Ice Hockey's Elite Steel Edge

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The World Steel Association (worldsteel), headquartered in Brussels, Belgium, is one of the largest industry associations in the world, with members in every steel-producing country. Its members represent around 85% of global steel production.

This monthly column features "Our Stories" from worldsteel, covering automotive, construction and building, infrastructure, and innovation.

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Brynäs IF are one of Sweden's best ice hockey teams. This article uncovers how combining the latest knife blade steel and the best boot innovations keep them ahead of the competition.

Defenseman Ryan Gunderson steps out onto the empty ice rink, the blades of his skates meet the glistening ice and he's off in a flash of steel and snow. Here, the cutting-edge kit the players choose to utilize, right down to the steel of their blades, can make a crucial difference to their performance and career.

We're at Gavlerinken Arena in central Sweden on an icy January day. The vast 8,000-seat arena is home to Brynäs IF, one of the most successful and best-loved teams in the Swedish Hockey League (SHL). Ice hockey vies with football for the position of most popular national sport in Sweden and the "Tre Kronor" national team took home silver at the last Winter Olympics.

Gunderson steps off the ice and notices the blades on teammate Daniel Paille's Bauer skates. "You still using the LS2s?" he asks. Gunderson, along with around 80% of players in the Bauer teams, has upgraded to LS4 blades, which use one of the Sandvik SanEdge® range of knife steels: Sandvik 14C28N. Formulated by Swedish steel company Sandvik, this hardened knife steel resists blows better and requires less frequent sharpening.

Mattias Pettersson, equipment manager for Brynäs and a former goalkeeper for the team, explains how a harder steel affects his job.

"Other brands have a softer steel and sometimes need resharpening three to five times during a game. On this steel you can go a whole game or maybe more without resharpening. So it makes my job a lot easier."

The new blades also have a removable and higher profile (their shape), allowing players' boots to achieve a lower angle on the ice while turning without actually hitting it. Back in the locker room, Paille, a left winger from Canada, former Stanley Cup winner and one of Brynäs' most experienced players, shows us the customized lift he's had attached to the back of his blade holder to achieve the same effect and help him lean slightly further forward.

Mattias Pettersson is Brynäs' equipment manager and former goalkeeper for the team.

"Mattias has explained to me that the LS4s might help with that so I won't need the lift anymore," says Paille. "It's just something I've stuck with my whole career so I've stayed with it, but I think the new blades are something I'll try in the off-season."

A pair of Bauer skates are taken onto the ice.

A set of profile guides for ice skate steels.

Marginal Gains

At this level, players expect the very best from their equipment and all have their personal preferences when it comes to frequency of sharpening, blade profiles and sharpness of edge. But while some, like Paille, are happy to stick with what's always worked for them, others are keen to embrace the latest technological advancements.

Philadelphia-born Gunderson, who began skating when he was three, says, "I try to keep up with the newest pair every year and if something better comes out I switch to it. I'm constantly changing things on my steels and different ways I can perform better." Over the last few years he's noticed more steel in the blades, a more powerful push, added height and better durability.

So what exactly is it that makes this steel so much harder than previous steels? Björn Mogard, global product manager at Sandvik, explains: "Sandvik SanEdge 14C28N was originally developed for knife applications. Compared to standard steel grade Sandvik SanEdge 12C27, used for both knives and skate blades, a higher final hardness after hardening can be achieved with 14C28N. The result gives a better edge wear resistance."

The steel, which is manufactured in the town of Sandviken, just 23 km (14 miles) from Gavlerinken Arena, is the result of a successful working partnership between leading ice hockey manufacturers Bauer and Sandvik.

"We chose Sandvik steel because our advanced research shows that this particular material under a microscopic analysis has properties that allow for improved edge retention and durability," agrees Robin Öhman, sales representative for Bauer in Scandinavia.

Skating Technology

Canadian-based Bauer have long been at the cutting edge of skating technology.

"We were the first company, in 1933, to attach the runner and holder to the boot," says Öhman, "and two years ago we introduced a removable clip on the holder for the steel, allowing it to be changed quickly and easily for resharpening or replacement."

What amateur skaters may not know is that pro skate blades are sharpened by grinding a concave hollow through the center of the blade lengthwise. This creates two sharp edges per blade and the depth of the hollow between the two edges is what determines how sharp the edge feels. The size and weight of the player, the blade profile he or she chooses, the conditions of the ice — as well the hardness of the blade steel — all these factors affect how a player chooses to have his or her skates sharpened.

For instance, in the U.S., the ice is generally considered to be harder, so players choose a sharper edge. Paille has softened his edge since coming to Europe.

"A deeper hollow will give you more 'grip' on the ice, so your blade will feel sharper and will hold the edges better, Pettersson says. "A shallower hollow will have less grip but more glide and easier stops and starts."

