



Modeling Method Investigation of Drives and Motors for an Industrial Overhead Crane

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Abstract. Overhead cranes are normally used to carry heavy objects from one place to another in workspace. In common, 3-phase electric drive and induction motor are selected to drive a crane in three dimension. Many mathematical models of a three dimensional overhead crane were previously derived by energy equation to describe a relationship of applied force and crane movement. The problem was that the applied force could not be used for controlling most overhead crane systems whose motors were commonly controlled by velocity command. Although, this problem was once solved by creating an empirical model which contains the three functions: switch, rate limiter and linear second order, the further investigation and validation was still required. In this paper, the model of drives and motors of an overhead crane was investigated, and validated by experiment using an industrial grade 1-ton overhead crane. A unit step input of velocity command and actual velocity were used as data to create an empirical model. The model's performance was experimentally evaluated by comparing with actual velocity and position of each time step. The discussion was also provided at the end.

Keywords: Overhead crane, Modeling, Control