Railway - 02-A

Measurement application sheet

A&D Company, Limited

-Development and testing of railway vehicles-

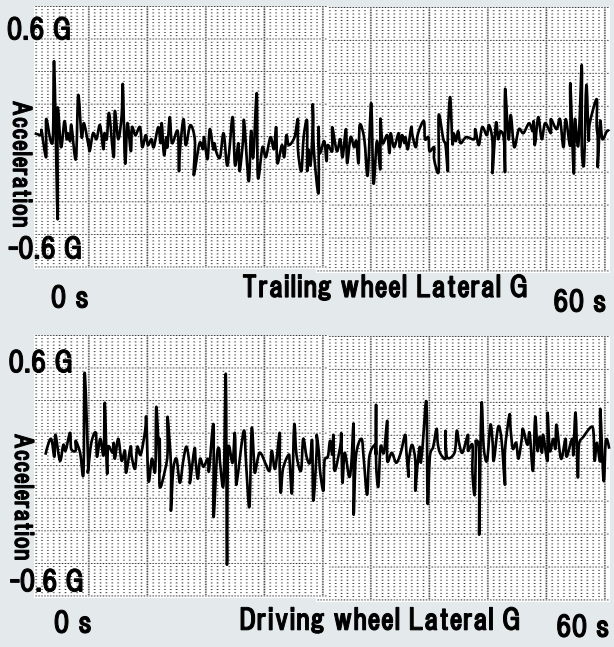
Railway vehicle ride quality test

"Shaking" during railway vehicle movement is measured with the goal of making a more comfortable ride experience. A&D's instruments are strong in noisy environments.

■ In 1974 ISO2631 "Evaluation of human exposure to whole-body vibration" was published. In 1980 the Research Committee for Ride Quality Management Standards proposed ride quality standards and after taking into consideration the special characteristics of railways added the following independent improvements: 1) Expanded ISO2631 and set the frequency band to 0.5 to 80 Hz. 2) The logarithm of frequency corrected values (dB) is displayed against the acceleration to evaluate ride comfort at that magnitude. 3) An average evaluation time of 1-5 minutes used for a ride quality evaluation. 4) This standard applies generally to vertical and horizontal vibration.

■ The Omniace III recorder can measure and analyze vibration data for the development of railway cars.

Image of ride quality (vibration) measurement

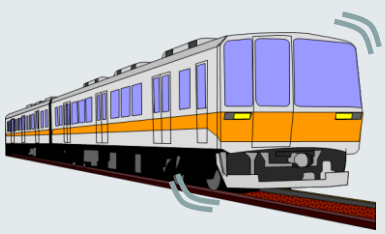


Direction of acceleration	X(back/forth)			Y(left/right)			Z(up/down)		
Acceleration / Operating condition	Steady acceleration	Change of steady acceleration	Vibration acceleration	Steady acceleration	Change of steady acceleration	Vibration acceleration	Steady acceleration	Change of steady acceleration	Vibration acceleration
①Normal run			○			○			○
②Acceleration/Deccelera	○	○	△						
③Curve				○	○	○			
④Turnout				△	○	○			
⑤Vertical curve							○		○

Vibration factors related to ride quality

Type	Ride quality	Grade
①	less than 83dB	Good
②	more than 83dB less than88dB	↑
③	more than 88dB less than 93dB	
④	more than 93dB less than 98dB	↓
⑤	less than 98dB	Bad

Ride qualiy level



Bolsterless bogies and ride quality

Modern trains use air springs instead of bolsters to support weight between the train car and bogie for simplicity of structure and reduced weight. Bolsterless bogies are mainly used on local train lines due to their reduced effect on train tracks and superior maintainability. Compared to the traditional wheel truck, it is thought that bolsterless bogies perform poorly negotiating curves and crossing railway switches for an overall poor ride quality. The limit for curve negotiation performance for standing passengers is 0.8 ms^2 and for sitting passengers is 0.9 m/s^2. Performance evaluation made possible by measuring the performance of curve negotiation at the most severe vibration range people feel, 4 Hz–12 Hz.

Digital Oscilloscope Recorder

RA2000A Series Omniace III

Did you know?

The RA2300A/RA2800A can simultaneously measure voltage, current, control timing, vibration, rotation, pressure and more directly from sensors. Recorded data can be converted to csv data or used in FFT analysis by using computer software.