THE DRIVE TO NET ZERO:

POWERFUL TOOLS FOR SUSTAINABILITY AND SAVINGS

FASTICE® ICE MAKING SYSTEM

The ice arena business has many challenges.
Arena owners need a tool chest full of efficient equipment
and technologies that can deliver every possible advantage
to save time, money and valuable resources.

ZAMBONI

FASTICE
ADVANCED ICE MAKING SYSTEM

Sometimes, seeing "advanced" in connection with a product can be intimidating. Sure, it has a lot of features, but are they simple to operate? Maybe your facility is a single pad arena. Things seem to be operating smoothly without these additional tools. Why would you consider making a change? People throw around the phrase "game-changer" in connection with new technologies. Further in the article, we'll share conversations and interviews with actual FastICE System users representing a variety of facilities, from municipal to the National Hockey League. Their experiences with the product outline their real-life savings of time, labor, energy and water as well as their observations relating to their improved ice quality.

The Ice is Your Product For Sale

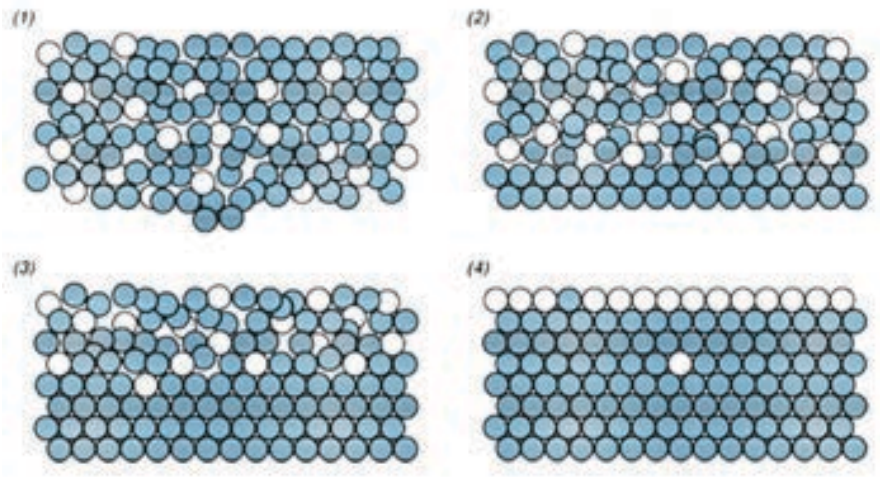
Frank J. Zamboni used to tell his customers that "The principal product you have to sell is the ice itself." They took note of that and embraced his new product upon its introduction. He never stopped innovating and he worked closely with his customers to make sure that the updates to his product addressed the issues an arena owner might face. When the ice surface is your product to sell, you want to minimize the variables and eliminate issues of inconsistency, low quality and cost.

Arena Operation Challenges

Ice arena operators and owners are well aware of the potential issues which impact profitability as well as the experience for guests on the ice. Many facilities count on staff members being cross-trained to handle a variety of tasks. The same person may be handling admissions, skate rentals and ice maintenance. The skill level in each of their roles may not be consistent between team members, so simplifying or automating as many of the processes as possible allows operators to find cost savings and improved efficiencies. This is critical for an industry which has high costs and little margin for error.

The Science of Ice

Like a snowflake, each facilities' factors and challenges for ice making are unique. Water quality, water temperature, humidity, temperature fluctuations, inconsistency between operators, varying on-ice activities and much more may impact the principal product you have to sell: your ice surface. The FastICE System is not a brand new technology. It's been around for over a decade. However, the continued innovation of this product has resulted in ice quality that had only previously been experienced in world-class or "league-level" venues. In the simplest of terms, FastICE creates



Less gases trapped in the ice minimizes the need for temperature adjustments. Build ice faster at higher temperatures. Improved ice quality with exceptional clarity and a harder surface

the ice surface with a computer controlled high pressure pump for an even and accurate fine mist water application. The smooth and consistent application freezes and bonds quickly and evenly with the existing surface, dramatically improving the quality of the ice.

FastICE provides precise distribution of the water flow and water application rate, enabling improved control of the ice thickness which may result in significant savings of time and energy.

Conversations with FastICE Users

As the Operations Manager of The Sports Centre at Western Fair District in London, Ontario, Ryan Gowan worked with four ice sheets in a busy multi-use facility. Known as a top tournament facility in southwestern Ontario, they have three NHL-size ice surfaces and one Olympic-size sheet with a wide variety of user groups and activities.

