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Reducing fuel consumption of Front End Loader using Regenerative Hydro-static drive configuration-An experimental study

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Abstract

Present paper highlights the effect of under-loading the engine and the hydraulic system of a Front End Loader (FEL). In this respect, a novel idea to modify load cycle of engine is applied in the Conventional Hydrostatic-Split Power Transmission (CH-SPT) drive by incorporating additional load on the drive through the DC generator. The load on modified system, called Regenerative Hydrostatic-split power transmission (RH-SPT) drive is the loading pump unit and DC generator unit, which is used for generating equivalent duty cycle of the FEL and electrical energy generation, respectively. The excess load of the DC generator is varied through the controller depending on engine's optimal efficient torque and the load torque. This assists the engine to operate in its efficient zone during under-loading conditions. Also, a MATLAB[®]/Simulink model is made and validated experimentally. The validated model is analysed to compare the performances and fuel consumption of conventional HST drive, CH-SPT drive and RH-SPT drive. It is concluded that with increase in fuel consumption of the RH-

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