



HEAD RUSH TECHNOLOGIES WHITE PAPER

ADDITIONAL INFORMATION REGARDING EADS

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INTRODUCTION

Head Rush Technologies is continually working to increase education and mitigate risk in the zip line industry. Ultimately, this should improve the zip lining experience for riders and help improve zip line business operations. The recent [Emergency Arrest Device \(EAD\) White Paper](#) was written to help share industry standards, reduce risk, and create a dialogue within our growing industry. Since the release of this white paper, Head Rush Technologies has received a number of questions about our stance on EADs for lines using zipSTOP brakes. This follow-up white paper will help answer some of these questions and clarify Head Rush's interpretation of the standards.

Due to the unique nature of each zip line, Head Rush cannot recommend any particular EAD. Items such as the zip line speed, landing platform size, available space for braking, and operational considerations will have an effect on choosing an appropriate EAD. It is essential that the EAD is tested independently from the primary brake and shown to prevent serious injury or death. Below is a list of questions Head Rush Technologies has been asked regarding emergency arrest devices along with two definitions that will help clarify the answers.

DEFINITIONS

1. Guide Activated Brake

A brake that requires no input from the participant but relies on the guide to engage the brake and fully arrest the participant.

2. Guide Set Brake

A brake that automatically engages without input from the participant or guide. A guide set brake does not automatically reset and requires a guide to ensure proper brake placement before every zip line descent.

QUESTIONS

1. When a zipSTOP serves as a primary brake, can a guide activated brake be utilized as an EAD?

- A guide activated brake, when used with a zipSTOP, is not considered an EAD by Head Rush. According to Head Rush, an EAD must automatically engage upon failure of the primary brake. An EAD cannot be dependent on the participant or guide to engage upon failure of the primary brake. This is due to several reasons, including guide safety and guide reaction time. If a guide is the first participant down a line, what is their EAD? , Guide reaction time and human error can play a large role in guide activated brakes. If a guide is distracted and the primary brake fails, the possibility of arresting the participant is low. Additionally, if a primary brake fails, there is very little time for the guide to react. Please see Head Rush Technologies' [Zip Line Braking Dynamics White Paper](#) for in-depth reasons why HRT does not allow guide activated EAD's.

2. When a zipSTOP serves as a primary brake, can a guide set brake be utilized as an EAD?

- Guide set brakes may be EADs if there are operational requirements/checks that ensure proper EAD placement and there is automatic activation upon

failure of the primary brake for every zip line participant, including guides. Because of the potential for human error, guide set brakes are not encouraged by Head Rush but are allowed. A guide set brake must, at a minimum, meet ACCT standards and must:

- Be in the proper location for all participants, including guides, at all times.
- Be verified by a qualified person that the participant experiences suitable deceleration and is verified, through unmanned testing, that serious injury or death will not occur upon failure of the primary brake.

3. Does an EAD have to be separate from the zipSTOP? (i.e. the brake trolley cannot touch the EAD during standard operation)

- If the EAD is capable of independently stopping a patron while preventing serious injury or death and it does not hinder zipSTOP performance or increase rider swing up, then there can be overlap between the EAD and zipSTOP during standard operation.
 - For example: Assume a zipSTOP IR is installed as the primary brake and a suitable spring pack is installed as an EAD. It is acceptable for the brake trolley to interact with the spring pack during standard operation so long as it does not hinder zipSTOP performance or increase rider swing up. The spring pack must be capable of independently stopping a patron without resulting in serious injury or death.
 - The zipSTOP devices are complex systems and interactions between EAD's and zipSTOPs or zipSTOP IR's should be evaluated and tested by a qualified person.

4. Can a zipSTOP or zipSTOP IR be an EAD for a guide activated brake?

- A zipSTOP or zipSTOP IR can be an EAD for a guide activated brake if the following conditions are met:
 - The zipSTOP or zipSTOP IR is only engaged once the primary brake has fully stopped the participant during standard operation or upon failure of the primary brake.
 - All participants, including guides, must receive primary braking from the guide activated brake. Guides cannot rely on the zipSTOP or zipSTOP IR as the primary braking method.
 - The installation meets all requirements of the zipSTOP Zip Line Brake Installation, Operation & Maintenance Manual.

5. Can a zipSTOP be an EAD for hand braking participants, including guides?

- Hand braking, as a primary braking method with a zipSTOP installed, is not recommended by Head Rush Technologies since there are many instances where hand braking cannot or is not properly performed by a participant or guide. These include, but are not limited to, gloves falling off, participants forgetting to brake, participants choosing not to brake, braking improperly, or the loss of consciousness of the participant. Since Head Rush does not recommend hand braking as a primary braking method, a zipSTOP or zipSTOP IR cannot be used as an EAD for hand braking.

6. Do EADs used for zipSTOP and zipSTOP IR installations need to meet ASTM and ACCT or can they meet one or the other?

- If zip line emergency braking complies with ASTM F2959-16 then no other requirements need to be met. If zip line emergency braking only complies with ACCT then the EAD must also:
 - Be verified by a qualified person that the participant experiences suitable deceleration and is verified, through unmanned testing, that serious injury or death will not occur upon failure of the primary brake.
 - Please note that while ACCT recognizes guide activated brakes as emergency brakes, Head Rush Technologies does not. Guide activated brakes most likely do not provide emergency braking for the first guide down the zip line and are too prone to human error to be considered a viable emergency braking technique by Head Rush. A guide activated brake cannot be used as an EAD for a zipSTOP or zipSTOP IR installation.

7. Can Head Rush Technologies tell me if my emergency brake is a suitable EAD for use with zipSTOP and zipSTOP IR?

- Head Rush cannot qualify or disqualify an EAD because every zip line installation is unique and different. What works for one zip line may not work another. Since Head Rush is the zipSTOP Brake manufacturer, a single part of the braking system and zip line as a whole, Head Rush cannot perform the necessary testing to ensure the zip line is ACCT and/or ASTM compliant. Therefore we rely on installers, operators, and inspectors to ensure that the zipSTOP Brake is installed/operated per ACCT and/or ASTM standards and the zipSTOP Operators Manual. For more information on how to test an EAD see Head Rush Technologies [Braking Dynamics White Paper](#).