

CCVC-SAFETY-0003

Minimum Requirements for Recovery Hooks

Introduction:

This document details the minimum requirement for a vehicle recovery hook as specified in CCVC-SAFETY-0002 Minimum Standards for Tow Hook Mounting. It is written in “lay terms” so that everyone may understand it.

General:

The purpose of the recovery hook is to provide a safe and secure point from which to recover a stuck vehicle. The hook should be strong enough to enable the recovery of a stuck vehicle, but more importantly must be designed so that if recovery forces exceed the design forces, it fails in a safe manner. To do so the hook must bend and release the rope. If the hook fails by breaking, the loose metal becomes a potentially lethal missile.

Considerations:

The forces that can be exerted during recovery have little to do with the size of the vehicle being recovered, and more to do with the nature of how the vehicle is stuck, and the “enthusiasm” of the recovery vehicle. For example, a Suzuki wedged into a submerged log, is effectively an immovable object and a snatch recovery will not free it, regardless of the force applied. In this case, unless commonsense is used and a different recovery technique employed, something will fail.

The potential failure points are:

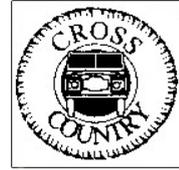
1. The tow rope/strap
2. The hook
3. The bolts
4. The hook mounting
5. The vehicle chassis

The tow strap is the only “soft” part of the recovery, so this is the most desirable component to fail. It should be noted however, that experience has shown a failed snatch strap has sufficient energy to smash a window or dent a panel.

Typically, snatch recovery straps have a minimum-breaking load of 8000kg. This is an enormous force and nearly twice the rated load of a typical 4wd recovery hook. 4wd recovery gear does not have to comply with any specific standard, and as such manufacturers devise their own. The hook rating cannot be directly compared to strap rating.

To ensure a safe situation always exist, CCVC have decided that:

- 1. All hooks must be securely mounted to the vehicle in accordance with CCVC-SAFETY-0002 Minimum Standards for Tow Hook Mounting.**
- 2. All hooks must be of forged construction and rated to 10,000lb. This value has been chosen because it is the industry standard for aftermarket hooks, and the most readily available type of hook. These hooks are stamped “10,000lb”.**



Recovery Hook Manufacture:

A combination of the type of material and the manufacturing method will determine the failure mode of a hook. Unfortunately, it is usually very difficult to determine how a hook was manufactured or what it is made of.

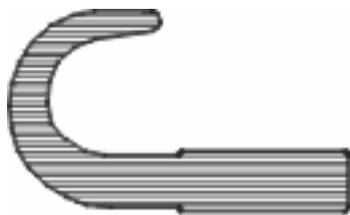
Material:

Mild steel is the household name for low-grade steel. It is relatively soft and can be easily bent or beaten into many shapes. It has high impact resistance, and knocked, it will bend rather than shatter. Unfortunately it is also relatively weak, so a hook would need to be made very heavy to take the loads required of it.

As steel becomes “stronger”, it also becomes less malleable, or willing to bend. An example of higher-grade steel is the bolts securing the hook to the chassis. The club specifies ISO grade 8.8 because this is a good compromise between high strength and impact resistance. A grade 4.6 (mild steel) bolt will fail at half the load of a grade 8.8 bolt.

Manufacturing Method:

All steels are made up of microscopic grains linked together. The way these grains are joined partly determines the strength of the material.



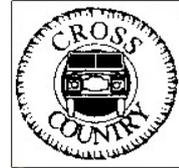
When steel sections or plates, are made at the steel works, they are rolled into their shape. As such, the grains tend to line up along the length of the section. If a hook was machined from a solid plate as shown in the picture at left, the grains would be disjointed, and the hook could crack along one of the lines shown. This becomes more of a problem with “stronger” grades of steel.



When an object is cast, the metal flows into a mould in no particular order, so the grains tend to be somewhat disjointed. This can make the material brittle. Though it is strong enough for normal applications, in an overload situation, the end of the hook is likely to break off.



A forged hook has the grains in line similar to the machined hook, but the grains follow the shape of the hook. Rather than acting as “crack here” lines, the lines in the forged hook make the material more malleable and can be described as “bend along here” lines. In an overload situation, the hook will bend without breaking.



Commercial Hooks:

It is very difficult to determine the material or manufacture method for a recovery hook. CCVC does not expect a vehicle inspector to have to decide if a hook is suitable based on a detailed examination. The most convenient way to ensure that a hook complies with this specification is to specify commercially available hooks stamped as rated to 10,000lbs. By doing this, the onus is on the manufacturer, rather than the vehicle owner or CCVC, to guarantee the load limit and failure mode.

Testing by CCVC has shown that aftermarket recovery hooks available from reputable 4wd accessories dealers fail in a safe manner at, or above, their rated load of 10,000lb. At the time of publication, these hooks complied:

Bush Ranger
Cokes
Black Rat
ARB

This list will be updated regularly. If in doubt, see your CCVC vehicle inspector.

These hooks can be recognised by the 10,000lb rating stamped into them.

Other Hooks:

It is acknowledged that other hooks not stamped may also fail safely, but there is no way to be sure without destructive testing, therefore the club does not allow the use of these hooks.

It is also acknowledged that there is potential for hooks to be falsely stamped. This document has been written for the benefit of the members. It relies on the integrity of the members to comply with it.