4 December 2009

BACKGROUND INFORMATION ON THE CURRENT DIGITAL TACHOGRAPH SYSTEM

Document prepared by the Commission and circulated during the Stakeholder conference of 7 December 2009

1 A brief history of the tachograph and of its associated European legislative acts

1.1 Some historical aspects

The original tachograph (often referred to as the analogue or chrono tachograph) has been in existence for many years and its origins can be traced back to the era of the Jones Recorder of 1912. Whilst the instrument has increased in sophistication since first introduced, concern increased regarding the instrument's ease of use, its susceptibility to misuse and fraudulent operation, and its ability to offer an effective and secure system for the recording and monitoring of drivers' hours and vehicle activity.

The obligation to record driver's activities was introduced in 1969, for social and road safety reasons. Recording was made via a paper book on which drivers were supposed to report what they did each working day.

In the early days (70's) there were mechanical tachographs, which progressed to the early electronic units, introduced around 1985. Over this time the tachograph has evolved but these were subject to interference by unscrupulous users. In order to combat this interference some amendments were made to the regulations that required diagnostic features to be incorporated into the tachograph, and for the signal cables to be armoured to prevent tampering.

All of these analogue units record the driver's periods of duty on a waxed paper disc - a tachograph chart. These were not always interchangeable between the different units and were vulnerable to damage and tampering.

The advent of digital electronics, the growing power of computing and its ever-increasing cost effectiveness, resulted in increased pressure to update the chrono tachograph. Following a proposal from the European Commission and opinions expressed by the Economic and Social Committee a decision was taken by the European Parliament and the Council to replace the current system with a digital version – a digital tachograph. The Digital Tachograph was clearly less vulnerable to illegal acts by users to distort the data. The new system also allowed for easier and better control of driver's hours by operators and the enforcement authorities.

1960 - 1970
Mechanical Tachograph

Electronic Tachograph
Analogue Tachograph
Reg. 3821/85)

Digital Tachograph
Defined in Reg 2135/98 &
Reg. (EC) 1360/2002 – Annex 1B
Mandatory since 1 May 2006

Figure 1 -- Evolution over time of the recording equipment

From May 2006 all new vehicles over 3.5 tonnes except for those exempt have had to be supplied with a Digital Tachograph.

The need to develop a more effective system was agreed, inter alia, because "experience has shown that the economic pressures and competition in road transport have led some drivers employed by road haulage companies to flout certain rules, particularly those concerning the driving and rest times laid down in Council Regulation (EEC) No 3820/85 on the harmonization of certain social legislation relating to road transport."

It has been generally acknowledged that fraudulent activities in road transport create the potential for reducing safety and disadvantaging those that do respect the rules in their day-to-day activities. Furthermore, it is generally considered difficult to monitor compliance with regulations given that data is recorded on several daily record sheets, wherein the record sheets for the current week and the last day of the previous week are stored in vehicle cabs.

The purpose of the new system is, therefore, "to put an end to the most common abuses of the present system" by introducing new "advanced recording equipment fitted with an electronic device for storing relevant information and a personal driver card, so ensuring that the data recorded are retrievable, intelligible when printed out, and reliable, and that they provide an indisputable record of the work done by both the driver over the last few days and by the vehicle over a period of several months."

1.2 The European legislative context

Regulation (EC) No 561/2006 of the European Parliament and of the Council of 15 March 2006 on the harmonisation of certain social legislation relating to road transport and amending Council Regulations (EEC) No 3821/85 and (EC) No 2135/98 and repealing Council Regulation (EEC) No 3820/85 (Text with EEA relevance).

The existence of the tachographs in the cabs originated in a social legislation targeting the world of Lorries/Pullman companies, that were inclined at that time, pressed by the market and the competition, to overload and overstress their drivers, leading to a very dangerous situation in terms of road safety, as well as health and safety working conditions for the drivers.

The regulation in place, Council Regulation (EEC) No 3820/85, today transferred and consolidated in the abovementioned Regulation (EC) No 561/2006, was fixing the scene for the driver activity rules, the best practices for enforcement, and the best practices for transport companies, applied to the commercial transportation of passengers and goods.

