Industry pledges to halve fatal on-road accidents with farm machines by 2035

New EU Dialogue Group should coordinate efforts to reduce accidents, CEMA presents Roadmap for Action & calls on stakeholders to get involved

21 September 2017

Executive Summary

The number of on-road accidents with farm machines in the EU is very low (when compared to accidents with other vehicles) and has decreased continuously and significantly in the last years (e.g. -36% & -38% from 1998–2013 in the Netherlands and Spain), while the reduction of non-fatal accidents has been even higher. Still, on average, around 400 fatal on-road accidents occur in the EU every year in which an agricultural machine is involved. The majority of accidents is not caused directly by the farm machine or its driver, but occurs as the result of other factors such as the lack of awareness of other vehicle drivers on e.g. narrow and winding country roads. **Effective, evidence-based priority measures are therefore needed to reduce this number of accidents further.**

The European agricultural machinery industry is fully committed to contribute to this goal and has therefore made a **common pledge: to reduce the number of fatal on-road accidents with farm machines in the EU by 50% by 2035.** To make this pledge a reality, CEMA calls on all stakeholders to work together and contribute to reaching this goal. To do this, CEMA proposes **the establishment of a new EU Dialogue Group.** The Group should focus on: a better understanding of the available data; sharing of best practices in EU Member States; and making recommendations on how to reduce on-road accidents with farm machines.

Meaningful and effective reduction efforts will have to focus on different aspects such as maintenance, periodical inspections, up-grading of the legacy fleet, driver behaviour as well as public awareness campaigns, and not merely on safety design features of new vehicles given that:

- The overwhelming majority of on-road accidents happens with old farm machines – so a special focus has to be put on the legacy fleet!
- 80% of on-road accidents appear to be caused by just 5 major factors – reduction efforts thus need to focus on them as a matter of priority!
- Maintenance problems such as defective rear lighting have been found to contribute to the occurrence of accidents – gradual progress towards regular Periodical Technical Inspections (PTIs) could effectively address this problem.
- New agricultural machines will boost road safety further in the coming years

Based on the available statistical evidence and the existing efforts in EU Member States listed in this document, CEMA proposes the following **Roadmap for Action** as the most effective and cost-efficient approach which should be implemented as a matter of priority:

1. **Improve the safety of the legacy fleet of farm machines** on EU roads by retrofitting of high-placed lighting and signalling & moving towards Periodical Technical Inspections (PTIs)
2. **Boost driver training** to ensure greater awareness & alertness of drivers of farm machines
3. **Raise awareness among other road users** about agricultural machines on the road
4. Speed up the **development and introduction of seamless Vehicle-to-Vehicle (V2V) communication** as the ultimate accident prevention tool

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1. CEMA's common pledge: to cut the number of fatal on-road accidents with farm machines by 50% by 2035

Agricultural machines have become significantly safer over the years. The number of on-road accidents with farm machines in the EU is very low (when compared to accidents with other vehicles) and has decreased continuously and significantly in the last years.

For example, between 1998 and 2013, in the Netherlands and Spain the five-year-average of fatal on-road accidents has been respectively reduced by 36% and 38% and the reduction in the number of non-fatal accidents is even higher. At the same time, a range of different measures at EU and national level have reduced the number of accidents with the agricultural machinery fleet.

