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Telematic applications: Easyguide to HGV eCall

Transmitted by European Committee for Standardisation (CEN)

Easyguide: How to use Technical Report TR(WI 0278284) eCall: HGV/GV additional data concept specification

C.1   Introduction

Standards provide unambiguous specifications, and TR (WI 00278284) is no exception to this. Apart from an introduction, the requirements clauses of a standard, set out the specification, but do not provide a 'how to use this specification' guide. It is the objective of this informative Annex to do just that. The objective is to make use of the deliverable easy and to encourage its widespread take-up. It provides all of the data or links to the data that you need in order to instantiate the system.

eCall is a European system where in the event of a serious traffic accident or incident, equipment in the vehicle automatically triggers a call to the emergency services (PSAPs), and they are provided with key information about the location and vehicle, and put in touch with the occupants of the vehicle via a mobile telephone call. There is also an option where the occupants of the vehicle can manually trigger an eCall.

It is important to understand that eCall is a 'post incident' system that uses the 'Teleservice 12' emergency telephone connection to Public Service Assistant Points (PSAPs). While the data concepts devised for eCall may be adopted and reused for other circumstances, the eCall communications system may only be used in an emergency situation. The necessary in-band modem technology is available without cost for systems that support 'eCall only', and is available to support other services, but a license is necessary for its use outside of eCall. Licences are available from the licence holder on fair, reasonable and non-discriminatory terms and conditions according to CEN IPR policy, however such other uses may not use the Teleservice 12 communication system to PSAPs.

The eCall system was designed primarily for cars and vans, and heavy goods vehicles were not included because at that time, the triggering mechanism typically used for eCall, airbags, were/are not typically installed in HGVs.

However, advances in technology mean that other now widely available, equipment, such as accelerometers, gyroscopes and other alarm systems on board may also be used to trigger eCall from HGVs.

Given an appropriate trigger mechanism, the existing eCall system will work for any class of road vehicle. However, whereas in the case of a car, knowledge of the location of the crash site, identification of the vehicle, and in some cases the number of vehicle occupants, is adequate information, in the case of commercial vehicles, knowledge of the load that the vehicle is carrying can provide very important information to PSAPs on how to respond.

The first thing PSAPs need to be aware of is if the vehicle is carrying dangerous goods (called ADR-Accord européen relatif au transport international des marchandises Dangereuses par Route). Vehicles with such cargoes are regulated and there is both a physical plaque displayed on the vehicle identifying the most dangerous goods, and the driver has detailed paperwork about the load. Access to this information before the emergency services set off will assist them to respond with the most appropriate way and to liaise with traffic management centres in a more timely way.

However it is not just classified ADR goods that may present the emergency services with particular problems that should affect the way that they respond to an incident. Other cargoes present particular problems. Livestock for example require manpower resources to clear up, and notifications to be sent to the traffic management centres so that visual VMS warnings can be sent

to approaching drivers. Some cargoes, for example, liquid detergents, animal manure, ball bearings, while not classified as 'dangerous goods' in the ADR context, can represent particular hazards to the road surface in the event of an accident, and this information is also very valuable to PSAPs before they set out. However, the amount of information available is not as controlled as with ADR goods.

The eCall 'minimum set of data' (MSD) already provides the opportunity for 'optional additional data'. But because of the in-band modem technology used for eCall, the total MSD, including optional additional data, is of very limited size, so the amount of optional additional data has to be strictly limited. However limited, this provision for 'optional additional data' can be used to either to provide some basic data to the PSAP, or in these web connected days, and especially for ADR goods being transported, to provide a link to where that information is available (at a website of the consignor, logistics operator, or a service working on the consignor or operators behalf, such as 'Eucaris' .) .

Of course, in order for the PSAP system to be able to understand the data, the data needs to be presented in a standard format, and EN (WI 0278284) provides specification of the structure of the data concepts.

Two HGV/GV data concepts are designed in EN (WI 0278284) to provide such data.

Schema A provides the data structure for ADR goods.

Schema B provides the data structure for non-ADR goods.

