FOREST SAFETY NEWS

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2020 – A Year of Challenges and Successes

Most of us were happy to ring in 2021 and leave 2020 in the rearview mirror as a notable chapter in the history books. And while we still have some challenges ahead, the road map is becoming clearer to a post-pandemic world. The forest sectors' history of resilience positioned it well to meet the challenges associated with COVID-19, supporting the BC government declaring forestry and silviculture practices as essential services early in the pandemic.

These efforts were supported across the industry and involved a concerted effort by employers, workers, unions, contractors and industry associations working collectively to achieve a common goal. Because of the forest industry's efforts and the priority placed on COVID 19 precautions, there were no known cases attributed to any forestry activity in BC last year. At the same time, an estimated 300 million trees were successfully planted in 2020 under these unprecedented circumstances, which is a remarkable undertaking.

This shared focus and collaboration to achieve a common goal is also evident in the continued progress by industry in improving safety performance. One doesn't have to look back very far in the history books to acknowledge the efforts of our industry to improve its safety performance. In 2005, BC's forest sector was making national headlines on the front page of the Financial Post highlighting forty-two forestry workers deaths in BC that year. One year before, the Forest Safety Task Force, set out a number of recommendations that would fundamentally change how health and safety was managed by the forest industry in BC. To use a quote from Henry Ford, "Coming together is a beginning, staying together is progress, and working together is success." Over the last fifteen years, forest sector stakeholders have demonstrated that when we work together, we can achieve our collective goal of ensuring every forestry worker goes home safe everyday. With each passing year, industry has achieved new milestones in improved safety performance and has demonstrated our goal of achieving no-work related deaths is within reach. In 2020, there was one direct harvesting work-related death. While this number represents the lowest number of work-related deaths on record, it also represents one individual that did not make it home to their family. I extend our heartfelt condolences to the families, friends and colleagues of the deceased.

As you read the articles in this issue of FSN, take some time to reflect and celebrate our success and progress and then ask yourself what each one of us can do in 2021 to achieve our goal of Ensuring Every Forestry Worker Goes Home Safe Everyday.

On behalf of BCFSC, I would like to thank you for your individual and collective efforts to ensure that everyone goes home at the end of every workday and wish you a healthy, safe and prosperous 2021!

Our industry's safety success is dependent on your continued commitment and support.

Sincerely,

Rob Moonen, BCFSC CEO

Welcome to the Spring edition of Forest Safety News, covering news about safety topics in forestry. This is YOUR safety newsletter. We look forward to your input and feedback! Email the editor at **editor@bcforestsafe.org** or call **1-877-741-1060**.

What's Inside:

What's New

Take a look at the latest list of what we have to offer since December 2020. Below you will find direct links to safety alerts, industry-specific resources, industry information and more for you to download and/or share with employees, industry and safety peers. We've also posted this information on Facebook, Instagram, LinkedIn and Twitter so make sure to follow us on social media and stay up-to-date with the latest news.

ELD Video – Check out the new "Busting the Myths about ELDs'" video and hear log truck drivers and wood fibre haulers talk about their experiences with electronic logbook devices.

New Faller Training – Three new faller training courses are scheduled for 2021. March 2–April 3, 2021, April 20–May 22, 2021, September 27–October 29, 2021. To register, contact the College of the Rockies at 250-344-5901.

SAFE Companies Online Audit Tool – Our dedicated resource page and instruction videos will help you learn how to use the new online system.

Resource Road Driver Program – New online training will include knowledge-based learning which will ensure a foundational base of knowledge to support the in-field training which focuses on essential driving skills.

Training Calendar – Take a look at the 2021 Training Calendar.

Safety Alerts – Here are the latest alerts from BCFSC and industry.

- BCFSC Safety Alert of the Month - **Learning from Past Incidents**
- Industry Alerts
  - **Roadside Hazard: Snow Plow at Work**
  - **First Aid Procedures and Equipment Revisions**
  - **Hazard Alert: Rocks in Logging Truck Loads**
- **Manufacturing Weekly Safety Alert** – Click on the link to see the latest alert

To subscribe to our safety alert emails – Click Here

Industry Links

WorkSafeBC Enews – Subscribe to Insight; WorkSafeBC's policy, regulation and research division e-Newsletter, Health and Safety Enews, Young Worker Enews and more.