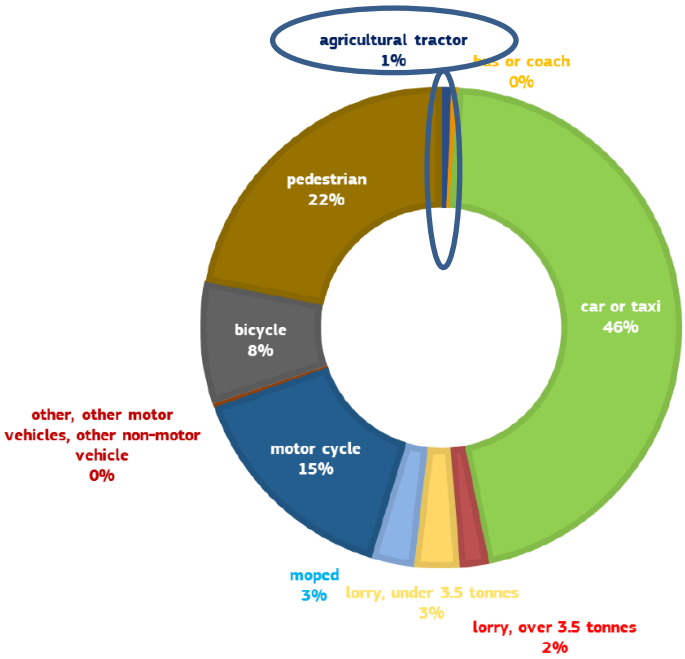

Figure 1: Distribution of fatalities by mode of transport in the EU, 2014 (Source: CARE/nat. data)

Notwithstanding the steady progress made in recent years, on-road accidents with agricultural machinery still happen with a high percentage of fatal outcomes. Although accounting for only 1% of all fatal on-road accidents in Europe, efforts are needed to further reduce the number of accidents further in the future.

The European agricultural machinery industry is fully committed to contribute to this goal and has therefore made a common pledge: <u>to reduce the number of fatal on-road accidents with farm machines in the EU by 50% by 2035.</u>

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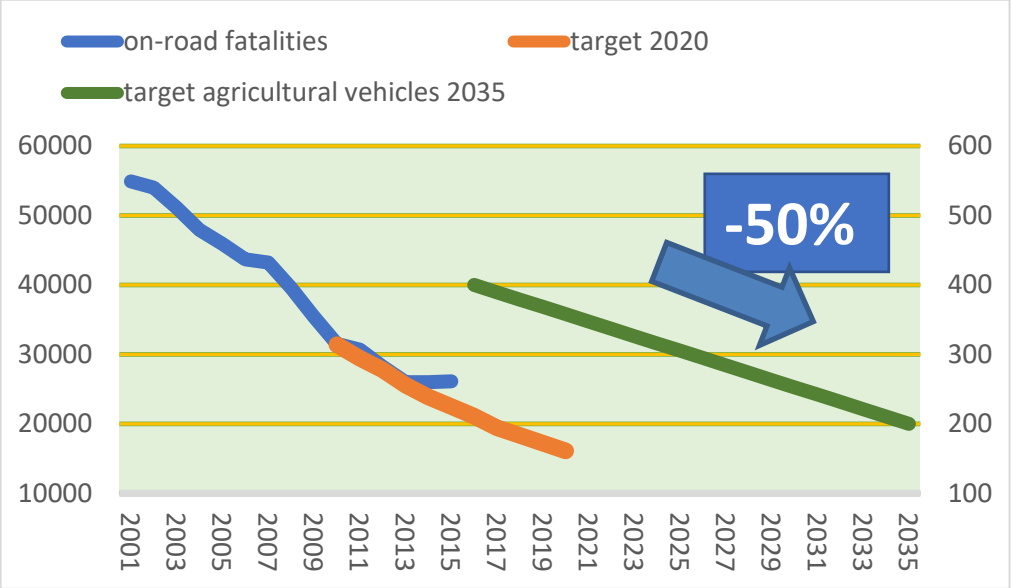

Figure 2: Fatality reduction targets for all vehicles 2010-2020 & for agricultural vehicles 2016-2035

2. A new EU Dialogue Group should coordinate joint efforts to reduce accidents – CEMA calls on stakeholders to get involved

To make this pledge a reality, CEMA calls on all stakeholders to work together and contribute to reaching this goal.

To do this, CEMA proposes the establishment of a **new EU Dialogue Group**. This new intra-stakeholder Group would be an important step in boosting cooperation to improve road safety in Europe further. Under the supervision of the European Commission, key stakeholders such as Member States, farmers, agricultural contractors, safety bodies, and industry representatives could join forces and work together to make the 2035 target a reality. The Group should focus on making recommendations and exchanging information on best practices in EU Member States on how to reduce on-road accidents with farm machines based on the available evidence.

