Identifying the Age of a Vehicle for Commercial Safety and Forensic Purposes Using “Window Stamps”

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Abstract. This paper deals with the issue of rapid, indicative identification of the age of a vehicle using time stamps on various components of the vehicle for technical, commercial, safety and forensic purposes. The main aim of the paper is the possibility of using markings of individual vehicle windows or “window stamps”, in which the times of production of the windows are encrypted in various ways. An analysis of time markings on vehicle windows was conducted on the basis of an extensive collection of photographs of windows from 980 basic vehicle models manufactured between 1991 and 2021, and acquired between 2015 and 2021 as part of the Europe-wide initiative eCall. Research found that 98.8% of all common motor vehicle window panes on the European market come with one of only three basic types of window stamps, which were named Euro-American, Japanese and Korean. The paper provides a detailed description of the structure and decoding of vehicle window stamps of the three specified basic types.

Keywords: vehicles, safety, automotive safety

1. Introduction

For various reasons, in commercial, administrative, security (police) and forensic practice, we need to identify vehicles and their age (date of manufacture) in order to make decisions on further procedures. For that purpose, there is a wide range of identifiers and possibilities that require access to technical and administrative documentation, either in a limited form in vehicle documents, or in an extensive form, where we obtain the required information by connecting vehicle identifiers (registration numbers or VINs (Vehicle Identification Number), or other unique identifiers of individual production components) to various information systems (national vehicle registers, third-party computer records, security and police information systems, or the information systems of vehicle manufacturers themselves and their brand’s servicing networks [1, 2, 3, 4]).

In practice, we may quite often encounter a lack of important information, when the vehicle documents or access to the relevant information systems is not immediately available, and we have to find the age of the vehicle (or its year of manufacture) in the field on the spot. The same problem arises in situations where, even though we have the vehicle documents, we have doubt about their accuracy and need to verify the information in the field on the spot without any other documents or access to remote information systems.
When faced with a lack of information in the field, we can ascertain a vehicle’s year of manufacture (or the model year of manufacture) [5, 6, 7]:

- by decoding the VIN;
- from markings on the seat belts;
- from the dates or years of individual components;
- from the window markings (“window stamps”).

### 1.1 Determining a Vehicle’s Age by Decoding its VIN

In the structure of the VIN, specifically in the 10th position, the manufacturer can locate the year of manufacture (see Table 1), according to the applicable standard ISO 3779:1983 – Road Vehicles -- Vehicle identification number (VIN) -- Content and structure; ISO 3780:1983 – Road vehicles -- World manufacturer identifier (WMI) Code [8]. This is not an obligation, however, but merely a recommendation. Some manufacturers make use of this option, and specify the model year in the 10th position of the VIN. In order to decode this information ourselves, we need to be familiar with the particular conversion table, whether the manufacturer has made use of this option for the specific vehicle model, and the approximate time period in which the vehicle was made, because the codes in Table 1 are periodically repeated after 30 years.

### 1.2 Determining a Vehicle’s Age from Seat Belt Markings

Some manufacturers (especially from Asia and Europe) mark seat belts with cloth or paper identification labels, which are attached to the seat belt in a suitable way around the area of its lower fastening. Selected manufacturers tend to mark these labels at the very least with the year of manufacture, and very often with the exact date. Seat belts are produced slightly before the vehicles themselves are manufactured (completed). In the case of lean manufacturing, numerous observations and analyses have found that the maximum time difference between the production of the belt and the assembly of the vehicle is up to 3 months, and in practice often many times less.

