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The Inner Workings of an Ice Resurfacing Machine

By Casey Murdough

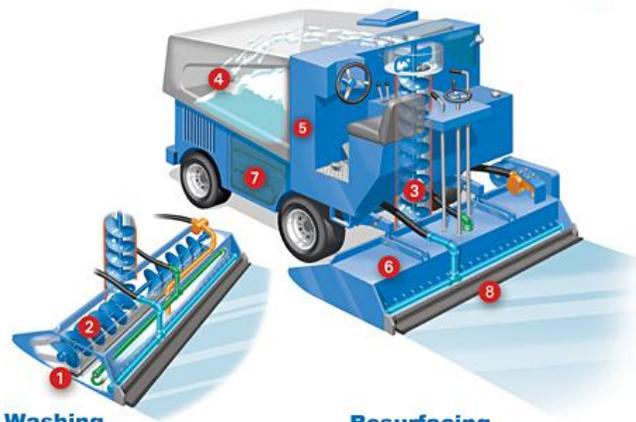
There are many elements of ice rink operations that contribute to the high quality ice and professional management you will find in an FMC arena. This week, Chelmsford Forum Rink Manager, Casey Murdough, gives us a behind the scene look at an Ice Resurfacing Machine and what's happening on the ice inbetween periods.

Shaving

A blade **1** shaves a thin layer from the surface of the ice.

Collecting

After a horizontal screw **2** (auger) gathers the shavings, a vertical screw **3** propels them into the snow tank **4**.



Washing

Water is fed from a wash-water tank **5** to the "conditioner" **6**, which rinses the ice. Dirty water collected in front of a squeegee is vacuumed, filtered, and returned to the tank.

Resurfacing

Clean water from the ice making tank **7** is delivered to the ice through a pipe and spread evenly by a towel pulled across the ice behind the conditioner **8**.

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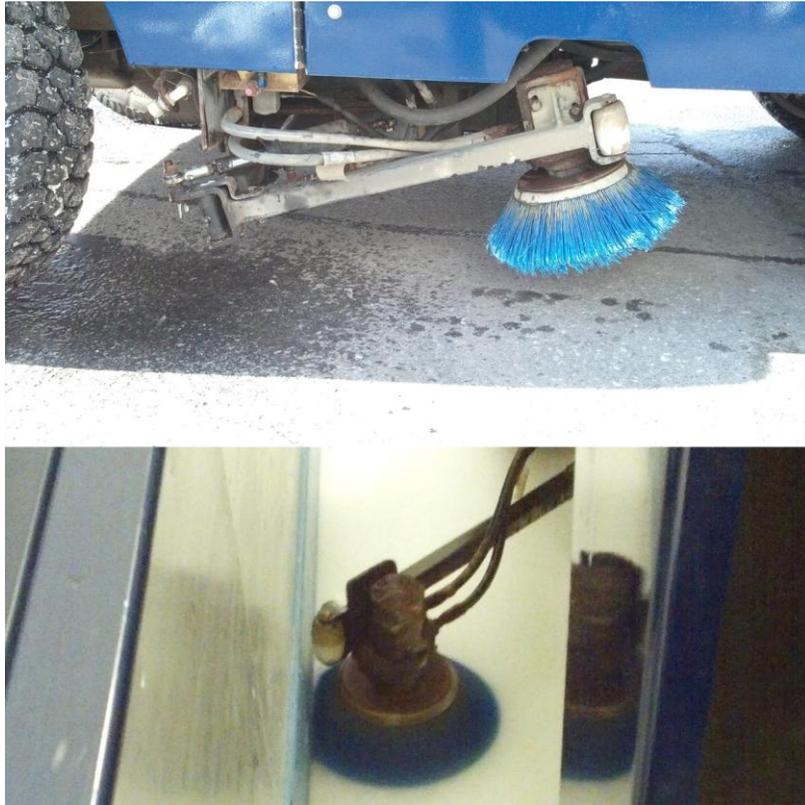
The [official Zamboni website](http://www.zamboni.com) provides a nice visual of how an Ice Resurfer works.



The Zamboni patrolling the ice sheet at your local FMC Ice Arena is powered by a pair of giant batteries. Each battery weighs in at a solid 1,700 pounds. There are two electric motors on-board, providing a whopping total of 18.5 units of horsepower (one unit of hp equals 745.7 watts or 33,000 foot-pounds per minute)! The drive motor is 10 units of horsepower and a separate 8.5 horsepower motor runs all the hydraulics. The battery unit holds about 84 volts, a little bit more than a standard car battery. There is enough power to complete on average, twelve to fourteen full ice resurfacings before needing a recharge.



There isn't much of a difference between a truck tire on a road and a Resurfacer tire on ice. The tires are a standard heavy duty truck tire riding on 16 inch rims. Factory studs are added to the outside edges of the tread to help the tire grip to the ice. When the studs wear down, FMC staff add a full set of new studs to the middle of the tread. Tires hardly ever wear out, but the studs take a beating when driving on surfaces like concrete and asphalt.



The board brush can be seen on the driver's side of the machine. When going around the boards on the first pass, the conditioner cannot reach all the way to the boards or deep into the corners. The board brush, activated by the operator, pulls the hard-to-reach snow out towards the center of the ice for the machine to pick up.



(Above - A dull cutting blade versus a new cutting blade). The cutting blade on a Zamboni Ice Resurfacing Machine is 77 inches long and starts at 5 inches in width. New blades are razor sharp but dull down very quickly and are able to be resharpened until they decrease to a width of 3.5 inches. All FMC rinks change their blades once a week during the summer months and twice a week during the busy winter season to maintain the smoothest ice possible.



The cutting blade is bolted onto the blade holder bar by ten bolts. The bottom of this bar is beveled up 1/16 of an inch to create a smooth, blended surface during each pass, and leaf springs on the inside of the conditioner provide the necessary down pressure to ensure a seamless cut of the blade on any ice surface.



(Above - A Zamboni Auger and a Snow Breaker). After the blade shaves the ice, the snow starts to pile up and needs a place to go. The horizontal auger's job is to collect the shavings and pull them towards the middle of the machine. Once the snow reaches the middle, the paddle throws the snow forward into a small opening at the bottom of the vertical auger. To prevent snow blockage in the hole, the snow

breaker is used to chop away buildup. You may have seen the Ice Resurfacers operator pumping the



snow breaker while driving on the ice.

You always see the Ice Resurfacers laying down water, but where does it come from? There is a large 200 gallon plastic tank located in the middle of the machine. It is easily seen here with the body panels removed. Standard ice resurfacings can use anywhere from 50 to 150 gallons of hot water, depending on the condition of the ice and the type of surface the driver is trying to achieve.



The dump tank sits right on top of the batteries and ice making water tank. It can hold up to 100 cubic feet of snow. Like a standard dumptruck, the dump tank can be raised to release the collected snow. As the tank rises, the lid, under spring tension, is pulled open. When the tank is lowered, a hook grabs onto a spot on the frame and puts tension back into the spring.