



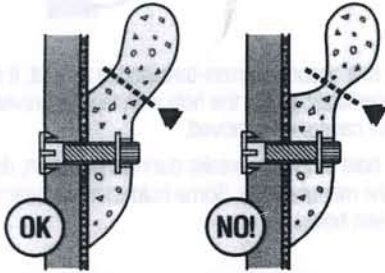
## WARNING!

Artificial climbing holds break! Climbers should be aware of the potential to fall from a climbing wall if a hold breaks. Provide spotters for climbers and be sure that proper landing surfaces have been installed. A hold that breaks during climbing could fall and strike a belayer or an observer. Belayers may consider wearing helmets and should stay out from beneath climbers when possible.

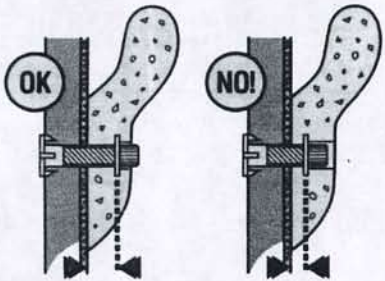
## WHY CLIMBING HOLDS BREAK

Over-tightening, uneven wall surfaces, previous damage, poor design, ultra-violet degradation, excessive force, use of an incorrect bolt and normal wear and tear can all cause a hold to break. While most hold breakage occurs during installation, holds can also break when in use. The route setter has the responsibility to inspect each hold for potential problems before installation. It is important to select holds that are designed to sustain the intended load without breakage. For example:

! Holds with thin cross-sections need to be thick enough to bear the expected weight.



! Center sleeves should be tall enough to prevent failure behind the washer or in the center sleeve area.



### Route Setting and Hold Use

- Employ experienced route setters.
- Route setting in commercial facilities should be done during off-peak hours or when the facility is closed. Reduce liability by closing off the route setting area to the public.
- Inspect holds for cracks or damage before starting to set the route.
- Keep holds clean so that cracks are easily spotted.

- Avoid using poorly designed holds, such as holds with sharp edges or burrs.
- Never install a damaged hold.
- Orient holds in a direction that reduces the chance of spinning.
- Double check holds for tightness.
- Don't set a route that exposes a climber to unexpected falls, or falls onto other climbers or objects.
- Set cruxes and other difficult moves in the middle and top sections of the climb.
- When setting lead routes, provide stances from which the leader can clip the quick-draw.
- Refrain from setting moves that could cause finger injuries. For example, use mono-pockets sparingly and avoid pockets that could catch a finger during a fall.
- Keep the landing area clear of bolts, holds, or other debris.
- Take care not to drop holds, as this may damage the hold or injure someone below.

### Bouldering

- Set the most difficult part of the route low to reduce the height of a fall.
- Avoid setting bouldering problems that are too far from the ground. The accepted industry average height for bouldering walls is no more than 12-14 feet from the ground.
- Create bouldering problems that end low to the ground.
- Always provide adequate landing surfaces.
- Encourage the use of a spotter, especially for cruxes and on hard problems.



—REMEMBER—

**YOUR SAFETY IS YOUR RESPONSIBILITY.**

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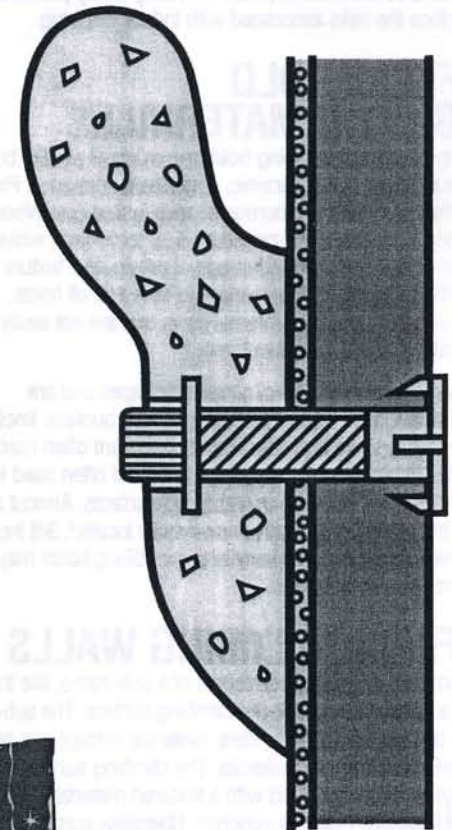
**ORCA**  
The Trade Association  
of the Outdoor Industry

CWIG promotes the safety of the climbing public through education, testing, research, and the establishment of standards for the industry.



# Artificial Climbing Holds

Information on the design, use, maintenance and limitations of artificial climbing holds.



Climb Smart! is a public information program of ORCA, the trade association of the outdoor industry.



## WARNING!

Indoor and outdoor climbing are different activities and each require their own techniques and safety procedures. While similarities exist, the objective dangers are different. Professional instruction should be sought to learn proper outdoor climbing techniques.

Artificial Climbing Holds (also called hand holds or foot holds) are an integral part of indoor climbing walls. When used in conjunction with climbing walls, holds can provide climbers a training alternative to real rock, newcomers a chance to learn the basics of climbing, and recreational groups an opportunity to try the sport in a controlled environment. Anyone using artificial climbing holds should be familiar with their use and limitations. Users should also understand proper climbing safety practices in order to reduce the risks associated with indoor climbing.

