

The Edger

The second most important ice maintenance tool is the edger. All too often it is misunderstood, misused and abused in the workplace. Prior to using an edger, it is the ice technicians responsibility to understand how it works, what it is designed to do, its limitations and associated dangers.



An edger's purpose

A sheet of ice needs to be equally flat throughout the entire surface. The rotary ice edger was developed to help ice technicians maintain the ice build-up that naturally occurs along the edge of the dasherboard kicker plate and the ice surface. There is also a variety of edging equipment that may be permanently or as required attached to an ice resurfacer. Which system to be used is left to each operation to determine based on specific needs.

Ice build-up occurs in this area for several reasons.

1. The ice resurfacer is not designed to cut ice tight to the dasherboard – the object of the resurfacing process along the dasherboard is to never touch the board system. The driver is expected to draw the resurfacer as close to the dasherboards as possible without actually touching the system. It is not unreasonable to leave 1/2 to 3/4 of an inch of un-cut ice along the

boards. New drivers may leave more until their confidence level with the equipment increases. The runner of the conditioner may vary in actual size – for this purpose we will use 1 inch as the conditioner runner width – the runner has no capability to cut ice. An additional space between the side of the runner and the blade exists. Even if a driver had the capability to draw the resurfacer tight to the boards there would be approximately 2 inches of unsurfaced ice each flood. This needs to be regularly cut away to maintain the flat surface.

2. Skating drills that have players use the dasherboards for stops and starts will throw excessive snow up against the kicker plate that will freeze building additional ice along the dasherboards. Note: Player box door areas are also prone to this type of build-up as players skate to the area to conduct line changes.
3. Player box areas may also have water bottles spilt or players constantly spitting excessive fluid in the area which can contribute to additional ice build-up along the dasherboards.
4. Facilities with no dehumidification systems may encounter moisture build-up on the dasherboard and shielding that drips to the surface and freezes creating built-up ice that needs to be removed.
5. Facility design may also contribute to ice build-up or bowl ice. Dasherboards that have less than 26-28 ft radius of their corners will not allow the resurfacing equipment to properly do its job.
6. Turning radius capability of the resurfacing equipment may also reduce the opportunity for the resurfacer to cut into the corners.
7. Worn or un-serviced ice resurfacer conditioners may not perform properly.

Failing to regularly use an ice edger is the primary cause of “bowl ice”. Bowl ice is a term used to describe a sheet of ice that is thick along the outer edge of the sheet and thinner towards the middle. This condition may cause unsafe ice that may contribute to user injury or poor puck control

during play. It is also proven to drain unnecessary operational funds as thick ice will require more mechanical refrigeration to maintain.

Choosing the right edging equipment requires a detailed investigation to ensure the right choice is being made. Do not hesitate to contact a variety of suppliers to attend your facility to showcase their equipment. The visit should include an opportunity for frontline staff to use the equipment. A scoring system should be created for staff to relay their experience for final purchasing consideration.

Example operational questions might include:

- | | |
|----------------------------|-----|
| 1. Ease of starting | /10 |
| 2. Powering capability | /10 |
| 3. Cutting capability | /10 |
| 4. # of cutting blades | /10 |
| 5. Look of cut ice | /10 |
| 6. Safety features | /10 |
| 7. Comfort during use | /10 |
| 8. Throttle system | /10 |
| 9. Blade adjustment system | /10 |
| 10. Noise level | /10 |

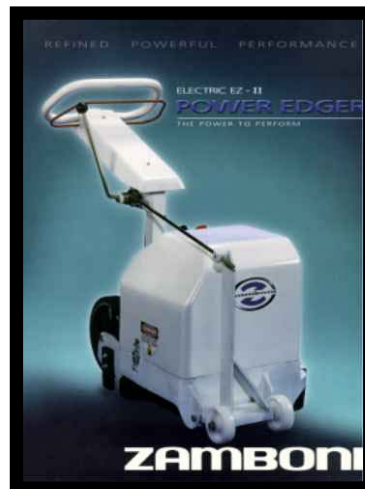
Management might also score the equipment using these example questions:

1. Number of years the make and model has been in the marketplace?
2. Cost and ease of installing replacement blades?
3. Service requirements?
4. Air quality factors – what is the ppm expelled from the equipment when new?
5. Available power sources?
6. Reference of other ORFA members who currently use this type of equipment?
7. Expected life-cycle of properly maintained equipment?
8. Cost? Which should include equipment and delivery charges.

