

## **The Effect of the Construction Contract System on the Quality of Contractors' Work in Road and Bridge Construction Projects in Mountainous Papua Province**

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### **ABSTRACT**

Construction contract systems play a critical role in determining project performance, particularly in challenging geographic contexts. This study examines the impact of Lumpsum and Unit Price contract systems on contractor work quality in road and bridge construction projects across Mountainous Papua Province, Indonesia. Data were collected through structured interviews with 40 contractors engaged in government-funded infrastructure projects in three regencies (Jayawijaya, Lanny Jaya, and Yalimo) between 2024 and 2025. Work quality was assessed using a five-point qualitative scale ranging from “Poor” to “Excellent,” based on field observations and project documentation verification. Results indicate that both contract systems yielded satisfactory work quality outcomes: Lumpsum contracts recorded 22% excellent, 40% good, 33% moderate, and 5% poor performance, while Unit Price contracts achieved 20% excellent, 60% good, and 20% moderate performance. Statistical analysis revealed no significant difference in work quality between the two contract systems (mean scores: Lumpsum = 3.7, Unit Price = 4.0 on a five-point scale). However, external factors—such as remote geography, customary land tenure issues, and security concerns—substantially influenced project execution timelines and resource mobilization. These findings suggest that contract system selection may be less critical than the implementation of contextual adaptation strategies for infrastructure projects in remote mountainous regions. The study provides empirical evidence on contract performance in underexplored geographical contexts and offers policy implications for regional infrastructure planning in Papua.

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**Keywords:** *Contract System; Construction, Projects; Road Development; Bridge*

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## **INTRODUCTION**

Globally, construction contract systems have evolved as critical instruments for managing project risks, costs, and quality outcomes (Osifo et al., 2025). International construction practices increasingly recognize that contract type selection significantly influences project performance, particularly in complex geographical and institutional environments (Gunhan, 2020). The choice between fixed-price arrangements such as Lumpsum contracts and measurement-based systems like Unit Price contracts carries substantial implications for cost certainty, scope flexibility, and contractor behavior (Rahmani et al., 2021; Suprayitno et al., 2020).

In developing regions with challenging infrastructure contexts, the relationship between contract systems and work quality becomes even more consequential. Recent studies have documented how contract structures interact with local conditions to shape construction outcomes in remote areas (Nwajei, 2021; Osifo et al., 2025). However, limited empirical data exist on how contract types affect work quality in geographically isolated mountainous regions characterized by logistical constraints, customary land tenure systems, and intermittent security challenges—conditions prevalent in Indonesia’s eastern provinces (Haryanto, 2022).

Construction project development is becoming increasingly rapid. Such projects comprise a series of activities carried out within a specific timeframe. The implementation

process involves various stages, starting from planning, drawing preparation, scheduling, and execution to project completion (Messner, 2023). This series of activities inevitably engages multiple parties, one of which is the contractor as the key executor of the construction project. According to, a contractor is a person or entity that performs construction work based on predetermined costs and design plans while adhering to established regulations or contractual conditions. Contractors may operate as individuals or companies with legal entity status engaged in construction activities (Ashworth & Perera, 2018).

The Lumpsum contract system, with a fixed-price value under the Contractor's Full Pre-financed (CPF) scheme, is implemented to alleviate financial burdens on project owners, as all financing is borne by contractors at 100% and paid 30 days after the Provisional Hand Over (PHO) minutes are signed by both parties (Rato, 2018). Another commonly used system in construction contracts is the Remeasure Contract (Unit Price). In this system, the key clause states that "the unit price of work is binding, but the quantity of work will be recalculated according to actual conditions in the field." Consequently, disputes often arise between the assignor and the contractor when determining the final quantity calculations, which serve as the basis for concluding the project's final contract value (Turudić & Dragojević, 2024).

Bridge construction represents a critical component of land transportation infrastructure that facilitates the distribution of goods, delivery of services, and community mobility across various economic sectors (Kaiser & Barstow, 2022). Thus, bridge development plays a pivotal role in fostering regional economic growth (Zaman et al., 2021). The Papua Mountains Provincial Government allocates budgetary resources not only for non-infrastructure expenditures but also for significant investments in bridge construction to promote sustainable economic development across multiple sectors (Townshend, 2020). Nevertheless, the unique challenges posed by mountainous terrain, remote locations, and limited accessibility in Papua create distinct implementation contexts that can influence how different contract systems perform (Fauzi et al., 2019, 2023).

Given these contextual factors, a notable research gap emerges: there is insufficient empirical evidence on how Lumpsum and Unit Price contract systems comparatively influence contractor work quality under extreme geographical conditions such as those in Mountainous Papua Province (Kinkin, 2020). While existing literature addresses contract performance in conventional settings, the interaction between contract types and Papua's unique challenges—including difficult topography, customary land systems, material transportation constraints, and security considerations—remains underexplored (Geyer, 2025).

This study addresses that gap by examining construction projects implemented across three regencies in Mountainous Papua Province. The research contributes to the field of construction management by: (1) providing empirical evidence on contract system performance in a remote mountainous context; (2) identifying how local contextual factors mediate the relationship between contract types and work quality; and (3) offering evidence-based insights for infrastructure procurement policy in geographically challenging regions.

