Case Study on Kuantam Papers Limited: SPIL'S MPS Performance on Paper Machine Backwater Application

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The case study depicts the efforts made by Sharad Projects India Limited towards reduction of fresh water requirement in the pulp & paper mill by using **SPIL'S Micro Plate Settler (MPS)** to treat machine backwater at the source. It reduces the consumption of fresh water and also reduces load on ETP as MPS overflow, i.e., clarified water of less than 60 ppm is achieved. It also recovers fibre from the backwater, which can be reused in the process.

Analyzing the results of MPS in the paper industry, demand for MPS has increased in the various industries to reuse process water as well as to make their plants as zero liquid discharge plants for sustainable development.

About Sharad Projects India Limited (SPIL)

Sharad Projects India Limited is a leading consultant/designer in the field of pulp and paper green field projects and day-to consultancy.

Besides that, SPIL has a well-experienced technical team in the area of environment/industrial water management and provides technical innovation and turnkey solutions for effluent treatment plants, sewage treatment plants, and raw/canal water treatment, which come under the head of water management.

The company is managed by a team of professionals and technocrats with the idea of providing turn-key services to various industries.

The company's forte lies in the design, manufacturing, and erection of major projects, offering services, competitiveness, and the ability to manage multidisciplinary teams. The commitment to delivering customized services tailored to clients' needs and local conditions has fostered successful business relationships.

SPIL'S Micro Plate Settler (MPS)

SPIL's Micro Plate Settler (MPS) separates settle-able solid particles from liquids and is used for the treatment of process water and waste water. Basically all solids that are settle-able in a given time can be separated easily and economically with the MPS, depending upon the density; those are usually solids larger than approximately 50 µm in diameter. For separating smaller particles and turbid substances, a small quantity of flocculants is used in order to create settle-able flocs to achieve outlet water of less than 30 ppm.

The MPS concept is based on Hazard's law, i.e., the settling of suspended solids is the function of settling area. The development of micro-plate settlers finds its design in the roots of Hazen's law only. MPS are intended to improve the settling efficiency of fine grain particles by decreasing settling distance.

Micro-plate settler designed by Sharad Projects India Limited finds its vast application in the pulp & paper industry, water industry, textile industry, pharmaceutical industry, and many more, where large streams of effluents are generated from different processes and operations with high suspended loads.

Design & Features:

- MPS is unique equipment that is a custom design for each application and characteristics of fluid to be handled. It uses dual media with different working principles for water clarifications.
- The flocculation chamber is used for floc generation, and suspension also keeps heavy solids from entering the MPS screw pump.
- MPS works on cross-flow passage design for solid-liquid separation.
- The plate media are inclined at specific angles required for different applications.
- Horizontal Fin Media have a unique design media in rack

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arrangement that separates out fine suspended solids that pass through inclined plate media. This medium works by creating steam line flow and utilizing the fluid boundary layer for solid-liquid separation.

- MOC of the MPS is designed according to the fluid characteristics.

Advantages:

- SPIL'S MPS works on 90-99% efficiency
- Low space requirement
- Low hydraulic retention times of only 30 min make the unit very compact and lightweight with high specific clarification. Volumetrically less than 1/5th size of conventional sedimentation clarifier.
- Low retention time eliminates chances of septicity of the fibre/ organic solids.
- Very low maintenance cost since there are no moving parts except flocculation chamber agitator.
- MPS is the best substitute for polydisc filter (PDF), dissolving air flotation (DAF), and conventional clarifiers.
- Recovered water can be reused in the system, reducing the load on the raw water source.
- Consumption of chemicals or polymers is either nil or negligible.
- Handles shock loads of flow without affecting effluent quality.
- Continuous operation without major downtime.
- Individual plate sections can be easily removed.

