

THE DESIGN AND PERFORMANCE OF AN INSTRUMENTATION SYSTEM FOR AN INDUSTRIAL TABLET-COATING MACHINE

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A 24-inch Accela-Cota (Manesty Machines Ltd., Evans Road, Speke) has been so instrumented that all the major operational coating parameters can be measured and recorded under the overall control of a PET 3032 mini-computer (CBM, 360 Euston Road, London WC1). The monitored values are obtained at selected short intervals, e.g. 5 seconds, and are displayed on the computer screen. At selected longer intervals, e.g. 2 minutes, they are printed as hard copy by an Anadex BP-8000 printer (Anadex Ltd., Woking).

The variables that it is useful to measure, the channel numbers under which they are listed by the computer, and the method of measurement, are as follows:

0. Rate of application of coating suspension by a JP 100 load cell (Data Instruments Inc., Lexington, Mass., U.S.A., imported by Control Transducers, Shaftesbury Avenue, Bedford) the signals being amplified by an Action-Pak amplifier (AJB Associates Ltd., Wells, Somerset) to give a record of the weight of the coating suspension tank.
1. Inlet air velocity, by an electronically-sensed rotating propeller (Flow rate monitor PRI-700-1, Flow Technology Inc., Phoenix, Arizona, imported by Lee Engineering, Bridge St., Walton-on-Thames).
2. Inlet air temperature, by an integrated-circuit temperature transducer AD 590 (Analog Devices, East Molesey, Surrey).
3. Outlet air velocity, as for 1.
4. Outlet air temperature, as for 2.
5. Outlet air humidity, by an automatic dew-point hygrometer 1100 AP (General Eastern Instruments Corp., Watertown, Mass., U.S.A., imported by Lee Engineering, as above).
6. Rotational speed of the fan, by an optically-coupled digital tachometer, modified to produce a 0-10V signal (Kane-May Ltd., Burrowfield, Welwyn Garden City, Herts.).
7. Torque on the drive shaft of the rotating drum, by a strain gauge oscillator SO 1-22 and a telemeter discriminator SD 1-22 (Davies Telemeters, Broadlands Court, Bracknell, Berks).
8. Coating suspension temperature, as for 2.
9. Tablet surface temperature, by an Infratrace non-contact infra-red digital thermometer (Kane-May Instrumentation, as above).
10. Atomizing air pressure of the spray nozzle by an IPL pressure transducer (AJB Associates Ltd., Wells, Somerset).

The output voltages from all the measuring instruments were fed to an AP 2047 16-channel analogue-to-digital converter (Anaspec Research Labs., Newbury, Berks) so that the computer received a digitised signal at a discrimination of 1 in 2^8 , or rather better than 0.5 per cent. The size distribution and velocity of the droplets in the coating spray were measured independently of the main instrumentation by sampling onto microscope slides, and by short time-lapse flash photography at exposure times of 300 μ s using an argon jet flash unit (Pulse Ltd., Fareham, Hants).

The results allow the interactions between the variables to be determined, an overall heat balance to be drawn up, and closer control to be maintained, with consequent improvement in performance. Results will be presented to demonstrate these findings in more detail.

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