ANALYSIS BRAKING ENERGY OF BUS TRANSJAKARTA USING FLYWHEEL REGENERATIVE BRAKING TO DETERMINE THE CAPACITY OF FLYWHEEL ENERGY

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Abstract

Transjakarta a mass transit system that operates at the transport Bus Rapid Transit (BRT) in Jakarta, which operate on routes with stops provided. The number of bus stops resulting in frequent braking. With frequent bus braking and supported by a large mass of the bus, then there is the potential energy that can be saved as a result of deceleration (regenerative) to be used again during acceleration. If only rely on power from the engine to the acceleration, the engine will work with high load. To reduce the workload of the engine during acceleration, can be assisted through the use of regenerative braking flywheel rotation.

To analyze regenerative braking on TransJakarta bus then used several parameters such as technical data specification vehicles, driving cycle, braking regulation ECE (Economic Commission for Europe), drag the vehicle and the vehicle braking FBD. This parameter is used to determine a map of the distribu-
tion of the vehicle's braking Bus Busway, good braking portion for regenerative braking and mechanical braking and know the distribution of braking energy in the driving cycle to braking region of vehicle.

From the analysis of TransJakarta bus braking energy, obtained regenerative braking portion of 0.05g front wheel, rear wheel of 0.065g and mechanical braking of 0.04387g. Maximum energy generated by front regenerative braking are 963623J and rear regenerative braking are 1252710.5J. In consideration of the availability of space on bus chassis, the flywheel is used has a front wheel specifications: \( D_{fw} = 0.4m, H_{fw} = 0.072m, M_{fw} = 68.58kg \), with maximum rotation 11105.39rpm. While the rear wheel specifications: \( D_{rw} = 0.34m, H_{rw} = 0.131m, M_{rw} = 87.85kg \), with maximum rotation 13065.165rpm. For energy can be met by regenerative braking for 41.37% of the total energy during acceleration.

**Key words**: Regenerative braking, Flywheel, Driving cycle, Modeling.