## ARTIFICIAL HOLD DESIGN AND MATERIALS

The majority of artificial climbing holds are made of plastic, but can also be made of wood, ceramic, concrete, or real rock. Plastic holds can be produced in numerous shapes and colors. Wood holds are generally known for providing a softer texture, while holds made of rock have the advantage of providing a texture that duplicates the real thing. It is important to note that all holds, especially wood, may contain internal flaws that are not easily detected and can cause a hold to break.

Holds are available in a variety of sizes and shapes and are grouped in categories such as: crimps, pinches, buckets, knobs, slopers, handlebars and pockets. Smaller holds are often used for more difficult moves, while larger holds are most often used for easier climbs or are placed on overhanging surfaces. Almost all holds affix to climbing walls with one centrally located, 3/8 inch, 16-thread per inch bolt. Some very large or oblong holds may use two or more bolts or screws.

## ARTIFICIAL CLIMBING WALLS

Climbing walls are typically constructed of a sub-frame, like the framing of a house, and a rock-like climbing surface. The sub-frame may be made of wood or steel, while the surface can be made of various composite materials. The climbing surface can be made of plywood that is coated with a textured material. It can also be made of concrete, resinous concrete, fiberglass composite, polyurethane or similar materials. The simplest walls are often made by attaching holds to concrete cinder block walls, towers made of 2x4s or 2x6s, or 3/4 inch plywood attached to a frame.

Most climbing walls incorporate T-nuts, pallet nuts, or threaded inserts, which are used to attach the hold to the wall.

exploring the possibility of building a commercial climbing wall should consult and adhere to the CWIG (Climbing Wall Industry Group) Specifications for Artificial Climbing Walls. These guidelines provide information for the determination of live loads and structural requirements for anchor points. For more information about climbing walls and design standards, contact CWIG through ORCA, the trade association of the outdoor industry.

## CLIMBING WALL TEXTURES

Many textures are available for climbing walls. Sand mixed into paint, acrylic climbing wall textures, resinous concretes, and regular concretes such as gypsum mixes are just a few of the options available to coat a climbing wall subsurface. Also available are pre-fabricated climbing wall panels, which are assembled into a continuous climbing wall surface. Whatever the climbing surface, it is helpful if the area around the T-nut is flat and even. This helps reduce hold breakage and makes seating the hold as simple as possible.

## BOLTS AND T-NUTS

Four types of bolts are generally used to attach artificial holds to climbing surfaces: the cap screw bolt, the flat head bolt, the hex head bolt, and the button head bolt. Bolts and T-nuts come in both plated (silver) and non-plated (black) versions. Plated versions should be used if moisture and corrosion are a concern. Questions regarding what type of bolt to use with a hold should be directed to the manufacturer. Route setters should be familiar with the correct type of bolt to use with each hold, as incorrect bolt use can result in hold breakage or injury to the climber.



Flat head bolt, hex head bolt, socket head cap screw, button head bolt.

## INSTALLATION OF CLIMBING HOLDS

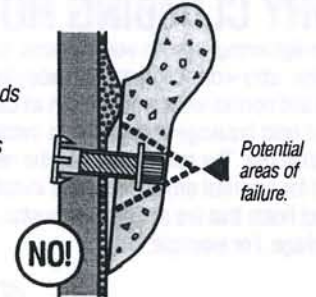
Correctly installing holds onto a climbing wall can reduce the frequency of broken holds and the potential for injuries. In addition to selecting the correct hold to create the desired climbing route, it is important to consider the amount of force (torque) needed to secure the hold to the wall. Due to the infinite variety of hold styles, wall texture types, and center sleeve configurations, torque values will differ for every hold.

### Basic guidelines for installing a hold are as follows:

- Check the hold's center sleeve design as it dictates which type of bolt will be used. Mismatching center sleeves with the incorrect type of bolt may cause the hold to spin or break.
- Tighten the bolt snugly until the hold will not rotate, and then tighten another partial turn, giving careful attention not to crack the hold.

- Once installed, there should be at least 3/4 inches of bolt inserted into the threads of the T-nut.
- Allow the hold to settle for a minute, and then check that it is still tight. If not, re-tighten the hold. The amount of force used to seat a hold is an acquired "feel" and should be enough so that the hold cannot rotate during use, but not so much that the hold breaks.
- When in doubt, consult the installation instructions provided by the manufacturer.
- If the T-nut pops out of the wall or the threads are damaged, replace the T-nut or contact the manufacturer for assistance.

**!** Make sure the threads of the bolt and T-nut are clean, and that the T-nut is perpendicular to the wall.



- If a bolt becomes cross-threaded in a T-nut, it should be removed immediately. Cover the hole with tape to prevent future use if the T-nut cannot be removed.
- If a hold cracks or breaks during installation, discard or return it to the manufacturer. Some hold manufacturers may warranty broken holds.

## HOLD MAINTENANCE

Washing holds periodically will remove chalk build-up and excess shoe rubber, and will also help restore the original texture. Texture may permanently wear off the surface of the hold with continued use. Wash holds in a mild detergent, either with a nylon brush or in a dishwasher.

Alternatively, they can be soaked or cleaned in a diluted muriatic acid or citric acid solution. Acids can be very dangerous, so be sure to read and follow the manufacturer directions carefully. Inspect holds for cracks or chips while washing them, and immediately retire those that are damaged.

**DISCLAIMER:** This brochure is meant only as a guide. When using artificial climbing holds always follow the manufacturer's instructions, and consult with experienced route setters as a rule.