Studies on Improvement Printed Mottle for High Quality Printing

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ABSTRACT

Talc Printing mottle of coated paper is one of the most common and the most difficult problems in offset printing. For a high quality printing, development of new paper coating technologies to prevent print mottle is required.

This research focused on improvement of printing mottle. Effects of ink dispersion and printing conditions such as nip conditions, printing pressure and printing speed on printing mottle were investigated with RI tester and IGT tester.

I. INTRODUCTION

Printed mottle should be solved by getting high quality printed products.[1)-5)] From now on, the study of solving printed mottle are coated paper absorption controled by base paper sizing degree and coating layer binder migration control. As a result, print mottle has improved in coated paper.[6), 7)] But, printing is worked by interaction of printing ink, coated paper and printing press. So it's difficult to solve printed mottle by the changed coated paper.

In this paper, we were carried out of improvement printed mottle by ink dispersion and changing printing condition such as printing pressure, printing nip condition and printing ink transfer.

II. Materials and Method

2. 1 Materials

2. 1. 1 Paper

We used coated paper of 120g/m². Table 1 showed properties.

2. 1. 2 Ink

We used cyan ink dispersed as 2㎛, 4㎛, 6㎛ for effects on ink dispersion. Table 2 showed the composition and viscosity of those.

Table 1. Properties of coated paper

Properties		
Basis weight (g/m²)		119
Thickness (㎛)		92.7
Bulk (㎤)		0.78
Density (g/㎤)		1.28
Smoothness (sec)	Top	5000
	Wire	4686
Gloss (%)	Top	82.5
	Wire	80.7
Color shade	L/D (L*)	93.4
	R/G (a*)	1.76
	Y/B (b*)	- 5.12
	Whiteness (%)	131.8
	Brightness (%)	90.5

Table 2. Composition and viscosity of inks

Color	Dispersion	Composition	Viscosity (poise)
Cyan	2 ㎛	Pigment 15 %	125
	4 ㎛	Resin 5 %	126
	6 ㎛	Oil 70 % High boiling Oil 5 % Compound Drier 5 %	125

2. 2 Experimental

2. 2. 1 Printing test

We used IGT Printability Tester C1(Netherlands). The printing conditions were 1m/sec printing speed and 200N printing pressure. And Ink was supplied by 0.3cc and 0.6cc. The coated paper was printed for condition change that was divided with soft nip and hard nip.

2. 2. 1 Image Analysis

The relation between inks quantity that was transferred on plate and paper was measured by weight. It was indicated by transfer rate. Because of objective evaluation of printed paper, The reflecting densitometer(X-Rite 418, USA) was used in this experiment. Each sample measured 20 times. The results were a mean. Area(-) indicated printing mottle through an image analysis.

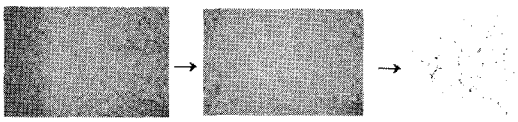

Fig. 1 Method of Image analysis

III. Results and Discussion

3. 1 Fractional ink transfer and rate of mottle area by ink dispersions.

Fig. 2 showed fractional ink transfer and rate of mottle area on 0.3cc ink. As a result, fractional ink transfer was 0.4585 and rate of mottle area was -1.99(%) on dispersed 2㎛. Printed mottle was lower than other dispersed inks. Also that was showed on good result by the hard nip. Because the pressure was higher than the other soft nip, the transfer happened a lot.

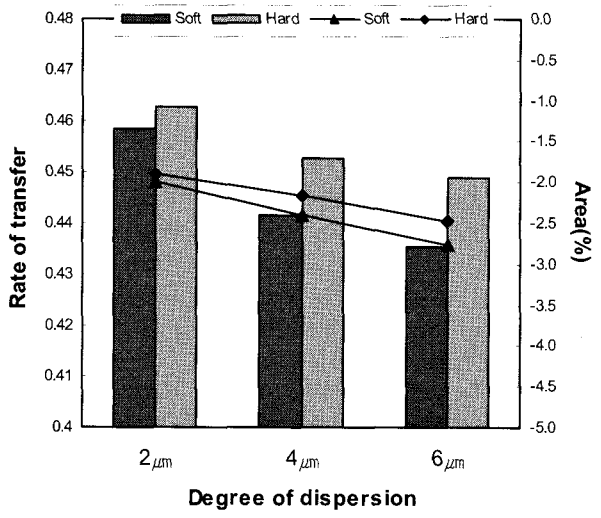

Fig. 2 Fractional ink transfer and mottle area on 0.3cc ink supplied.