Road Safety at Work – Resources, workshops and consulting services to help BC employers and workers build and improve their occupational road safety programs.

Auditor General Report: Management of Forest Service Roads

The Office of the Auditor General of British Columbia has released a new audit report about the management of Forest Service Roads. The audit assessed whether the Ministry of Forests, Lands, Natural Resource Operations and Rural Development managed safety and environmental risks on forest service roads in accordance with its policies. The report includes nine recommendations to help the ministry meet its own expectations for undertaking inspection and maintenance work on FSRs. These recommendations include tracking information required to determine if inspections and repairs are completed on time and developing an approach to ensure that FSRs are adequately maintained. Take a look at the BC Auditor General's Report and watch the overview video featuring Auditor General, Michael Pickup.

Forestry Sector 2021 Conferences and Events

Forest sector events and conferences have been put on ice since the start of the COVID-19 pandemic. Tree Frog Forestry News has been putting together a list of conferences (linked when possible to relevant websites) showing what's been cancelled and what's been rescheduled. Visit this link for the most up-to-date information.

Coming Up Soon:

Council of Forest Industries Virtual Conference, April 8, 2021. Register now.

Wood Products Manufacturing Best Practice Share

Last year the Manufacturing Advisory Group (MAG) expressed a desire to look outside BC to share information and best practices about COVID-19 risk management. BCFSC reached out to Workplace Safety North in Ontario and that alliance inspired the development of the first cross-country Wood Products Manufacturing Best Practice Share.

The initial session was very well-received and the group agreed to meet quarterly to review other topics relevant to both groups.

In 2020, representatives from some wood products manufacturing companies in Ontario and BC met to review and discuss best practices in Lock-out and Mobile Equipment/Pedestrian interface.

> *"There was a silver lining to this pandemic. Our respective provincial Wood Product Manufacturing safety groups determined a collective need to share COVID-19 safety plans, ideas and practices. This partnership has evolved into other risk-reduction and safety idea sharing opportunities addressing many of our industry's significant safety challenges. This has been a great step towards making our operations safer for our employees and contractors."* said David Murray, BC Manufacturing Advisory Group (MAG) Chair and Corporate Safety, HR & Environment Manager for Gorman Group of Companies.

The quarterly sessions scheduled for 2021 will be:

- April 1 @ 10:30am-12:00pm (PST)
- May 20 @ 10:30am-12:00pm (PST)
- September 30 @ 10:30am-12:00pm (PST)
- December 16 @ 10:30am-12:00pm (PST)

Topics are identified based on input from industry. Representatives from BCFSC and Workplace Safety North will work with their manufacturing clients to identify content and presenters that would be of interest and benefit industry.

> *"We are very excited about this new opportunity to share and learn with other wood producers outside of BC. We will be working with other forestry safety associations to expand the network in 2021. The more we can learn from one another and implement best practices on common issues common, the safer our workplaces will be across the country. Industry hazards don't stop at the BC border and neither should learnings."* Cherie Whelan, Director SAFE Companies BCFSC, former resident of Alberta and born and bred in Newfoundland!

If you would like more information, or to be added to the meeting, please email **mag@bcforestsafe.org**

Breaking New Ground in Pellet Plant Safety: Simply and Effectively

British Columbia's wood pellet producers are devoted to running safe operations. In 2014, the Wood Pellet Association of Canada established the WPAC safety committee as a forum for industry participants to share knowledge and to work collectively on solving common safety concerns such as combustible dust management, safe-guarding, working in confined spaces and lock-out procedures. This has resulted in a near elimination of safety incidents, increased worker protection, and an ever-improving relationship with WorkSafeBC. BC Forest Safety Council's ongoing participation in our safety initiatives are integral to WPAC's success.

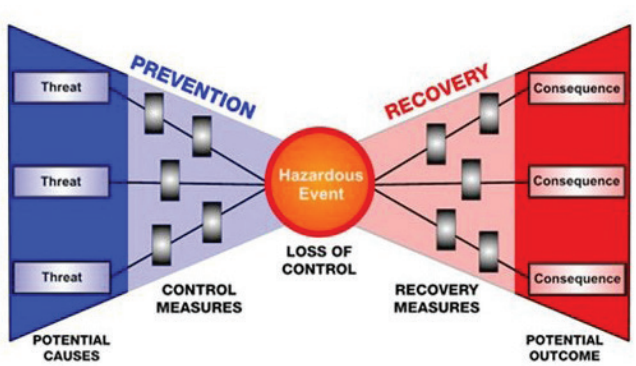
Recently, WPAC safety committee members realized that despite everyone's best efforts, the industry was still vulnerable to potential catastrophic incidents that couldn't always be prevented by traditional approaches to safety. Members believed that despite all the safety improvements that had been adopted, the potential remained for pellet plants to experience major unwanted events (MUEs) such as explosions fires and fatal accidents.

