



Best Practices for Development and Rebolting in the Bighorn Mountains and Bighorn Basin

Foreword:

The development of rock climbing routes in the Bighorn Mountain region is a fantastic opportunity to provide rich and varying climbing experiences to the public. We are lucky to have such an incredible amount of fantastic rock, from beautiful alpine granite to the endless cliffs of Bighorn Dolomite. It is our duty as developers, rebolters, climbers, and outdoor stewards to respect and protect the great climbing resources, and to ensure proper and safe use of the rock.

Although many of us have different methods of developing and rebolting routes, we can, and should all agree that an ethical form of development is one that does not include any sort of “manufacturing” of holds. We must all be able to agree that development on Bighorn stone must involve minimal destruction to the rock, and must preserve the geological recourse whilst also providing safe climbing opportunities to those who are seeking such an experience. Routes must be developed and updated with safe, corrosion-resistant hardware, and developers must do their part to protect the climbing resource.

Rebolting historical and previously developed routes in the Bighorns is a necessary and beneficial undertaking. I would hope that everyone interested in the development of new lines is equally interested in benefiting the community and safety of other climbers by rebolting and equipping routes with safe, modern hardware. Through the Bighorn Anchor Initiative, the Bighorn Climbers' Coalition continues to pay for state-of-the-art climbing hardware for community use in rebolting routes. The BCC has kept track of rebolting efforts in the greater Bighorn Area, and through the help of volunteers and climbing stewards, we have been able to replace thousands of dangerous/out-of-date climbing bolts and anchors in the area. The continued support of volunteers and donors is what keeps the BAI alive. We are eternally grateful for all of the work and support that people have given to make the Bighorns a better place to climb.

It is my hope that through this document, continued discussion of development ethics, and through the conjoined effort of climbers, developers, land managers, and the public, we can continue to develop and manage rock-climbing routes in the Bighorn region in a safe and responsible manner.



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Personal Responsibility:

Climbing is an inherently dangerous activity. The use of any previously installed anchors or equipment to protect climbers has inherent risks that cannot be removed, and are assumed entirely by the user. Holds break, rocks fall, and equipment fails. Users are entirely responsible for their safety and the risks associated with climbing.

Living Document and the Community:

A lot has changed in climbing throughout the years. Technology gets better, and ethics may change. This document represents the current consensus of the local climbing community and the BCC. If new technology of protection is developed, for example, the community consensus for rebolting new routes may change to incorporate said hardware, and this document should be updated to reflect these changes.

It is important to realize that the BCC is not an enforcement organization. We will not “enforce” anything in this document, although for the safety of other people, we hope that you will not simply ignore this document and continue developing with non-consensus hardware. Although, it should be noted that manufacturing IS indeed ILLEGAL. Manufacturing of any sort can be enforced by some land managers and government organizations, and it is your responsibility to be aware of the consequences.

Best Practices for Route Development:

- Climbing routes are established only where not prohibited by land management or property owners, and in accordance with authorization if required.
- It is accepted and often necessary for the safety and quality of climbing to soften sharp edges, lips and teeth with a file or hammer. The goal here is to make the feature less sharp or dangerous and more comfortable to use generally, not to change the nature of the hold to where it is more possible or easier to use. Removing



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sharp edges will prevent abrasion of the rope and possible damage to the climber and equipment upon contact.

- Spacing between bolt anchors on routes that are established is consistent and provides adequate protection for a lead climber. Bolts should be placed in sound-rock where they are easy to clip and are spaced evenly to prevent injury during climber falls.
- Loose rock is removed from its natural position only when: it is done without creating a hazard for other parties; it poses a significant risk to the climbing party or future climbing parties, and it is done without significantly damaging other routes or resources.
- Cleaning a route of excessive dirt, vegetation, and pebbles is necessary for the safety and quality of the climb. Surface dirt and debris should be brushed or blown from climbing features where possible. It is accepted to remove loose or unconsolidated ash, dirt, pebbles, and sand from the route, including inside of pockets, cracks, ledge systems, and other holds.
- Helmets are worn to reduce the hazard of falling or dropped objects. All tools are secured with a backup to the harness, to prevent the dropping of tools and objects. Personal Protective equipment should be used i.e. eye protection, and masks, (specifically on limestone routes where silica is present and extremely dangerous to inhale).
- Route development work is timed and/or communicated to not create a hazard or adverse experience for other users. This “communication” can include signs at trailheads, cones, or other warning signs for development.
- Bolt anchors are not physically blocked, chopped, adversely affected, or removed to prevent access by other users.
- Permanent anchors should be made up of 2 bolts and allow for safe lowering once a climb is completed. Care should be taken to locate anchors to where ropes do not



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see significant abrasion from rock surfaces. Anchor bolts should not be more than 6 inches apart unless the rock does not allow for relatively close placement. This prevents unnecessary wear and coiling of the rope and allows the climber to go “in-direct” to both anchor bolts simultaneously. Avoid “sharing anchors” of routes to prevent clutter and backup if climbers use both routes simultaneously.

