

RECOMMENDATIONS TO TACKLE THE IMPACT OF DRIVER SHORTAGE IN THE EUROPEAN CHEMICAL TRANSPORT



Issue 1 – August 2020



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Disclaimer

This document is intended for information only and sets out recommendations to tackle the impact of the driver shortage in the European chemical transport. The information provided in these guidelines is provided in good faith and, while it is accurate as far as the authors are aware, no representations or warranties are made with regards to its completeness. It is not intended to be a comprehensive guide. Each company, based on their individual decision-making process, may apply these guidelines, in full or partly or apply any other adapted measures. No responsibility will be assumed by ECTA/Cefic in relation to the information contained in these Guidelines.

These guidelines were drafted before the Covid-19 outbreak and the recommendations therein do not account for Covid-19 related safety and preventive measures. They also don't consider the European Commission's Mobility Package I adopted in 2020.

Introduction

Safe, sustainable and efficient transport is the backbone and lifeblood within the chemical industry to serve our customers and to secure the overall agility and industry competitiveness.

The transport and logistics sector has been facing a shortage of truck drivers over the past decades. Before the crisis in 2008, the truck driver shortage already significantly affected the availability of transport capacity. Waiting times on sites were increasing and the driver's comfort level decreased. Drivers didn't feel well treated at loading/unloading sites. Acknowledging this situation, Cefic and ECTA already worked together in 2009, and have released their recommendations for loading/unloading sites through Best Practice Guidelines on "How to reduce time spent by drivers on site and improve their treatment", on Cefic and ECTA websites.

Due to the 2008 global economic crisis and the inflow of new truck drivers from the new eastern EU member states, the overall pressure on the transport market suddenly released, and driver shortage was no longer a critical business priority.

After some years of crisis, the economic recovery started, though still by 2017-2019, some countries have yet to completely bounce back. For the major European economies that have reached their pre-crisis level, this growth came with an increase in demand for transport and with a decrease in truck driver availability and productivity due to road congestion, stricter driving regulations, unfavourable demographics, increased truck driver waiting times and an overall lower job attractiveness for young drivers. In addition, the recent truck driver demand for more local e-commerce logistics activities has created a truck driver job rotation within the transport sector towards easier, more "work-life balanced" and local-oriented transport jobs. Consequently, now and for the years to come, truck driver demand exceeds the supply of a qualified truck driver workforce. Compared to 2008, Europe was lacking by about 75.000 drivers, new studies have shown that in 2017 this number exceeded by far the 200.000 across a group of just eight European countries (Germany, France, Belgium, Poland, UK, Sweden, Denmark and Norway). Additionally, The ManpowerGroup Talent Shortage survey held in 2017, ranked the job of driver as the second most difficult position to fill in Europe (EMEA). In the next 5-15 years, about 40% of the current active truck drivers in Europe will retire. This situation requires immediate attention and focus programmes to attract new truck drivers, including truck driver training & qualification.

The truck driver shortage as faced today, is from a structural nature, much wider than Europe and hitting all industry sectors. This results in increasing difficulties for shippers to deliver goods to their customers "on-time" and "in-full". The chemical sector makes no exception to this evolution. For our industry, this structural driver shortage is putting the entire chemical supply chain at risk. Besides increased transport costs, the service level to customers is also declining. In addition, it becomes more and more difficult to find qualified chemical drivers who are able to cope with ever more demanding legislation and site requirements. This lack of qualified truck drivers may pose safety as well as product quality risks. All of this endangers the security of supply in the European chemical industry with possible disruptions.

With these guidelines, Cefic and ECTA want to support their members to secure and increase efficiency in chemical road transport by improving the productivity of chemical drivers on the one hand and by improving the attractiveness for the truck driver profession in the chemical sector on the other hand. The chemical sector has the ambition to achieve this goal while fulfilling the highest safety, mobility and sustainability requirements from customers and from society. These guidelines provide practical recommendations for various stakeholders.

Given all interrelations, it is evident that in the coming decade, the chemical industry, transport companies and authorities will need to work more closely together to further explore the proposed recommendations and innovations. New mobility and digital technology solutions will be evolving and create new opportunities. However, focusing on safety and people at loading/unloading will remain a key

success factor. It is crucial that we look at this issue from a truck driver perspective, and that we improve truck driver job attractiveness, comfort and respect, by establishing an open dialogue and strong collaboration amongst all actors, enabled by the new emerging technologies.

Priority setting

To develop this list of recommendations with hands-on proposals, Cefic and ECTA have conducted a root-cause investigation based on interviews and surveys amongst members.

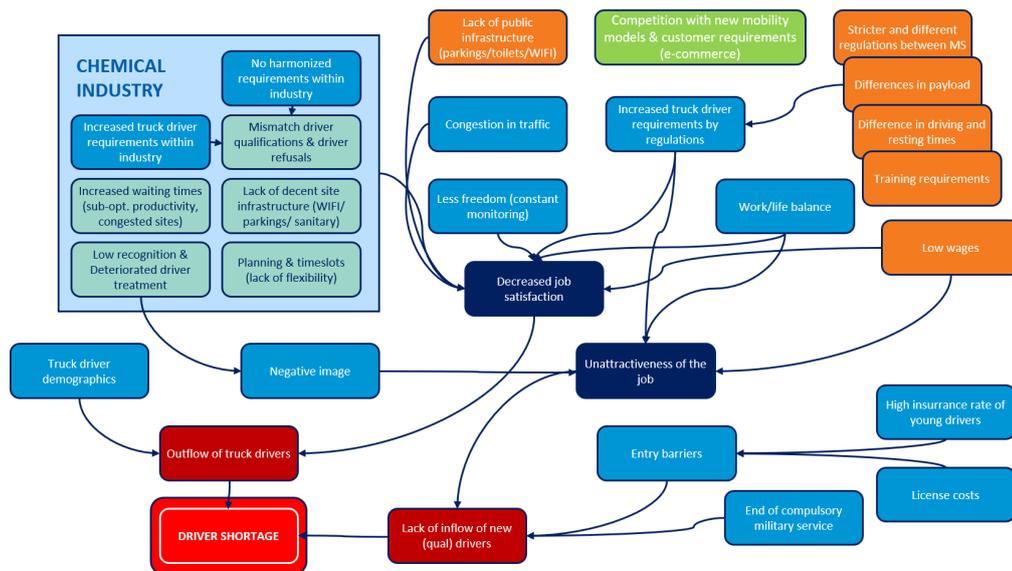


Fig. 1: A “mind-map” with the underlying causes of driver shortage in the chemical industry, see enlarged picture in appendix 1

The conclusion is, due to the structural nature of the driver shortage, it is important that the chemical industry adapts and rethinks how it will organise road transport in the coming decade. The chemical industry will have to adjust to the reality that the availability of drivers will always be limited. This implies that collective actions will be needed by industry, logistic service providers and authorities to secure a safe, reliable, efficient and sustainable road system. Additionally, automatization and digitalisation will change the job content of a driver, requiring a change plan to ensure the right driver qualification.