The objective of this research is to determine the influence of the Lumpsum contract system on the quality of contractors' work in road and bridge construction projects, to analyze the influence of the Unit Price contract system on work quality, and to evaluate how the overall contract system affects contractor performance in the context of Mountainous Papua Province (Marsudi & Andung Yuniarta, 2025; Pasinggi & Simanjuntak, 2024).

Based on the preceding background, the author re-examines construction projects in Mountainous Papua Province in terms of contractor work quality, the Lumpsum contract system, and the Unit Price contract system implemented in bridge construction. Therefore, it is deemed essential to undertake this study under the title “*The Effect of the Construction Contract System on the Quality of Contractors' Work in Road and Bridge Construction Projects in Mountainous Papua Province.*”

## **METHOD**

This study employed a quantitative descriptive research design to examine the relationship between contract systems and work quality outcomes. The research systematically explored the application of Lumpsum and Unit Price contract systems across construction projects in Mountainous Papua Province, Indonesia.

The research focused on three regencies within Mountainous Papua Province: Jayawijaya, Lanny Jaya, and Yalimo. These locations were purposively selected due to their concentration of government-funded road and bridge infrastructure projects and their representation of typical mountainous terrain challenges in the region. The study area was characterized by elevations ranging from 1,400 to 4,800 meters above sea level, dense tropical rainforest coverage, and limited road accessibility, all of which substantially influenced construction logistics and project execution.

The study population comprised contractors engaged in road and bridge construction projects funded through Regional Budget (APBD) and National Budget (APBN) sources during the 2024–2025 fiscal period. Through purposive sampling, 40 contractors representing 40 distinct work packages were selected as respondents. Selection criteria included: (1) active involvement in completed or ongoing road/bridge projects; (2) utilization of either Lumpsum or Unit Price contract systems; and (3) willingness to participate in structured interviews. The sample included 11 primary contractors and 29 subcontractors, all of whom possessed required technical competency certificates (SKK) and work competency certifications (SKT) as mandated by Indonesian construction regulations.

Primary data were obtained through structured interviews conducted with contractor representatives, including project managers and site supervisors who possessed direct knowledge of project execution and contract administration. Interview protocols addressed: (1) contract system characteristics and implementation experiences; (2) work quality self-assessment based on project completion standards; (3) challenges encountered during project execution; and (4) factors influencing quality outcomes. Interviews were supplemented by a review of project documentation, including PHO (Provisional Hand Over) reports, quality inspection records, and contract documents, to validate respondent assessments.

Analysis proceeded in three stages: First, descriptive statistical analysis calculated frequency distributions, mean scores, and percentages for work quality categories across both contract systems. Second, comparative analysis examined differences in quality outcomes between Lumpsum ( $n = 30$  projects) and Unit Price ( $n = 10$  projects) contract implementations. Third, thematic analysis of interview transcripts identified external and internal factors mediating the relationship between contract systems and quality outcomes.

To enhance reliability, data validation involved: (1) cross-referencing interview responses with official project documentation, including PHO minutes and inspection reports;

(2) consistency checks across multiple respondents working on similar project types; and (3) triangulation of contractor assessments with observable project characteristics documented during site visits. This multi-method validation approach strengthened confidence in the accuracy of work quality classifications.

The research stages followed a three-phase process: pre-research preparation, research implementation, and data analysis (Sugiyono, 2017), as illustrated in the research flowchart below.

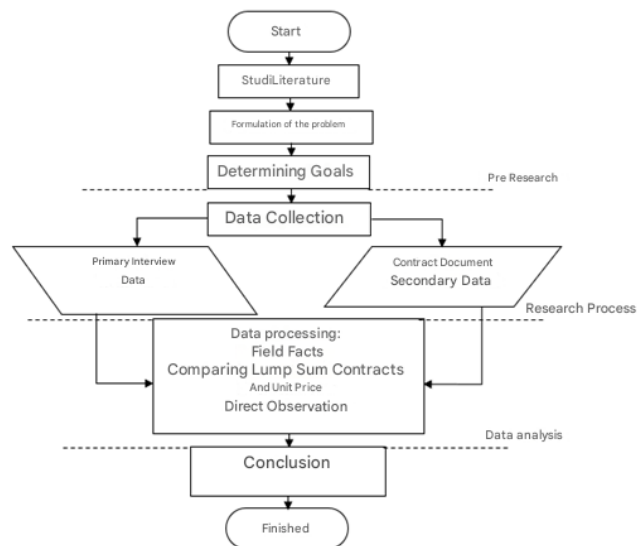


Figure 1 Research Flow Chart

## RESULTS AND DISCUSSION

### Identification of Respondent Data Against Service Providers and Owners

The following table of specific data obtained from the interview respondents includes the 10 main work packages carried out by the contractor as a Service Provider and provided by the agency/owner can be seen in Table 1 below.