The objectives were clearly announced:

- Increase the Road Safety
- Secure a fair competition between the transportation companies
- Safer and less stressful working conditions for the drivers, while maintaining satisfactory social standards

and conferring direct benefits to all citizens in each and every Member State.

The rules regard mainly:

- The maximum daily driving time
- The maximum driving periods
- The minimum daily and weekly rest periods
- The maximum weekly driving time

To assess and to enforce the rules it was necessary to define the control tool that securely accounts for all these periods of time, and the digital tachograph was the answer. The equipment, embedded in the vehicles, records time, speed, and driver activity, allowing for road and company checks, and providing evidence to enforcers.

The definition of the equipment was the subject of the Council Regulation (EEC) No 3821/85 of 20 December 1985, on recording equipment in road transport.

The first technical annex of that Council Regulation (EEC) No 3821/85, "Requirements for construction, testing, installation, and inspection" stand in 7 pages.

The recent EC Regulation No 1360/2002 of 13 June 2002, adapted for the seventh time to technical progress Council Regulation (EEC) No 3821/85 on recording equipment in road transport. This regulation was recently reviewed and has an annex 1b exceeding 45 pages, together with 11 appendixes totalizing more than 200 pages.

This of course reflects the numerous progresses and enhancements inserted in the initial text, to follow technical evolution, to ensure interoperability between components designed and produced by different manufacturers[1] and to cover more and more cases and experiences learned from the field, but it is also becoming excessively technically complex, and heavy to manage.

Very recently, the 10th amendment to Regulation (EEC) No 3821/85 (to be published end 2009) led among others to the following requirements:

- a more "robust" Motion Sensor to magnet attack
- Independent(s) source(s) of motion information to corroborate data from the motion sensor

[1] Full detailed standards needed to be defined (for instance for cards specification, download protocol, calibration protocol, standard security mechanisms, security target). At the time, it was considered more efficient to include such standards in the Regulation itself, rather than to rely on standards that had still to be drafted and published by standardization bodies. The existence of standards not only ensures interoperability of components, but also brings economic advantages in minimising components costs and investments costs by workshops, enforcers, and transport companies. Standards were also needed to avoid any commercial situation of monopoly.

2 Situation in other regions of the world

2.1 AETR Contracting Parties

The European Agreement concerning the work of Crews of Vehicles engaged in International Road Transport (AETR), of 1st July 1970 is commonly referred to as 'AETR Agreement'. It aims at improving road safety and regulating drivers' hours' rules for working and rest times. Today, 46 Contracting Parties (mainly countries that have a common border with the EU 27, and further ex-east block countries) have signed and ratified the AETR Agreement, which consists in a transposition of the EU regulation regarding the Digital Tachograph by the UN ECE Inland Transport Committee. It aims at improving road safety and regulating drivers' hours' rules for working and rest times.

The scope of AETR Agreement applies in the territory of each Contracting Party to all international road transport performed by any vehicle registered in any Contracting Party. Generally speaking AETR applies to international road transport done by vehicles used for the carriage of goods that exceed 3.5 tons and vehicles used for the carriage of passengers that can carry more than 9 persons, including the driver.

The negotiation to incorporate the EU Legislation on digital tachograph into the AETR agreement started in 2000. The UNECE Inland Transport Committee adopted the AETR Amendments in 2004. However, the ratification process was delayed by a Communication from the Netherlands stating that it intends to accept the AETR Amendments once its internal legal system is adapted. On 16 March 2006, the Netherlands notified the UN Secretary General that it accepted the Amendments to the AETR Agreement. According to the UN procedure, these Amendments will enter into force three months after the date of acceptance, namely on 16 June 2006, which will also mark the starting date of the 4-year transition period before the mandatory introduction of digital tachograph into AETR contracting parties, namely on 16 June 2010.

2.2 United States of America

The Hours-of-Service (HoS) regulations (49 CFR Part 395) put limits in place for when and how long commercial motor vehicle (CMV) drivers could drive. It is managed by the US DoT (Department of Transport). These regulations are based on an exhaustive scientific review and are designed to ensure truck drivers get the necessary rest to perform safe operations. FMCSA (Federal Motor Carrier Safety Administration) also reviewed existing fatigue research and worked with organizations like the Transportation Research Board of the National Academies and the National Institute for Occupational Safety in setting these HOS rules.

