STUDI KOMPARATIF ANALISA HARGA SATUAN PEKERJAAN STRUKTUR BETON ANALISA PROYEK, METODE KONDISI AKTUAL, SNI 2016 DAN PERMEN PUPR NO. 1 TAHUN 2022 MENGGUNAKAN SOFTWARE ESTIMATOR.ID

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Abstract: Delays occurred in the Accounting and Commerce Administration Building Construction Project Phase I, Malang State Polytechnic, Malang City on 29 June 2021 to 26 July 2021, originally the cumulative weight on the initial S-curve plan was 17.39%, but in practice it was only achieved 7.73% in the 1st floor of structure work. The delay was due to the need for materials that should have been able to reach the field's target was not facilitated, due to a discrepancy in the planning analysis with the standardized Work Unit Price Analysis (AHSP) guidelines, so it was necessary to evaluate comparison of AHSP according to project analysis, actual condition method, SNI 2016 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022 in order to find out the most appropriate type of method as a reference in conducting planning analysis. Calculations on concrete structure work because it has a major influence on the cost of construction projects. The purpose of the research are: (1) Describing the total unit price of concrete structure work project analysis, Actual Condition method, SNI 2016 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022software Estimator.id, (2) Describing the largest unit price percentage ratio of concrete structure work between project analysis of Actual Condition method, SNI 2016 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022, (3) Describing the lowest percentage ratio of the total unit price of concrete structure work AHSP method, (4) Knowing the level of distribution of tests together with the unit price of concrete structure work project analysis, Actual Condition method, SNI 2016 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022and (5) Knowing the level of distribution of paired tests of unit prices of concrete structure work project analysis, Actual Condition method, SNI 2016 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022. The design of research using descriptive, comparative research, experiments with quantitative approaches. Secondary data collection using research instruments in the form of documentation guidelines. Data analysis was carried out by calculating the AHSP of the three methods and then the ANOVA One Way test for comparison together and Tukey HSD for the comparison test in pairs. The results of the study are: (1) HSP total of concrete structure project analysis of IDR 252,161,551.51, Actual Condition method of IDR 296,562,918.52, SNI 2016 of IDR 300,278,528.99 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022 of IDR 295,731,973.03, (2) the largest percentage ratio between the Actual Condition method, SNI 2016 and Regulation of Minister of Public Works And People's Housing Number 1 of 2022 to project analysis is plate foundation work with a consecutive ratio value of 0.301%, 0.283% and 0.268%, (3) the lowest total HSP percentage ratio is the Regulation of Minister of Public Works And People's Housing Number 1 of 2022 with a ratio value of 0.147%, (4) the results of the comparison test with ANOVA One Way, namely there is a significant difference with a significance value of $0.03 < 0.05$, and (5) the results of the comparison test in pairs of Tukey HSD, namely there is a significant difference between the AHSP project analysis and the SNI 2016 method with a significance value of $0.043 < 0.05$.

Keywords: Job Unit Price Analysis, Coefficient, Unit Price of Work

1. INTRODUCTION

1.1 Background

According to the Ministry of PUPR (2022) on Guidelines for Preparing Estimated Cost of Construction Work in the Field of Public Works and Public Housing, most contractors compiling estimated prices do not always refer to existing standards. This is because planners are more likely to calculate the unit price of work based on previous experience in completing construction projects, but the assumption of different calculations still cannot be separated from the provisions of the standardized Work Unit Price Analysis (AHSP) (Pratama, et al., 2017). If the preparation of the unit price of work is not in accordance with the standards, there is a discrepancy between planning and implementation analysis which can result in delays and even cost overruns (Manto, 2016). The delay occurred in the Construction Project of the Accounting and Commercial Administration Building of the State Polytechnic of Malang Phase I on June 29, 2021 to July 26, 2021, originally the cumulative weight of the initial plan of the S curve was 17.39%. but in its implementation it achieved only 7.73% on the work of the 1st floor structure. The delay is due to the need for materials that should be able to achieve field targets is not facilitated because the provisions of the AHSP coefficient determined are not in accordance with the AHSP guidelines that have been standardized, so it is necessary to evaluate the AHSP comparison according to project analysis with several methods to find out the right method used as a reference in planning analysis.