![Figure 1. Examples of labels displaying the MFD (manufactured) date on seat belts. Source: Roman Rak](image)

### 1.3 Determining a Vehicle’s Age from Markings on Components

Much like seat belts, markings can be found on many components of vehicles [9]. In older vehicles they are marked with day/month/year by embossing or pressing. Modern-day vehicle components are marked using laser technology, engraving, scoring or stickers, with dates marked using digits, bar codes or 3D codes [10]. In this case too, there is no significant difference in the times between the manufacture of individual components and the vehicle. Not all vehicle manufacturers always mark seat belts with a time stamp. However, by examining a vehicle thoroughly we will find a considerably larger number of components marked with the time of their production, but not necessarily accurate to the day [11].
1.4 Determining a Vehicle’s Age from Window Stamps

In accordance with current standards, all vehicle windows are marked with “window stamps”, in which we can find a wide range of information, including the time of the window’s manufacture. Unlike the markings of other vehicle components, window stamps can be found on all vehicle windows, observable from the outside without having to open the vehicle’s cabin, engine space or luggage compartment. Window stamps are therefore the first easily accessible places for ascertaining the time of a window’s production and, thereby, the approximate age of a vehicle that has been fitted with such a window. A key disadvantage of window stamps is that the date of manufacture is visually encoded, and in different ways for different makes.

Figure 2. Examples of window stamps from various motor vehicle manufacturers Source: Roman Rak

2. Materials and Methods

An analysis of the structures and encoding of window stamps was conducted with a sample of 980 basic passenger car models covering the European market from 1991 to 2021. The research project was conducted at the Academy of the Police Force in Bratislava (Slovakia) from 2020 to 2021. The sample of basic models (980 in total) was acquired for the task of forensic identification of motor vehicles for the needs of investigative and forensic practice, and for the needs of the units of the Integrated Rescue System as part of the international eCall (emergency call) [12] initiative, which covers all EU member states. For the purposes of identifying vehicles and following correct technological processes when freeing persons from crashed vehicles, a set of photographs was taken for every model in an average quantity of 110-130 photographs per model. The photos captured the exterior and interior of the vehicles, their engine space and luggage compartment, cabin, basic vehicle identifiers, methods of opening the engine space and luggage compartment, the engine itself, the battery, etc. This photo-documentation also included images of all individual windows of the vehicles, including their visual identifiers. On Table 1. Code identification of a vehicle’s model year or year of manufacture in the 10th position of its VIN

| Model year | Code | Model year | Code | Model year | Code |
|------------|------|------------|------|------------|------|
| 1980       | A    | 1990       | L    | 2000       | Y    |
| 1981       | B    | 1991       | M    | 2001       | 1    |
| 1982       | C    | 1992       | N    | 2002       | 2    |
| …          | …    | …          | …    | …          | …    |
| 1989       | K    | 1999       | X    | 2009       | 9    |
| 2010       | A    | 2020       | L    | 2030       | Y    |
| 2011       | B    | 2021       | M    | 2031       | 1    |
| …          | …    | …          | …    | …          | …    |
| 2019       | K    | 2029       | X    | 2039       | 9    |
average, 10 photos were taken of the window stamps on various parts of all of the vehicles’ windows. All of the images were analysed and compared with the basic technical standard. The conducted analyses established basic types of window stamps, their content and means of decoding the information stored in them.

3. Dates of Manufacture of Car Windows and Means of Determining them

One of the most complicated aspects when decoding window stamps is identifying a window’s date of manufacture, because there are no unified norms and standards establishing means of dating car windows.

A detailed analysis ascertained that there are currently three basic methods used in practice, which can slightly differ. These three methods of dating can be named after the countries or continents where they are primarily used:

- Euro-American
- Japanese
- Korean

All three types of dating share a common principle, specifically the use of dots for decoding dates (except for the Japanese method, which has replaced dots with numbers, but the principle remains the same). They differ in the methods and locations in which dots are used.

3.1 Euro-American dating

Euro-American dating is based on dots and numbers, which appear, in most cases, near the bottom of the window stamp. The number located either below, next to or in between the dots identifies the year. Individual months are then identified by the dots next to or above the number (the location of the dots determines the method of decoding). The last places where dots can occur may be in the area under the number. These dots identify individual weeks in which windows are produced.

