VH SPEED SKATING

Providers of the Worlds highest quality speed skate equipment

VH TECHNICAL REPORT 2004

VH Short Track Inc was developed after an evaluation of the developmental system by former National Short Track Speed Skating Coach Shawn Holman and Scott Van Horne world renowned boot maker and biomechanist of VHfootwear. After a critical evaluation of the developmental system, it was identified that major gaps existed resulting in many deficiencies in the developmental equipment that speed skaters currently use.

The analysis of equipment below focus's on 3 specific areas of a speed skating boot which are; Comfort, Performance, and Safety.
The following analysis identifies each deficiency in developmental equipment followed by the VH technology to address the current issues. Along with a quality boot, VH understands the importance of a quality blade for development and performance, which is also discussed below.

BOOT COMFORT

Identified Deficiencies and Impact:

- Recruit and retain athletes in our sport
  - Current equipment does not provide an enjoyable pain free environment
- Allow athletes the comfort to use their outside edges
  - Lack of comfort reduces the skaters ability to develop the skills to perform a crossover
  - Lack of comfort reduces the skaters ability to develop weight transfer in the critical windows of skill development
- Inability to accommodate for high and low arches, which results in foot pain.
- Tongue design frequently produces "lace bite"

VH Boot Comfort Technology

To address the issues above, VH has developed their own foot last for each size, while correctly using an integration of thermo plastic and carbon fiber to make the most heat moldable boot on the market. Below are the heat moldable areas (in red) of the boot which include the ankle, arch area, and tongue of the skate.

Inside

Outside

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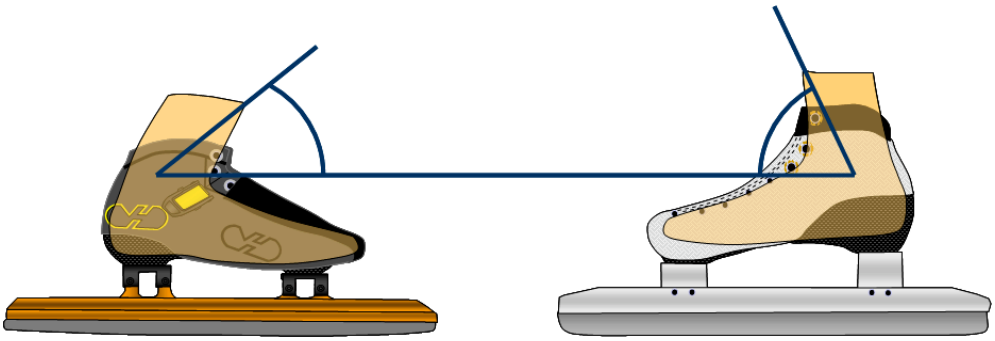
BOOT PERFORMANCE

Identified Deficiencies and Impact:

- Custom fit to execute technical skills
  - Lack of proper fit and design to develop:
    - Efficient weight transfer
    - Agility through speed of edge control
    - Critical forward flexion of ankle angle
- Custom fit and design to execute tactical skills
  - Lack of proper fit and design to:
    - Achieve optimal pivot position (through forward ankle flexion)
    - Quickly initiate passes and manipulation of track patterns
    - Achieve optimal body position to stretch at the finish line
- Lack of heat mold-ability
  - Sloppy ankle fit or painful spots
  - Inability of customizing the arch to optimally transfer power into the ice
  - No moldability in the tongue to optimally support the foot at the critical phase of force development
- Weight of boots are not appropriate for skill development
  - Current boots are too heavy for the young athletes stabilizing muscles
- Stiffness/flex in the ankle of the boot does not allow for skill development, as well as provide the optimal structural support for performance
  - Current boots are too stiff to allow the athlete to feel which edge they are on,
  - Current stiffness of the boot does not allow for development of stabilizing muscles.
  - Inability to develop kinesthetic awareness with regards to proper skate placement for effective weight transfer.

VH Boot Performance Technology

VH Short Track Boots are designed by using a custom made foot last that allows a skater to achieve the necessary “knee over skate” technical development, which translates into performance. It is important to note that the majority of manufacturers focus on inline skate development vs Speed Skating (on-ice) specific development. VH Short Track’s primary focus is on Speed Skating.



It was discovered that current developmental boots are developed by taking a custom skate and imposing the same specifications for a developmental boot. When looking at the Long Term Athlete Development (LTAD) of a skater, training programs and equipment should be appropriate for the developmental needs of the skater. Therefore, adult training programs and equipment should not be superimposed onto children/adolescent skaters.

One specific example of inappropriate use of adult equipment for children is the stiffness of the boot. This contributes to the inability of skaters to properly develop edge control, proper weight transfer, and

stabilizing muscles. Along with performance factors inappropriate boot stiffness for developing skaters can contribute to acute and major injuries as mentioned below in the safety section.
The VH boot has been developed with the optimal stiffness to develop speed skating technical skills and stabilizing muscles in developmental skaters and children. Performance speed tests where also conducted to test the structural integrity and performance capabilities of the boot. To do this National Development Team member Cory Rasmussen was selected to test the boot. After only one practice Cory was able to clock four 8.4 second laps using the VH boot, which solidified the capability of the VH boot to achieve very high performances. It is important to note that Cory's boot did not rub on the corner when performing the speed test. Interestingly enough this also suggests the need for custom boot manufacturers to conduct research to quantify the construction specifications of custom skates.

BOOT SAFETY CONSIDERATIONS

Identified Deficiencies and Impact:

- Boot height and stiffness in reference to ankle injures
    - Boot height in combination with stiffness has been shown through medical studies to be excessive, therefore resulting in ankle and lower leg injuries in Short Track (independent analysis by Dr. Andrew Quinn, MD).
- Lack of Mold-ability
    - Increase in blisters makes the athletes susceptible to infections.

VH Boot Safety Technology

With the evolution of speed skating equipment (1986-present), boot manufactures develop stock boots based on a custom model, with little research to support product development. Medical research conducted by former Canadian Team Member (short track) and World Record holder Dr. Andrew Quinn, concluded that ankle injuries in Short Track Speed Skating where at a frequency to be classified as an epidemic in our sport. Through the design of the VH boot, the speed testing also indicated that not only did the boot succeed at improving skill development, but achieved the optimal stiffness to allow for World Class speed performances, while being an industry leader in injury prevention.
Poor fitting boots have also been a major concern with the development of bursitis and bone tuberosities, which can result in long term foot damage. VH Short Track has addressed this issue by making one of the most heat moldable boots on the market, and by designing the heat moldable structure to cover all potential problem spots of the foot.

Blade Considerations

To complement the VH Short Track boot's comfort, performance, and safety characteristics requires a blade which will elicit skill development during the critical LTAD window of skill trainability. With this in mind, the blade chosen to accompany the VH boot should poses the following characteristics;

- Quality steel of at least 58rc for ease of sharpening, quality edge, and optimal glide.
- Two factors that are critical to develop skills and achieve performance is the ability to bend and off-set the blade for proper alignment and application of power to the ice.
- When considered a blade it is important that the tube of the blade allows for proper bending and adjustments as needed.
- Tube stiffness and responsiveness should be a factor to ensure that the skate is receiving the proper feedback and flex from the blade to optimize skill development, and ultimately perform better.