Widodo, et al. (2020) conducted a comparative study between AHSP contractors, SNI 2016 and HSPK Surabaya City 2016 with the results of the study, namely the AHSP HSPK method is greater than SNI and contractors. Research by Widodo, et al. (2020) there are shortcomings, namely the discrepancy of the comparison concept used because the unit price list on the HSPK does not match the period of the construction project and the unit price in SNI based on contractor analysis. Astari (2014) conducted a comparative research between AHSP contractor bids and Regulation of PUPR No. 11 of 2013 with the results of the study, namely the unit price of work of the Regulation of PUPR method No. 11 of 2013 was greater than the AHSP on the contractor's offer. Astari's research (2014) there are shortcomings, namely the concept of comparison that is not appropriate because in the PUPR Regulation method, the calculation of indirect costs (overhead and profit) is carried out, while the contractor analysis does not take into account indirect costs.

Based on the problems in the project and previous research above, this study tries to compare the AHSP project analysis, the Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 with the concept of adjusting the coefficient and unit price based on the 2021 Malang City HSPK. The 2021 Malang City unit price list on the HSPK is used if the planner cannot use the supplier as a reference, AHSP is still within reasonable limits for the bidding process and is in accordance with the unit price standardization according to the work location. AHSP SNI 2016 was made by analyzing the coefficient nationally, while Regulation of PUPR No. 1 of 2022 is used because the object of research is a government construction project. A comparison of AHSP is carried out in three methods to determine the unit price of work that is closest to the needs of the project. AHSP calculations are reviewed on concrete structure work that has considered the similarity of quality and units so that each method can be compared. AHSP calculations can be done with the help of manual number processing software (spreadsheets) or a special application that has been facilitated by automatic calculation

formulas (Ministry of PUPR, 2022). In this study, the calculation process was operated using software specifically for AHSP formulation, namely Estimator.id.

1.2 Research Objectives

The objectives of this study are as follows:

1) Describe the total unit price of concrete structure work project analysis, Actual Condition method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022 software Estimator.id
2) Describe the largest percentage ratio of unit price of concrete structure work between project analysis, Actual Condition method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022
3) Describe the lowest percentage ratio of the total unit price of concrete structure work AHSP method
4) Knowing the level of difference in the joint test of the unit price of concrete structure work project analysis, actual condition method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022
5) Knowing the level of difference in the paired test of the unit price of concrete structure work project analysis, actual condition method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022

1.3 Issue Limitations

1) AHSP calculation on concrete structure work that is fundamental (types of work in the SNI guidelines and Regulation of PUPR)
2) Calculation format based on AHSP project analysis
3) The basic unit price of AHSP components (wages, materials and tools) for the Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 based on the 2022 Malang City HSPK
4) No taking into account miscellaneous costs

1.4 Research Benefits

1) For consultant planner as an evaluation in planning cost analysis so that the price offered is at a reasonable limit with consideration of the unit price set according to project site standards
2) For the executing contractor as an evaluation in the analysis of resource needs planning to match the needs at the time of implementation

