

# New Zealand Alpine Club

## Bolting Philosophy and Standards (for Route Developers)

December 2017

### Introduction

This document sets out the NZAC's philosophy and standards for bolting (fixed anchor) practices and hardware. It forms part of the NZAC's Rock Climbing Access Framework, which aims to establish and maintain positive and sustainable relationships between landowners, route developers, climbers and other land users to ensure ongoing access to rock climbing in New Zealand.

This document does not contain comprehensive instructions on how to place bolts safely. Proper training should be completed by route developers and climbers before undertaking any of the activities described in this document. NZAC run bolting workshops; contact NZAC for details.

### Bolting Policy

1. Climbing is an appropriate activity and fixed anchors are necessary tools for climbing.
2. Some level of fixed anchor use shall be allowed wherever climbing is allowed, and that the appropriate level of use should be established on an area by area basis, by landowners, route developers, climbers and other land users.
3. Climbers should bear the responsibility, in accordance with land management regulations or agreed access rules, for determining when and where to place and replace fixed anchors, and how to use these tools.
4. Fixed anchors should be placed/replaced in accordance with NZAC Bolting Philosophy & Standards, as applicable to the relevant area.
5. Climbers assume personal responsibility for the safety of any bolts that they use.

### Ethical Standards

NZAC encourages all climbers/route developers to act reasonably and ethically when establishing climbs and placing/replacing of bolts as follows:

1. Respect and minimise impact on environmental, cultural and other values.
2. Respect the finite natural resources available to climbers.
3. Be safe at all times.

### New Crag/Route Development

In addition to the general ethical standards above, NZAC encourages all climbers/route developers to act reasonably and to consider the following specific matters before commencing any new crag or route development:

1. Is the crag or route worth developing, from a climbing perspective? Factors to consider include:
  - scale (height and/or crag density),
  - rock quality and cleanliness,
  - style of climbing,
  - proximity to other sectors or areas.

Also consider related factors such as transport, accommodation and services options. All of these factors will impact likely future use and/or the value the climbing community places on the crag or climb.

Avoid excessive use of bolts, development of contrived, insignificant or 'squeezed in' climbs, and chipping. Respect established area ethics/styles for route development or obtain community support for changes to those ethics/styles before acting. Do not retro-bolt without community support

2. Do you have permission from the landowner or manager? NZAC does not support crag development without appropriate permissions. NZAC can help with advocating for permission.
3. Is the crag or route in an environmentally or culturally sensitive area? If you do not know the answer, do not proceed with development. Avoid any development that



- has undue impact on other users or user values.
4. Will development require vegetation removal, or impact species such as birds, skinks and geckos? If so, consider what species or types of vegetation are likely to be impacted. Avoid any development that would require significant vegetation removal or otherwise impact rare or sensitive biota.
  5. Can you develop crags or route properly? Adopt good technical practices/standards (see below) for the relevant area.
  6. Can you safely mitigate the risks and effects of crag or route development – both during the development phase and afterwards? Do not conduct development activities in circumstances where people or property could be harmed. Ensure all manageable crag hazards (eg. loose flakes) are properly managed – users will expect route developers to have taken reasonable steps to make the crag area safe. Avoid dangerous under-bolting, do not develop routes with loose rock or other unmanageable natural hazards.

### Technical Standards

#### Soft Rock:

Ignimbrite (eg. Whanganui Bay)  
Limestone (soft) (eg. Castle Hill)  
Rhyolite/Andesite (soft)  
Schist (soft)

#### Bolt type

Use only glue-in bolts. NZAC recommends use of [P bolts](#).

Minimum physical dimensions:

- 10mm diameter
- 100mm long
- Notched or crosshatched shaft

Use only strength-rated equipment – never use unrated chain, mallions or other anchor components. Minimum rating for components:

- 25kN in shear
- 15kN tension

(refer AS/NZS1891.4)

#### Glue

NZAC recommends the use of epoxy glues for bolt placements. Epoxy glues are generally superior to other construction glues (such as polyester-based glues) in terms of design life, bond and seismic strength. In some areas (such as marine environments) only certain types of epoxy are recommended.