Table 1 Responding Identities

No	Provider	Project Packages	Contract System	Quality of Work
1	PT. The Land of the Primaries	Construction of Jalan Gatot Subroto - Location III	<i>Unit Price</i>	Excellent
2	CV. Herarek Ikimo Meke	Drainage Construction of Gatot Subroto Road - Location III	<i>Lumpsum</i>	Good
3	CV. Nasmi	Drainage Construction of Gatot Subroto Road - Location III	<i>Lumpsum</i>	Moderate
4	PT. True Same Ray	Habema Road Development - Mugi	<i>Unit Price</i>	Excellent
5	Copyright © 2019 Welsh Rays. All Rights Reserved.	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Excellent
6	CV. Hagaruok Werne	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Moderate

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<b>No</b>	<b>Provider</b>	<b>Project Packages</b>	<b>Contract System</b>	<b>Quality of Work</b>
7	CV. Viol Jaya	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Moderate
8	CV. Vian Jaya	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Good
9	CV. Yowin Jaya	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Good
10	CV. Anugrah Kasih Putri Kalini	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Good
11	CV. Dolabut Putra	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Bad
12	CV. The Light of the East Star	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Good
13	CV. Hendi Putra	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Moderate
14	CV. Marcelo Elia Jaya	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Moderate
15	Copyright © 2019 Gihon Lani	Development of Ground Wall Retaining on Jalan Habema - Mugi	<i>Lumpsum</i>	Excellent
16	Copyright © 2019 Copyright © 2019 Copyright © 2019 Copyright	Development of Ground Wall Retaining on Jalan Habema - Mugi	<i>Lumpsum</i>	Moderate
17	CV. Aspel Mandiri Jaya	Development of Ground Wall Retaining on Jalan Habema - Mugi	<i>Lumpsum</i>	Bad
18	CV. Blessing Victory	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Good
19	CV. Honai Putra Papua	Habema Road Drainage Construction - Mugi	<i>Lumpsum</i>	Excellent
20	CV. Peace	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Moderate
21	CV. Holim Putra	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Excellent
22	CV. Cahaya Indah Papua	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Good
23	Copyright © 2019 Kali Mayu. All Rights Reserved	Construction of Habema Road Plate Decker Bridge - Mugi	<i>Lumpsum</i>	Moderate
24	Copyright © 2019 Copyright © 2019 Copyright © 2019 Copyright	Development of Ground Wall Retaining on Jalan Habema - Mugi	<i>Lumpsum</i>	Moderate
25	CV. Cahaya Papua	Development of Ground Wall Retaining on Jalan Habema - Mugi	<i>Lumpsum</i>	Excellent
26	PT. The Land of the Primaries	Construction of Hepuba Bridge Spanang 100 m	<i>Unit Price</i>	Good
27	PT. Sutama Mandiri Jaya	Steel Frame Bridge Installation	<i>Lumpsum</i>	Excellent
28	CV. Topaz Teknikal	Periodic maintenance of the Landik Bridge	<i>Unit Price</i>	Moderate

No	Provider	Project Packages	Contract System	Quality of Work
29	CV. Yali Vano	Installation of gabions with Galfanis coated wire on periodic maintenance of landic bridges	<i>Lumpsum</i>	Good
30	CV. Runi Jaya	Improvement of General Sudirman Road	<i>Unit Price</i>	Moderate
31	CV. Runi Jaya	Maima - Popugoba Road Improvement	<i>Unit Price</i>	Good
32	Copyright © 2019 Kasi	Construction of 3 Units of Deck Plate Bridge on Maima - Popugoba Road	<i>Lumpsum</i>	Good
33	Copyright © 2019 Abua Merah Kasih All Rights Reserved. All rights reserved Beautiful	Construction of Awin River Bridge, Niname District	<i>Unit Price</i>	Good
34	CV. Nai Awua Papua	Stone Pairs on the Construction of the Awin River Bridge	<i>Lumpsum</i>	Excellent
35	Copyright © 2019 Abua Merah Kasih Indah All Rights Reserved.	Construction of the Melagai River Bridge in Mokoni District	<i>Unit Price</i>	Good
36	CV. Nai Awua Papua	Construction of Temporary Bridges	<i>Lumpsum</i>	Moderate
37	CV. Months Pilamo	Construction of the Nogi River Bridge	<i>Unit Price</i>	Good
38	Lan Lanny's Native's CV	Installation of boronjong with Galfanis coated wire	<i>Lumpsum</i>	Moderate
39	CV. Yulisem	High River Bridge Connection	<i>Unit Price</i>	Good
40	CV. Yelper	Preparation, Disassembly, Transportation and Installation of High River Bridge Materials	<i>Lumpsum</i>	Good

Source : Interview Results, 2025

Based on the data obtained through interviews, analysis and discussion will be carried out at the same time. Descriptive analysis is presented as additional information to understand the results of the research being carried out and describe the condition of the respondents' answers to the questions presented in the interview. The identification of the interview candidates' work quality assessment can be seen in Table 2 below.

