

Detailed Measurement of a Practice Rapier from the Royal Armouries in Leeds

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Abstract

In this article, a rare late 16th to early 17th century practice rapier from the Royal Armouries in Leeds is presented in image and text, together with its measurements. An authentic reconstruction of the blade is made possible with this data.

I. INTRODUCTION

DETAILED MEASUREMENTS OF period weapons are the most important source of information for manufacturing authentic reproductions. Furthermore, parameters of blade geometry and mass distribution are very illuminative for the interpretation of period fencing treatises.

II. TERMINOLOGY

Most measurable parameters are common to all swords and quite clear, although some need a more detailed explanation, which follows. The measurement coordinate origin in all planes is the center of the front end of the grip.

- *Ricasso Length* – Ricasso length is measured from the front end of the grip to the start of the edge.
- *Blade Length* – Blade length is measured from the front end of the grip to the point.
- *Point of Balance (POB)* – The point of balance is usually considered the main parameter of handling and can be easily located by balancing the sword on an edge. However, it only determines little regarding handling characteristics. It is measured from the front end of the grip.
- *Pommel Neck Length* – The length of the pommel part that is the transition to the grip, which extends the actual grip length.
- *Crossguard Diameter* – The diameter of the crossguard at its thinnest point. This value is an indicator for the stability of the hilt.

Overall length	l_o
Blade length	l_b
Ricasso length	l_r
Ricasso block length	l_q
Grip length	l_g
Pommel length	l_p
Pommel neck length	l_{pn}
Point of balance	l_{pob}
Hilt height front of crossguard	l_{hf}
Hilt height rear of crossguard	l_{hr}
Blade width	w_b
Ricasso width at front end	w_{rf}
Ricasso width at rear end	w_{rr}
Hilt width	w_h
Grip width at crossguard end	w_{gf}
Grip width at pommel end	w_{gr}
Grip width at distance X	w_{gX}
Blade thickness	d_b
Ricasso thickness at the front end	d_{rf}
Ricasso thickness at the rear end	d_{rr}
Hilt depth outside	d_{ho}
Hilt depth inside	d_{hi}
Grip thickness at the crossguard end	d_{gf}
Grip thickness at the pommel end	d_{gr}
Grip thickness at distance X	d_{gX}
Blade cross-section area	A
Overall mass	m

Table 1: Edged Weapon Parameter Overview

III. BLADE CROSS SECTION CALCULATION

Blade cross sections can be calculated along a blade according to its shape. In this special case we omit formulae, because the blade is of trivial rectangular shape across its whole length.

IV. DESCRIPTION AND MEASUREMENT OF A 16TH—17TH CENTURY PRACTICE RAPIER

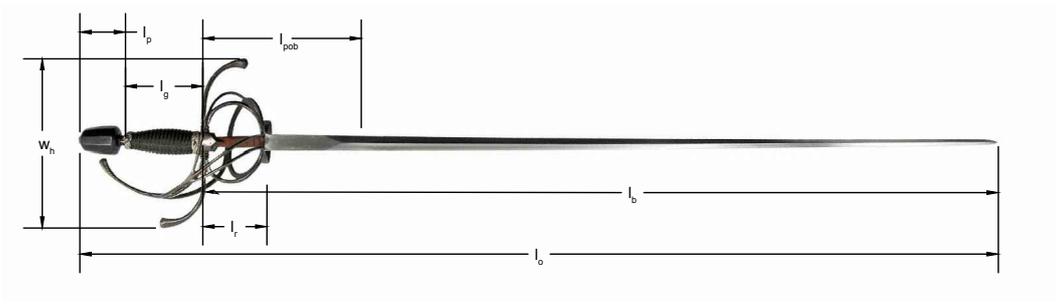


Figure 1: Sketch of a one-handed sword.

A sword with a sturdy, blunt, and rectangular blade without decoration, a rectangular ricasso and a nail—head tip. The makers mark on the ricasso depicts a ship within a rectangle. The hilt consists of a one—sided curved quillon, and a knuckle bow, both ending in disc—shaped finials. Further, two side rings and forward curved arms of oval cross section. The lower side ring connects to the knuckle bow. The rear side of the guard consists of three swept bars of round cross section and connects to the knuckle bow. The pommel is a rounded cone stump with a smooth surface. The grip has a double—concave oval shape with carved spiral grooves and is made of wood wrapped with wire.

