding stages.

Furthermore, the detailed tables shown in Appendix 3 – Part B detail the breakdown of the WBS for Bid Item 2, emphasizing the diverse Construction Phase activities. The Construction Phase involves the construction of the Jetty/ Pier on the designated site, utilizing the specifications, datasheets, and drawings developed during the Engineering Design Phase.

While at the closing stage, the detailed tables presented in Appendix 3 – Part C offer a detailed breakdown of the WBS for Bid Item 3, highlighting the Handover activities. The Handover Phase incorporates a final inspection upon completion of the construction of the New Jetty/ Pier and its accessories, ensuring that the facility operates at total capacity without any outstanding problems.

Step 7 – Performance Monitoring and Post-Evaluation of Results

The new standardized bidding template will be the complete guide for activities related to the construction of the Jetty/ Pier construction in the company. To assess the effectiveness of the bidding template, it is essential to determine if it can be implemented promptly. Additionally, a review process should be established to identify any components of the Jetty/ Pier project in the construction phase or bidding process that do not align with the WBS and Bidding Template Format. Successful implementation requires meeting specific criteria before and during the execution of the WBS, as outlined below:

[39] For further details and access to the complete research results (bidding template document), please get in touch with the author through: wiharsapragitatama@gmail.com

1. **Pre-Implementation Review**

   The company should evaluate whether the WBS and the Bidding Template are compatible with current practices used by personnel in charge of bidding and constructing the Jetty/ Pier project. An analysis should follow to ensure that the formats are logically consistent with field activities and can be practically executed. The feasibility of implementing these tools with minimal complications should also be assessed.

   Refer to the Unified Theory of Acceptance and Use of Technology (UTAUT) initially created by Davis et al. in 1989 and adjusted by Venkatesh et al. in 2003, "The perceived likelihood of adopting the technology is dependent on the direct effect of four key constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions"[40].

   a. Performance expectancy refers to the extent to which a consumer believes that using a particular system will help them perform their tasks more effectively. [41]
   b. Effort expectancy refers to how much effort a person thinks they need to put into use a new system or technology. Users with low effort expectancy are more likely to adopt a new technology.[42]
   c. Social influence refers to how much someone cares about what their family and friends think about them using a new system or technology.[43]
   d. Facilitating conditions refers to how much someone thinks their organization will help them use a new system by providing resources and technical support.[44]

   The company must pay close attention to these four factors to ensure that the new system functions effectively and is smoothly adopted.

2. **Define and Set Key Performance Indicator (KPI)**

   Define and set specific KPIs that correspond with the goals of the standardization of the Bidding Template. These KPIs may encompass metrics related to cost accuracy, resource allocation, schedule accuracy, and variance analysis.

3. **Periodic Review with stakeholders**

   Conduct regular reviews with all relevant stakeholders to assess the current Bidding Template, including the WBS for the Jetty/Pier construction project, and identify opportunities for system improvement.

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[40] Marikyan, D., Papagiannidis (2023). *Unified Theory of Acceptance and Use of Technology: A review.* https://open.ncl.ac.uk/theories/2/unified-theory-of-acceptance-and-use-of-technology/
[41] Nurfitriyani, S.J., (2020). *Mengenal UTAUT2 sebagai Salah Satu Technology Acceptance*. https://sis.binus.ac.id/2020/07/20/mengenal-utaut2-sebagai-salah-satu-technology-acceptance/
[42] Ibid
[43] Ibid
[44] Ibid

CONCLUSION

As Indonesia is an archipelagic country, the reliability of the Jetty/ Pier for Pertamina Patra Niaga has become very important[45] [46]. Therefore, a strategy for making sure that the projects are managed well, especially pier construction projects, must be implemented.

Implementing a "Standardized Bidding Template," as a follow-up to the "Standardized WBS Template", will be a crucial step as part of fixing the company Front End Loading (FEL) with some benefits “reducing costs, minimizing risks, meeting the schedule within deadlines, a diligent approval system, corporate alignment, transparent communication and achieving success at the end of the project.”[47]

Based on the author's study, the research question can be answered as follows :

1. The most effective format for the Bidding Template that the company can use for the Jetty/ Pier Construction Project is the Class A Cost Estimate Template - United States of America’s National Park Service (US-NPS).

2. The information contained within the Bidding Template can align with the Work Breakdown Structure (WBS) for the Jetty/ Pier construction project to ensure the bids accurately reflect the specific conditions of the jetty/ pier project site.

BIBLIOGRAPHY

1. AACE International. (2020). *AACE International Recommended Practice No. 18R-97 Cost Estimate Classification System – As Applied in Engineering, Procurement, And Construction for The Process Industries.*

2. Al Farizi, S., & Latief, Y. (2018). *Development of Standardized WBS (Work Breakdown Structure) For Planning the Schedule Based On Risk In Steel Bridge Construction Projects.* http://www.ieomsociety.org/ieom2018/papers/167.pdf

3. Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April. https://pmworldlibrary.net/wp-content/uploads/2024/04/pmwj140-Apr2024-Andrian-building-an-econometrics-model-for-pier-construction.pdf

[45] Riyadi, Muhammad. (2024). *Exploration of the Developing Maritime Transportation Regions of Indonesia.* Jurnal Maritim Malahayati (JuMMa) Vol 5, No 2, Juli 2024, 202-209

[46] Berliani, M., Djuwadi, M., (2021). *Evaluation Experimental of the Dynamic Wharf Structure: A Study Case at Nabire Port, Indonesia*. Proceedings of the 2nd International Seminar of Science and Applied Technology (ISSAT 2021)

[47] Ruga, Fransisco. (May,17). *What is FEL? Front-End Load for Projects.* https://www.dmspartners.com.br/post/what-is-fel-front-end-load-for-projects?lang=en

4. Ardiansyah. (2017). *Indonesian State-Owned Oil and Gas Company Cost Estimating against GAO and NPS Best Practice: A benchmarking study*. PM World Journal, VI(XI), 24–44. https://pmworldlibrary.net/wp-content/uploads/2017/11/pmwj64-Nov2017-Ardiansyah-indonesian-cost-estimating-against-gao-and-nps-best-practices.pdf

5. Armstrong, G., Gilge, C., Max, K., & Vora, S. (2023). *Familiar Challenges - New Approaches "2023 Global Construction Survey."*

6. Andréfouët, S., Paul, M., & Farhan, A. R. (2022). *Indonesia's 13558 islands: A new census from space and a first step towards a One Map for Small Islands Policy*. Marine Policy, 135, 104848. https://doi.org/10.1016/j.marpol.2021.104848

7. Anton Setiawan. (2023, July 26). *Menyiapkan Tata Kelola Laut Berkelanjutan.* https://indonesia.go.id/kategori/ragam-ais-forum-2023/7295/menyiapkan-tata-kelola-laut-berkelanjutan?lang=1