The regulations are designed to continue the downward trend in truck fatalities and maintain motor carrier operational efficiencies. Although the HOS regulations are found in Part 395 of the Federal Motor Carrier Safety Regulations, many States have identical or similar regulations for intrastate traffic

The hours reporting is done in written form, unless the driving time is being recorded electronically using an automatic on-board recording device.

The written is called the "record of duty status." Common names for this form are the driver's daily log, log, or logbook.

Exceptions also exist, like a 100 miles air radius. Everything written on the log must be true and correct, on one original and one copy of the log.

Authorized government inspectors may check the logs at any time. Drivers must have a log for each day of the last 8 days that are required to log. The current day's log must be current to the last change of duty status. Inspectors check the logs to see if a driver has violated the hours-of-service regulations. Violations of the hours-of-service regulations can result in being fined and/or placed out of service.

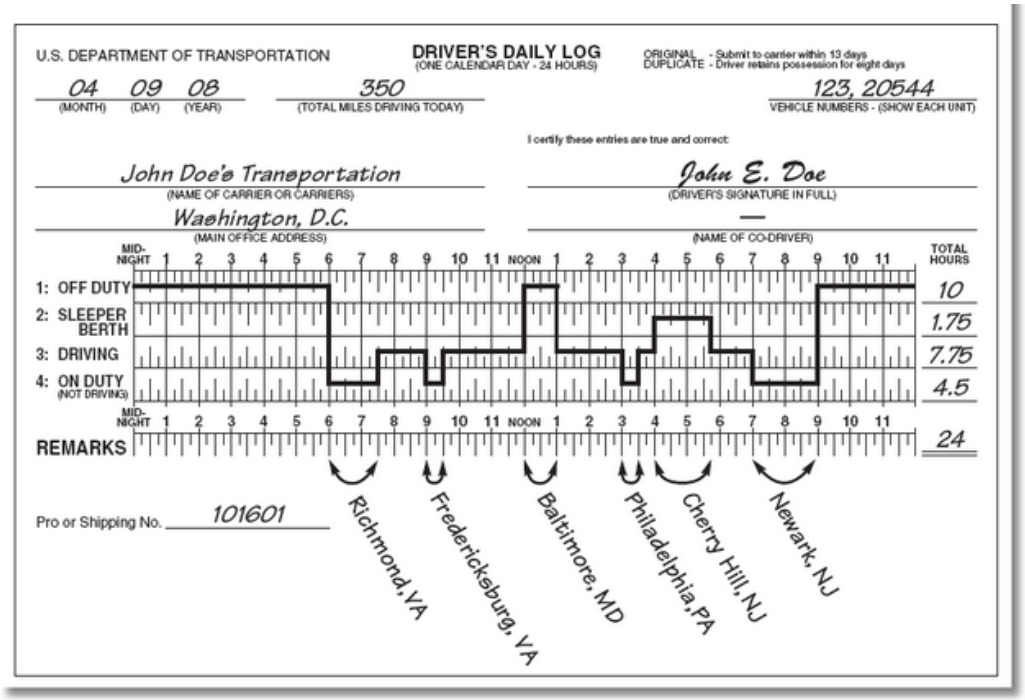

Figure 2 - A typical Driver's daily log used inthe United States

Many motor carriers have installed electronic devices in their trucks to help accurately record hours-of-service information. If such a device meets the requirements of Section 395.15 of the safety regulations, it is called an Automatic On-Board Recording Device (AOBRD), and may be used in place of a paper logbook.

Manufacturers of AOBRDs must certify that their devices meet the following requirements:

- an AOBRD must be mechanically or electronically connected to the truck to automatically record, at a minimum, engine use, road speed, miles driven, the date, and time of day.
- the AOBRD device must be capable of displaying or printing for enforcement officers the times of duty status changes and other required information. It must also store this information for the prior 7 days.

An AOBRD may be used without creating any paper copies of logs by transmitting the data electronically to the carrier, or it may be used to print copies of the logs that would be signed by the driver and mailed to the carrier.

