

## Ergonomics of a Stock-Mounted Missile Weapon: Design Analysis of the Crossbow

**Bora Avcı**

M.A. Student, Ihsan Doğramacı Bilkent University

### Abstract

The crossbow was an important missile weapon during the Middle Ages, especially in Western Europe, and its wide-adoption dates back to the 11th century A.D. It was the weapon of preference for various reasons from "the rise of castle" to its relatively straightforward *modus operandi*, compared to long or composite bow types. So far, scholars have focussed on the crossbow's efficiency, simplicity, rate of fire and the battles it was used in. However, the design features and ergonomic qualities of the weapon have received less attention. In fact, what has been written about the weapon itself are directly related to the design and ergonomic qualities of the weapon in its very essence. That is to say, the crossbow was a unique weapon in terms of its design. Its three main components, -- the tiller, lathe and trigger mechanism -- were designed and combined together in such a manner that it enabled the shooter to align his line of sight along the weapon, and thus hold it steadily, aim properly, and learn how to use it within a few weeks. Additionally, its source of power --i.e. lathe -- developed over time, being constructed from composite material -- i.e., horn, sinew-- especially due to Hungarian influence of mobile, horseback archery, along with Turkish troops', marching towards Venice. Then, it was followed by steel lathe, developed in 14th century and widely adopted in 15th century which required cranequin devices to arm the weapon as well as composite ones. Thus, in the light of aforementioned features, I will argue that the crossbow was a significantly ergonomic weapon, unlike any other individual missile weapon of the medieval and early Renaissance periods. I will also analyse how design of the weapon was distinct and argue that it was designed to achieve the optimum compatibility between the human body and the weapon in question.

### Keywords

Crossbow, Design, Middle Ages, Early modern period.