

Chapter 5

Effects of Weather

Weather conditions can cause a Marine to be ineffective while engaging targets. Temperature, precipitation, and wind can affect the trajectory of the bullet. Light may affect a Marine's perception of the target and impact shot placement. Therefore, a Marine must develop confidence in his ability to rapidly offset the effects of weather.

5001. Light Conditions

Light conditions do not affect a bullet's trajectory, but they can change the appearance of the target, range estimation, or the clarity of the target. Changes in light conditions (including glare on the front sight post) can cause a Marine to aim at what appears to be the correct aiming point or at what appears to be a target's center of mass. The true aiming point or center of mass may actually be higher or lower or to the left or right.

Therefore, a Marine must learn to compensate for changes in light conditions. Typically, a Marine that maintains a center of mass hold can reduce the effects of light and execute an effective shot. The rifle's true zero may need to be adjusted to compensate for changing light conditions. Blackening the rifle's front sight post can reduce glare.

5002. Temperature

Extreme changes in temperature will cause fluctuation in the rifle's chamber pressure. Extreme changes in temperature also can affect a Marine's ability to engage targets effectively in a field firing environment. Once the rifle is zeroed, a change in temperature of 20 degrees or more can cause the bullet to strike above or below the point of aim.

Therefore, if the temperature changes 20 degrees or more, a Marine should rezero the rifle.

a. Extreme Heat. In extreme heat, a Marine may experience rapid fatigue. This can cause muscle cramps, heat exhaustion, heat stroke, blurred vision, and reduced concentration levels that result in inaccurate shooting. Increased fluid intake, good physical condition, and periodic rest breaks can offset the effects of extreme heat. Extreme heat also can create ground mirages that cause a target to appear indistinct and to drift from side to side. Heat waves or mirages also may distort the target shape or the appearance of the front sight post. A mirage created by the heat of the barrel reduces a Marine's ability to see the sight clearly. To overcome the effects of heat and accurately engage a target, a Marine should maintain a center of mass hold.

In extreme heat, the rifle's chamber pressure increases causing the bullet to exit the muzzle at a higher velocity and impact the target above the point of aim. Hot air is less dense than cool air and provides less resistance to the bullet. This allows the bullet to travel faster and experience less deflection from the wind. Avoid changes in propellant temperature by protecting ammunition from direct exposure to the sun.

b. Extreme Cold. Extreme cold may affect a Marine's ability to concentrate. If a Marine's hands are numb, he will have difficulty holding a frigid rifle and executing effective trigger control. To protect the hands in a cold environment, a Marine should wear arctic mittens or gloves. To operate the rifle while wearing arctic mittens or gloves, a Marine depresses the trigger guard plunger to open the trigger guard. This allows easier access to the trigger. See figure 5-1.

Figure 5-1. Open Trigger Guard.

————— **Note** —————

If the trigger guard is open, a Marine must ensure that the safety is engaged. This prevents the rifle from firing inadvertently if foreign objects come into contact with the trigger.

If the rifle is exposed to below freezing temperatures, it should not be brought immediately into a warm location. Condensation may form on and in the rifle, and it may freeze if reexposed to the cold. Ice that forms inside the rifle may cause it to malfunction.

In extreme cold, the rifle's chamber pressure decreases causing the bullet to exit the muzzle at a lower velocity and to impact the target below the point of aim. Cold air is dense and provides the bullet with more resistance. This causes the bullet to travel slower and experience greater deflection from the wind.

5003. Precipitation

Precipitation (rain, snow, hail, sleet) can affect target engagement, a Marine's comfort level, and a Marine's ability to concentrate. The amount and type of precipitation may obscure or completely hide the target and it may reduce a Marine's ability to establish an accurate sight picture. Freezing rain and other types of precipitation may make the rifle difficult to handle, foul the rifle and cause stoppages, or buildup in the barrel or compensator and cause erratic shots. Care should be taken to keep the barrel and muzzle free of water. If the rifle was submerged, a Marine must drain the bore before firing. To drain the bore, pull the charging handle slightly to the rear while the muzzle points down. This breaks the seal created by the round in the chamber. Once the barrel has been drained, turn the rifle muzzle up. This allows the water to drain out of the stock.

5004. Wind

Wind affects a bullet's trajectory. The effect of wind on the bullet as it travels down range is referred to as deflection. The wind deflects the bullet laterally in its flight to the target. The bullet's exposure time to the moving air determines the amount it is deflected from its original trajectory. Deflection increases as the distance to the target increases. There are four factors that affect the amount of deflection of the bullet: velocity of the wind, range to the target, velocity of the bullet, and bullet size and weight.

- The greater the velocity of the wind, the more the bullet will be deflected.
- As the distance to the target increases, the speed of the bullet slows allowing the wind to have a greater effect on shot placement.
- A bullet with a high muzzle velocity will not be affected by the wind as much as a bullet with a low muzzle velocity.
- The bullet's size and weight determine the adjustments required to compensate for the effects of wind. The heavier the bullet, the less it will be affected by wind.