Regarding the Electronic On-Board Recorders (EOBRs), the use of EOBRs to record hours-of-service information is not yet authorized by the safety regulations, but it has been formally proposed. An EOBR is more complex than an AOBRD and, if approved, may use new technologies such as Global Positioning Systems to automatically record additional hours-of-service information.

2.3 Canada

Canada is following similar rules than U.S. CANADA recently up-dated their regulations (1n 2007), and the up-date is quite precisely documented and motivated, as described here after.

The current regulation can be consulted following the link:

http://www.gazette.gc.ca/archives/p2/2005/2005-11-16/html/sor-dors313-eng.html

What follows is a summary of the regulatory impact analysis statement that accompanied the recent update of regulation in Canada. The amendment came into force on January 1, 2007.

The Commercial Vehicle Drivers Hours of Service Regulations govern the maximum driving times and minimum off-duty times of commercial vehicle (bus and truck) drivers employed or otherwise engaged in extra-provincial transportation. These Regulations require drivers to keep a record of their daily driving and other work activities in a prescribed format and to make these records available to designated enforcement officials upon request.

The central changes featured in the new Regulations include, amongst others:

- introduction of a new daily requirement for a minimum of 10 hours off-duty. The current Regulations do not contain a specific daily requirement;
- requiring that upon reaching the on-duty, driving or a new elapsed time limit, a minimum of 8 consecutive hours of off-duty time is taken before re-commencing driving;
- introducing a new elapsed time limit of 16 hours from the last off-duty period of 8 hours or greater;
- increasing the minimum rest period for team drivers using a vehicle equipped with sleeper berth accommodations from 2 to 4 consecutive hours;
- requiring a minimum of 24 consecutive hours off-duty, at least once every 14 days for all drivers.

The main objective of the new Regulations is to reduce the risk of fatigue-related commercial vehicle collisions by providing drivers with the opportunity to obtain additional rest. The Regulations also aim to reduce the complexity of the rules by making them easier to comply with and to enforce.

The Commercial Vehicle Drivers Hours of Service Regulations establish the limitations and minimum requirements that bus and truck drivers are required to follow when operating a commercial vehicle in Canada. The Regulations are intended to address safety issues that pertain to the operating environment of a driver. It is important that the regulation be viewed as a package of changes, as many of the clauses and sections are inter-related.

The new Regulations maintain the principle to increase the opportunity for drivers to obtain more rest.

Indeed, sleep researchers around the world agree that obtaining sufficient restful sleep is the only way to counteract the effect of fatigue. However, no matter how the Regulations are constructed, it is not possible to guarantee that a driver will sleep, nor can we mandate that sleep will be taken. Regulators agree that the Regulations must afford drivers with sufficient time to rest and that, through better education and guidance, drivers and motor carriers recognize the need for rest and sleep.

The motor carrier industry is a very important component of the Canadian economy, with annual operating revenues of $50 billion. Trucking is a vital component of international trade, with exports to the U.S. representing 80 per cent by value of goods shipped, and imports 60 per cent. While the motor coach industry is much smaller, it also plays an important role in transporting passengers both on an inter-city and on a charter/tour basis, and carries approximately 14 million scheduled passengers annually.

Data is sparse on the cause of collisions as a result of fatigue. Information collected by Transport Canada is derived from police collision reports, as provided by the provinces. Of the approximately 3,000 fatalities that occurred annually on Canada's roads between 1994 and 1998, an average of only 11 fatalities per year are attributed to either fatigue or falling asleep, while other sources suggest that the number could be considerably higher.

The adoption of the new Commercial Vehicle Drivers Hours of Service Regulations, therefore, is expected to have incremental beneficial effects on road safety. While prescribing additional hours of consecutive rest does not guarantee that drivers will sleep, the possibility that a driver will be less tired is significantly enhanced under the new rules. Simplifying the Regulations ensures that they will be easier to understand and will thereby promote improved industry compliance.

2.4 Brazil

Is currently still using analogue tachographs.

2.5 Argentina

Recently contacted the Commission to discuss possible technology transfer and adoption of the EU Digital Tachograph system.

CONCLUSIONS: EU is pioneer and leader. General trends in other parts of the world are to go versus Digital Recording Equipment.

