

Scottish Curling-Ice Group

MAN, BLADE AND ICE

Overview

From the report on *Level*, it is clear that definition is important, and it is only accurate if it is possible to demonstrate the accuracy through measurement. To say that a sheet of curling ice – or the entire ice pad – is sufficiently level for top-level curling, means to us that the degree of level can be measured to within 0.05mm over 5m, because anything within that measurement is largely irrelevant. As far as we know and can measure, a curling stone will not be affected if the sheet of ice is perfectly level and consistent.

The reverse argument is an interesting one. Start with a sheet of ice that is perfectly level and consistent, created by genius and precision equipment to the highest possible specification, and now add the effects caused by man, machine and water at a temperature cold enough to be called ice. Suddenly the sheet is no longer sufficiently level, but it is very difficult to tell what caused it, and by how much it has changed.

Ice

Water does indeed find its own level, but that does not mean it is level – all it has done is find its *own* level. From a supply out a tap at say 15°C it is poured onto a cold floor at say – 5°C, heat is extracted to cool the liquid down to below 0°C and cause it to freeze, or become solid, at which stage its *own* level becomes fixed. However, as the liquid cools it becomes more viscous and loses the ability to find its own level well before 0°C, and when it freezes it also expands by some 9%, which causes deeper areas to expand more than the level of surrounding lower areas. Only if a sheet of ice is perfectly level, is flooded perfectly evenly and frozen consistently throughout will the new surface be level, and yet the new surface is meant to correct any flaws in the old surface.

The installation of an ice pad is a complicated business, affected by virtually anything from air movement to water quality, and from refrigeration to the behaviour of water molecules at different temperatures (see the report on *Water In A Curling Rink*). It requires supreme skill and much experience to produce a level pad, and very few technicians have such skill. Even when a perfectly level pad has been achieved, the ice will move, or sublimate unevenly, or collect condensation unevenly, or be compacted unevenly, or melt unexpectedly and/or unevenly, or develop frost heave – it certainly will not stay level. But which cause is responsible? How can it be measured without a highly accurate instrument? How can the perfect level be restored?

Assuming that the ice technician is sufficiently competent to install a level sheet of ice, it is safe to assume that he will also know if the ice itself is the cause of a change in level. Uneven condensation will be visible, air flows can be checked, sublimation can be controlled, cracks will be caused by fast freezing or a heavy object and heaving will be a known problem in certain areas. For this reason it is unlikely that the ice itself can be blamed for a change in level, it can only be blamed if it had not been installed level or had not been maintained properly.

Blade

This wonderful implement is used to cut the ice every day, or even more often, to remove the playing surface of pebble and all the dirt that comes with it. It is assumed that the blade will also keep the ice level, yet it is ignored that the blade does not really cut the pad at all but only the pebble. If it cuts the pebble unevenly the blade will certainly cause the pad to become less level, because the uncut pebble will remain on the pad and become part of it. Unevenly.

The report on *Cutting Technique* deals with ways of approaching the matter in some detail. The patterns were developed over many years specifically to ensure that the cutting maintains the level of the pad, and the patterns can do so for many months or even an entire season. The development of the patterns only became possible after the skill of flooding had been mastered, because no pattern can be tested without a very level pad to start with. Maintaining a level pad fit for curling only became possible once the skill of even pebbling had been mastered, and this also incorporated the testing of many different pebble heads and different temperatures and pebble sizes. Every day the pebble is applied, and every day the pebble is removed by the blade, but the tiniest flaw in either technique will become exaggerated as the days pass.

When a blade is ground, the machinist will try to achieve a consistent straight edge within 0.025mm (0.001") over the blade's length. This is well within the 0.05mm that is sufficient for curling ice – or is it, because the blade is only 5ft and the width of the sheet is 5m, nearly four times wider. Furthermore, the blade will cover the sheet several times, along the same lines, as the pattern continues, and any flaw in the blade will become exaggerated until the ice pad is no longer level. To hone a blade edge by hand to achieve a straight edge within 0.001mm (0.0005") is possible, and this will certainly help, but then the blade will change once it is placed on the ice and cooled down. A brace fitted to the box of the blade (or knife) can correct this, but if the brace also cools down it will shrink and deform the box again. The blade and box are made of metal, and metal moves when subjected to changes in temperature.

A good blade can only be tested on a very level ice pad, usually after the final finishing floods and after the salts have been removed, to avoid damaging the very new cutting edge. Once a good blade is identified, it can only be maintained with careful and accurate honing, and the brace must never be removed or even adjusted once it has been fitted to correct a flaw at a certain temperature. The blade must not be subjected to extremes of temperature and must not be bumped, banged or dropped, the cutting edge must be protected and the blade must always be used at the same temperature where it has been judged to be good. This is not easy, but technicians of experience can do this and do so every day. The biggest problem is that this degree of precision cannot be measured in the average curling rink, and only the machinist can be trusted to achieve such a near-perfect cutting edge.

Assuming therefore that a blade of precision has been identified by testing it on a very level ice pad at the right temperature (with the ice surface at about -3.5°C), and that the blade is being used correctly by an experienced ice technician, it is unlikely that the blade will be the cause of any change in the level of the pad. The only times when a blade can be blamed are when it has been adjusted incorrectly, or cooled down improperly, or honed badly, or used wrongly by the technician who follows a poor cutting pattern.

Man

There are many female ice technicians too, and they are included. Most the ice technicians whom I know are hard-working, dedicated and committed people, and they take enormous pride in their work. Most of them are also happy to learn as much as they can and apply the knowledge to their work. The one thing they all have in common is that they are human, and most the humans I know will blame themselves last. The same can of course be said of most curlers, who will certainly blame the ice first and themselves last.

This is human nature, part of the job, goes with the territory – if ice is the territory, they certainly have a leg to stand on. If the ice is not level, they win. If the blade and poor pebbling have messed up the level, they win. If perfection is not provided by the technician, the curler cannot achieve perfection with his stones, and the technician will lose, unless of course they all blame the ice.

Conclusion

The purpose of this report is to illustrate how difficult it can be to install and maintain a very level ice pad fit for curling. For those who do it the rewards are there, but an ice technician who cannot achieve the aims also cannot blame the water. If he cannot use a blade properly he cannot blame the machinist, unless the latter failed to deliver his part of the contract. A curler cannot blame the ice or the technician if he has a flawed delivery or release, yet if the ice is not of a high standard he will never improve his technique. There is a relationship between many people here, all striving to achieve perfection, and that is what the game of curling is about.

With the recent advancements in curling ice, perfection is now being challenged by ice technicians who should now surely be called specialist curling-ice technicians. With the advancements in blade technology perfection is achievable by specialist curling-ice technicians who will value their blades, because they have learnt how to use them properly. The curlers will achieve perfection because modern curling ice has given them a surface upon which they can perfect their technique and skill. No longer should anyone blame anyone else, other than themselves.