8. Badan Pusat Statistik. (2021). *Hasil Sensus Penduduk 2020.*

9. Berliani, M., Djuwadi, M., (2021). *Evaluation Experimental of the Dynamic Wharf Structure: A Study Case at Nabire Port, Indonesia.* Proceedings of the 2nd International Seminar of Science and Applied Technology (ISSAT 2021)

10. CIDB Malaysia. (2021). *Malaysia Building Information Modelling (BIM) Report 2021.* https://www.cream.my/data/cms/files/BIM_%20REPORT.pdf?iframe

11. Deborah (2017). *Steps to Encourage Technological Acceptance.* https://info.qpercom.com/blog/encouragetechnologicalacceptance

12. Giammalvo, P. D., & PTMC (2021). *Unit 4 - Managing Scope.* https://build-project-management-competency.com/1-4-1-4-unit-4/

13. Giammalvo, P. D., & PTMC (2022). *Unit 10 - Managing cost estimating and budgeting.* https://build-project-management-competency.com/1-4-1-10-unit-10/

14. Hatmoko, J. U. D., & Khasani, R. R. (2019). Mapping Delay Risks of EPC Projects: A Case Study of A Platform and Subsea Pipeline of An Oil and Gas Project. IOP Conference Series: Materials Science and Engineering, 598(1), 012095. https://doi.org/10.1088/1757-899X/598/1/012095

15. Hidayat, M. (2024). *Standardized Multi-Dimensional WBS for Enhanced BIM and Data Analytics in LPG Facility Projects*. PM World Journal, 13(4). https://pmworldlibrary.net/wp-content/uploads/2024/04/pmwj140-Apr2024-Hidayat-standardized-multi-dimensional-wbs-for-enhanced-bim.pdf

16. International Energy Agency. (2021). *Evolution of oil final consumption by product in Indonesia since 2000.* https://www.iea.org/countries/indonesia/oil

17. Kenton, Will. (2024). *Intangible Drilling Costs (IDC): Overview and Example.* https://www.investopedia.com/terms/i/intangible-drilling-costs.asp

18. KPMG & AIPM. (2022, November). *The state of project management in Australia 2022*

19. Lai, A., Gimino, G. (2024). *Making safer projects with BIM.* https://www.thestar.com.my/news/nation/2024/09/05/making-safer-projects-with-bim

20. Marikyan, D., Papagiannidis (2023). *Unified Theory of Acceptance and Use of Technology: A review*. https://open.ncl.ac.uk/theories/2/unified-theory-of-acceptance-and-use-of-technology/

21. Ministry of Energy and Mineral Resources Republic of Indonesia. (2023). *Handbook of Energy & Economic Statistics of Indonesia*.

22. National Park Services. (2023). *Construction Cost Estimating Requirements Handbook.* National Park Service (NPS) - Denver Service Center (DSC).

23. National Park Service. (2021, May 27). *Class A Construction Cost Estimate Template.* NPS.gov (U.S. National Park Service). https://www.nps.gov/dscw/upload/ClassAConstructionCostEstimate_Template_5-27-21.xlsx

24. Nurfitriyani, S.J., (2020). *Mengenal UTAUT2 sebagai Salah Satu Technology Acceptance.* https://sis.binus.ac.id/2020/07/20/mengenal-utaut2-sebagai-salah-satu-technology-acceptance/

25. Omni Class. (2020). *Construction Entity by Function - Table 11, 21, 22, 23, 31 and 32*. https://www.csiresources.org/standards/OmniClass

26. Omni Class. (2020). Introduction and User's Guide. https://www.csiresources.org/standards/OmniClass

27. Omni Class. (2013). *Table 11 - Construction Entity by Function*. https://www.csiresources.org/standards/OmniClass

28. Omni Class. (2012). *Table 21 - Elements*. https://www.csiresources.org/standards/OmniClass

29. Omni Class. (2012). *Table 22 - Work Results*. https://www.csiresources.org/standards/OmniClass

30. Omni Class. (2012). *Table 23 - Products*. https://www.csiresources.org/standards/OmniClass

31. Omni Class. (2020). *Table 31 - Phases*. https://www.csiresources.org/standards/OmniClass

32. Omni Class. (2020). *Table 32 - Services*. https://www.csiresources.org/standards/OmniClass

33. Pradibta, I. (2024). *Developing a Standardized, Multidimensional WBS/CBS Coding Structure for Storage Tanks*; PM World Journal, Vol. XIII, Issue III, March. https://pmworldlibrary.net/wp-content/uploads/2024/03/pmwj139-Mar2024-Pradibta-Standardized-Multidimensional-WBS-CBS-for-Storage-Tanks.pdf

34. Pratama, F.N. (2021). *Indonesia Aviation Fuel Facilities Project Cost Estimating Process vs the NASA Cost Estimating Process – a Process Benchmarking Study*; PM World Journal, Vol. X, Issue I, January. https://pmworldlibrary.net/wp-content/uploads/2021/01/pmwj101-Jan2021-Pratama-Indonesia-aviation-fuel-facilities-project-cost-estimate.pdf

35. PT. Pertamina Energy Terminal [@pet.pertamina]. (2023, October 25). *Dolphin Jetty*. https://www.instagram.com/p/Cy01OItS8zQ/?igsh=MTN3ZHY3dTRpOXBiaw==

36. Riyadi, Muhammad. (2024). *Exploration of the Developing Maritime Transportation Regions of Indonesia.* Jurnal Maritim Malahayati (JuMMa) Vol 5, No 2, Juli 2024, 202-209

37. Sambasivan, M., & Soon, Y. W. (2007). *Causes and effects of delays in Malaysian construction industry*. International Journal of Project Management, 25(5), 517-526. https://doi.org/10.1016/j.ijproman.2006.11.007.

38. Shuttleworth, M. (2008, February 2). *What is research?* https://explorable.com/what-is-research.

39. Sullivan, W. G., Wicks, E. M., & Koelling, C. P. (2020). *Engineering Economy (Seventeenth Edition)*. Pearson Education Limited.

40. Task Force Roadmap Infrastruktur – PT Pertamina Patra Niaga. (2022). *Roadmap PIIM (Pertamina Integrated Infrastructure Masterplan) Pertamina C&T 2022-2032*.

41. The H+M Industrial Team. (2023). *Front End Loading Project Management : Planning for Success*. https://www.hm-ec.com/blog-posts/front-end-loading-project-management-planning-for-success-hm#:~:text=Front%2DEnd%20Loading%20(FEL),on%20time%2C%20and%20within%20budget.

