



THE HONG KONG
INSTITUTION OF ENGINEERS
香港工程師學會

Power Hop of Agricultural Tractors

Jointly organized by

The Hong Kong Institute of Acoustics

The Hong Kong Polytechnic University - Department of Mechanical Engineering

The Hong Kong Institution of Engineers – Environmental Division

Speaker: Prof. C.W. Solomon To
Department of Mechanical and Materials Engineering, University of Nebraska

Venue: Room EF305, The Hong Kong Polytechnic University

Time: 6:30pm – 7:45pm, Friday, 21 October 2011
(Registration starts at 6:15 pm)

Power hop (pitch/bounce oscillation superimposed on the forward motion) of agricultural tractors is characterized by large amplitude vibration that reduces the ability of the operator to control the tractor. This, in turn, can lead to safety risks for the operator and bystander. The large amplitude vibration can cause injuries such as head, neck, or back trauma. It also reduces performance and increases operating costs. When a tractor is undergoing power hop, it often loses its ability to perform the desired task. The operator is thus frequently required to make adjustments to the tractor in accordance with the recommendations of the manufacturers. In addition to the fact that such adjustments are time consuming and therefore costly they do not guarantee the ability to control power hop. It has been known that an increase in the occurrence of power hop has to do with the introduction of radial ply tires. It has most commonly occurred with four wheel drive (4WD) agricultural tractors, but has also been observed in two-wheel drive (2WD), and mechanical front wheel drive (MFWD) agricultural tractors.

In this lecture results of an investigation on power hop are presented. A simple governing equation of motion has been applied to the analysis of power hop in agricultural tractors. This equation is commonly associated with the so-called spaghetti/noodle problem, elevator instability, inserting graphite rod into the fuel core of a nuclear reactor, pony tail oscillation, and jack knifing of tractors, to name but a few. A relatively more sophisticated model has also been studied. Computed results are presented and identification of the mechanism that gives rise to power hop is discussed.

Prof. C.W. Solomon To is a professor of Department of Mechanical and Materials Engineering in University of Nebraska since 1996. His researches focus in machinery noise and vibration, finite element analysis, and nonlinear random vibration.

Registration

Pre-registration is required. For registration, please fill in and submit the form at <http://wal.hk/hkioa/PowerHop.html>. The number of participants is limited up to 40. Attendance certificate will be available. Registrations will be served in **first-come-first-served basis**. Enquiries please send to: who@wal.hk.

Wilson HO
Chairman, Activities Sub-committee of HKIOA