After some research and with guidance and prompting from WorkSafeBC, WPAC's safety committee decided to pursue a process known as Critical Control Management (CCM) which starts with a procedure known as bowtie analysis.

Plant operators identify various potential MUEs – like fires and explosions – each one of these MUE's forms the centre of a bow tie. Then plant operating, maintenance and safety personnel consider all plausible accident scenarios that could exist around each MUE and then identify critical controls that would prevent the MUE from occurring.

"CCM and bow tie analysis relies on the Swiss Cheese Model -- imagine each piece of swiss cheese having holes and each hole represents a potential safety weakness," explains WPAC's Executive Director Gord Murray. "But if you layer multiple pieces of swiss cheese together, the holes don't line up, they create a collective barrier to safety weaknesses. This is the essence of CCM."

To complete the CCM process, plant management must assign responsibility for each critical control to designated plant personnel, and implement a monitoring and reporting program to ensure continuous improvement.



CCM is already widely used in mining, chemical, and oil and gas industries around the world, but it's new to the wood pellet industry.

WorkSafeBC is a supporter of CCM and so WPAC began working with them to implement CCM plans

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for their member companies' plants. But it became clear very early on that CCM was a complicated process that could not be implemented by simply handing out a manual and issuing instructions to WPAC's members.

"We initially underestimated how much work it would take to implement it at the plant level," says Gord. "So together with BC Forest Safety Council we started reviewing the manuals and developing a program that will help us take our collective safety to a new level."

WPAC and BCFSC struck a project team to assist member companies adopt and implement bow tie-identified critical controls at the site level.

"The bow tie is a great tool because it gives everyone involved a better understanding of how they need to work together to prevent an incident," says Cherie Whelan, the BC Forest Safety Council's director for SAFE Companies and a member of the WPAC-BCFSC project team. "With CCM we can now manage multiple layers of controls into a single process resulting in better safety at every level."

Last year work began on implementing CCM around combustible dust. It was so well-received by the industry that WPAC now has all 14 of its member plants and one MDF facility clamouring to be the first to implement it. Together WPAC and BCFSC, in conjunction with the industry, have developed an implementation schedule with the goal of completing bow ties and critical controls to WorkSafeBC by late 2021.

Two BCFSC Safety Advisors, Bill Laturnus and Tyler Bartels will be providing on-site and online support to all 15 operations in 2021. They will provide education, training and mentoring in the necessary knowledge and skills required to identify the site-specific critical controls. Further support will help the operations develop their internal systems to effectively manage these critical controls to ensure they operate 100% of the time.

"We have identified priority processes to cover in each plant with a primary focus on potential fires and explosions. Presently we are testing that out at two facilities," explains Gord. "Then we will take those learnings and applications to other plants where the preliminary bow ties will be modified for the circumstances in each plant."

"We are hugely gratified by the degree of industry buy-in and the outstanding cooperation amongst all plant operators. WorkSafeBC is keenly interested in our progress and we are diligent in reporting to them regularly," adds Gord.

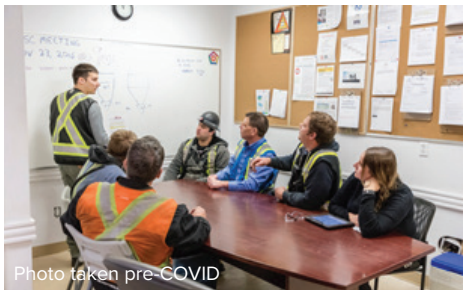
Photo taken pre-COVID

The initiative has also caught the eye of university researchers. WorkSafeBC is funding a Dalhousie University Department of Process Engineering and Applied Science research project that will build on a comprehensive set of combustible dust bow ties developed by WorkSafeBC and WPAC to facilitate knowledge and transfer it to employees and employers throughout the wood pellet industry in other Canadian provinces and internationally.