First key conclusion is that the road system needs to be redesigned by decoupling the long-distance driving from the first and last miles and the on-site driving. This decoupling allows to combine optimised long-haul driving with safe and efficient first and last miles and on-site distribution.

Long-haul driving in the future:

- should be possible outside peak hours and by night,
- should not be driven by (narrow) estimated time of arrival (ETA) time slots,
- should minimise waiting times outside driving and resting times,
- should not give any language issues,
- should allow for new multimodal/combined transport concepts including platooning,
- should allow for digitalisation, e.g. central monitoring of product and equipment for increased safety and security and dynamic ETA calculation that considers traffic and weather,

- should allow easy access to the profession, almost no site-specific training.

First and last miles and on-site distribution in the future:

- should maximise asset and resource utilisation,
- should be executed by well trained and qualified drivers/operators, being familiar to the local loading/unloading production site requirements, warehouses, depots, terminals and cleaning stations,
- should be highly automated and digitalised,
- should strive for zero or low emissions,
- should reduce the number of incidents, especially at loading/unloading sites.

Overall the safety and security performance of all involved parties along the whole chain will increase.

The second key conclusion is that we cannot accept losing more qualified drivers due to job dissatisfaction or bad working conditions. The chemical industry, together with the road sector needs to have a strong focus on truck driver health & comfort, adapted training & qualification, two-way communication, a market conform remuneration, efficiency and safety of the truck drivers in order to retain truck drivers and keep them engaged within the chemical industry.

Policy makers should support driver availability by lowering the entry costs to the access to the profession, by lowering the minimum age, and by providing enough safe and secure parking areas. Logistics reliability could also be improved by limiting the impact of road works based on proper impact assessments or creating smart fast lanes.

The following practical best practice recommendations will help to tackle the above main conclusions:

- Recommendation 1: redesign of the logistics infrastructure at loading/unloading sites. Several infrastructural measures are proposed:
 - Option 1: Decoupling last mile from long haul
 - Option 2: Fast lane
 - Option 3: Self loading
 - Option 4: CapacityCombinations of the above options allow for safe, optimised and efficient loading processes.
- Recommendation 2: digitalisation and planning
- Recommendation 3: truck driver communication and comfort
- Recommendation 4: chemical truck driver training, engagement and retention

Recommendation 1: infrastructure redesign

This recommendation focuses on the infrastructural design of the end to end process, aiming to reduce the overall lead time and increase the productivity of the driver and the assets. The proposed improved process is shown in the picture below.

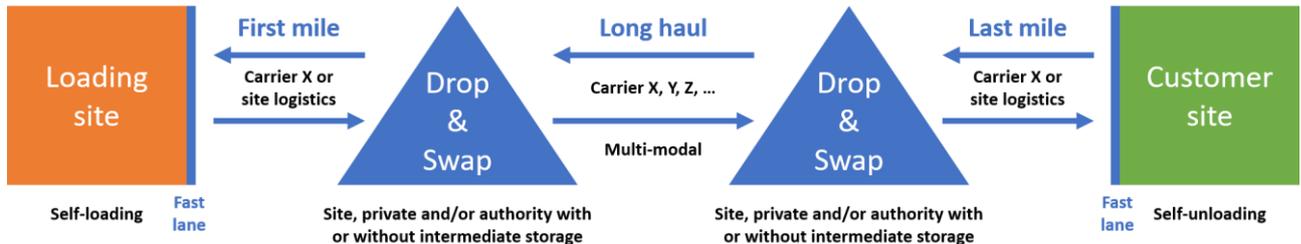


Fig. 2: Decoupling last mile from long haul - drop & swap concept

1. Decoupling last mile from long haul (drop & swap concept)

The basic idea of decoupling is to divide the entire journey of the transport equipment and cargo into a long and a short haul (or first/last mile), each being carried out by a different driver. The drop-off zone can be an on-site parking zone or depot, a private carrier zone or a neutral/open terminal access zone. This drop & swap zone can be designed with additional intermediate storage and services, including a zone or terminal where a switch can happen between transport modes. Different operation models are possible using this basic idea:

- Operations model 1: site operations controlled
In this model, the “fit to load” transport equipment is put at the disposal of the loading site by the haulier. Site personnel performs the short haul, the loading operation and prepares also the required shipment documentation. The long-haul haulier will pick up the loaded transport equipment at the drop-off zone at his convenience in accordance with the required delivery date of the customer. In this practice the haulier is not involved at all in the loading process. Typically, this drop-off zone is a parking zone closely linked to the site.
- Operations model 2: service provider controlled
The second model is an operational model in which a small number of dedicated drivers perform the transport from the drop-off zone to the site and back, including the loading. Another driver carries out the long-haul transport from the drop-off zone to the end customer. This operations model gives the haulier the possibility to load in off-peak hours and outside the admin office hours (provided the required shipment documentation can be made available upfront and/or is digitally available for sign off by the long-haul driver outside office hours). Additionally, the haulier only needs a limited number of well-trained and qualified short-haul drivers to execute the loadings.
- Operations model 3: service provider collaboration
The third model requires a higher collaboration between different carriers, as this model is using multiple dedicated drivers from multiple carriers to perform the transport from the drop-off zone to the loading site. Site operations and/or the service provider perform the loading and delivers the loaded equipment back to the drop-off zone. The follow-on transport is following same principle as within the second model. Such model is frequently used in multimodal transport where the drop-off zone is a rail or barge depot.



Fig. 3: a drop & swap parking zone

The drop & swap parking zone can be a temporary buffer for empty trailers and loaded trailers “in transport”. For the latter it is essential that CMR¹ and SDS² information is always available, to support and proof the transport chain.

In the case no customer has been allocated yet, the drop & swap zone is used as intermediate storage or depot. In that case all legal requirements for storage of tank containers need to be fulfilled. Especially for ADR³ products, additional safety and

security measures are required, such as fire protection and emergency intervention, closed and secure area, regular supervision. See also the Cefic-ECTA best practice guidelines on “Safe storage and handling of containers carrying dangerous goods and hazardous substances”, on Cefic and ECTA websites.

Key considerations for implementing “drop & swap” concepts

- The producer needs to investigate which product streams can be involved and for which customers this could be beneficial.
- Every loader and carrier should know the product, loading/unloading and equipment specifications per segment (packed, dry bulk, liquid bulk and gases).
- A contractual agreement between the loading site, including Third Party Logistics (3PL), and the haulier is required. Any equipment liability aspect needs to be discussed and agreed upon by the haulier and the loading site (including 3PL). This liability framework should be in place before starting drop & swap between parties.
- For small sites, an agreement with one single haulier is recommended in order to benefit from economies of scale.
- Enough (well cleaned) trailers and related equipment must be made available.
- The use of yard tractors may be envisaged if this is applicable and more convenient than the use of road trucks.
- The site planning needs to take account of the impact of “urgent” drop & swap operations.
- Mixed loads are more complicated for drop & swap. Fully empty trailers are the best to use for drop & swap activities.
- There may be a need to invest in additional parking area, including equipment inspection and waiting area where drivers can wait or work safely (e.g. safe working at height).