The problem of how to provision the data into the on board equipment is not standardised, but it is recognised as the major issue in the ability and willingness and ability to provide this additional data. This is not data that is loaded just once during a vehicles lifetime, but is dynamic and relates only to each particular journey, so must be updated into the on-board unit each journey. Clever and detailed concepts could be designed and have been considered, but are considered impracticable in most cases because of the administrative burden of loading them into the on-board unit.

Easy to do is at the heart of EN (WI 0278284)

The structure of both of these data concepts is simple, and apart from some 'header' information, is therefore largely 'optional', indeed both of the data concepts are, at the time of developing this standard, optional information sent at the discretion of the consignor/fleet operator. ***The general principle being to provide what you can reasonably easily provide, and be expected to provide only that which is reasonably easy to provide.***

In the case of data concept A (ADR Goods), the data concept has 8 elements.

In the case of data concept B (non ADR Goods), the data concept has 8 elements.

In both case**s the first two elements of the data concept are mandatory**. That is to say that the provision of the data is voluntary, but if it is sent, these two elements must be populated with values according to the standard. All **other elements are sent with data where it is available and can be provisioned onto the vehicle on-board equipment**, but blank fields of zeros can be sent if the data is not available.

C.2   Mandatory elements of both data concepts

The mandatory elements of both data concepts are:

C.2.1   12-A0 and 12-B0   'OID' (Object Identifier)

This is an identifier provided by a central data registry that uniquely identifies the data concept. The MSD itself has an OID, but each of these data concept schemas for HGV/CG also need an identifier.

At the time of developing this standard, a central data registry had not yet been established, so the MSD OID is temporarily set at an octet with the value binary 1 (00000001); Schema A (ADR) OID is temporarily set at an octet with the value binary 2 (00000010); Schema B (non ADR) OID is temporarily set at an octet with the value binary 3 (00000011).

Once a central data registry is available these values may be revised. However the OID for each instance of Schema A and Schema B will normally remain the same, and will not change from journey to journey unless there is a change in the nature of goods carried (ADR/non ADR)

C.2.2   12-A1 and 12-B1   'Version number'

The standard recognises that things change over time, and that at some time in the future there may be a revision to the content of the data concept (which should result in a revision of EN (WI 0278284)).

This is the first version in both cases, so the Version number for each variant is an octet of binary 1 (00000001), and this does not change until a new version of the data concept is agreed.

C.3   Optional data elements

C.3.1   General

All of the other elements of both data concepts are 'optional', that is either a value is provided if available and can be easily transferred, or zeros are provided if the data is not available or not required.

Some accurate information is better than no information. (but do not send inaccurate information)

This standard offers the opportunity to send data in addition to the MSD that may be helpful to a responder to an emergency call.

Clearly, if the user system enables it, as many of the data elements of these data concepts should be provided as possible or useful. This is in the interest of both the operator and PSAP.

However, information provided should be accurate and it is better to send a blank data field, than incorrect data.

Every shipment is accompanied by

A range of information needs to be covered in the CMR note (Convention on the Contract for the International Carriage of Goods by Road (CMR)), including:

- The date and place at which the CMR note has been completed.

- The name and address of sender, carrier(s) and consignee (the person to whom the goods are going).

- A description of the goods and their method of packing. The description should be acceptable to the consignor and consignee. For security reasons, you do not always want the carrier to be able to identify valuable goods.

- The weight of the goods.

- Any charges related to the goods, such as customs duties or carriage charges.

- Instructions for customs and any other formalities such as dangerous goods information

3 of the elements of the data concept are common between the Schemas, but, at the risk of some repetition, for ease of reading/use Section C.3 will provide guidance in respect of Schema A optional data, and Section C.4 will provide guidance in respect of Schema A optional data.

C.3.1 Schema A – ADR Goods optional data

C.3.1.1 ADR General

The optional data elements for Schema A are elements 12-A2 to 12-A6.

Transport involving ADR (dangerous) goods is regulated. The means by which this is effected varies slightly from country to country, but is controlled by regulation. In addition to the CMR shipper is also legally obliged to make a declaration of the danger or hazard of the goods being transported. For the movement of dangerous goods by sea, inland waterways, road and rail, the shipper can fulfil this requirement by completing a Dangerous Goods Note (DGN). (However, the shipper can design, prepare and present a bespoke or 'in-house' document for the surface modes (roads or rail) provided it contains the mandatory information). Details should also be included on the CMR note.

