

**Development and Performance Evaluation of Rail Fastening System
Using Non-metallic Materials Applied to Its Main Components**

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A function of rail fastening systems is to fasten rails to supporting structures such as sleepers. In addition to the fastening function, rail fastening systems are designed to provide a certain level of electrical insulation to prevent rail current from leaking through the supporting structures to the earth. Despite this, some cases have been reported where the electrical insulation of rail fastening systems has deteriorated in some installation environments, resulting in transport disturbances such as ground faults and short circuits. Thus, we studied the applicability of resin materials to the rail fastening components to prevent the reduction of the electrical insulation. Based on the results of this study, we produced a prototype of a rail fastening system using resin components and evaluated its performance. In order to evaluate the performance of the prototype, design reference values were proposed to reflect the influence of the installation environment on the material strength. The performance evaluation of the prototype based on the proposed value confirms that the prototype has the performance to be installed on a conventional rail track.