Ryan joined the Zamboni team for a podcast in 2020 and shared his real-world experience with the FastICE product in those buildings. "It's the type of system anyone can use. If facilities are looking for that consistency in their ice – I know there's definitely a cost associated with it. Maybe smaller municipalities overlook things like that – they have to maintain that budget. Western Fair is no different. We're a private facility, but we've always been willing to invest in technology. It's a huge part of everyday life and from an arena standpoint, I'd say if you are a smaller facility I don't see why they couldn't use this kind of technology. It's going to save them on utilities and create a safer product."

changes and other preventative maintenance activities. Hardware has been updated to stainless steel components, enhancing durability.

It's well-known that ice maintenance is a labor-intensive process. However, during the conversation, Ryan shared that the labor savings were only part of the equation when using FastICE. Savings of water and energy costs are evident. "Having FastICE as a tool for ice maintenance: we've seen a big difference. You can put small amounts of water on at a time. You're actually able to build faster and that's rule of thumb with installing rinks that less is more when it comes to the amount of water you're applying. We used to operate at lower ice temperatures but at the same time we would flood the ice with the flood bar and towel and what was happening especially

> **"Since using FastICE, we've been able to raise temperatures from where we normally have them. We could run anywhere from 19 to 21 degree surface temp and since using FastICE we've been able to go to 22, 23, and even 24 on certain pads. That's just going to translate into savings on the utility side of things because our utility plant isn't going to work as hard to drive that temperature down."**
>
> *Ryan Gowan, Operations Manager*
> *The Sports Centre at Western Fair District, London, Ontario*

Ease of Operation

While the system has sophisticated capabilities, it is easy to operate. The operator can use the on-dash setup screen to select and set operational parameters such as: measurement unit system, preferred language and system shut-off speed. A recent enhancement is the quick-release system which mounts the spray booms to the conditioner of the ice resurfacer. The quick-release handle gives your team easy access for blade

after a long day of floods was the ice temperatures would end up being much higher than we are seeing now. FastICE has allowed us to not only have higher ice temperatures to begin with, but it's easier for our plant to maintain those temperatures because the water we spray on the rink is setting up much quicker and doesn't put as big of a load on the refrigeration system as it would with traditional flooding. With those higher temperatures the ice was physically softer, we would see a lot wetter snow being picked up during floods than we do now. As well with not having water sitting on the surface like we do with the flood bar and towel, we aren't trapping as much air in the ice and making a brittle sheet of ice, while also creating a better bond between the water/ice we are creating on the surface to the sheet. Eliminating all of those things and applying the water with the FastICE has helped us make harder, faster ice." Gowan sums up his fondness for the product: "We've seen a big difference in having FastICE. Later on in the day you can see the ice holds up better – the quality of it. Nice thing with FastICE is no matter who's behind the wheel you have a consistent flood from the water standpoint because of the way it adapts to the speed of the machine with the disbursement of the water. That's a big thing for a facility of our size to make sure we're putting out a quality product."

> **"We've compared doing a typical bar/towel flood to one with FastICE and you can see the difference within a lap or two laps, your ice is basically set up. It's decreasing the run hours on our pumps and compressor and the overall refrigeration plant so we're going to see savings utility-wise for sure."**
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> *Ryan Gowan, Operations Manager*
> *The Sports Centre at Western Fair District, London, Ontario*

As an early adopter of FastICE when the technology was introduced, the American Airlines Center, home of the NHL's Dallas Stars used the first iteration of the system. During his time as the Ice Operations Manager for the American Airlines Center, Cody Bateman has league-level experience, including today's FastICE System with robust updates and enhancements to the assortment of features and benefits on board the original version of the product used first by the Stars more than a decade ago. Cody joined the Zamboni team for a podcast in 2020 and shared feedback based on his years of experience with the product. In 2021, Cody accepted a position overseeing the ice for the NHL Seattle Kraken's Climate Pledge Arena which will be equipped with electric lithium-ion powered Zamboni machines featuring not only FastICE, but Level-Ice and Zamboni Connect as well. When asked about the reason he believes in the system, Cody replied "Number one is ice quality. That's really what it comes down to. Technology is advancing. So we should advance with it. When you building ice, you're building with a boom. That's the best way to build ice. You're building in fast, small layers. Less gases and air and everything that's trapped inside of the ice. If you've ever sprayed with a hose flood, it doesn't make good ice. You don't want to do that. You can build ice faster, freezing small thin layers than you could putting out 1200 gallons of water and waiting four hours for it to freeze. I could put 1200 gallons out in two hours with a FastICE System and get a better result. The ice building time – you cut it completely down. Every time I go out, I know the machine is going to put out 140 gallons at this number and this pace. It's a control factor. If I get out three resurfacings an hour at 140, that's 420 gallons an

hour and on that pace, I know it's going to take me somewhere around 22 hours to 24 hours to get to my 10,000 gallons to get to the one inch of ice. So, that's kind of the math."