The Dangerous Goods Note (DGN) is a transport document that gives details about the contents of a consignment to carriers, receiving authorities and forwarders.

The DGN accompanies hazardous goods in transit. However, the consignor will have copy of the documentation, and quite commonly will be required or choose to register the shipment in some central database, where it can be accessed online by authorised parties.

You can use a DGN when you transport goods using all forms of transport except air freight, when the IATA Dangerous Goods Declaration is normally used.

When you transport dangerous goods, your consignment must be accompanied by a document that declares what the dangers of the goods are. By using a DGN, you can complete the same standard document for all consignments of dangerous goods, regardless of which port or ICD they are going to.

If you use the Customs Freight Simplified Procedures you can use a DGN as a pre-shipment advice.

This information is therefore already available in paper, and increasingly, electronic, form.

C.3.1.2 Procedures where ADR data is available on a central web accessible database

If you are in a situation where your ADR data is available on a central database, you need only provide the relevant website URL data to the on-board equipment, and the PSAP can then access the details from the central database, thus simplifying on-board update requirements.

The advantage of having or using a central web-located address for the dynamic information simplifies the provisioning of the on-board data significantly in most cases. In most cases the URL address, and the telephone number will remain the same for long periods of time, possibly even the life of the vehicle, so do not have to be provisioned each trip.

C.3.1.3 Procedures where ADR data is not available on a central web accessible database

If you do **not** have the facility where your ADR data is available on a central database, it is preferable to identify the most significant ADR goods by their UN ADR code. And the backstop of a telephone number to a place where that information is available is also requested.

Similarly for tractor units pulling single type cargoes of ADVs, this record will only need updating when the tractor pulls something other than an ADR cargo.

The following sections provide more information about the requirements for each of the data elements in the HGV ADR Schema (A).

C.3.1.4 12-A2   Conveyance type and number of types of ADR goods on board.

This data element comprises just one octet (byte) that provides information both about the conveyance type and the number of types of ADR goods on board.

It is important for a PSAP to know whether it is responding to an incident involving a tanker.

Therefore the first binary position of the octet should be set to 1 for tankers, and 0 for any other type of conveyance, (1nnnnnnn or 0nnnnnnn).

The remaining 7 binary positions of the octet are to identify the number of types of dangerous goods being carried

1 - 10 (0000000 − 0001010) = number of types of dangerous goods present on board (in binary representation)

(therefore 0 (0000000) = no dangerous goods on board)

12 (0001100) = empty but uncleaned

11 (0001011) = mixed load (unspecified number of types of dangerous goods present on-board, but number unknown)

10 (0001010) = 10 or more types of goods present on-board

The octet will therefore carry a value between

0 0000000- 1 0001100

Concatenated as a binary octet:

00000000 −10001100

C.3.1.5 12-A3   ADR data address URL

This is simply the URL address where the ADR data for the load can be found. It may be presented as any accepted internet scheme (protocol), but the total URL length cannot exceed 35 octets (bytes).

This may be a site operated by the consignor, the logistics operator, or may be a site such as 'Eucaris' (EURCARIS is the EUropean CAR and driving licence Information System) which is being expanded to carry freight load data.

Like any other URL the format is as follows:

scheme://domain:port/path?query_string#fragment_id

i.e.: The scheme name (commonly called protocol), followed by :// then, depending on scheme, a domain name (alternatively, IP address) : a port number, and / the path of the resource to be fetched or the program to be run.

If the scheme name is http, the 'http://' is assumed

e.g:

www.example.com/path/to/name

https://example.com/47.35868

telnet://192.0.2.16:80/

The information endpoint to be contacted and respond in a standardized* way using an access to a standardized method to retrieve data,

*the standardized way this is done to be set elsewhere and is outside of the scope of this deliverable.

