Continental
The Future in Motion

Electronic Logging Devices (ELD)s

Reliability and Efficiency for Hours Of Service Enforcement

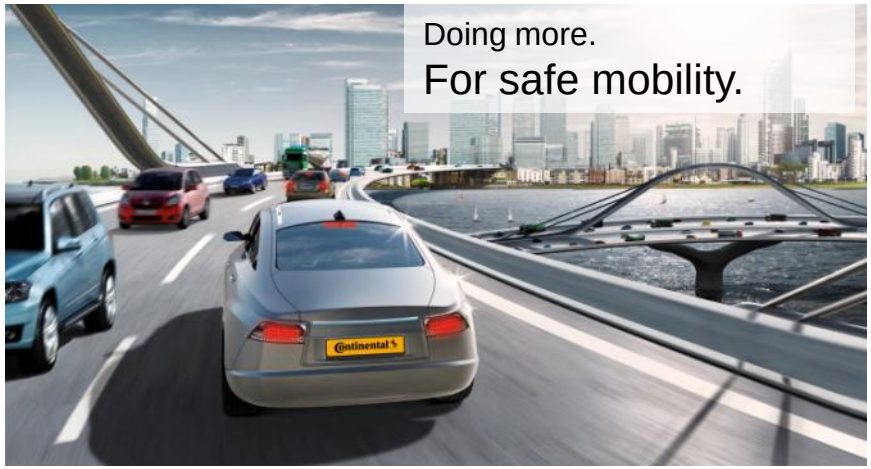
CCMTA, June 16, 2015

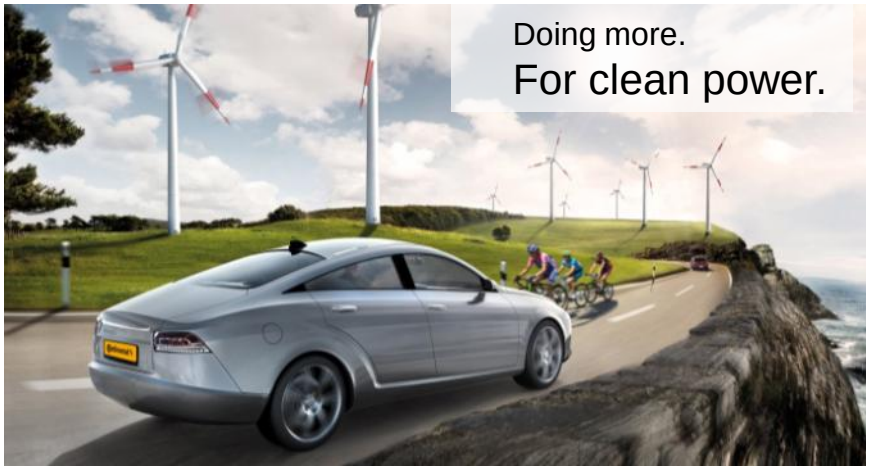
Continental Corporation
Five Strong Divisions

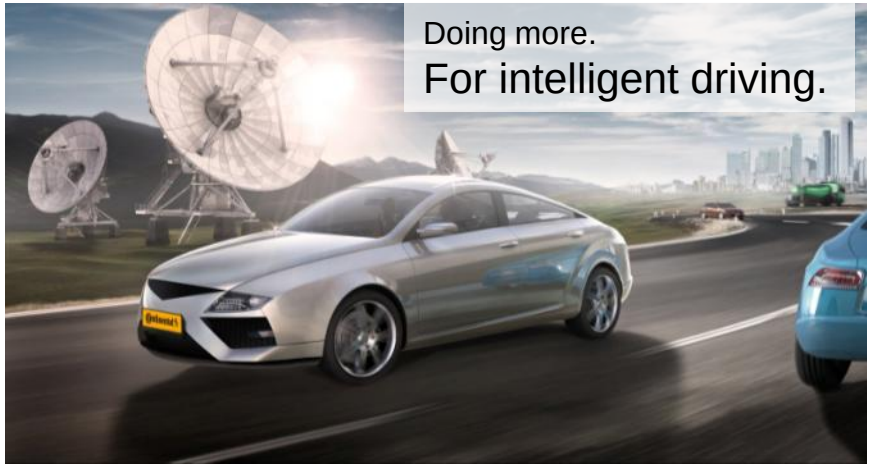
Chassis & Safety	Powertrain	Interior	Tires	ContiTech
Vehicle Dynamics	Engine Systems	Instrumentation & Driver HMI	PLT, Original Equipment	Air Spring Systems
Hydraulic Brake Systems	Transmission	Infotainment & Connectivity	PLT, Repl. Business, EMEA	Benecke-Kaliko Group
Passive Safety & Sensorics	Hybrid Electric Vehicle	Intelligent Transportation Systems	PLT, Repl. Business, The Americas	Compounding Technology
Advanced Driver Assistance Systems (ADAS)	Sensors & Actuators	Body & Security	PLT, Repl. Business, Asia Pacific	Conveyor Belt Group
	Fuel & Exhaust Management	Commercial Vehicles & Aftermarket	Commercial Vehicle Tires	Elastomer Coatings
			Two Wheel Tires	Fluid Technology
				Power Transmission Group
				Vibration Control

