

SUGGESTED ICE RESURFACER – Blade Change Procedure

Purpose: To detail a suggested procedure for changing the blade on an ice resurfacer

Background: A standard ice resurfacer blade is available in various lengths, ranging from 68" to 96". Blade construction may also vary. The minimum hardness for new blades should be no less than RC-58-62 inlaid steel. A typical ice resurfacer blade should provide adequate cutting service for at least 100 resurfacings before a re-sharpening is required. However, this may vary depending on actual arena water quality, building/ice cleanliness and snow shaving dumping area. Ice resurfacers taken outside to dump may track dirt inside and onto the ice surface causing the blade to dull in less than 100-scrapes.

The new blade width is 5" and of this width, only 2" of the blade is actually the inlaid steel. At a width of 3" or less, the blade must be disposed. *Each sharpening will reduce the blade life by a minimum of a 32nd of 1".* This may increase if damage to the blade has occurred. Blades that have nicks or gouges need to be looked into as such damage may suggest other operational problems have occurred to the ice resurfacer, the entranceway to the ice resurfacer storage area or some other portion of the building.

Workers should be physically capable of lifting 50-85 lbs when handling an ice resurfacer blade. Weights will vary depending on the actual length and width of the blade.

Each blade arrives with two [2] sets of mounting holes. The series of front holes are to be used when a blade width of 4-5" is in place. The second set of mounting holes, which are referred to as the "back holes", are to be used once the blade reaches a width of less than 4". When selecting a replacement blade from stock, choose a replacement blade as close to the width of the blade that is mounted on the ice resurfacer. By making this choice, you can reduce the actual blade set-up time and any required adjustment.

New blades are available in today's market place. The following suggested procedures are intended to meet the challenges of a "traditional one-sided ice resurfacer blade". Should the blade you are about to change be of a different style or design, further training may be required prior to conducting a blade change.

Suggested Ice Resurfacer Blade Change Procedures

Training:

No persons should attempt a blade change unless they have received the appropriate training. Only authorized individuals are to perform a blade change procedure.

Time:

A typical ice resurfacer blade change should be scheduled for 45-60 minutes. A person conducting a blade change should not be placed under any operational timing pressures. Rushing a blade change will escalate the related hazards associated with such a task.

Required Person(s):

This task is best performed with two [2] people whenever possible. There may be times that one [1] person is to perform some or all of the work. However, a second person being near, on site or available byway of two-way communication should be in place in case of an accident.

Personal Protective Equipment (PPE)

Personal Protective Equipment that is required when changing the blade on an ice resurfacer includes but is not limited to the following:

- Safety footwear [**Hands and feet should never be exposed to the sharp edge of the blade**]
- Safety eyewear
- Kevlar safety gloves [**Hands and feet should never be exposed to the sharp edge of the blade**]
- Magnetic blade cover
- Conditioner 6" x 6" safety blocks
- Blade hooks - Olympia [see figure 4]

Required Tools and Resources:

Some tools will arrive with the ice resurfacer; they should be on-hand and used. Other tools may include, but not limited to the following:

- Manufacturers operating manual which will provide specific blade change details
- Internal written procedures which may include a Job Hazard Analysis
- Hex key to firmly hold the head of the blade bolts
- Ratchet with appropriate sized socket and extension (*Note - impact equipment is not recommended when changing an ice resurfacer blade*)
- Consider purchasing a pallet truck to assist staff with the blade change. Refer to figures 1.0 and 2.0 (Recommended)

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Figure 1.0 - Pallet (truck) Jack



Figure 2.0 - Blade on Pallet (Truck) Jack



The Task

The blade change process consists of two functions: removing the dull blade and reinstalling the sharp blade. It is imperative that the necessary safeguards for the ice resurfer cutting edge are in place during this task. Always put the dull blade away prior to starting the installation of the sharp blade. **Do not rush the blade change process**; always allow enough time to do it carefully and safely. Never carry the unsheathed blade to and from the area where you are changing the blade.

- The ice resurfer conditioner should be flushed of any snow and allowed to dry prior to undertaking a blade change
- Some operations have utilized “vehicle tire ramps” to elevate the ice resurfer, making the task somewhat **easier** (**Note: caution is extended to ensure that the right design of ramp is chosen – the ramp should be selected to exceed the “wet weight” of the ice resurfer**).

- The ice resurfer should be parked in a dry, flat area free of other equipment or potential trip hazards.
- **All PPE should be on site and worn throughout the process - unless otherwise stated.**
- Conditioner should be put in an “up” position with the unit being secured from rolling – this may include placing the equipment in park or engaging another safety mechanism as well as blocking the wheels.
- The equipment ignition key should be “removed”.
- Safety blocks are placed under the conditioner in case of a hydraulic or electronic failure that may cause the conditioner to suddenly drop; conditioner should be slowly lowered into these safety blocks prior to any work being conducted under the unit.
- If a second person is not on site, the persons changing the blade should have conducted a “dangerous work notice” with someone who is available in or outside the building. This notice should give a brief overview of the work to be undertaken and the expected length of time to complete the task. Note that signing out once the work is complete is essential to this process.
- **Kevlar gloves should be worn when placing the magnetic blade cover on the blade**; once this blade cover is in place the Kevlar gloves can be removed by the worker making the intricate work with the details easier.
- If a snow pit is located near the blade change area protect the area to reduce the potential for lost nuts, washers and bolts such as the use a piece of tarp or cardboard.
- If blade hooks are to be used remove the two [2] end bolts on the blade and install the blade hooks. This will hold the blade safely in place as the rest of the bolts are removed. Refer to figures 3.0 and 4.0



