

**ABSTRACT**

Solid Bleached Sulphate Boards (SBS) and Duplex Boards are commonly used substrates for various carton based packaging applications. Both types of boards were printed with Web Offset Printing Press available in local market keeping in target to check printing characteristics i.e. Solid Ink Density, Dot Gain and Print Contrast. A master consisting of quality control patches was prepared, printed and evaluated for above mentioned print characteristics with the help of spectrodensitometer. The results indicated that Solid Bleached Sulphate Boards are better than Duplex boards in terms of Solid Ink Density and Dot Gain. On the other hand, Duplex boards are better than in term of Print Contrast.

**KEYWORDS:** Solid Bleached Sulphate Board, Duplex Board, Web Offset, Solid Ink Density, Dot Gain, Print Contrast.

**I. INTRODUCTION**

Printing is a process of reproducing text and images by the use of a master or original. Offset printing process is mostly used process now-a-days. In this, firstly ink is applied on plate and then ink is transferred to blanket. Finally, ink is transferred on paper from blanket cylinder. It is an indirect process. It is known as offset because image areas are set in reverse form on blanket before going to printing surface. This process works on the principle of repulsion of oil and water.

Paperboard is a thick paper-based material. According to ISO standards, a material is considered to be paperboard if its gsm is more than 220. There can be single-ply or multi-ply paperboards. It is used in packaging because it can be easily cut and formed. It is also used as book and magazine covers. Paperboards can be printed also.

Solid Bleached Sulphate Board (SBS) is a virgin fiber grade of paperboard. It is made up of bleached chemical pulp and there is coating of a mineral or synthetic pigment on the top surface/ front side in one or more layers (C1S) and can be coated on the reverse side (C2S). Its printability is good. Easily cutting, creasing, embossing and hot foil stamping is also possible with it. It can be perfectly white from both sides. It is used in food and cosmetic industry because of its additional properties such as purity. It has neither smell nor taste. It is hygienic in nature.

Duplex board is a kind of cardboard or paperboard. It is made up of two layers or piles. So, it is known as duplex board. It is smooth and used in packaging. There are two types of duplex board. One is coated duplex board and another is uncoated duplex board. Both types of boards are strong but coated duplex board is coated and has more water-resistance as compared to uncoated duplex board. Duplex board has more additional properties. It has bright white appearance. It is tough. There are many uses of duplex boards. It is used in food industry and pharmaceutical industry. It is also used to make cups, paper plates, cigarette packs, garment boxes etc. There are more uses of duplex board. These are used to make greeting cards, book covers, match boxes etc. but relatively lightweight duplex board is used for these purposes.

**II. RESEARCH OBJECTIVES**

Solid Bleached Sulphate (SBS) board (coated) and Duplex board (coated) are widely used substrates for various carton based packaging applications. To check and compare print quality between both is the need of the hours. Objective of this research is:

- To compare print quality of SBS board (Coated) and Duplex board (Coated) of 300 gsm printed with four color Web-Fed Offset printing process.

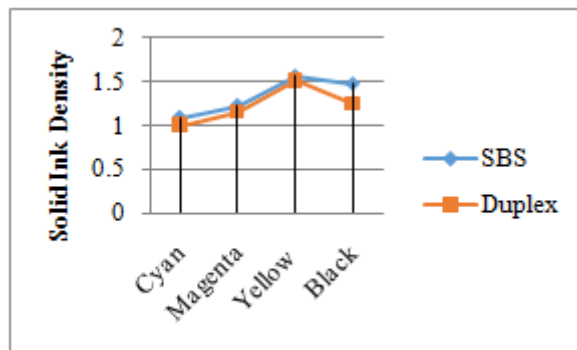
**III. RESEARCH METHODOLOGY**

In above research work, a master (consisting of quality control patches) was prepared with Corel Draw software. Then plate is prepared by TechNova CTP (Computer to Plate). Then this master is printed on Solid Bleached Sulphate Boards and Duplex boards by Web Offset Printing Press available in local market. After that, it was cut in form of sheets of fix size in post press department. Then one sheet out of thirty and total thirty were evaluated with the help of spectrodensitometer and print characteristics i.e. Solid Ink Density, Dot Gain and Print Contrast of both types of boards were compared.

**IV. DATA COLLECTION AND ANALYSIS**

*Table.1. Comparison of average Solid Ink Density of Solid Bleached Sulphate Boards and Duplex boards*

	SBS Board	Duplex Board
Cyan	1.09	1.00
Magenta	1.23	1.16
Yellow	1.57	1.53
Black	1.48	1.26



*FIG.1. Comparison of average Solid Ink Density of Solid Bleached Sulphate Boards and Duplex boards*

*Table.2. Comparison of average Dot Gain (%) at 40% of Solid Bleached Sulphate Boards and Duplex Boards*

	SBS Board	Duplex Board
Cyan	29.16	24.38
Magenta	23.11	22.44
Yellow	26.70	24.71
Black	24.76	23.85

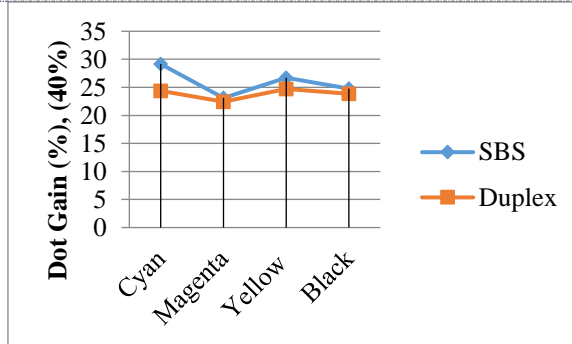


Fig.2. Comparison of average Dot Gain (%) at 40% of Solid Bleached Sulphate Boards and Duplex Boards