42. Wisnugroho, J. (2020). *Indonesia Oil & Gas Cost Estimating vs International "Best-Tested and Proven" Practices – A Benchmarking Study*; PM World Journal, Vol. IX, Issue II, February. https://pmworldlibrary.net/wp-content/uploads/2020/02/pmwj90-Feb2020-Wisnugroho-benchmarking-indonesia-og-cost-estimating-vs-international3.pdf

43. Vyčítal, M. (2019). *On BIM based automatized nD modelling for construction management [Doctoral dissertation]*. https://core.ac.uk/download/326321885.pdf

44. Zain, R. A. (2024). *Developing Parametric Modelling for Class 4 Estimate of Pier and Jetty Construction by Analyzing Historical Databases using AI Tools & EVM Techniques*; PM

World Journal, Vol. XIII, Issue IV, April. https://pmworldlibrary.net/wp-content/uploads/2024/04/pmwj140-Apr2024-Zain-Parametric-Modelling-for-Class-4-Estimate-of-Pier-and-Jetty-Construction.pdf

45. Zilikram, M. F. (2023). *Benchmarking Indonesia's Downstream Oil & Gas Construction: Evaluating Project Scheduling and Cost Estimating Processes Against Global "Best-Tested and Proven" Practices*. PM World Journal, 12(10). https://pmworldlibrary.net/wp-content/uploads/2023/10/pmwj134-Oct2023-Zilikram-Benchmarking-Indonesias-Downstream-Oil-and-Gas-Construction.pdf

About the Author

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Wiharsa Pragitatama is an engineer with more than nine years of professional experience in the oil and gas sector. He holds a bachelor's degree in electrical engineering from the Bandung Institute of Technology (ITB). Currently, he works as an engineer at Indonesia's national oil company. He has been involved in several projects in the oil and gas sector, such as fuel terminals, pipelines, storage tanks, piers/jetties, electrical and instrumentation, and other downstream projects across Indonesia. He is attending a distance learning mentoring course, under the tutelage of Dr. Paul D. Giammalvo, CDT, CCE, MScPM, MRICS, GPM-m, Senior Technical Advisor at PT Mitrata Citragraha, to attain Certified Cost Professional (CCP) certification from AACE International.

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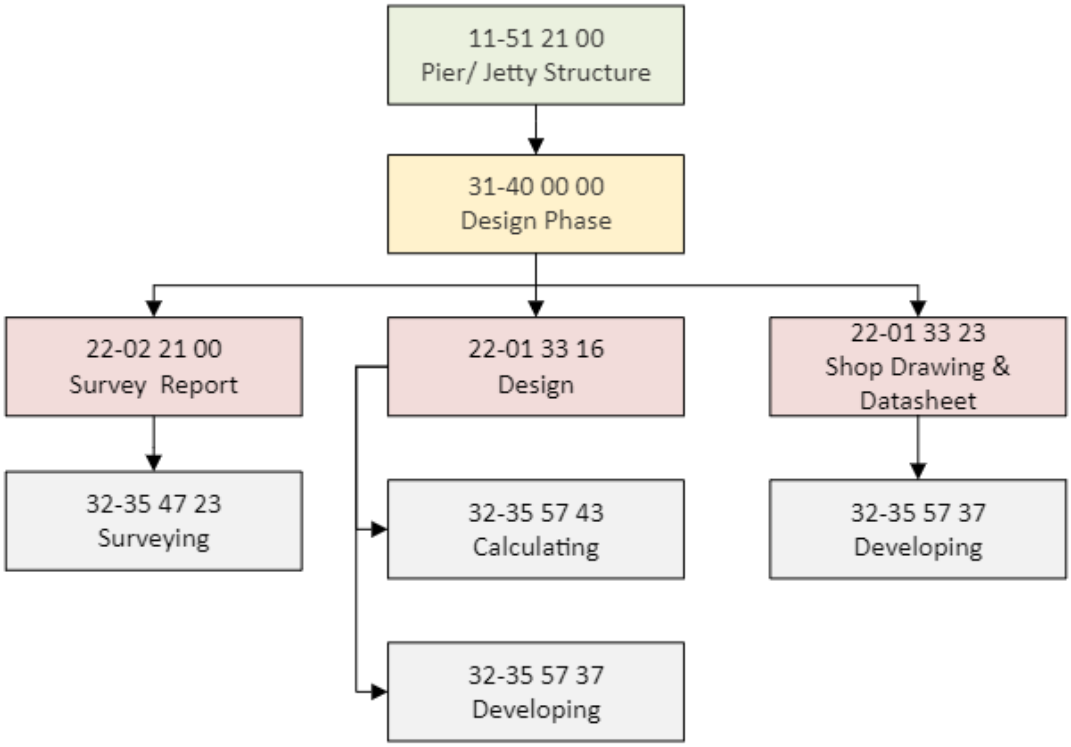
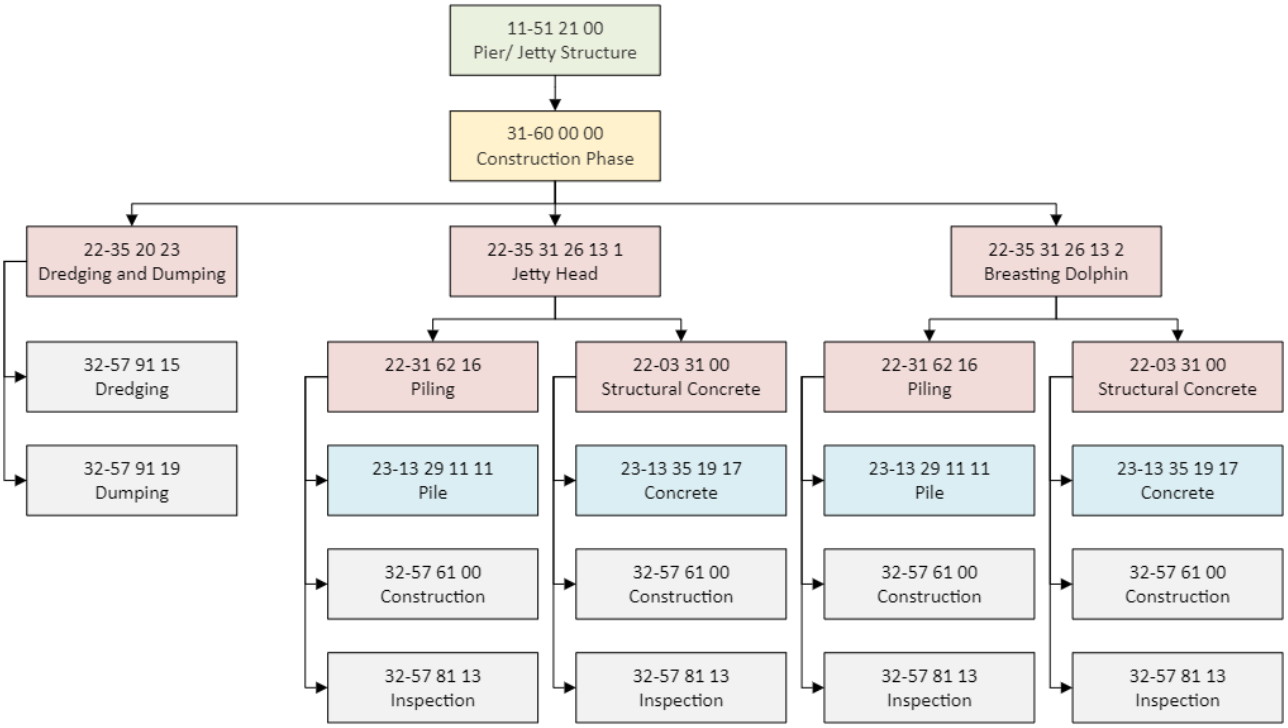
APPENDICES

