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ARES Research Note 9 – Estimating Year of Production for FN Herstal FAL Rifles

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Background

The FN Herstal FAL is one of the most common self-loading rifles in the world. Some 5.5 million FAL type rifles have been produced to date (ARES, 2015). FAL rifles regularly appear in conflict zones, and have been documented in recent years in Iraq, Libya, Mali, South Sudan, Sudan, and Syria (Jenzen-Jones & Spleeters, 2015).

Arms tracing relies on the accurate identification of the weapon in question. This is accomplished by examining a combination of the markings and physical characteristics of the weapon (Jenzen-Jones, 2015). This research note assumes that a weapon has been successfully identified, and will detail the process of identifying the likely year of production for FN Herstal FAL rifles produced in Belgium (for both the domestic market and export) between 1972 and 1980. This time period accounts for some 585,644 FAL rifles produced by FN Herstal in Belgium; this is estimated to reflect more than 5% of the global production of FAL rifles to date (Johnston & Nelson, 2010). Although this figure is limited in global terms, Belgian FAL rifles are commonly documented in MENA conflict zones.

An online year estimation tool is available: http://www.armamentresearch.com/tools/faldate; the user simply needs to input an FAL serial number and will be given a year of production and an interpolated estimate of month of production with error bounds.

Photo 1 A Libyan rebel combatant poses with an FN Herstal FAL 50.00 self-loading rifle near Misrata, Libya, in June 2011 (photo credit: Luis Hidalgo/AP).

Serial Numbers on FAL Rifles

FAL rifles may feature serial numbers on one or both sides of the receiver. Generally, the serial number will appear on the upper, rather than lower, receiver. The two types of serial numbers are as follows:

> Primary serial number: This number is present on FAL rifles produced after 1972[1], and is located on the right-hand side of the receiver. The primary serial number is a sequential number indicating the cumulative production of FAL rifles. A rifle marked with '500125' is thus the 500,125th FAL rifle ever produced.
>
> Secondary serial number: This number is present on FAL rifles manufactured prior to 1972, as well as post-1972 rifles destined for export. The secondary serial number is a sequential number reflecting the total number of FAL rifles produced for a particular end user (typically a country), typically located on the left-hand side of the receiver. A rifle marked with '50400' is thus then 50,400th rifle manufactured for a particular client.
>
> Source: Stevens & Van Rutten, 1981

Figure 1.1 FN Herstal FAL model 50.00 rifle with serial number 1461404. Documented in Libya, 2012 (photo credit: Damien Spleeters).

[1] Despite being introduced later than the 'secondary' serial number, the primary serial number is named such as it more closely reflects the sequential serial numbering commonly used by investigators to identify and trace a firearm.

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Estimating an FAL Rifle's Year of Manufacture

This methodology relies on known cumulative production data for the period January 1953 – January 1980. The year of production for rifles manufactured after 1971 (that is, those rifles bearing primary serial numbers) can be estimated based upon known cumulative production totals for the years 1953–1980. By comparing an FAL rifle's primary serial number (and hence its position within cumulative production) with Table 1, the year of production can be determined. In order to narrow down the production time frame further, the authors have developed a mathematical methodology which can provide an estimated month of manufacture (see below).

Wherever possible, this should be supplemented by an official tracing request issued to FN Herstal and the Belgian government. The primary serial number should provide sufficient information to facilitate such a request; however, this should be accompanied with additional information such as any secondary serial number, other markings, and photographs, if possible. ARES may be able to assist in making such requests. It may be possible to identify and trace rifles produced prior to 1972 through a combination of their markings and physical characteristics (Jenzen-Jones & Spleeters, 2015).

Table 1: Cumulative production of FAL rifles, 1953–1980

Year	Cumulative production total	Year	Cumulative production total
1953	0	**1967**	785,620
1954	14,284	**1968**	835,614
1955	78,562	**1969**	849,898
1956	214,260	**1970**	871,324
1957	257,112	**1971**	907,034
1958	314,248	**1972**	949,886
1959	357,100	**1973**	1,042,732
1960	428,520	**1974**	1,164,146
1961	528,508	**1975**	1,256,992
1962	557,076	**1976**	1,364,122
1963	578,502	**1977**	1,421,258
1964	642,780	**1978**	1,499,820
1965	692,774	**1979**	1,514,104
1966	699,916	**1980**	1,535,530

Source: Spleeters, 2013; Stevens and Rutten, 1981.