PLT – Passenger and Light Truck Tires

We Shape the Megatrends in the Automotive Industry:
Safety, Environment, Information, Affordable Cars

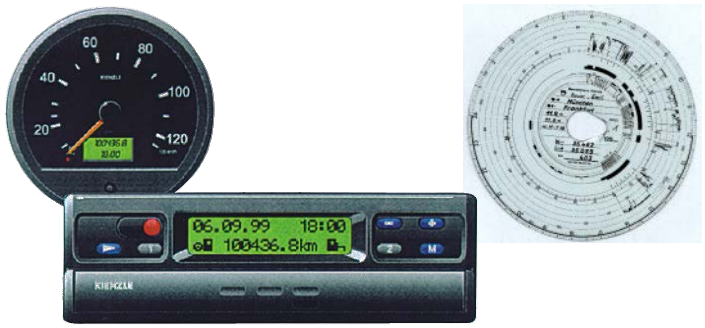




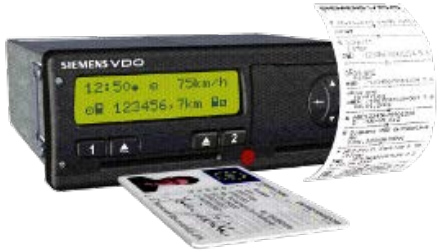


Definitions

- Analog Tachographs
  - Used in the EU for over 35 years
  - Data recorded on diagram charts
  - Now replaced by Digital Tachographs



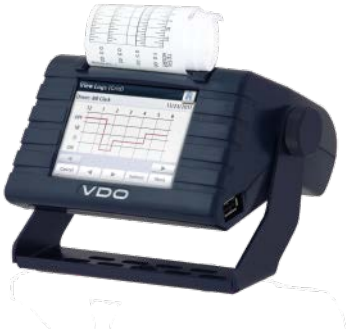
- Digital Tachographs
  - Compulsory in EU since 2006, in AETR since 2010
  - Chip cards for driver identification and data transfer, printer, interface for electronic data download



Definitions

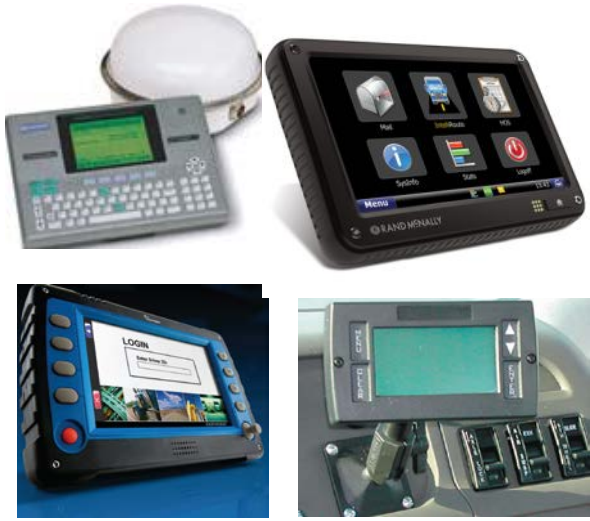
- Automatic On Board Recording Devices (AOBRD)
  - US Regulation 49 CFR Part 395.15 published 1988
  - integrally synchronized with the vehicle
- Electronic Recording Device (ERD)
  - complies with section 83 of the Canadian Commercial Vehice Drivers Hours of Service Regulations.