Filling the gap – need for a new, dedicated EU Dialogue Group

At the EU level, only one group currently exists for agricultural vehicles: the Working Group on Agricultural Tractors (WGAT). However, its focus is slightly different, dealing primarily with technical requirements for placing new machinery on the market. At the same time, there is no group with all relevant stakeholders to discuss accident reduction measures in a dedicate and structured manner.

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It is therefore necessary to organise a new group that has a specific thematic focus (on accident reduction), a more open scope and shared responsibilities between the participating stakeholders. CEMA is convinced that such an intra-stakeholder EU Dialogue Group is the right place to discuss measures to improve road safety and reduce the number of on-road agricultural machinery accidents as envisaged.

Objectives of the EU Dialogue Group

The Group's main goal must be to seek evidence on the root causes of accidents through a methodical analysis of robust national accident data. Additionally. the Group should regularly check for trends, differences between regions/countries and good practices in reducing accidents.

The three primary objectives of the Group should therefore be to:

- Collect evidence & insights into the causalities of on-road accidents with farm machinery
- Exchange information on national best practices on how to reduce such accidents
- Elaborate recommendations on how to progress to meet the reduction target by 2035

Roadmap for Action – focus on evidence & the legacy fleet

The Group should elaborate a clear Roadmap for Action – CEMA's proposals for this Roadmap can be found below. CEMA believes the 4 priority actions described in this paper are the most effective and cost-efficient actions to reduce the number of fatal and non-fatal accidents further.

Once central tenet in the Group must be a clear understanding that new vehicles are doing proportionately superior in terms of safety prevention. For instance, in the case of cars, in the 1950s, 50% of all accidents with cars were due to human error, the other 50% due to technical failures. In the following years, the safety of new cars increased substantially – and with impressive results: today, human error is the critical Reason for 93% of crashes, while only 2% are due to component failure and degradation.[1]

The same technological advancement has been observed in farm machines. In light of the major improvements for new machines that will be implemented in the EU in the coming years it is of paramount importance that new accident reduction measures take into account **all** areas of concern for the safety of operators and bystanders and consider **the entire used fleet**, and not merely add new safety features on new vehicles. The focus must be put on those measures that have been found to be most effective and cost-efficient.

[1] NHTSA's 2009 National Motor Vehicle Crash Causation Survey

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3. A Roadmap for Action: 4 priority actions to reduce accidents

CEMA proposes 4 priority actions as a Roadmap for Action to reduce the number of on-road accidents with agricultural machinery further in the next years. These proposals are based on:

- An in-depth evaluation of the key facts & trends regarding such accidents (outlined below in Annex I)
- A comparative analysis of existing best practice measures in EU Member States to reduce them (outlined below in Annex II)

CEMA believes that the below list includes the most effective and cost-efficient measures to reduce fatal on-road accidents with farm machines until 2035.

1. EU Member States should consider moving towards more regular checks such as Periodical Technical Inspections (PTIs) for all tractors
2. Boost training as an answer to ensure greater awareness & alertness of drivers of farm machines
3. Run awareness-raising campaigns for other road users about encounters with farm machines
4. Speed up the development and introduction of Vehicle-to-Vehicle (V2V) communication as the ultimate accident prevention tool

These measures should be discussed with the other stakeholders in the new intra-stakeholder EU Dialogue Group as described below.

3.1. EU Member States should consider moving towards more regular checks such as Periodical Technical Inspections (PTIs) for tractors

The largest share of tractor accidents occurs with old tractors that are more than 13 years old. When they were first sold, these tractors were fully compliant with the applicable technical requirements. However, afterwards, their road-worthiness remains often unchecked in many EU Member States.

In terms of accident prevention and reduction, regular checks can make a huge difference in ensuring that older tractors meet applicable minimum requirements and maintenance levels, especially for crucial safety systems such as lighting or braking. This could easily be done by simple and proportionate **Periodical Technical Inspections (PTIs).** Like in Spain, these could be made mandatory in greater regularity in line with the advancing vehicle age (non PTI below 8 years of use; every other year between 8 and 16 years; annually above 16 years).