C.3.1.6 12-A4 Phone contact number

This is simply the consignor contact telephone number or telephone number displayed on the goods container as contact number in case of emergency. In the case of more sophisticated systems it is a backup number in case of problems with the transmitted data. In the case of the most basic systems, it may be the only data available.

Countrycode/areacode/number
As :
000 0000 0000000000
Represented as an integer
0000000000000000

C.3.1.7 12-A5 Alarm information

Alarm information may be available on-board in a number of ways, few of which are standardised. It may be any alarm information from on-board sensors (pressure, leakage, shock, temperature etc)

As technology develops more of this information may become available on board and available to the eCall on-board unit. Knowing that there was an alarm occurring before or at the time of the accident can be useful to the emergency services. But it is important for emergency services to be aware that the absence of an alarm indicates only that there was no alarm showing as activated at the time of compiling the data. Alarms raised post the population of/sending of the MSD will not be transmitted. These codes therefore only indicate status before or at the point of the incident, and cannot be taken as the current status post incident.

Complex alarm data was ruled out because of the lack of standards and the amount of memory required, so the data is a simple octet (byte) of binary YES(1)/NO(0) binary flags.

Binary Flag 0 = no alarm

1 = alarm

00000000

Binary position

L F T S P O Z R1

L = Leakage alarm

 F = Fire alarm

 T = Temperature alarm

 S = Shock alarm

 P = Pressure alarm

 O = Orientation alarm

 Z = Other alarm

R1 = reserved for future use

Concatenated as 00000000

For example to indicate a temperature alarm = 00100000

To indicate a fire alarm =01000000

To indicate both a fire and temperature alarm = 01100000.

To indicate a pressure alarm = 00001000 etc.

C.3.1.8 12-A6   UN code of dangerous goods

If you have already provided a URL link to the ADV data, there is no need to provide any data in this element (just provide zero values).

However, if you are unable to use such a link, or believe in 'belt and braces' and have the means to easily provision the on-board unit, you have the option to provide up to 10 UN ADR codes.

Up to a further 10 materials identified by UN ADR code, most dangerous listed first (based on response code- same response code prioritised to most impact in fire or largest volume) each semantically identified by the UN code as as: nnnn

This element provides 10x nnnn values.

No/no more Dangerous goods to be identified by '0000'

The code list is issued by UN and may be obtained from

http://live.unece.org/trans/danger/publi/adr/adr2011/11contentse.html

or

http://the-ncec.com/assets/Resources/EAClist2011.pdf

C.3.2 Schema B – non- ADR goods optional data

C.3.2.1 Non-ADR General

The optional data elements for Schema B are elements 12-B2 to 12-B7.

Most cargo by volume is not classified as ADR and the Dangerous Goods Note (DGN) is not required. However, over a certain volume a CMR note (Convention on the Contract for the International Carriage of Goods by Road (CMR)) will be required for larger loads. But this is not always the case, especially for small or local movements. However, the CMR data, where available, can be provided to a central database, avoiding the need to constantly update the data on board each trip, simplifying the requirements for the provisioning of the on-board Schema B data concept.

C.3.2.2 Procedures where non-ADR data is available on a central web accessible database

If you are in a situation where your CMR data or similar shipment data is available on a central database, you need only provide the relevant data to the on-board equipment, and the PSAP can then access the details from the central database, thus simplifying on-board update requirements.

The advantage of having or using a central web-located address for the dynamic information simplifies the provisioning of the on-board data significantly in most cases. In most cases the URL address, and the telephone number will remain the same for long periods of time, possibly even the life of the vehicle, so do not have to be provisioned each trip.

C.3.2.3 Procedures where non-ADR data is not available on a central web accessible database

If you do **not** have the facility where your ADR data is available on a central database, it is preferable to identify the most significant goods by their UN SPC code. And the backstop of a telephone number to a place where that information is available is also requested.

Similarly for tractor units pulling single type cargoes of non-ADV cargoes, this record will only need updating when the tractor pulls a different type of cargo.

The following sections provide more information about the requirements for each of the data elements in the HGV ADR Schema (B).