Applications:

- Canal Water/Underground Water
- Machine Back Water, Fibre Recovery
- Centri cleaner Reject, Deinking Foam
- Black Liquor, Wet Washing
- Starch Recovery, Sulphate Removal
- Replacement of ETP Primary and Secondary Clarifiers

Case Study of Kuantum Papers Ltd., Punjab

1. Introduction:

Kuantum Papers Ltd. is an integrated manufacturing facility based on agro- and wood raw materials. In 2008, they expanded by introducing a wood-based pulp mill, exclusively utilising wood waste from the furniture industry supplemented by wood logs sourced from social forestry, as opposed to traditional forest-based wood. Evolving from their initial production of 30 TPD, they have grown to an impressive 450 TPD, producing over 150,000 MT of paper annually.

Their product range includes Maplitho, Creamwove, and a wide range of speciality products such as Thermal Paper, Bond Paper, Parchment Paper, Azurelaid Paper, Cartridge Paper, Coloured Paper, Ledger Paper, Stiffener Paper, Cupstock Paper, Carry Bag Paper, and Straw Paper, available in a GSM range of 42–200.

2. Problem:

In Kuantam Papers Ltd., the excess backwater from Paper Machine 3 was directly being recirculated back to process.

Paper Machine 3 Backwater has a TSS value of 1500–2500 ppm, which is degrading the paper quality, wastage of good fibre, and increasing load on ETP.

3. Solution:

SPIL has suggested a fibre recovery and water clarification system at source by installing the Micro **Plate Settler (MPS-150) at Paper Machine 3 backwater.** The results of MPS were favourable, and SPIL's MPS performance was amazing in the backwater application as per SPIL guarantee. MPS was highly effective in reducing the TSS. The readings are as follows:

Table 1

S. No.	Flow (m^3/hr)	pH Inlet	MPS Inlet) TSS (mg/l	pH Outlet	MPS Outlet TSS (mg/l)
1	120	7.6	916	7.5	37
2	120	7.6	1042	7.4	50
3	119	7.5	1218	7.3	54
4	122	7.5	1618	7.3	55
5	120	7.5	1430	7.6	52
6	121	7.4	1166	7.5	40

The inlet TSS levels were elevated, as indicated in the table above. However, following the installation of the MPS, the outlet TSS values fell within the acceptable range (<60 ppm) without requiring polymer dosing. As a result, the clarified water meets the requirements for reuse within the plant, thereby reducing the load on the ETP. Notably, the TSS is collected as fibre, which is also reused in the process. This

Before

After

MPS Installed at Kuantam Paper Ltd.

dual reuse of water and fibre significantly enhances resource efficiency.

4. Conclusion:

After analysing the readings, it has been concluded that

- The TSS removal efficiency exceeds **95-97% without polymer dosing,** achieving levels below 60 ppm. With minimal polymer dosing, levels as low as 30 ppm are attainable.
- The process yields high fibre recovery and minimal fibre wastage as sludge.
- Average fibre recovery reaches **96%,** with an average of **42 TPD** recovered, as per Table 1.
- Average water recovery is **92.18%.**
- The system utilises **minimal polymer in the machine backwater clarification,** resulting in substantial chemical savings compared to other water clarification equipment.
- Clarified water is directly reused in the process.
- The system reduces the load on the ETP.
- Energy savings are achieved through reduced heat energy loss due to lower retention times and maintaining inlet water temperature.

Therefore, by summing up the case study, it has been proven that SPIL's MPS has been working efficiently. MPS is designed in such a way that no polymer is required for the separation of the solids from the liquid. Sometime we observed in some of the mills that the charge on the fibre is very high; in that case we have to neutralize the charge by minor dosing of polymer up to some extent to achieve less than 30 ppm. SPIL successfully conducted a trial and installed a commercial plant at Kuantam Paper Ltd., yielding desired results. Further fine-tuning of polymer dosing, considering inlet flow and fibre charge, can reduce TSS levels in the final outlet.

Hence SPIL's MPS is a perfect solution to clarify water from various applications like paper machine backwater, drinking foam water, wet washing systems, black liquor clarification, raw/canal water clarification, etc.

With over 100 companies trusting SPIL's innovative solutions, Sharad Projects India Limited has established itself as a leading technology provider.

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