PTIs for tractors are already in place in certain EU Member States such as Germany or Spain. During the PTI, the critical elements of the tractor are checked to see if they are complying with the applicable requirements. As tractors are mostly used to push, pull or carry machinery/vehicles, an on-the-spot check of a farmer/contractor fleet (with the different vehicle combinations) could be

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an effective solution. Voluntary schemes, subsidised by local governments, could also be a suitable solution to move ahead on PTIs.

The main technical area in which failures were detected in Spain was with respect to **lighting and signalling**. Better lighting and signalling will improve the visibility of the vehicle for other road users. It makes it easier to adjust the behaviour given farm vehicles are typically slower and larger. Since the behaviour of other road users is the second most important reason for accidents, large benefits reduction effects can be expected from such a measure.

Another element where checks could be very effective is controlling the presence and quality of Roll Over Protection Systems (**ROPS**). The most important reason for fatal accidents, for instance, in Switzerland was found to be rollovers. Ensuring the tractor fleet has high-quality ROPS can significantly reduce the number of fatalities due to rollovers.

PTIs can be particularly effective when they are combined with permanent lighting and signalling requirements. This means that all tractors, irrespective of their age, need to meet certain basic lighting and signalling requirements when they are used on the road. This will boost retrofitting of older machines to be in line with new rules. For instance, such a retrofit requirement is already in place in Belgium.

Call to Action:

- **EU Member States should introduce Periodical Technical Inspections (PTIs) for all tractors or consider alternative forms of regular checks for the farm vehicle fleet, including towed vehicles.**
- **EU Member States should make retrofit-suitable lighting & signalling requirements mandatory to allow the entire fleet to be retrofitted.**

3.2. Boost training as an answer to ensure greater awareness & alertness of drivers of farm machines

One of the five main causes of on-road accidents is driver behaviour. In such cases, appropriate driver actions could have prevented the accident. To reduce the number of accidents caused by driver behaviour, adequate training is essential:

- to obtain the necessary driving skills: well-trained drivers are more aware of the limits of their vehicle in terms of braking, steering and stability as well as the effect of their actions on the tractor-trailer combination.
- to reach the necessary level of awareness and alertness about the most dangerous situations to be potentially encountered by a farm vehicle on the road.

Based on the knowledge and skills gained by driver training, drivers will be more alert and drive in a more anticipative way, even under stress.

According to evidence from the Netherlands, around one-third of accidents happen with younger drivers under the age of 24 who have less experience with driving and may overestimate the

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capabilities of the vehicle.[2] Adequate training could thus particularly reduce the number of accidents with younger drivers. Driver training should live up to modern standards, teaching young drivers to navigate large equipment including use of mirrors when reversing.

A variety of measures in different EU Member States are currently in place to improve driver training. In many countries such as France and Germany driving licences are mandatory, even if sometimes not for all users. In addition, training courses for farmers and contractors are available. For example, in Ireland, the Farm Safety Action Plan 2013-2015 includes driving skills courses for young entrants to farming.[3] Manufacturers and dealers of agricultural machinery also provide driving courses

Call to Action:

- **National & regional governments should support industry's voluntary initiatives to improve driving skills and awareness**
- **Consider the introduction of driving licences for drivers that are more at risk (when this is not yet the case)**
- **Manufacturers and relevant stakeholders should work together to ensure an ample choice of driving training to users is available**

3.3. Run awareness-raising campaigns for other road users about encounters with farm machines

Behaviour of other road users is a major factor in accidents with farm machines. Yet if other road users are sufficiently aware of potentially dangerous situations – e.g. typically slow speed of farm vehicles, frequent manoeuvres such as moving into a field or joining the road from a field – accidents can effectively be prevented.

This can be achieved with the help of dedicated awareness-raising campaigns.[4] Road users are often insufficiently aware about risky situations when encountering farm machines. This can result in inappropriate behaviour which may put the driver of the farm machine and other road user at risk. Examples are: keeping insufficient distance, excessive speed or risky overtaking manoeuvres.