3 Brief description of the Digital Tachograph System

This section describes the basic structure of the recording equipment and its behaviour in normal operation. The system is complex and requires substantial resources (e.g. from the users, the member states or the Commission, the vehicles and VU manufacturers, the haulage industry who were and are intensively committed in the process).

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3.1 The recording equipment

A recording equipment consists of three main elements (see Figure 3):

- a Motion Sensor (MS),
- a Vehicle Unit (VU), and
- a Cable.

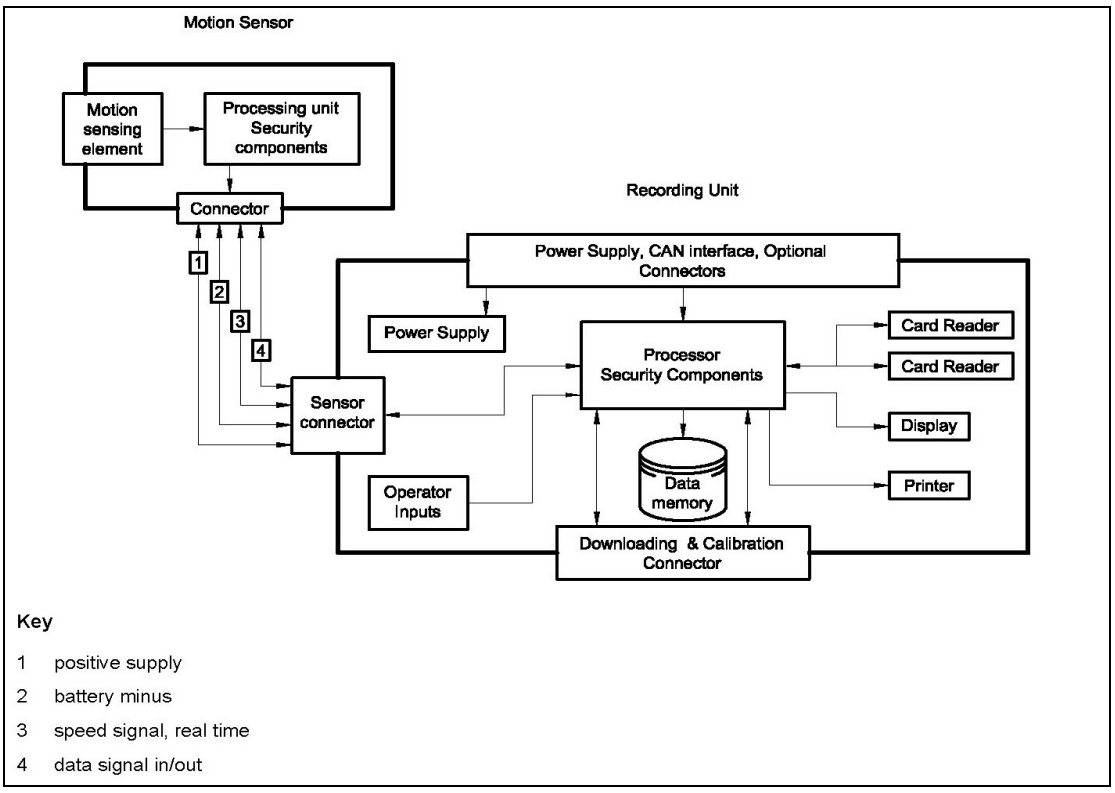

Figure 3 – Schemata of a typical recording equipment (extracted from ISO-16844-3)

3.1.1 The Motion Sensor

As stated in the legislation, the purpose of a MS is to provide a VU with secured motion data representative of vehicle's speed and distance travelled. A MS is mechanically interfaced to a moving part of the vehicle, which movement can be representative of vehicle's speed or distance travelled.

In practice a MS is usually screwed into the vehicle's gear box. Movement detection is provided in most cases by a Hall-effect position sensor located in the sensor. The Hall-effect position

sensor is a non-contact device that detects the small electromagnetic variations created by the movement of a toothed ring inside the gear box or inside the sensor itself. The Hall-effect position sensor converts these variations into electrical signals. These signals are processed by a small electronic board inside the MS. Real time speed pulses are sent via the cable to the VU. In addition, a secured serial data communication signal on the same cable allows for mutual authentication and identification between MS and VU, and secured transmission of data. Encryption is carried out by a dedicated crypto-chip welded on the electronic board.