"Overall the plan is ambitious, requires a significant amount of effort—and will make our plants safer," says Gord. "Companies will understand their equipment better; workers will be able to operate and maintain that equipment safely; the equipment will be more reliable; and plant managers will know what activities are most important."

Stay tuned for more CCM articles over the coming months as the process is implemented province-wide. For more information contact Gord Murray, **gord@pellet.org**

Defining Combustible Dusts: Does Particle Size Matter?

By Eric Brideau, Industrial Process Safety Group Project Consultant, Jensen Hughes

Many wood materials and by-products are not easily burned in their raw form but may be explosible in dry particulate or dust form due to the reduced moisture content and increased surface area available for reaction and diffusion mechanisms during the combustion process. These materials are known as combustible dusts and can cause dust explosions in processing facilities if the particle size of the dust is small enough to propagate a flame front, there is a means of suspending or dispersing the dust in air or other oxidizing atmosphere, a sufficient quantity of dust exists to achieve the minimum explosible concentration, a source of ignition exists, and there is a sufficient degree of confinement such that damaging overpressure may develop as a result of the rapid increase in temperature associated with the combustion process. If there is no or little confinement, a dust flash fire may occur which can still cause injury or damage to equipment and property.

In a processing or manufacturing facility that handles wood materials, there can be solid particulates and dusts with varying particle size distributions that exist throughout the process, some of which may be combustible dusts that are explosible in dust cloud form. But what exactly is a combustible dust, and how can you determine if combustible dust hazards exist in your facility? Definitions for combustible dust are provided in various codes and technical standards, among other sources, but can vary across these sources making it somewhat difficult to clearly define what a combustible dust is. Most notably, there are some technical standards that use a specific particle size limit as a criterion while others provide a broader definition. For example, combustible dust is defined without a particle size limit in many NFPA standards, such as NFPA 652 (2019), NFPA 68 (2018), and NFPA 69 (2019), as "a finely divided combustible particulate solid that presents a flash fire hazard or explosion hazard when

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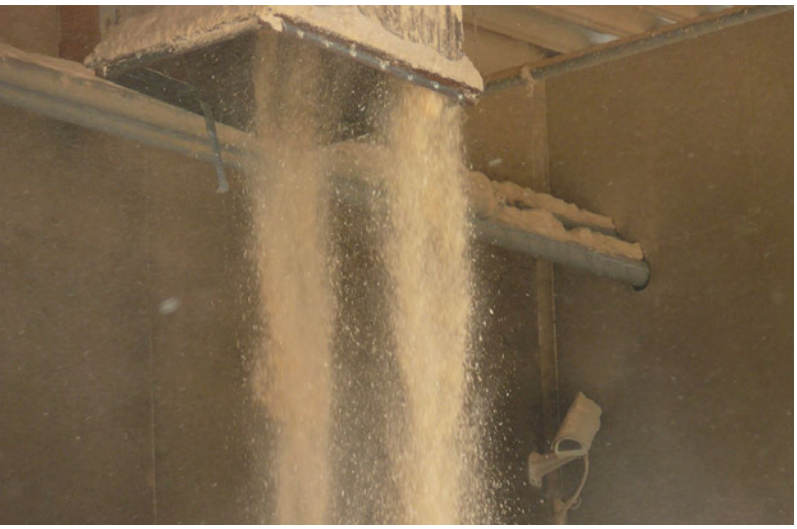
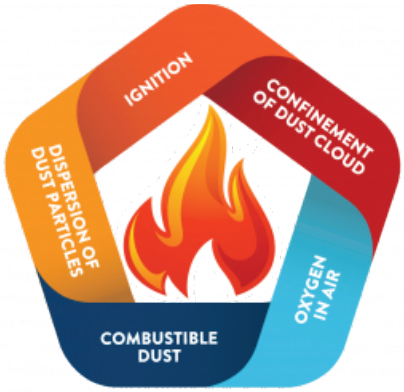
suspended in air or the process-specific oxidizing medium over a range of concentrations." Similarly, NFPA 77 (2019) defines a combustible dust as "a combustible particulate solid that presents a fire or deflagration hazard when suspended in air or other oxidizing medium over a range of concentrations, regardless of particle size or shape." OSHA also uses a similar definition to NFPA 77 with slightly different wording but emphasizes that a dust can be combustible regardless of size, shape, or chemical composition. The definition provided in NFPA 499 (2021), however, uses a particle size criterion and defines combustible dusts as "dust particles that are 500 micron or smaller (i.e., material passing a U.S. No. 35 standard sieve as defined in ASTM E11-17), and present a flash-fire hazard or explosion hazard when dispersed and ignited in air." Similar definitions with a 500-micron particle size limit are used in the U.S. National Electrical code (NFPA 70, 2020) and the Canadian Electrical Code (CSA C22. 1-18).

