The Creation, Maintenance and Archiving of Firearm Records

An Australian Perspective

May 2011
Purpose

For those States that require compulsory registration of firearms and/or licensing of their owners, maintaining accurate records of both the firearm and the owner is a major undertaking. In general, firearm registries are not adequately resourced to perform this task effectively. With shrinking budgets and an ever-increasing demand for public services, governments must think carefully about where their limited resources are applied. The purpose of this paper is to outline the minimum requirements to create and maintain a firearm transaction recording system.

Main Requirements

A business case for the creation of a firearm transaction recording system must identify if the project is intended to record those firearms:

- seized, stored and destroyed by the State
- possessed, used and carried by private citizens in accordance with State laws
- owned by the State and used for official purposes

The business case must also allow for the cost of the on-going maintenance of the database, primarily involving the:

- creation of new firearm data codes
- updating information relevant to the firearm, such as sale, destruction or legal export
- cost of printing and associated consumables to produce reports as required.

Without accurate firearm transaction records there is little chance of a positive outcome to a firearm trace request, and even less chance of a successful prosecution of those who have breached either local legislation or binding international agreements.

The purpose of creating and maintaining records is to:

- identify a firearm against all others
- indicate the circumstances under which the firearm is held or issued
- identity the current owner of the firearm, whether individual or corporation
- track the firearms movement from manufacture to destruction or licit export.

Without verifiable and accurate data indicating the above criteria it would be difficult to successfully achieve a prosecution for a firearm offence, or to identify methods of diversion from the licit to illicit market.

Identifying one firearm from another

Records must contain adequate firearms descriptors which enable a particular firearm to be isolated against all others of the same make and model.¹ Some manufacturers use a ‘numeric only’ serial numbering system on various models. On each model the serial number range (SNR) may commence at ‘1’ and continue into

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¹ Descriptors are the serial number, make, model, calibre(s), barrel length, magazine capacity and action type.
the hundreds of thousands. Unless the full range of identifying features is included in
the firearm record, then the possibly exists that the firearm will be misidentified, thus
jeopardising the prosecution case in any legal proceedings. Appendix 1 contains a
case study which reveals the dangers of not having correct descriptors recorded. Appendix 2 illustrates the incorrect use of a generic cartridge name rather than a
specific one.

The use of serial number prefixes and suffixes should be mandatory in any serial
number marking regime, as they enhance the capability to identify a firearm make
and model from a paper record.

In summary, a system that only records minimal firearm descriptors will result in
failure both to trace firearms and the prosecution of offenders involved in firearm
related offences.

Recording of Country of Manufacture

A common mistake within existing systems is recording a country name as the
manufacturers’ name. A firearm located during policing operations should be
accurately identified by the markings and codes placed upon it, including the serial
number(s) placed upon the frame/receiver and other major components. Much of the
data seen by the author indicates that personnel do not have the knowledge to
identify a firearm by make, and they choose to record the name of the firearm by a
country name they presume the firearm originates from. Many predominant firearm
types are made in various countries and they may all look the same, but it is
important to identify actual country of make and the manufacturer within that country
if possible.

The international efforts on Small Arms and Light Weapons issues, particularly
tracing in a timely manner requires a concerted effort to accurately identify firearm
country of manufacture.

The use of both the ISO code and the United States (FBI) National Crime Information
Centre (NCIC) Code2 for firearms are processes that will strengthen the accuracy of
data.

Serial Numbers.

While a firearm number (serial number) is a unique identity, it can only be regarded
as such when used as a component of a broad range of other firearm descriptors.3
Several major firearm manufacturers, including government arsenals, have produced
similar models with duplicate serial numbers in large quantities, so caution must be
used if initiating prosecution on the face vale of serial numbers.

Caution must also be used when identifying a firearm by serial number as the
number may be a forgery placed upon a stolen unmarked (usually government
owned) firearm frame or receiver. It has been observed that records exist of multiple
registered firearms of the same make and model each with the same serial number.
Other markings on the firearm may also be forgeries and expert advice should be
sought before confirming the make, country of manufacture and model.

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2 www.fbi.gov/about-us/cjis/ncic/ncic
3 Multiple firearms of the same make can have the same serial number applied by the manufacturer.
When recording numbers any prefix and suffix must be included, as these are a valuable, if not indispensable component of the number and its relation to the make and model of firearm it relates to. It is important not to try to ‘replicate’ what is seen on the firearm, as spaces that may appear between numbers will be included. Taking it to the extreme, data entry people may commence typing in symbols which attempt to replicate scratches and other markings not relevant to the serial number. Database programming should be incorporated which will recognise serial numbers that may be entered with spaces, forward slashes and other superfluous symbols.4

It is to be noted that some manufacturers, particularly those who engage in government military contracts, use a year code or year date imbedded in the serial number. The year of manufacture should be recorded in a separate data field, whilst maintaining the original serial number (including year date/code) in the serial number data field.

