

The Use of Silicone Soap in the Production of DIP for Newsprint and other Publication Grades

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ABSTRACT

This paper outlines a new type of deinking chemical used in the production of Deink pulp for Newsprint and other publication grades. Information on the product and performance data from a reference mill using the Silicone soap since March 2009 in Germany are presented, comparison with standard fatty acid soap in terms of cost and performance are shown. As treatment cost of traditional deinking chemicals such as fatty acid soaps are going up due to factors outside the control of the chemical producers, the silicone soap Serfax SLR developed and produced in England can help paper mills reduce their costs.

Introduction

Fatty acids are now linked to 'Energy'. The fatty acid and fatty acid soaps availability is good, however due to Bio-diesel production pressure, the prices of fatty acid and fatty acid soaps are highly volatile. Hence the focus is on the application of Silicone soap.

Silicone Soap Serfax SLR

The Silicone soap is a patented Emulsion with a brand name of Serfax SLR. It is liquid at room temperature and it is a blend of components for Ink collection, Foam control, Water repellence. Silicon Soap is NOT a Surfactant. Its performance is not dependent on temperature. It exhibits no cloud point, and in the process no special operating temperature is required.

Review of application in Commercial use of Silicone soap in Lang Papier, Germany

Serfax SLR Silicon soap has been running in LANG PAPIER of Germany in their both DIP lines since March 2009 till date. Lang Papier is part of the Myllykoski group and is located in Ettringen, Germany. Lang Papier manufactures mostly SC papers, some improved Newsprint and some Newsprint all with the furnish mix of D39 Household & D20 Magazine.

The flow chart of the two loop DIP of Lang Papier is broadly Conveyor --- Batch Pulper HD Cleaner Medium consistent ScreensPre flotation (having

Primary and secondary cells) Low consistency ScreensDisc Filter 1 Screw PressDisperger Bleach 1Post Flotation (with primary and secondary cells) Disc Filter 2Bleach 2Storage MC

In the typical data of April 2009 to September 2009 for the runs of newsprint & SC/ improved News, an analysis was made on brightness gains, Ash reductions, Chemistry, pH, Consistency and the impact on the dirt on the paper machine sheet.

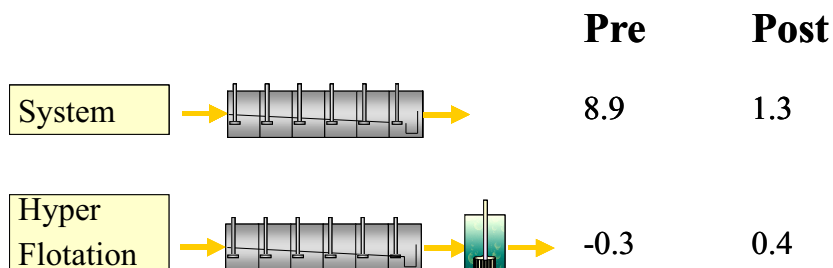
As regards Chemistry, in the pulper standard alkaline chemistry and

has been confirmed that the Serfax SLR - silicone soap can operate over a large range of pH values.

Some of the observations made are tabulated and are furnished below

Brightness Gains, Hyper Flotation Evaluation, Ash 570 deg C Reductions, Paper machine dirt by size

The hyper flotation shows that there is no more ink to remove in Pre or Post Flotation



peroxide is used. In the post oxidative and reductive bleaching stage peroxide and Hydrosulphite are not used for newsprint, but used in the higher quality grades. We have seen no water treatment problem during this period.

The pH range at Flotation feed was in the range from 7.50 to 8.40, therefore it

The Ash Reduction in the Flotation cells is balanced to achieve the Final ash levels required for the different grades being manufactured Reductions in the dirt levels in the machine of around 8% were observed during this period.

