Performance Evaluation of a Small Agricultural Tractor on Bangkok Clay Soil

Jannatul Ferdous
University of Saskatchewan, Canada, jaf968@mail.usask.ca

Peeyush Soni
Asian Institute of Technology, Pathumthani, Thailand, Thailand,

Alex Keen
49 Vineyard Drive, Newport, Shropshire TF10 7DF, UK, United Kingdom,

Madhav D. Gholkar
Asian Institute of Technology, Pathumthani, Thailand, Thailand,

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ABSTRACT To improve the prediction of tractive performance of tractor under different surface condition, it is important to find out the best model for specific condition. There have many empirical to theoretical model to predict the performance of a tractor among which most of the models are suitable for dry condition. Moreover there is no specific model for wet condition of soil which is essential for rice production. The aim of this research was to investigate the tractive efficiency of a small agricultural tractor on Bangkok clay soil under wet condition and two different soil surfaces. Four torque transducers were developed and assembled to the four wheel of tractor to measure the wheel force. Furthermore four pulse sensors on individual wheels and load cell on drawbar pull were used to measure wheel speed and drawbar pull. During field test wheel slip was recorded from dynamo, which was attached with the front wheel of loaded tractor. Seven existing models were evaluated with field data to get the appropriate one for the wet field condition. Among these model, test data from drawbar pull match with Gholkar method and test wheel thrust data with GeeClough method. Coefficient of rolling resistance was found higher on the bare surface
compared to the grassy surface. Net traction ratio, tractive efficiency and drawbar pull was higher on the grass surface.

**Keywords:** Traction, tractive efficiency, rolling resistance, thrust, drawbar pull, Bangkok clay soil