GENERAL

analisa sni harga satuan pekerjaan jalan aspal

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Introduction

Road infrastructure is the backbone of any modern economy, enabling the flow of goods, services, and people. In Indonesia, the development and maintenance of asphalt roads are governed by a set of technical standards known as **SNI**(Standar Nasional Indonesia). These standards provide a framework for design, construction, and quality control, ensuring that roads are safe, durable, and cost-effective.

One of the most critical aspects of managing road projects is the accurate determination of **unit prices**. Unit prices are the building blocks of a project's budget; they represent the cost of a single unit of work—such as per meter of asphalt pavement, per cubic meter of base material, or per square meter of drainage system. The **SNI harga satuan pekerjaan jalan aspal**(SNI unit price for asphalt road works) is a comprehensive list of these unit prices, published by the Indonesian Ministry of Public Works and Housing.

For engineers, project managers, and procurement specialists, mastering the analysis of these unit prices is essential. It enables accurate cost estimation, effective tendering, transparent budgeting, and ultimately, the delivery of high quality roads within budget constraints.

In this article, we will dive deep into the world of SNI unit pricing for asphalt roads. We'll explore how the standards are structured, the components that make up each unit price, the methodology for analyzing and applying them, common pitfalls, and best practices to ensure your projects remain on track and on budget.

1. Understanding the SNI Framework for Asphalt Roads

1.1 What is SNI?

SNI stands for **Standar Nasional Indonesia**, which translates to "Indonesian National Standard." These standards are developed by the Indonesian National Standards Body (BSN) and cover a wide array of technical specifications, including construction materials, safety guidelines, and cost estimation.

For road construction, the most relevant SNI documents include:

- SNI 1726:2013 – Design of asphalt pavement
- SNI 1725:2015 – Design of sub base and base layers
- SNI 1724:2015 – Design of drainage and embankment
- SNI 1721:2015 – Cost estimation and unit price calculation for road works

These documents collectively form the foundation for calculating unit prices and ensuring compliance with national regulations.

1.2 The Role of Unit Prices in Road Projects

Unit prices serve as the currency of project budgeting. They allow:

- Consistent cost comparisons across different contractors and regions.
- Transparent tender documents that reduce the risk of cost overruns.
- Standardized cost estimation for government procurement.

Because road projects often involve complex sequences of activities—such as excavation, subgrade preparation, base layer construction, asphalt laying, and finishing—having a reliable unit price for each activity is indispensable.

2. Anatomy of an SNI Unit Price

2.1 Core Components

Each unit price in the SNI list typically comprises the following elements:

1. Basic Cost – The direct cost of materials, labor, and equipment for the specific activity.
2. Indirect Cost – Overheads such as site supervision, administration, and utilities.
3. Profit Margin – The contractor's expected profit on the activity.
4. Contingency – A buffer for unforeseen risks (e.g., weather, material price fluctuations).
5. Tax and Fees – Value Added Tax (VAT), local taxes, and any licensing fees.

When combined, these components yield the final **unit price**that should be used in tender documents and cost estimates.

2.2 Example: Asphalt Pavement Unit Price

Consider the unit price for laying a 3 /mm thick hot mix asphalt (HMA) layer:

- Material Cost – Asphalt binder, aggregates, and additives.
- Labor Cost – Operatives, supervisors, and quality inspectors.
- Equipment Cost – Asphalt mixer, pavers, and rollers.
- Logistics – Transportation of materials to the site.
- Quality Control – Testing and certification.
- Overheads and Profit – Calculated as a percentage of the direct cost.

The final unit price will be expressed per square meter (m^2) or per cubic meter (m^3), depending on the activity.

3. Step by Step Analysis of SNI Unit Prices

3.1 Gather the Relevant SNI Documents

Before diving into cost analysis, ensure you have the latest versions of the SNI manuals. These are usually available from the BSN website or through official government portals. Keep a digital copy for quick reference.

3.2 Identify the Scope of Work

Break down the project into its constituent activities:

1. Site clearing and excavation.
2. Subgrade preparation and compaction.
3. Base layer construction.
4. Asphalt overlay.
5. Final finishing and markings.
6. Drainage installation.

Each activity will correspond to a specific unit price in the SNI list.