![Image of a window stamp with dots and numbers]

**Figure 3** An example of one of the most frequently used forms of encoding the date of manufacture in a window stamp

Generally speaking, the method depicted in Figure 3 is the most commonly used form of encoding. The image shows the most common means of encoding the date in the Euro-American window stamp type. In this example, the figure 19 represents the year 2019. The number of individual dots on the left and right-hand sides identify the month. The dots underneath the figure 19 represent the number of the week within the particular month of manufacture. For example, three consecutive dots to the left of the number 19 (the year) mean the month of March.
3.1.1 First Euro-American dating type

The first most frequently used method for vehicle windows made in Europe and America is shown in Figure 3. This type appears relatively simple to decode. A problem occurs when, instead of the number 19 (identifying the year), we find the number 1 (or any number from 0 to 9). In such cases, 1 could mean 2001, 2011 or 2021. To find the exact decade of production, we must be able to determine it based on the vehicle’s model year, according to the known period of a minor model change, markings of the vehicle’s components, identification labels and stickers, etc. Automotive specialists can easily ascertain such information.

Another way of more precisely decoding a window’s date of manufacture is by using the English alphabet, or a number that can occasionally be found near the basic date markings. The year of manufacture can be identified according to the sequence of letters in the English alphabet and the corresponding numbers as shown in Table 2.

Table 2 The sequence of letters in the English alphabet and the corresponding numbers for identifying years of manufacture

| Letter | Number |
|--------|--------|
| A      | 1      |
| B      | 2      |
| C      | 3      |
| D      | 4      |
| E      | 5      |
| F      | 6      |
| G      | 7      |
| H      | 8      |
| I      | 9      |
| J      | 10     |
| K      | 11     |
| L      | 12     |
| M      | 13     |
| N      | 14     |
| O      | 15     |
| P      | 16     |
| Q      | 17     |
| R      | 18     |
| S      | 19     |
| T      | 20     |
| U      | 21     |
| V      | 22     |
| W      | 23     |
| X      | 24     |
| Y      | 25     |
| Z      | 26     |

Some stamps use English letters that do not represent an exact number, but rather supplement another number, see Figure 4, right.
Figure 5 (left) shows a window stamp from a Škoda Kamiq made in January 2019 (one dot before the number 9 under the letter (A) represents the month, see Figure 4, left, and the number 9 located below the letter (A) identifies the possible year as either 1999, 2009 or 2019. The letter A in the box marked (B) identifies the decade).

The examples in Figure 4 (left) and Figure 5 (right) are less commonly used methods, but it is important to be able to recognise them. This first dating type more commonly only uses a number and dots representing the month, and possibly the week of the window’s manufacture.

The window stamp in Figure 5 (right) with a red box highlighting the method of encoding the date of the window’s manufacture is taken from a Cadillac XT4. The date of manufacture is the second week (two dots at the bottom of the box) in January (one dot before the number 20) of 2020 (the number 20 itself).

Figure 6. Window stamp from a Volvo V60 Cross Country (left) and a Dodge Durango (right)

Figure 6 (left) shows a window stamp from a Volvo V60 Cross Country highlighting the encoded date of manufacture (framed in red). The car window was manufactured in the first week (one dot at the bottom of the red frame) in March (three dots to the left of the number 19 represent the third month) of 2019 (the number 19 marks the year).

The example window stamp in Figure 6 (right) is taken from a Dodge Durango, again highlighting the window’s date of manufacture (framed in red). In this case, the car window was made in July (one dot to the right of the number 17) of 2017 (the number 17 marks the year).

Figure 7. An alternative way of expressing the month of manufacture by subtraction
3.1.2 Second Euro-American dating type

The second type differs from the first in the way that the dots are positioned or the number of dots on one side of the number. This method uses subtraction. If a dot is in the 12th position (see Figure 7), this does not mean December as in the first case, but rather that the month of manufacture is January. In this case the dots are located either in the section above the number, or just to one side of the number. A problem occurs in cases where the window manufacturer uses precisely this subtraction method, and on one side we find, for example, two dots. It is not then possible to tell whether the month is February or November.