The ice edger is a precision piece of cutting equipment. It may be powered by a variety of fossil fuels, electrical, battery or through the existing hydraulic system on the ice resurfacer. The cutting system may also vary. Rotary edger’s may have as little as two blades or as many as eight. The more blades the smoother the cut!

Other systems will use one length of cutting blade that is set in place or driven hydraulically. All equipment found in today’s marketplace are proven however, there are clearly defined differences and benefits associated with some designs, makes and models.

An inadequately functioning fossil fuelled rotary edger has been proven to significantly increase poor indoor air quality. A fossil fuelled edger should never be operated indoors without adequate ventilation being on. Remember to continue to run the ventilation system well after the edging has been complete. The reader may be asking how long is “adequate ventilation run time”. Because of facility design and actual ventilation capability this must be building specific. Buildings that have air quality testing devices should use this equipment to ensure the in air toxins are within the suggested safe levels for an indoor ice arena, Visit the ORFA’s Air Quality document at http://www.orfa.com/library/guide_bp/index.htm to better understand indoor air quality issues and recommended operational guidelines.



Weight of an ice edger may vary between 125-300+lbs. Operators must be trained to safely move and lift this equipment to avoid personal injury! Other difference may include:

- Size of wheels 4 to 6 inch
- Number of wheels – 2 or 4
- Number of cutting blades – anywhere from 2-8
- Cutting width will vary from 12-18 inches based on make and model

- Horsepower will also vary from 8 -12
- Electric or pull start
- Pre-set blade angle or manual setting
- Maximum cutting depth is ½ inch for any current model

The shift from a fossil fuelled edger to battery or hydraulically operated system is increasing. These systems contribute little or no toxins to indoor air.

Once considered expensive, this type of equipment is now viewed as cost effective and safer for worker and user health purposes. They should be given consideration when purchasing new edging equipment.

How an edger works

A series of cutting knives are mounted on a plate that is attached to a shaft that is driven by a motor. To be effective, the plate must exceed 3000rpm which should be considered dangerous to the operator! Hands and feet must be protected at all times when using an edger.



The rotating blades are slowly lowered onto the ice surface to begin to cut the excessive ice build-up that has been previously identified. The blade plate is usually designed to be slightly offset so that it might better cut toward the dasherboard system.

The blades are set to cut as close to the bottom of the dasherboards as possible without actually touching the board system. This may result in some leftover snow and ice build-up that will need to be removed by hand. Edger's that cut away any part of the dasherboard must be immediately stopped and taken off the surface for re-adjustment.

Preparing to use the edger

One of the most common mistakes made by an operator using an edger is failing to conduct a detailed site inspection of the area to be serviced. An operator must walk the ice surface and inspect the dasherboards for any items that might cause dangerous situations (i.e. loose or protruding screws, damaged plastic, failing advertising). Any identified problems must be repaired before edging occurs.

A common operational activity now includes the identification of excessive ice build-up areas by having the operator mark the surface with a marking pen at the beginning of the problem area and then again at the end of the area. This helps the operator concentrate on these trouble spots when on the ice.

Upon conclusion of the inspection, the edging equipment must be "circle checked". The operator should be familiar with the manufacturer's operations manual and should use the pre-use inspection list prior to using the equipment. As with many activities conducted in an ice arena, the logging of such inspections is strongly recommended by the ORFA!

The following items should be considered as a basic circle check for an edger:

- Render the unit "dead" by removing the spark plug wire
- Check all components for tightness, wear and movement
- Are cutting blades sharp and adjusted - an edger is designed to have the knife bed having a slight "tilt forward" (1-degree) – do not try and correct this
- Adequate fuel
- Adequate oil

Common edger operational and care mistakes include:

- Turning the edger improperly (check your manual for detailed instructions) - causing the engine oil to drip into the carburetor making it difficult to start and reducing its operational capability putting more toxins into the air

- Not rendering the unit dead prior to checking it
- Failing to check oil level that results in excessive engine wear or failure
- Leaving gasoline in the tank for extended periods that causes carburetion varnishing that makes the unit hard to start and increases air toxin levels
- Cutting near a metal ice dam near the resurfacer doors
- Operators walking backwards with the edger while trying to cut ice

Common edger operational and care best practices include:

