THE WAKFOOT MK2: AN INFIELD FFB TRANSPORT FOR PEAT AREA

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Collection of harvested fresh fruit bunches (FFB) in soft and soggy areas have always been very inefficient and slow. In soft and soggy areas, such as in peat and alluvial clay, the means of FFB collection is limited to manual carrying or using wheelbarrow. The productivity of each worker is between 1.5 to 2 tonne for eight working hours per day.

In mid 1980s, a machine was developed locally for these areas. This rubber track vehicle, a one tonne capacity infield transporter, was well accepted by estate managers having such marginal areas. Unfortunately, the problem of track slippage from the housing and some technical teething problems were not attended to by the manufacturer resulting in lack of interest by the industry.

In early 1990, PORIM introduced a metal track FFB infield transporter, The SuperCrawler, for soft and soggy areas. This is a fully hydrostatic machine. This machine performs very well in soft, soggy and in hilly areas with terrace. The problem with this machine is fast wearing of the track. It was found that a pair of track could only last for 200 working days (1,600 working hours). A pair of track costs about RM7,000. As the maintenance costs was high, the industry was not keen to adopt the system.

Realising that there is still a need to introduce a vehicle for peat areas, Palm Oil Research Institute of Malaysia, in mid 1996 introduced a single chassis machine with six tyres. The tyres are high flotation types that exert low ground pressure. With appropriate carrying load, this machine could maneuver in peat areas very well. This machine was developed and tested in deep and young peat areas.

THE MACHINE

A six-wheel drive, single chassis oil palm FFB infield transporter developed by PORIM has tandem back wheels. The wheels are fixed with flotation tyres of equal size (31 x 15.5 x 15). The tandem back wheels are to ensure that at least one of the tyres is always in contact with the ground when going over obstacle along the path. Since all the six wheels are driving wheels, the traction was good.

Plate 1: The WakFoot with tipping bucket.

This WakFoot MK2 is powered by a 23hp watercool diesel engine. It is equipped with power steering system, a one-tonne hydraulic tipping FFB bucket and a nine-tonne electrical winch. To enable this machine to operate with six-wheel drive, each pair of wheels is connected to an axial with differential gear.

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The standard machine of WakFoot MK2 is only with tipping bucket (Plate 1). It can also be equipped with a grabber and a hi-lift bucket (Plate 2). The fixing of the grabber and hi-lift system will increase the weight of the machine by 450kg. This configuration is most suitable for use in inland areas where the soil is firm. The use of WakFoot MK2 with grabber in peat areas will decrease the carrying load to prevent the machine from bogging down.

Plate 2: The WakFoot MK2 with Grabber and hi-lift bucket

FIELD TRIAL

This machine was fully tested at one of the FELCRA estates in Banting. The estate is on a deep peat area and the palm age is about 8 years. The average FFB weight was about 18kg. Field tests were carried out in both the wet and the dry seasons. The normal method of FFB evacuation to the roadside is by wheelbarrow. The field trials of this machine started in early 1998. Modifications and developments were made to ensure that this machine could withstand the rough usage in the estate. By mid 1999, this machine was ready for commercial production. The field trial continued through the wet season of late 1999. By early year 2000, this machine was ready for commercial production.

From the field trials, the following observations were recorded.

- Productivity
- Fuel consumption
- Repair and maintenance costs
- Labour requirement for the machine team

On the average, the daily productivity of the WakFoot MK2 was found between 24 to 28 tonnes per eight-hour day. The fuel, repair and maintenance costs were estimated at RM1.04 and RM0.84 per working hour respectively. The machine team comprised of seven cutters and three collectors.

In their conventional system, this productivity requires about 12 workers. Hence, the use of WakFoot Mk2 (without grabber and hi-lift bin) had reduced by two workers.

A straight-line depreciation was used to predict the average cost per tonne of FFB evacuated. The machine cost is RM50,000 with annual depreciation of RM9,000 and the economic life is five years with the scrap value of RM5,000 (i.e. 10% of the purchase costs). Based on the data obtained from the field trials and estimated value for the repair and maintenance costs, the average accumulated machine costs of FFB evacuation per tonne (over five years) was estimated to be RM2.32.

THE BENEFIT

The WakFoot Mk2 enables collection of FFB in peat areas to be more efficient. The use of this machine could save labour requirement by 16%. On the average, the machine could collect between 24 to 28 tonnes of FFB per day. This enabled the FFB to be sent to the mill on the same day, as the field evacuation was fast.

The use of this machine had certainly improved the income for the group as the overall productivity increased by at least 30%. This machine was designed for peat areas. To prevent tyre puncture, the harvesting path must be cleared of old stumps or logs.

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