APPENDIX 1 - WBS FROM OMNICLASS FOR JETTY/ PIER PROJECT (1/6)[48]



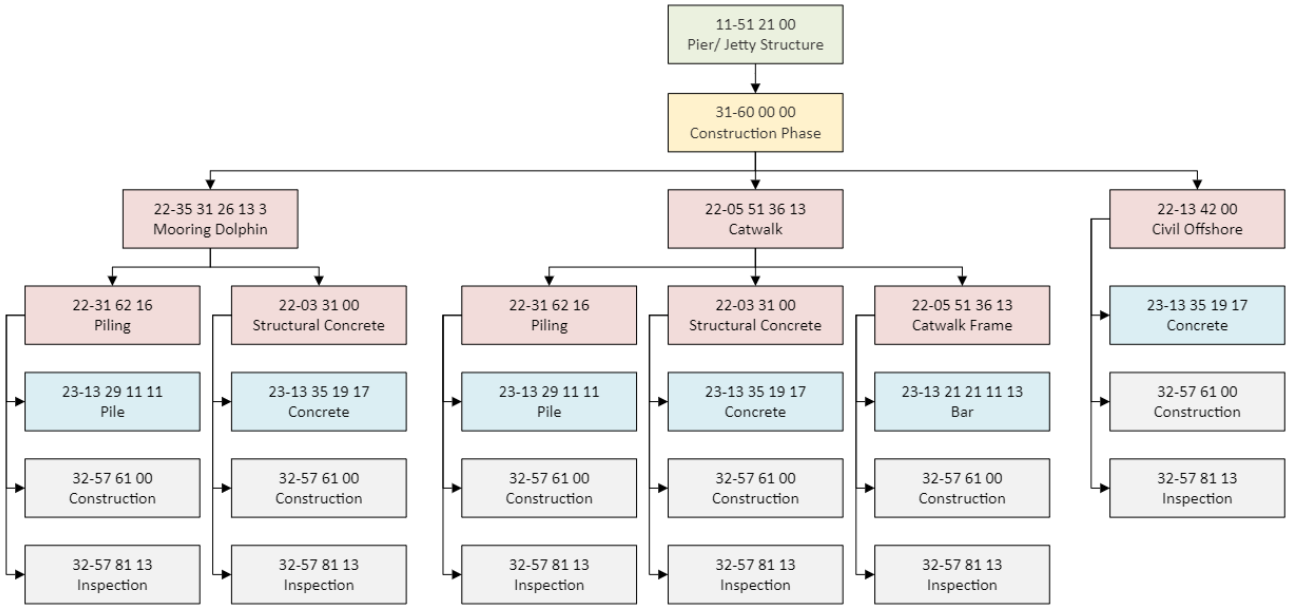
[48] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April.

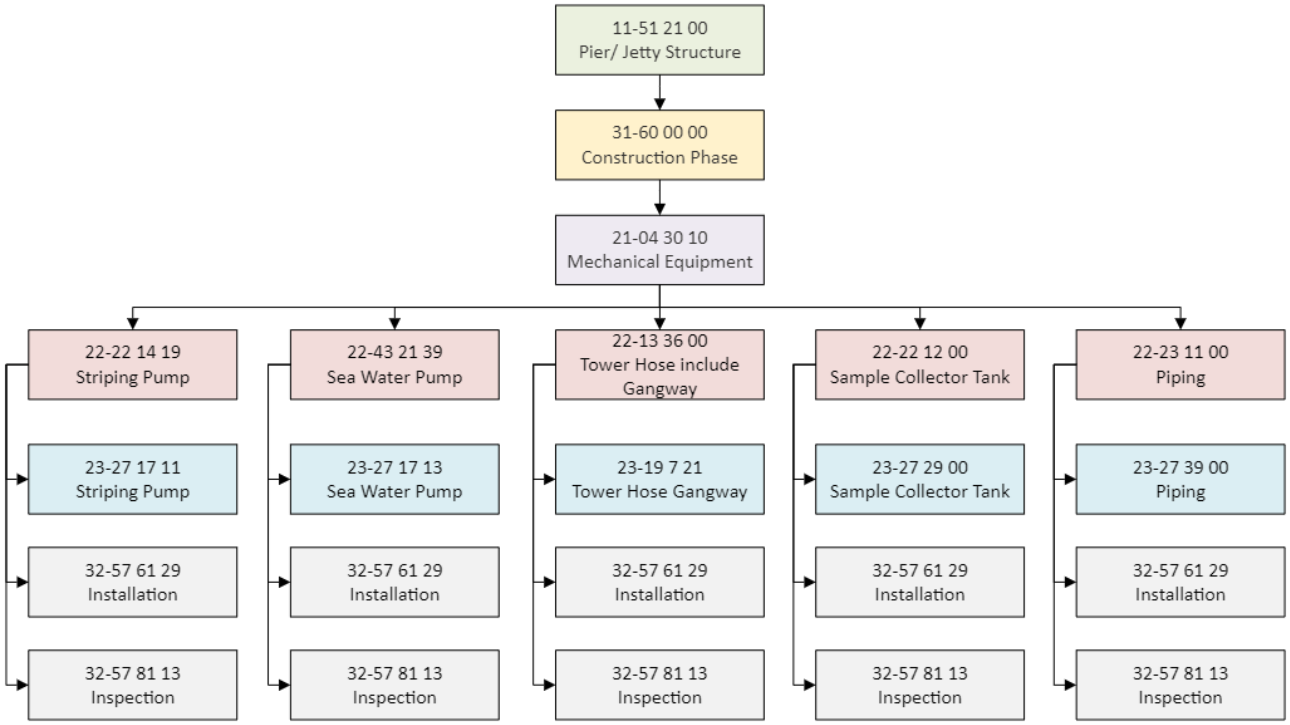
APPENDIX 1 - WBS FROM OMNICLASS FOR JETTY/ PIER PROJECT (CONTINUE) (2/6)[49]



[49] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April.