- Change engine oil twice per-season – or any time the blades are to be changed. This will allow the unit to be tipped in a manner that allows easy access for inspection and repairs without fear of oil dripping out
- Blades should be changed in “sets” whenever possible
- Blade plates are mounted to the engine using ¼ inch machine bolts – do not over-tighten as they will easily snap off (most common amount of pressure for these bolts is 11lbs – check owners manual for specific details)

Edger Personal Protective Equipment (PPE)

As with any piece of equipment, PPE must be worn! Each edger owners manual will recommend PPE. An internal policy and procedure should be developed and implemented for the use and storage of edger PPE. Common PPE includes, but is not limited to:

- CSA “Green Patch” Footwear
- Ice creepers
- Gloves
- Eye safety wear
- Head protection
- No short pants
- Hearing protection

The amended Regulations (851 and 855) contain 3 key requirements, which may be summarized as follows:

- Employers are to take all measures reasonably necessary in the circumstances to protect workers from exposure to hazardous sound levels that result in the $L_{ex,8}$ exposure limit of 85 dBA being exceeded. (8-hour time-weighted average exposure)
- When the exposure limit prescribed by the regulations is exceeded, the employer is required to put in place measures to reduce workers’ exposure. Protective measures may include: engineering controls to reduce noise at the source or along the path of transmission; work practices such as equipment maintenance (to keep it quieter), or scheduling to limit a workers exposure time; and, personal protective equipment in the form of hearing protection devices, subject to the restrictions stated in the regulations.
- Employers must clearly post visible warning signs at the approaches to areas where the sound level regularly exceeds 85 dBA.

The most common mistakes involving edger PPE includes:

- Failing to wear adequate foot protection
- Altering equipment safety devices
- Not starting the equipment on the ice surface



Edger use dangers

Edgers have been responsible for some significant life changing accidents! Feet have been badly cut; workers have slipped and fallen on the ice chips left from the edger resulting in significant loss time injuries. Edger blades and blade plates have been known to break-off resulting in operator injury, shielding and dasherboard damage. No person other than the operator should be on the surface when edging is taking place. A further caution is extended to limit edging activities to when the general public is NOT in the facility. Edging between events should have the associated risks carefully considered prior to taking place.

Any incident or accident involving an edger requires official reporting. As required under the Occupational Health and Safety Act (OHSA) operator' must complete in detail the facilities incident/accident forms whenever an incident or accident occurs!

Properly using an edger

To avoid damage to an edger it should never be started on a hard surface. The cutting system should be at the highest level whenever not in use. Operators should ensure that this has occurred prior to trying to start the unit. Newer edger's are now equipped with a battery powered starting system. Battery starting options are strongly recommended as they help ensure the edger will start and used on a regular basis. Regardless of the starting system, an edger should be placed tightly against the dasherboards prior to starting the unit. This reduces the opportunity for injury that may be caused by kickback.



A manually started edger should have the operator firmly place one foot on the edge of the unit prior to pulling the starting cord. If the equipment has a system that “chokes” the fuel/air system it should be used to start the motor. Once the motor is running the choking device should be shut off!

Edgers are designed to work slowly – they should never be pushed harder than they can work. Blade systems should be dropped onto the ice slowly – small cuts work best! Never walk backwards with an edger – they are designed to only cut in one direction and pulling the edger backwards will increase the risk to operator injury by accidentally pulling the unit onto feet or the operator if a slip and fall occurs.

When the operator encounters an area that was identified as a high spot during the pre-inspection it is acceptable to slightly increase cutting blade depth while cutting through this high area. At the end of the trouble zone, the edger blades should be adjusted to a point where they no longer cut into the ice. The edger should be carefully returned to the start of the identified trouble zone and the cutting process repeated until the problem area has been effectively reduced. Once the trouble area has been corrected, the edging process should be continued.

Caution: *the snow shavings created during the edging process will render the surface extremely hazardous byway of slipping. Operators are warned to walk cautiously in these environments.*

Double edging

Some surfaces may require a double edge cut which means a first cut is made tight against the dasherboard and a second cut is made beside the first cut away from the boards. This is a high risk procedure as the operator does not have the support of the dasherboards. It should only be considered by the most competent operators.

Surfaces that need this type of maintenance usually have insufficient radius in the corner which does not allow the resurfer to get tight into the corner. Buildings that determine that a second cut along the straight portions of the surface is required may need to consider what is actually causing this problem. It may include mechanical issues that require that the ice resurfer be adjusted or is

worn; or it may be the human factor – the driver’s capability to actually perform a professional resurfacing. The new battery edger’s which can be 300lbs+ in weight can make a double cut with reduced concern to operator injury.

