

Laser Range Finder Monocular Manufactured by,



Model LRM
200



Validation Report

Nisreen Hasib

Elaine Silver

Abstract

We validated the Laser Range Finder Monocular LRM 200, manufactured by Newcom Optix. The range finder is rather accurate; it has a resolution of ± 0.5 meters, a precision of ± 0.5 meters, and an accuracy of approximately ± 2.0 meters. It is best to use the range finder over long distances where a measurement of ± 0.5 is not going to have a big effect.

Purpose

The purpose of this experiment was to test the accuracy of the Laser Range Finder Monocular. An instrument needs to produce meaningful data before it can be relied upon. Our tests needed to reflect changes in the variables and what other variables might erroneously affect measurements. We need a detailed evaluation of the instruments resolution, precision, and accuracy. We also need to pinpoint sources of error.

Experiment #1

1. First we went outside and found a target about 6 feet across, which was in this case a bush at the end of the bus lane.
2. Then we marked off several distances from the middle of the bottom of the bush, starting off with 50 meters, by increments of 50 meters until we reached 200 meters, which was as far as we could go.
3. We measured the distance from that point to the bush using the Laser Range Finder. We measured each distance three times and recorded the results in the table below.

Measured Distance	Laser Range Finder
50 meters	1. 50m 2. 50m 3. 50m
100 meters	1. 100m 2. 100m 3. 100m
150 meters	1. 150m 2. 150m 3. 150m
200 meters	1. 200m 2. 200m 3. 200m

Experiment #2

1. First we went outside and measured off 50 meters from a target with a measuring tape. Then we measured off increments of one meter, until we reached 60 meters.
2. Then we measured the distance to the bush from each of these points using the Laser Range Finder.
3. We found the data and compared.

Measured distance	Laser Range Finder
50 meters	1. 50m 2. 50m 3. 50m
51 meters	1. 50m 2. 50m 3. 50m
52 meters	1. 52m 2. 52m 3. 52m
53 meters	1. 52m 2. 52m 3. 54m
54 meters	1. 54m 2. 54m 3. 54m
55 meters	1. 55m 2. 55m 3. 55m
56 meters	1. 57m 2. 57m 3. 57m
57 meters	1. 57m 2. 57m 3. 57m
58 meters	1. 58m 2. 58m 3. 58m
59 meters	1. 61m 2. 61m (Only one that is 2 meters off) 3. 61m
60 meters	1. 61m 2. 61m 3. 61m

Resolution: ± 0.5 meters
Precision: ± 0.5 meters
Accuracy: ± 2.0 meters

Analysis



After conducting our experiments we found that the range finder was pretty accurate over long distances (i.e. distances at intervals of 50 meters) but it wasn't that accurate over short distances (i.e. distances over intervals of one meter). You have to be at least 20 meters away from the object you're measuring the distance to, according to the manual. The maximum distance is 1500 meters away. The important thing to remember when using this instrument is to aim at approximately the same spot on your target when trying to verify your measurements, otherwise you'll get a wide range of readings which may or may not make any sense. For example, when we conducted experiment #1, we measured from the middle of the bottom of the bush, but when we used the range finder, we measured from the center of the bush. So that may have caused some inaccurate measurements, but because we were measuring over a longer distance, the range finder might have just rounded the measurement, which would explain the perfect measurements in experiment #1.

Conclusion

The Laser Range Finder Monocular was overall a very good instrument. It takes accurate readings at 50-meter intervals. However, we found that if you are measuring meter by meter, it has an accuracy of plus or minus 0.3 meters. It also has a precision of plus or minus 0.5 meters, and a resolution of plus or minus 0.5 meters. We found a couple sources of error. Where you aim at a target, or user error, is a problem. While using the Laser Range Finder, try to keep your hand as steady as possible at the same spot on the target.