

BINARY/AKD SIZING OF WHEAT STRAW PULP

Bisht B.S., Tiwary K.N. and Jauhari A.S.

ABSTRACT

Reasons for replacing binary system by AKD has been discussed. It was mainly deposition causing breakage at Machine, which restricts application of binary system. AKD performs well with wheat straw soda pulp. Use of soap stone powder, S.S powder containing high carbonate and GCC were discussed. S.S. Powder containing high carbonate increases wear and tear reducing wire life by almost half. With 100% GCC, retention is very low -60-62% -against 75-80% in case of Soap stone powder. Trial with 25-30% GCC mixed with 70-75% Soap Stone Powder is in progress.

INTRODUCTION

Benefits of alkaline sizing over acid or neutral sizing have been well debated, understood and alkaline sizing is well adopted in our country. However, benefits and draw backs of AKD and ASA are still under debate and opinion differs. Some of the mills prefer ASA over AKD and vice versa. The aim of this paper is to share the experience of using AKD and AKD-ASA combination i.e Binary system on wheat straw pulp. This may be helpful to those who wish to decide the system of alkaline sizing particularly with agri residues pulp.

Shreyans Papers uses wheat straw soda pulp for paper making and replaced acid sizing by alkaline sizing in 2005. It was the first occasion in the history of agri residues based mills that Shreyans Papers adopted Binary system of alkaline sizing. Experience gained by running binary system was shared with IPPTA in its zonal seminar held at Ahmedabad in July 2005(1). After running the binary system for 3-4 months it was replaced by AKD and the same is running satisfactorily since then.

Observations

Performance of binary system was good as far as increase in whiteness and brightness of paper and also increase in ash and fiber retention etc are concerned, but, due to heavy deposition at wet end it was decided to replace the binary system by AKD. Deposition could not be controlled even after frequent hot water boiling. Machine efficiency was impaired due to increased breakage at machine. Breakage reduced considerably after

replacing binary system by AKD. While changing to AKD following points were kept in mind:-

- It is easy to handle AKD and needs simple metering equipment.
- It runs very clean, few deposit problems.
- Though hot penetrant hold out is poor but it has got broad range penetrant holdout. Which is sufficient in grades of paper being manufactured at Shreyans Papers.
- Though reaction rate of AKD with cellulose is moderate/low, it is adequate for sizing. Also hard sizing is possible without deposit or de-sizing problem.
- It has got ability to size at high filler levels.

The chemical dosing in AKD sizing is given in Table I

Initially, AKD consumption was as high as 18-20 kg/t of paper which was gradually reduced to 9-10 kg/t of paper. Following factors contributed in reducing the consumption of Chemicals.

1. Pulp washing was improved considerably by replacing washers

with efficient ones.

2. Supplier worked neck to neck to understand the requirement of furnish and making the product effective.
3. Selection of package product combination to get the best result and
4. Selection of sequence of addition.

Best practice for AKD sizing may include:-

- Dilution with fresh water before addition.
- Not to add closer to filler addition.
- Minimise use of defoamer.

During AKD run, required Cobb 60 was maintained at par with that in case of binary sizing.

Strength properties and brightness of paper remained similar to those obtained during binary sizing.

Use of calcium carbonate

Advantage of using calcium carbonate in alkaline sizing is well known. However, its use is restricted due to abrasion caused in machine. Several trials were conducted at Shreyans for using calcium carbonate. Some of them are given below:-

Table-1
Consumption of chemicals during AKD sizing

| Chemical | Dose |
|---------------|----------------|
| AKD | 9-10 Kg/t |
| DSR | 3-3.5 Kg/t |
| Fixing agent | 0.5-0.6 Kg/t |
| Gum/Starch | 3-5 Kg/t |
| Retention aid | 0.15-0.25 Gm/t |

Shreyans Industries Ltd.,
P.O. Ahmedgrah-148021, Dist. Sangrur (Pb.)

Table-II
Comparison of S.S powder and calcium carbonate used in AKD sizing.

| Material | Brightness (% ISO) | Carbonate content(%) | Retention on 300 mesh(%) |
|---|--------------------|----------------------|--------------------------|
| Soap stone powder containing high calcium carbonate | 88.5-92.3 | 23.8-38.5 | 0.1-1.9 |
| Soap stone powder | 86.1-90.1 | 1.8-2.7 | 1.7-2.1 |
| Ground calcium carbonate | 94.5-96.2 | 94.5-96.2 | Traces |

Trial -1

100 % GCC was used as filler. It was to be discontinued due to very low retention viz. 60-62% against normal retention of 75-80% found in case of soap stone powder.

Trial-2

Another trial was conducted with Soap stone powder containing 24-38% Carbonate. Comparison of various soap stone powders and calcium carbonate is given in Table-II.

It was observed that due to high

abrasiveness of soap stone powder containing high carbonate wear and tear at machine, particularly at wire part, is higher compared to normal soap stone powder. Wire life reduced by 40-45% due to abrasion. Hence, addition of high carbonate containing soap stone powder was stopped.

Trial no.3

Third trial is being taken using 70-75% soap stone powder and 25-30% GCC. Results are encouraging. On an average 1% gain in brightness over soap stone powder is observed. Effect on machine wear and tear on prolonged use is under observation.

Ash retention during trial no.2 and 3 remained at par with that in case of soap stone powder.

CONCLUSION

It was observed that in case of wheat straw soda pulp AKD works better than combination of AKD and ASA. Binary system was stopped due to deposition in the wet end system due to ASA. High carbonate containing soap stone powder increased wear and tear due to high abrasion, hence, discontinued. 25-30% addition of GCC with soap stone powder improves whiteness/brightness of paper. Retention of ash was found at par with soap stone powder.

ACKNOWLEDGEMENT

The authors are thankful to the Management of Shreyans Industries Ltd. for permitting them to present this paper and Shri Anil Kumar, ED & CEO for his encouragement and support.

REFERENCE

1. Bisht et.al, IPPTA vol.17 no.3, 2005, P-75