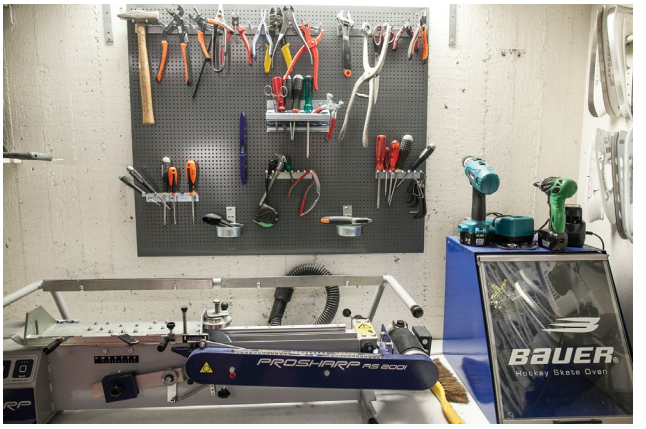
Where previously his job involved hand-grinding an edge in a clamp, Pettersson now has a machine that can automatically carve out different base profiles for individual player preferences, making his job easier physically but more technically demanding.

"Sandvik steel is a combination of the hardest steel we've ever had and the most efficient steel regarding how good an edge you can get when sharpening," says Öhman.

So where do we go from here?

Öhman confirms that Bauer’s research and development department “are not sleeping” and they’ll continue working with Sandvik steel to find new ways to keep elite hockey players skating harder, faster and for longer. And as for those of us still wobbling around the local rink — well, we might just find paying a little more attention to our skates and steels could bring us one step closer to the skating style and skills of the Brynäs boys.

This and other stories are available at stories.worldsteel.org. ✦



Pettersson's work bench and tools.

Did You Know?

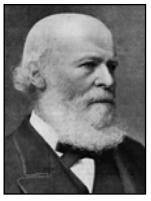
AIME’s First President and First Two Honorary Members Were Iron and Steel Men

Thomas

On 17 May 1871, the then-American Institute of Mining Engineers selected David Thomas, a blast furnace expert born in Wales, as its first president. From his biography on AIME’s website: “The Lehigh Coal and Navigation Company had spent a large sum of money in building a blast furnace for the purpose of making experiments with anthracite coal as fuel. They did actually succeed in making some anthracite iron; but found the same trouble as Thomas had with his cold blast — they could not keep the furnace in blast. They were, therefore, compelled to give it up. But in the summer of 1838 the *London Mining Journal* conveyed to them the welcome and cheering news of Thomas’ great success at Yniscedywn, and in November one of their leading directors, Mr. Hazard, crossed the ocean to witness the process, and learn all about it, with authority to bring back with him one conversant with the process of making anthracite iron. Proceeding at once to Wales, he found the Yniscedwyn furnaces in full and successful operation. Crane strongly recommended Thomas as the only man who could answer Hazard’s purpose. The result was that Thomas was offered and accepted a five-year engagement to go to the United States and see what he could do with an anthracite furnace in the Lehigh Valley.

Thomas arrived in America in June 1839 and, soon after his arrival, the Crane Iron Company of Catasauqua was organized. In the following month, the construction of the first of six furnaces of the Crane Iron Company was begun. The first run of iron was made on 4 July 1840, with the most encouraging success; and that furnace ran on steadily for many years. To Thomas then there is undoubtedly and justly due the credit of having built the first anthracite blast furnace in America, or any other country, which successfully fulfilled the purpose for which it was constructed.”

Read more at http://www.aimehq.org/about-us/presidents/david-thomas-deceased.



Bell

In addition to being selected as the first president, the organization also conferred honorary membership upon David Thomas a year later. They also lifted up Sir Lowthian Bell, born in Newcastle upon Tyne in 1816, as the second Honorary Member of 1872. From his biography on AIME’s website: “Bell was an authority on mineralogy and metallurgy…During his life Bell was a founder member of the Iron and Steel Institute (elected president in 1874); a Fellow of the Royal Society and of the Chemical Society of London; a member of the Society of Arts, a member of the British Association for the Advancement of Science; a member of the Institution of Civil Engineers; president of the Institution of Mechanical Engineers; president of the Society of Chemical Industry; and a founder member of the Institution of Mining Engineers (elected president in 1904).

Bell was the recipient of the Bessemer Gold Medal from the Iron and Steel Institute in 1874, and in 1885 received a baronetcy for services to the State. In 1890, he received the George Stephenson Medal from The Institute of Civil Engineers and in 1895 received the Albert Medal of the Society of Arts for services through his metallurgical researches.”

Read more at http://www.aimehq.org/programs/award/bio/sir-lowthian-bell-deceased-1904.

A celebration of AIME’s 150th anniversary will occur during AISTech 2021 in Nashville, Tenn., USA, on 3–6 May 2021. We hope you will join us.