Every MS is identified by a unique MS identification data which is stored once and for all in the MS by the MS manufacturer.

A MS must be marked with all or if not possible part of its MS identification data.

If a MS is designed so that it cannot be opened, it shall be designed such that physical tampering can be easily detected (e.g. by visual inspection).

Power to a MS is always supplied by the VU via the Cable.

There are currently two approved manufacturers of the so-called encrypted MS: Actia and Continental.

3.1.2 The Vehicle Unit

The purpose of a VU is to record, store, display, print and output data related to driver activities. It is connected to a motion sensor with which it exchanges vehicle's motion data.

There are four approved manufacturers of VU's: Actia, Continental, Stoneridge and Efkon.

3.1.3 The Cable

A 4-wire cable connects physically without interruption the MS with the VU. It provides wires for the transmission of encrypted data between VU and MS, the supply of energy to the MS, and the transmission of real time speed pulses to the VU.

The cable, the connector of the MS, the electrical characteristics of the data exchanged between the MS and the VU and the communication protocol between MS and VU are specified in the standard ISO 16844-3.

3.2 Tachograph Cards

Central to the introduction of digital tachograph technology is the provision of smart cards for use by drivers, companies, calibration workshops and enforcement officers.

National authorities are responsible for card issuing:

- general management (issuing, renewal, replacement)
- security: data protection, driver identification, workshop passwords PIN

3.2.1 Driver Card

The personal driver card:

- is a plastic card similar in size to a credit card, with a microchip in it.

- the card can store all relevant driver data required for EU Drivers Hours regulations including break and rest times.
- is personalised to the individual driver and valid for 5 years
- can store information for at least 28 days (with few exceptions)
- one card is issued per driver during period of validity (except in the case of a damaged, lost, stolen or faulty card).
- a driver is only authorised to use his/her own personalised card
- if the card is lost a driver is required to report it and to make an application for a replacement card within 7 days of its loss
- a card may be suspended or withdrawn by an enforcement officer if the card has been falsified, if the person using the card is not the legal holder of the card or if the card has been obtained by false declaration or forged documents.

The driver card must be made available to law Enforcement Officers on request.

Downloading of data by the driver

The legislation requires the driver to either download the data and retain it themselves or allow the company to download the data from their driver card and retain for inspection.

Procedures to follow if the driver card is lost/stolen or malfunctions

- If lost/stolen the theft must be reported to the police in the area where it occurred and a report number is required.
- The driver needs to signal and report its loss and to request a replacement card. He must complete an application form and send it with the relevant fee to the relevant authority.
- An applicant must apply within 7 days for a replacement card.
- A driver may continue to drive without a card for a maximum period of 15 days or for a longer period if this is necessary for the vehicle to return to its premises, provided a driver can present evidence of the impossibility of producing or using the card during this period.
- The driver must keep a manual record of driving activities during the absence of his driver card.
- In the event that a card malfunctions a driver must apply for a replacement card within seven days.
- A replacement card will issue within 5 working days of receipt of a completed application.
- A card that has malfunctioned must be returned to the card issuing authority with the application for its replacement.

Renewal of a driver card

An application for a renewal of a driver card must be made at least 15 days in advance of expiry of card so that a new card can be issued in a timely manner. Applicants should ensure that they submit applications within a few weeks of expiry of their driver card to avoid delay in the renewal of cards.

Exchange of Driver Card

If a drivers personal details change, e.g. name or address, an application for a new card must be made. Prior to an exchange of card taking place the data from it has to be downloaded and the driver card has then to be handed over to the card issuing authority.

Data Protection

Data held on a Driver Card may be exchanged with the appropriate authorities in other Member States, for enforcement purposes.

3.2.2 Company Card

A company card is valid for 5 years and serves to protect company-related data in digital tachographs. The card allows a company to download the information from the Digital Tachograph Unit in order to carry out checks on drivers' hours (rostering, etc), as required by the legislation and to maintain the required records for examination by Transport Officers. The company card allows a company to lock data recorded in the VU to prevent another operators downloading the data. This is necessary to ensure the protection of personal information of a company and its driver(s), and details of work patterns and times from competitors. This would be important when vehicles are sold or returned to a hire/lease company.

