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COMPARATIVE ANALYSIS OF SOLID INK DENSITY, PRINT CONTRAST AND PRINT GLOSS OF METALIZED BOARD PRINTED WITH SHEET FED OFFSET PRINTING PROCESS AND DRY TONER BASED DIGITAL PRINTING PROCESS

Aman Bhardwaj*, Vandana
* Scholar, M.Tech. Printing Technology, GJUS&T, Hisar
Assistant Professor, Dept. Of Printing Technology, GJUS&T, Hisar

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ABSTRACT

Metalized boards are frequently used in the packaging industry. In our study, we compare the Print properties of metalized board printed with the primer coat on sheet fed offset and dry toner based digital printing process. Metalized boards are give good print properties when printed with digital printing process for short run jobs. Comparatively high contrast is found in less solid ink density in digital printing.

KEYWORDS: Digital printing, Sheet fed offset, Metalized board, Gloss, Contrast.

INTRODUCTION

In the modern world of printing and packaging, metalized board (formerly known as met-pet board) are widely used in the printing and packaging industry for making package, carton etc. A metalized board is product which is laminated with a layer of aluminum which contribute in decorative and protective properties of the product. Metalized board are intermittently printed with the offset printing process because printing with offset printing process is economical and speed of production is high although there is a process of primer coating on the metalized board is add when metalized board are printed with offset printing process. But when we talk about the small run jobs offset printing process is comparatively much pricey than the digital printing process.

Offset printing is a commonly used technique in which the inked image is transferred (or "offset") from a plate to a rubber blanket and then to the substrate. The offset printing process employs a flat (planographic) image carrier on which the image to be printed obtains ink from ink rollers, while the non-printing area attracts a water-based film (called "fountain solution"), keeping the non-printing areas ink-free.

Digital printing (using toner) primarily uses an electrical charge to transfer toner to the substrate onto which it is printed. Digital printing can handle variable data. Digital offset presses are also called direct imaging presses, although these presses can receive computer files and automatically turn them into print-ready plates. The main difference of production cost between the offset printing process and digital printing process is due to the plates which are used in the offset printing process. These plates increase the cost of the production. So for small run jobs, we always have to print with the digital printing process.

RESEARCH OBJECTIVES

The main aim of our research is to analyze the print properties like solid ink density, print contrast and print gloss of metalized board printed with sheet fed offset printing process and dry toner based digital printing process.

RESEARCH METHODOLOGY

In the beginning we take 200 primer coated metalized board and 100 without primer coated metalized board. Than we print 100 primer coated boards with offset and 100 primer coated boards with dry toner based digital printing

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process. 100 without primer coated boards are also printed with dry toner based digital printing process for sophisticated comparison between the offset printing process and dry toner based digital printing process.
After the printing, we measure the readings of all of the 300 boards printed with offset and digital(primer coated and without primer coated).With the help of spectrophotometer and gloss meter solid ink density, print contrast and print gloss is measured.

DATA COLLECTION AND ANALYSIS

Solid ink Density

Solid ink density of Randomly chosen 10 boards printed with sheet fed offset and digital(primer coated and without primer coated) each.

