Participatory Method to Maintain the Unpaved Rural Roads with Do-nou in Papua New Guinea

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1. Introduction

The lack of accessibility of the rural access roads has been identified as one of the main causes of poverty of the rural people in the developing countries. In this study, the new design for all-weather rural access road with “do-nou” is being developed. In the new design, the maintenance of the rural road to keep it passable is conducted by manual labor and available materials in the developing countries, therefore the local farmers can participate in the process of the restoration of the road. To rehabilitate the rural road by themselves continuously, it is necessary to establish the road maintenance system in the community. These lead to the promotion of their ownership and motivation to solve their problems by themselves and ultimately the poverty will be reduced. Through the several tests conducted in Japan[1)], the maintenance method with do-nou was proposed. The trial construction according to the proposed method was done together with the rural people in Papua New Guinea. In this paper the construction was reported.

2. The maintained road

The construction was done at the unpaved road from Kundiawa city leading to Mt.Wilhelm in Chimbu Province (Fig.1) . Along the road there are 80 villages of about 15,000 inhabitants. The coffee, fruit and vegetable are the main crops cultivated and they receive income from selling the crops at the market in the town. Therefore it is necessity to transport the crops from the farm to the market. However, as shown in Photo.1, the road is so muddy that the 2 tone truck on its way to the market got stuck and the number of the climber to Mt.Wilhelm hit the wall because of the road condition. The road need to be maintained to keep its accessibility in all season. Traffic count conducted on the road revealed that the largest hourly volume per day was 14 and the total volume in the day was 78. Most of the cars that passed on the road were 2 tone truck and 4 wheel driven cars loaded with passengers and crops.

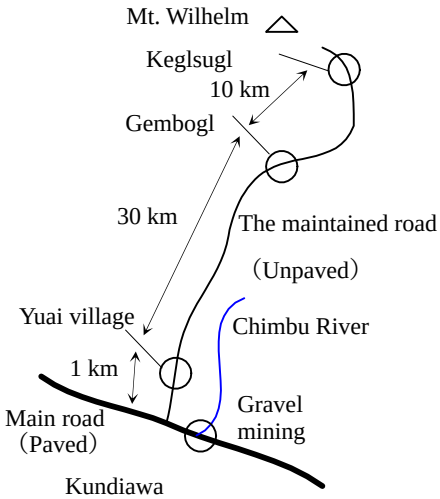

Fig.1 The location of the road

Photo.1 The truck stuck in the mud

Photo.2 The working villagers

3. The Construction

The construction was conducted in Yuai Village for 3 days in September, 2005. The requisite material for the proposed method were just sugar bags made in Papua New Guinea and river gravel got from the river bank near the construction site, which were available to the people. The construction was human labor based except for the transportation of do-nou that was done by 4 tonne truck from the river bank to the maintenance area. The material and the truck hire fee were financed by Japanese study group. About 40 villagers participated in the construction as volunteers (Photo.2).

The procedure for the construction were as follows; 1) digging of the drain 2) removal of the mud from the surface of the road 3) putting the do-nou 4) spreading the river gravel over do-nou.

Totally 1,500 do-nou were made, 28 m^3 of the river gravel were utilized and 36 m of the road was maintained. Fig.2(a) and (b) show the cross section before

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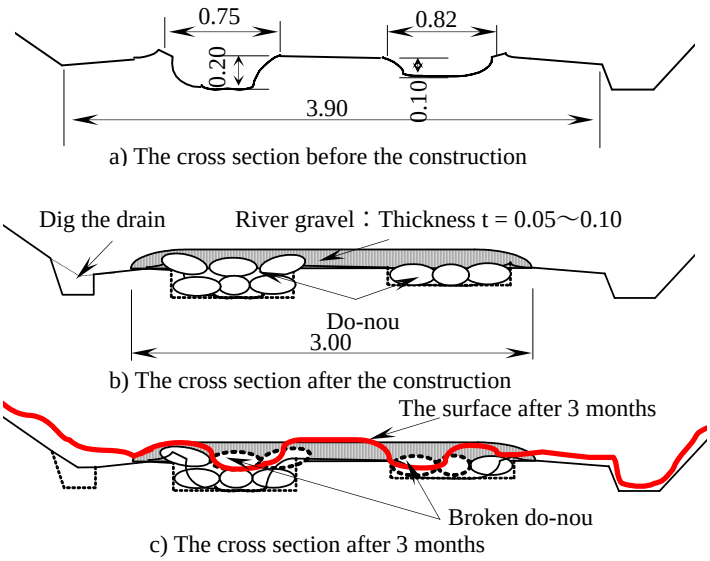

Fig.2 The cross section of the road

and after the construction (Photo.3 and Photo.4). Table.1 shows the construction expenses.It was found that the transportation fee accounted for the 40% of the total cost. The total cost of maintenance will become cheaper due to the increase in efficiency of the transportation.

3 month after the construction the road condition was checked. Both the drain and the road surface were covered with mud and as shown in Fig.2(c) and Photo.5 The do-nou bag were broken since the gravel that covered the do-nou was removed and the car drove directly over do-nou. The tire friction of the car caused the damage to do-nou. However there was well compaction of the gravel put inside the do-nou. The trafficability was kept in this area.

4. Conclusion

1) The proposed method was accepted by the people in the rural area.

2) The trafficability was improved by the proposed method.

5. Further research

1) The maintenance method should be established and transferred to the rural people correctly.

2) Before the construction a survey of the villagers daily life style and the traffic should be conducted to know their motivation to improve their life.

3) The other problem that need to be considered is the availability of fund to buy the material for road maintenance and to pay for the wages of the villagers who participate in the work. To maintain the road by themselves, it is important the community to have a system of road maintenance.

Photo.3 The road before the construction

Photo.4 The road after the construction

Table1 Construction expense
(Width: 3 m, Length: 1m)

	Use amount	Unit Price (US$)	Total(US$)	%
Do-nou	50	0.22	11	57%
Gravel	0.6 m^3	1.18	0.71	4%
4t track	-	-	7.54	39%
Total	-	-	19.3	100%

Photo.5 The road
3 months after the construction

Reference 1) Kimura, M. and Fukubayashi, Y., “Establishment of Design for All-Weather Rural Access Road in East Africa Using Labor-Based-Technology for Empowerment of Agricultural Community”, The Sixth ATWS KENYA CHAPTER International conference, Kenya, November 2005.

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