Critical success factors

- Quick access for drop & swap drivers is needed on sites to make drop & swap a success (see option 2: fast lane).
- The availability of the shipping papers should be synchronised with the loading flow. Otherwise, waiting times occur after loading and the benefits of the drop & swap concept are lost.

¹ CMR: Convention on the Contract for the International Carriage of Goods by Road (transport document)

² SDS: Safety Data Sheet

³ ADR: European Agreement on International Carriage of Dangerous Goods by Road

- Technology (digitalisation) is critical for success and will help the drop & swap process, especially with regards to shipping and loading/unloading papers.
- To avoid overloading, the maximum total payload of the equipment must be known before loading by both the transport company and the loader in case of preloading activities. This may require the sharing of equipment data for the equipment involved.
- The loading site will have to adapt its site organisation, as well as its loading process. Site personnel need to be trained in the safe handling of the different types of transport equipment.
- Clear work instructions must be established and communicated to trained drivers and site personnel, as certain products require strict and specific product training and the appropriate immediate measures (in case of incident in transit).

Summary of key benefits of decoupling last mile from long haul

- Dedicated drivers have better experience of site safety & security specifics, and speak the local language resulting in lower incidents rate.
- Limited dedicated drivers allowing a higher utilisation rate of trucks and drivers.
- Better work-life balance for drivers due to local activities.
- Shorter distances allow better options to implement zero emission vehicles.
- Drop & swap areas nearby terminals support multimodal transport and improve transport safety & sustainability.
- The concept allows to have a better utilisation of the loading capacity and less infrastructure needs on the loading place (parking/loading bridges). The loading/unloading areas have more space and time to organise the loading/unloading activities better, safer and more effectively.
- Time on site for the haulier is reduced. There should be no handling or waiting time for drivers anymore.

2. Fast lane access

Providing a fast lane access will help drivers to get faster access on sites. With this solution, time is no longer lost at registration desks, as the truck and driver can enter the site without any administrative intervention when the truck arrives at the site.

Benefits

- Lead time: no waiting time at check-in of a site (safety test, waiting time at check-in, etc.). Faster gate processes, efficient site security.
- Driver treatment: less stress as the fast lane is bypassing queues and communication issues. Higher safety standards (only trained, experienced drivers on site).

Requirements

- Transporter and equipment need to be pre-registered. Such pre-registration includes:



Fig. 4: biometric identification of the driver

- Registration of driver passport or identity card
- Registration of truck driver licences and certificates (e.g. ADR) incl. validity
- Registration of biometrics (e.g. hand scan, iris scan)
- Registration of site safety training validity
- Registration of equipment information (e.g. tank code, compartments, number of axles).
- Registration of equipment certificates validity (e.g. ADR, inspection)
- Preregistration, planning
 - Before entering the site, the equipment needs to be allocated to the transport order by the dispatcher of the logistics service provider. This information should be digitally available before the arrival of the truck.
 - Documents (e.g. cleaning document, proof of previous load, pressure test) can also be pre-checked before arrival at the site if these processes are digitalised.
 - By sharing dynamic ETA information of the truck, the loading/unloading slot planning can be optimised proactively, allowing more flexibility to the transport companies without losing loading efficiency.
- Automatic detection and verification of vehicle information at arrival
 - Via an optical character recognition (OCR) gate, number plates of vehicle, trailer and container can be registered automatically. It also allows to take pictures, at site entry and when leaving the site, for checking and archiving technical status of equipment at site entry/leaving time.
 - Radio Frequency Identification (RFID) devices on truck, trailer and container can also be used to automatically detect and register equipment information at site entry.

The fast lane option can be strongly advised for companies that only have a limited number of drivers and transport equipment (regular transfers to external storage or warehousing locations, local distribution to customers, fix shuttles or milk runs). Last minute equipment changes (within the dedicated pool of pre-registered equipment) are digitally adapted and confirmed by the dedicated truck driver via mobile device or smartphone.

To take full advantage of the fast lane option, it is advised to combine this with option 1, decoupling of the transport chain, to reduce the number of drivers and vehicles to be pre-registered. However, it is vital for this option to keep administrative burden for transport companies as low as possible (e.g. via digitalisation). This option will ensure the highest success, if a general, European-wide standard could be implemented. Given that the fast lane concept makes use of personal truck driver data, it must be implemented in compliance with the EU General Data Protection Regulation (GDPR).

3. Self-loading/unloading, potentially in combination with drop & swap

Definition of a self-loading/unloading operation:

- The driver brings the empty vehicle/tank and loads the vehicle/tank himself.
- The driver who brings the loaded vehicle/tank unloads the vehicle/tank himself.

A lot of companies have self-loading and self-unloading operations already in place and this practice is growing because it significantly increases the loading efficiency. Self-loading will increase productivity of the truck drivers, especially in combination with fast lane access and/or loading/unloading outside regular working hours.

However, the loading/unloading site remains responsible for securing the operation against human error and ensuring that the driver's safety is not compromised.

Typically, self-loading/unloading is limited to a dedicated pool of drivers, and mainly beneficial for bulk transport.

Benefit

- Higher productivity of loading employees (number of trucks per site FTE is multiplied by 5 to 10).
- Efficient use of resources.
- Wider opening hours of the loading place.
- No time loss for driver waiting for administration and loading employee.

Process

- Gate-in: driver and equipment are pre-registered and are pre-announced.
- Checks at the loading place:
 - Automatic checks: cage down for working at height, correct loading arm connected, etc.
 - Manual or semi-automatic checks: e.g. wheel blocks.
- Self-loading procedure: clear self-loading procedures in the language of the operators and drivers must be available at the loading place, describing clearly the roles and responsibilities of each party to avoid confusion.
- Risk assessment: assess the impact on safety and insurances in order to be completely covered in case there is a claim.

