# IMPLEMENTATION OF THE EUROPEAN DIRECTIVE ON "IDENTIFICATION & TRACEABILITY OF EXPLOSIVES FOR CIVIL USES" WITHIN IRELAND

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## INTRODUCTION

A European Directive on “Identification & Traceability of explosives for civil uses” came into effect on the 4th of April 2008 (2008/43/EC). The Directive was part of a wider initiative to address concerns relating to the security of civil explosives and pre-cursers within the European community following a number of high profile incidents in recent years (EU Commission Com (2005) 329) and (EU Commission Com (2007) 651).

The Directive is intended to establish a harmonised system for the unique identification and traceability of all packaged explosives, detonators, reels of detonating cord, primers and other explosives articles used in civil applications across the European Union. It requires all packaged explosives manufactured after 5th of April 2012 to be uniquely identified and tracked to their final usage point after that date. The requirements of the Directive apply to all explosives manufactured and imported into the European Union after that date. At the time of drafting this paper, consideration is being given to extending the implementation date to 5th April 2013 for products manufactured after that date, with some changes being introduced to remove the requirement to identify very small items. The change will also postpone tracking of items by end users until 5th April 2015 with all stock being identified that date.

To achieve a harmonised position, a European Explosives Code structure (FEEM, 2009) has been agreed by members of the Federation of European Explosives Manufacturers. This code employs the global standards of application identifiers to segregate data in a common format, enabling all manufacturers’ unique code to be read and receipted into stock throughout the European explosives supply chains. The code has the flexibility to enable each manufacturer to add additional information for their own purposes and for the benefit of their customers, should they decide to do so.

This Paper also describes the process used within the Kemek Group in Ireland to design, install and commission a tracking system to identify individual items, and then track them at the logistical unit level through each stage of the logistics chain to the end use. While bar-coding is widely used in our everyday lives, the requirement to track at item level, in real-time over large area sites isn’t the normal application of this technology.

## THE DIRECTIVE

In the later part of 2004, following a number of high profile terrorists attacks within Europe, political opinion emphasised the need for greater control over access to explosives. The European Commission initiated discussions with the Federation of European Explosives Manufacturers to improve the security of explosives within the European Union. With the support of the FEEM Executive, a FEEM Security Working Group was established, with many of its members nominating personnel to participate in the future development of security in the industry.

At the outset, the EC sought to limit access to explosives by terrorists by:

(i) Considering marking / tracking of explosives
(ii) Implementing greater control of ex-military explosives
(iii) Determining the extent of risk
(iv) Improving the detectability of explosives / detonators

As support grew, an EC Working Group was established, comprising of representatives from many European countries from National Authorities, Security Agencies and Industry, forming the Explosives Security Experts Task Force. Over a period of months, this group made a total of 55 proposals (2), one of which became the European Directive titled "The Identification and traceability of explosives for civil uses" (1). This paper relates only to how the requirements of this Directive are being met.

The Directive on Identification & Traceability of explosives came into effect on the 4th of April 2008. It is intended to establish a harmonised system for the unique identification and traceability of all packaged explosives, detonators, reels of detonating cord and primers used in civil applications across the European Union. The Directive was to have been adopted into the national legislation of each European Union member state by the 5th of April 2009 with compliance achieved throughout Europe by the 5th of April 2012. Many of the national authorities failed to achieve the targeted date of April 2009 to implement the national legislation, illustrating the difficulty many countries faced in drafting, consulting and implementing the requirements within the short timeframe. This has placed the European explosives industry in a position that it is now extremely unlikely that full compliance can be achieved by April 2012. The industry has lobbied for an extension of the implementation date and a decision on this shall be made by the European Commission in the near future.

The requirements of the Directive are likely apply to all civil explosives manufactured after 5th April 2013.

In summary, the Directive requires:

(i) Unique readable identification for each explosives article (with an exemption likely for specified small items)
(ii) A means of recording information on each uniquely identified article throughout the supply chain and life cycle.
(iii) Retention of all information relating to the unique article during its life cycle for a period of 10 years
(iv) Regular testing of the data collection to ensure the effectiveness of the storage system and quality of the data recorded
(v) Providing competent authorities with information on any unique article upon their request
(vi) Appointment and disclosure of contact details of a person who can provide information on any unique article outside of working hours.

The readable identification number that must be visible on every explosives item may, or may not be the full code associated with the item. The readable part will enable the traceability process to commence, by identifying the country and site where the item was first manufactured, along with a unique number. To determine the life cycle of the item, the trail starts with the manufacturer and moves along the supply chain by checking the relevant databases throughout the chain.