- Records drivers's duty status information
- Display or printout logs
- Must be connected to vehicle (wired or wireless). Standalone smartphone not compliant.
- Can be part of a Fleet Management System



Definitions

- Fleet Management Systems (FMS) / On Board Computers (OBC)
  - Record vehicle, driver and freight related data
  - Typically allows tracking and real time information through cell or satellite connectivity
  - Do not need to comply with FMCSA and Transport Canada regulations
  - May include AOBRD / ERD functionality



Definitions

- Electronic On Board Recorder (EOBR)
  - US regulation 49 CFR Part 395.16 published 2010
  - US Rule was vacated in 2011
- Electronic Logging Device (ELD)
  - US proposed rule March 2014
  - US Final rule expected September 2015
  - Canada draft standard CR-683, no official schedule for implementation

Countries with Legislation on Tachographs / ELDs

	Europe	South America	North America	Africa	Asia
Strictly enforced	27 EU 4EEC	Brazil			Japan
Partly enforced	Russia 24 AETR Turkey Israel	Chile Venezuela		Marocco Algeria Tunisia	Taiwan South Korea China Australia
In preparation			Canada USA Mexico	Egypt	India

Tachograph Systems in Europe

- More than 5.5 Million Tachograph systems are being used in commercial vehicles and busses to improve road safety in the whole of Western and Eastern Europe
- The focus here is to avoid accidents caused by drivers fatigued from excessive driving times.
- Due to strong competition and heterogeneous cost structures in the transport sector there is also an attempt to contribute towards a level playing field.
- This is why EU tachographs are optimized for the driver-related registration of driving, working, standby and rest times. However, speed data for the purpose of accident analysis are also recorded.

Tachograph Systems in South America and Asia

- In general there is no mandatory registration of driving and standby times of the vehicle, because there is usually no legal basis for restricting the driving time in any way .
- Tachographs are used to record speeds for the purpose of detecting speeding offenses as well as for accident analysis.
- The devices are focused largely on recording vehicle speed.

Conclusion

- Most of the developed global regions have regulations regarding driving time and speeding for commercial vehicles and busses.

- More than 50 countries have mandated **Electronic Data Recorders** for driving and standby time recording and/or speed and distance recording.

- The analysis of successes and failures allows to draw recommendations for ELD regulations.

Goal for Tachograph / ELD

- has the expected impact to increase **road safety**,
- is easy to handle in its day to day operation,
- is **cost effective** for transport utilization and enforcement,
- Authorities and law enforcement **trust the recorded data**
- a fair and focused enforcement ensures a **level competitive playing field**

- offers the **possibility to increase productivity** via low-cost expansion of its functionality for fleet management; it can pave the way for its acceptance by commercial operators and drivers.

Challenges associated with ELD

- Industry
  - Costs of ELD - cost pressure in competitive environment,
  - Adapt processes to strict compliance with HOS rules
  - How to choose an ELD? Which systems are compliant?
  - Data privacy / data access rights

Challenges associated with ELD

- Enforcement
  - Access RODS at roadside in all situations
    - With or without cell reception and network access
    - Ability to access and view electronic data
  - Trust data
    - How to identify if data has been manipulated?
    - Which devices can be trusted?
  - Costs of implementation

Key-Points for ELD

- Practical HOS Regulation
- Standardization of Interfaces and Certification Requirements
- A security concept which ensures that fraud would be extremely difficult
- A system design to ensure complete and accurate recorded data
- A system design, that ensures the availability and integrity of the drivers' activities data presented to enforcement officials and the possibility to use recording equipment's data in Courts
- Access rights that ensure data privacy and avoid competitive problems
- Proper Enforcement and resulting penalties for infractions
- Interfacing or expansion possibilities to Fleet-Management-Solutions
- Effective Communication and Support

Standardization

- To achieve interoperability
  - user Interface should follow common recommendations
  - driver identification needs to be unique and similar with each ELD system
  - the way individual HOS data from a specific driver are moved from one vehicle to another vehicle needs to be specified in every detail
  - the interface and data structure to download data from ELDs needs to be standardized

Security concept / Data privacy

- **Any EOBR system that is not tamperproof will be manipulated!**
- A tamperproof system withstands attacks up to a defined security level and gives indications for any manipulation attempt.
- Data encryption and sealing will be necessary.
- The security level needs to be precisely defined.
- An authorized and independent authority has to determine the recording equipment's level of security - third party certification is necessary.