Conditions

- Self-loading is highly recommended for very regular and recurring product flows.
- Ensure that roles, responsibilities and liabilities between the loader/unloader and the transport companies are clearly defined in the self-loading/unloading procedure.
- Make sure that a site operator can still be contacted in case of questions/problems/incidents/spills.
- Comply with regulations e.g. working at height. Foresee correct infrastructure to work safely.
- High degree of automation (automatic valves, etc.)
- Low complexity (no cleaning or cleaning pre-checks are done before arrival at loading place).
- Drivers must do a minimum of 3-5 loadings per month in order to avoid losing knowledge of the loading process.
- Training:
 - Training must be done in a classroom and on the loading place.
 - The first 3-5 loadings will always be executed under supervision of the site operator. Only after a positive evaluation, the driver can start self-loading on his own.
 - Regular spot checks must be done, where the driver is supervised by an experienced operator to secure a good level of know-how (e.g. every 6 months). Besides practical and product training, these checks also include regulation training (e.g. plastics losses, payload checks).
 - A classroom training is repeated at least once a year for every driver.
- As loading installations and self-loading processes are most probably different in each company, it is not advised for drivers to do self-loading in multiple companies.

4. Capacity optimisation

An additional option to reduce lead times on site and to increase driver productivity, is to optimise capacities (speed) of physical loading/unloading, and to investigate and optimise the occupancy level of site facilities.

4.1. Speed of loading/unloading

Description

Data from eight sites with 12 different loading facilities show that the actual loading/unloading activity takes up to 50% of the total time spent on the site by a driver. Increasing the average loading/unloading speed will thus have a direct impact on reducing this time.

Achievable benefits

Time saving on site: up to two hours per truck can be saved (based on actual data from these eight sites), applying to all operations where the speed of loading/unloading can be increased.

Key considerations for implementation

This recommendation applies mainly to the loading of bulk liquids.

- Loading speed can be increased by:
 - increasing pumping capacity (depending on product properties),
 - eliminating/reducing bottlenecks in the product line between the storage tank and the loading/unloading facility, e.g. pipe diameter, presence of filters, and/or
 - increasing the loading temperature for viscous products.
- All actions should be linked to the product properties.
- All the actions should be linked with safety rules and process safety.

Additional comments

- Actual data of eight different sites show that the site with the lowest time spent on site by the driver, had an average loading time of 40 minutes whereas the site with the highest time spent on site had an average loading time of 180 minutes.
- Example of best practice: a site has decreased the mesh width of product filters used for lower viscosity products, hereby achieving a decrease of the loading time of up to one hour per load.
- Example of bad practice: a product used to be heated before unloading in order to increase the pumping rate. The heating however was taking two days for every truck. This extra time exceeded the time gained by an increased pumping rate.

4.2. Occupancy level of site facilities

Description

Sites want to make optimal use of their facilities and prefer a high occupancy level in order to minimise the cost of invested capital per loading. However, this may conflict with efforts to reduce the waiting times for drivers. Experience in the industry shows that waiting times at an occupied loading/unloading

facility increase significantly once the occupancy level exceeds 60-70 %. Depending on the specific configuration of each loading/unloading site, equilibrium needs to be found between occupancy level and vehicle waiting times.

Achievable benefits

Time saving on site: up to one hour per truck can be achieved (based on actual data from 10 sites), applicable to all loading/unloading activities at the same installation.

Key considerations for implementation

- Increase the flexibility of loading by optimising the number of loading points per product if more than one loading point is available for different products. Use the sales & operations planning (S&OP) process to validate. This consideration is depending on the site configuration.
- Investigate opportunities for decreasing the occupancy rate by extending opening hours, also towards night loading. Drivers must be available, and it must be specified in the contractual terms with the transporters. Organisational changes at the site may be required.
- Investigate opportunities for decreasing the occupancy rate by increasing the number of loading/unloading points (see first bullet above). This consideration might require investments.
- Spread the loading/unloading activities more evenly over the week/month in close cooperation with customers.
- Spread the loading/unloading activities more evenly over the hauliers e.g. by implementing daily time slot booking.

Additional comments

- Data on time spent on 10 different sites indicate that the best site has an average waiting time of 15 minutes versus 60 minutes for the least efficient site.
- Within the same context of optimising the utilisation of site facilities (and reducing road congestion at the same time) it is recommended consulting the ECTA-EPCA-Cefic "Guidelines for 16 hours operation", on ECTA and Cefic websites.
- Changing opening hours can be avoided with drop & swap or preloading concepts. If intermediate buffering is not possible, it is advised to have opening hours that also allow for driving outside peak hours (e.g. before 6:00 am and after 8:00 pm). To avoid increasing costs due to resources, using fast lane concept (including pre-notification) is advised.

Recommendation 2: digitalisation and smart planning

In this chapter, the importance and the potential of digitalisation and planning to support lean and reliable operations is clarified.

As already stated in the previous recommendation, digitalisation of loading/unloading processes, especially planning and on-site administrative activities, can highly contribute to reduce waste in lead times caused by:

- manual administrative tasks (typing, checking, etc.), which can be avoided through digital interfaces,
- human errors (wrong information provided or typed in the enterprise resource planning - ERP system), which can not only cause additional lead time, but also give rise to additional safety and compliancy risks,
- missing or invalid certificates (e.g. driver, equipment, cleaning) which could have been checked before, and cause a big loss of driver, equipment and loading capacity. This is also an important source of frustration and stress for the driver and loading personnel.

As outlined in the fast lane section, digital solutions can really speed up check-in and gate processes. In the following paragraph, the use of digital information in slot planning is explained.

Dynamic time slot planning - real time adaptation of time slots

Description

Time slot booking is a process in which hauliers are required to book in advance a time slot for loading, preferably by electronic means. It enables the loading site to evenly spread the arrival of trucks, minimise waiting times for drivers and match loading site resources to loading activities.

However, static loading/unloading time slots can also bring some significant disadvantages for drivers especially when time slots are missed due to traffic congestions or are unavailable due to late or changed order booking. Dynamic time slots, in combination with ETA predictions and flexible capacity, overcome this and allow drivers to be loaded in acceptable times and keep driving.

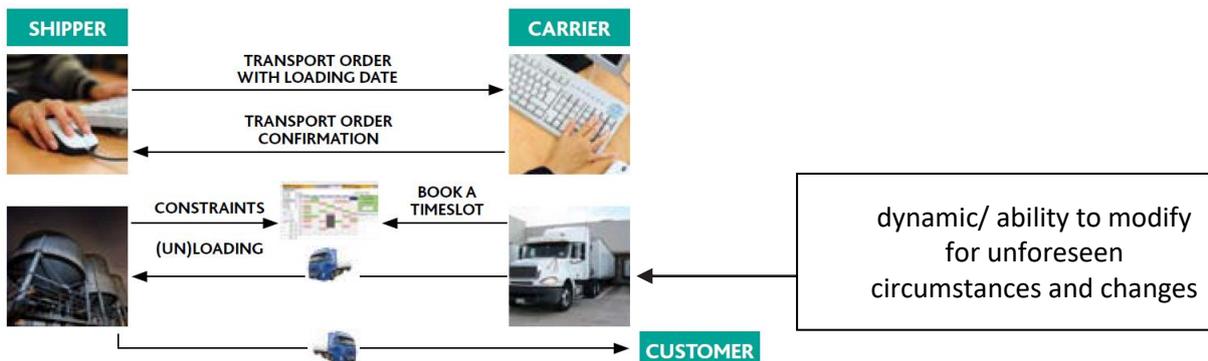


Fig. 5: time slot booking process

Achievable benefits

- Planning and driving time:
 - Minimise waiting time to load. The demurrage for loading is up to three times higher on sites without slot planning.
 - Ability to plan loading and driving hours considering the driver resting and driving times.
 - Smooth loading process, low frustration for drivers.
 - Adaptable to late changes, within rules set by the loading site.
- Other:
 - Workload is evenly spread for the loading site with no or few peak hours.
 - Ability to optimise site resources.
 - Ensures loads are loaded on time so customers receive goods when expected.

