TRI-CAM

C.A.M.P. TRI-CAMS are the result of many year's evolution in cam nut design.
You'll find C.A.M.P. is TRI-CAMS to be the most versatile artificial chock stones you've ever used.
With a little practice TRI-CAMS allow easy secure one-hand placement in normal and exotic situations. In addition to protecting you where conventional nuts will work, TRI-CAMS will protect you where absolutely nothing else can. The TRI-CAMS design create a stable tripod with the two parallel camming rails flat against one side of the crack and the fulcrum point contacting the opposite side. This tripod can be set solidly with a downward jerk on the sling. TRI-CAMS are easily removed even after a fall. Parallel-sided cracks shallow holes, horizontal outward flares, Bombay flares - all are TRI-CAM placements! Eleven overlapping sizes fit cracks from 10 mm to 140 mm. Sizes 0,125 through 4 TRI-CAMS are forged, and 5, 6 and 7 are stamped. The bodies are hardened aircraft aluminium with stainless steel sling retaining pins. Each TRI-CAM comes equipped with a sewn sling.

Why Tri-Cams ?

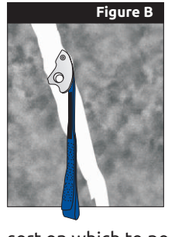
Although spring loaded cams are convenient, they have several drawbacks. Mechanical complexity makes them susceptible to breakage, They are expensive both to manufacture and to buy. They have the unwanted tendency to walk deeper into cracks, and in other ways too, resist extraction. Spring cams also cannot be used in many normal nut placement. The TRI-CAMS is the first single piece cam nuts that really work.

Method of placement

Figure A

Normal:
TRI-CAMS work very well as a normal nut in constricted cracks. (**Fig.A**). The tri-pod configuration actually allows a placement that in most cases is more secure than a conventional nut. Use the cam channel to straddle a bump or rugosity.
ALWAYS MAKE CERTAIN THAT BOTH CAM RAILS ARE CONTACTING THE ROCK, as well as the fulcrum point do that a true tri-pod is achieved.

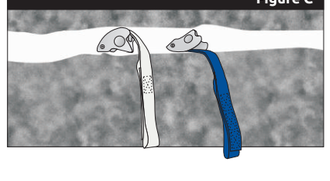
Figure B



Standard:
In a vertical parallel-sided or flared crack, place the TRI-CAM as in **Fig.B**. Cock the TRI-CAM by running the sling down the cam channel. Look for a rugosity of some sort on which to position the fulcrum point. (This is not absolutely necessary, but often makes the placement more secure). Give a good jerk on the sling to set the nut.

Horizontal: Fig.C.
In horizontal (or diagonal) cracks you have a choice of positioning the TRI-CAM fulcrum up or fulcrum down. Neither way is best in all situations.

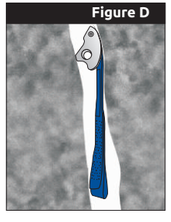
Figure C



Sometimes if you're climbing directly above the placement, fulcrum down will offer the greatest security. At other times (when traversing or angling away from the placement) it's best to have the fulcrum up. But there are no hard and fast rules for this.

Tight Fit Camming:

Figure D

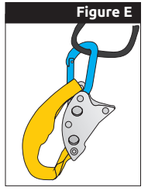


For parallel-sided cracks there is an additional effective camming mode in which TRI-CAMS may be used. As in the **Fig.D**, if the TRI-CAM fits tightly into a crack in the attitude shown, a small camming effect is created, enough so that good protection is afforded.

Other Placements: TRI-CAMS are the most secure form of protection available when used in icy cracks or cracks formed by ice and rock. Just make certain to use the largest size of TRI-CAM possible, as under the weight of the sling and carabiner alone the fulcrum point will melt into the ice until the cam shoulders contact the ice. Take this into consideration when arranging a belay, and don't apply long term strain to a TRI-CAM used between ice and rock. TRI-CAMS work very well in holes, flares, up under flakes, and so on. Always remember, however, to ascertain that both cam rails and the fulcrum point are in contact with the rock, otherwise the TRI-CAMS will be unstable.

Leading
Please do not learn to use TRI-CAMS on a lead. TRI-CAMS require some getting used to. An analogy may be drawn with climbers who grew up with pitons, making the switch to nuts. At first nuts seemed insecure, but as familiarity grew their advantages became evident.

Figure E



Racking:
Sizes 0.125, 0.25, 0.5, 1, 1.5, 2, 2.5, 3, 3.5 and 4 TRI-CAMS may be carried singly or in multiples on carabiners. But the larger sizes are best carried by clipping the sling and the channel pin that is located near the cam shoulders, through the carabiner. This keeps the TRI-CAM from swinging down around the knees (see **fig.E**).