If using Microsoft Excel spreadsheets for data entry then the data entry person must ensure that the cells are formatted as text, otherwise any serial number commencing with a ‘0 – zero’ will lose the ‘0 – zero’ during the process. This error will not only create a false serial number, it will double up the number of firearms recorded if and when the error is noticed and entry re-occurs. Data entry processes should be done with a batch number included, so that blocks of data can be removed, copied or corrected en masse from the database.

Many semi-automatic pistols are marked with the factory common serial number on three major components – the frame, barrel and slide.

Table 1 indicates the correct manner to record a firearm in these circumstances.

<table>
<thead>
<tr>
<th>Serial Number Location</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Serial Number defaced</td>
</tr>
<tr>
<td>Barrel</td>
<td>245PN012345</td>
</tr>
<tr>
<td>Slide</td>
<td>No Serial Number visible</td>
</tr>
</tbody>
</table>

Table 1 indicates the correct manner to record a firearm in these circumstances.

4 Data entry personnel should be closely supervised, as ‘artistic’ serial number entry can become the norm if allowed to occur unchecked.
This will enable future analysis to recognise that the Browning P35 pistol with serial number 245PN012345 has yet to located, but a Browning P35 pistol barrel with a factory applied serial number comprises part of this firearm record. While the defaced frame may be the original Browning P35 with a serial number of 245PN012345, it cannot be proven unless forensic analysis of the defaced frame takes place. Until such time as forensic services can recover and conclude the serial number is correct, the firearm should be recorded with the serial number being identified as ‘Serial Number Defaced’. While this may appear to be of little value, the collection of such uniform data will begin to show a pattern of firearm diversion and the methods used to facilitate it. In all instances it should be recorded as to why there is no serial number recorded, and this can be accomplished by a ‘drop-box’ allowing choices such as:

- Serial Number Defaced
- No Serial Number Visible
- No Factory Serial Number
- Seizure/Exhibit Serial Number Applied

Undertaking such activities will allow those who analyse the data at a later date to have a full comprehension of the firearm and its history, especially if the firearm is subsequently destroyed after seizure or surrender.

Firearms which have upper and lower receivers should have the serial number(s) on each of these major components recorded.\(^5\) In all instances when the firearm left the factory in new condition, the same serial number would have been applied to each component. As the service history of the firearm lengthens it may undergo field repairs during which the upper receiver is swapped with the lower of another firearm, hence the importance to record the location of each number. For this reason all databases should have as mandatory adequate data fields to enter multiple serial numbers and their location.

Firearm serial numbers can be a valuable firearm descriptor in themselves and registry staff should be trained in identification of the many serial number structures that are relevant to unique makes and their models.

**Transliteration of firearm serial numbers**

Any system that records serial numbers must be able to accommodate the transliteration of characters into other languages, while contemporaneously maintaining the original markings in the database for future reference. Specialised software has been developed for this process and is commercially available. (See later section on *Sample software solution for keeping firearm records*).

**Data Fields**

The United Nations Coordinating Action on Small Arms (CASA) ‘Draft International Small Arms Control Standard’ indicates field requirements from 5.1.1.1 thru 5.1.1.7 for record keeping purposes, with 51 fields requiring creation and populating of preferred data.\(^6\)

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\(^5\) Firearms such as the FN FAL, Colt M16, and ‘Luger P08 pistol variants

In regard to serial number data fields, multiple (up to three) fields should be created for any one firearm as various numbers may be located on a frame or receiver of a firearm.

Recording details of destroyed firearms

It is imperative that full and accurate details of any firearm to be destroyed are recorded before destruction takes place. This will ensure that in any subsequent legal proceedings the state can give evidence in court confirming that a unique firearm has been destroyed. The circumstances can occur where a similar make and model of firearms with the same serial number can be located. This may occur because of several reasons:

- Corruption at the destruction centre and the firearm destined for destruction is diverted for further use.
- The assembly of a firearm using stolen receivers/frames and a serial number using a factory format is applied to the illicit assembled firearm.
- Incorrect firearm identification of a previous firearm destroyed.
- Multiple firearms of the same make and model with the same serial number manufactured by the manufacturer.

Time records to be maintained

Firearm transfer/sales records should be kept indefinitely. Recent technology ensures that that the storage space on electronic systems is cheap and readily available. Data can be exported from the main frame and stored in formats that do not take up much space on portable hard-drives.

Firearms will be operational for over a century\(^7\) and it is imperative that sales records are maintained. The records will also require modification as over time law enforcement may discover more information on a particular firearm that requires addition to the database. This is particularly relevant to stolen firearms which are recovered, and those firearms which have been recorded as destroyed but re-appear within the community.