- The use of temporary bolts such as tapcons is a necessary part of developing severely overhung routes, however, the use of temporary hardware should be mitigated, and any unused holes should be camouflaged, while unused temporary anchors are removed after development.
- New routes should be installed with a density that does not adversely affect surrounding routes. Squeeze jobs, “grid bolting”, and unnecessary variations are discouraged.
- The developer/rebolter is never putting themselves or others at risk.
- Manufacturing, chipping, creating or placement of artificial holds is not authorized. Adhesive may only be used to restore a broken hold on an established route. Although a certain amount of “comfortization” is required on rock, especially the sharp dolomite in the Bighorns, excessive comfortization of holds, or manufacturing of new holds, is unethical and prohibited. (Refer to appendix A. for photo examples of manufactured and overly comfortized holds).
 - Manufacturing and chipping of new holds on a route is unacceptable.
 - A drillbit should ONLY ever be used for drilling holes for protection bolts and anchors.
 - A drill should NEVER be used to “comfortize” a hold.
 - Holds should NEVER be purposefully “expanded” by a drill or any other tools (Ex. Deepening a “mono”, or creating a 3 finger pocket from a 2 finger pocket, etc.)
 - Holds should NEVER be comforted with the use of sika/glue.



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- Gluing new holds onto the wall is unethical and destructive to the climbing resource. Consult BCC or land manager should a “crucial hold” break off of an established route.

Anchor and Hardware Specifications:

- Bolt anchors are a minimum of $\frac{3}{8}$ " (or 10mm) bolt diameter
- Bolt anchors are a minimum of 2 $\frac{1}{4}$ " length in solid rock types (refer to rock-specific development practices). Longer length bolts should be used in softer rock types.
- Screw-links and connectors are a minimum of 5/16" (or 8mm) diameter and markings indicate quality controlled manufacturing of hardware.
- Stainless steel, corrosion-resistant hardware should be used.
- Bolt anchors are installed to allow for monitoring and possible future maintenance or replacement.
- Modern hangers should be used for bolt anchors. This is developer-specific, but it is important that hangers are safe. For reference, visit <https://www.accessfund.org/learn/for-advocates/managing-fixed-anchors/bolt-basics-what-every-climber-should-know>
- Bolt anchors are camouflaged with paint prior to installation to reduce visual impact. Paint is not used when contrary to the manufacturer's instructions for installation.
- Screw-link connectors, “perma-draws”, and steel carabiners are used for fixed protection only on severely overhanging routes where removal between ascents is not reasonable.
- Textile slings or cords are not to be used for permanent anchors.
- Ropes used for establishing or maintaining routes are removed when not in consistent use, or if affecting access to other routes.
- Holes used for bolts should be brushed, blown, and clean to increase the integrity of the hardware and to prevent corrosion.



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Tools and Usage:

This is not a comprehensive list of all equipment used for the development and rebolting of routes, rather a list of tools commonly used and the purpose for their use. Any one of these tools used improperly could result in manufacturing or illegal development tactics. It is important that regardless of the tool used, we are avoiding dubious development techniques.

- Hammer - for placing bolts and the dulling or removal of sharp points on rock features.
- Power drill - for the placement of bolts only. Once bolts are installed, this is no longer used.
- Crowbar - for removal of loose rock when needed.
- Electric Blower - to blow off surface dust and to assist in cleaning debris and dirt out of pockets and cracks.
- Blow tube or pump blower - to clean out bolt holes and pockets.
- Natural or synthetic bristle whisk broom or brush - to clean surface dirt off the rock.
Excessive brushing, particularly with a metal brush can damage and polish rock surfaces and must be avoided.
- Screwdriver - for use as a mini-crowbar and to assist in cleaning cracks, pockets, and other rock features.
- Metal file - used to soften the edges/lips of pockets or other rock features.
- Epoxy - For use with the installation of glue-in bolts. Not OK for shaping holds, adding holds, or creating prosthetic holds.

Consensus Anchor Specifications for Limestone Route Development:

Developing with state-of-the-art hardware is especially important on softer rocks, such as sandstone and limestone. Bighorn dolomite and other types of limestone make up the significant portion of the developed rock in the Bighorns. Therefore it is important that the community consensus is to develop using the best hardware available to ensure safety and prevent routes from



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needing rebolted soon after development. The most important factor is developing and rebolting with stainless steel hardware only.