Precise Water Distribution Control

A hydraulically-driven centrifugal water pump combined with a proportional hydraulic flow valve deliver exceptionally accurate control of water distribution at any speed. Each spray nozzle is precisely aligned to apply the fine mist of droplets. The addition of a board-spray valve enhances system performance. Electrically controlled valves support the upper and lower boom as well as the board-spray valve. The upper and lower booms can be controlled together or operated independently of each other. The operator can use the "blast" feature to apply water at the maximum application rate wherever needed. Sensors deliver data for ice making water flow, water pressure, spray volume, ground speed, ice making water level/ usage and water temperature.

During the interview with Cody, Doug Peters, Zamboni's Regional Sales Manager for the US asked if he feels FastICE gives him much more precise control with how many gallons they want to put out as opposed to flooding the conventional way with a towel or a hose when building the ice. "That's a big key factor for it. When you work in an arena or let's say you're in a municipal rink and you're doing a tournament weekend and you lose ¾" of ice through that tournament. You're going to have to have time to rebuild that ice as fast as you possibly can. Overnight or in the morning. However you choose to do it or however your schedule dictates. I would say it gives me tons more peace of mind. I know that if I lost a half an inch of ice, I need to ask my scheduler to give me ten or twelve hours in order to rebuild that sheet of ice. "

> **"I would say I've done my fair share of ice, even without the FastICE System. Just the clarity that you get from it which is really what you're looking for is second to none compared to a hose or even a flood bar. I've done it both ways...but if I was choosing, right off the bat, I'm going to go with the FastICE System just because of the method that is used for the application itself."**
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> *Ryan Gowan, Operations Manager*
> *The Sports Centre at Western Fair District, London, Ontario*

There are a number of big-league teams and multi-sheet hockey facilities (such as Western Fair) counting on FastICE so one might think the

product is designed exclusively for NHL-level play. So Doug asked "Do you think that the FastICE System is going to be beneficial in the community rinks and if so, what do you think is going to be the biggest advantage in a community rink versus an NHL rink?" Cody replied "Oh, I think it's the same thing. I think if you learn what your ice surface is and figure out what temperatures you put out and 100 gallons to resurface – let's just say that's your number as an example – it doesn't matter if you have a 19-year-old kid who doesn't know much about it. If you say set it at this, drive it like this, program it, then you know you're going to give every team that comes through there… you already know that it sets up. It's frozen. It's producing a quality sheet like every time. It's another control factor. If you have 15 cuts a day, you only put on 100 gallons at a time because that's the load that your compressors and ice plant is taking at that time, you'll probably save yourself on some energy too, because you're not going to be over-flooding or under-flooding. You're just going to have that right amount all the time to maintain your surface where you want to keep it."

Cody on ice science: "Do I think the FastICE System gives you an advantage in making not-so-green ice? Absolutely. Not that I'm a professional in thermal dynamics or anything but it all comes down to the way an ice molecule works. An ice molecule basically - whenever water goes from a liquid to a solid, the hydrogen molecules actually push apart from each other which is why you get cracking in your ice. When those molecules start to grab each other and start to expand and the colder you drive your ice it expands - and that's what causes it to put pressure against your ice dam or kick plate or whatever you've got and that's going to crack it up. Whenever you're building in thinner layers, I don't think that expansion happens as fast and you can control your ice plant to the load that you're putting on the ice. You don't get as much fracturing because it's already relieved its pressure and it's bonded the way it's supposed to." Cody's thoughts on bringing FastICE into the picture: "It was night and day – the ice changed pretty much immediately."

Zamboni Mission Control

The system's digital console acts as your "real-time mission control", displaying information on the go, while recording and retaining FastICE resurfacing session data without the need for a laptop or programming tool. The displayed features can

be monitored and controlled by the operator during resurfacing and include: spray volume; ground speed; water flow and application rate scaling; water pressure; water temperature and total water used. The operator has the ability to toggle between several preset screens for quick reference. A download of data to a USB is all it takes to retain and reference historical information. FastICE System data can be used to generate detailed reports, which can be saved or printed.

Users appreciate having access to historical data as it can be used for budgeting purposes as well as analyzing performance and water consumption. Another benefit of the system data is for use with operator training. Being able to reference performance per resurfacing including speed and water consumption is helpful to educate operators about the impact of their operation of the machine. The system has other important features which can prevent show-stopping performance issues.

