New Seismic Parameters and Their Application to Railway System

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Since a seismic magnitude, which is defined from long-period component of seismic waves, has been generally used as one of the most important seismic parameters to scale size of an earthquake, almost all the attenuation relations for strong motion estimation use magnitude as a key seismic parameter. However, when we estimate short-period strong motion indices, such as seismic intensity, short-period responses and other pertinent factors, the magnitude may not be the best seismic parameter physically. Here we propose new seismic parameters,"seismic intensity magnitude" and "frequency-response magnitude", as directly determined from the target strong motion indices in order to obtain more accurate estimates in real-time systems. Our results show that these parameters are capable of decreasing estimation errors by approximately 10-22% comparing with the conventional method applying JMA magnitude. Further, we present basic plans how to apply these new parameters to a railway system.