Hand tools

Completing the edging process will require the operator to remove the edger from the surface and return with a variety of ice edging hand tools. These may include an “ice spud/chipper”, broom, shovel and hole patching slush.

The operator must walk the surface using the ice spud/chipper removing any leftover ice along the dasher board. Some areas may need hand sweeping if the ice resurfer is not equipped with a board brush. Any cracks, dips or imperfections along the dasherboards should be repaired using a slush compound.

Edging use best practice

To effectively manage ice depth along the dasherboard, edging must be conducted no less than every 8-12 hours of ice rentals. Operations that continually monitor and maintain ice depth along the dasherboards will benefit from energy savings and best utilization of human resources. Ice that is left unchecked along the dasherboards is a sign of poor operational activities and will require a concentrated staff effort to correct the ice build-up problem.

Ice edging must be finalized using the ice resurfer. The resurfer’s blade should be set to a standard cutting depth. The operator will first collect all shavings created during the edging process. An operator must be careful to not pick-up too much of the shavings at one time as auger blockage may occur. A full fine cut along the dasherboards must be completed around the entire surface. At the start point of this cut, the operator should move out 1/2 of a conditioner width and complete a second cut. A third adjustment of 1/2 of a conditioner length follows the second cut – with a final cut against the dasherboard completing the process.

Some operations complete the process by applying a light spray of hot water to the kicker plate. This washes any access snow off the boards and helps fill

small cracks and gouges that were created during the edging process leaving a professional finish.

Operations that regularly edge and perform the above process have noted follow-up cuts will reduce the potential of bowl ice by 99%!

Irregular ice along the boards

An ice technician may encounter ice issues along the boards while edging or during use. Problems such as chipping, cracking or chunks of ice which “pop out” are indications of internal environmental problems. Older dasherboards may allow air or moisture to creep between the bottom of the boards and the permanent base it is mounted on. This space may be created through the freeze thaw process in the facility, damaged boards or due to the age of the system. Air or moisture that gets through to the ice from under the dasherboard will cause many of the problems identified above.

Ice technicians that experience large chunks of ice popping out along the dasherboards must take this problem as a warning sign. Pieces of ice that regularly break away may suggest that the dasherboard is worn or damaged and as such is now loose. Movement through play or when the resurfacing equipment comes in contact with it may be causing the ice failure. A thorough inspection of the dasherboard system should be planned.

Edger equipment storage

The edger owners manual will identify how best to store the equipment when not in use. The equipment should be stored away from public access areas. The equipment should be washed down after use. Spraying a light coat of oil onto the equipment may help reduce rusting and keep the equipment in proper working order. Consider covering the unit with a canvas tarp. Canvas will allow the unit to breath where plastic may promote rusting.

Edger equipment maintenance

There will be a variety of ongoing maintenance and upkeep procedures that an operator can regularly perform to increase the life and usefulness of the edger. However, at least annually the equipment should be inspected and tested by a trained small engines technician to help ensure it continues to meet the original operational expectancy!

Carburetion adjustments should **never** be performed by untrained persons!

Training

As required under the OHSA - no operator should be permitted to use an ice edger until they have undertaken a comprehensive training session with a competent person as defined in the OHSA. This training should be repeated no less than annually or anytime there has been an incident or accident involving an ice edger in the workplace!

Consider the benefits of the ORFA's Ice Maintenance and Equipment Operations training course as well as the Certified Ice Technician professional designation in enhancing your operations staffing knowledge base in ice equipment use and care.

As setout in Section 28 of the Occupational Health and Safety Act

Duties of workers

28. (1) A worker shall,

- (a) work in compliance with the provisions of this Act and the regulations;
- (b) use or wear the equipment, protective devices or clothing that the worker's employer requires to be used or worn;
- (c) report to his or her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker; and
- (d) report to his or her employer or supervisor any contravention of this Act or the regulations or the existence of any hazard of which he or she knows.

Idem

(2) No worker shall,

- (a) remove or make ineffective any protective device required by the regulations or by his or her employer, without providing an adequate temporary protective device and when the need for removing or making ineffective the protective device has ceased, the protective device shall be replaced immediately;
- (b) use or operate any equipment, machine, device or thing or work in a manner that may endanger himself, herself or any other worker; or
- (c) engage in any prank, contest, feat of strength, unnecessary running or rough and boisterous conduct.

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Sources:

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