CHAPTER I

INTRODUCTION

1.1 Scientific rationale

Flexography has traditionally been used for low quality print. However, dramatic improvements in the print quality have been evident in recent years due to developments in press elements, inks, substrates and pre-press work. The quality can sometimes be almost the same as that achieved in offset. As the quality rises, it is more important that ever to understand the process and to identify the parameters which can affect the print result.

It is important for the print quality in flexography that ink transfer takes place from the ink tray to the substrate without any disturbance. A full understanding of the mechanisms by which the ink is transferred in a press and how different factors affect this process are therefore greatly needed.

A flexographic printing unit consists of an inking system, an anilox roller, a printing cylinder and an impression cylinder. To achieve a full understanding of the ink transfer it is necessary to measure the ink amount at three different positions. We need to know how much ink is taken up by the anilox roller, the ink film thickness on the printing form (plate) before the printing nip, and the amount of ink transfer to the paper. This is shown in figure 1-1.

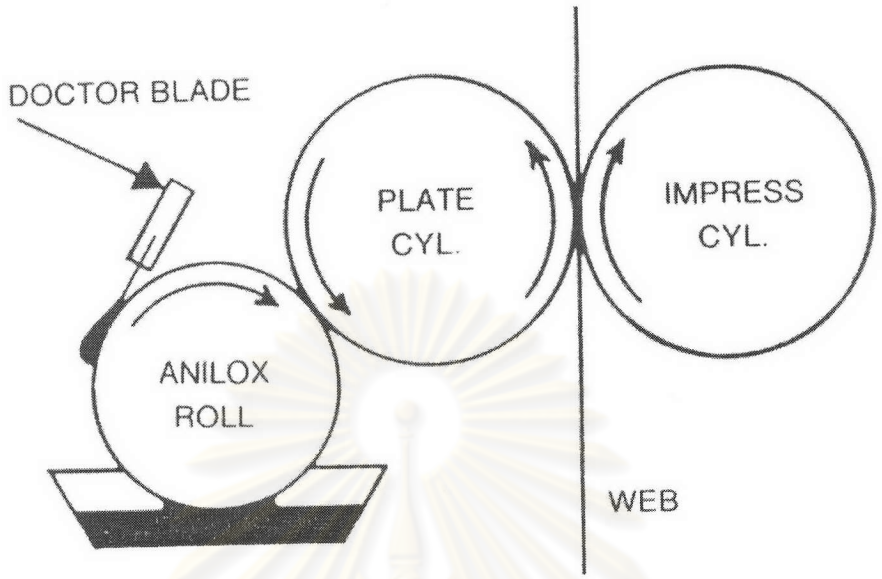

Figure 1-1 Typical flexographic print station.

The ink transfer to the plate can be affected by surface structures, hardness and contact angle of the plate. The thickness of the plate may vary due to the 'cupping' phenomenon, which means that the plate becomes thinner in the middle parts when it is stretched over the plate cylinder. It is very important that the impression is less in the first nip than in the second nip, otherwise ink will be left on the plate after the printing nip due to lack of contact with the substrate.

This research investigates the ink transfer of flexography printing on paper using plate nyloflex® FAH 170, nyloflex® ACE 170, nyloflex® FAH DII 170, nyloflex® ACE DII 170 and DuPont® DPU 67. Then the amount of ink on the plate and the materials is measured by weighing for comparison each plate type quality and the influence of the ink amount when transfered on the plate. Finally, to consider the settle base of the printing quality in the future.

1.2 Objectives of the research work

1. To define plate system's performance in UV flexography printing.
2. To compare ink transfer among the different conditions of plate system in UV flexography on adhesive labels.

1.3 Scope of the research work

To evaluate the plate performance on UV flexographic ink transfer on five plate types which effect dot gain, uniform, fine reverse and gradient of printing quality. Using a model equation to determine the amount of ink transfer by weight of the specific plate and substrate in order to get the amount of ink transfer from a different plate type. And finally get the amount of ink transfer of each plate type to evaluate printing quality.

1.4 Content of the research work

This thesis consists of five chapters including introduction, theoretical background and literature review, experiment, results and discussion, and conclusion and suggestions. Chapter 2 displays in brief about the principles of flexographic process, photopolymer plate, plate making, UV flexo inks and some shot literature review of some previous work. In Chapter 3 , The details about the material, apparatus and procedure of this research are examined and calculation of ink transfer coefficient. Chapter 4 presents the results and discussion of the effect of the amount of ink transfer to printed quality. Chapter 5 presents the conclusions and suggestions of the work.