There should no time limit on the storage of firearm transfer data as the contents provide a valuable intelligence holding in relation to possible diversion and firearm trafficking activity.

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\(^7\) The USA Colt manufactured semi-automatic pistol Model 1911 recently celebrated its hundredth birthday and there seems no end to the manufacture of handguns of this celebrated design.
These historical paper records are just part of the total which reflects the sales history of some 460,000 firearms, which was painstakingly transferred to electronic format over a five year period.

Sample software solution for keeping firearm records

While commercial database products are available, the very technical nature of firearms and their variants requires the use of a custom-based application if the purpose of record keeping is to be successful.

The following is a brief description of a sample software solution that could be used for simple or multi-functional management of firearm inventories.

**Weapons Tracker**

The software solution ‘Weapons Tracker’ (WT) has been developed using a FileMaker database. WT can work for standalone Laptops or Desktops as well as networked-centric FileMaker Database Server solutions where wireless and or Internet connectivity is available.

The major advantage of using FileMaker is that it provides a rapid development environment that permits both data integrity and industry standard security. FileMaker provides a robust and flexible relational database that includes a complete range of field types and allows screen designs that can accommodate and capture all relevant firearm data required. FileMaker is a robust fully featured database with a low cost of deployment. The inclusion of container fields to store high-resolution graphics means that firearm identification is simplified for those who are not fully conversant with the wide range of firearms in the market.

The database design is self-documenting and allows ‘click and drag’ to create table relationships. Simplicity of operation in WT has been achieved by establishing a set of gun codes that are applicable for each firearm in respect of its make, model, type, calibre and country of manufacture. To make the identification and collection of firearm details user-friendly, generic firearm type graphics guide the operator. The gun code system ensures minimal data entry, but still populates the full range of descriptors for that firearm. A firearm image and known distinctive markings (where available) are also displayed.
Image 002
WT Main Menu directs user to desired data entry point by use of generic firearm type images.

Image 003
WT data entry page indicating fields for technical data, firearm image and serial number, with a capacity to automate the transliteration of Cyrillic to the Latin alphabet.
WT sample “gun code” information for a Waffenwerke Bern M1929 semi-automatic pistol. The data entry process links with this data set to establish uniform and accurate data results.

In implementing a reliable and sustainable database system, countries should give consideration to the issues of hardware, training, management processes, maintenance and technical support. These are important to manage the risks of lack of use, systems breakdown and data loss.

**Summary**

Recording the details of multiple firearm transactions is an onerous task if done correctly. Technical expertise, motivated staff, on-going government funding and a strong working relationship with industry are all pre-requisites for a successful firearm transaction reporting system.

Software exists to automate many of the tasks that rely upon registry staff having more than a general knowledge of small-arms and light weapons.

The success of creating, modifying and archiving of firearm records will rely heavily upon on-going government support for adequate infrastructure.
Appendix 1

Table 2 below indicates a set of descriptors of Winchester firearm models all chambered for the 308 Winchester (WIN308) Cartridge. The table indicates the Serial Number Range (SNR)\(^8\) and the action type (Type) of the firearm.

RSF – Rifle Select Fire  
RBA – Rifle Bolt Action  
RLA – Rifle Lever Action  
RSA – Rifle Semi Automatic

All the firearms listed in Table 2 have varying magazine capacity as indicated under column ‘Magazine’.

Example

If a firearm record only had the details of make and serial number (SN), then it is apparent that a sample firearm could be any one of five models and action types, depending on the serial number recorded.

It is incorrectly assumed that all that is required to identify one firearm from another is the make and serial number of each firearm.

Sample Firearm Data

Make: Winchester   SN: 202111   Calibre: 308WIN

By using the SNR and the combination of the serial number ‘202111’, ‘Winchester’ make and Calibre ‘308WIN’ indicates the firearm could be any one of four of the five models, as highlighted in Table 2. If the record had an additional descriptor which indicated the firearm ‘Type’ then the rifle could be accurately identified further, but not until all descriptors are recorded could law-enforcement claim to know exactly what firearm they were dealing with.

