SESSION D –
MACHINE ROOM

1.) Rethinking Vacuum Systems to Reduce Energy Costs:
Troy Miller, National Sales Manager – **Gardner Denver: Runtech-Nash**

Overall cost competitiveness is playing more and more important role in paper production. Due to the rising energy prices and cost of the fresh water the both minimum energy and water consumption, or better to say maximized energy efficiency and minimized water usage are getting more and more important for paper makers.

Runtech Systems has developed very efficient new Ecopump technology for paper machines vacuum systems. Ecopump technology is based on the variable speed turbo blowers and it can cut the energy costs of a paper machine vacuum system by some 30% to 70% compared to the more traditional technologies.

In addition, the Ecopump blowers are totally water free and thus fresh water consumption of the whole paper machine would be decreased remarkably and at the same time the water handling and/or water treatment costs of the complete vacuum system would be zero.

Due to the fully adjustable speed of Ecopump turbo the vacuum system is very easy to optimize to meet the varying operational situation of the tissue machines which is creating superior operational efficiency of the vacuum system compared to any other vacuum systems available.

2.) **Papermaking Best Practices with Vacuum Dewatering Systems:**
Douglas F. Sweet, P.E. – **Doug Sweet & Associates Inc.**

Vacuum systems are essential for papermaking, and contribute to sheet formation and dewatering, press performance, felt conditioning, and general machine efficiency. The vacuum system includes several sub-systems for vacuum control, air/water separation and vacuum pump seal water management. These systems can incorporate liquid-ring pumps, low vacuum fans, single and multi-stage centrifugal blowers, or hybrid configurations to complete a vacuum system.
Generally, paper machines operate with little attention required of the vacuum processes. But, these systems tend to evolve, intentionally or unintentionally, into processes with lost performance. The result is often reduced dewatering capability having a direct impact on paper machine efficiency and operating costs. Other problems can include vacuum pump reliability and maintenance problems contributing to downtime. This presentation will cover common issues found in these systems which can have a major impact on dewatering processes, quality and energy efficiency.

3.) **<u>Improving Efficiency and capacity of Number One Pulp Machine Flakt Dryer Through Focused Investments in Technology and Best Practices for Preventative Maintenance</u>:**
Koowar Singh, Process Control Engineer – **Mercer Celgar**

Mercer Celgar's PM1 is a 1961 vintage with a fourdrinier table, 3 open nip presses and flakt dryer. The machine has a capacity of 820 ADMT/day of NBSK pulp. An integral part of Celgar's Kraft process since the mill's inception in 1962, PM1 continues to play a key role in production today and for the foreseeable future.

The second half of 2018 saw Celgar make strategic upgrades involving the latest in drive technology, laser draw control, high speed cameras and refined process control to improve the overall efficiency of the machine. These efforts were highlighted in a paper presented by the mill at Pacwest 2019.

In 2019, the mill further invested in PM1 by upgrading the flakt dryer with modern steam coils, as well as rehabilitating the associated condensate and heat recovery equipment.
This paper highlights the efforts and methods involved debottlenecking the flakt dryer and the resulting increase in efficiency, performance and capacity.

4.) **<u>Phenomena of Hornification and its Mitigation Through Enzymatic Treatment:</u>**
James Tausche, CEO – **Enzymatic Deinking Technologies, LLC (EDT)**

Delignification, achieved through chemical cooking and bleaching, leads to micro- and macropores and unprocessed fibrils on the fiber's internal and external surfaces that contribute greatly to the strength of the paper product once formed, pressed and dried. Nevertheless, once the freshly produced never-dried fibers have been initially dried, permanent closure of the pores, collapse of the lumen and reattachment of the fibrils to the fiber surface make it impossible for the pulp to regain its original properties through hydration. This process was first described as "Verhornung", later renamed as hornification, in the early 40s by the German scientist G. Jayme. Due to the nature of chemical cooking and bleaching, chemical fibers suffer from hornification, leaving the market pulp producers condemned to losing 30% of the strength of the pulp processed through their dryers.

Hornification, not a deeply studied subject in the pulp and papermaking field, is more relevant to pulp producers and their customers than first thought, due to the growing importance of market pulp versus integrated paper production. During the research performed in collaboration between EDT and Mercer International Pulp Sales, hornification was proven to cause a reduction in the water holding capability of the fiber and the strength of the fiber network.

This series of studies are pointed towards measuring the micro- and macro effects of hornification in an effort to mitigate the losses from this cause. While other techniques to reduce the hornification penalty in pulp dryers have been proven unsuccessful or not suitable for full-scale operation, the right enzymatic treatments can be efficient in mitigating these losses and producing a stronger pulp for the pulp and paper producers: introducing EDT's patented technology *pRefinase*®.

The potential of the enzymatic blend *pRefinase* has been confirmed through both laboratory- and full-scale experiments, resulting in faster drainage, stronger pulp, enhanced refinability, and reduced hornification as benefits to the pulp producer as well as to the paper manufacturer. During this presentation, the physical and morphological advantages of treating European NBSK from Mercer Stendal and Rosenthal sites are presented

for both unrefined and refined samples. An in-depth study of the effects of hornification in paper production and its relation to the drying intensity are also presented.

5.) Economical Approach to Equipment Guarding:

Jeremy Goh, E.I.T., Project Manager – **Slave Lake Pulp, WF**

There has been a paradigm shift in safety culture over the past few decades that is widespread across the industrial sector. Historically in Canada, it can be said that the 1960's: Industrial Safety Act [1] marks the turning point that legislated employers to invest in safety and thereby, achieving an injury-free culture. Regardless, it would still take decades of tragedies, accidents and continued government legislation to mandate employers to take all precautions for ensure worker's safety, develop a safety-oriented culture and uphold occupational health and safety regulations. Health and safety culture are now prevalent across all industrial sectors as companies recognize the economic, productivity and legal ramifications for failing to uphold safety.

Originally built in 1989, most of the equipment at West Fraser's Slave Lake Pulp (SLP) division are original and have seen close to three decades of operation. Despite that, SLP remains a relatively young division when compared to other mills in the industry. While machinery safe-guarding is not entire absent in the 1980's, one could argue that safe guarding standards were still in their infancy. For SLP, this is evident as numerous original equipment exhibit guarding that do not meet today's safety standards. Of course, this is not exclusive to SLP as various other facilities in the industry still operate equipment close to or over half a century old.

With proper maintenance, SLP expects continued operation of these equipment until their end of life. Hence, it is critical that guarding deficiencies are rectified in order to uphold the safety culture and meet modern safety standards.
To surmount the economic, energy and environment challenges that the pulp and paper industry is currently facing, the cost of installing equipment guarding can be economically challenging, especially if inadequate guarding is found on multiple large pieces of equipment across the production line.

Most often, it is not entirely economical to replace the equipment nor is it economical or feasible to have the original OEM custom design guards. SLP have identified numerous areas in the pulp processing and finishing line where major equipment requires guarding. Hence, this presentation will explore economical approaches undertaken by SLP to rectify deficient guarding, focusing mainly on the methodology in guarding ten twin-wire wash presses.

For the wash press specifically, permanent fixed guarding is required to fully comply with the guarding deficiencies outlined by OHS and West Fraser's safety standards, as well as to bring the targeted areas up to CSA Z432 Standard.

The presentation will outline the challenges and results of SLP's internal design methodology, exploring in further detail the process to guard all ten of SLP's wash presses. Economic benefits, successes and improvements will be outlined.

[1] https://www.labour.gov.on.ca/english/hs/faqs/molrole.php