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Chart 1: Cumulative production of FAL rifles, 1953–1980

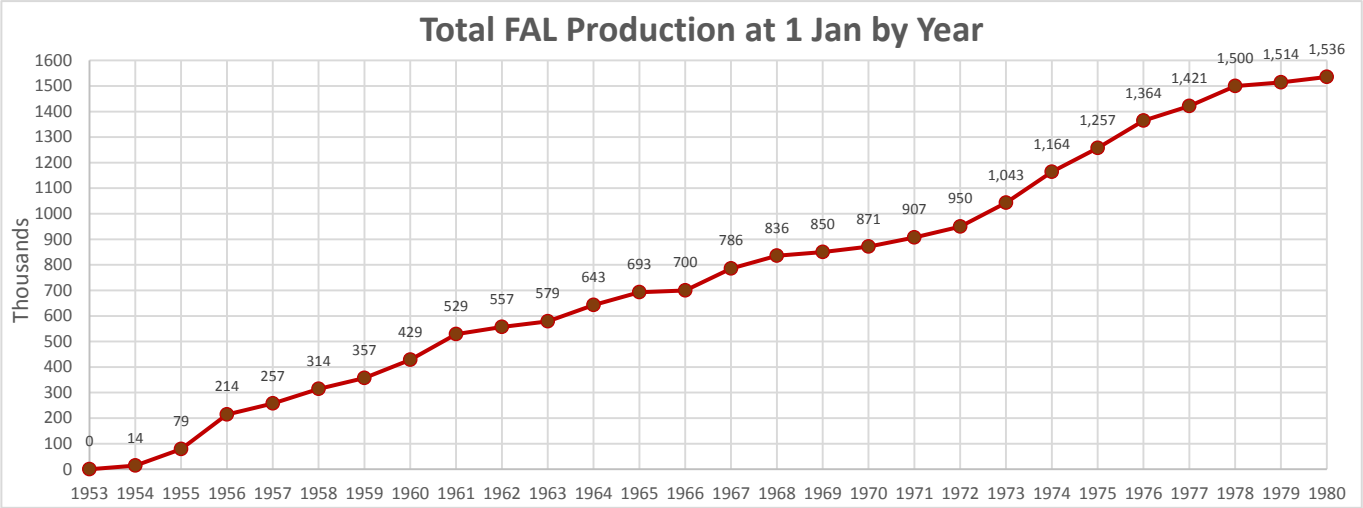

Chart 1 shows the cumulative production of FAL rifles at FN Herstal in Belgium from 1953 to 1980. Source: Stevens & Van Rutten, 1981 (see Table 1).

Mathematical Methodology

The year of manufacture for FN Herstal FAL rifles produced between 1953 and 1980 can be interpolated via a relatively simple mathematical method. Table 1 gives the cumulative production of FAL rifles from 1953 to 1980, and forms the core data set. This methodology can be applied to any known cumulative production data set, with the precision being determined by the interval between known data points.

Given a regular iterative time interval (yearly), and associated cumulative production (CP_{year}), the year-on-year production can be determined by the difference from the year before, thus giving annual production (AP_{year}), Equation 1.

$$AP_{year} = CP_{year} - CP_{year-1} \qquad \textbf{Equation 1}$$

AP_{year} can be divided by twelve to give a monthly average of the number of rifles produced for that year. This monthly average is useful as a guide (see below for limitations of this method).

Determining the year of manufacture of a rifle with a given serial number (S) is done by placing it between given values of CP_{year}, e.g. serial number 1,300,000 would have been produced in 1975. This simple method can be made more precise by conducting a fractional determination of when in 1975, at a rate of AP_{1975}, the 1,300,000th rifle was likely produced. The number of rifles produced between 1 Jan 1975 and S is divided by AP_{1975}, and multiplied by days in the year to give the estimated date of production (DP_{year}).

$$DP_{year} = \frac{(S - CP_{year})}{AP_{year}} * 365 \qquad \textbf{Equation 2}$$

The resultant DP_{year} can offer false precision if taken at face value. This method is not valid for the determination of the exact date of manufacture; rather, it is a tool for estimating when during a year a given FAL would have been manufactured. The precision of this estimate is dependent upon AP_{year}.