**Table 2 Identification of Respondent Assessments**

No	Contract System	Quality of Work	Value of Work Quality
1	<i>Unit Price</i>	Excellent	5
2	<i>Lumpsum</i>	Good	4
3	<i>Lumpsum</i>	Moderate	3
4	<i>Unit Price</i>	Excellent	5
5	<i>Lumpsum</i>	Excellent	5
6	<i>Lumpsum</i>	Moderate	3
7	<i>Lumpsum</i>	Moderate	3

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No	Contract System	Quality of Work	Value of Work Quality
8	<i>Lumpsum</i>	Good	4
9	<i>Lumpsum</i>	Good	4
10	<i>Lumpsum</i>	Good	4
11	<i>Lumpsum</i>	Signs	2
12	<i>Lumpsum</i>	Good	4
13	<i>Lumpsum</i>	Moderate	3
14	<i>Lumpsum</i>	Moderate	3
15	<i>Lumpsum</i>	Excellent	5
16	<i>Lumpsum</i>	Moderate	3
17	<i>Lumpsum</i>	Signs	2
18	<i>Lumpsum</i>	Good	4
19	<i>Lumpsum</i>	Excellent	5
20	<i>Lumpsum</i>	Moderate	3
21	<i>Lumpsum</i>	Excellent	5
22	<i>Lumpsum</i>	Good	4
23	<i>Lumpsum</i>	Moderate	3
24	<i>Lumpsum</i>	Moderate	3
25	<i>Lumpsum</i>	Excellent	5
26	<i>Unit Price</i>	Good	4
27	<i>Lumpsum</i>	Excellent	5
28	<i>Unit Price</i>	Moderate	3
29	<i>Lumpsum</i>	Good	4
30	<i>Unit Price</i>	Moderate	3
31	<i>Unit Price</i>	Good	4
32	<i>Lumpsum</i>	Good	4
33	<i>Unit Price</i>	Good	4
34	<i>Lumpsum</i>	Excellent	5
35	<i>Unit Price</i>	Good	4
36	<i>Lumpsum</i>	Moderate	3
37	<i>Unit Price</i>	Good	4
38	<i>Lumpsum</i>	Moderate	3
39	<i>Unit Price</i>	Good	4
40	<i>Lumpsum</i>	Good	4

Source : Analysis Results, 2025

The results of the researcher's assessment that have been carried out obtained the average value of the conformity of the quality of work of the contractor in the construction project of the Lumpsum and Unit Price contract system is at point value 3-4. Based on Table 2 above, the quality of contractors' work quality categories is Good.

**Table 3 Identification of Respondents' Assessment of the Lumpsum Contract System**

No	Contract System	Quality of Work	Value of Work Quality
1	<i>Lumpsum</i>	Good	4
2	<i>Lumpsum</i>	Moderate	3
2	<i>Lumpsum</i>	Excellent	5
3	<i>Lumpsum</i>	Moderate	3
4	<i>Lumpsum</i>	Moderate	3
5	<i>Lumpsum</i>	Good	4
6	<i>Lumpsum</i>	Good	4
7	<i>Lumpsum</i>	Good	4
8	<i>Lumpsum</i>	Signs	2

No	Contract System	Quality of Work	Value of Work Quality
9	<i>Lumpsum</i>	Good	4
10	<i>Lumpsum</i>	Moderate	3
11	<i>Lumpsum</i>	Moderate	3
12	<i>Lumpsum</i>	Excellent	5
13	<i>Lumpsum</i>	Moderate	3
14	<i>Lumpsum</i>	Signs	2
15	<i>Lumpsum</i>	Good	4
16	<i>Lumpsum</i>	Excellent	5
17	<i>Lumpsum</i>	Moderate	3
18	<i>Lumpsum</i>	Excellent	5
19	<i>Lumpsum</i>	Good	4
20	<i>Lumpsum</i>	Moderate	3
21	<i>Lumpsum</i>	Moderate	3
22	<i>Lumpsum</i>	Excellent	5
23	<i>Lumpsum</i>	Excellent	5
24	<i>Lumpsum</i>	Good	4
25	<i>Lumpsum</i>	Good	4
26	<i>Lumpsum</i>	Excellent	5
27	<i>Lumpsum</i>	Moderate	3
28	<i>Lumpsum</i>	Moderate	3
29	<i>Lumpsum</i>	Good	4

Source : Analysis Results, 2025

The results of the researchers' assessment that have been carried out obtained the average conformity of the quality of contractors' work in the construction project of the Lumpsum contract system is 3-4. Based on Table 3 above, the category of contractor work quality is Good.

**Table 4 Identification of Respondents' Assessment of the Unit Price Contract System**

No	Contract System	Quality of Work	Value of Work Quality
1	Unit Price	Good	4
2	Unit Price	Good	4
3	Unit Price	Good	4
4	Unit Price	Good	4
5	Unit Price	Good	4
6	Unit Price	Moderate	3
7	Unit Price	Moderate	3
8	Unit Price	Good	4
9	Unit Price	Excellent	5
10	Unit Price	Excellent	5

Source : Analysis Results, 2025

The results of the researcher's assessment that have been carried out obtained the average value of the suitability of the quality of work of the contractor in the construction project of the Unit Price contract system is to get a point value of 4. Based on Table 4 above, the contractor's work quality category is Good.

## Percentage of Contractor Work Quality

### 1. Lumpsum Contract System and Unit Price

The quality of work in the lumpsum contract system tends to result in definite costs and a clear scope of work, but is less flexible to change, whereas the unit price contract system offers high flexibility for adjustment of work volumes and uncertain field conditions, although it requires a more intensive monitoring system to measure the realization of work and ensure costs. The selection of a contract system depends heavily on the clarity of the project scope; Lumpsum is suitable for the exact scope, while the unit price is better for the still uncertain scope.