	Solid Ink Density of Offset (Primer coated boards)				**Solid Ink Density of Digital (Primer coated boards)**				**Solid Ink Density of Digital (Without Primer coated board)**			
Sr. No.	**C**	**M**	**Y**	**K**	**C**	**M**	**Y**	**K**	**C**	**M**	**Y**	**K**
1	2.68	2.32	2.13	2.79	2.09	2.01	1.9	2.39	2.06	2.02	1.86	2.55
2	2.68	2.35	2.12	2.77	2.21	1.92	1.89	2.57	2.07	2.01	1.9	2.42
3	2.68	2.26	2.13	2.7	2.11	1.98	1.88	2.56	2.03	2.09	1.75	2.59
4	2.71	2.31	2.14	2.84	1.96	1.98	1.86	2.35	2.14	2.04	1.88	2.57
5	2.68	2.29	2.14	2.74	2.05	2.01	1.73	2.45	1.96	1.98	1.86	2.35
6	2.65	2.27	2.13	2.78	2.13	2.08	1.84	2.56	2.05	2.01	1.73	2.45
7	2.67	2.31	2.12	2.79	2.04	2.07	1.93	2.51	2.14	2.09	1.85	2.57
8	2.66	2.34	2.11	2.77	2.01	2	1.82	2.48	2.04	2.07	1.93	2.51
9	2.69	2.25	2.14	2.79	2.04	2.02	1.85	2.53	1.98	2.01	1.84	2.49
10	2.72	2.32	2.14	2.78	2.07	2.04	1.7	2.39	2.05	2.03	1.84	2.57

the average solid ink density of metalized boards printed with offset printing process is much higher as compare to the solid ink density of boards printed with digital printing process and the average solid ink density of primer coated metalized boards and without primer coated boards printed with digital printing process is same.

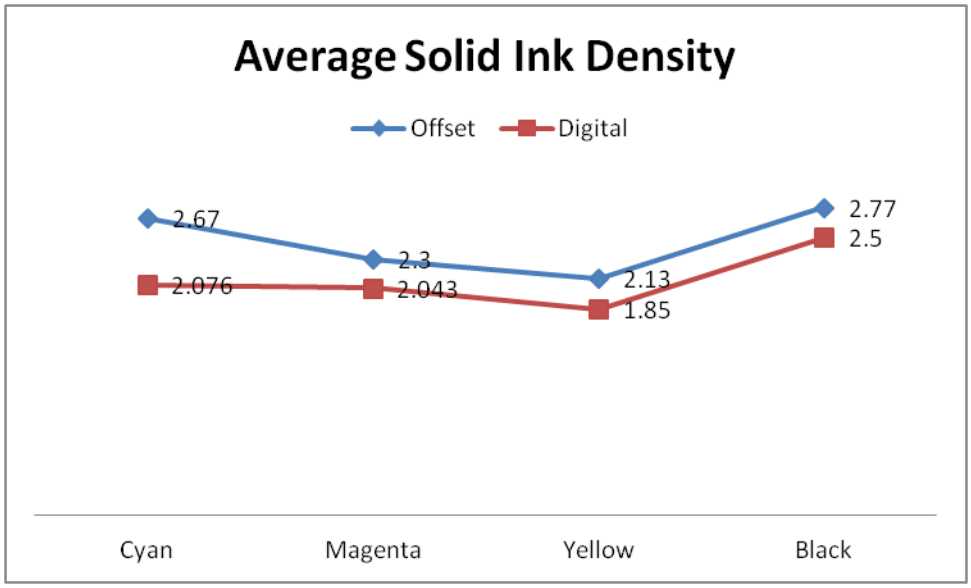

Figure 1 Comparison of solid ink density of Digital and Offset printing process on metalized boards.

Print Contrast

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Print contrast of Randomly chosen 10 boards printed with sheet fed offset and digital(primer coated and without primer coated) each.

	Print contrast of Offset (Primer coated boards)				**Print contrast of Digital (Primer coated boards)**				**Print contrast of Digital (Without Primer coated boards)**			
Sr. No.	C	M	Y	K	C	M	Y	K	C	M	Y	K
1	0.15	0.1	0.05	0.14	0.15	0.14	0.14	0.22	0.2	0.17	0.14	0.23
2	0.16	0.12	0.07	0.14	0.18	0.15	0.17	0.21	0.18	0.14	0.14	0.2
3	0.17	0.1	0.05	0.16	0.15	0.15	0.13	0.17	0.17	0.16	0.14	0.22
4	0.17	0.1	0.05	0.15	0.2	0.16	0.13	0.22	0.17	0.17	0.14	0.22
5	0.15	0.1	0.07	0.14	0.19	0.15	0.15	0.21	0.18	0.16	0.13	0.2
6	0.16	0.1	0.05	0.16	0.16	0.16	0.14	0.21	0.18	0.14	0.14	0.2
7	0.15	0.11	0.05	0.14	0.19	0.17	0.13	0.23	0.17	0.14	0.16	0.22
8	0.15	0.11	0.07	0.15	0.18	0.16	0.13	0.2	0.16	0.16	0.13	0.21
9	0.16	0.12	0.05	0.14	0.2	0.14	0.14	0.21	0.16	0.14	0.14	0.21
10	0.17	0.12	0.05	0.15	0.17	0.15	0.16	0.22	0.19	0.14	0.14	0.23

