

Improvement Review of Road Network Connectivity (Case Study: Transport Infrastructure Lueng Daneun - Awe Geutah)

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1. ABSTRACT

Infrastructure development is one of the sectors currently being pursued by the government to support the standard of living of the people, in order to lead to the era of globalization. In this context, various regions have been marked by the development of the residential sub-sector which aims to support smooth transportation, the economy from one region to another. To anticipate traffic flow on the Leung Daneun-Awe Geutah road, Peusangan Siblah Krueng District, Bireuen Regency. One way is to overlay or add thickness and smoothen the existing road surface, so that with this effort it can smoothen traffic density in Peusangan Siblah Krueng District with a length of STA 0+⁰⁰⁰ to STA 5+⁰⁰⁰ where the road length is 5 km with a road width of 9 meters, with work scheduling management for 34 days while the consultant's planning time is 58 days, the difference obtained is 24 days, thus the author's scheduling results are more effective than the consultant's planning time. In implementing this road project, it is necessary to have a method of dealing with and preventing problems in the field. In order to prevent various problems in the field, it is necessary to create a resource utilization program that includes programs for employee, equipment, materials, work methods and **IMPLEMENTATION**.

Keywords: Implementation time, Paving, Overlay, Scheduling.

2. INTRODUCTION

Infrastructure development is one of the sectors that the government is currently pursuing to support the standard of living of the people, in order to lead to the era of globalization. In this context, various regions have been marked by the development of the community development sub-sector which aims to support smooth transportation, the economy from one region to another. To anticipate traffic flow on the Leung Daneun-Awe Geutah road, Peusangan Siblah Krueng District, Bireuen Regency. One way is to overlay or add thickness and smoothen the existing road surface, so that with this effort it can smoothen traffic density in Peusangan Siblah Krueng District.

3. REVIEW OF LITERATURE

3.1. Labor

Labor as the most important element of resources, because labor is the main component that utilizes and drives other resources. According to Soedrajat (1984), to determine the time needed to complete a type of work depends on the volume of work itself, the amount of labor used and the production of work produced, both individually and in work groups. To calculate the execution time for each activity, a formula is used with the equation: [1]

$$W = \frac{V}{N \times PK} \times 1 \text{ Day}$$

Information of :

W = Time to complete the job

V = Volume of each type of work

N = Number of each worker or work group in 1 hour

2.2. Equipment

The equipment is operated according to the sequence of work that is in good enough condition so that there are obstacles in the execution of the work. The purpose of selecting equipment is to select equipment according to the volume of work and the type of work to be carried out. The equipment to be used in the Leung Daneun-Awe Geutah road improvement project, Peusangan Siblah Krueng District, Bireuen Regency is Compressor, Asphalt Sprayer, Dump truck, Asphalt Finisher, Tandem Roller, Pneumatic Tired Roller and other equipment. According to Soedrajat (1984), the following formula is used to calculate compressor production: [1]

$$P = \frac{W \times S \times E}{N}$$

Information of :

- P = Tool productivity (m²/hour)
- W = Width of swivel broom (meters)
- S = Average speed
- E = Truck moving speed (km/hour)
- P = Thickness of the binder recipe layer (m)

According to Soedrajat (1984), to calculate the productivity of the asphalt sprayer, the following formula is used [1] :

$$P = W \times S \times E \times p$$

Information Of :

- P = Tool productivity (m³/hour)
- W = Spraying width (meter)
- S = Average speed
- E = Truck moving speed (km/hour)
- P = Thickness of the binder recipe layer (m)

According to Soedrajat (1984), to calculate the productivity of Dump Trucks the following formula is used:

$$P = \frac{10 \times S \times C}{S + (24 \cdot d)} \times f$$

Information of :

- P = Productivity of tool work per hour
- K = Average speed of Dump truck (km/hour)
- d = Hauling distance (distance from the AMP to the project work site)
- f = depreciation factor
- C = Dump Truck Capacity (m³)
- S = Movement Speed

Asphalt Finisher is used as a Sphalt Threat Base (ATB) tool. According to Soedrajat (1984), the following formula is used to calculate the productivity of the asphalt finisher: [1]

$$P = W \times S \times E \times p$$

Information of :

- P = Tool productivity (m³/hour)
- W = Width of the sprayer (meter)
- S = Movement speed (km/hour)
- E = work efficiency of the tool 50 minutes/hour = 0.83
- P = Kneumatic Tired Rollers
- S = Movement speed