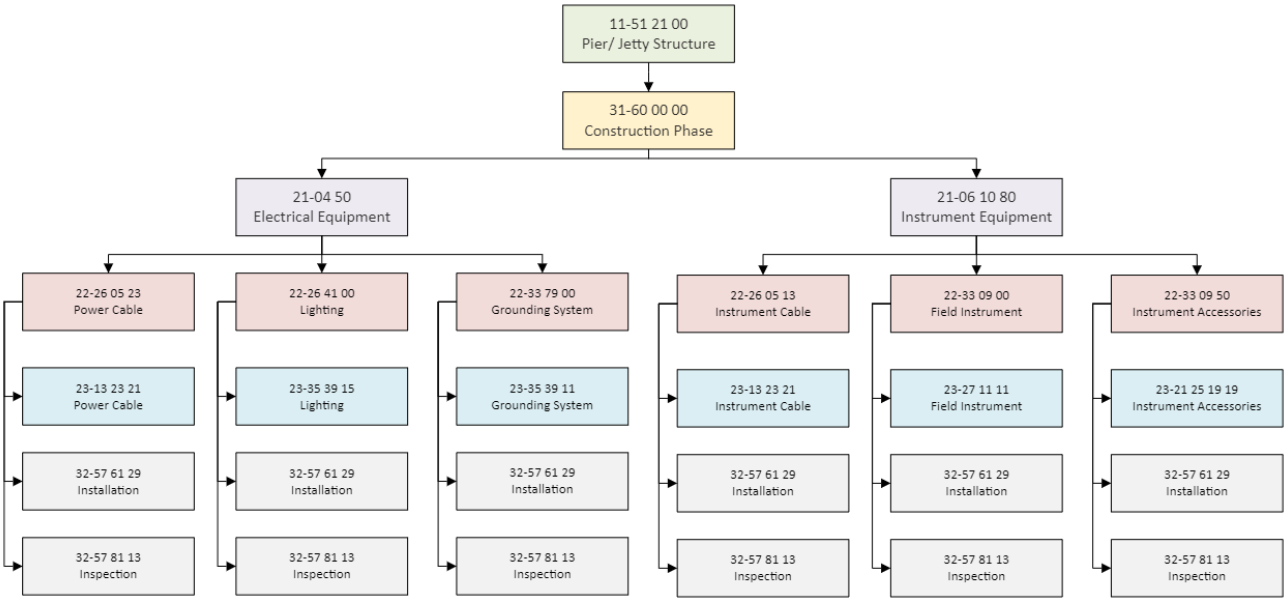
APPENDIX 1 - WBS FROM OMNICLASS FOR JETTY/ PIER PROJECT (CONTINUE) (3/6)[50]





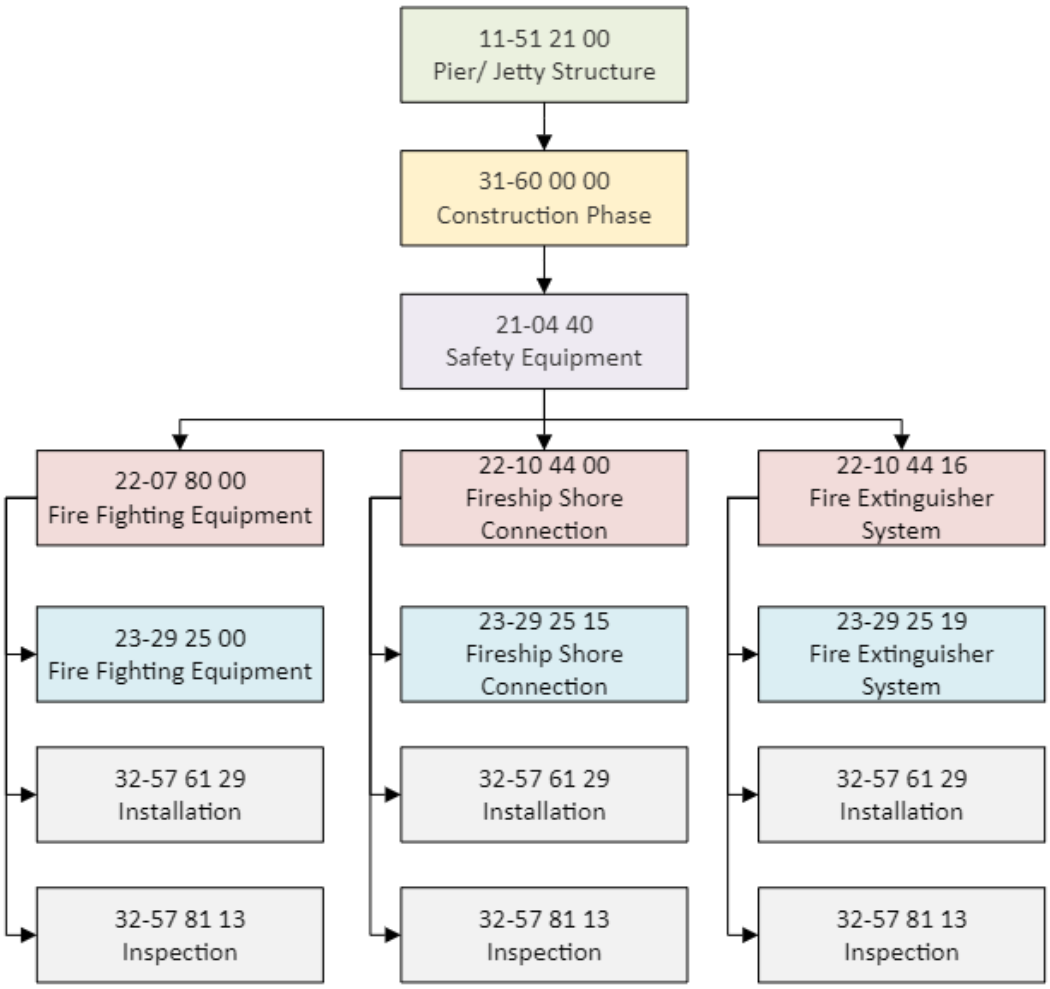
[50] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April.

APPENDIX 1 - WBS FROM OMNICLASS FOR JETTY/ PIER PROJECT (CONTINUE) (4/6)[51]



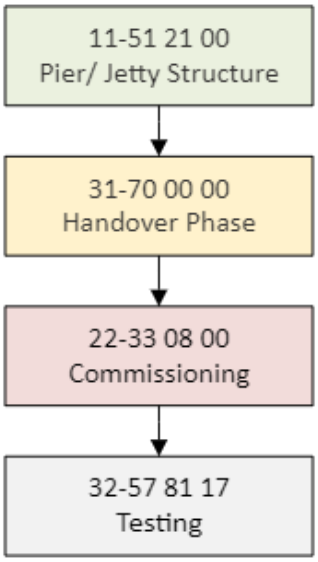
[51] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April.

APPENDIX 1 - WBS FROM OMNICLASS FOR JETTY/ PIER PROJECT (CONTINUE) (5/6)[52]



[52] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April.

APPENDIX 1 - WBS FROM OMNICLASS FOR JETTY/ PIER PROJECT (CONTINUE) (6/6)[53]



[53] Andrian, Y. P. (2024). *Building an Econometrics Model for Pier Construction in an Indonesian Oil and Gas Company*; PM World Journal, Vol. XIII, Issue IV, April.

