

**Improvement Proposal about Rail Detection Method
for Track Measuring Device with the Inertial Mid-chord Offset Method**

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Optical two-axis rail displacement sensors used as a part of an on-board track measurement device with the inertial mid-chord offset method sometimes cannot detect rail correctly depending on track structures, e.g. an expansion joint or a turnout, and on weather conditions such as rain or snow. This phenomenon is called “light clipping” and we cannot obtain accurate measurement data when light clipping occurs. To find a countermeasure to light clipping, we measure detailed movement of the sensors. We propose improved control methods for existing devices. As a result, the frequency of light clipping by track structures is decreased. We also propose a cover for preventing soiled things from attaching to windows for laser projecting and receiving under rain or snow condition. Then we confirm the effectiveness of this cover by fluid simulation and wind tunnel testing.