Industry specific NFPA standards also exist that provide slightly different definitions for the specific combustible dusts handled. For example, NFPA 664, which is an industry standard specific to the prevention of fires and dust explosions in wood processing and woodworking facilities, does not provide a definition for combustible dust and instead provides a definition for deflagrable wood dust; however, the term combustible dust is used interchangeably with deflagrable wood dust throughout the standard. NFPA 664 defines deflagrable wood dust as "wood particulate that will propagate a deflagration flame front, when suspended in air, or the process-specific oxidizing medium, in sufficient concentration, thus presenting a deflagration hazard." Similar to many other technical standards that provide general definitions for combustible dust, NFPA 664 does not specify a particle size limit when defining deflagrable wood dust.

Although a particle size limit of 500 microns is not used as a criteria to define a combustible dust in many of the relevant NFPA standards, such as NFPA 644 and NFPA 652, these standards explain that, typically, it is unlikely that particulates will be combustible when the particle size is greater than 500 microns due to the small surface-to-volume ratio. It is also recognized in these standards, however, that when particles deviate from a spherical shape, such as for flat platelet-shaped particles, flakes, or fibers with lengths that are large compared to their diameter, they may not pass through a 500 micron sieve but could still pose deflagration or explosion hazards. In reality, there is no single particle size limit that can define combustible dusts as chemical composition, in addition to physical parameters such as moisture content and particle shape, effect the upper limit of the particle size in which a given dust will be combustible. Therefore, from a dust explosion prevention and mitigation perspective, a definition of combustible dust that does not define a particle size limit is more appropriate for the identification of combustible dust hazards so that potential hazards are not erroneously screened out from further hazard analysis or risk assessment based on particle size. For example, if sieve analysis is used for preliminary screening of potential combustible dusts based on the percentage of material that passes through a 500 micron sieve, a combustible material with a low percentage capable of passing through a 500 micron sieve could be wrongly classified as non-combustible even though the particulates are small enough to propagate a flame front and may be explosible in dust cloud form. If it is assumed that no hazard exists from the material during the hazard identification stage, further evaluations will likely not be performed to determine the prevention and mitigation measures required to manage the existing process-specific risks, which may leave process equipment and building areas vulnerable to dust deflagrations or explosions.





So, if combustible dusts can't be definitively identified based on particle size, how can you determine whether the specific wood materials handled at your facility present combustible dust hazards and are explosible in dust cloud form? As a starting point, the materials should be tested at various locations throughout the process and facility based on an informed dust sampling and testing strategy and using standardized equipment and procedures such as those developed by the American Society for Testing and Materials (ASTM). By testing the dusts at your facility, you can determine whether your dusts have the potential to cause an explosion, as well as characterize the ignition sensitivity (i.e., how easily the dust is ignited) and explosion severity (i.e., how violently the dust will react) of the combustible dusts. Once the combustible dusts within your facility are characterized, a Dust Hazard Analysis (DHA) should be performed to identify the process- and equipment-specific hazards and to ensure that these hazards are being managed in accordance with the applicable codes, standards, and engineering guidelines with respect to explosion safety requirements. A DHA is a systematic review of potential fire, flash fire, and explosion hazards associated with combustible dusts that will help to ensure that equipment is installed in compliance with good engineering practice guidelines and that a proper level of protection exists to prevent combustible dust explosions from occurring and mitigate the severity and consequences of a dust explosion should one occur.

