

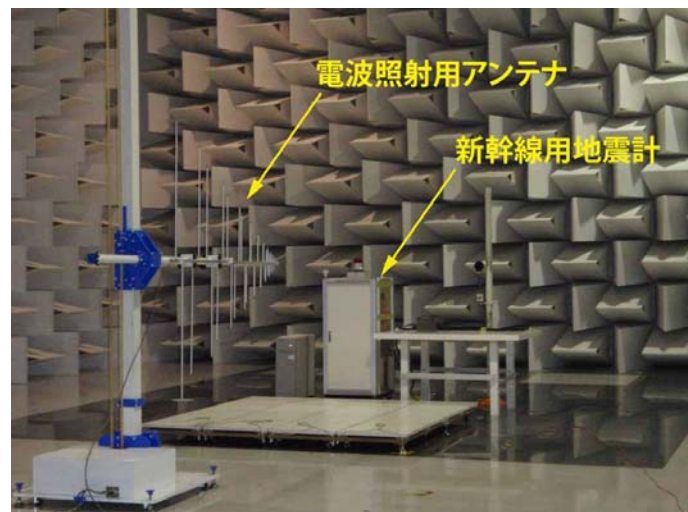
## Development of seismograph design based on international standards (IEC) for Shinkansen

Shinji Sato<sup>1\*</sup>, Kunihiro KAWASAKI<sup>1</sup>, Keiichi TAKEUCHI<sup>1</sup>, Kazuki NAKAMURA<sup>1</sup>,  
Shunta Noda<sup>1</sup>

<sup>1</sup>Railway Technical Research Institute

### 1.Introduction

Railway Technical Research Institute (RTRI) has been studied seismic observation method to detection P-wave and developed UrEDAS since 1988. Our knowledge and experience gained has been utilized for all Shinkansen seismographs. The seismograph for Shinkansen, to ensure high reliability is important issue. Reliability and stable operation for more time, applying international standards for EMC test was conducted.



### 2. Support international standards (IEC)

In general, electromagnetic disturbance cause errors for electronic devices. We call EMC test that is resistance evaluation tests, including seismograph for electromagnetic disturbance. EMC means Electromagnetic Compatibility. EMC test is defined immunity test and emission test. Immunity test is to evaluate the resistance of the equipment from the radio noise from outside. Emission test is to evaluate whether the interference of electromagnetic disturbance is not affecting the operation of other equipment.

Seismograph's environment is set up, was generally defined primarily by temperature and humidity. Seismograph in railway must observe seismic wave and judge train control whether electric power and communication lines in the state of disconnect. Therefore, Seismograph in railway essential that a single observation point processing capabilities.

### 3.Conclusion

We made a draft of EMC test menu and evaluate seismograph for Shinkansen using a draft EMC test menu. We confirmed that electromagnetic disturbance is cause errors in the seismograph. It is very important to protect seismograph against electromagnetic disturbance. This approach is considered to be applied to seismic technology in general as well as rail infrastructure. We will cooperate with railway companies, promote these specifications.

Keywords: Seismograph, Shinkansen, IEC, EMC