A Coupled Analysis of Mechanical Vibration Problem and Transfer Process

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Abstract

Electrostatic printing process is an assembly of electrostatic, mechanical and optical process. It includes controlling such a variety of physics. It involves materials that can be electro-staticly charged, or vibrate in and deform mechanically. While the dimensions of physical parts are in centimeters, the accuracy of the process is measured and controlled in microns.

In general, the overall printing process is analyzed in terms of series of individual processes, e.g. transfer of toner to paper or vibration of the rollers. The design of a new printer concept is followed by investigation of the performance against a series of design parameters. The components of a laser printer are tested to verify the desired performance of each of these processes.

If one considers a printer as a system, it may be beneficial to look at the relationship between the individual processes and identify the interrelation between the components and processes of the entire system. In this paper, we will attempt to demonstrate, the coupling between a specific electrostatic process: transferring toner from a photo-conductor roller to paper and a mechanical process: vibration of the OPC roller, paper and belt. This approach can be extended to include many other processes and components.

Author Biography

Dr. Ecer received his Ph.D. from University of Notre Dame. He is the President of Technalysis and Professor of Mechanical Engineering at Indiana University – Purdue University (IUPUI)

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