A successful example is the awareness campaign of the Dutch organisation VOMOL (Dealing safely with outstanding agricultural traffic) which aims at informing primary school children about how to deal with farm machines on the road.[5]

[2] Jaarsma, C.F., (2016), Verkeersveiligheid landbouwvoertuigen 1987-2015
[3] Health and Safety Authority Ireland, (2013), Farm Safety Action Plan 2013-2015
[4] As outlined elsewhere in this document, appropriate lighting and signalling features on agricultural vehicles are also a main contributor to this end.
[5] Veilig omgaan met landbouwverkeer (VOMOL), http://www.vomol.nl/oude%20site/Index.html

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Call to Action:

- **The EU and national governments should provide support to the development of appropriate awareness-raising campaigns**
- **CEMA and relevant stakeholders should work together to develop appropriate content and guidelines for such awareness-raising campaigns**

3.4. Speed up the development and introduction of Vehicle-to-Vehicle (V2V) communication as the ultimate accident prevention tool

In case of agricultural vehicles, many accidents happen because fast moving vehicles do not notice the typically slow-moving farm vehicle making until it is too late. With V2V communication it is possible to exchange information and alert drivers even before they can see a farm vehicle. As a result, drivers can adapt speed and are fully alert well before a dangerous situation occurs. As such, V2V is a perfect accident prevention tool.

Work has started in ETSI (European Telecommunication Standards Institute) to link the agricultural platform to the e-mobility platform with the view to make safe and secure exchange of information will be possible in the future for vehicles using Wi-Fi technology.

Call to Action:

- **The EU should ensure that the exchange of information between automotive vehicles and industrial vehicles (like farm vehicles) as a simple V2V service is part of the initial deployment of C-ITS (Cooperative Intelligent Transport Systems) in Europe**
- **The EU should support the development of the necessary service layers between vertical & horizontal platforms to enable seamless Vehicle2Tractor (+ Vehicle2FarmMachine) communication**

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Annex I

4 key facts & trends regarding on-road accidents with farm machines

4.1. The vast majority of on-road accidents happen with old farm machines – so a special focus needs to be put on the legacy fleet!

The European Commission's CARE database (Community Road Accident Database) collects as much harmonised data from the EU28 as possible. Based on an in-depth analysis of the available data from the last year, it is evident that the vast majority of on-road accidents involving tractors happens with tractors older than 13 years old. [6] Moreover, given that – on average – new tractors are used a lot more intensely than older equipment, the effective on-road accident risk for tractors which have been in use for less than 13 years actually is estimated to be 82% lower per hour worked when compared to older machines. This significant finding underlines that, in on-road accident prevention with farm machines, the focus must first shift to the legacy fleet.

4.2. 80% of on-road accidents are caused by just 5 major factors – reduction efforts need to focus on them as a matter of priority!

Another analysis by CEMA on Swiss accident data from the period 2011-2016 showed that a limited number of factors is responsible for the majority of all on-road accidents.[7] The 5 most important factors causing 80% of all on-road accidents are (in order of importance):

- Rollover
- Behaviour of other road users
- Visibility on the machine or tractor
- Machine maintenance
- Driver behaviour

Accident reduction efforts thus need to focus on these 5 factors as a matter of priority.

[6] CEMA, (17 July 2015), *Road accidents with tractors: main problem is older machinery*, http://www.cema-agri.org/publication/road-accidents-tractors-main-problem-older-machinery

[7] CEMA, (12 June 2017), *Revealed: 5 major factors causing more than 80% of on-road accidents with farm machines*, http://cema-agri.org/publication/revealed-5-major-factors-causing-more-80-road-accidents-farm-machines

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4.3. Defective rear lighting seems to be the biggest maintenance problem in farm machines – regular Periodical Technical Inspections (PTIs) would effectively address that problem

Data from the Spanish Transport Ministry shows that for more than 92% of the on-road tractor accidents between 1998 and 2013 the tractor was not at fault.[8] The only factor that proved significantly to be the cause of 2.5% of all accidents was defective rear lighting. This conclusion was supported by data of the Periodical Technical Inspections (PTIs) in Spain.[9] During the technical inspections, 29% of all tractors were found to have defects on lighting and signalling. As we can infer, it is very likely that the number of tractors with faulty rear lighting involved in accidents is significantly higher in countries where, unlike Spain, Periodical Technical Inspections (PTIs) for tractors are not mandatory.

