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STUDY OF WORK UNIT PRICE PERMEN PUPR NUMBER 28 OF 2016 WITH PERMEN PUPR NUMBER 1 YEAR 2022 IN JU 1 RIVER EXCAVATION WORK

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Abstract

Construction cost estimation is a critical aspect of construction activities that requires in-depth attention. The cost estimation process, which relies on specifications and working drawings prepared by the project owner, should ensure efficient and accurate project execution with appropriate and measurable execution methods. However, in reality, as revealed in previous research, there are still weaknesses in considering nonconformances in specifications in selecting heavy equipment, determining optimal execution methods, and ensuring efficient workforce management, including work safety aspects. Therefore, it is important to choose an implementation method that suits the characteristics of the field to ensure that the resulting cost analysis is accurate and appropriate. In some cases, the Unit Price Analysis Method (AHSP), in some cases, still tends to be general in nature and has not fully taken into account the differences between the 2016 and 2022 AHSP, such as changes in the coefficients for labor, equipment and materials. The effect of this discrepancy is that the base unit price often does not reflect the actual situation at the project site, which can impact the accuracy of cost estimates. To overcome this challenge, more in-depth adjustments are needed in the AHSP method to ensure that construction cost estimates truly reflect actual field conditions. This step will enable the use of the AHSP method as a more relevant and accurate tool for predicting construction project costs, which will ultimately support more efficient and effective project management. Thus, industrial construction can maximize resource efficiency and reduce potential cost discrepancies in the field.

***Keywords**: Implementation Method, Equipment, Analysis of the Unit Price of Work, Regulation of the Minister of PUPR, Labor*

1. Introduction

The study of cost estimates on construction activities refers not only to the economic cost results that are sometimes irrelevant to a particular field condition, but it is necessary to pay attention to the supporting factors such as the method of implementation[1],[2],[3], the selection of heavy equipment that is suitable for the constraints of the field conditions, skilled and certified labour relevant to the type of construction activity. In this study it is necessary to conduct a study against PERMEN PUPR NOMOR 28 YEAR 2016 TRANSLATORS PROVIDING PERMAN PUPER NOMORE 1 YEAR 2022 as well as to clarify the need for analysis with factual field[4],[5],[6]. Cost estimates affect the success of projects and companies in general. In the latest AHSP 2022 guidelines there are no changes to the methods of implementation of construction activities where still adopting methods – methods taken from AHSP 2016 that are no longer relevant to current and future conditions[7],[8],[9].

The aim of this research is to examine and refine existing studies and to study and perfectionist AHSP 2022 to be a benchmark that can be applied to current and future conditions and is not normative but provides an in-depth study of various cycles of construction activities such as:

1. Selection of heavy equipment suitable for field conditions.
2. In-depth and comprehensive safety study (SMK3) of heavy equipment operators.
3. Study of the need for heavy equipment in construction activities in order to avoid inefficiencies that have no added value in project activities[10].
4. Study of the placement of heavy equipment to work simultaneously the entire fleet used in construction activities[11].
5. The absence of new innovations or studies on the method of implementation wherein in the AHSP 2022 guidelines belom represents the entire activity of construction activities that are constantly developing with problems – problems that are increasingly variable especially in the field of water resources[12], the selection of methods of execution belom represent various issues on construction activities[13], because the minimum of the methods implementation then the impact is very broad among them waste of time[14], costs then affect on the choice of heavy equipment that does not fit the problem on the field and the placement of inappropriate heavy equipment as well as the heavy equipment operated can be assured to work simultaneously so that avoided from an activity which does not add value to the benefits[15],[16].
6. The 2022 AHSP guidelines still address long-standing heavy equipment while heavy equipment manufacturers are currently releasing increasingly sophisticated heavy equipment products that can produce a more efficient activity both time, cost and inconvenience of heavy equipment operators[17],[18].
7. In the AHSP 2022 guidelines still apply 7 hours to 8 hours of work where this is adopted from the labor measurement regulations[19], this cannot be applied and implemented in the construction world where either construction world in the field of water resources or the entire civil work construction activities must be maximum 24 hours[20],[21], because the system at the moment every work in the cycle of construction activities demanded must be fast with a very short duration of time so that it is irrelevant civilian work only 7 to 8 working hours the impact of many projects that will not be completed and swelling it costs and so on[22].