APPENDIX 2 - WBS CODING FOR PIER/ JETTY PROJECT USING OMNICLASS TABLE (1/4)

Criterion Fulfiled	OmniClass No	Omniclass Title
Table 11 (Construction Entities by Function		
Pier/ Jetty Structure	11-51 21 00	Marine Transportation Terminal
Table 31 (Phase)		
Design Phase	31-40 00 00	Design Phase
Construction Phase	31-60 00 00	Implementation Phase
Handover Phase	31-70 00 00	Handover Phase
Table 21 (Element)		
Civil Offshore	22-13 42 00	Buliding Modules
Mechanical Equipment	21-04 30 10	Facility fuel system
Electrical Equipment	21-04 50	Electrical
Instrument Equipment	21-06 10 80	Special instrument
Safety Equipment	21-04 40	Fire protection
Table 22 (Work Result)		
Survey Report	22-02 21 00	Survey
Design	22-01 33 16	Design Data
Shop drawing & Data Sheet	22-01 33 23	Shop Drawings, Product Data, and Samples
Dredging & Dumping	22-35 20 23	Dredging
Jetty Head	22-35 31 26 13 1	Jetties
Pilling	22-31 62 16	Steel Piles
Structural Concrete	22-03 31 00	Structural Concrete
Breasting Dolphin	22-35 31 26 13 2	Jetties
Pilling	22-31 62 16	Steel Piles
Structural Concrete	22-03 31 00	Structural Concrete
Mooring Dolphin	22-35 31 26 13 3	Jetties
Pilling	22-31 62 16	Steel Piles
Structural Concrete	22-03 31 00	Structural Concrete
Catwalk	22-05 51 36 13	Metal Catwalk
Pilling	22-31 62 16	Steel Piles
Structural Concrete	22-03 31 00	Structural Concrete
Catwalk Frame	22-05 51 36 13	Metal Catwalk
Striping Pump	22-22 14 19	sump pump dishcarge piping
Sea water pump	22-43 21 39	submersible liquid pump
Tower hose	22-13 36 00	Tower
Sample Collector Tank	22-22 12 00	facility portable water storage tank
Piping	22-23 11 00	Fuel piping
Power cable	22-26 05 23	control electrical power cables
Lightning	22-26 41 00	facility lighnting protection
Grounding system	22-33 79 00	site grounding
Instrument Cable	22-26 05 13	medium voltages cables
Field Instrument	22-33 09 00	instrumentation and control utilities
Instrument accessories	22-33 09 50	Instrument and control for fuel
Fire fighting	22-07 80 00	Fire protection
Fireship connection	22-10 44 00	Fire protection specialist
Fire extinghuiser	22-10 44 16	Fire extinghuiser
Commisioning	22-33 08 00	Commissioning of Utilities

APPENDIX 2 - WBS CODING FOR PIER/ JETTY PROJECT USING OMNICLASS TABLE (2/4)

Criterion Fulfiled	OmniClass No	Omniclass Title
Table 23 (Product)		
Jetty Head Pile	23-13 29 11 11	Foundation Piles
Jetty Head Concrete	23-13 35 19 17	Precast Concrete Beams
Breasting Dolphin Pile	23-13 29 11 11	Foundation Piles
Breasting Dolphin Concrete	23-13 35 19 17	Precast Concrete Beams
Mooring Dolphin Pile	23-13 29 11 11	Foundation Piles
Mooring Dolphin Concrete	23-13 35 19 17	Precast Concrete Beams
Catwalk Pile	23-13 29 11 11	Foundation Piles
Catwalk Concrete	23-13 35 19 17	Precast Concrete Beams
Catwalk Bar	23-13 21 21 11 13	Reinforcing Bars
Civil Offshore Concrete	23-13 35 19 17	Precast Concrete Beams
Striping Pump	23-27 17 11	axial split pump
Sea water pump	23-27 17 13	Centrifugal pump
Tower hose	23-19 7 21	Tower
Sample collector tank	23-27 29 00	Tank and Storage
Piping	23-27 39 00	Piping
Power cable	23-13 23 21	Ropes, wires and cables
Lighting protection	23-35 39 15	Lightning protection
Grounding system	23-35 39 11	Electrical groduning devices
Instrument Cable	23-13 23 21	Ropes, wires and cables
Field instrument	23-27 11 11	General instrument and controls
Instrument accessories	23-21 25 19 19	Instrument equipment
Fire fighting	23-29 25 00	Fire fighting equipment
Fireship connection	23-29 25 15	Fire hose equipment
Fire extenghuiser	23-29 25 19	Fire extinghuiser
Table 32 (Service)		
Surveying	32-35 47 23	Surveying
Calculating	32-35 57 43	Calculating
Developing Design	32-35 57 37	Developing
Developing Drawing and DS	32-35 57 37	Developing
Dredging	32-57 91 15	Excavating
Dumping	32-57 91 19	Disposing
Jetty Head Pile Construction	32-57 61 00	Constructing
Jetty Head Pile Inspection using UT, DPT, and PDA	32-57 81 13	Inspecting
Jetty Head Concrete Construction	32-57 61 00	Constructing
Jetty Head Concrete Mix Inspection	32-57 81 13	Inspecting
BD Pile Construction	32-57 61 00	Constructing
BD Pile Inspection using UT, DPT, and PDA	32-57 81 13	Inspecting
BD Concrete Construction	32-57 61 00	Constructing
BD Concrete Mix Inspection	32-57 81 13	Inspecting

APPENDIX 2 - WBS CODING FOR PIER/ JETTY PROJECT USING OMNICLASS TABLE (3/4)

Criterion Fulfiled	OmniClass No	Omniclass Title
Table 32 (Service)		
MD Pile Construction	32-57 61 00	Constructing
MD Pile Inspection using UT, DPT, and PDA	32-57 81 13	Inspecting
MD Concrete Construction	32-57 61 00	Constructing
MD Concrete Mix Inspection	32-57 81 13	Inspecting
Catwalk Pile Construction	32-57 61 00	Constructing
Catwalk Pile Inspection using UT, DPT, and PDA	32-57 81 13	Inspecting
Catwalk Concrete Construction	32-57 61 00	Constructing
Catwalk Concrete Mix Inspection	32-57 81 13	Inspecting
Catwalk Frame Construction	32-57 61 00	Constructing
Catwalk Frame Coating Inspection using Elcometer	32-57 81 13	Inspecting
Civil Offshore Concrete Construction	32-57 61 00	Constructing
Civil Offshore Concrete Mix Inspection	32-57 81 13	Inspecting
Stripping Pump Installation	32-57 61 29	Installing
Stripping Pump Inspection using Vibration Meter, Dial Gauge, Thermal Gun, UFM	32-57 81 13	Inspecting
Sea Water Pump Installation	32-57 61 29	Installing
Sea Water Pump Inspection using 3 points method	32-57 81 13	Inspecting
Tower Hose Installation	32-57 61 29	Installing
Tower Hose Function Test/ Inspection	32-57 81 13	Inspecting
Sample Collector Tank Installation	32-57 61 29	Installing
Sample Collector Tank Inspection using DPT and Hydrotest	32-57 81 13	Inspecting
Piping Installation	32-57 61 29	Installing
Piping Inspection using RT, DPT, and Hydrotest	32-57 81 13	Inspecting
Power Cable Installation	32-57 61 29	Installing
Power Cable Inspection using Megger Test	32-57 81 13	Inspecting
Lighting Installation	32-57 61 29	Installing
Lighting Function Test/ Inspection	32-57 81 13	Inspecting

