The University Of Sheffield.

The Department of Automatic Control & Systems Engineering is pleased to announce the following seminar:

Cyclic scheduling of hoist operations in electroplating lines

Speaker: Professor Jiyin Liu

School of Business and Economics,
Loughborough University

Wednesday, 13 March 2013 at 14:00

Location: Sir Henry Stephenson Building, Lecture Theatre LT02

ABSTRACT

This talk presents our research results on hoist scheduling problems in electroplating lines such as those used in the production of PCBs. An electroplating line consists of a series of processing stations (tanks). The processing time of products in each tank must be within given lower and upper limits. Hoists running on a common track are used to move the products between stations. There are no buffers between stations and so the production scheduling problem is tightly constrained. The objective is to minimize the production cycle time. We first present a comprehensive MILP model for the single-hoist problem which can be solved due to its limited size. We then turn to analysis of a no-wait version of the problem, which leads to polynomial-time solutions. Similar technique is then used to study the general multi-hoist scheduling problem, analyse the possible relative positions of any pair of moves, and derive a set of linear constraints to express the hoist non-collision requirements accordingly. Based on the analysis a new mixed integer linear programming model is formulated for the general multi-hoist scheduling problem. An efficient branch and bound strategy is proposed to solve the problem more quickly. Computational results show that the new model can be solved much more quickly than previous models and that the proposed branch and bound method is more efficient to solve the problem than commercial software package.