Figure 7 shows an example for decoding the date of manufacture from the second Euro-American window dating type. Black dots are located next to the number five (framed in red) and grey dots are located above it. The black dots represent one way of locating the month in the window stamp, and the grey dots represent the second possibility for locating them. From the picture, it can be deduced that 12 dots either before or above the number 5 mean January, and 1 dot means December. For a complete list of the months and the corresponding number of dots, see Table 3.

Table 3 Distribution of individual months according to the number of dots in the second Euro-American car window dating type

| Number of Dots | Month   |
|----------------|---------|
| •••••••••••••••| 12 January |
| •••••••••••••| 11 February |
| •••••••••••••| 10 March   |
| •••••••••••••| 9 April    |
| •••••••••••••| 8 May      |
| •••••••••••••| 7 June     |
| •••••••••••••| 6 July     |
| •••••••••••••| 5 August   |
| •••••••••••••| 4 September|
| •••••••••••••| 3 October  |
| •••••••••••••| 2 November |
| •••••••••••••| 1 December |

Figure 8 shows an example for decoding the date of manufacture from the second Euro-American window dating type. Black dots are located next to the number five (framed in red) and grey dots are located above it. The black dots represent one way of locating the month in the window stamp, and the grey dots represent the second possibility for locating them. From the picture, it can be deduced that 12 dots either before or above the number 5 mean January, and 1 dot means December. For a complete list of the months and the corresponding number of dots, see Table 3.

Figure 8. Window stamps from a BMW series 7 (left) and a Škoda Kodiaq (right)

Figure 8 (left) shows a window stamp from a BMW series 7, highlighting the section where the window’s date of manufacture is encoded. The window was produced in October (four dots above the number 4) of either 1994, 2004 or 2014. According to an analysis of the car’s VIN (WBAYB01040D126525), the car was made in 2014, and therefore the window was also made in 2014.

Figure 8 (right) shows a window stamp with the encoded date of the window’s manufacture framed in red; it contains the number 1, identifying the window’s year of manufacture as either 1991, 2001, 2011 or 2021. Above the number there are 12 dots, identifying the month of manufacture as January. We cannot ascertain any further information about this window stamp (source of image1), so the exact date of manufacture cannot be identified with certainty. From the information available in the window stamp, we can identify the month of manufacture as January (see Table 3). The window’s year of
manufacture is either 1991, 2001, 2011 or 2021. Information which could help us to identify a more precise date of the window’s manufacture includes, for instance, the technical properties of the glass (HUD, for example, would almost certainly eliminate 1991 and 2001), or the model of the car (for example, if the window was fitted in a Škoda Kodiaq, its year of manufacture would be 2021, because this car has only been in production since 2016).

Figure 9. Examples of encoding the year of manufacture using the subtraction method (left) and the Japanese dating method with an imaginary decoding table

Figure 9 (left) shows another car window stamp. The red frame contains the number 8, which identifies the possible year of manufacture as 1998, 2008 or 2018. You can see 11 dots to the left of the number 8, identifying the month as February (see Table 3). As we do not have any further information for this kind of window stamp, all we can say with certainty is that the window was made in February of either 1998, 2008 or 2018. We can determine the decade of manufacture based on further knowledge of the examined vehicle.

3.2 Japanese dating type

The Japanese dating type is distinguished by the fact that, at a first glance, the dots or numbers seem to make no sense. In order to decode them, we need to draw an imaginary grid, which will help us to identify the window’s date of manufacture. This dating type can take the form of dots or numbers, where it is more complicated to decode the meaning of the dots in some cases (for example, when there are not enough dots for us to create a decoding grid in the area where the date is encoded).

The data in the window stamp in Figure 9 (right) can be decoded with the help of the outlined decoding grid.