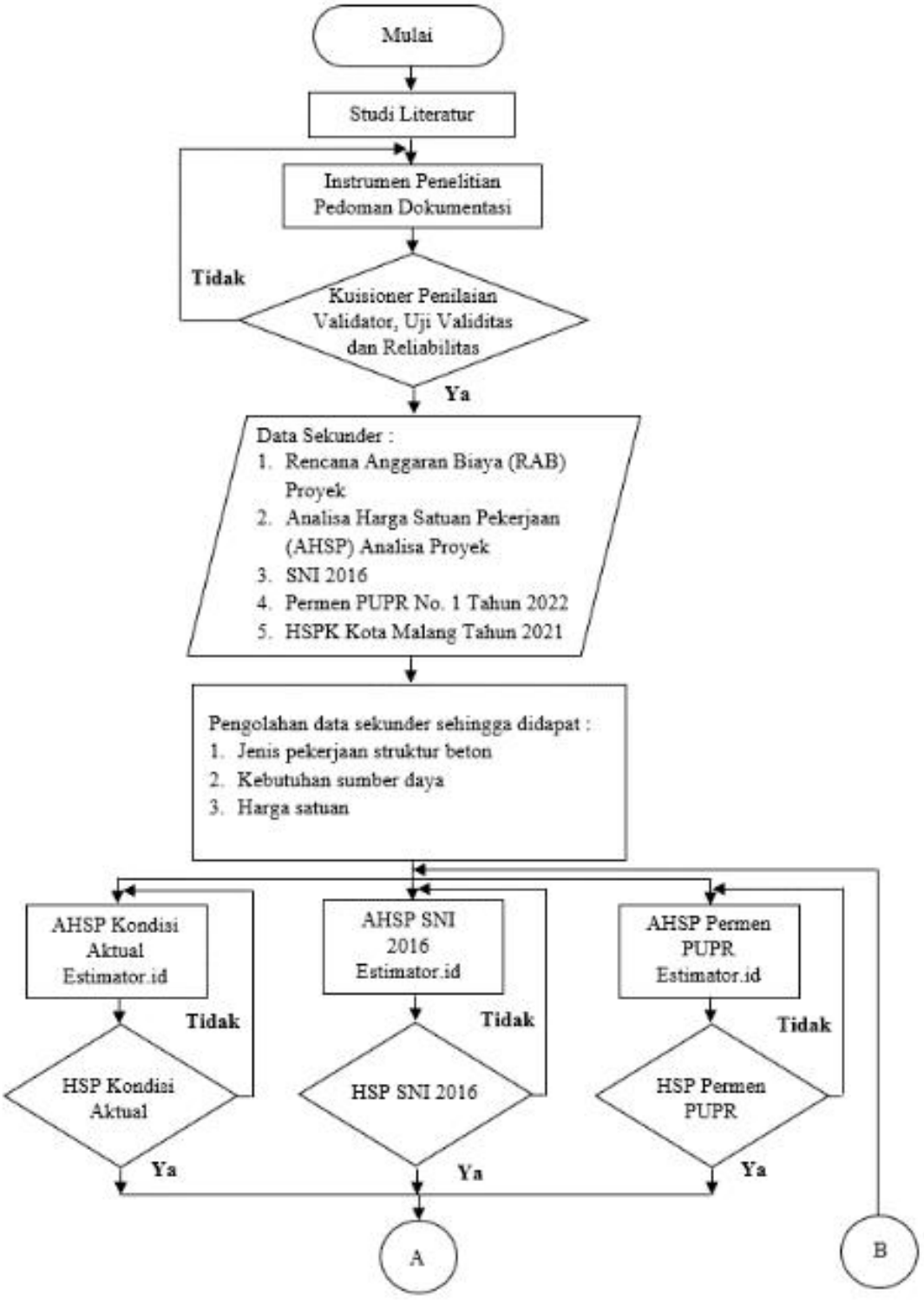
For civil engineering students as a solution to add insight into AHSP comparisons to generate the right planning costs

2. METHOD

The design of this study uses descriptive, comparative, experimental with a quantitative approach. The population in this study is the entire concrete structure work in the Accounting and Commercial Administration Lecture Building Construction Project, Malang State Polytechnic in Phase I. Sampling technique uses the purposive sampling method, which is to review a certain criterion (Sugiono, 2020). The number of samples in this study is in accordance with the type of concrete structure work that is fundamental or fundamental, namely the type of work listed in the 2016 SNI guidelines and Regulation of PUPR No. 1 of 2022. The method of data collection in this study is documentation with research instruments in the form of documentation guidelines. The secondary data taken are the Cost Budget Plan (RAB), Work Unit Price Analysis

(AHSP) project analysis, AHSP SNI 2016 Guidelines, PUPR Regulation No. 1 of 2022 and Malang City Main Activity Unit Price (HSPK) in 2021.

The research flowchart can be seen in **Figure 1** below.