APPENDIX 2 - WBS CODING FOR PIER/ JETTY PROJECT USING OMNICLASS TABLE (4/4)

Criterion Fulfiled	OmniClass No	Omniclass Title
Table 32 (Service)		
Grounding System Installation	32-57 61 29	Installing
Grounding System Inspection using Earth Ground Tester	32-57 81 13	Inspecting
Instrument Cable Installation	32-57 61 29	Installing
Instrument Cable Inspection using Continuity Test	32-57 81 13	Inspecting
Field Instrumen Installation	32-57 61 29	Installing
Field Instrument Inspection and Calibration	32-57 81 13	Inspecting
Instrument Accessories Installation	32-57 61 29	Installing
Instrument Accessories Function Test/ Inspection	32-57 81 13	Inspecting
Fire Fighting Eq Installation	32-57 61 29	Installing
Fire Fighting Eq Function Test/ Inspection	32-57 81 13	Inspecting
Fireship Shore Connection Installation	32-57 61 29	Installing
Fireship Shore Connection Function Test/ Inspection	32-57 81 13	Inspecting
Fire Extinguisher Installation	32-57 61 29	Installing
Fire Extinguisher Visual Inspection	32-57 81 13	Inspecting
Testing	32-57 81 17	Testing

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART A BID ITEM 1 (ENGINEERING PHASE) [54]

Bid Item Number	Asset / Project Element / Description	Size/Count	Units
BID ITEM 1	Engineering/ Design Phase	1	Unit

Item No.	WBS	Description	Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Direct Cost/Unit	Total Direct Costs
1	22-02 21 00	Survey Report	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
2	22-01 33 16	Design	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
3	22-01 33 23	Shop Drawing & Datasheet	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
	Subtotal Direct Construction Costs		Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-02 21 00 Survey Report **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-02 21 00	SURVEY REPORT										
32-35 47 23	Surveying Activities that shows the condition of the location that will be built Pier/ Jetty	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	SURVEY REPORT	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-01 33 16 Design **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-01 33 16	DESIGN										
32-35 57 43	The activity of Calculating the Pier/ Jetty Design (Usually done by Engineer with minimum of 7 years of experience) so that the pile/ foundation, the structure, the equipment, and other parameter are suitable (Reff. International and National Standard)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-35 57 37	Based on the calculation on WBS 32-35 57 43, develop the Design according to the standard and the site condition	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	DESIGN	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-01 33 23 Shop Drawing & Datasheet **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-01 33 23	SHOP DRAWING & DATASHEET										
32-35 57 37	Drawing and Building Datasheet based on Design result from Engineer. Usually conducted by drafter of minimum 2 years experience	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	SHOP DRAWING & DATASHEET	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

[54] For further details and access to the complete research results (bidding template document), please get in touch with the author through: wiharsapragitatama@gmail.com

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART B – BID ITEM 2 (CONSTRUCTION PHASE) (1/6)

Bid Item Number	Asset / Project Element / Description	Size/Count	Units
BID ITEM 2	Construction Phase	1	Unit

Item No.	WBS	Description	Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Direct Cost/Unit	Total Direct Costs
1	22-35 20 23	Dredging and Dumping	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
2	22-35 31 26 13 1	Jetty Head	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
3	22-35 31 26 13 2	Breasting Dolphin	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
4	22-35 31 26 13 3	Mooring Dolphin	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
5	22-05 51 36 13	Catwalk	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
6	22-13 42 00	Civil Offshore	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
7	21-04 30 10	Mechanical Equipment	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
8	21-04 50	Electrical Equipment	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
9	21-06 10 80	Instrument Equipment	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
10	21-04 40	Safety Equipment	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
	Subtotal Direct Construction Costs		Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-35 20 23 Dredging and Dumping **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-35 20 23	DREDGING AND DUMPING										
32-57 91 15	This process typically removes sediment, rocks, and debris from the construction site, ensuring stable support for the pier or jetty and facilitating safe access for vessels.	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 91 19	Depositing dredged materials in designated areas	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	DREDGING AND DUMPING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-35 31 26 13 1 Jetty Head **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-31 62 16	PILING										
23-13 29 11 11	Pile Material	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Piling Construction Activity (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Pile Weld Inspection using Ultrasonic and Dye Penetrant	0	joint	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Bearing Capacity Inspection using PDA (Usually conducted by Engineer with minimum of 5 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	PILING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-03 31 00	STRUCTURAL CONCRETE										
23-13 35 19 17	Concrete with fc' =	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Structural Concrete Construction Activity (the price include tools and PPE)	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Concrete Mix Test/ Inspection (Usually conducted by Certified Laboratory and Certified Personnel, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	STRUCTURAL CONCRETE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART B – BID ITEM 2 (CONSTRUCTION PHASE) (2/6)

22-35 31 26 13 2 Breasting Dolphin **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-31 62 16	PILING										
23-13 29 11 11	Pile Material	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Piling Construction Activity (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Pile Weld Inspection using Ultrasonic and Dye Penetrant	0	joint	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Bearing Capacity Inspection using PDA (Usually conducted by Engineer with minimum of 5 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	PILING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-03 31 00	STRUCTURAL CONCRETE										
23-13 35 19 17	Concrete with fc' =	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Structural Concrete Construction Activity (the price include tools and PPE)	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Concrete Mix Test/ Inspection (Usually conducted by Certified Laboratory and Certified Personnel, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	STRUCTURAL CONCRETE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-35 31 26 13 3 Mooring Dolphin **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-31 62 16	PILING										
23-13 29 11 11	Pile Material	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Piling Construction Activity (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Pile Weld Inspection using Ultrasonic and Dye Penetrant	0	joint	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Bearing Capacity Inspection using PDA (Usually conducted by Engineer with minimum of 5 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	PILING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-03 31 00	STRUCTURAL CONCRETE										
23-13 35 19 17	Concrete with fc' =	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Structural Concrete Construction Activity (the price include tools and PPE)	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Concrete Mix Test/ Inspection (Usually conducted by Certified Laboratory and Certified Personnel, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	STRUCTURAL CONCRETE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART B – BID ITEM 2 (CONSTRUCTION PHASE) (3/6)