C.3.2.4 12-B2   URL Address (information endpoint)

This is simply the URL address where the consignment data for the load can be found. It may be presented as any accepted internet scheme (protocol), but the total URL length cannot exceed 35 octets (bytes).

This may be a site operated by the consignor, the logistics operator, or may be a site such as 'Eucaris' (EURCARIS is the EUropean CAR and driving licence Information System) which is being expanded to carry freight load data.

Like any other URL the format is as follows:

scheme://domain:port/path?query_string#fragment_id

i.e.: The scheme name (commonly called protocol), followed by :// then, depending on scheme, a domain name (alternatively, IP address) : a port number, and / the path of the resource to be fetched or the program to be run.

If the scheme name is http, the 'http://' is assumed

e.g:

www.example.com/path/to/name

https://example.com/47.35868

telnet://192.0.2.16:80/

The information endpoint to be contacted and respond in a standardized* way using an access to a standardized method to retrieve data,

*the standardized way this is done to be set elsewhere and is outside of the scope of this deliverable.

C.3.2.5 12-B3   Phone contact number

This is simply the consignor contact telephone number or telephone number displayed on the goods container as contact number in case of emergency. In the case of more sophisticated systems it is a backup number in case of problems with the transmitted data. In the case of the most basic systems, it may be the only data available.

Countrycode/areacode/number
As :
000 0000 0000000000
Represented as an integer
0000000000000000

C.3.2.6 12-B4 Number of types of goods on board

It is useful for the PSAP to know whether the conveyance is carrying one or many types of goods, so this octet of binary data provides some key summary information:

0 - 11 = number of types of goods present on board (in binary representation)

 0 (binary 00000000) = no goods on board

11 (binary 00001011) = mixed load (unspecified number of types of goods present on-board, but number unknown)

10 (binary 00001010) = 10 or more types of goods present on-board

C.3.2.7 12-B5   Container type code

It is useful for the PSAP to identify the type of container.

ISO 6346 is an international standard covering the coding, identification and marking of intermodal (shipping) containers used within containerized intermodal freight transport. The standard establishes a visual identification system for every container that includes a unique serial number (with check digit), the owner, a country code, a size, type and equipment category as well as any operational marks. The standard is managed by the International Container Bureau (BIC).

ISO 6346 also gives size and type codes for containers. When displayed on the container, the size and type codes shall be used as a whole.

The codes are compiled of the following elements:

- First character, representing the length (coded)
- Second character, representing the width and height (coded)
- Third and fourth character indicating the type of the container

12-B5 requires only the third and fourth character indicating the type of the container as 2 octets

The following is an overview of the most common codes:

12-B5 Code	ISO type Code	Description
RS	22RS	BUILT-IN GEN. F. POWER SPLY OF REEF
BU	22BU	BULK CONTAINER
BK	45BK	BULK CONTAINER
PC	22PC	FLAT (COLLAPSIBLE)
PF	20PF	FLAT (FIXED ENDS)
PF	22PF	FLAT (FIXED ENDS)
PC	42PC	FLAT (COLLAPSIBLE)
PF	42PF	FLAT (FIXED ENDS)

PS	42**PS**	FLAT (SPACE SAVER)
PC	45**PC**	FLAT (COLLAPSIBLE)
GP	20**GP**	GENERAL PURPOSE CONT.
GP	22**GP**	GENERAL PURPOSE CONT.
GP	25**GP**	GP-CONTAINER OVER-HEIGHT
GP	26**GP**	GP-CONTAINER OVER-HEIGHT
GP	2E**GP**	GEN. PURP. WITHOUT VENT WIDTH 2.5M
GP	42**GP**	GENERAL PURPOSE CONT.
GP	4C**GP**	GP CONTAINER
GP	45**GP**	HIGH CUBE CONT.
GP	L0**GP**	HIGH CUBE CONT.
GP	L2**GP**	HIGH CUBE CONT.
GP	L5**GP**	HIGH CUBE CONT.
UP	45**UP**	HIGH CUBE HARDTOP CONT.
UP	22**UP**	HARDTOP CONTAINER
UP	42**UP**	HARDTOP CONTAINER
HR	20**HR**	INSULATED CONTAINER
HR	22**HR**	INSULATED CONTAINER
HR	26**HR**	INSULATED CONTAINER
HR	42**HR**	INSULATED CONTAINER
HR	46**HR**	INSULATED CONTAINER
SN	22**SN**	NAMED CARGO CONTAINER
SN	42**SN**	NAMED CARGO CONTAINER
UT	22**UT**	OPEN TOP CONTAINER
UT	28**UT**	OPEN TOP (HALF HEIGHT)
UT	42**UT**	OPEN TOP CONTAINER
UT	45**UT**	OPEN TOP CONTAINER
PL	29**PL**	PLATFORM