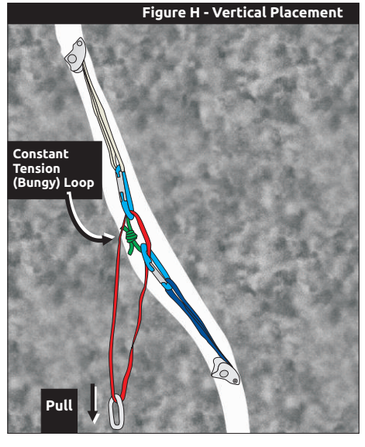
Figure F

One Handed Placement
Practice removing TRI-CAMS from your rack with one hand and cocking the sling into the cam channel until the necessary motions come naturally. This is a skill that must be acquired before you get out on a difficult lead (**Fig.F**).

Directional Considerations

When used as a normal nut in a crack with a constriction, TRI-CAMS are usually more directionally stable than most conventional nuts because of the ability to "key" the cam rails over an irregularity. However, when used in their normal camming mode in some placements they must be carefully runnered, and/or used in opposition to each other. You must consider how the forces of a fall will be transferred by the rope, not only to the top nut, but also to those below (see **Fig.H**). It is possible to wedge a TRI-CAM more securely in place by giving it a tap or two downward near the "Stingers" with a nut tool or hammer, but this is using a TRI-CAM as a piton. When used in the "tight-fitting" attitude, TRI-CAMS are very secure and will resist considerable outward and even upward force, once you've set them with a good jerk on the sling.

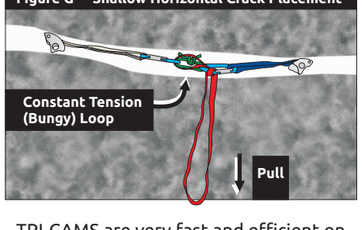
Figure H - Vertical Placement



Constant Tension Loops:
It's a good idea to carry three or four loops tied from 2" lengths of light-weight elastic (bungy) cord. These loops can be used to exert a constant tension between TRI-CAMS (or a TRI-CAM and another anchor) used in opposition to each other (see **Fig.G**)

Aiding:

Figure G - Shallow Horizontal Crack Placement



TRI-CAMS are very fast and efficient on aid. They work exceptionally well in expanding flakes and unusual pockets, holes, flares, etc.

Belaying:

When setting up belays with TRI-CAMS try use them in normal constrictions or cam them in the "tight fit" manner. They are less directionally sensitive this way. If a tight fit can't be found, use them in the standard camming mode and oppose them (this is where a constant tension loop often comes in handy).

TRI-CAM Performance on Various Rock Types
In all types of solid rock TRI-CAMS work very well. But they are a special boon to climbers who spend some time on less than a perfect rock. The ability of TRI-CAMS to convert most shear forces to expansion (when used in their standard mode) means that they are the most secure form of protection available for decomposed granite and soft sandstone, and in many wet or icy alpine situations. In placements in rotten rock use the largest size TRI-CAM that will fit the crack. Behind very loose flakes or between stacked blocks, however, try not to use them in the standard camming mode as they may actually lever off such a flake, or pry blocks apart.

A Caution
When free climbing, TRI-CAMS can be dislodged from standard camming placement by a trailing foot, or by grabbing them directly, or resting directly on them with your elbow, arm, or foot. If you need the direct aid of a TRI-CAM, grab it only by it's sling and pull only in the direction for which the placement is good. Doing so ensures that proper camming forces are applied.

Testing
Random samples of each batch of TRI-CAMS are tested for the strength of the sling itself. In addition TRI-CAMS have been thoroughly tested in actual placements.

CAMP

TRICAM

INSTRUCTION MANUAL
MANUALE ISTRUZIONI
NOTICE D'INFORMATION

July 2024 - Rev. 12

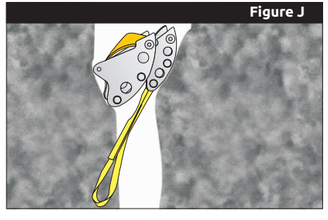
22 PAP

CAMP
C.A.M.P. SpA
Costruzione Articoli Montagna Premana
Via Roma, 23 - 23834 Premana (LC) - Italy
Tel. +39 0341 890117 - Fax +39 0341 818010
www.camp.it - contact@camp.it

Stacking

Although it's not recommended to do so for climbing protection, TRI-CAMS #'s 5, 6, & 7 will nest well together in the configuration shown in the **fig.J**. Always stack the fulcrum point of the next size smaller TRI-CAM between the two channel pins of the larger size. Thus, a #5 may be stacked into a #6 and a #6 may be stacked into a #7, or all three may be stacked in Series, #5 into #6, into #7.