3.2.3 Workshop Card

A Workshop Card is valid for 1 year

The workshop card is available only to approved calibration workshops.

Such workshops must be approved by the National Authorities and the workshop fitter must provide proof that he/she has received the necessary qualifications.

If a workshop fitter is employed by more than one workshop, he/she must hold a workshop card for each workshop that he/she is working for.

General Rules

- The Workshop manager is responsible for the workshop cards at all times.
- The Workshop manager is responsible for the return of cards if/when fitters leave their employment
- If a card cannot be returned such as lost/stolen/malfunctioning the Workshop foreman is obliged to notify the card issuing authority.
- The PIN is personal to a fitter and is posted to him/her personally. This should not be disclosed to any other person.
- The Workshop card can only be used by the person to whom it is issued.

3.2.4 Control Card

The control card is available only to law Enforcement Authority Officers for carrying out enforcement of digital tachograph legislation.

- A control card enables the mass memory of digital tachographs and driver card data to be accessed
- Allows printouts, display and download of all relevant information to be made at any time

- A control card has a maximum validity of 5 years, some users adopted a shorter one (e.g. 2 years)

3.2.5 Some fact and figures regarding cards:

A total of 4.622.290 cards have been issued until 31.12.2008

- 125.947 (2.7 % of the issued cards) cards have been returned to the CIAs – *was 1.6% on 31/12/2007*
- 96.617 (2.1% of the issued cards, 76,7 % of the returned cards) are malfunctioning cards – *was 1.0%*
- 0.85% declared as lost or stolen – *was 0.55%*

Malfunctioning is subdivided in Production Problems, Physical Damages, Card Failure and VU Device Problems.

JRC is currently developing a software, called Card Analysis Tool – CAT, to manage the data regarding the issued and returned cards. The card analysis allows the determination of the reason of the card failure.

Over 1000 measurements, all the malfunctioning explanations have been found and a univocal error code assigned to each card.

Before CAT, ca. 70% of malfunctioning cards were assigned as being not analyzed or with for unknown reasons. With the use of CAT, we expect to reduce the unknown reasons to 1 or 2%.

3.3 How Equipment and Actors Interact

As mentioned before, the digital tachograph is an electronic system composed of a VU (Vehicle Unit) and a motion sensor, designed for recording driving and rest times for drivers and co-drivers of commercial vehicles. Data is stored in a memory (mass memory) inside the unit and on driver-specific smart cards (driver cards).

The actors in this system can be subdivided into:

- The companies manufacturing vehicle units, motion sensor, and cards
- The security management authorities
- The type approval entities
- The card issuing authorities
- The Tachonet network
- The cards and associated players: Enforcers and Control cards, Fitter workshop and workshop cards, Transport companies and Company cards, and the drivers paired with their driver cards.
- Other tools needed to implement or use the digital tachograph system: e.g. calibration and diagnostic tools, download tools, data analysis and enforcement tools, key generation/distribution tools

Before commencing a journey (e.g. when loading/unloading or driving) a driver /both drivers must insert the driver card into the 1st or 2nd man slot (driver or co-driver) on the front Digital Tachograph Unit. The centre field details will be recorded automatically by the tachograph driver name, vehicle registration number, start and finish odometer readings.
In the same way as with the analogue tachograph, a digital tachograph will record drivers' activities such as driving, other work, breaks and rest by changing the mode switch, and swap the cards between driver and co-driver slots when double manned.
When a driver is doing a manual entry of data to the tachograph he/she will be asked (via the units menu) if he/she has driven any other vehicle that day and must select whether it was by digital or analogue recorded method. If driving a vehicle fitted with an analogue tachograph the driver should have a chart to cover the driver activities.
A driver must also make daily printouts when changing between vehicles fitted with analogue and digital tachographs. This guarantees a complete record (printouts and charts) of driving activities for the current week and the last working day of the previous week.

4 Key Characteristics

4.1 Expected Tachograph specifications and performances

Reliable: trustworthy equipment recording and tracing the reality in real time. It means also that the data are fixed and accessible even after distortion, misuse or broken equipment.