**Proper training on how to correctly place glue-in bolts is essential.** Key steps to remember:

- Diameter of hole should exceed bolt diameter by 2mm
- Hole must be thoroughly cleaned (with brush and blower)

#### Hard Rock:

Basalt (eg Long Beach)  
Granite (eg Darrans, Borland)  
Gneiss (eg Charlston)  
Greywacke (eg Sebastopol)  
Limestone (hard) (eg Fyfe river gorge)  
Rhyolite/Andesite (hard)  
Schist (hard)

#### Bolt type

Glue-in bolts as per soft rock or mechanical bolts with minimum physical dimensions:

- 10mm diameter
- 75mm long

NZAC recommends the use of tru-bolts. If dyna-bolts are used, the minimum diameter should be 12mm.

Use only strength-rated equipment – never use unrated chain, mallions or other anchor components. Minimum rating for components:

- 25kN in shear
- 15kN tension

(refer AS/NZS1891.4)

**Proper training on how to correctly place mechanical bolts is essential.** Key steps to remember:

- Diameter of hole should match bolt diameter
- Hole should be over-drilled by 15-20mm, to enable the bolt to be hammered in if necessary
- Hole must be thoroughly cleaned (with brush and blower)
- Nut should be tightened with a calibrated torque wrench in order to avoid plastic deformation of the material and to keep axial stress at moderate levels.



- Eyelet on P bolts must be countersunk by 3-5mm to mitigate any rotational force applied to the bolt

### Metals

Use of appropriate metals is essential for safe anchors.

NZAC endorses the UIAA Safety Commission warning regarding stress corrosion cracking (SCC). In areas where SCC has occurred or where all risk factors are present, UIAA recommends use only of Titanium Grade 2 anchors. In areas with no incidence of SCC, Stainless Steel 316L Grade is recommended. For more information, including on risk factors, refer [UIAA](#).

Bimetallic corrosion can also affect the integrity of bolts. Do not mix metals (eg. stainless bolt, non-stainless hanger, or chain).

### Anchors/belay stations

An anchor should comprise two bolts with attachments that enable a user to abseil off and not damage the rope: i.e. ring bolts, cold-shut lower offs, or hangers with rap rings. Consider installing replaceable lower-off equipment.

Anchor bolts should be level, set between 20 and 25cm apart.

### Placement

Good bolts require careful placement. There are many practical and ethical/stylistic factors to consider:

1. Only place bolts in solid rock that is part of a significant stratum, not in a block system and not near or on lines of weakness, joins, lips or edges.
2. Avoid placements that cause equipment attached to a bolt (e.g. carabiner, sling) to be exposed to the risk of cross-loading and/or unnecessary and dangerous wear.
3. All bolts should be set perpendicular to the surrounding rock surface, even on steep/overhanging rock.
4. Wherever possible, bolts should be able to be clipped from a safe stance/position.
5. Anchors should be set at logical points. Do not place an anchor at a height longer than half a standard rope-length (currently 60m), unless a midway anchor is also placed. For multi-pitch routes, anchors should be no more than 60m apart.
6. When choosing the placements, consider the potential for rope-drag—for both climbing and abseiling.
7. Closely-spaced bolting can make for great beginner climbs but it can also be unsightly and/or reduce the quality of the climbing experience for others. Sparse bolting can make for exciting, committing climbing but it can also be dangerous. Consider rock type and quality, local 'styles' or ethics, likely user group and the long term impact before determining bolt spacing.

### Anchor inspection/maintenance

Climbers are responsible for checking the safety of bolts that they intend to use. If an issue is identified (such as corrosion, cracking, dangerous placement etc) speak to NZAC or local climbing group.