PL	49**PL**	PLATFORM
RC	22**RC**	REEFER CONT.(NO FOOD)
RT	22**RT**	REEFER CONTAINER
RC	42**RC**	REEFER CONT.(NO FOOD)
RS	42**RS**	REEFER CONT.(DIESEL GEN.)
RT	42**RT**	REEFER CONTAINER
RC	45**RC**	REEFER CONT.(NO FOOD)
RT	45**RT**	REEFER HIGHCUBE CONTAINER
TD	20**TD**	TANK CONTAINER
TG	20**TG**	TANK CONTAINER
TN	20**TN**	TANK CONTAINER
TD	22**TD**	TANK CONTAINER
TG	22**TG**	TANK CONTAINER
TN	22**TN**	TANK CONTAINER
TG	28**TG**	TANK FOR GAS
TD	42**TD**	TANK CONTAINER
TG	42**TG**	TANK FOR GAS
TG	48**TG**	TANK FOR GAS
TN	42**TN**	TANK CONTAINER
VH	22**VH**	VENTILATED CONTAINER
VH	28**VH**	VE-HALF-HEIGHT =1448 MM HEIGHT

C.3.2.8 12-B6   Alarm information

Alarm information may be available on-board in a number of ways, few of which are standardised. It may be any alarm information from on-board sensors (pressure, leakage, shock, temperature etc)

As technology develops more of this information may become available on board and available to the eCall on-board unit. Knowing that there was an alarm occurring before or at the time of the accident can be useful to the emergency services. But it is important for emergency services be aware that the absence of an alarm indicates only that there was no alarm showing as activated at

the time of compiling the data. Alarms raised post the population of/sending of the MSD will not be transmitted. These codes therefore only indicate status before or at the point of the incident, and cannot be taken as the current status post incident.

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Binary Flag 0 = no alarm

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00000000

Binary position

L F T S P O Z R1

L = Leakage alarm

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 T = Temperature alarm

 S = Shock alarm

 P = Pressure alarm

 O = Orientation alarm

 Z = Other alarm

R1 = reserved for future use

Concatenated as 00000000

For example to indicate a temperature alarm = 00100000

To indicate a fire alarm =01000000

To indicate both a fire and temperature alarm = 01100000.

To indicate a pressure alarm = 00001000 etc.

C.3.2.9   12-B7   UN SPC Code of significant goods on board

The emergency services would like to know the content of the cargo in order to ascertain whether if the cargo spills onto the road it will cause them particular problems, even if not classified as ADR dangerous goods cargo. . Examples that cause problems are many and examples given include livestock, liquid detergents, manure, ball bearings, etc.

Classifying the codes needs to be according to a standard that is both widely in use and freely available. The United Nations Standard Products and Services Code®(UNSPSC®) provides an open, global multi-sector standard for efficient, accurate classification of products and services. Search the

code on this website to locate commodity codes that can be used by your company. One of its advantages is that it is freely and readily available and on http://www.unspsc.org you are able to enter a product name or product type and it will immediately provide you with the code.

The UNSPC code is therefore freely available to consignors, logistics operators, PSAPs, emergency services, transport management centres, and others.

Up to 6 goods of significant quantity ('significant' defined at discretion of consignor) shown in decreasing order of quantity semantically identified as:

00000000;
00000000;
00000000;
00000000;
00000000;
00000000

Represented as 000000000;

Example: 50400000 = Fresh vegetables

Unassigned codes reproduced as 00000000

Obtained from
http://www.unspsc.org