3.3 Extract Unit Prices

Locate the relevant unit price for each activity. For example:

- Unit price for "Paving of asphalt layer" – Rp /1,200,000 per m^2.
- Unit price for "Compaction of base layer" – Rp /300,000 per m^3.

Record these values in a spreadsheet for further calculations.

3.4 Quantify the Work

Calculate the total quantity of each activity:

- Project length: 5 /km.
- Road width: 10 /m.
- Asphalt layer thickness: 3 /mm.

Using these figures, compute the total area (m²) or volume (m³) required:

Area = Length × Width = 5,000 m × 10 m = 50,000 m²\\nVolume of Asphalt = Area × Thickness / 1,000,000 = 50,000 /m² × 0.003 /m / 1,000,000 = 0.15 /m³\\n\\n3.5 Apply the Unit Prices

Multiply the unit price by the quantity to obtain the direct cost for each activity:

Asphalt Cost = Rp 1,200,000/m² × 50,000 m² = Rp 60,000,000,000\\nBase Layer Cost = Rp 300,000/m³ × 0.15 m³ = Rp /45,000\\n\\nRepeat for all activities, then sum the totals to get the preliminary project cost.

3.6 Incorporate Overheads, Profit, and Contingency

Apply the percentages specified in the SNI guidelines:

- Overheads: 8%
- Profit: 12%
- Contingency: 5%

Calculate each component:

Direct Cost = Rp 60,045,000,000\\nOverheads = 8% × Direct Cost = Rp 4,803,600,000\\nProfit = 12% × Direct Cost = Rp 7,205,400,000\\nContingency = 5% × Direct Cost = Rp 3,002,250,000\\nTotal Cost = Direct Cost + Overheads + Profit + Contingency\\n = Rp /75,056,250,000\\n\\n3.7 Validate with Historical Data

Compare your calculated cost with historical data from similar projects. Adjust if there are significant deviations, keeping in mind local variations in material prices or labor rates.

4. Common Pitfalls and How to Avoid Them

4.1 Using Outdated Unit Prices

Construction costs can fluctuate rapidly due to inflation, commodity price changes, or supply chain disruptions. Always verify that you are using the most recent SNI edition.

4.2 Ignoring Local Variations

While SNI provides national averages, regional differences—such as transportation distances or labor market conditions—can significantly affect costs. Adjust unit prices accordingly.

4.3 Overlooking Indirect Costs

Some contractors may underreport indirect costs to appear more competitive. Ensure that your analysis includes all overheads as prescribed by SNI.

4.4 Skipping Contingency Planning

Road projects are inherently risky. A 5% contingency is a baseline; complex projects may require higher buffers.

5. Best Practices for Accurate Cost Estimation

- Regularly Update Data – Keep a rolling list of the latest SNI unit prices and local market rates.
- Use Standardized Templates – Adopt a spreadsheet template that automatically calculates indirect costs, profit, and contingency.
- Engage Experienced Engineers – Leverage the expertise of civil engineers familiar with SNI standards.
- Validate with Field Surveys – Conduct site visits to confirm material availability and labor requirements.
- Document Assumptions – Clearly state any assumptions made during the estimation process.

6. Tools and Resources

6.1 Digital Cost Estimation Software

Software solutions such as **CostOS**, **RSMeans Indonesia**, and **Procore**integrate SNI unit prices and allow dynamic cost modeling.

6.2 Government Procurement Portals

Platforms like **e-Procurement PUPR** provide access to tender documents, unit price lists, and historical cost data.

6.3 Professional Networks

Joining associations such as the Indonesian Society of Civil Engineers (IIC) can offer access to workshops and updated guidelines.

7. Case Study: A 5 km Asphalt Road Project

Let’s walk through a simplified example to illustrate the application of SNI unit price analysis.

7.1 Project Overview

- Length: 5 /km
- Width: 10 /m
- Asphalt thickness: 3 /mm
- Base layer thickness: 0.2 /m

7.2 Cost Breakdown

Using the methodology described earlier, the estimated cost structure is:

- Asphalt layer: Rp /60 /billion
- Base layer: Rp /1 /billion
- Subgrade preparation: Rp /0.5 /billion
- Drainage: Rp /0.3 /billion
- Finishing: Rp /0.2 /billion

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