4.4. New agricultural machines will boost road safety further in the coming years

While old machines, as shown above, already account for the largest share of on-road accidents in Europe, new machines will become even safer in the coming years due to new harmonised EU and national legislation.

As of 1 January 2018, EU Regulation 167/2013 will apply to ALL new tractors placed on the EU market. The vast array of tightened and entirely new requirements contained in this Regulation will further improve new tractors in terms of their: braking performance, lighting and signalling, additional protection measures for the operator and bystander, and operator's presence control for the PTO.

The new requirements in Regulation 167/2013 will also result in major safety improvements for towed machinery and agricultural trailers. Many EU Member States are planning to adopt these European technical requirements also in their own national provisions, which will further boost the safety profile of the new vehicle fleet.

In addition, safety aspects of self-propelled farm machines will also be updated and harmonised in the near future. The European Commission has initiated the procedure for a new proposal on EU-wide road circulation requirements for mobile machines. CEMA fully supports the work of the European Commission to develop these new harmonised rules which will further contribute to the strengthening of the safety performance of the new vehicle fleet in the EU.

[8] Dirreción General de Tráfico, (2017), http://www.dgt.es/es/seguridad-vial/estadisticas-e-indicadores/accidentes-30dias/tablas-estadisticas/

[9] Ministerio de Industria, Energía, Turismo y Agenda Digital, (2017), http://www.minetad.gob.es/en-US/Paginas/index.aspx

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Annex II

Overview of best practice measures in EU Member States to reduce on-road accidents with farm machines

This Annex provides a non-exhaustive **overview** of measures that exist in different EU Members States to reduce on-road accidents with farm machines:

	Germany	Italy	France	UK	Spain	Belgium	Netherlands	Austria	Hungary
Periodical Technical Inspections (PTIs)	Mandatory	Mandatory	/	/	Mandatory	Mandatory	Under discussion	Mandatory	Mandatory
Retrofitting of lighting	Mandatory	Mandatory	/	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
ROPS retrofit	Mandatory	Mandatory	Partly	Mandatory	Mandatory				
Driving license	Mandatory	Mandatory	Partly	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	

Figure 3: overview of on-road accident reduction measures in selected EU Member States

It is based on information provided by the CEMA members in the different Member States and publicly available information.

5.1. Regular checks/Periodical Technical Inspections (PTIs):

Austria:

Different requirements based on maximum design speed:

<25 km/h: No periodical technical inspections mandatory

25-40 km/h: First inspection after three years, then two years later and afterwards annually

>40 km/h: Annually

Belgium:

Periodical technical inspections are mandatory for all tractors not used in agriculture.

Germany:

Mandatory periodical technical inspections

- Most visual checks are similar to the test methods in Annex I of Directive 2014/45/EU.

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- Mostly where testing tools are used for cars and trucks, for tractors, it is also done with visual checks,
    - e.g. head lighting is checked using the distance of the upper level of the beam; the lights are too high and the car-truck equipment cannot reach so high.
- On steering: basic check on play in the steering wheel
- Or on the road for brake testing:
    - The current braking test bench could be used if the front axle is lifted to prevent movement due to automatic engagement of the front axle and if the large wheels do not go beyond the width of the test bench. For some tractors like Narrow track tractors the test bench is too wide (although it is expected that there will not be many T2b: fast narrow track tractors: track width below 1150 mm).
    - The service brakes are always tested on the road and the performance is only checked by observing that the tyres will lock while braking hard.
    - The handbrake is also checked on road for a good left-right braking distribution.
- In general, the test doesn't take more than 5-10 minutes

Hungary:

Mandatory periodical technical inspections. The following aspects are tested:

- Rear reflectors, headlamps, functional stop lamps (brake lights)
- Adequate braking system
- Tires in safe operating condition
- Rear view mirror
- Horn
- Functional exhaust and muffler system
- Interchangeable working equipment

Italy:

The periodical technical inspections are now included in the legislation, first implementing measures should be published soon.