the average Print contrast of metalized boards printed with offset printing process is much lesser as compare to the Print contrast of boards printed with digital printing process and the average print contrast of primer coated metalized boards and without primer coated boards printed with digital printing process is same.

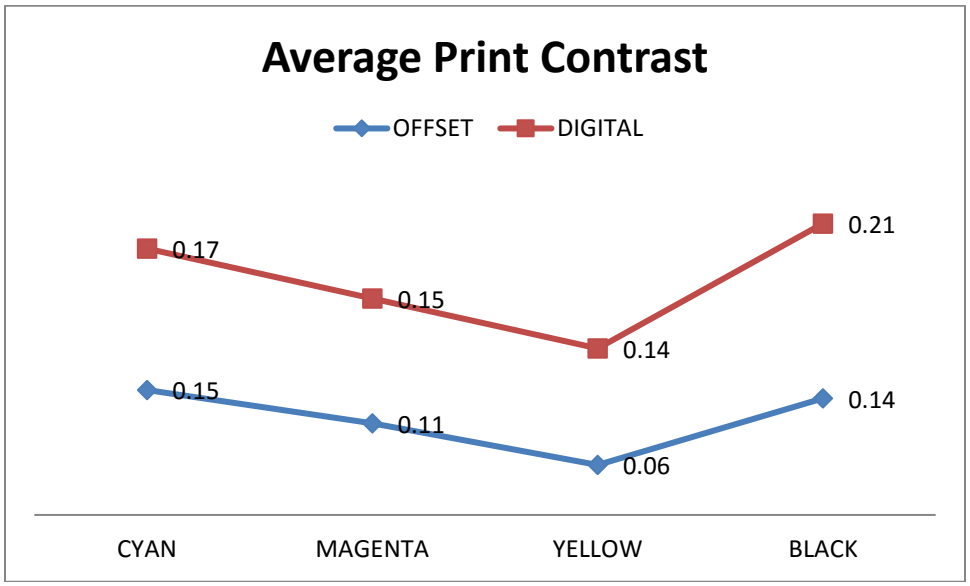

Figure 2 Comparison Print contrast of Digital and Offset printing process on metalized boards.

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Print Gloss

Print gloss of Randomly chosen 10 boards printed with sheet fed offset and digital(primer coated and without primer coated) each.

Sr. No.	Print Gloss of Offset (Primer coated boards)	Print Gloss of Digital (Primer coated boards)	Print Gloss of Digital (Without Primer coated boards)
1	146.4%	111.9%	170.2%
2	146.5%	116%	172.3%
3	147.3%	110.1%	168.3%
4	150.6%	110.5%	169.4%
5	144.4%	113.1%	177.5%
6	142.2%	112.8%	172.5%
7	145.8%	114.4%	169.1%
8	143%	111.6%	175.4%
9	130.2%	116.6%	178.3%
10	133.7%	109.8%	176.2%