The numbers in the rows from top to bottom mean:
1) years
2) months
3) days

There are two Japanese dating types.

3.2.1 First Japanese dating types

The first Japanese dating type uses dots. In order to decode the information, we need to create an imaginary calculation grid (see Figure 9, right) to help us determine when the car window was made. In the individual cells on each row, we enter powers of the number 2 (1, 2, 4, 8 and 16).

In the row to the left of the symbol (1) (in Figure 9, right), you will see a row with dots above the numbers 1 and 4. These numbers are added together (1+4=5), identifying the year of manufacture as 2005. The row to the left of the symbol (2) identifies the month of manufacture. Once again, we add the numbers together, revealing the month of May (1+4=5 and May is the 5th month of the year). The last row to the right of the symbol (3) helps us to ascertain the day of manufacture, in this case the second day of the month. From the information in the window stamp, we can therefore date the production of the window to 2 May 2005.
Figure 10. Window stamp from a Japanese Subaru Forester with an example of the first Japanese encoding type

The left side of Figure 10 shows a standard window stamp located on a Subaru Forester window. The right-hand side of the image presents an example of how to decode the first Japanese dating type using an imaginary table. A table has been drawn up around the dots at the bottom of the image (see left-hand side), with each cell marked with a number. When added together, the numbers in the cells containing the dots (1 and 8) in the top row (indicating the year of manufacture) equal the number 9 (identifying the year of manufacture as either 2009 or 2019). Adding up the numbers in the bottom row (2 and 8) produces the number 10, corresponding to the 10th month of the year (October). The red frame above the table highlights the data “10S”. Adding the number 10 to the earlier possible year of manufacture (2009) gives us 2019, and S is the 19th letter of the English alphabet (see Table 2). The letter S helps us to determine the year of manufacture as 2019, not 2009, according to the relevant table. This confirms that the window was manufactured in October 2019.

Figure 11. Window stamp from a Honda Jazz

The left-hand side of Figure 11 shows a window stamp from a Honda Jazz. The right-hand side shows a modified version with a table and a frame for decoding. The top row of the table (serving to decode the year of manufacture) contains dots in positions 2 and 8. The sum of these numbers is 10 (identifying the year of manufacture as 2010 or 2020), while the bottom row contains a dot in position 2. This indicates the second year of the month (February). The red frame above the table containing “10A” helps us to determine the exact date, just like in the previous example. Adding the number 10 from the frame to the previous sum of 10 (2+8) gives us the year 2020. The letter A here, just like in Figure 5, helps us to clarify the decade. The first decade ends in 2010 (the sum 2+8 in the first row of the table). The second decade is indicated by the letter A = 1 (see Table 2). The resulting decade is 2010 + 10, i.e., 2020. This example does not specify the day of production (there are only two rows in the table).

A problem with this kind of window dating arises when there are only two dots, one above the other, in the space for decoding the date (it is not then possible to draw up a decoding grid with the corresponding numbers with certainty and to obtain the date of manufacture).

3.2.2 Second Japanese dating type

Instead of dots, the second Japanese dating type uses numbers. It uses the same method as with dots, but in the created grid there are only numbers where the dots would be. This method is easier to decode. The same rules as in the previous method apply. The numbers can be arranged in up to three rows, where the top row indicates the year, the second row identifies the month, and the last row indicates the exact day of the window’s manufacture (the third row indicating the precise day is less common and is not required).
Figure 12. Window stamps from a Toyota Hilux (left) and Suzuki Celerio (right)

Figure 12 (left) shows a window stamp from a Toyota Hilux, with two areas marked for decoding the date of manufacture. The lower box highlights the second Japanese method of encoding the date of manufacture. This method is simpler, because we do not have to form a grid to ascertain the numerical values in the rows (the first Japanese type contains dots, which are located in similar places to the numbers in this method). The top row produces a sum of 10 (2+8), which gives us a value indicating that the window was manufactured in 2010 or 2020. The bottom row contains only the number 1, corresponding to January (the first month of the year). Finally, the letter T can be found in the upper box (helping us to ascertain the year of production using the English alphabet), representing the number 20 (see Table 2). From this information, we can deduce that the window was made in January 2020.