Tandem Roller serves as an initial compaction tool on an asphalt spread. According to Soedrajat (1984), the following formula is used to calculate the productivity of the Tandem Roller:

$$P = \frac{W \times S \times E}{N} \times P$$

Information of :

- P = Compaction productivity per hour (m³/hour)
- W = Roller width (meters)
- S = Roller speed (km/hour)
- N = Number of passes
- P = Thickness of compaction (meters)
- E = work efficiency of the tool 50 minutes/hour, = 0.833

The Pnumeric Tired Roller functions as a second compaction tool on an ATB and AC layer which is compacted at a temperature of not less than 90 – 1000C. According to Soedrajat (1984), the following formula is used to calculate the productivity of the Pnumeric Tired Roller: [1]

$$P = \frac{W \times S \times E}{N} \times P$$

Information of :

- P = Compaction productivity per hour (m³/hour)
- W = Roller width (meters)
- S = Roller speed (km/hour)
- E = work efficiency of the tool 50 minutes/hour, = 0.833
- N = Number of passes
- P = Thickness of compaction (m)

2.3. Scheduling the Execution of Work

Scheduling is a work arrangement project in the implementation of a project related to existing work activities. The method used is the Time Schedule method. as a scheduling method. The use of a block chart is basically an inventory of all activities, then determines the implementation time for each of these activities. In this case, the bar chart can also be used as a scheduling and control method for the use of materials, equipment and labor. A bar chart shows the activity of each work element and time can be divided into monthly, weekly and daily.

3. METHOD OF RESEARCH

The scope of work elements reviewed in the Leung Daneun-Awee Geutah road paving project, Peusangan Siblah Krueng District, Bireuen Regency, namely in the asphaltting section, which includes: cleaning work, binder impregnating layer work, material transport work, asphalt treat base (ATB) paving work, paving work Asphalt Concrete (AC) and compaction work.

4. CONTENTS

In the cleaning work for ATB and AC overlays, a compressor with a capacity of 5,000 m³/hour is used and the time is adjusted with an asphalt finisher. Followed by spraying liquid asphalt (prime coat) with a tool that used an asphalt sprayer with a capacity of 174.93 days with a time adjusted by an asphalt finisher for 1 day, both works were carried out by an Asphalt Mixing Plant (AMP) with a capacity of 152 m³/day, then transported using 4 units of dump trucks with a capacity of 8 tons, after the hot ATB mixture arrives at the location, it is then poured into an asphalt finisher with a capacity of 40 tons/hour for spreading, followed by a tandem roller which functions as initial compaction with a capacity of 8 tons and compaction and final compaction is carried out with pneumatic tired rollers with a capacity of 10 tons. And then followed by the implementation of asphalt concrete (AC) work, the work system is the same as above. The volume of cleaning work by the compressor is 35000 m² with an effective productivity of 7 working hours of 35000 m²/day. For the prime coat layer by asphalt sprayer the volume of work is 105 m³ with an effective productivity of 7 hours of 174.93 m³/day. Dump truck productivity is D1 = 4.63 m³/hour D2 = 4.87 m³/hour, D3 = 5.14 m³/hour, D4 = 5.44 m³/hour, D5 = 5.77 m³/hour. Asphalt finisher productivity with 7 hours of effective work is 122.01 m³/day, tandem roller productivity is 233.24 m³/hour, PTR productivity is 262.3 m³/hour, water tank productivity is 17.5 m³/day.

5. CONCLUSIONS

Asphalt finisher productivity with 7 hours of effective work is 122.01 m³/day, tandem roller productivity is 233.24 m³/hour, PTR productivity is 262.3 m³/hour, water tank productivity is 17.5 m³/day. The main equipment used for paving the Leung Daneun-Awe road, Peusangan District, Bireuen Regency is Compressor 1 unit to clean the road surface layer that will be tack coat, with the number of days for 1 day, Dump Truck 4 units, used as a means of transporting materials to the project work site, with a time of 31 days, Asphalt Finisher 1 unit is used to spread

asphalt that has been filled by a Dump Truck within 31 days for spreading Asphalt Treat Base (ATB) and Asphalt Concrete (AC), 4. Tandem Roller and Pneumatic Tired Roller, 1 unit each which is used for compaction sequentially (gradually), with a time of 31 days for compacting Asphalt Treated Base (ATB) and Asphalt Concrete (AC) and Water tank 1 unit which is used as a regular spraying of water with a period of 14 days of spraying.

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