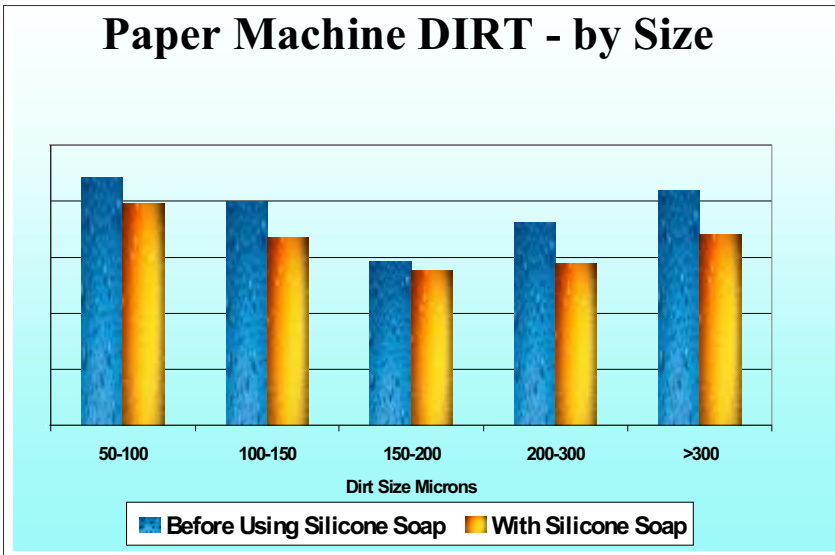
Comparison of Silicone soap

Brightness Gains	
Pre Pri	8.9
Pre Sec	11.2
Pre Pri Hyper	-0.3
Post Pri	1.3
Post Sec	2.6
Post Hyper	0.4

Ash 570°C Reductions	
Pre Pri	11.80%
Pre Sec	7.50%
Post Pri	4.00%
Post Sec	3.80%

Stephenson Recycling Chemicals,
Brookfoot House, Low Lane, Horse
forth, Leeds, LS18 5PU England

Paper Machine DIRT - by Size



Treatment cost

The Silicone soaps are expensive. However the very small dosage of Silicone soap means that Silicone soaps can be 40 to 50% lower in treatment cost as compared to the treatment costs with conventional fatty acids and fatty acid based soaps.

The Serfax SLR Silicone Soap achieves levels of brightness similar to conventional fatty acid soaps.

The ash levels in any given deink plant are subject to the incoming ash level and the ash level required by the papermachine. In the above case the paper machine required ash level of around 12-13%.

One of the major differences is in the ash levels seen in the secondary flotation cell; with silicone soap these are generally lower. However the final reject sludge are same as those obtained using fatty acid soaps indicating a good level of selectivity.

Vs. Fatty acid Soap

The following series of results illustrate the performance of Silicone Soap Serfax SLR in standard two loop deinking systems.

The recovered paper is generally 60-70% ONP and 30-40% OMG.