Figure 12 (right) shows a window stamp from a Suzuki Celerio with boxes highlighting the data encoding the date of manufacture. The top row contains the numbers 1 and 4, which produce a sum of 5 (possible years of manufacture are 1995, 2005 and 2015), while the bottom row contains the number 4, indicating the 4th month (April). The model year for this particular car is 2015, meaning that the window was made in April 2015.

3.3 Korean dating

Korean car window dating uses dots, which are most often located above and below the name of the window manufacturer in a window stamp. In this encoding system, the dots above the window manufacturer’s name indicate the year of manufacture, while the dots below it indicate the month.

There are two Korean dating types:

- The first Korean dating type uses the window manufacturer’s name to encode the date of manufacture.
- The second Korean dating type uses a DOT code to encode the date of manufacture.

3.3.1 First Korean dating type

The first Korean dating type is distinguished by dots above and below the window manufacturer’s name. While there are no clearly set encoding rules for individual manufacturers, as a general rule the dots placed above the manufacturer’s name are used to identify the year of manufacture, and the dots below the name are used to indicate the month.

Figure 13. Window stamp from a Daewoo Evanda (left) and the means of decoding the time of manufacture (right)
Figure 13 (left) shows a window stamp from a Daewoo Evanda. The red circles contain dots that are used to decode the window’s date of manufacture. The upper dots (in this case one above the letter A) help us to decode the year of manufacture, and the lower dots (in this case one below the letter R) help us to decode the month.

As mentioned above, the dots above the manufacturer’s name serve to identify the year; a table can be drawn around the letters in the name to make it easier to decode the year and month of manufacture.

In Figure 13, a grid for decoding Korean dating is shown on the right. The top section contains data for decoding the year of manufacture, and the lower section for the month. It can therefore be said that the dot for the year of manufacture in this window stamp is located above the letter A, which corresponds to the position in auxiliary Table 2 (possible year of manufacture 2002 or 2012). This example does not give us enough information to determine the exact year of manufacture, but the possibilities are 2002, 2012, 2022, etc. In this case, we proceed in the established manner and determine the decade of manufacture based on other information about the vehicle that is available for us to examine.

By decoding the VIN, we ascertained that the model year was 2003. The lower dot serving to identify the month is located under the letter R and is marked with the number 11. The window was therefore made in November 2002 (the lower dot under the letter R is marked with the number 11). So the window was made in November 2002.

This dating type has already been shown in the first two pictures document. It is a method where dots are used above and below the name of the window’s manufacture. The upper dots serve to decode the year of production, while the lower dots indicate the month.

**Figure 14.** Example of decoding the time of manufacture of a window from a Lexus

Figure 14 provides an example of the procedure for decoding the first Korean dating type in the case of a window made by AGC AUTOMOTIVE (found primarily in the Lexus factory). The full dots in the top row indicate the year of manufacture, where 0 encompasses all whole numbers. The rings by the side of and under the letters of the word AUTOMOTIVE indicate the month of the window’s production, where 1 means January and 12 means December.