- On limestone, it is important to bolt with longer-length hardware. We recommend bolts with a length of at least 3 ½”.
- Glue-in ½” diameter, 3 ½” length stainless steel wave bolts, and glue-in ½” diameter, 3 ½” length stainless steel twist bolts are the safest, longest-lasting, and most ideal bolts for limestone for most cases, and the BCC recommends the use of glue-in style bolts, however, the use of 5-Piece Stainless steel powers bolts with a minimum length of 2 ¼”, or stainless steel wedge bolts of a minimum length of 3 ½” are viable options for route development on limestone
 - Stainless steel hardware should always be used to prevent corrosion and water damage.
 - Zinc plated hardware should not be used.
 - We recommend the use of glue-in bolts on limestone.
 - Glue-in bolts are significantly more corrosion resistant than other types of bolts, especially in Limestone.
 - Glue-in bolts are stronger than most other bolts used for climbing.
 - Glue-in bolts do not have any “moving parts” and therefore do not require any tightening over time.
 - Glue-in bolts have a smaller protruding metal surface from the rock and are easier to camouflage.
 - Glue-in bolts provide many advantages over commonly used wedge bolts. Wedge bolts have many moving parts which are prone to loosening and wear, are weaker in softer rock than glue-in bolts, and are less resistant to corrosion from both water and limestone contact. Although our rock is not necessarily prone to quickly corrode hardware, using stainless steel glue-in bolts is the best way to mitigate corrosion.



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Consensus Anchor Specification for Granite Route Development:

Granite is naturally a much harder rock than limestone and sandstone, although there are exceptions to this rule. Granite in the greater Bighorn area tends to be well consolidated and strong, therefore, shorter lengths of bolts and other types of bolts may be used to effectively protect climbs. Use your best judgment.

- Stainless steel wedge bolts of diameter $\frac{3}{8}$ " or greater, length of $2\frac{1}{4}$ " or greater, Stainless steel 5-piece powers bolts of diameter $\frac{3}{8}$ " or greater, length of $2\frac{1}{4}$ " or greater, and glue-in twist/wave bolts of diameter $\frac{3}{8}$ " or greater, length of $2\frac{1}{4}$ ' or greater are all effective forms of bolted protection in solid granite and should be used to develop on granite.

Rebolting and Maintaining Previously Developed Routes:

The BCC provides hardware for route rebolting through the Bighorn Anchor Initiative. The BCC will always provide the current state-of-the-art hardware. If you are providing your own hardware for rebolting routes, it is best practice to rebolt the routes using the same hardware as mentioned above in the anchor specification sections.

- Rebolting should only occur if authorized by the land manager/owner. (Refer to Bighorn National Forest Rebolting Document at: <https://www.fs.usda.gov/activity/bighorn/recreation/climbing>).
- Rebolting should be done hole-for-hole when applicable (it is not always possible, and this is understandable). If this is not applicable, bolts should be replaced near their original position. Many tools exist to remove bolts from their original hole, to allow for reuse of the hole. The BCC manages the use of numerous "Hurley-Junior" bolt removal devices. Please contact us if you require the use of one for rebolting a route.
- Unused bolt holds or old sleeves/studs should be removed. If this is not possible, the remaining hardware or hole should be camouflaged in some way.



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- Heavily reworking routes (changing the position of bolts), adding bolts, or minor comfortization on previously established routes should only be done with permission from the original developer, or with a community consensus, should the original developer not be available for contact.
 - Report anchors in poor or damaged condition to the BCC at info@bighornclimbers.org and to the land manager.
 - Route maintenance work is timed and/or communicated to not create a hazard or adverse experience for other users.
 - Climbing and/or industrial rope descent and ascent systems are used according to the manufacturer's instructions for access, fall protection, and positioning.
 - Helmets are worn to reduce the hazard of falling or dropped objects. All tools are secured with a backup to the harness, to prevent the dropping of tools and objects.
 - Secondary rope systems, lanyards, and/or rope protection sleeves are used to reduce the hazard of cutting tools/ropes while suspended.
 - The developer/rebolter is never putting themselves or others at risk.
 - Anchors are minorly staggered to prevent wear on BOTH anchors simultaneously.
 - Depending on whether routes rebolted with glue-in bolts are given 24-48 hours to cure before any lead attempts are completed.
 - We recommend the use of one 5-Piece SS powers bolt, and one glue-in bolt for the anchors. This allows the rebolter to safely descend the route without giving the glue a considerable amount of time to cure. The rest of the protection bolts should be stainless steel glue-in bolts.



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