- Access to data should be restricted to authorized persons only

US ELD Proposed Rule (SNPRM)

- Certification
  - Self certification. Tests criteria to be published by FMCSA
  - Vendors to register systems with FMCSA
  - FMCSA will maintain list of self certified systems on web site
- Tamper resistance
  - Connected to vehicle data bus (or sensors for older vehicles)
  - Record miles, engine hours, power on/off
  - Data integrity protection level not defined
- Data transfer to office within 8 days
  - Real time wireless no required
  - Allows to minimize ELDs costs of operation

US ELD Proposed Rule (SNPRM)
Roadside Inspection

- Required technology for data transfer to enforcement at roadside

Option 1	Printout				QR Codes
Option 2	Wireless web Services	+	USB2.0	+	QR Codes
Option 3	Wireless web Services	+	USB2.0	+	Transfer Jet
Option 4	Bluetooth	+	USB2.0	+	QR Codes
Option 5	Bluetooth	+	USB2.0	+	Transfer Jet
Option 6	Wireless Email	+	USB2.0	+	QR Codes
Option 7	Wireless Email	+	USB2.0	+	Transfer Jet

- Concerns
  - Multiple of options lead to high complexity and costs
  - QR codes and TransferJet impractical?
  - Time needed / allowed to provide data?

US ELD Proposed Rule (SNPRM)
Manual Roadside Inspection

SNPRM requires either Printout or Display

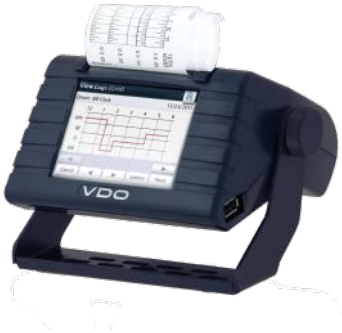
- Printout
  - Keep proof, available outside the cab, ease of use
  - Standard Grid graph layout
- Display
  - available outside the cab?
  - no standard layout
  - liability issues (who is responsible for handheld?)
  - Ease of falsification for open architecture handhelds (fake apps for smartphones easy and cheap to develop)

Canadian ELD / EOBR requirements

- Compatible with US ELD SNPRM
- Manual inspection only
  - Printout or Display
  - No requirement or standard for electronic data transfer
- Data availability must not rely on cellular connectivity
- Must be connected to vehicle databus
- Real time communication to office not required

How ELDs will look like?

› Multiple types of ELD will be found



ELD types

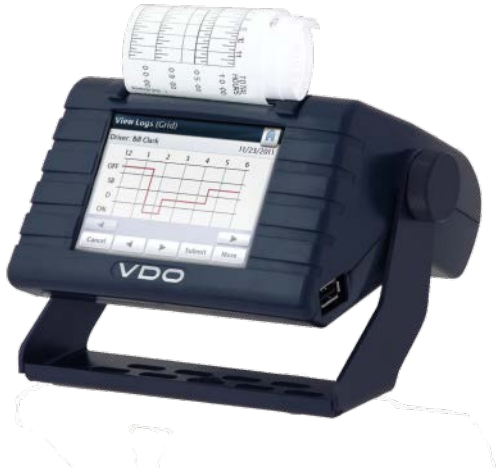
- Fleet Management System with ELD functionality
  - Wide range of productivity features
  - Relies on wireless connectivity (cell or satellite) to send data to back-end
  - Roadside inspection through display or printout (optional)

ELD types

- Smartphone, tablet based systems
  - App that runs on smartphone / tablet with connection through Bluetooth to blackbox installed in vehicle
  - Roadside inspection through display or printout (optional)

ELD Types

- Standalone system
  - Dedicated device that provides regulatory compliances as well as vehicle usage information
  - Integrated printer for reliable and fast manual roadside inspection



Thank you!

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