Classification according to [Norman, 1980]:

- *Outer Guard*: type 57
- *Inner Guard*: type 30
- *Pommel*: type 32

A video of the sword is also available here: https://youtu.be/YQyl_m2oYBg.



Figure 2: Hilt oblique view



Figure 3: Hilt and forte true edge side view



Figure 4: Hilt and forte false edge side view



Figure 5: Hilt and forte top view



Figure 6: Ricasso detail



Figure 7: Nailhead point



Figure 8: Hilt rear oblique view

Object 1				
Overall length [mm]	1324			
Blade length [mm]	1168			
Overall mass [g]	1059			
Point of balance [mm]	115.5			
Pommel length [mm]	40.2			
Pommel width [mm]	39.0			
Pommel thickness [mm]	39.0			
Pommel neck length [mm]				
Grip length [mm]	73.0			
Grip material	wood, wire			
Measurements Grip	Distance [mm]	0	33	73
	Width [mm]	21.6	24.4	19.4
	Thickness [mm]	21.6	22.7	19.4
Quillon block length [mm]	25.3			
Quillon block thickness [mm]	15.8			
Quillon block width [mm]	27.0			
Hilt width [mm]	87.5			
Hilt depth outside [mm]	67			
Hilt depth inside [mm]	67			
Hilt length [mm]	177			
Crossguard shape	lenticular			
Crossguard diameter [mm]	6.8			
Blade shape	rectangular			

Table 2: Overview of the measurement parameters of object IX.120

l_b [mm]	w_b [mm]	d_b [mm]	A [mm ²]	Blade shape
0	21.0	6.6	138.60	Rectangle
56	10.0	6.85	68.5	Rectangle
100	9.4	6.6	62,04	Rectangle
200	8.8	6.6	58,08	Rectangle
300	8.05	6.1	49.1	Rectangle
400	7.2	6.1	43.92	Rectangle
500	6.6	5.25	34.65	Rectangle
600	6.1	5.0	30.5	Rectangle
700	6.1	5.0	30.5	Rectangle
800	6.1	4.4	26.84	Rectangle
900	6	3.8	22.8	Rectangle
1000	5.5	3.8	20.9	Rectangle
1100	5.5	3.55	19.53	Rectangle
1160	5.5	3.2	17.6	Rectangle

Table 3: Blade measurements of object IX.120, a one-handed sword.

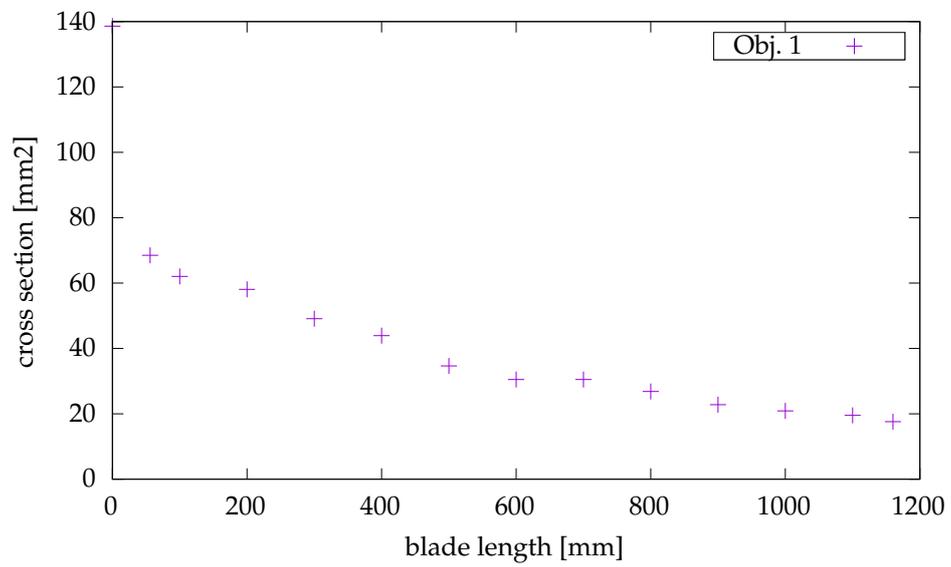


Figure 9: Cross Section of object IX.120

V. ACKNOWLEDGEMENTS

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REFERENCES

A.V.B. Norman. *The Rapier and Smallsword: 1460-1820*. Ayer Company Publishers, Inc., 1980.