Creep in Rolling Contact - Its importance to Rail Vehicle Behaviour and other Mechanical Systems

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104 Knox Hall
Thursday, December 4th, 2008
3:30 pm - 4:30 pm

Abstract:
The action of two solid bodies rolling against one another exhibits a behaviour which is quite different from that of bodies that slide against one another without rolling. This behaviour is known as creep in rolling contact. The fundamental difference between creep and sliding behaviours will be explained, and a very brief history of the discovery of this effect will be given. Examples of the effect, drawn from everyday experiences, will illustrate it in a practical way.

Having established the characteristics of the phenomenon of creep it will then be shown how this effect is fundamental to the way a railway wheelset operates. The railway wheelset is simply a rotating rigid body (both wheels being pressed on to a single solid axle) with specially shaped surfaces that roll on the rails - yet it has the properties of a feedback control system, seeking the centre of the rails due to the phenomenon of creep. Once that property has been established it will then be shown how this has further important effects on the dynamic behaviour of rail cars.

Biography:
Roy is President of RESCO Engineering, a company that specializes in the design and analysis of railway vehicle trucks (transit, passenger, freight and locomotive) and provides consulting services to operators seeking to understand and rectify issues of rail vehicle dynamics and/or the rail/wheel interface. RESCO Engineering also designs and builds rail vehicle trucks and is currently engaged in a partnership arrangement with a US company to develop and market a new freight car truck based on one of Roy's patents.

Roy has a B.Sc. in Mechanical Engineering from the University of Birmingham (UK) and a Master of Engineering from the University of Toronto. He has worked on railway vehicle dynamics and design for over thirty years and is the author of 23 patents (mostly in he field of rail vehicle trucks) and a great number of papers and articles.

Roy is registered as a professional engineer in the provinces of Ontario and British Columbia and is a member of the American Society of Mechanical Engineers.