Key considerations for implementation

- Make use of an IT-based, dynamic time slot booking system with efficient access by third parties, thus avoiding manual administrative work. Have phone back-up for emergency.
- Install a planning tool for each loading/unloading site.
- Give visibility of the dynamic slot planning to carriers to enable booking and adapting loading slots online.
- Some companies have replaced or complemented time slots with a system of ETA and are investigating the use of geofencing. The system integrates GPS location and other parameters like the remaining driving time of the driver, traffic data and weather conditions for a more accurate ETA.
- Align the availability of loading personnel to the planning forecast.
- Establish and communicate clear priority rules for “late” and “early” arrivals but include enough flexibility in the planning to deal with these, e.g. for long haul transports. Only 70% of the loading site capacity should be “slotted” to ensure that the planning can be met.
- Integrate “customer pick-ups” e.g. by providing for empty slots.
- The dynamic planning might allow for flexible steering when arrivals are within a one-hour time range. This flexible time range can be adapted during peak periods or even increased in case of low volumes.
- Consider the characteristics of the site, e.g. location in a congested traffic area or low cleaning station capacity.
- Avoid carriers booking “safety” slots at peak loadings by considering phased release of booking slots.
- Advise the relevant parties in due time about any changes that might affect the operation, including early arrivals or delays. Provide contact points to whom parties can report early arrivals or delays, as well as emergencies and incidents.

Feasibility

Setting up a dynamic booking system requires only a low investment and is offered by e-platforms used for transport booking management. Adaption of the site organisation and the order planning process might need to be considered.

An important added value for the driver efficiency, is to combine a booking system with extended opening hours or to allow for early/late loadings.

Additional comments

Booking slots are already in use at major chemical sites and tank storage terminals. Customers have also started to introduce unloading slots. Some learnings from these implementations are:

- Time slots can often be amended up to two hours before the agreed time. So far, not all drivers or hauliers are using this opportunity, which leads to planning difficulties.
- Absence of flexibility may result in even longer waiting times.
- Planning is not sufficient. Monitoring compliance with the schedule is equally important as hauliers tend to book the earliest possible time slot.
- Loading slot booking is used to ensure that loading can be executed efficiently, and resource utilisation is increased through low waiting times before loading.
- At some chemical plants, the implementation of dynamic slot planning has been unsuccessful or even counterproductive because the scheduling of the loading personnel is done at least one day in advance. Rescheduling the loadings might then even increase waiting times.
- Dynamic slot planning can only work if flexibility and collaboration is possible at the loading place and at the transport company.

Recommendation 3: truck driver communication and comfort

With this recommendation, the importance of an optimal interaction with the driver and attention for his/her well-being is emphasised.

The first proposals focus on more technical measures that can be taken to make life easier for the truck driver at the site.

Different safety procedures across different sites lead to ambiguities. Standardisation in procedures and safety requirements and clear communication are good examples where sites can collaborate. This will reduce complexity for drivers and reduce frustration and stress due to misunderstood requirements. The higher the uniformity of working procedures between the chemical sites, the better trained and experienced drivers will be in applying them.

In case of issues, potential unsafe situations and unexpected events, it is important to always ensure mutual trust and open communication between all parties involved. It is very important that an open conversation can take place between the truck driver and the site operator about any safety observation made or reported.

1. Standard loading/unloading procedures

Description

Depending on which loading/unloading point they are operating on, drivers may be confronted with different procedures on the same site, which may lead to confusion and unease. The producer should therefore make efforts to ensure that procedures be as standardised as practicable on all its loading/unloading points and even on different production plants.

The procedures should follow the same process on each site and include all relevant safety information, e.g. PPE (Personal Protective Equipment) requirements, key emergency numbers. They should consider Cefic-ECTA-Fecc “Best Practice Guidelines for Safe (Un)Loading of Road Freight Vehicles”, available on Cefic, ECTA and Fecc websites. They should also be available in different languages (e.g. supported by a simple but meaningful introduction video) and include pictograms to aid understanding.

Achievable benefits

- Time on site: clear standardised procedures will help minimising loading/unloading time.
- Driver treatment: a standardised model of procedures will clarify the role of the driver and eliminate any possible confusion and stress.

Key considerations for implementation

- To be ideally implemented through a specifically designed and standardised best practice template, following a rigid process in terms of procedure but offering flexibility for loading points to apply.
- Encourage sites to adopt the template for standardised procedures and provide time and resources to engage in this process.
- Adapt the procedures to the different aspects of the different working areas.

- Ensure that hauliers and drivers have access to this information e.g. via a website or the SULID⁴ document.
- Keep it short and simple. The bigger the documents, the higher the probability that instructions will be ignored.
- Try to make use of digitised versions for most important instructions, e.g. with ticking boxes for allowing loading/unloading.

Feasibility

- Once the template is designed, it should be rather straightforward to make such harmonised template digitally available for carriers via the cloud and/or via procurement tenders with explanatory notes. The major obstacle may lie in persuading loading locations and loading personnel to engage in a common and standardised procedure which may differ from their current practices.
- For some very specific products, additional procedural requirements might be needed.

2. Multilingual and visual notice boards - clear site instructions

Description

Notice boards, listing the “do’s & don’ts” on the premises of a site, play an important role in the communication with drivers. They contain key messages about general safety and security instructions (e.g. the use of PPE, emergency response details) and should be in different languages (e.g. local language, languages of neighbouring countries and ideally also in English). These instructions remind drivers of key messages that were already provided by written instructions, by the SULID document, a specific website and/or by (digital) training.