**Figure 15.** Window stamp from a Lexus LC500 (left) and a Daewoo Evanda (right)

Figure 15 (left) shows a window stamp from a Lexus LC500 with dots circled in red above and below the manufacturer’s AUTOMOTIVE brand for decoding the date. The year of manufacture is indicated in the upper circle (the dot above the letter E). The value above the letter E in this case corresponds to the number 0, meaning either the year 2000, 2010 or 2020. The dot in the bottom row designating the month of manufacture is located under the letter M, corresponding to the number 6 or June (the 6th month). The final and additional information for decoding the date is the make and type of motor vehicle itself. The model year is 2021. We can therefore say that the window was made in 2020.
Figure 15 (right) shows a window stamp from a Daewoo Evanda. The places for decoding the date of manufacture are located above and below the manufacturer’s HANKUK SEKURIT brand. The same rule applies as for all Korean dating types, where the dots above the name denote the year, and the numbers below indicate the month. According to the sample image, the letter A corresponds to the number 2 for decoding the year (2002, 2012 or 2022). The lower dot indicating the month of production is located under the letter R, which marks the 11th month (November). The Daewoo Evanda’s model year is 2003. From the information that we know from the window stamp and the vehicle itself, we can deduce that the window was made in November 2002.

3.3.2 Second Korean dating type

The second Korean dating type uses dots above and below a DOT code. The method of decoding remains the same. The upper dots indicate the window’s year of manufacture, while the lower dots identify the month.

![Figure 16. Basic method of decoding the second Korean type](image)

Figure 16 shows the method of decoding the second Korean type. The spaces for decoding the date are located below and above the DOT code. The dots above the DOT code indicate the year of manufacture, where the code starts with the letter D, representing the number 1 for the years 1991, 2001, 2011 or 2021, and carries on until the letter M, indicating the number 10 (1990, 2000, 2010 or 2020). The bottom row indicates the month, where the code starts with the number 1 (January) and ends with the number 12 (December, in this image located under number 3 in the DOT code).

![Figure 17. Window stamps from a Kia Sorento (left) and a Genesis G90 (right)](image)

Figure 17 (left) shows a window stamp from a Kia Sorento. The spaces for decoding the date are located above and below the DOT code. The year of manufacture can be found in the red circle above the letter M in the DOT code, representing the number 10 (possible years 1990, 2000, 2010 and 2020). The month of the window’s manufacture is located under the number 8, which in this case means June, the 6th month of the year (the number 8 is in the 6th position of the code). The model year of the Kia Sorento is 2021, so according to this information, the window was made in June 2020.

Figure 17 (right) shows a window stamp from a Genesis G90. The areas for decoding the date of manufacture are located below and above the DOT code, where the upper dots indicate the year, and the lower dots identify the month of the window’s manufacture. The month of manufacture can be identified as May, because the lower dot is in the 5th position of the DOT code under the number 4. The year of manufacture is indicated by the upper dot, which is in the 6th position under the number 8. The sixth position could represent the years 1996, 2006 or 2016. The car’s model year is 2017, so the window was made in May 2016.
3.4 Less common ways of encoding dates of manufacture in window stamps

Because there is no uniform regulation for dating car windows, in practice we may also encounter other window stamp dating types, which are in the minority in the European Union.

Figure 18. Examples of Carlite codes

Figure 18 (left) shows an example of how to decode a Carlite window stamp. The box in the bottom left-hand corner shows the method of decoding the year of manufacture with an arrow pointing towards the figure 0 (same method of decoding the year as in the Euro-American type). The right-hand box contains two methods of determining the month of the window’s production.

Figure 18 (right) shows a way of decoding Carlex window stamps. On the left-hand side (arrow from the dot pointing downwards to the left), you can see the method of decoding the year of manufacture. Above the word “Carlex”, we create a table, and decode the year according to the position of the dots, e.g., the one dot above the letter C in this example represents either 0 or 5 (possible years of manufacture are 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, and so on). The arrow pointing to the right-hand side shows us how to decode the month. A single dot underneath one of the letters in the word “Carlex” indicates a month from January to June (one dot under the letter C means January, and one dot under the letter X means June). Two dots under one of the letters indicate the months from July (C) to December (X).

Figure 19 Other decoding methods
Figure 19 (left) shows a Safeguard window stamp on an unidentified Chrysler model. The method of decoding is similar to the second Japanese type. The arrows show us how to decode the year of manufacture (the top right arrow pointing to the number 8) and the month (top left arrow pointing to the numbers 2, 4 and 5). In the bottom right, the number 1 indicates the week of manufacture, while the bottom left arrow points to a number indicating the day of the week. The decoded date on this window stamp is the second (day = 2) of November (month 2+4+5=11) of either 1988, 1998, 2008 or 2018 (years = 8).

