RAILWAY VEHICLE RIDE QUALITY TEST

Development and Testing of Railway Vehicles

"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.

ISO2631 "Evaluation of human exposure to whole-body vibration" was published in 1974. 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 RA2300MKII data recorder can measure and analyze vibration data for the development of railway cars.

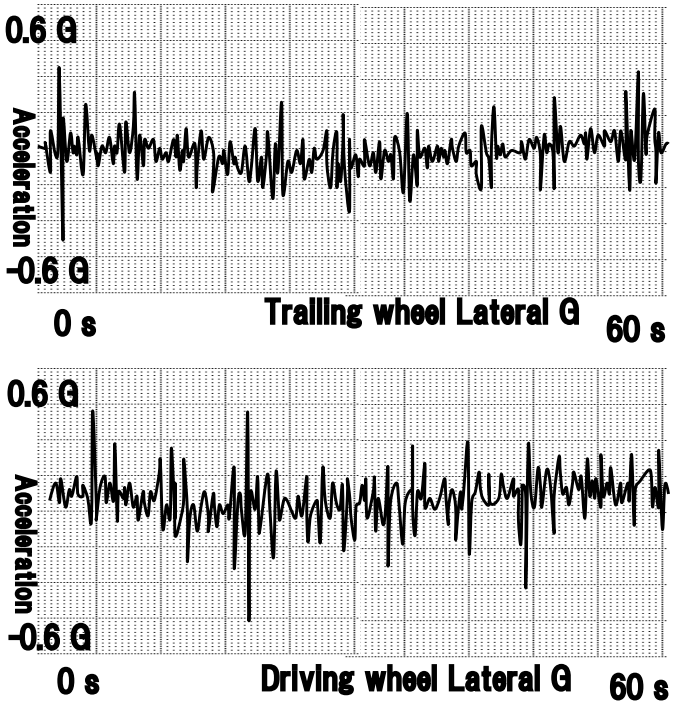
Vibration Factors Related to Ride Quality

			Operating Condition				
			1 Normal Run	2 Acceleration/ Deceleration	3 Curve	4 Turnout	5 Vertical Curve
Direction of Acceleration	X (back/ forth)	Vibration Acceleration	●	▲			
		Change of Steady Acceleration		●			
		Steady Acceleration		●			
	Y (left/ right)	Vibration Acceleration	●		●	●	
		Change of Steady Acceleration			●	●	
		Steady Acceleration			●	▲	
	Z (up/ down)	Vibration Acceleration	●				●
		Change of Steady Acceleration					
		Steady Acceleration					●

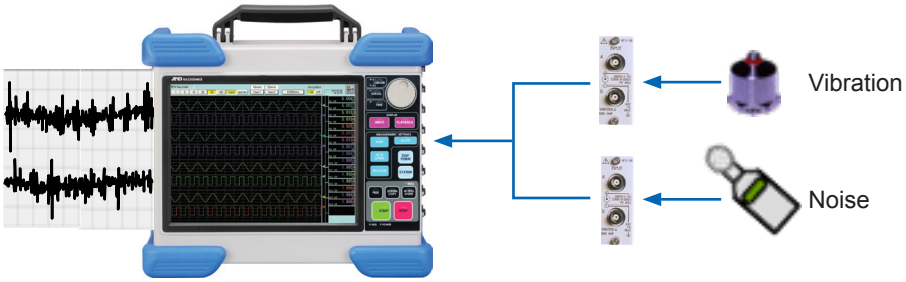
Ride Quality

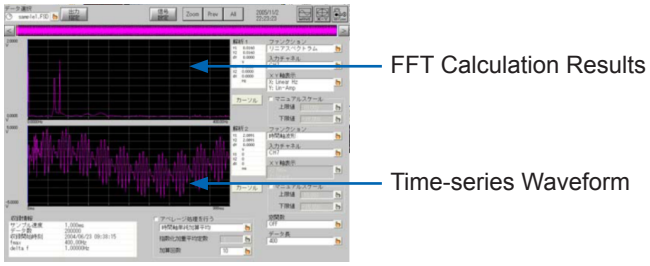
← Good	1	Less than 83 dB	2	More than 83 dB Less than 88 dB	3	More than 88 dB Less than 93 dB	4	More than 93 dB Less than 98 dB	5	Less than 98 dB	→ Bad

Ride Quality (Vibration) Measurement



RA2000A Series Omniace III Digital Oscilloscope Recorder





Bolsterless Bogies and Ride Quality

Modern trains use air springs instead of bolsters to support weight between the train car and bogie due to the structural simplicity 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 m/s² and for sitting passengers is 0.9 m/s². Performance evaluation is made possible by measuring the performance of curve negotiation at the most severe vibration range which people feel, 4 Hz-12 Hz.

Did You Know?

The RA Series (RA2300MKII pictured upper left) simultaneously measures voltage, current, control timing, vibration, rotation, pressure and more directly from sensors. Recorded data can be converted to .csv data or used with FFT analysis software.

A&D Weighing

1756 Automation Parkway, San Jose, CA 95131 • 1-888-726-9965 • www.measurement.andonline.com

06/2018