Easy to use: for drivers and enforcers.

Fraud resistant: its design is supposed to minimize tampering possibilities.

Accurate: as any counter.

Cost-effective: as it is imposed by the legislation, it must be acceptable at cost level.

Provider of trustworthy rules of evidence: that can be used in court in case of severe infringements.

This last point calls for special provisions and requirements regarding:

- Data integrity
- Data protection
- Data authentication
- Data confidentiality
- Data non-repudiation
- Business continuity

4.2 In service constraints

Need for a type-approval process: as a legal instrument, like e.g. the radars for vehicle speed excess recording, the tachographs must be type-approved in accordance with a technical specification, before to be sold in the internal market. See later the certificates (security, functionality and interoperability).

Need for initial and regular calibration: as instrument measuring time, speed, distance, the correctness of the conversion factors must be checked every 2 years, in the authorized workshops. It is to be noted here that even if not specifically required by the regulation, the digital tachographs are recording the vehicle speed, and could qualify as becoming an accident reconstruction equipment (this is an opportunity for functionality extension).

Need for Standards and Norms:

- Interoperability: supposed to be compatible with all the equipment of the system (e.g. cards, downloading equipments, calibration equipment etc), the tachographs must comply with norms and standards defined in the specification of the interoperability certification procedure.
- Enforcers: data downloading, formatting and interpretation. Downloading interfaces. Pictograms. Fault/Warning/Error messages. All these elements are normalized and translated in the official languages of the EU 27, and soon extended to the 44 countries of the UN-ECE AETR agreement.
- Manufacturers: precise norms and standards both at VU and vehicle manufacturer levels guarantee smoother adaptation in the vehicles, and a common technical platform.
- Security: to ensure an adequate level of resistance of the system against frauds, and in particular to ensure data integrity, authentication and confidentiality.
- To reduce the risk of commercial dominant positions.

Currently fully included in the tachograph EU regulations, these standards are a real burden, slowing any revision or modification to the regulation, and a common understanding of all the actors is pledging for a transfer of these deep technical details into an external independent standard (ISO, CEN,…). On the other hand, the regulation will then need to be flexible enough in terms of deadlines for technical implementations so as to cope with the independent pace of developments of international standards.

Need for provisions for the transition management: like all new technologies in the transport and vehicle sector, you cannot erase the current fleet and applications. The rules and the regulation must accommodate with the presence on the roads of vehicles equipped with the previous generation of analogue tachographs.

Records availability: drivers must keep their recorded data available for a period of 28 days, and the companies must archive a minimum of 1 year records.

4.3 Consequences of Important choices made during the definition process

Real time declaration and data storage resolution: every minute of driver activity, every second for speed and real time recording. Note that it is the changes of activities that are recorded and not the activities themselves.

Consequences: the driver smart card must always be inserted in the VU during activity. A driver has to manually entered his/her past activities at insertion of the driver card. It is not possible to modify recorded data.

No communication, off-line system, no position: only the declaration of the initial position and final position of a journey would have been automatically solved with a GNSS device on board (GPS).

Consequences: No remote control of card validity. Recently, download of data issues at company side have been solved by the adoption of a remote ‘company card’ recognition, allowing for online data transfer to the company headquarters.

Design limited to the VU and no data interpretation: the standards and specifications are limited to the description of the VU as a black box recording driver activity data. The way to download the data are provided in the regulation, together with guidelines for data interpretations, but the technical design of the downloading and interpretation tools is left to Member State responsibility. The recording equipment is not supposed to evaluate if there are infringements of the drivers hours regulation. It is only supposed to record data; not to interpret data. Interpretations are up to enforcers, drivers/operators.

Consequences: large disparities among Member States regarding the capacity and the efficiency of enforcer’s instruments for road side and company checks. Limitation of the recording equipment to support with interpreted data, for the benefit of the driver, the application of the driver hours legislation.

Persistence of printouts: This is mainly a matter of generation, as previously on the analogue tachographs, the data were always recorded on paper supports. But it is also a good alternative to manage the transition, and in case of particular checks or situations where the driver is without card, or the enforcers do not have downloading equipment.