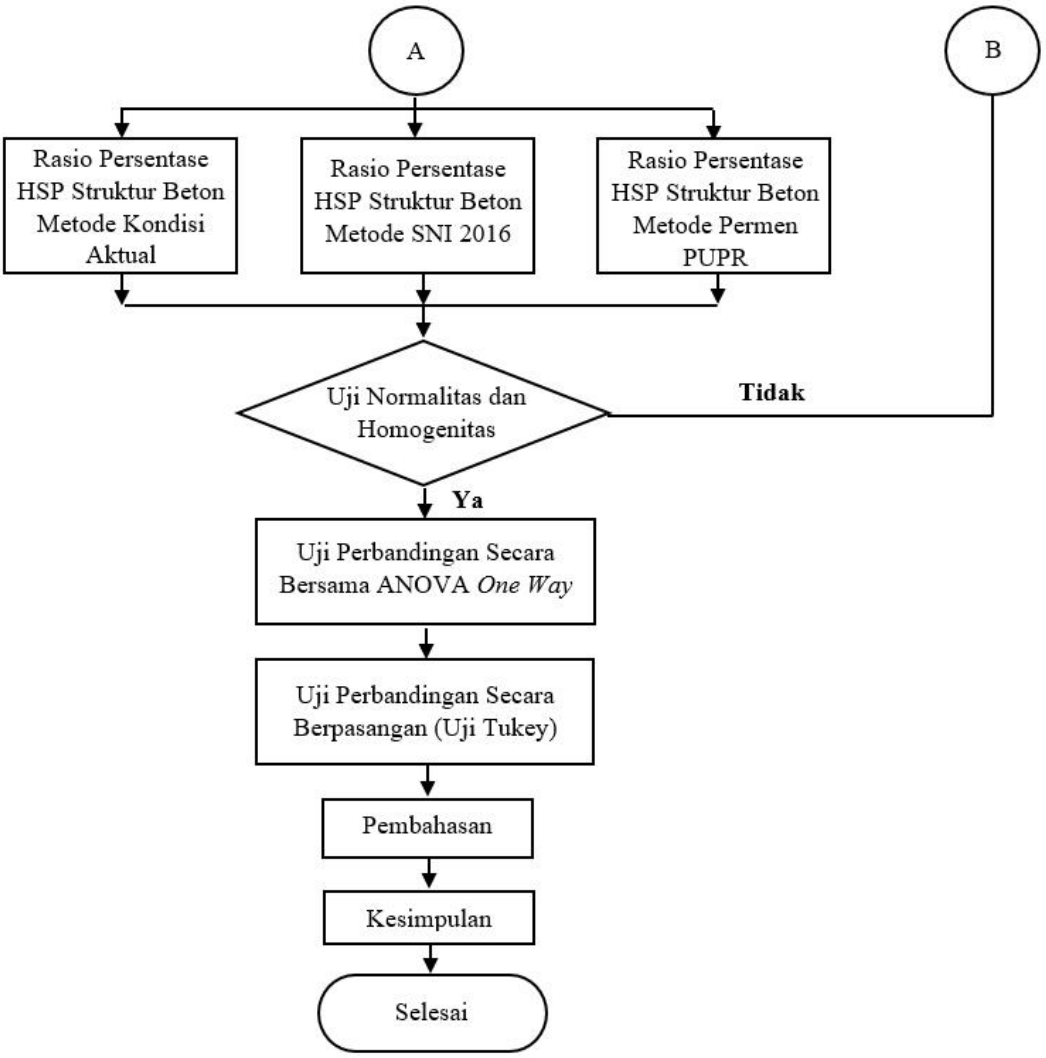


Figure 1. Research Flowchart

Based on **Figure 1** above, the stages of research are described as follows:

1) Conduct a literature study to determine the research topic.
2) Compiling research instruments in the form of documentation guidelines as a tool for retrieving data
3) Conducting a questionnaire assessment by validators regarding the relevance of AHSP indicators to data data sources, then the score results are carried out validity and reliability tests, if they are valid and reliable, then they can continue in the secondary data collection process, if not, revisions are made to the research instrument.
4) Perform secondary data retrieval
5) Processing secondary data so that the data matches the research needs
6) Calculating AHSP using the Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022, if the cost is cheaper than project analysis, then return to the calculation process for revision.
7) Calculate the percentage ratio of each type of concrete structure work and total HSP to project analysis data.

8) Analyze the results of the calculation of the total percentage ratio of HSP with the aim of obtaining the method with the lowest percentage ratio.
9) Conducting a normality and homogeneity test of the AHSP calculation results, namely the total HSP of the concrete structure of each method, if the test results are abnormal and homogeneous, then return to the AHSP calculation stage to be revised until the test results are normally distributed and homogeneous.
10) Conducting a joint comparison test of ANOVA One Way
11) The results of the ANOVA One Way have significant differences, so continue on the Tukey HSD test to find out the pairs of significantly different methods.
12) Discussing the results of the AHSP calculation of project analysis, actual condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022, percentage ratio, comparison test results together and in pairs.
13) Drawing up conclusions from the results of the study

3. RESULTS

3.1 Description of Total Unit Price of Concrete Structure Work Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022 Software Estimator.id

The results of the AHSP calculation of the Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 with unit prices based on the 2021 Malang City HSPK can be seen in **Table 1** below.