<table>
<thead>
<tr>
<th>SNR</th>
<th>Model</th>
<th>Type</th>
<th>Calibre</th>
<th>Magazine</th>
</tr>
</thead>
<tbody>
<tr>
<td>19214 - 577866</td>
<td>US Rifle M14</td>
<td>RSF</td>
<td>308WIN</td>
<td>20</td>
</tr>
<tr>
<td>238821 - 581471</td>
<td>Pre 64 Model 70</td>
<td>RBA</td>
<td>308WIN</td>
<td>5</td>
</tr>
<tr>
<td>1 - 548255</td>
<td>US Rifle Model of 1917</td>
<td>RBA</td>
<td>308WIN(^9)</td>
<td>5</td>
</tr>
<tr>
<td>1 - 230199</td>
<td>Model 88</td>
<td>RLA</td>
<td>308WIN</td>
<td>5</td>
</tr>
<tr>
<td>1 - 210054</td>
<td>Model 100</td>
<td>RSA</td>
<td>308WIN</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 2

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\(^8\) The serial number range allocated by the manufacturer to this particular model.  
\(^9\) This indicates a M17 rifle re-chambered from the 30-06 Govt Cartridge to 308WIN cartridge.
Table 3

The four Winchester rifles shown in Table 3 were produced or modified to fire the 308WIN calibre cartridge and have been factory stamped with a same serial number – 202111.

A firearm record that only indicates firearm make, serial number and calibre is not adequate for complete identification.

The capacity to isolate one firearm from another is only achieved by ensuring that a full range of adequate firearm descriptors is included in the record of the firearm.
Appendix 2

Table 4 below indicates the consequence of inaccurate data being recorded. In this case a generic calibre descriptor (Calibre) has been used rather than being more specific. Calibres should be described in full using a manufacturer’s proprietary name (eg 308 Winchester) or with the case length as an extension of the projectile diameter (eg 7.62X54). Table 3 indicates calibres as being incorrectly recorded as ‘30’. This activity now negates any chance of being able to correctly identify the firearm if the following information is recorded:

Make: Winchester    SN: 240000    Calibre: 30

Trying to identify example Winchester rifle # 240000 chambered for ‘30 calibre’ results in five of the eight examples being a possibility, as highlighted in Table 4. The rifle being identified could not be either a US Carbine 30M1, a Model 100 or a Model 88 because the example serial number falls out of the respective SNR's for those three firearms.

Winchester firearms identified by ‘30’ calibre cartridge

<table>
<thead>
<tr>
<th>SNR</th>
<th>Model</th>
<th>Type</th>
<th>Calibre</th>
<th>Magazine</th>
</tr>
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<tr>
<td>19214 - 577866</td>
<td>US Rifle M14</td>
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<td>30</td>
<td>5</td>
</tr>
<tr>
<td>1 - 210054</td>
<td>Model 100</td>
<td>RSA</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>1 - 6980000</td>
<td>Model 1894 variation</td>
<td>RLA</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>1000000 - 7369660</td>
<td>US Carbine Cal 30</td>
<td>RSA</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>100001 - 26559982</td>
<td>US Rifle Cal 30M1</td>
<td>RSA</td>
<td>30</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 4
All of the Winchester rifles pictured above can have the same serial number (see Table 5):

<table>
<thead>
<tr>
<th>Make</th>
<th>Serial #</th>
<th>Model</th>
<th>Specific</th>
<th>Generic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winchester</td>
<td>240000</td>
<td>US Rifle M14</td>
<td>308WIN</td>
<td>30</td>
</tr>
<tr>
<td>Winchester</td>
<td>240000</td>
<td>Pre 64 Model 70</td>
<td>308WIN</td>
<td>30</td>
</tr>
<tr>
<td>Winchester</td>
<td>240000</td>
<td>US Rifle M17</td>
<td>30-06 Govt</td>
<td>30</td>
</tr>
<tr>
<td>Winchester</td>
<td>240000</td>
<td>Model 1894</td>
<td>30-30WIN</td>
<td>30</td>
</tr>
<tr>
<td>Winchester</td>
<td>240000</td>
<td>US Rifle Cal 30M1</td>
<td>30-06 Govt</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 5

Table 6 indicates a more comprehensive calibre description for each of the models, which enables increased capacity to identify the actual firearm under investigation. If the calibre of the subject rifle (SN 240000) was 30-06 Govt then the rifle in question could be either a US Model of 1917 or a US Rifle Cal 30 M1. Recording a full set of descriptors (including the action type) would accurately identify the firearm down to one particular model.

*Winchester firearms chambered for correct calibre cartridge*

<table>
<thead>
<tr>
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<td>Pre 64 Model 70</td>
<td>RBA</td>
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<tr>
<td>1 - 548255</td>
<td>US Rifle Model of 1917</td>
<td>RBA</td>
<td>30-06 Govt</td>
<td>5</td>
</tr>
<tr>
<td>1 - 6980000</td>
<td>Model 1894 variation</td>
<td>RLA</td>
<td>30-30 Win</td>
<td>6</td>
</tr>
<tr>
<td>1000000 - 7369660</td>
<td>US Carbine Cal 30</td>
<td>RSA</td>
<td>30 M1 Car.</td>
<td>15</td>
</tr>
<tr>
<td>100001 - 26559982</td>
<td>US Rifle Cal 30M1</td>
<td>RSA</td>
<td>30-06 Govt</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 6