Achievable benefits

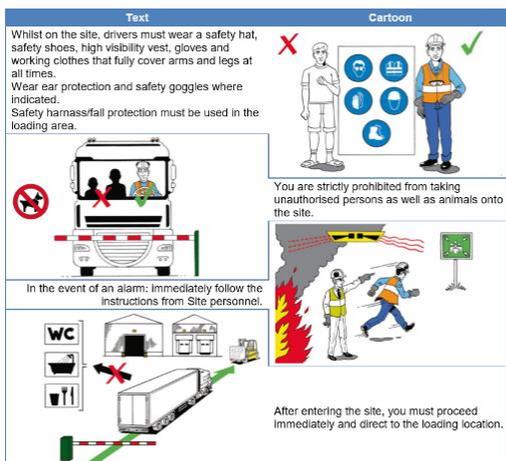


Fig. 6: example of site pictograms, see enlarged pictures in appendix 2

- Driver treatment: it reduces the risk of drivers/others carrying out an unsafe act.
- Other: the use of different languages, videos and/or pictograms help addressing a wider population, e.g. contractors for maintenance activities.

Key considerations for implementation

- A standard notice board should be designed, containing a standard list of items which cover a wide range of risks, usually encountered in the loading/unloading area. Preferably, pictograms should be included, and empty spaces left for each individual site to add their own details, e.g. emergency number (see examples in appendix 2).
- Notice boards need to be placed at strategic locations: at site entrance/gatehouse but most importantly at the loading/unloading areas.

⁴ SULID: Site (Un)Loading Information Document, on ECTA, Cefic and Fecc websites

- This practice isn't a substitute for regular safety training or the provision of safety instructions. However, it should include the most relevant safety instructions at the site, which can be called "Life Saving Rules" for example (working at heights, mobile phone usage, opening of valves/covers incl. sample taking and more).

Feasibility

- Notice boards are a simple communication tool that merely requires the translation of standard messages in a few languages.
- It is important that the notice board is read by the driver. Therefore, it is important to use large and simple symbols as much as possible (such as maximum speed) and to limit the use of text.

Additional comments

- For direct conversations between operator and truck drivers each in their own native language, innovative solutions, such as translating earbuds, are coming on the market. Technology will certainly evolve and will need some deeper investigation and try-out in practice.
- Cefic and ECTA have developed Transperanto, a toolbox which contains 150 key safety words and short phrases in 26 European languages, and which has been made available on www.transperanto.org.



Fig. 7: innovative translation technologies are under development

3. Standard set of Personal Protective Equipment (PPE) and common application rules

Description

Introduce a standard set of PPE for use by drivers during loading/unloading operations of certain groups of products, leaving the possibility to have additional specific requirements for certain specific products.

Whereas this recommendation is in the first place addressing the requirements of different loading points on individual sites, it is advised to set uniform standards requirements across different sites of the same company. This might also apply to industrial areas, like port region, etc.

Achievable benefits

- The driver can cope more easily with the requirements by having a standard set of PPE per product type.
- Less product related incidents caused by inadequate PPE.
- This standardisation also offers cost savings to the haulier.

Key considerations for implementation

In the Cefic-ECTA-Fecc "Best practice guidelines for safe (un)loading of road freight vehicles", an established list of applicable standard PPE grouped by type and specification can be found (Fig. 8 below). This overview gives an example of standardised PPE requirements for drivers, which may be used on a site, a company, or in a chemical cluster. Chemical companies should compare their site rules with those,

make them known to all interested parties and try to limit too specific requirements like helmet colours, additional shoes standards, etc.

PPE	Reference to standard	Type of operation		Description
Safety Spectacles	EN 166-3 with side protection	Type 1: Drivers loading / unloading packaged goods + drop and swap operations.	Type 2: Drivers loading and unloading bulk granulates or other solid chemicals without danger classification	Protection against liquid droplets/splashes Minimum EN 166 with side protection. This side protection is guaranteed if special shaped spectacles are used. If straight shape spectacles are used, side protectors are to be present.
Protective clothing	Arms + legs + body covered			For packaged goods, drop and swap and bulk granulates protective clothing which covers arms + legs + body is sufficient. Both a jumpsuit or vest + trousers are OK.
Safety shoes	EN 20345 S1 – closed			Steel toe, antistatic, absorption around heel. Safety boots are acceptable too. Rigid or steel soles are not recommended as it is uncomfortable for driving. Clogs, even EN 20345 are not accepted. ⁽¹⁾
Helmet	EN 397			Industrial helmet protection. Safety caps do not provide sufficient protection from falling objects.
Safety gloves (mech. risks)	EN 388			Safety gloves with protection against mechanical risks.
Warning vest	EN 471			High-visibility clothing for professionals – warning vest Same standard of high visibility clothing is already required for ADR as well as for all drivers in most European countries.
Fall arrest harness	EN 361			See Note on Transportation Equipment Elevated Work
Safety goggles	EN 166		Type 3: Drivers loading and unloading bulk liquids (ADR and non-ADR) and solids (ADR)	
Safety gloves (chem. risks)	EN 374 JKL or according to product		For bulk liquids and solids (ADR) use of goggles is required which can also replace a normal safety spectacle. These are also preferable when (non-dangerous) dust can occur during operations. Goggles are to be strapped to the head, not to the helmet. Safety gloves with protection against chemical risks JKL : test chemicals are n-heptane, NaOH 40 % and H ₂ SO ₄ 96 %	
Protective clothing	EN 533 EN 1149/5 EN 13034 type 6		<ul style="list-style-type: none"> o Protective clothing with limited flame spread properties. o Protection against the danger caused by static electricity. o Limited protection against liquid chemicals, type P(6) 	
Safety shoes	EN 20345 S2 – closed		As S1 + water resistance of upper. In some circumstances safety boots may be required. Rigid or steel soles are not recommended as it is uncomfortable for driving. Clogs, even EN 20345 are not accepted. ⁽¹⁾	

Fig. 8: source: “Best practice guidelines for safe (un)loading of road freight vehicles”, on Cefic, ECTA and Fecc websites.

Feasibility

The successful implementation of a standard set of PPE will largely depend on the differences between loading locations on a site or between sites. Each location or site may need to be convinced to apply standards that may be perceived as lower than the ones in use.

An investment may also be required from hauliers, but this may be compensated by the savings brought by the standardisation.

4. Truck driver respect and comfort

In some cases, drivers don't feel treated respectfully, due to communication styles, lack of information and waiting times. Drivers generally expect:

- communication in the same way as own employees and on-site personnel,
- to enjoy safe and ergonomically practical working conditions,
- to spend no more time than necessary on a loading/unloading site, i.e. short waiting times by having an efficient loading/unloading process,
- clear information about planning, timing, etc., especially in case of changes in the schedule due to unexpected events.

Enhanced attention for driver treatment will increase job attractiveness. Good driver treatment will help to attract and retain drivers on loading sites and not move them to other industries.

It is key to create an environment where collaboration and customer-oriented communication is a priority. This can be done by measures such as **communication training** for check-in, loading and security staff, but also by transport companies with more emphasis on **knowledge of certain main languages** (English, French and German).

Another concrete action that demonstrates interest in driver well-being consists in setting up the possibility for the driver to give **feedback on his/her experience on the site**. This can consist in a quick (e-)form, a survey by the haulier, smiley feedback buttons, etc. Such measurement will help identifying areas of possible improvement, while also promoting the site/company as being “driver friendly”.