Table 1. Total Unit Price of Concrete Structure Work

Number	Methods	HSP
1	Project Analysis	IDR 252,161,551.51
2	Actual Condition	IDR 296,562,918.52
3	SNI 2016	IDR 300,278,528.99
4	Regulation of PUPR Number 1 of 2022	IDR 295,731,973.03

Based on Table 1, the total unit price of concrete structure work for project analysis is IDR 252,161,551.51, the Actual Condition method is IDR 296,562,918.52, the SNI 2016 method is IDR 300,278,528.99 and the Regulation of PUPR method No. 1 of 2022 is IDR 295,731,973.03. The SNI 2016 method produces the highest unit price of concrete structure work, while the Regulation of PUPR No. 1 of 2022 method produces the lowest unit price of concrete structure work.

3.2 Description of the Largest Percentage Ratio of Unit Price of Concrete Structure Work between Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022 Software Estimator.id

The results of the calculation of the percentage ratio of the unit price of concrete structure work in the Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 to the project analysis can be seen in **Table 2** below.

Table 2. Concrete Structure Work Unit Price Percentage Ratio

Number	Types of Work	Actual Condition (%)	SNI 2016 (%)	Regulation of PUPR (%)
1	Plate Foundaton Work	0.301%	0.283%	0.268%
2	Strauss Foundaton Work	0.221%	0.273%	0.263%
3	Sloof Work	0.121%	0.157%	0.130%
4	Column Work	0.238%	0.239%	0.213%
5	Floor Plate Work	0.133%	0.158%	0.169%
6	Stair Plate Work	0.030%	0.000%	0.017%
7	Beam Work	0.078%	0.160%	0.079%

Based on **Table 2**, the percentage ratio of the unit price of concrete structure work in the Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 is the largest plate foundation work. This is due to the determination of the wage coefficient and different materials/materials between the project analysis and the three methods, besides that the unit price of class III wooden blocks/boards at the 2021 Malang City HSPK is much more expensive than the standard price in the project analysis. The percentage ratio is influenced by differences in the provisions of the coefficient and unit price on wages and materials used (Astari, 2014).

3.3 Description of the Lowest AHSP Method Concrete Structure Work Unit Price Percentage Ratio

The results of the calculation of the percentage ratio of the Actual Condition method, SNI 2016 and Regulation of PUPR No.1 of 2022 to the project analysis can be seen in **Table 3** below.

Table 3. Percentage Ratio of Total Unit Price of Concrete Structure Work

Number	Methods	HSP Project Analysis	HSP Methods	Ratio
1	Actual Condition	IDR 252,161,551.51	IDR 296,562,918.52	0.150%
2	SNI 2016		IDR 300,278,528.99	0.161%
3	Regulation of PUPR Number 1 of 2022		IDR 295,731,973.03	0.147%

Based on Table 3, the percentage ratio of the AHSP method for Actual Conditions is 0150%, SNI 2016 is 0.161% and Regulation of PUPR No. 1 of 2022 is 0.147%. The Pupr Regulation No. 1 of 2022 method produces the lowest percentage ratio compared to the 2016 Actual Condition and SNI methods. The lower the unit price of work, the lower the percentage ratio produced (Pratama, et al., 2017).

3.4 Level of Difference in Joint Test of Unit Price of Concrete Structure Work Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022

1) Normality Test

The results of the test operated using SPSS software version 26 can be seen in **Figure 2** below.

Tests of Normality							
		Kolmogorov-Smirnov			Shapiro-Wilk		
	Sumber	Statistic	df	Sig.	Statistic	df	Sig.
Harga Satuan Pekerjaan Struktur Beton	Analisa Proyek	0.281	59	0.126	0.775	59	0.059
	AHSP Kondisi Aktual	0.266	59	0.144	0.82	59	0.065
	AHSP SNI 2016	0.263	59	0.154	0.814	59	0.057
	AHSP Permen PUPR No. 1 Tahun 2022	0.254	59	0.192	0.818	59	0.061
a. Lilliefors Significance Correction							

Figure 2. Normality Test of Unit Price of Concrete Structure Work

Based on Figure 2, the significance values of the normality test are as follows:

(1) Sig AHSP Kolmogorov-Smirnov and Shapiro-Wilk Project Analysis = 0.126 and 0.059 > 0.05 (Widana & Muliani, 2020), meaning the average unit price of normally distributed concrete structure work.

(2) Sig AHSP Actual Condition Kolmogorov-Smirnov and Shapiro-Wilk = 0.144 and 0.065 > 0.05 (Widana & Muliani, 2020), meaning the average unit price of normally distributed concrete structure work.

