Rating the Capacity of Off-highway Vehicle Recovery Gear

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Industry has developed a rating system for cables, slings, and rigging. The relevant portion of this rating system deals with the Dynamic Load Limit (DLL) or Working Load Limit (WLL), and the Static load limit. DLL and WLL are just different terms for the same thing. Static load limit is also known as “ultimate load” or “breaking strength”.

The WLL is designed to provide a liberal safety factor for the capacity of a piece of rigging. This factor is at least 3 times the Static rating, and often 4 times or more.

The difference between Static loads and Dynamic loads are in the nature of the stresses that the rigging must handle.

Examples of dynamic operations include: lifting by construction cranes, securing items to a moving platform such as a tow truck or railroad car, and overhead lifting. These operations involve either high speed movement of a load, restraining a shifting load, or a desired extra safety margin as when lifting loads above people.

Static operations are where low speeds are involved and where loads are not being restrained. When properly done, vehicle winching and recovery operations are considered static operations.

Please note that the use of a recovery strap in a “rubber band” fashion, where a slack strap is pulled and stretched by a moving vehicle in an effort to free a stuck vehicle, must be considered a Dynamic operation.

As a further illustration of the differences between Static and Dynamic loads, look at the following table listing the DLL of wire rope typically used in off-highway vehicle winches.

Cable Diameter	Typical Winch Rating	Cable DLL Rating
3/8”	8,000 to 12,000 lbs	3,000 lbs
7/16”	12,000 lbs	4,100 lbs

The stock Hummer / H1 winch is rated at 12,000 lbs and uses 7/16” cable. The stock H2 winch is rated at 9,000 lbs and uses 3/8” cable. Clearly the anticipated use of these winches is not for Dynamic load applications.

Another place where DLL terminology applies is in rating trailers and receiver hitches. All trailer towing is considered dynamic in nature. The static load rating of receiver hitches is at least 3 times the dynamic rating, usually more. Therefore, placing a winch (static) rated at 8,000 to 12,000 lbs in a receiver hitch (dynamic) rated at 3,000 to 5,000 lbs is not a problem.

Winches are usually sized for the vehicle where they are mounted -- heavier vehicles usually have higher-capacity winches. Therefore, the capacity of the winch may be used as a guideline for the capacity of the associated recovery gear. When using a snatch block (pulley), the winch capacity is effectively doubled. Therefore, all of the recovery gear should have at least twice the capacity of the winch.

For instance, if you have a 12,000 lb capacity winch using 7/16" cable, all of the rigging used with this winch / vehicle should have either a Static load capacity of at least 24,000 lbs, or a Dynamic Load Limit of at least 8,200 lbs.

By following this guideline you will never have to be concerned about whether a piece of rigging can stand up to the load applied by the winch. And since the winch is sized to the vehicle, this same guideline should provide rigging that the vehicle can use in a non-winch recovery, such as pulling a stuck vehicle using a recovery strap and shackles.

Notice that the shackle pictured below has a much higher capacity than would be required for a 12,000 lb winch. A smaller shackle, however, is not physically large enough for use with the appropriately sized recovery straps.

¾" D Shackle with a WLL of 6-1/2 T (tons)

2" wide strap with 6,400 lb capacity (DLL)