

Chapter 1 – Ladder Definitions

Stepladders:

Stepladders are self-supporting portable ladders that are not adjustable in length. Normally, there are two front legs with flat steps and two back legs without steps. The front and back legs are tied together with a spreader bar. A side-view of the ladder forms an "A" shape. The stepladder is shown in the next photograph:



Figure 7 - A typical stepladder

Platform Stepladders:

This ladder is a stepladder with some logical design features that correct some of the problems with a typical stepladder. The platform stepladder simply has a platform at the very top step. The stepladder in Figure 7 has a top step that warns the user to not use it as a step, which of course will be

ignored in some situations. The platform also reduces some of the dangerous racking found in regular stepladders. The platform acts as a membrane to resist racking.



Figure 8 - A platform ladder and a double front ladder (Steps on both sides.)

Extension Ladders:

Extension ladders are portable ladders that are adjustable in length. They are not self-supporting and must lean up against a suitable structure. There are two or more sections that travel in guides. The extensions are held with extension locking devices sometimes referred to as "fly locks". Extension ladders frequently false lock causing the user to telescope downward, which is covered in another book. In this book, the focus is on stepladders. Stepladders and extension ladder have different design problems and the topic is covered separately.



Figure 9 - Extension ladder

Articulated Ladders:

Articulated ladders are ladders that can be locked into various shapes. The ladder can be set up as a single or extension ladder, stepladder, scaffold or worktable. The articulated ladder is shown in the next photograph:



Figure 10 - Articulated Ladder

Trestle Ladder or Double Front Ladder:

A self-supporting ladder is a special case of a stepladder. The ladder consists of two sections with steps on both sides intended for climbing. The rails are hinged at the top and the ladder forms an "A" when viewed from the side. See Figure 8 to view a double front ladder.

Duty Rating of Ladders:

There are four ratings of ladders. The types are:

- Extra heavy duty - Type IA - Working Load is 300 pounds
- Heavy duty - Type I - Working Load is 250 pounds
- Medium duty - Type II - Working Load is 225 pounds
- Light duty - Type III - Working Load is 200 pounds

Note that each type is tested to four times the working load. It will be shown later that users can generate four times their weight with motion on the stepladder. In other words, dynamic motion can generate 4 g's or four times the weight of the person. If this is true, the typical stepladder does not have a factor of safety in its design. A factor of safety is a basic engineering concept where a product will be over-designed to compensate for various variables that are not considered in the design process. The different ladder types can be cryptic to the average user. If there is some reason for the extra heavy-duty type IA, how do typical users determine what type they should use? If two stepladders were sitting side by side and one were type 1 and one were type 3, is it conceivable that the user might use the wrong stepladder? Once the stepladder is in the stream of commerce, there is no way to control the type of usage.

Stepladder Racking:

The following drawing illustrates what racking is:

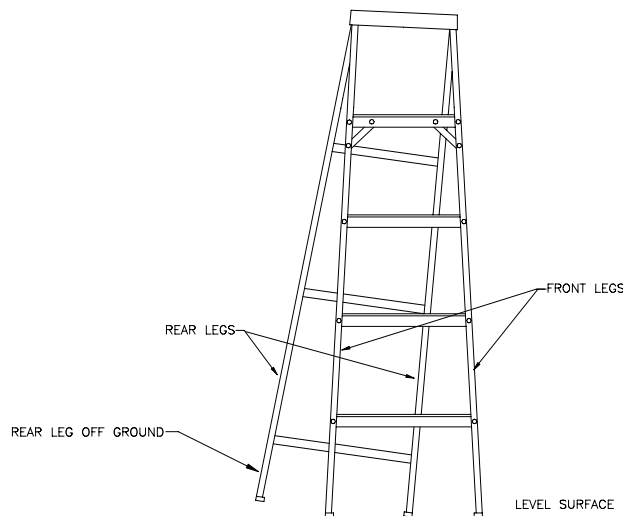


Figure 11 – Racking diagram