Figure 19 (right) shows a window stamp of the manufacturer Carlite. The method of decoding is demonstrated by the red boxes. On the left-hand side, you will find the number 0, indicating the year of manufacture (same method of decoding as in the Euro-American type). On the right-hand side, the month is decoded using letters. In this example, you will find the letter D, which identifies the precise month (April) according to the table on the right. This window stamp was therefore produced in April of either 1980, 1990, 2000, 2010 or 2020.

4. Discussion

Identification of a vehicle, including its age, is a common task in automotive, commercial, safety and forensic practice, and can be put to practical use in various ways [13, 14]. There are many other ways to determine a vehicle’s exact age. The most accurate method, although not always the fastest, simplest, or most readily available, is identifying a vehicle based on its VIN (global identifier) in the manufacturer’s information system [15]. From there, it is possible to obtain the exact date of production of any given vehicle. Identifying a vehicle this way requires access to the above-mentioned manufacturer’s database and the “willingness” of the manufacturer to provide the required information to interested parties from various institutions (individuals, private companies, third-party partners, and government authorities and institutions, including the police, investigating bodies, courts and security forces) [16]. As a general rule, access to a manufacturer’s systems is limited to a restricted group of potential enquirers, based especially on applicable legislation [17, 18].

Situations arise, however, where we need to very quickly determine at least a vehicle’s approximate age using various secondary identifiers during an initial examination of the vehicle at the site of an inspection or, in extreme cases, the scene of a crime, and only then, in case of further need and possibly after some time, can we identify the vehicle more precisely [19].

Vehicles generally contain a range of various components marked with the time of manufacture. Some can be identified to a specific day, while others can only be identified to a precise month or year of manufacture. For primary orientation, such time periods are more than sufficient. Today, vehicles are assembled on production lines “just in time”, meaning that the date of their assembly in the modern globalised world does not differ fundamentally and extensively from the date of their completion with individual components marked with various time stamps. In five years of research and examination, we have found maximum time differences of just 1-3 months between the manufacture of individual components and the completion of a whole vehicle.

Another factor that decides on the method of determining a vehicle’s age is whether we have the opportunity or the right to examine the interior, i.e., to open the vehicle by some means, and to provide access to spaces such as the cabin, engine space, luggage compartment and other spaces. We cannot always do so, and it is in precisely such situations that window stamps, which are a legitimate source of information for any observer from the outside of the vehicle, provide a suitable indication as to the approximate time of manufacture.

5. Conclusions

This paper has analysed the encoding of dates of manufacture in window stamps on 980 basic passenger car models manufactured between 1991 and 2021. The analysis found that there are three basic methods of encoding time data in window stamps: the Euro-American, Japanese and Korean
methods. Each type uses two other, more detailed methods of logically indicating a window’s date of manufacture with dots, letters and numbers. We found that the three above-mentioned basic methods of indicating the date of manufacture of passenger car windows cover 98.8% of all commonly found vehicles on European roads within the past 30 years.

A fundamental problem when attempting to determine a vehicle’s date of manufacture based on its windows or window stamps is the fact that there is no standardised, uniform procedure, and a person who wants to use this method must have good knowledge and experience of the three basic approaches that have been described above. In addition, this person must have at least a basic knowledge or an idea of which vehicle models (including versions with minor model changes) were produced within which time frame, so that it is possible to determine the correct decade, e.g., 2001, 2011 or 2021, in cases where the manufacturer encodes the year with the number 1.

A fundamental question remains: why do car window manufacturers today use such sophisticated or coded methods of indicating the year of manufacture, instead of marking windows with a simple date of manufacture such as 25/12/2021?

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