Figure J



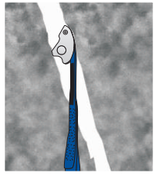
Good climbing . . . !

Size		CAM				CHOCKS		3 CHOCKS				Weight	
		Useful Range		Minimum strenght		Minimum strenght		Useful Range		Minimum strenght			
		mm	in	kN	lbs	kN	lbs	mm	in	kN	lbs	g	oz
EVO	0,25	13.5 to 23	0.53 to 0.91	5	1.124	5	1.124	20 to 22.5	0.79 to 0.86	5	1.124	17	0.6
EVO	0,5	17 to 27	0.67 to 1.06	8	1.798	8	1.798	24 to 27	0.94 to 1.06	8	1.798	29	1.0
EVO	1	21 to 32	0.83 to 1.26	10	2.248	10	2.248	24 to 27	0.94 to 1.06	10	2.248	37	1.3
EVO	1,5	27 to 40	1.06 to 1.57	12	2.698	12	2.698	26 to 31	1.02 to 1.22	12	2.698	57	2.0
	0,125	10 to 16	0.39 to 0.63	3	0.674	2	0.450					9	0.3
	0,25	13.5 to 22	0.53 to 0.87	5	1.124	5	1.124					19	0.7
	0,5	18 to 27	0.71 to 1.06	9	2.023	7	1.574					26	0.9
	1	21 to 32	0.83 to 1.26	10	2.248	8	1.798					35	1.2
	1,5	26 to 40	1.02 to 1.57	12	2.698	12	2.698					50	1.8
	2	29 to 45	1.14 to 1.77	14	3.147	14	3.147					55	1.9
	2,5	32 to 48	1.26 to 1.89	15	3.372	14	3.147					77	2.7
	3	38 to 54	1.50 to 2.13	15	3.372	14	3.147					90	3.2
	3,5	41 to 60	1.61 to 2.36	15	3.372	15	3.372					117	4.1
	4	45 to 64	1.77 to 2.52	15	3.372	15	3.372					138	4.9
	5	57 to 89	2.24 to 3.50	15	3.372	15	3.372					120	4.2
	6	73 to 105	2.87 to 4.13	15	3.372	15	3.372					200	7.1
	7	92 to 140	3.62 to 5.51	15	3.372	15	3.372					264	9.3
DYNEEMA	0,5	18 to 27	0.71 to 1.06	9	2.023	7	1.574					29	1.0
DYNEEMA	1	21 to 32	0.83 to 1.26	10	2.248	8	1.798					35	1.2
DYNEEMA	1,5	26 to 40	1.02 to 1.57	20	4.496	17	3.822					49	1.7
DYNEEMA	2	29 to 45	1.14 to 1.77	20	4.496	17	3.822					55	1.9

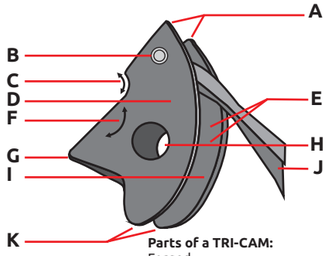
TEST REPORT

TEST A
#5 TRI-CAM between rock and Ice. Ice broke at 11,2 kN.
No major deformation of TRI-CAM.

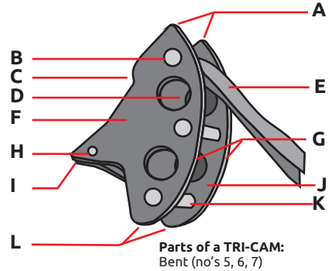
TEST B
#3 TRI-CAM in slight downward and putward flaring granite crack. Pulled out at 15,3 kN. No major deformation of TRI-CAM Sling showed some unravelling (not at sewn seam).



TEST C
#3 TRI-CAM in bombay quartzide hole. At 12,5 kN. Piton used to anchor test failed. No major deformation of TRI-CAM.



Parts of a TRI-CAM:
Forged
(From n° 0.125 to n°4)
A. Stingers
B. Sling retaining pin
C. Fulcrum relief cut
D. Body
E. Parallel cam rails
F. Fulcrum cut
G. Fulcrum point
H. Lightening hole
I. Sling channel
J. Sewn sling
K. Cam shoulders



Parts of a TRI-CAM:
Bent (no's 5, 6, 7)
A. Stingers
B. Sling retaining pin
C. Fulcrum relief cut
D. Lightening holes
E. Sewn sling
F. Fulcrum bend
G. Cam rails
H. Fulcrum pin
I. Fulcrum point
J. Sling channels
K. Channel pins
L. Cam shoulders