(3) Sig AHSP SNI 2016 Kolmogorov-Smirnov and Shapiro-Wilk = 0.154 and 0.057 > 0.05 (Widana & Muliani, 2020), meaning the average unit price of normally distributed concrete structure work.

(4) AHSP Regulation of PUPR No. 1 of 2022 Kolmogorov-Smirnov and Shapiro-Wilk = 0.192 and 0.061 > 0.05 (Widana & Muliani, 2020), meaning the average unit price of normally distributed concrete structure work.

2) Homogeneity Test

Based on calculations using SPSS version 26, the average significance value of the unit price of AHSP concrete structure work for project analysis, actual condition method, SNI 2016 and Permen PUPR No. 1 of 2022 with the Levene method is homogeneously varied, because Sig > 0.05 (Widana & Muliani, 2020). These results can be seen in the figure below.

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Harga Satuan Pekerjaan Struktur Beton	*Based on Mean*	2.575	3	232	0.055
	Based on Median	1.102	3	232	0.349
	Based on Median and with adjusted df	1.102	3	208.9	0.349
	Based on trimmed mean	2.5	3	232	0.06

Figure 3. Homogeneity Test of Unit Price of Concrete Structure Work

3) ANOVA One Way Test

Based on calculations using SPSS version 26, the significance value of the ANOVA One Way test was generated by 0.03 < 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work there was a significant difference.

3.5 Level of Difference in Paired Test Unit Price of Concrete Structure Work Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022

Based on calculations using SPSS version 26, **Table 6** is generated below.

Table 6. Tukey Test Unit Price of Concrete Structure Work

Number	Methods	Sig
1	Project Analysis – Actual Condition	0.089
2	Project Analysis – SNI 2016	0.043
3	Project Analysis – Regulation of PUPR Number 1 of 2022	0.091
4	Actual Condition – SNI 2016	0.991
5	Actual Condition – Regulation of PUPR Number 1 of 2022	1.000
6	SNI 2016 – Regulation of PUPR Number 1 of 2022	0.990

Based on Table 6, the Tukey HSD test results are as follows:

1) Sig Project Analysis with Actual Conditions = 0.089 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work does not have a significant difference.
2) Sig Project Analysis with SNI 2016 = 0.043 < 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work there is a significant difference.
3) Sig Project Analysis with Regulation of PUPR No. 1 of 2022 = 0.091 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work does not have a significant difference.
4) Sig Actual Condition with SNI 2016 = 0.991 > 0.05 (Widana & Muliani, 2020), meaning the average unit price of concrete structure work does not have a significant difference.
5) Sig Actual Condition with Regulation of PUPR No. 1 of 2022 = 1,000 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work does not have a significant difference.
6) Sig SNI 2016 with Regulation of PUPR No. 1 of 2022 = 0.990 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work does not have a significant difference.

4. DISCUSSION

4.1 Description of Total Unit Price of Concrete Structure Work Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022 Software Estimator.id

4.1.1 Description of Total Unit Price of Concrete Structure Work Project Analysis

Based on **Table 1**, the total unit price of concrete structure work for project analysis is Rp 252,161,551.51. These results are in accordance with Mone's research (2017), especially in the aspects of: (1) the type of work reviewed is concrete structure work, (2) the similarity of concrete quality and (3) the research location in Malang City. This research was carried out at the Accounting Lecture Building Construction Project, Polinema, Malang City, while Mone's research (2017) was carried out on the Revistar Graha Dewata Office Building Construction Project, Malang City, thus causing differences in the coefficients and unit prices used.

4.1.2 Description of Total Unit Price of Concrete Structure Work Actual Condition Method

Based on **Table 1**, the total unit price of concrete structure work for the Actual Condition method is IDR 296,562,918.52. These results are in accordance with Widodo's research (2020), especially in the aspects of: (1) the type of work reviewed is concrete structure work, (2) the type of wood used in the scope of drilling and (3) the project is included in the East Java region. The 9 mm multiplex coefficient in this study was 2.5, while in Widodo's research (2020) it was 1.6. This is due to the different amount of use, namely in this study, formwork was used 2 times, while Widodo's research (2020) was used 3 times.

