

Using Mixed Integer Linear Programming to Solve Multi-Layer Films and Multi-Materials Planning Optimization Problems

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ABSTRACT

The major attributes of the TFT-LCD industry are the capital-intensive and high technological impact. The advantages of Liquid Crystal Display (LCD) are that it is thin, low-power and high resolution. But the fierce competition in the globalization process and the ever-changing industrial progress leads to serious decline in price. To enable the display function, LCD technology requires having a key section which is a polarizer. In addition, the growing LCD size and thinner tendencies leads to a higher risk of polarizer damage, therefore the increase of cost becomes unavoidable. Planning the usage of the polarizer is very important and how to reduce the unnecessary waste becomes a major issue.

In this research, we use the Mixed Integer Linear Programming to develop a mathematical model to solve the Multi-Layer Films and Multi-Materials assignment problem and obtained an optimal solution. Our results are analyzed and compared to the company current situation and to the Multiple of Maximum Length methodology used in research made by Peng (2013). With the developed mathematical model, we performed tests with different order numbers, material numbers and types of materials. The results obtained in this research using our mathematical model have proven to be less wasteful compared to the company current situation and to the methodology used by Peng (2013), thus, increasing the company's competitiveness.

Keyword: Polarizer 、 Mixed Integer Linear Programming(MILP) 、 Multi-Layer Films and Multi-Materials 、 Assignment Problem