CALCULATING
FALL CLEARANCE DISTANCE

Montana State Fund

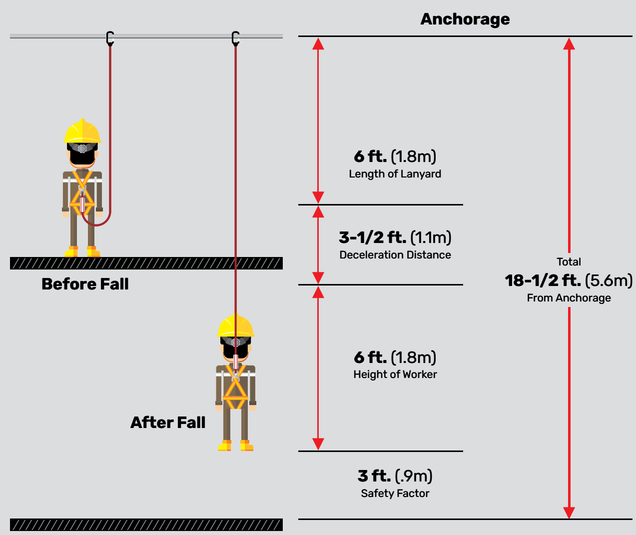
When selecting connecting devices and anchorage connectors, it is important to understand how to calculate potential fall clearance distance. Fall clearance distance is defined as the height at which a worker must attach to an anchorage to avoid contact with a lower level. (This is the worker's "safety zone.")

CALCULATING FALL CLEARANCE DISTANCE USING A SHOCK-ABSORBING LANYARD AND D-RING ANCHORAGE CONNECTOR

First, add up the length of the shock-absorbing lanyard (6 feet), the maximum elongation of the shock-absorbing lanyard during deceleration (3 1/2 feet) and the average height of a worker (6 feet).

Then, add a safety factor of 3 feet to allow for the possibility of an improperly fit harness, a taller-than-average worker and/or a miscalculation of distance.

The total, 18 1/2 feet in this example, is the suggested safe fall clearance distance.



NOTE: Should the shock-absorbing lanyard be used in conjunction with a cross-arm anchorage connector or other, the additional length of the anchorage connector must be taken into consideration.

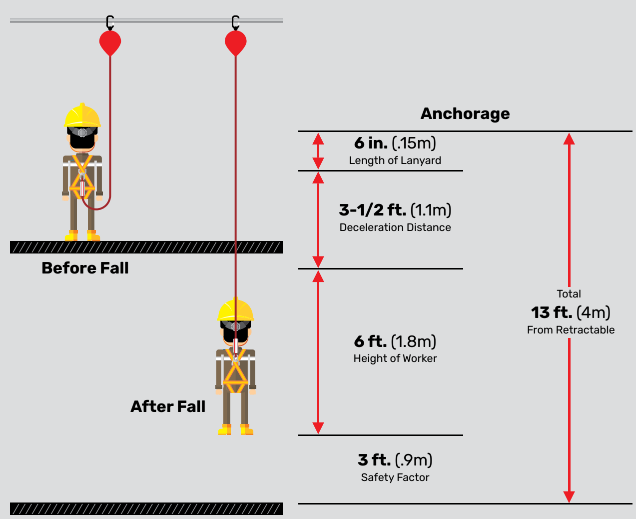
NOTE: Be sure to customize / fine-tune your measurements of line lengths and safe distance as appropriate for the specific worksite and worker.

CALCULATING FALL CLEARANCE DISTANCE USING A RETRACTABLE LIFELINE

First, add together the maximum free-fall distance with a retractable lifeline (6 inches), the maximum deceleration distance (3 1/2 feet) and the average height of a worker (6 feet).

Then, add a safety factor of 3 feet to allow for the possibility of an improperly fit harness, a taller-than-average worker and/or a miscalculation of distance.

The total, 13 feet in this example, is the suggested safe fall clearance distance.



NOTE: When using a retractable lifeline, the distance is calculated from the point where the retractable attaches to the back D-ring of the worker's harness.

NOTE: Be sure to customize / fine-tune your measurements of line lengths and safe distance as appropriate for the specific worksite and worker.

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TIME AND FALL DISTANCE SUMMARY

Distance a person will travel during free fall at 9.8 meters/second^2 or 32 feet/second^2.

Time (seconds)	**Distance** (feet)
0.5	4
1.0	16
2.0	64
3.0	160
4.0	257

Lessening the impact on the body

Falling any distance puts a certain amount of force or impact on your body - the amount of force felt increases with increased *weight of the worker* and/or increased *distance of the fall*. (In physics, this calculation is: Force = Mass x Acceleration.) So, the heavier you are and the farther you fall, the more impact you'll feel. (But it won't be near the impact of crashing onto a solid surface.)

Using a fall protection system adds to the calculation a third variable, one meant to lessen the impact felt from a fall. The components of a fall arrest system limit that force by using deacceleration devices in the harness and a self-retracting lifeline or lanyard attached to the anchor point. The fall protection components are designed to provide a cushion by slowly unravelling (commonly found lanyards) or catching and stopping a fall (self-retracting lifelines) to limit the falling distance - and to stop the fall well above the ground. Quality fall protection systems are designed to limit this force experienced to a maximum of 1,800 pounds, as required by ANSI and OSHA.

APPROXIMATE IMPACT LOAD ON THE BODY FALLING 6 FEET IN A FULL-BODY HARNESS USING VARIOUS LANYARDS:

Of this group of both traditional and modern lanyards, you would feel the least amount of impact or force if using a shock-absorbing lanyard.

Web lanyard (shock absorbing)	900-980 pounds
Web lanyard (not shock absorbing)	2,500 pounds
Rope	2,700 pounds
Steel cable	4,800 pounds

Maintained and used correctly, know that the force felt when a fall protection system stops your fall is always less than the force to be felt if you hit the ground or lower level.