

## HEAD RUSH TECHNOLOGIES WHITE PAPER

# STAIR CLIMBING ELEMENTS

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One of the most dynamic and exciting Fun Climb activities is an elevated, hands-free stair climbing challenge. This white paper discusses any variation of a participant ascending on separated members of increasing height. In these elements a participant ascends until he or she completes the element and egresses, falls prematurely, or descends prematurely by will. These elements are a great test of balance and confidence.



Figure 1: Example of a stair climbing element

Due to the nature of the activity, there is a risk of an excessively slacked webbing prior to descent if a participant grabs onto the TRUBLUE Auto Belay webbing to use it to support their ascent. While ascending, participants may unknowingly pull webbing out of the TRUBLUE resulting in an excessively slacked line, unsuitable for device operation. If the webbing is not tightly retracted before descent, the participant may experience excessive swinging into objects, or even a ground fall that could result in equipment damage, serious injury, or death.

Users of TRUBLUE Auto Belays should never climb or descend with an excessively slacked webbing line. Operators should always follow operational guidelines set by their Fun Climb manufacturer and implement a risk mitigation strategy to reduce participant risk to a suitable level. Mandatory participant orientation and monitoring can lower the risk of participants pulling out excessive webbing during this activity.

#### Potential Risk Mitigation Methods

Head Rush Technologies has created a list of possible risk mitigation tactics which include, but are not limited to the following:

- **Add a permanent staff member to supervise the element**  
Description: A permanent staff member at this element may be assigned to instruct participants in proper use, warn against pulling on the webbing while ascending, and intervene when necessary.
  - Pros: Human supervision may mitigate participant risk. Supervisor will be able to intervene if participant pulls out slack manually while ascending.
  - Cons: There will be a cost of labor increase and potential activity closures. If supervisor ever stops paying attention or walks away from element, the solution may not suffice.
- **Use a dorsal clip-in point to keep webbing out of reach**  
Description: Many full body harnesses come with a dorsal connection point. Using a dorsal connection for the element may help keep the webbing out of reach for the participant.
  - Pros: A dorsal connection reduces ability for participants to grab webbing and pull out excessive slack.
  - Cons: A dorsal connection will require staff to connect participant to the TRUBLUE. This may also require additional harness purchases for locations who use harnesses without rated dorsal connection points.

- **Install a second TRUBLUE for redundancy on element**  
Description: An excessively slacked line arises when a participant pulls out webbing hand over hand while ascending. By adding a second auto belay, the user will be unable to pull out excessive slack on two auto belays simultaneously, and at least one line will be properly retracted for descent.
  - Pros: Participant can still use the TRUBLUE webbing to help balance, but they won't be able to pull excess webbing from both devices simultaneously.
  - Cons: Cost of adding a second unit
  - If set up improperly, the two webbings can get tangled during ascent which may interfere with retraction of the webbing, resulting in a slacked line. Be sure the webbings can swivel properly and are not tangled prior to clipping in.
  - Due to the additional device, the minimum weight required to descend would increase from 10kg to 20kg. **THIS DOES NOT INCREASE THE MAXIMUM WEIGHT CAPACITY.**
- **Add a support feature that participants may use to maintain balance**  
Description: A separate support feature such as a railing or hanging ropes may be considered. Always consult with your manufacturer before modifying any activity.
  - Pros: A separate support feature may offer additional balance or support when needed to minimize pulling on the auto belay webbing.
  - Cons: Participant may still grab auto belay webbing
  - If improperly installed, feature may wear against the auto belay webbing, reducing life of the auto belay webbing or affecting retraction.
  - If the support feature is a rope or line, there may be potential for entanglement between the participant or webbing and the feature.
- **Use a TRUBLUE SPEED on the element for faster retraction**  
Description: A TRUBLUE SPEED Auto Belay enables faster retraction, optimal for elements in which participants may climb quickly. A TRUBLUE SPEED will eliminate slack quickly from the line and is an option for any activity involving fast climbing in Fun Climbs. **\*Warning: A TRUBLUE SPEED does not mitigate the main hazard of certain elements where participants pull down on the webbing for support!**

- o Pros: Faster retraction means a user who is quickly climbing the element without grabbing the webbing won't have to wait for slack to be taken by the device. Additionally, it will ensure a fast slack uptake before descent.
- o Cons: Cost of upgrading auto belay.
- o The participant can still use the webbing as a support during ascent and pull out excessive slack.
- o The TRUBLUE SPEED may not mitigate the risk of an excessively slacked descent alone, but may be considered in conjunction with other tactics in an overall risk mitigation strategy.
  
- o ***A modification that allows the climber to hold onto an installed padding, and makes it more difficult to pull down the webbing, reducing the occurrence of webbing wrapping around wrists or arms of participants or additional free fall.***
- o Description: Add the black padding to cover the webbing used to connect the guest's harness to the belay device, then use duct (or electrical) tape to secure black padding. The padding must be loose enough to slide up and down the lanyard, and not impede the mandatory daily webbing inspection. In order to clearly see the harnesses is properly secured to the self-belay or carabiner, do not allow the padding to slide down and cover the self-belay or carabiner.
- o Pros: The black padding offers a cost-effective solution for preventing serious injury.
- o Cons: The black padding needs to be inspected during daily inspection. Replace the padding if there is any wear causing the piece of black padding to flex, bend, or separate.

## Conclusion

It is the responsibility of Fun Climb manufacturers and operators with planned or existing stair climbing elements to devise and implement an overall risk mitigation strategy for excessively slacked descents. Various risk mitigation strategies may include increased staff supervision, device redundancy, participant orientation, and using a dorsal connection. Always consult your manufacturer

before implementing any operational changes or modifications to the element. Since participants occasionally ascend stair climbing elements quickly, a TRUBLUE SPEED may be a superior option for this or any activity involving easy, timed, or competitive climbing where speed is likely or encouraged. None of these methods alone will fully mitigate risk, but a combination of tactics should be considered to support an overall strategy.