

Troyer Difficulty Rating System

Circa 1995, Brad Troyer developed a simple method to estimate the difficulty of any target, and of an entire course. This can be very useful for planning the course layout so that there is a good mix of easy, moderate, hard and expert level shots on the course. The Target Difficulty rating formula is as follows:

$$\text{Target Difficulty} = (\text{Distance} / \text{Kill Zone Size}) * (1 + \text{Difficulty Factors})$$

Where the Difficulty Factors are any additional factors for forced positions, target placement, or environmental conditions; these factors are defined in the following tables:

Non-Environmental Factors	
Type of Shot	Factor
Standing	0.75
Kneeling	0.50
Extreme Up/Down	0.25
Shots past 45 Yds	0.125

Environmental Factors	
Type of Shot	Factor
Windy	0.25
Extreme Light/Dark	0.25

Extreme Up/Down: Creates stress from the normal shooting position with shots typically at an angle of 15 degrees or more.

Windy: Winds strong enough to require windage hold-off.

Extreme Light/Dark: Light conditions that adversely affect accurate ranging or visibility of the target.

The standard difficulty factor is 1. Any additional difficulty factors are added to 1. As an example, if a target with a 1.5" kill zone is placed at 50 yards (add 0.125 for distance past 45) and it is placed in a windy area (add 0.25 for wind), the Difficulty equation would be:

$$\text{Target Difficulty} = (50 / 1.5) * (1.0 + 0.25 + 0.125) = 45.83$$

To get the average course difficulty, simply average all of the individual target difficulties by adding the target difficulties and dividing it by the total number of targets.

$$\text{Course Difficulty Rating} = \text{Average of Target Difficulty Ratings}$$

The following charts were developed to relate the difficulty factor to a degree of hardness for individual targets (left chart) and to the overall course difficulty (right chart). Two charts were developed since there can be different factors involved when figuring the overall course difficulty. A single target with a Difficulty of 36 is considered Hard, but across the entire course of fire there are fatigue and concentration factors that come into play during the match which will elevate the course difficulty level.

Individual Target Difficulty Ratings	
Rating	Yards
Easy	0 to <20
Moderate	20 to <30
Hard	30 to <40
Expert	40 and up

Overall Course Difficulty Ratings	
Rating	Yards
Easy	0 to <25
Moderate	25 to <30
Hard	30 to <34
Expert	34 and up