Dosage

Treatment Cost

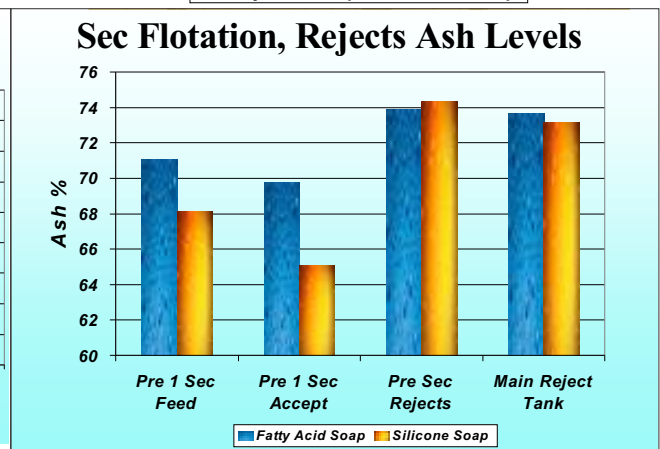
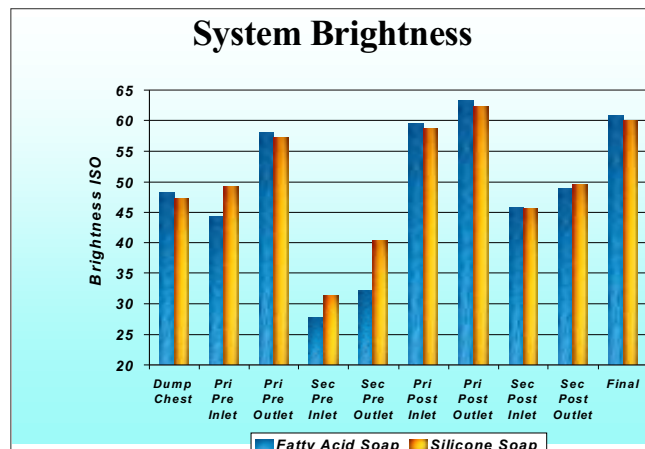
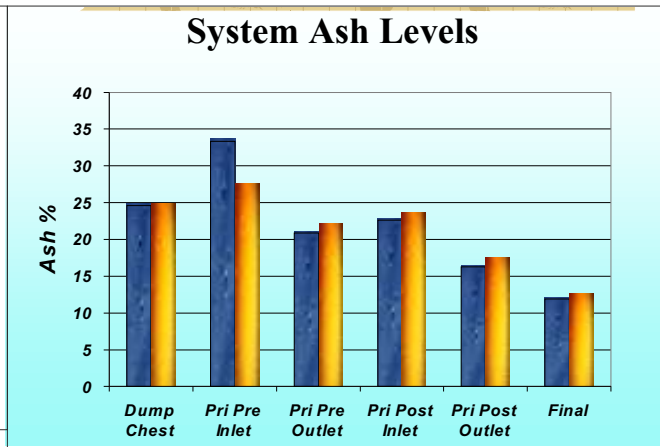
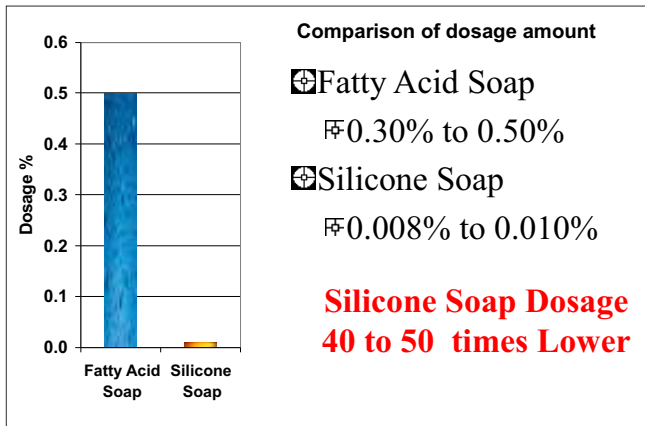
System brightness
System Ash Levels
Secondary Flotation Rejects Ash level
Yield - Pre-flotation and System

Comparison of dosage amount

This illustrates the vast difference in dosage rates.

Comparison of System Yield

Yield comparison is complicated due to major factors like --Recovered Paper



ash, Final Deinked pulp ash, large trash Plastics etc. and System configuration, Chemistry and highly dependent on the calculation method used.

Comparison of Yield Newsprint deinking system

	Recovered Paper Ash %	Deinked Pulp Ash %	System Ash Loss %	Total Solid Yield*	Total Solids Loss %	Fibre Loss %
Fatty Acid Soap	28.50	14.10	14.40	76.84	23.16	8.76
Silicone Soap	28.34	14.90	13.44	78.28	21.72	8.28

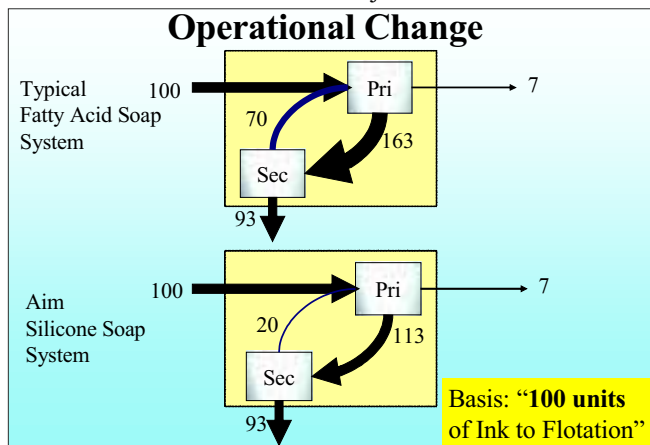
The chart below will highlight the Yield is similar on the basis of yield calculation using the Ash method

Deinking plant conversion from fatty acid soap to silicone soap.