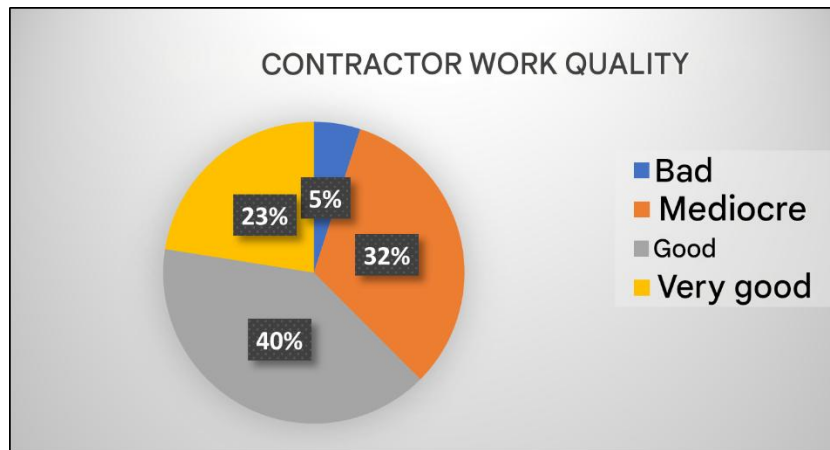


Figure 2 Work Quality of Contractors in the Road and Bridge Sector (Analysis Results, 2025)

### 2. Quality of Work Lumpsum Contract System

The quality of work on a lumpsum contract system tends to result in definite costs and a clear scope of work. Below it is known that out of a total of 40 service provider contractors/40 work packages in the field of roads and bridges in 3 districts are the focus areas of research from APBD and APBN funding sources, 30 service provider contractors/30 work packages.

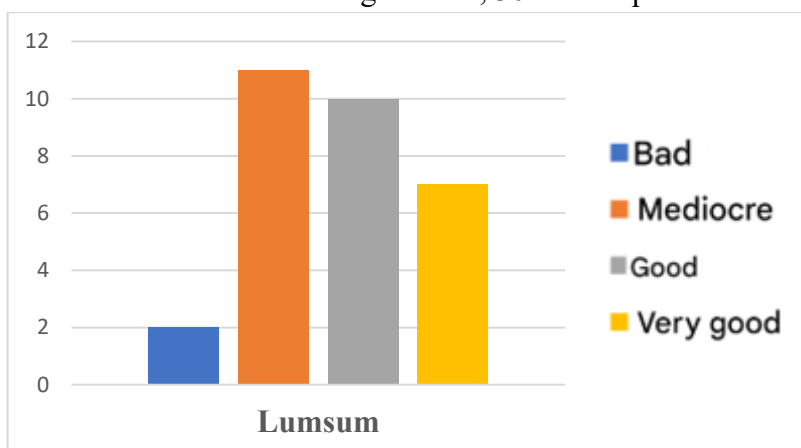


Figure 3 Quality of Work of Contractors in the Road and Bridge Sector of the Lumpsum Contract System (Analysis Results, 2025)

### 3. Quality of Work Unit Price Contract System

The unit price contract system offers high flexibility for adjustment of work volumes and uncertain field conditions. Below it is known that out of a total of 40 service provider

contractors/40 work packages in the field of roads and bridges in 3 districts are the focus areas of research from the source of APBD and APBN funds, 10 service provider contractors/10 main work packages.

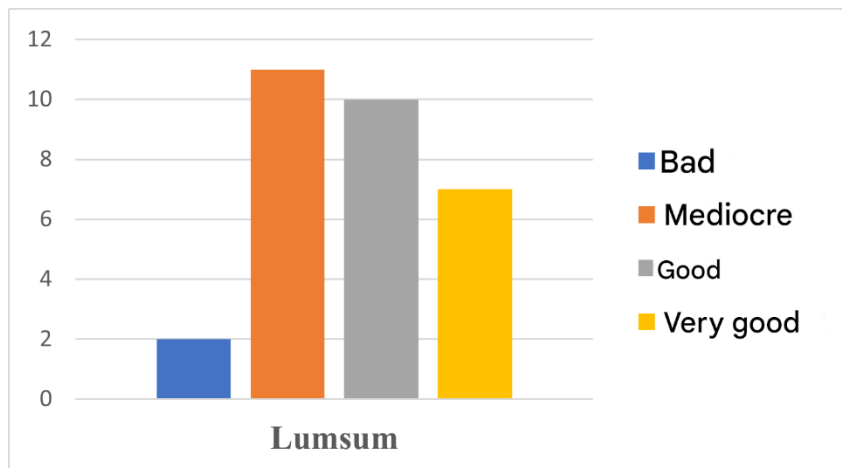


Figure 4 Work Quality of Contractors in the Road and Bridge Sector Unit Price Contract System (Analysis Results, 2025)

#### 4. Quality of Gabion Work

Gabions are structures made of woven wire filled with stone or other materials, used for a variety of purposes in the fields of civil and environmental engineering. Infrastructure development. Gabions can be used as part of infrastructure development, in this case the construction of gabions on the landic river bridge in Yalimo Regency and the construction of the river bridge in Lanny Jaya Regency, Papua Pegunungan Province