Figure 3.0 - Blade with Blade Hooks in Place

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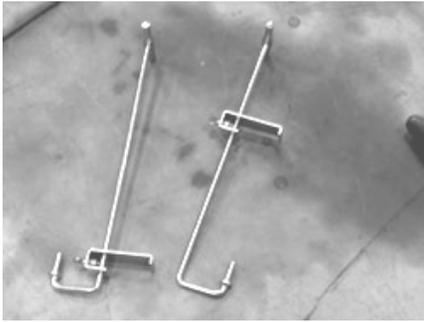


Figure 4.0 – Blade Hooks

- If no blade hooks are used, consider using a system that will facilitate lowering the blade. This may include an additional set of safety of blocks for this purpose. Some operations utilize a pallet (jack) truck to assist in this process. (see figures 1 & 2).
- Remove the remaining bolts from the used blade.
- Keep a second set of ice resurfacer blade bolts, washers and nuts in stock. Place these in a small container and soaked in light oil between blade changes. The used bolts are exchanged with the bolts that have been kept in the oil bath during each blade change. This helps reduce the potential for seized bolts to occur. (Note: Olympia does not recommend stainless steel bolts and lock washers, while Zamboni does recommend these items. Follow the manufacturer's recommendations in this regard).
- If the blade is resting on a set of blocks under the conditioner, restart the ice resurfacer and raise the conditioner; the blade is will be resting on the blocks; stop the engine and remove the ignition key once again. If another device is to be used, the lifting of the conditioner may also assist in safely removing the blade from under the conditioner.
- Carefully slide the dull blade from beneath the unit; **put the Kevlar gloves back on** and remove the magnetic guard from the dull blade; place the dull blade in its wooden protective sheath and label it dull with an appropriate tag. (see figure 5)
- Clean the blade holder, which is the flat surface, located permanently under the conditioner where the blade rests after it has been installed. Steel wool, sand paper or other metal cleaning devices can be used to remove any debris, rust or damage. Once complete, apply a light coat of oil to the surface to help condition and protect this area.

- **While wearing the Kevlar gloves** remove the “fresh blade” from its wooden protective sheath and put on the magnetic guard.
- Prior to installing the new blade, it is strongly recommended to lightly clean the top of the blade with a small amount of oil being applied. Place the protected fresh blade on the wooden blocks or other device and smoothly slide it into place under the conditioner. If blade hooks are used, they are simply hooked into the end of the blade and lifted toward the blade holder; once in place the blade hook will extend into the blade holder holes. The blade hooks are then secured to the conditioner allowing the remaining bolts to be installed; at this point, hand tighten only.
- Once all bolts are in place they can be equally tightened. Bolt tightening options: 1) start in the middle and work your way to one side and then the other; or 2) start at one end and work toward the other side of the conditioner.
- Tighten bolts down and then hand-tighten $\frac{1}{2}$ to $\frac{3}{4}$ of a turn with the ratchet.
- Once complete be sure to remove the magnetic blade guard.
- Adjust the blade-cutting angle. **Note: Refer to the manufacturers' recommended adjustment.**
- Log the completed work and report any incidents or accidents that may have occurred during this procedure.
- Arrange for the dull blade to be re-sharpened.
- If internal or off site communication system has been used be sure to sign-out.

Health and Safety Risks

The ice resurfacer blade is extremely sharp – even when tagged “dull”! Workers who cut themselves with an ice resurfacer blade must:

- Seek immediate medical attention
- Submit an accident report

Clostridia bacteria, the family of C. tetanus can be found in soil, dust, feces and on skin. Clostridia bacteria reproduce only in the absence of oxygen so any wound deep enough can become a breeding environment. A rusty nail will act only as a penetration entry point on the skin; the fact is, the bacteria can come from many sources such as a cut from an ice resurfacer blade, needles, animal bites, gardening tools and splinters. Injuries, like a hot or cold burn [propane/NG], that create dead skin are also prone to infection.

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The symptoms can be severe. Once Clostridia bacteria enters the human body it begins to create toxins that attack the central nervous system, causing spasms and muscle rigidity all over the body, most frequently in the face. Although tetanus shots are usually provided to children, they wear off after 10-years. **It is strongly recommended that all facility workers discuss the benefits of a tetanus booster with their family doctor.**

Blade Storage

Both new and dull blades may require on site storage. Blades that are stored vertically will need to be secured with a chain or other safety device to ensure that they will not tip over. It is recommended that a method for identifying the age and size of the blade be implemented.

Operational State of the Blade and Blade Holder



Figure 5.0 - Tagged Blades



Figure 6.0 - Stored Blades

Each new blade and the blade holder arrive at the facility in a “mirror finish condition”. You will not see an actual reflection when looking at these items. The mirror finish will provide a visual imprint of what the condition of these two surfaces should be; smooth with no rust or “pitting” of the metal surfaces. It is the ice resurfacer operator’s responsibility to maintain

these surfaces as close to their original condition throughout the life of the equipment.

As previously stated, an identifier for each blade will help create an effective rotational system which has several operational benefits. An operator should never mark or scar the mounting surface of the blade as this will promote rusting and pitting of the mirror surfaced area. Identification marks should only be

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