Besides these “soft” measures, some basic infrastructure is needed for a better driver comfort:

- Adequate and clean sanitary and resting facilities, separated for women and men, clean showers, toilets and rest area, vending machines and free coffee machines, free Wi-Fi, etc.
These facilities must be in an appropriate location and easily accessible for drivers. Some rules are necessary to make drivers understand what is expected of them and the consequences in case of abuse.
- The installation of a communication system to alert drivers to go back to their vehicle in case of alarm can be considered.
- Allow drivers to give feedback after they loaded/unloaded on a site.

Conclusion: drivers are an essential part of the supply chain and are partly the ambassador of the company at the customer site. A good reputation of being an efficient, customer-oriented and driver-friendly company or site, creates trust and builds a stronger customer relationship.

Recommendation 4: chemical truck driver training, engagement and retention

Whereas the first three recommendations mainly addressed chemical sites, third party warehouses or terminals, this section is more directed towards the transport companies.

To ensure new drivers get attracted to the chemical truck driver profession, this recommendation covers the need to train, engage and retain truck drivers by offering a chemical truck driver career path.

The chemical industry has very specific safety requirements in terms handling and loading/unloading of dangerous goods. Only fully qualified truck drivers can maintain the “license to operate” for the entire industry. The truck driver qualification framework has the following objectives:

- provide a harmonised chemical truck driver training & qualification framework at European chemical logistics level, helping to reduce the entry barriers into the chemical driver profession and to align training methods between industry stakeholders while securing the safety, quality, social and environmental impact of moving chemical goods in Europe;
- categorise the truck driver training requirements amongst various types of activities (load/unload, driving, bulk/packed) and specific training needs;
- describe and support an accelerated training & qualification framework, specific for professional chemical truck drivers, to retain and attract new drivers into the chemical sector;
- create alignment of training programmes towards more frequently used sustainable logistics concepts (e.g. drop & swap, intermodal transport and synchro-modality, self-loading, preloading, fast lane access requirements), each requiring new responsibilities and a perfect communication between loading/unloading site and the truck driver;
- Provide an easy way to communicate about “Driver Qualification Requirements” as a best practice guideline.

1. Understand the chemical transport business segments

Most transport companies work in different industrial sectors like fast moving consumer goods, electronics, construction, automotive, pharma, etc., and therefore it is important to understand the specific (petro)chemical road transport market needs before the (petro)chemical market is served. General safety, more particularly in the transport of dangerous goods, forms the key priority within the chemical sector. However, looking deeper into the transport requirements, a broader diversity can be found, and different chemical segments can be identified each with its special requirements for truck drivers. Such requirements can be related to product, equipment type or customer’s needs. A summary of the different business segments is represented by Fig. 9.

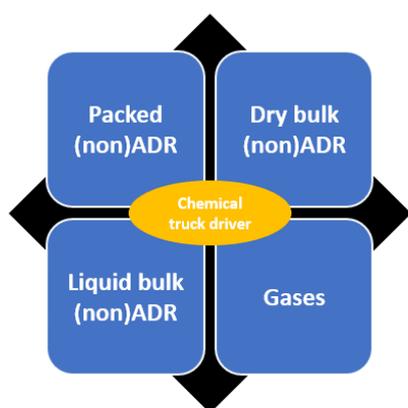


Fig. 9: the four main different business segments within chemicals

Each chemical business segment brings specific transport and handling tasks and responsibilities that a chemical truck driver needs to cope with, resulting in different required competency levels.

Each chemical business segments deals with an own portfolio of chemical and petrochemical products that are transported and handled across the chemical logistics supply chain. Here below some typical product examples:

- Packed or packaged chemicals, mainly palletised chemical goods (bags, drums, cans, kegs, IBC's, etc.)
- Dry or solid bulk chemicals (powders, pellets, granules, etc.) packed in bulk tank containers, silo trucks, railcars, inner liner containers.
- Liquid bulk chemicals in tank containers, tank trucks, railcars, etc.
- Gas container transport, recipients under pressure, specialised equipment for highly hazardous chemicals.

Quite often, chemical producers manufacture different chemical product classes and cover different business segments on the same chemical production site. To minimise safety risks, this product clustering leads to more strict and controlled site entry procedures that a truck driver might expect at first sight from the transport instructions document.

2. Understand the chemical truck driver qualification dimensions

In this section, we will further drill down into our analysis and explain the six qualification or training dimensions that a chemical truck driver typically needs to master when transporting (petro)chemicals. A truck driver is requested to have received training about the following six dimensions of requirements before being able to transport chemical products in a safe, compliant and secure way.



1. Truck driver licence, code 95 and regulation requirements
2. ADR product classes
3. Transport company policy & procedure requirements
4. Chemical product types
5. Chemicals transport & equipment type requirements
6. Customer loading/unloading training requirements at customer, production sites or third-party warehouses or terminals

These six truck driver training requirements are sequenced in terms of qualification & training levels. First, the chemical truck driver needs to fulfil the mandatory country regulation requirements as for instance obtaining a driver licence. Next, he/she needs to be trained on the ADR transport basics, company safety policies and available equipment types. Thereafter, a training mentor is personally guiding the truck driver and gives extra business segment and product-specific training to deal, for instance, with dangerous chemicals or niche products (TDI/MDI/hot resin, etc.), combined with the customer loading/unloading requirements.

An overview of the six chemical truck driver qualification dimensions are summarised in the picture below.