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The following error-boundary estimations are made with the assumption that the highest recorded annual production of FAL rifles (occurring 1955 with AP_{1955} = 135,698 rifles produced) is representative of the maximum annual production capacity (AP_{max}) during the 1953 – 1980 period.

It is not possible to determine if all rifles were produced at the same monthly rate throughout the year with the data set provided. Therefore, it is not possible to state with complete certainty that a given FAL was produced in a given month. However, it is viable, with varying degrees of precision for different years, to estimate which month it is likely a given FAL was produced, and to give confidence intervals for that estimate (error bounds).

It is relatively simple to determine the approximate earliest likely month of production with this method, by substituting AP_{1955} as the assumed upper-bound of AP, shown in Equation 3.

$$Earliest\ Likely\ DP_{year} = \frac{(S - CP_{year})}{AP_{1955}} * 365 \qquad \textbf{Equation 3}$$

The method for determining the approximate latest likely month of production is more complex, as it necessitates the calculation of how long, given S, it would have taken at AP_{1955}, to produce enough FALs to equal annual production of that year.

$$Latest\ Likely\ DP_{year} = 365 - \frac{(CP_{year} + AP_{year}) - S}{AP_{1955}} * 365 \qquad \textbf{Equation 4}$$

According to the assumption that AP_{1955} is approximately equal to AP_{max}, it is evident from Equation 4 that serial numbers' calculated DP is likely to be more or less precise, based on a given serial number's AP_{year}. Essentially, as AP_{year} approaches AP_{1955}, precision increases.

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Safety Information

Remember, all arms and munitions are dangerous. Treat all firearms as if they were loaded, and all munitions as if they were live, until you have personally confirmed otherwise. If you do not have specialist knowledge, never assume that arms or munitions are safe to handle until they have been inspected by a subject matter specialist. You should not approach, handle, move, operate, or modify arms and munitions unless explicitly trained to do so. If you encounter any unexploded ordnance (UXO) or explosive remnants of war (ERW), always remember the 'ARMS' acronym:

AVOID the area

RECORD all relevant information

MARK the area to warn others

SEEK assistance from the relevant authorities

Disclaimer

This report is presented for informational purposes only. It is not intended to provide instruction regarding the construction, handling, disposal, or modification of any weapons systems. Armament Research Services (ARES) strongly discourages non-qualified persons from handling arms and munitions. Arms or munitions of any variety should not be handled without the correct training, and then only in a manner consistent with such training. Subject matter experts, such as armourers, ATOs, and EOD specialists, should be consulted before interacting with arms and munitions. Make a full and informed appraisal of the local security situation before conducting any research related to arms or munitions.

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References

ARES (Armament Research Services). 2015. Global Development & Production of Self-Loading
Military Rifles. Unpublished background paper. Geneva: Small Arms Survey.

Jenzen-Jones, N.R. 2015. Documenting Small Arms and Light Weapons. Issue Brief 14. Geneva: Small Arms Survey. <http://www.smallarmssurvey.org/fileadmin/docs/G-Issue-briefs/SAS-IB14-Documenting-Small-Arms.pdf>

Jenzen-Jones, N.R. & Damien Spleeters. 2015. *Identifying & Tracing the FAL Rifle: Documenting signs of diversion in Syria and beyond.* Field Guide No. 1. Perth: Armament Research Services.

Johnston, Gary Paul & Thomas B. Nelson. 2010. *The World's Assault Rifles*. Lorton: Ironside International.

Spleeters, Damien. 2013. FAL Rifles in Libya: A Guide to Data Gathering. Security Assessment in North Africa (SANA) Dispatch No. 1. Geneva: Small Arms Survey. <http://www.smallarmssurvey.org/fileadmin/docs/R-SANA/SANA-dispatch1-FN-FAL.pdf>

Stevens, R. Blake and Jean E. Van Rutten. 1981. The Metric FAL. Toronto: Collector Grade Publications.

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Further Assistance

Should you require further assistance with the identification or tracing of arms and munitions, please contact Armament Research Services (ARES): ArmsID@armamentresearch.com

The authors would welcome the submission of FAL tracing data (especially serial numbers and images of such) in order to continually test and refine this methodology.

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