## THE TECHNICAL REQUIREMENT

We see tracking of products, containers and vehicles all around us every day of the week, and generally we understand what they do. Using a digitally readable number or code, an association is made within a database to a price, a product description, a product code, your photograph (such as used by airport security), a batch or something of that nature. Scanning the label enables us to capture the information relating to that code to use for management purposes. The technology isn't widely used for capturing unique numbers that are linked to associated unique numbers that may have sub-assembly numbers contained within them. The links and associations may be broken when repacking occurs, with some sub items remaining associated, while others are linked to a new unique number. It's this concept that starts to scratch the surface of what the European explosives industry have been required to undertake. You then consider the number of explosives manufacturers in Europe, all likely to design their own coding solution and a problem immediately arises. How are downstream customers going to be able to process data in a range of formats that are not compatible with each other? This isn't a new problem, as other industries globally have had to address the issue. Global Standards exist that enable codes to be created for this purpose. Having identified the issue, the European industry collectively agreed to resolve it.

The solution to achieve barcode harmonisation between all companies and supply chains was enabled by the collective adoption of "application identifiers" (AI's). These in effect are prefixes prior to fields of information that allow databases to recognise the information and place it in the appropriate location in the database. This was achieved

by the industry in the later part of 2009, and ratified by the F.E.E.M. Executive in January 2010.

Having created a Standard of AI's, systems can then be developed and implemented to capture data at the point of manufacture, allocate storage locations, change storage locations, book stock out to customers, track material in transit, implement point of receipt proof, etc. All of this can be done in real time, in batches or a combination of the two. Reports can be generated to provide all of the information to meet the legislative requirements, but the opportunity also arises to improve existing quality control systems, inventory management, factory licence compliance and monitoring of efficiency.

The format of the type of barcode used (either 1 dimension or 2 dimensional) is optional, but in reality, a 2D (matrix) barcode is more likely to be adopted given that it can contain a significantly greater quantity of data within a small area and it is more robust. This means that even in the event of a portion of the barcode being damaged, it can still be read. A 1D barcode containing 5-6 different fields and AI's will be too long for a practical sized label.

Should an item be recovered from a terrorist device, if the label is available, the country and number of the manufacturing site (the first 5 digits on the code) along with the unique number will enable the authorities to commence their investigation. They would then progress down the supply chains records to determine the last point at which the article was known to have been secure. Evidently, it is very easy to remove the label such that all traceability is lost, defeating the objective of this Directive. Past experience demonstrates that this doesn't always happen and the information has been recovered and used to gather additional information.

## KEMEK'S EXPERIENCE IN TRACKING EXPLOSIVES

The Kemek Group comprises of two explosives companies, Irish Industrial Explosives located in the Republic of Ireland and Ulster Industrial Explosives located in Northern Ireland (within U.K. jurisdiction) Due to the political unrest over decades, security of civil explosives has always been a major operational constraint in conducting business. All packaged explosives have been required to be coded and records maintained of where each case was delivered. In 1994, bar-coding technology was introduced in N. Ireland that enabled the tracking of all explosives to be routinely computerised. The system operated as a continuous process at the manufacturing stage and as batch processing at the dispatch end. All cartridges within each case displayed the same number as the case label. The required number of cartridges were scanned and counted electronically and then matched with the same case number. Cases containing less than the standard number of cartridges were not permitted. This system operated very effectively until 2010, when the change to tracking at item level has been made.

The new track and trace Directive requires each individual explosive item to have a unique number that must be traced throughout its lifecycle. There will no longer be the opportunity to track a case on the understanding that everything shall be contained within that case until its final destruction. What is required is the ability to add or remove items from any packaging unit, create a new packaging unit with other items and then

track it regardless of where it is stored, transported or used, until final destruction. It is the item that is tracked, not the case. A problem for the explosives industry is that on receipt of items, we can't un-package cases and scan each item within it. The label placed on the case cannot contain all of the information relating to the items contained within the case as the case contents may be broken down and segregated at some point in the supply chain. All of the information relating to each item must be assembled within a database. At the manufacturing stage, this will often require high speed scanning equipment to ensure that production isn't impaired due to the requirement to capture these data. Thought needs to be given to how to manage an un-scanned label, a label falling off the item before it is scanned, or a rogue label rotating around a conveyor. Will the system permit the same label to be scanned twice? These are some of the issues to be considered in the design of a scanning system.