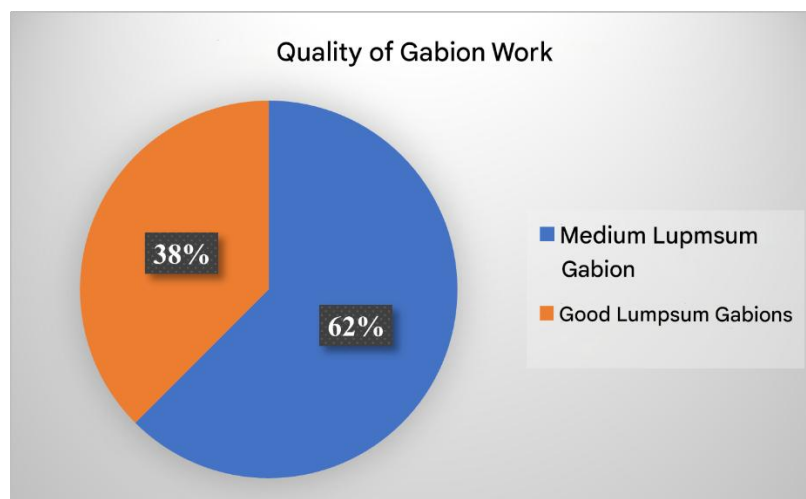


Figure 5 Work Quality of Boronjong Work Contractors (Analysis, 2025)

#### 5. Quality of Drainage Work

The construction of road drainage to drain rainwater and prevent waterlogging, road drainage can protect road infrastructure from damage. Good road drainage can improve the safety of road users by reducing the risk of accidents due to waterlogging or slippery roads. In this case, the focus of the research is on the construction of the drainage of the habema-mumugi

road, Jayawijaya Regency, and the construction of the Gatot Subroto road, location III, Jayawijaya Regency, Papua Mountainous Province.

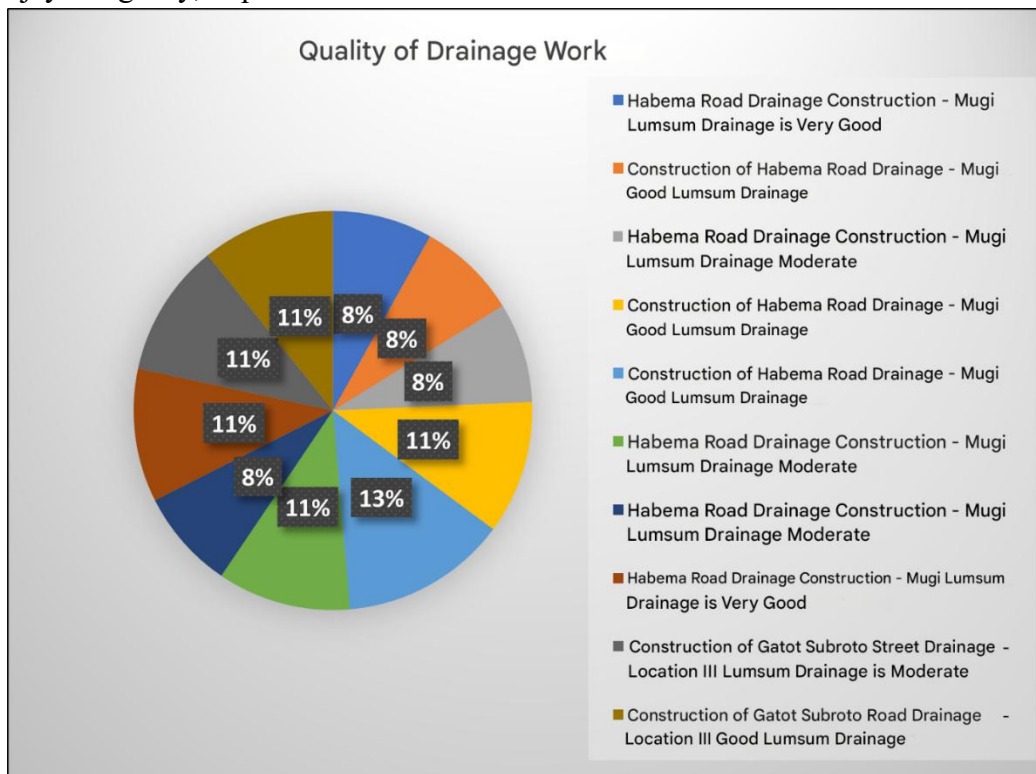


Figure 6 Work Quality of Drainage Work Contractors (Analysis, 2025)

### 6. *Quality of Bridge Work*

Bridge construction serves as a link between areas separated by rivers, valleys, or other obstacles, good bridge construction can improve the safety of road users by reducing the high risk of accidents due to crossing rivers or other obstacles. Thus, the construction of bridges can improve connectivity, support the main in economic growth and so on. In this case, the main focus of the research is on the Construction of the Melagai River Bridge in Mokoni District, the Stone Pairing in the SS Construction of the Awin River Bridge, the construction of the Nogi River Bridge, and the construction of the Lanny Jaya Regency Temporary Bridge. Provision, Dismantling, Transportation and Installation of High River Bridge Materials, High River Bridge Connection, Construction of Hepuba Bridge 100 m Span, Installation of Steel Frame Bridge, Construction of 3 Units of Plate Decker Bridge on Maima – Popugoba Street, Construction of 8 Units of Deck Plate Bridge on Habema – Mugi Road Jayawijaya Regency. Periodic maintenance of the Landik Bridge, Yalimo Regency, Mountainous Papua Province.