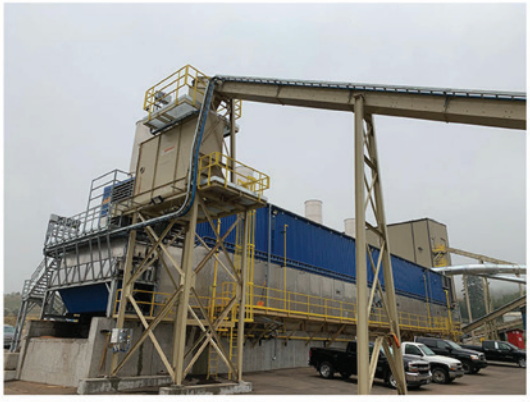
CANADIAN BIOMASS

Dryers Equipment Features Pellets

Key takeaways from WPAC's Belt Dryer Symposium

January 20, 2021

By Fahimeh Yazdan Panah



A view of the bed dryer infeed at Pinnacle's Williams Lake, B.C., plant, showing the infeed conveyor and metering bin supplied by Continental Conveyors. Photo courtesy Pinnacle Renewable Energy

The Wood Pellet Association of Canada (WPAC), in co-operation with the BC Forest Safety Council, WorkSafeBC and media partner Canadian Biomass, held the Belt Dryer Symposium on Nov. 25, 2020. As belt dryers have become more common, the pellet industry has experienced several safety incidents over the past few years. The purpose of the Belt Dryer Safety Symposium was to share the learnings from these incidents and for individual operators to share in-house safe operating procedures with their industry colleagues.

Over 70 participants, including pellet producers, dryer manufacturers, insurance companies, universities, fire detection equipment suppliers and WorkSafeBC, attended the event. The workshop was moderated by Fahimeh Yazdan Panah, WPAC's director of research and technical director.

The symposium included presentations from all the operators of belt dryers in British Columbia. Steven Mueller, director of health and safety at Pinnacle Renewable Energy, and Nathan Bond, plant superintendent at Skeena Bioenergy, described their dryers, energy systems, the safety incidents they experienced and the results of their post-incident investigations. Jimmy Boudreau, plant manager at Canfor, presented their dryer operating procedures in Fort St. Johns and Chetwynd. Comparisons were done between direct versus indirect energy systems and Bill Laturnus, senior safety advisor at the BC Forest Safety Council, examined the use of process safety bowtie analysis as a means of systematically identifying and managing critical controls.

All the incidents that were discussed had occurred in direct-fired dryer systems. The key learnings from the speakers on some of the potential causes for incidents included:

- Investigation of some incidents showed that the contributing factor in one incident was believed to be loose debris from cleaning activities picked up in air stream, blown through burner, and ignited before being deposited on fibre mat on belt. Smolder eventually burned through the belt and was then recirculated by air flow igniting further smolders.
- In another incident, strong belief shared that the recirculation of air was a significant contributor to the build-up of flammable deposits, as well as a prime source of ignition as small bits of material could be blown into the airstream through the burner and redeposited on the dryer bed.
- Another potential cause included introduction of ignition source in fibre stream, or foreign material entering air intake and being ignited by a burner.
- Some of the incidents were not primarily dryer incidents but turned into one. One hammermill deflagration incident was likely caused by a foreign object creating sparks within the hammermill, possibly a rock or metal contaminant. All other potential causes were ruled out by investigation. In a conveyor deflagration, the entire system was inspected for possible ignition source, but no cause was identified.
- In one incident, sparks from the fire were not detected by the spark detection system and the temperature sensors above the belt were not affected by the fire's heat.

A number of action items were executed to address the findings from these incidents. They included:

- Engaging professional fire investigators to assist in investigation and provide recommendations
- Bringing dryer manufacturers' representatives onsite to review and approve new prevention and mitigation measures
- Increasing dryer cleaning frequency and improving cleaning practices
- Adding mesh screens in post burner airflows to catch sparks or debris
- Increasing dryer purge cycle to clear out ducting before restarting burners
- Adding additional deluge in recirculating ducting for fire suppression
- Adding man doors to allow for better cleaning and firefighting access
- Re-programming fan motors to immediately stop in upset conditions to prevent further circulation of smolders/sparks
- Re-engineering the air flow ducting and stacks to remove the recirculation air ducting system,
- Conducting Process Hazard Analysis (PHA) with process safety experts on drying systems during removal of recirculating air system
- Installing infrared cameras to detect/shut down the dryer if hot spots are found in incoming fibre
- Resetting HMI to alarm/shutdown/deluge on belt temperature increases

At the end of the symposium, participants decided to form a Belt Dryer Working Group to review the past incidents and lessons learned for safer uses of belt dryers in pellet industry.

Anyone seeking more information or interested in joining the working group should contact Fahimeh Yazdan Panah, WPAC's director of research and technical development:

Tel: **1-778-990-2656** Email: **fahimeh@pellet.org**