Having packaged items within the manufacturing environment, it is relatively easy to track the cases and pallets that items are on and which magazines they have been moved to. Scanners capture all of the information relating to each transaction and it can be input to the database either in real-time or in batch processing. Real-time significantly adds expense to the overall project, but it removes the synchronisation issues that may arise in batch processing. If operating in real-time, the scanner is instantly transmitting the data as it is collected to the system, which compares it to what is currently in the system. Numbers can't be duplicated, dispatched before receipted into stock or if quarantined. While operating in batch, the process of obtaining this verification is different. As an example, in batch processing, there is the potential to attempt to transfer or dispatch products prior to them being entered on to the system. The action will not be red flagged until the process has the opportunity to conduct the verification. The system needs to be designed such that it has an infallible audit trail; so within a batch process, an item can't be dispatched if it hasn't been initially manufactured and created and receipted onto the system from another supplier. Within a manufacturing environment, real-time will be essential in most situations, while within depot operations, batch processing shall suffice.

Having designed a system for the collection of the necessary data relating to each explosives item manufactured and where it has been transferred to within the company's storage locations, at some point the products are going to be dispatched to a customer. The information contained within the European Explosives Code Structure for each item is likely to have to be passed to the customer. The customer isn't going to open every case upon receipt to scan and capture that information. They most likely will do as they currently do, count the number of pallets and verify the number of cases on each pallet, and accept the consignment as seen, on the basis that it hasn't been verified at item level. To obtain all of this information, the customer would require an electronic file containing all of the information for each item. This would then be uploaded into their stock management system to reflect the stocks receipted. An electronic file transfer format has also been agreed by F.E.E.M., enabling software to be designed to upload incoming data and manipulate it into the database such that it can be read and use.

Most will agree that the concept of adding a unique label to an explosives item isn't going to add significantly to the security of explosives. In certain circumstances, it will provide information that will be of benefit in the investigation process. The requirement will however be mandatory within Europe, therefore implementation will occur. If

however consideration is given to the design of the tracking system, benefit and efficiencies can be gained by using the opportunity to improve upon existing stock management routines and quality control. It also ties into commercial transactions as the audit trail will introduce a very strong proof of purchase.

As with all IT projects, the introduction of the identification and traceability of explosives Directive within explosives supply chains has the potential to be more expensive and time consuming that it needs to be. Implementation needs to be planned and specified as tightly as it can be. Certain aspects of the project are unlikely to be fully priced without upfront investment. This is an investment worth seriously considering and hidden costs can and often do develop, as occurs in many IT projects.

## CONCLUSION

It is likely that as of 5th April 2013, all civil explosives manufactured in a European Member States will bear a unique number in a readable form, and have records associated with it that enable the article to be traced from the point of manufacture or import to its end User. The records must be kept safe and be retrievable upon demand by national authorities. The European explosives industry is required to have implemented a harmonised system that will enable this to occur and be fully operational, but implementation may be deferred from April 2012 to April 2015.

## REFERENCES


1 Official Journal of the European Union
Commission Directive 2008/43/EC
The Identification & Traceability of explosives for civil uses

2 Communication from the Commission on measures to ensure greater security in explosives, detonators, bomb-making equipment and firearms.
Com (2005) 329

3 Communication from the Commission to the European Parliament and the Council on enhancing the security of explosives
Com (2007) 651

4 Guidance Note on the FEEM European Explosives Code Structure (November 2009)

| Field | Digits | Format | Application Identifier | AI Description | Length | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Country & Production Site No.** | 5 | Alpha-Numeric | (90) | Mutually agreed between trading partners | Variable but used as a fixed number to 5 digits | **Mandatory to comply with Directive e.g. FR002 – France, 2nd site** |
| | | | | | | |
| **Unique Item No. OR Logistical Unit No.** | 30 | Alpha-Numeric | (250) | Secondary Serial No. | Variable up to 30 characters | **Mandatory to comply with Directive** |
| | | | | | | |
| **Production Date** | 6 | Numeric | (11) | Product Date (YYMMDD) | Fixed | **Optional** |
| | | | | | | |
| **Product Code** | 30 | Alpha- Numeric | (240) | Additional Product Identification Assigned by Manufacturer | Variable up to 30 characters | **Optional** |
| | | | | | | |
| **Batch Number** | 20 | Alpha-Numeric | (10) | Batch or lot number | Variable length | **Optional** |
| | | | | | | |
| **Quantity** | 8 | Numeric | (37) | Count of items contained in a logistic unit | Variable Length | **Optional** |
| | | | | | | |
| **Net Explosive Quantity** | 6 | Numeric | (310n) | Product net weight in kgs | Fixed | **Optional** |
| | | | | | | |
| **Unit of Measure** | 6 | Numeric | (311n-316n) | Specified units of measure eg length / volume etc. | Fixed | **Optional** |
| | | | | | | |
| **Gross weight** | 6 | Numeric | (330n) | Gross weight - Kgs | Fixed | **Optional** |
| | | | | | | |
| **Internal Use** | 30 | Alpha-Numeric | (91) – (99) | Company Internal Information | Variable length | **Optional** |
| | | | | | | |