Denmark:

Different requirements based on maximum design speed:

<u>≤40 km/h</u>: No periodical technical inspections mandatory

<u>>40 km/h</u>: Annually inspection (always registered as a lorry)

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Spain:

- No periodical inspections mandatory first 8 years of tractor.
- Every two years periodical technical inspections when the tractor is between 8 and 16 years old.
- Tractors above 16 years old need to go to the periodical technical inspections every year.

Netherlands:

A proposal on mandatory periodical technical inspections is currently being discussed.

1. **Lighting requirements**

Mandatory requirements regarding signalling and lighting on all vehicles in use are in place in all the above-listed countries except France.

5.2. Driving licences

Mandatory in Austria, Germany, Netherlands, Belgium and Spain. This can be either a specialised driving license for tractors or a driving license for cars.

In France, it is only necessary for persons driving agricultural machinery that are not employees of the farm or farmers themselves.

5.3. Awareness campaigns

Other road users:

VOMOL is an example from the **Netherland**s. This is a campaign focussing on children on primary schools. During five days, children get more information about the risks of agricultural machinery at school. Tractor drivers will explain to the children what they should know, by showing the machines in practice. Similar campaign approaches have been rolled out in **Denmark**.[10]

Drivers:

In Germany, the contractor associations took the initiative for the 'Profis mit Rücksicht' campaign.[11] The campaign aims at improving road safety by making contractors more aware of the risks.

[10] Denmark: Trafikkampagne: https://youtu.be/RQl2SfhuGA0
[11] Profis mit Rücksicht: https://www.youtube.com/watch?v=1stMFlJ8mL4

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The Dutch contractor association developed brochures to inform contractors about how to drive safer on the road.[12]

5.4. ROPS retrofit

In Germany, Italy, UK and Spain Roll-Over Protection Structures (ROPS) are mandatory on all tractors. Retrofitting tractors with ROPS in case they don't have them is mandatory. In France, ROPS are strongly encouraged and used tractors can only be sold with ROPS installed on them.

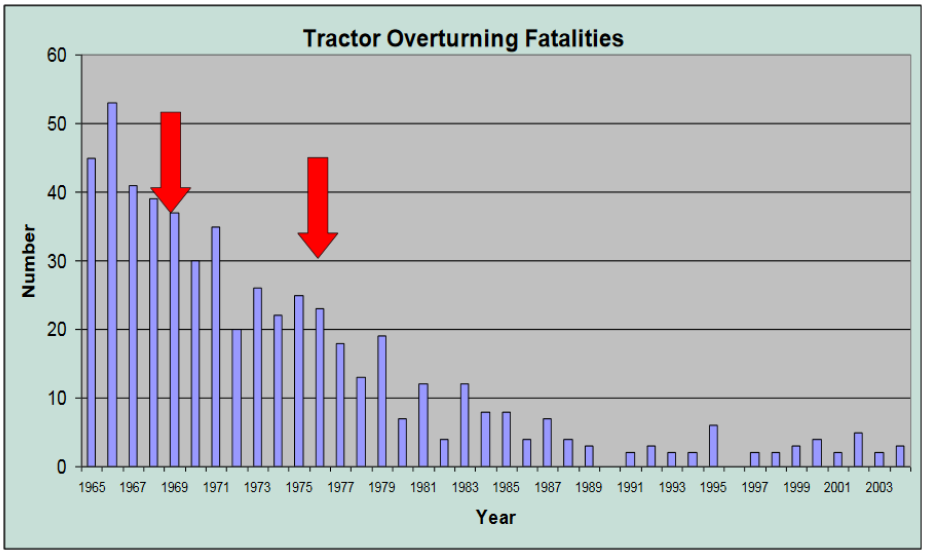

Figure 4: Positive impact of mandatory ROPS & ROPS retrofitting in reducing fatal tractor accidents in the UK (Source: OECD)

The above graph clearly shows the positive impact of ROPS on reducing tractor overturning fatalities in the UK. In 1970, ROPS became mandatory on new tractors. In 1977, ROPS retrofit on all tractors was introduced.

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[12] Veiliger (land)bouwverkeer: www.land-bouwverkeer.nl

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