Evaluation of Traffic Accident Risk for Road Alignment
Using Real Vehicle Cockpit with Wide Visibility Driving Simulator

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One of the causes of accidents in hilly and mountainous road is considered to be road alignment such as longitudinal slope and curvature radius of left or right curves. In this study, the authors developed original driving simulator with a real vehicle cockpit and wide visibility, to focus on the evaluation of road alignment. Furthermore, using this simulator, the accident risk evaluation of four-wheeled vehicles due to road alignment such as curvature of road on a hilly and mountainous road was investigated.

As a result, real vehicle with wide visibility driving simulator (RW-DS) was developed as shown in figure 1. The RW-DS has an approximately 180-degree wide range monitor, steering reaction force motor and brake reaction force motor in real vehicle cockpit, can reproduce curve visibility and drivability on hilly and mountainous roads.

Subjects' experiments on a simple evaluation course consisting of straight roads and curves using the RW-DS showed that the distance to recognize a left curve was shorter than that of a right curve, and that the distance to recognize a curve was shorter for sharp curves with smaller radius of curvature as shown in figure 2. Based on the distance at which the driver can recognize the curve, it is considered necessary to provide information to the driver at least 100 m before the start of the curve and to induce the driver to slow down to prevent accidents.
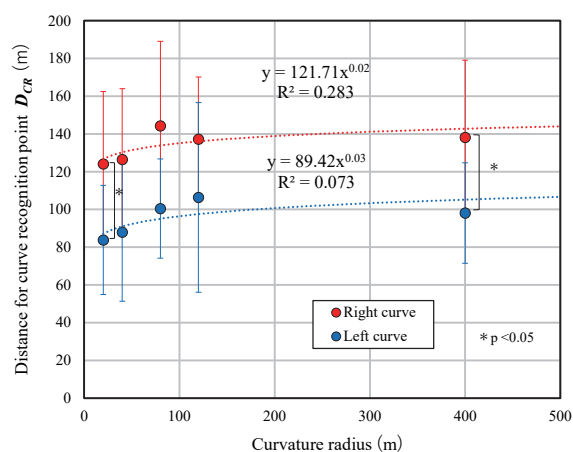

Fig.1 Real Vehicle Cockpit with Wide Visibility Driving Simulator

Fig.2 Distance for curve recognition point