4.1.3 Description of Total Unit Price of Concrete Structure Work SNI 2016

Based on **Table 1**, the total unit price of concrete structure work for the SNI 2016 method is IDR 300,278,528.99. These results are in accordance with the research of Natalia, et al. (2019), especially in the aspect of the type of work reviewed is concrete structure work. The difference between this study and Natalia, et al. (2019) lies in the calculation of AHSP in the scope of fixing. In this study, a screw / plain iron coefficient of 10.5 was used with an adjustment to iron needs according to project analysis, so as to use waste of 5% every 10 kg of fixing, while the research of Natalia, et al. (2019) adjusted iron needs according to planning data without using waste.

4.1.4 Description of Total Unit Price of Concrete Structure Work Minister of Public Works and People's Housing Number 1 of 2022 Software Estimator.id

Based on **Table 1**, the total unit price of concrete structure work for the Regulation of PUPR No. 1 of 2022 method is IDR 295,731,973.03. These results are in accordance with Astari (2014), especially in the aspects of: (1) the type of work reviewed is concrete structure work and (2) the use of waste every 10 kg of fixing. The difference between this study and Astari's (2014) research lies in the calculation of miscellaneous costs. In this study, it did not calculate other costs (overhead), while Astari's research (2014) added other costs according to the provisions in the guidelines, namely 10%. In addition, the method in this study is Regulation of PUPR No. 1 of 2022 which already uses kg units for Portland Cement (PC), while the AHSP method in Astari's research (2014) is PUPR Regulation No. 11 of 2013 which still uses zak units, so it is necessary to convert units first to adjust to field needs.

4.2 Description of the Largest Percentage Ratio of Unit Price of Concrete Structure Work between Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022 Software Estimator.id

Based on **Table 2**, the largest percentage ratio of the unit price of concrete structure work is plate foundation work, namely the Actual Condition method of 0.301%, SNI 2016 0.283% and Regulation of PUPR No. 1 of 2022 0.268%. These results are in accordance with Astari's research (2014), especially in the aspect of the type of work that produces the largest percentage ratio, namely pile foundation work (0.508%). This result is also in accordance with the research of Natalia, et al. (2019), especially in the aspect of the type of concrete structure work that is fundamental, namely beam work (0.885%) because the Aeon Mixed Use Apartment Construction Project, Bogor there are 27 floors that require many items on the type of block work, so that the price difference produced is even more. The largest percentage ratio is produced in the type

of concrete structure work that is fundamental, thus having a great influence on construction costs (Ervianto, et al., 2012).

4.3 Description of the Lowest AHSP Method Concrete Structure Work Unit Price Percentage Ratio

Based on Table 3, the lowest percentage ratio of the total unit price of concrete structure work is the Regulation of PUPR No.1 of 2022 method, which is 0.147%. This is because the wage coefficient is smaller than other methods, thus affecting the unit price of the work produced. This result is in accordance with the research of Pratama, et al. (2017), especially in the aspect of the AHSP method which produces the lowest percentage ratio, namely the Regulation of PUPR No. 11 of 2013 method of 0.159%. This result is also in accordance with Rasuna's research (2019), especially in the aspect of the AHSP method with the lowest percentage ratio, namely Regulation of PUPR No. 28 of 2016 of 0.192%.

4.4 Level of Difference in Joint Test of Unit Price of Concrete Structure Work Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022

Based on sub-chapter 3.4 number 3, Sig = 0.03 < 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work between project analysis, actual condition method, SNI 2016 and PUPR Regulation No. 1 of 2022 there are significant differences, this is due to the provisions of coefficient and different unit prices. These results are in accordance with the research of Pratama, et al. (2017), especially in the aspect of significant differences. This is because the coefficient and unit price between the actual method, SNI 2008, HSPK Medan City in 2016 and Permen PUPR No. 11 of 2013 are different.

4.5 Level of Difference in Paired Test Unit Price of Concrete Structure Work Project Analysis, Actual Condition Method, SNI 2016 and Minister of Public Works and People's Housing Number 1 of 2022

1) Project Analysis with Actual Condition Method

Sig = 0.089 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work between the project analysis and the Actual Condition method does not have a significant difference because the coefficients in the Actual Condition method follow the data in the project analysis, while the difference lies only in the base unit price. This result is in accordance with Triyatmo's research (2020), especially in the aspect of the absence of significant differences between contractor analysis and the Actual method, because the coefficients used are the same and only differ in the base unit price.