An automated shut-off prevents the hydraulically driven water pump from running dry, as it is interlocked to the water level sensor. A diagnostic screen provides system component and communication status, as well as operating system version information. Giving the operator access to this information while the machine is on the ice can help increase their awareness and provide the entire team with tools for accountability to maintain consistent performance.

Financial and Environmental Sustainability

Is it possible to improve an arena's environmental sustainability while paying attention to the bottom line? Some of the tools available to arena owners and operators have a big price tag and in an industry with big operating costs, how can you determine the return on your investment?

> **A lot of it is money-driven. Ultimately, community rinks don't always have those funds but over the years, we're finding that more companies are doing it and it's made it more affordable. If you can really look at the ROI, you're looking at anywhere from 2.5 to 5 years. From there on out, you're not spending that utility anymore and that's a huge benefit to the mom and pop rinks.**
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> *Jay Freeman, General Manager*
> *Flyers Skate Zone*

During a Zamboni podcast regarding arena sustainability Omar Mitchell, Vice President, Sustainable Infrastructure and Growth Initiatives for the NHL and Jay Freeman, General Manager of the Flyers Skate Zone, they discussed the experience of Jay's building with their commitment to renewable energy and sustainability. It's an exciting project and while many facility operators may believe that some of these technologies are out of their reach, Jay shared some interesting calculations about their return on investment relating to their facility.

The building is located in Voorhees, NJ and over the past ten years, they've been working towards the reduction of their use of utilities. Jay shared the vision that has driven the changes: "It's kind of evolved over time. When we first looked at it a lot of these technologies were very expensive and not obtainable at the time, so we took the approach of what was most affordable, where do we start, how do we grow slow and make those things happen. We started with lighting in 2009 and went away from

> **We have a megawatt of solar. We've reduced waste. A Zamboni (machine) typically uses about 850 gallons of fuel..**
> **We're reducing 7.5 megatons of carbon monoxide (annually) from the atmosphere...**
>
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> *Flyers Skate Zone*

metal halides and worked our way up. We haven't quite gotten to LED, but that's next on our list. A lot of it is money-driven. Ultimately, community rinks don't always have those funds but over the years, we're finding that more companies are doing it and it's made it more affordable. If you can really look at the ROI, you're looking at anywhere from 2.5 to 5 years. From there on out, you're not spending that utility anymore and that's a huge benefit to the mom and pop rinks."

The facility is reclaiming their waste heat and using that energy for dehumidifiers. They purchased an electric Zamboni machine. There are several things on their wish list, but the addition of solar in 2020 will result in significant savings and reduced consumption of resources. The installation is a 1.06 megawatt solar system onsite which gives them 100% renewable energy to support the building's needs. With their electric Zamboni ice resurfacer, they've calculated their reduction in carbon monoxide to be 7.5 megatons on an annual basis. As the host of the podcast, Doug took the opportunity to discuss the FastICE System which is of interest to the Flyers Skate Zone as it is another tool to help them reduce their consumption of resources, including water and energy.

The NHL has seen a shift toward the adoption of the advancements and innovation at the community rink level which will help facilities reduce resource and energy costs, with the hope that trend will continue. During the chat, Omar shared: "The League's mandate is to be a resource for our clubs and their venue partners. We want to share the latest sustainability best practices…at both the NHL arena level and also the community rink level... Particularly for the community rinks at the grass roots level… we know that every single facility is different. No one sustainability-focused technology, product or service is going to make sense for everybody. We try to educate as much as we can, so rinks can make the right choice, so they can understand what questions to ask and what decisions to make."

Sustainability is an important consideration for facility owners, so when the additional benefit is exceptional ice, it's a win for everyone.

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> *Omar Mitchell*
> *VP, Sustainable Infrastructure and Growth Initiatives*
> *National Hockey League*

Top 10 Benefits of the FastICE® Advanced Ice Making System!

1. Water disbursement consistent with speed of machine
2. Control water flow to within 1/1000th of an inch, avoiding inconsistency between operators
3. Build ice faster at higher temperatures, reducing load on refrigeration equipment
4. Blast Button allows operator to apply maximum water flow to build ice over low areas
5. Digital Control Monitor provides real time view of ice making water temperature and ground speed
6. Utility savings from reduction in water consumption, decreased run hours on pumps, compressors and refrigeration plant
7. Each flood can build ice thickness from 9/1000" to 11/1000" with a 1/8" max
8. Ice making water distributed by pressurized nozzles sets up much more quickly than with the traditional flood pipe/towel application
9. Exceptional ice quality with enhanced clarity
10. Less gasses trapped in the ice reduces the need for temperature adjustments