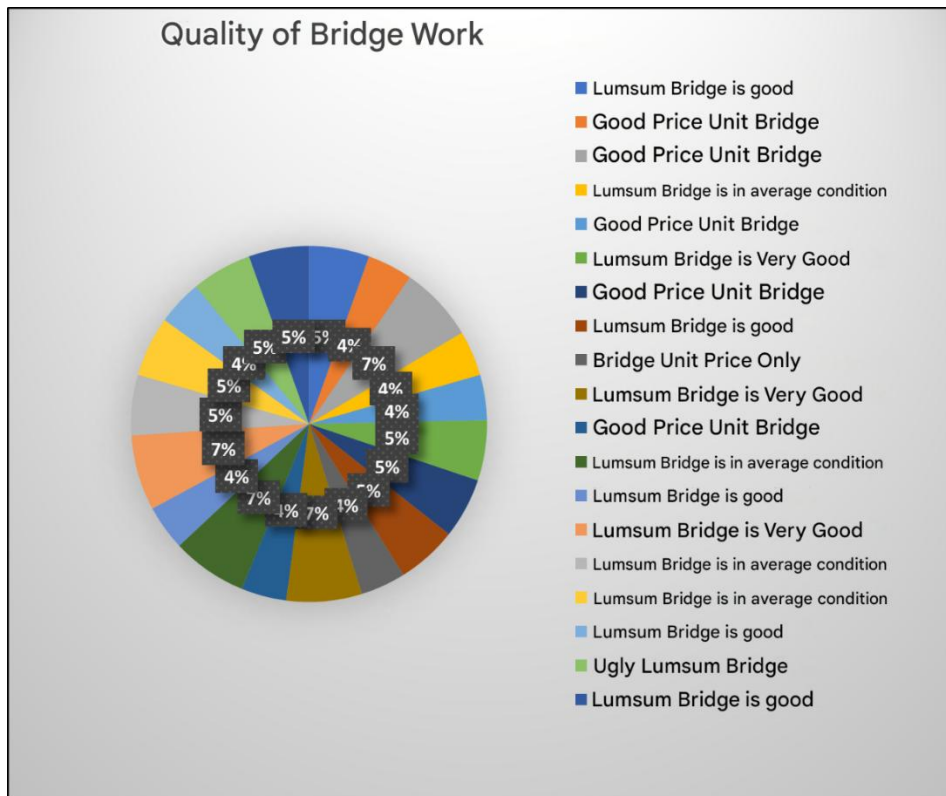


Figure 7 Work Quality of Bridge Construction Contractors (Analysis Results, 2025)

### 7. Quality of Work Road Work

Road construction functions as a link between different areas, making it easier to move people and goods. Road development also plays an important role in supporting the economy by facilitating the transportation of goods and services. In this case, the focus of the research is on the Construction of the Habema – Mugi Road, the Construction of the Gatot Subroto Road - Location III, the Improvement of the Maima – Popugoba Road, the Improvement of the General Sudirman Road, Jayawijaya Regency, Papua Mountainous Province.

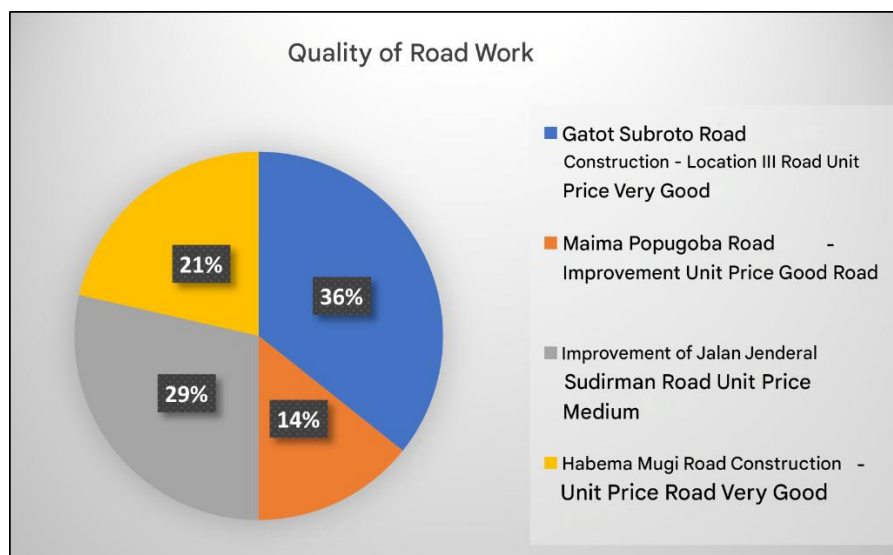


Figure 8 Quality of Work of Road Work Contractors (Analysis Results, 2025)

### 8. *Quality of Work Talut*

Good talut construction can improve community safety by reducing the risk of landslides and damage around residential areas and other land functions. The construction of talut can also support infrastructure development such as roads, bridges, and other buildings. In this case, the main focus of the research is on the development of talut in the construction of the Habema – Mugi Jalam section, Jayawijaya Regency, Mountainous Papua Province.