2) Project Analysis with SNI 2016 Method

Sig = 0.043 < 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work between project analysis and SNI 2016 method there is a significant difference because the wage coefficient in SNI 2016 is greater than that of project analysis. In addition, to the difference in the larger wage coefficient, the unit price used is based on the 2021 Malang City HSPK which has considered various external factors so that it is more expensive than project analysis. These results are in accordance with the research of Natalia, et al. (2019), especially in the aspect of significant differences because the 2016 SNI wage coefficient is greater, because it still uses conventional work methods.

3) Project Analysis with the Regulation of PUPR Method No. 1 of 2022

Sig = 0.091 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work between project analysis and the method of Regulation of PUPR No. 1 of 2022 does not have a significant difference, because the wage coefficient in the Regulation of PUPR No. 1 of 2022 method is smaller than the project analysis. These results are in accordance with Rahman's research (2018), especially in the aspect of the absence of significant differences between project analysis and PUPR Regulation No. 28 of 2016 because most wage coefficients are smaller than project analysis.

4) Actual Condition Method with SNI 2016

Sig = 0.991 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work between the Actual Condition method and SNI 2016 does not have a significant difference because the coefficient of wood materials/materials in SNI 2016 is smaller than the Actual Condition, besides that the unit price used is the same, namely based on the 2021 Malang City HSPK. This result is in accordance with the research of Messah, et al. (2013), especially in the aspect of the absence of significant differences between the actual method and SNI 2008 because the determination of the quality of materials / materials is smaller than the actual and price standards used based on analysis on the contractor.

5) Actual Condition Method with Regulation of PUPR Number 1 of 2022

Sig = 1,000 > 0.05 (Widana & Muliani, 2020), meaning that the average unit price of concrete structure work between the Actual Condition method and PUPR Regulation No. 1 of 2022 does not have a significant difference because the coefficient of wood materials / materials in the scope of the breeding work and the wage coefficient is smaller than the Actual Condition, besides that the unit price used is the same. This result is in accordance with Fajar's research (2019), especially in the aspect of the absence of significant differences between the actual method and Regulation of PUPR No. 28 of 2016 because the wage coefficient in the PUPR Regulation is smaller than the actual condition and the unit price used is the same, namely based on the price standard in project planning.

6) SNI 20162015 Method with Regulation of PUPR Number 1 of 2022

Sig = 1,000 > 0.05 (Widana & Muliani, 2020), meaning that the average total unit price of concrete structure work between the SNI 2016 method and Regulation of PUPR No. 1 of 2022 does not have a significant difference because the coefficient of building materials / materials is almost the same, the difference lies only in the wage coefficient. This result is in accordance with Rasuna's research (2019), especially in the aspect of the absence of significant differences, because the coefficient of ingredients between the method of Regulation of PUPR No. 28 of 2016 and SNI 2016 is almost the same.

5. CONCLUSION

Based on the discussion, the following conclusions were obtained:

1) Total unit price of concrete structure work project analysis = IDR 252,161,551.51, Actual Condition method = IDR 296,562,918.52, SNI 2016 = IDR 300,278,528.99 and Regulation of PUPR No. 1 of 2022 = IDR 296,231,973.03. The AHSP SNI 2016 method produces the highest unit price of concrete structure work, while the

Regulation of PUPR No. 1 of 2022 method produces the lowest unit price of concrete structure work.

2) The largest ratio percentage of the unit price of concrete structure work between project analysis, actual condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 is plate foundation work.
3) The lowest percentage ratio of the total unit price of concrete structure work is the method of Regulation of PUPR No. 1 of 2022
4) The level of difference in AHSP test with ANOVA One Way project analysis, Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022 is that there are significant differences
5) The level of difference in AHSP paired test Tukey HSD project analysis, Actual Condition method, SNI 2016 and Regulation of PUPR No. 1 of 2022, namely:
   (1) The average unit price of concrete structure work between the project analysis and the Actual Condition method did not make a significant difference
   (2) The average unit price of concrete structure work between the project analysis and the SNI 2016 method there is a significant difference
   (3) The average unit price of concrete structure work between the project analysis and the method of Regulation of PUPR No. 1 of 2022 does not have a significant difference
   (4) The average unit price of concrete structure work between the Actual Condition method and SNI 2016 did not have a significant difference
   (5) The average unit price of concrete structure work between the Actual Condition method and the Regulation of PUPR No. 1 of 2022 method does not have a significant difference
   (6) The average unit price of concrete structure work between the SNI 2016 method and the Regulation of PUPR method No. 1 of 2022 does not have a significant difference

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