

Evaluation Method of Object Detection Function by Means of the Dynamic Analysis of Turnouts and Switch Mechanisms

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The object detection function of the turnout and the switch mechanism is one of the important functions for keeping the safety of the railway system. An object between a tongue rail and a stock rail on the turnout is detected by a lock mechanism of the switching machine and circuit controllers. So far, designers of the switch mechanism have checked their detecting function design by experiments, which have been the sole way to check it, using a real turnout and a switch mechanism. Therefore, the designing work of detection devices has a problem in that needs a large amount of time and money. To solve this problem, we developed a method of simulating the motion of tongue rails and switch mechanisms by means of flexible multi-body, so that we can estimate the output of the detectors when an object is inserted into the gap between the tongue rail and the stock rail. We confirmed that the method enabled us to estimate the gap of the rails and the outputs of the detectors by comparison between the simulation results and experiment results. Moreover, it was also confirmed by means of the method proposed, we could simulate the detection section, the data of which are necessary for deciding the positions and the number of detectors.