The conversion of a deinking system from fatty acid soap to silicone involves some operational change and operational challenges. Some of the challenges have been resolved. There is considerable difference in dosage system and of course treatment costs

Operational change

The above illustrate the major



difference in operation between a fatty acid soap flotation system and one operating with silicone soap.

On the basis that 100 units of ink is feed to the flotation system both chemistries achieve the result required, however with silicone soap there is less ink run around in-between the primary and secondary stage.

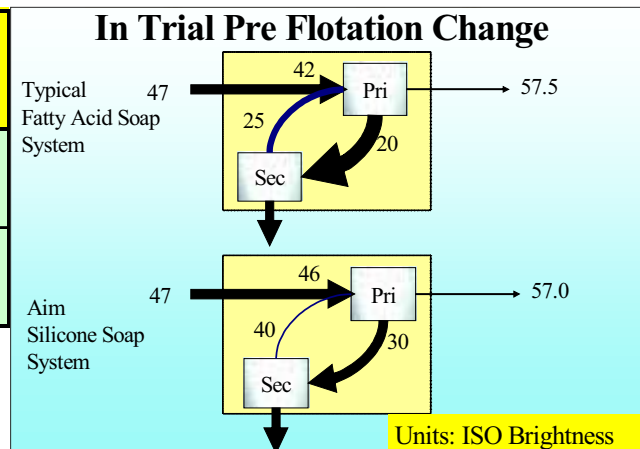
This is now illustrated in terms of brightness.

Operational Challenges

Therefore the challenges are to stop the ink running around the system and to increase secondary flotation efficiency,

Summary

Silicone soap has been proven to achieve the quality parameter required for Newsprint and other publishing grades as shown by the Lang reference - Deinked pulp properties: Brightness, Gain and final, Ink and dirt removal,



reducing consistency and flow does this. As Silicone soap reject foam is stronger than fatty acid soap this involves changes to level control strategy and improving the physical foam breaking systems. Defoamers are generally not required.

Operational Challenges Solved 1

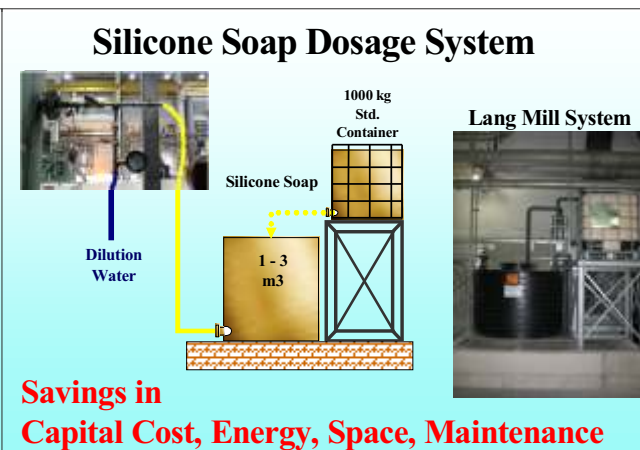
During the initial phase of introducing silicone soap into deinking system some operational challenges were

ash removal

Silicone soap has now been run in systems with a great range of process conditions this include changes in recovered paper grades, pH consistency, temperature

Serfax SLR is used successfully in News, SC grades in Europe.

More European Mills are now awaiting conversion from fatty acid soap to



encountered and resolved. This included the difficulty in introducing small dosages into flotation feed line.

The characteristics of the dilution water were found to be important and Special injection units were designed to protect against over dosages and to optimized dosages. Highly accurate pumps are required.

Serfax SLR

Price pressure on fatty acid availability and price will not go away and therefore alternatives must be found.

Trials soon to be carried out in large size Indian Deinking plants manufacturing Newsprint.