Fig. 3 indicated the result of 0.6cc ink. It showed the good result at 2㎛. Because 2㎛ was good for dispersion.

In view of the results so far achieved, there was a great difference from bad condition of dispersion when provided ink was increase in quantity.

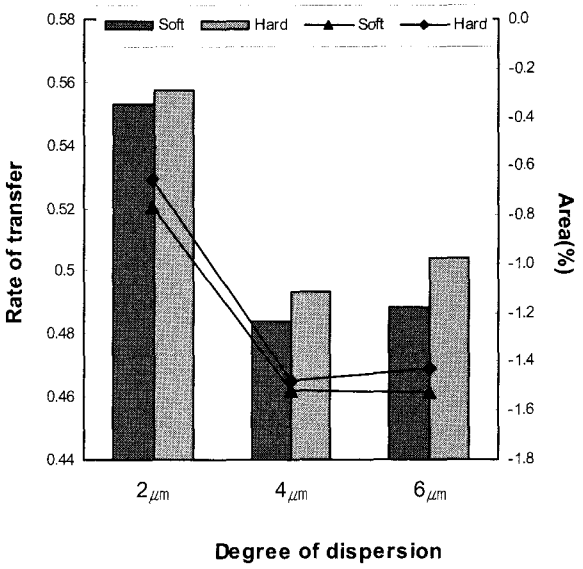

Fig. 3 Fractional ink transfer and mottle area on 0.6cc ink supplied.

3. 2 Fractional ink density and rate of mottle area by ink dispersions.

3. 2 Roughness and paper gloss of coated board

Fig. 4 showed the relation between fractional ink density and rate of mottle area.

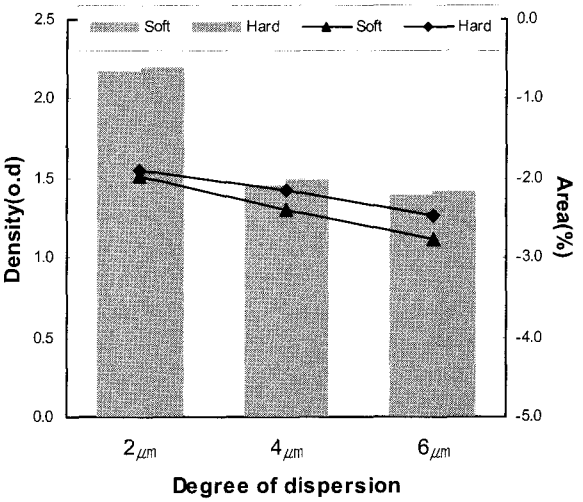

Fig. 4 Printed density and mottle area on 0.3cc ink supplied.

Fig. 5 indicated that fractional ink density of badly dispersed ink was lower than good one.

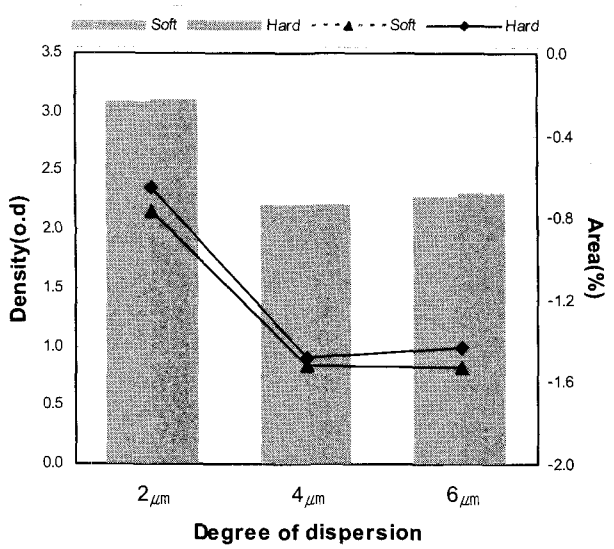

Fig. 5 Printed density and mottle area on 0.6cc ink supplied.

IV. Conclusions

As a result of this experiment, The 2㎛ ink oh good dispersion got good density among inks that were used in this test, and rate of mottle area was the lowest in the test. It happened the same when ink quantity was increased. In case of hard thing, It was the good result in comparison with nip condition.

So Printing mottle was really effected by ink dispersion. That is why the study about pressure in printing and controlling inks is carried out so much.

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