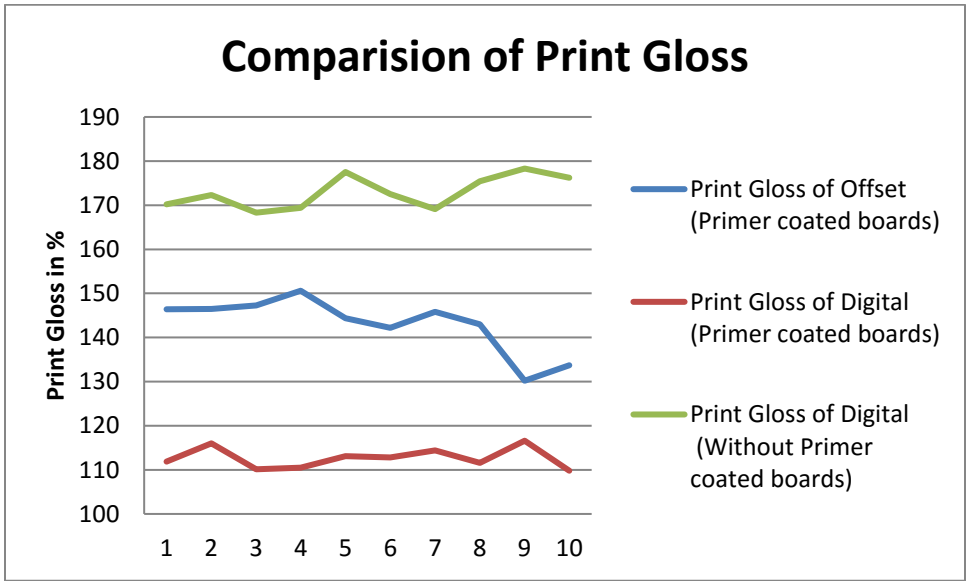

Figure 3

When print gloss of metalized board printed with offset and digital (primer coated and without primer coated) compared it was found that the Without primer coated boards printed with dry toner based digital printing process have highest print gloss with an average of 173.08 % and primer coated boards printed with dry toner based digital printing process have less print gloss i.e. 110.71% when compare with the print gloss of primer coated boards printed with offset printing process i.e. 140.21 %.

RESULT AND DISCUSSION

Solid ink density (Average of 100 boards) of Primer coated Metalized board printed with offset printing process is higher than the board printed with digital(primer coated and without primer coated) the average density of Cyan, Magenta, Yellow, Black printed with offset printing process is 2.67, 2.30, 2.13, 2.77 respectively.

The average solid ink density of board printed with Digital(primer coated and without primer coated) is almost same. The average density of Cyan, Magenta, Yellow, Black printed with (primer coated and without primer coated) is 2.076, 2.043,1.85, 2.50 respectively.

Print contrast (Average of 100 boards) of Metalized board printed with digital(primer coated and without primer coated) is higher than the board printed with offset printing process. The average Print contrast of Cyan, Magenta, Yellow, Black printed with Digital printing process is 0.17, 0.15, 0.14, 0.21 respectively. The average Print contrast of board printed with Digital(primer coated and without primer coated) is almost same.
The Print contrast of board printed with offset printing process is less than the digital printing process. The average Print contrast of Cyan, Magenta, Yellow, Black printed with offset printing process is 0.15, 0.11, 0.06, 0.14 respectively.

Print Gloss
Average of 100 boards 173.08 % Print gloss is found while without primer coated boards printed with digital printing process and 110.71% average gloss is found while primer coated boards printed with digital printing process and 140.21 % % average gloss is found while primer coated boards printed with offset printing process.

CONCLUSION
In our study we found that the solid ink density is more on metalized board while printed with sheet fed offset printing process and less in dry toner based digital printing process.

While contrast is high on metalized board while printed with dry toner based digital printing process. we conclude that we can get more contrast in less ink density in dry toner based digital printing.

Print Gloss is much higher while without primer coated boards print with dry toner based digital printing process.
We can also conclude that we eliminate a process of primer coating if we print metalized board on dry toner based digital printing process and can get more print gloss as compared to sheet fed offset process.

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