So this research is very necessary so that PUPR candy about AHSP field of future water resources can take into account aspects – aspects listed in the point – point above so that correctly can be a reference in various aspects of civil work activities Therefore, this research focuses on the study of Candy Work PUPP No. 28 Year 2016 With Candy Pupr No. 1 Year 2022 and compared with actual conditions of the field[23], to improve added value and efficiency in the construction activities of gasoline on the river JU 1 among the four factors:

1. Selection of methods of implementation: In the 2016 AHSP guidelines as well as the 2022 AHSP Guidelines, Belom adopted the concept of lean construction construction

construction so that the implementation methods used in JU1 river gravel activities should be more simplified and avoid inefficiencies and reduce activities that do not add value in construction activities 2[24]. Selection for heavy equipment: The use of heavy equipment in accordance with the constraints of the field conditions can increase productivity and impact on the efficiency of execution time, and the cost to realize added value in a construction activity[25].

2. Workforce Factor: In the 2016 AHSP guidelines as well as the 2022 AHSP Guidelines, all construction activities, especially in the field of water resources, are listed in all aspects of construction activities using workers and mandors whereas in the JU1 river gravel activities only require heavy equipment operators and heavy equipment mechanics[26], the workforce should have relevant certification for each construction activity so that it affects the productivity of the labour force in carrying out the construction activities of JU1 River gravel, As well as in the latest AHSP guidance which includes health insurance in case of work accidents.

3. Field Conditions: In the 2016 AHSP guidelines as well as the 2022 AHSP Guidelines do not take into account the geographical conditions and topography of the field including weather and geographic factors which affect the safety of heavy equipment operators and other personnel and effectiveness during construction activities[27].

4. Field Conditions: In the 2016 AHSP guidelines as well as the 2022 AHSP Guidelines do not take into account the geographical conditions and topography of the field including weather and geographic factors which affect the safety of heavy equipment operators and other personnel and effectiveness during construction activities. This research is limited to the regulation of the unit price of construction work in force in Indonesia [28]. Therefore, the results may not be directly applicable in other countries or territories that have different geographical regulations and conditions. The focus of the research is on the work of the river corridor. This means that the research findings may not be relevant to other types of construction projects, such as building construction or road infrastructure. This study takes into account the change in regulation from PUPR Candy Number 28 of 2016 to PUPP Candy No. 1 of 2022[29]. However, future changes in the unit price of work or external factors affecting the cost cannot be taken into account.

2. Research Method

In this study, the methods of data collection of the three AHSP 2016, AHSP 2022, as well as the actual field methods can be subsequently processed as can be described in the following points:

a. Data Regulation: Collect the latest regulations that regulate the unit price of work, such as Candy PUPR Number 28 Year 2016 and Candy 1 Year 2022. This data contains a list of unit prices of work and cost calculation guidelines. For the factual field method data – data obtained from the Blora and Holy regulations of the budget year 2023 on labour wages, and slow prices[30].
b. Comparison of Regulations: Compare the 2016 and 2022 AHSP regulations to the actual field methods to identify differences in the unit price of work, the calculation formula, or other relevant parameters[31].
c. Field Data: Collect field data related to river slopes work. This includes the actual price of previous river drainage projects, including records, wages, and other relevant costs.

In the table below is an example of calculation of productivity analysis of heavy equipment factual condition:

a. Calculate production capacity (m^3 / jam) = Q = (V x F bx Fa x60)/(Ts x Fk) (1)
b. Calculate cycle time = T1 + T2 = Ts 3 (2)
c. coefficient excavator tool / m3 = 1 / Q.1 (3)
d. Working Power Coefficient / m3 = (Tk x P) : Q.1' (4)