22-05 51 36 13 Catwalk **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-31 62 16	PILING										
23-13 29 11 11	Pile Material	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Piling Construction Activity (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Pile Weld Inspection using Ultrasonic and Dye Penetrant	0	joint	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Bearing Capacity Inspection using PDA (Usually conducted by Engineer with minimum of 5 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	PILING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-03 31 00	STRUCTURAL CONCRETE										
23-13 35 19 17	Concrete with fc' =	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Structural Concrete Construction Activity (the price include tools and PPE)	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Concrete Mix Test/ Inspection (Usually conducted by Certified Laboratory and Certified Personnel, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	STRUCTURAL CONCRETE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-05 51 36 13	CATWALK FRAME										
23-13 21 21 11	Steel Profile/ Structural Steel Material	0	kg	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Structural Steel Construction Activity (the price include tools and PPE)	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Coating Inspection using Elcometer (Usually conducted by Engineer with minimum of 1 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	CATWALK FRAME	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-13 42 00 Civil Offshore **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-13 42 00	CIVIL OFFSHORE										
23-13 35 19 17	Concrete with fc' =	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 00	Structural Concrete Construction Activity (the price include tools and PPE)	0	m3	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Concrete Mix Test/ Inspection (Usually conducted by Certified Laboratory and Certified Personnel, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	CIVIL OFFSHORE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART B – BID ITEM 2 (CONSTRUCTION PHASE) (4/6)

21-04 30 10 Mechanical Equipment **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-22 14 19	STRIPPING PUMP										
23-27 17 11	Stripping Pump Material	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Stripping Pump Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Stripping Pump Inspection using Vibration meter, Dial Gauge, Thermal Gun, UFM (Usually conducted by Engineer with minimum of 7 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	STRIPPING PUMP	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-43 21 39	SEA WATER PUMP										
23-27 17 13	Sea Water Pump Material	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Sea Water Pump Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Sea Water Pump Inspection using 3 point test method (Usually conducted by Engineer with minimum of 7 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	SEA WATER PUMP	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-13 36 00	TOWER HOSE INCLUDE GANGWAY										
23-19 7 21	Tower Hose Gangway Material	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Tower Hose Gangway Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Functional Testing of Tower Hose Gangway, include connection testing and unrolling mechanism of hose (Usually conducted by Engineer with minimum of 7 years of experience, including Tools & PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	TOWER HOSE INCLUDE GANGWAY	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-22 12 00	SAMPLE COLLECTOR TANK										
23-27 29 00	Sample Collector Tank Material with capacity ... m3 incl. Accessories	0	set	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Sample Collector Tank Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Sample Collector Tank Inspection using Dye Penetrant Test and Hydrotest (Usually conducted by Certified Inspector with Level II Certificate, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	SAMPLE COLLECTOR TANK	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-23 11 00	PIPING										
23-27 39 00	Piping Material	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
23-27 39 00	Piping Accessories	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Piping Installation incl. Accessories (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Piping Inspection using Radiography Test, Dye Penetrant Test and Hydrotest (Usually conducted by Certified Inspector with Level II Certificate, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	PIPING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART B – BID ITEM 2 (CONSTRUCTION PHASE) (5/6)

21-04 50 Electrical Equipment **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-26 05 23	POWER CABLE										
23-13 23 21	Power Cable … core x … mm2	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Cable pulling and termination (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Cable Inspection using Megger Test (Usually conducted by Engineer with minimum of 3 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	POWER CABLE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-26 41 00	LIGHTING										
23-35 39 15	Lighting Material incl. Fitting	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Lighting Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Lighting Funtion Test (Usually conducted by Technician with minimum of 1 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	LIGHTING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-33 79 00	GROUNDING SYSTEM										
23-35 39 11	Grounding Cable, Rod, and Accessories	0	set	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Grouding System Installation (the price include tools and PPE)	0	set	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Grounding System Inspection using Earth Ground Tester (Usually conducted by Engineer with minimum of 3 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	GROUNDING SYSTEM	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

21-06 10 80 Instrument Equipment **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-26 05 13	INSTRUMENT CABLE										
23-13 23 21	Instrument Cable … Pair x … mm2	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Instrument Cable pulling and termination (the price include tools and PPE)	0	m'	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Instrument Cable Continuity Testing (Usually conducted by Engineer with minimum of 3 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	INSTRUMENT CABLE	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-33 09 00	FIELD INSTRUMENT										
23-27 11 11	Field Instrument Material	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Field Instrument Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Instrument Inspection and Calibration (Conducted by Related Agency, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	FIELD INSTRUMENT	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-33 09 50	INSTRUMENT ACCESSORIES										
23-21 25 19 19	Instrument Accessories	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Instrument Accessories Installation (the price include tools and PPE)	0	set	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Instrument Accessories Function Test (Usually conducted by Engineer with minimum of 1 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	INSTRUMENT ACCESSORIES	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART B – BID ITEM 2 (CONSTRUCTION PHASE) (6/6)

21-04 40 Safety Equipment **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-07 80 00	FIRE FIGHTING EQUIPMENT										
23-29 25 00	Fire Fighting Equipment Material	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Fire Fighting Equipment Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Fire Fighting Equipment Function Testing (Usually conducted by Engineer with minimum of 1 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	FIRE FIGHTING EQUIPMENT	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-10 44 00	FIRESHIP SHORE CONNECTION										
23-29 25 15	Fireship Shore Connection Material	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Fireship Shore Connection (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Fireship Shore Connection Function Test (Usually conducted by Engineer with minimum of 3 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	FIRESHIP SHORE CONNECTION	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-10 44 16	FIRE EXTINGUISHER SYSTEM										
23-29 25 19	Fire Extinguisher Material Type ...., ... kg	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 61 29	Fire Extinguisher Installation (the price include tools and PPE)	0	unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
32-57 81 13	Fire Extinguisher System Visual Check (Usually conducted by Engineer with minimum of 1 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	FIRE EXTINGUISHER SYSTEM	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

APPENDIX 3 - DETAILED BIDDING TEMPLATE – PART C – BID ITEM 3 (HANDOVER PHASE)

Bid Item Number	Asset / Project Element / Description	Size/Count	Units
BID ITEM 3	Handover Phase	1	Unit

Item No.	WBS	Description	Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Direct Cost/Unit	Total Direct Costs
1	22-33 08 00	Commissioning	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
	Subtotal Direct Construction Costs		Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -

22-33 08 00 Commissioning **Total Cost:** Rp -

OmniClass WBS Code	Description	Quantity	Unit	MATERIAL		LABOR		EQUIPMENT		TOTALS	
				Material Cost/Unit	Total Material Cost	Labor Cost/Unit	Total Labor Cost	Equipment Cost/Unit	Total Equipment Cost	Total Cost/Unit	Total Cost
22-33 08 00	COMMISSIONING										
32-57 81 17	Testing The Pier/ Jetty including Pulling Test QRH and Berthing Test (Usually done by Engineer with minimum of 7 years of experience, including Tools and PPE)	0	Manhour	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -
SUBTOTAL	COMMISSIONING	1	Unit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -	Rp -