Figure 9 Work Quality of Talut Work Contractors (Analysis Results, 2025)

### **The Influence of Service Provider Factors in Construction Projects on the Quality of Contractors' Work in Mountainous Papua Province**

This study aims to find out the quality of work of construction contractors with the Lamsam and Yunit Price contract system focusing on road and bridge construction projects in the Mountainous Papua Province. There are often delays in implementation due to administration, in this case the work contract between the Service Provider and the Owner, the lack of material mobilization from Jayapura to Mountainous Papua and even the increase in the price of building materials according to the conditions at that time.

In other words, the decline in the quality or quality of work of the implementing contractor in the construction of roads and bridges in the Mountainous Papua Province results in delays in work with internal and external factors that can be experienced during the implementation of construction projects, especially the provision of materials that must be brought in from outside Wamena takes a long time so that it affects the quality of contractors' work.

### **The Influence of External Factors on Construction Projects on the Quality of Contractors' Work in Mountainous Papua Province**

Mountainous Papua has a difficult topography in the form of high mountains with calculations from zone 1 to zone 5 containing forests, tropical rain, and swamps, thus hindering the mobilization of materials, heavy equipment, and labor. The issue of customary rights or the release of customary land often affects the course of construction projects, making costs outside the Cost Budget Framework (RAB) so that it affects the quality of contractors' work.

In 2014 until now, the special security factor of the papda, in general, Mountainous Papua has become the main problem that can interfere with the smooth and completion of development projects in Papua Province.

### **The Influence of Owner Factors on Construction Projects on the Quality of Contractors' Work in Mountainous Papua Province**

Lack of clear and open communication between the owner and the contractor can lead to misunderstandings between both parties, and delays in decision-making in the contract of employment. Owners often delay or fail to make important decisions regarding the project, such as design approvals or specification changes, which can cause the project to stop.

Payment systems that are not in accordance with the contract, such as late payments to contractors, so that the project is also late. Implementation can be stalled, resulting in the smooth running of the project because the contractor is experiencing financial difficulties.

Here we will discuss the results of the research with similar research that has been carried out previously. The results of previous research related to this research are as follows:

- 1) Rato Toll Road Construction Project, (2018), The Semarang-Batang toll road project has a Lumpsum contract form stated in the Contractor Service Contract with the payment system used is contractor's Pre-Financing (CPF), which is the contractor must finance all work until completion and will be paid after the first handover report (PHO). Meanwhile, in this study, the Lumpsum contract system with the charge payment system is taken into account, in which the cost of materials, handyman costs, mobilization costs and equipment costs and other costs related to the work are taken into account.
- 2) Comparative analysis of Quantity calculation uses Microsoft Excel and Glodon Software for Pric Unit contracts, but in this study Quantity calculation uses Microsoft Excel for Unit Price contracts.
- 3) Based on the research that has been conducted, the following conclusions were obtained: Factors that affect the quality of road construction projects in Garut Regency have 5 criteria, namely, Planning, Road Construction Period, Auction Stage, External Factors and Internal Factors, but in the implementation of road construction projects with the Unit Price and Lampsam contract system there is no effect.
- 4) Indonesian construction contract system with international construction contract system. This research was written by Ery Radya Juarti et al. (2020), The purpose of this research is to conduct a study on the content and format of international contract standards associated with existing laws and regulations in Indonesia. There are several standard formats of international construction contracts such as FIDIC, JCT, ICE, AIA, EJCDC and SIA, in practice in this study it is used as a reference to create a standard format of Unit Price system contracts and Lampsam contracts with service providers and owners.

- 5) To realize the success of a quality building that is able to function as planned, good quality human resources are needed as well. And the professional ability of construction workers is evidenced by the possession of a skill or skill certificate. In this study, it consists of 11 contactors, main service providers and 29 subcontract service providers with different company qualifications, but in the completeness of the document, all have experts who are certified as Work Competency Certificates (SKK) and Technical Competency Certificates (SKT) in accordance with the field being worked.
- 6) Analysis of the risk factors of the bid below the estimate on the quality performance of the building construction project in the city of Padang. In this study the percentage bid (%) on the project can vary depending on the type of project and the project location, the percent bid that can be used is 5% - 12%.

### **Summary of Results**

The results of this study are as follows:

- 1) The quality of work of the contract system contractor Unit Price and Lampsam in the field of roads and bridges in the Mountainous Papua Province with a good classification of 40%, poor 5%, very good 22%, medium 33%.
- 2) Based on the analysis of project data from the Lampsam contract system, the quality of work is good.
- 3) Based on the analysis of project data, the Unit Price contract system is a good quality of work.

### **CONCLUSION**

The study found that both the Lumpsum and Unit Price contract systems yielded good quality outcomes in contractors' work for road and bridge construction projects in Mountainous Papua Province. However, statistical analysis indicated no significant effect of the contract system type on overall work quality, suggesting that factors beyond contract structure—such as contextual adaptation, resource management, and site-specific challenges—likely play a more influential role in determining outcomes. Future research should examine how external variables, including geographic constraints, stakeholder coordination, and local resource availability, interact with contract types to influence construction quality in remote and challenging environments.

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