Tabel 1. Faktor Bucket (Bucket Fill Factor) (Fb) Untuk Excavator

Kondisi operasi	Kondisi lapangan	Faktor bucket (Fb)
Mudah	Tanah biasa, lempung, tanah lembut Pemuatan material / bahan dari *stockpile* atau material yang telah dikeruk oleh *Excavator* lain, yang tidak memerlukan lagi daya gali dan bahan dapat dimuat munjung ke dalam *bucket*. **Contoh:** Pasir, tanah berpasir, tanah *colloidal* dengan kadar air sedang, dan lain-lain.	1,1 – 1,2
Sedang	Tanah biasa berpasir, kering. Pemuatan dari *stockpile* tanah lepas yang lebih sukar dikeruk dan dimasukkan ke dalam *bucket* tetapi dapat dimuat hampir munjung (penuh). **Contoh:** Pasir kering, tanah yang berpasir, tanah campur tanah liat, tanah liat, gravel yang belum disaring, pasir padat dan sebagainya atau menggali dan memuat gravel lunak langsung dari bukti asli.	1,0 – 1,1
Agak sulit	Tanah biasa berbatu. Pemuatan batu belah atau batu cadas belah, tanah liat yang keras, pasir campur gravel, tanah berpasir, tanah colloidal yang liat, tanah liat dengan kadar air yang tinggi, bahan-bahan tersebut telah ada pada *stockpile* / persediaan sulit untuk mengisi *bucket* dengan material-material tersebut.	1,0 – 0,9
Sulit	Batu pecah hasil. Batu bongkah besar-besar dengan bentuk yang tidak beraturan dengan banyak ruangan di antara tumpukannya, batu hasil ledakan, batu-batu bundar yang besar-besar, pasir campuran batu-batu bundar tersebut, tanah berpasir, tanah campur lempung, tanah liat yang dimuat – gusur ke dalam *bucket*.	0,9 – 0,8
Bibliografi: [2] Specifications and Application Hand book, Komatsu, Edition 28- Des2007		

2.1 ANALYSIS OF THE PRICE OF EXCAVATOR FERROR OPERATIONS

1. tool residual value = 11% x B (5)
2. Capital Increase Factor (6)
3. Capital share factor $= \frac{i \times (1+i)^A}{(1+i)^A - 1}$ (7)
4. Insurance (8)
5. The cost is one hour. = faktor cicilan modal + Asuransi (9)
6. Fuel = (10%-12%) x Pw x Ms (10)
7. lubricants = (0,25%-0,35%) x Pw x Mp (11)
8. Maintenance and repair = (6,4%-9%) $\times \frac{B}{W}$ (12)
9. Skilled operator = (m orang/jam) x U1 (13)
10. skilled heavy equipment mechanics = (1 Orang / Jam) x U3 (14)

11. TOOL OPERATION COST/JAM = (G+P) (15)

3. Findings

Analysis of heavy equipment requirements (Excavator = volume of material / (production per hour of heavy gear / number of working hours per day / total duration of river excavation activities) The research arose because of a question about the change in coefficients of AHSP 2016 updated with AHSP 2022 which makes the price of mechanical ground grinding cheaper that sometimes in a particular field conditions is irrelevant.

The research was carried out because of the lack of optimum use of heavy equipment in terms of time and cost between planning and reality in the field. Based on the results of data analysis in this study obtained the cost estimates using AHSP 2016 then the estimates of cost by AHSP 2022, whereas on the methods corresponding factual field of the analysis results of the calculation so there is a difference in price then it can be concluded that the calculations of estimates cost by actual field method is more accurate and more economical compared to AHSP 2016. This change occurs in the price analysis of the unit of work

4. Conclusion

Based on the research conducted in the context of water resources management and river channel construction, it can be concluded that in order to achieve efficiency and effectiveness in future projects, comprehensive guidelines are required that encompass appropriate and measurable implementation methods while taking into account the diverse characteristics of different rivers. Additionally, the selection of heavy equipment suitable for field conditions, including the use of cutting-edge technology, as well as the utilization of advanced equipment that is more fuel and energy-efficient, plays a crucial role in reducing operational costs. A skilled and experienced workforce also plays a vital part in enhancing the quality and efficiency of the work. Therefore, recruiting competent labor and providing training for those less skilled can expedite task execution and minimize the risk of work-related accidents. Lastly, the importance of assessing field conditions before analyzing unit work prices cannot be understated, as this ensures that cost estimates align with the actual field conditions. With a holistic approach that considers the methods of work execution, equipment, labor, and adaptation to field constraints through thorough analysis of these four factors, river basin management projects can be carried out more efficiently and effectively, thus avoiding undesirable losses. This conclusion serves as a critical foundation for the development of future policies and best practices.

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