Table.3. Comparison of average Dot Gain (%) at 80% of Solid Bleached Sulphate Boards and Duplex Boards

	SBS Board	Duplex Board
Cyan	16.90	15.69
Magenta	13.14	10.38
Yellow	16.19	15.36
Black	15.43	13.92

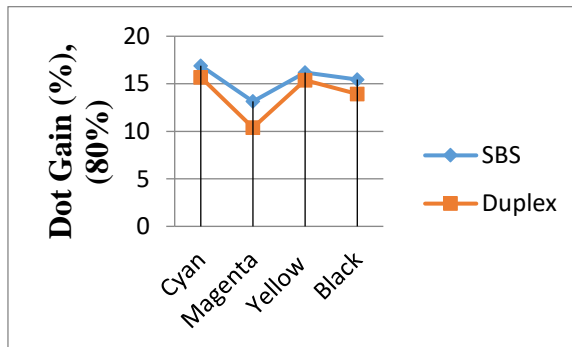


Fig.3. Comparison of average Dot Gain (%) at 80% of Solid Bleached Sulphate Boards and Duplex Boards

Table.4. Comparison of average Print Contrast (%) of SBS Boards and Duplex Boards

	SBS Board	Duplex Board
Cyan	27.67	28.83
Magenta	29.20	32.33
Yellow	24.03	25.47
Black	24.20	26.07

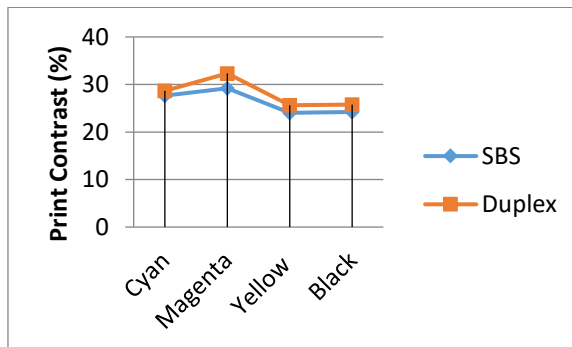


Fig.4. Comparison of average Print Contrast (%) of SBS Boards and Duplex Boards

## V. RESULT AND DISCUSSION

After analysis of data collected from the different tests, the following results are found:

1. **Comparative Solid Ink Density analysis of Solid Bleached Sulphate Boards and Duplex Boards.**  
It is found that average of Solid Ink Densities of Solid Bleached Sulphate Boards is 1.09, 1.23, 1.57, and 1.48 of Cyan, Magenta, Yellow, and Black respectively. On the other hand, Average of Solid Ink Densities of Duplex Boards is 1.00, 1.16, 1.53 and 1.26 of Cyan, Magenta, Yellow and Black respectively. It is quite evident that more density is found in case of Solid Bleached Sulphate Boards. It is because of absorption of ink in SBS is higher as compared to Duplex Board because Porosity of SBS is higher than Duplex Board.
2. **Comparative Dot Gain analysis at 40% of Solid Bleached Sulphate Boards and Duplex Boards.**  
It is found that average of Dot gain (at 40% Dot Size) is 29.16%, 23.11%, 26.70% and 24.76% for Cyan, Magenta, Yellow, and Black colour respectively of Solid Bleached Sulphate Boards. On the other hand, Average of Dot Gain of Duplex Boards is 24.38%, 22.44%, 24.71% and 23.85% for Cyan, Magenta, Yellow, and Black respectively. Hence Dot Gain is more in case of Solid Bleached Sulphate Boards. It is because of absorption of ink in SBS is higher as compared to Duplex Board because Porosity of SBS is higher than Duplex Board. In this, ink spreads more through their pores.
3. **Comparative Dot Gain analysis at 80% of Solid Bleached Sulphate Boards and Duplex Boards.**  
It is found that average of Dot gain (at 80% Dot Size) is 16.90%, 13.14%, 16.19% and 15.43% for Cyan, Magenta, Yellow, and Black colour respectively of Solid Bleached Sulphate Boards. On the other hand, Average of Dot Gain of Duplex Boards is 15.69%, 10.38%, 15.36% and 13.92% for Cyan, Magenta, Yellow, and Black respectively. Hence Dot Gain is more in case of Solid Bleached Sulphate Boards. It is because of absorption of ink in SBS is higher as compared to Duplex Board because Porosity of SBS is higher than Duplex Board. In this, ink spreads more through their pores.
4. **Comparative Print Contrast analysis of Solid Bleached Sulphate Boards and Duplex Boards.**  
It is found that average of Print Contrast is 27.67%, 29.20%, 24.03% and 24.0% for Cyan, Magenta, Yellow, and Black colour respectively of Solid Bleached Sulphate Boards. On the other hand, Average of Print Contrast of Duplex Boards is 28.83%, 32.33%, 25.47% and 26.07% for Cyan, Magenta, Yellow, and Black respectively. Hence Print Contrast is more in case of Solid Bleached Sulphate Boards.

## VI. CONCLUSION

After Analysis of collected data, following findings as listed below:

- Solid Ink Density is more in Solid Bleached Sulphate Boards as compared to Duplex Boards.
- Dot Gain is more in Solid Bleached Sulphate Boards as compared to Duplex Boards.
- Print Contrast is less in Solid Bleached Sulphate Boards as compared to Duplex Boards.

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