The 6 Chemical Truck Driver Qualification Dimensions

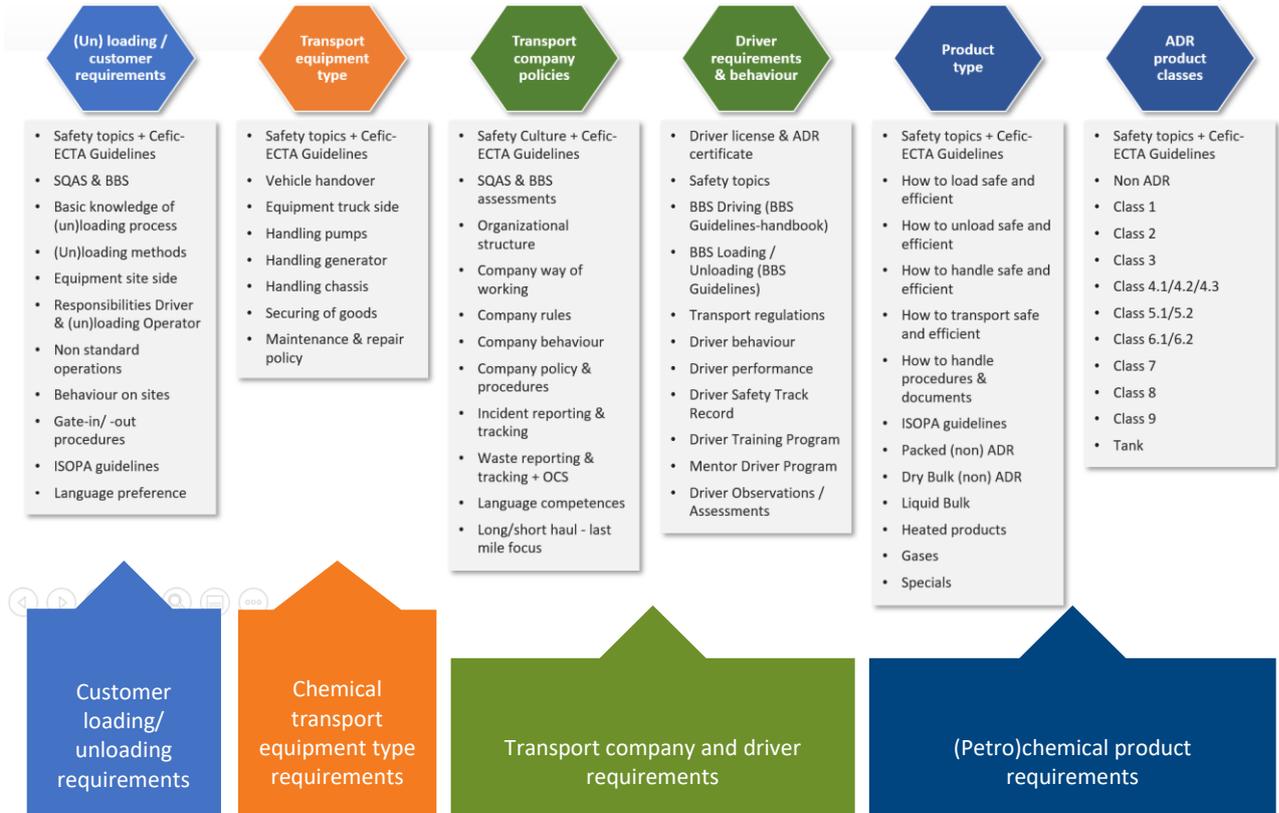


Fig. 10: the six chemical truck driver qualification dimensions, see enlarged picture in appendix 3

The driving licence and ADR certificate are often mandatory requirements within the petro(chemical) industry. Furthermore, the dimensions “transport company policies” and “driver requirements & behaviour” go hand in hand and can be further grouped into “**transport company and driver requirements**”. And so are the “product type requirements” and the “ADR product classes”, which we can group into one dimension “**(petro)chemical product requirements**”. We do this simplification to be able to match the truck driver qualification with each chemical business segment as visualised below. In addition, we put the chemical truck driver at the centre of the picture given the driver needs to master the right training qualifications for moving chemicals in a safe, secure, compliant and sustainable way.

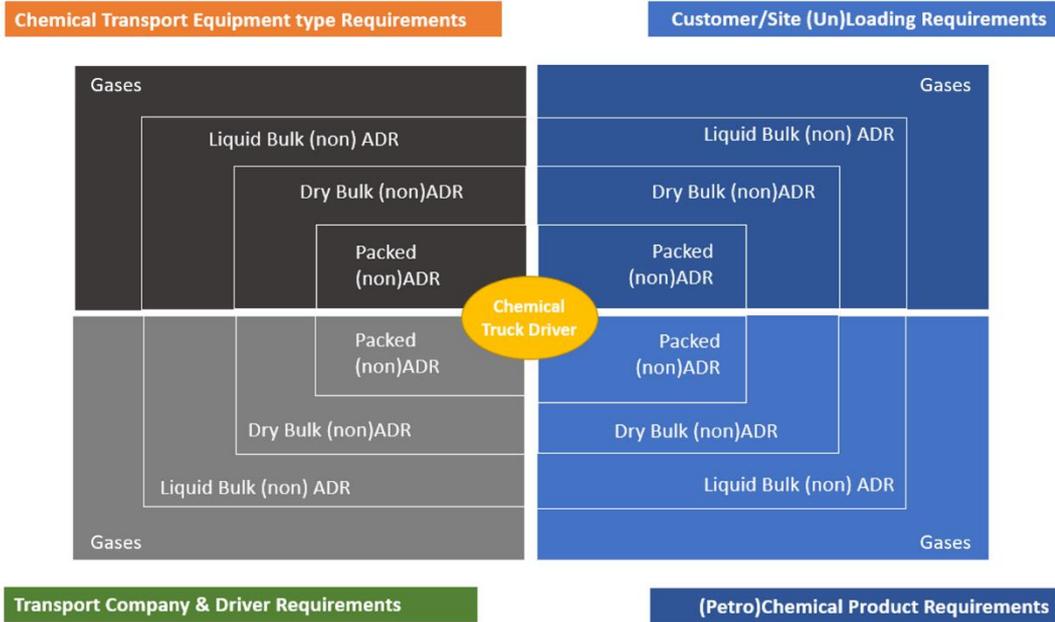


Fig. 11: qualification requirements per chemical business segment

As per the table below, within each qualification dimension and chemical business segment, a truck driver can have a basic, intermediate, advanced or mentor-expert competency level.

Basic proficiency	Intermediate	Advanced	Mentor- expert
Focus on learning the qualification. Foundational understanding of the qualification dimensions and requirements.	Applies qualification competencies in moderate difficult situations.	Applies qualification competencies in difficult and complex situations.	Applies qualification competencies in exceptionally difficult and emergency situations.
Basic driver experience level. Can apply routine and simple driver tasks.	Intermediate truck driver experience level. Can cope with routine and non-routine driver tasks.	Advanced and experienced truck driver with product segment experience level.	Practical trained and experienced mentor driver. Able to coach other drivers.
Expected to need support and guidance within a business unit or product segment.	Requires occasional guidance.	Requires little or no guidance. Operates independently in a business unit or product segment.	Serves as an expert or coach to advise other truck drivers within a chemical business segment.

3. The foundation towards a qualified truck driver career path

Given the complexity of the different truck driver requirements mentioned in the previous paragraph and given the chemical truck driver skills and experiences are built up “along the road” and with a lot of practical “peer to peer” coaching, and this over the life span of a professional truck driver career, a split up in different training steps and programmes is done in practice. This training qualification steps, which are spread over time, form the foundation of a career path as professional and qualified chemical truck driver.

In addition, it is important to note the difference between a qualified driver and an experienced driver. A qualified truck driver refers to the different (theoretical) training programmes a truck driver completed successfully. As important is the experience level of a truck driver, where an unexperienced truck driver is typically coached by an experienced mentor driver, making observations and increasing the practical driver performance level.

4. The typical competency levels for a chemical truck driver training path

We have explained the chemical business segments, each bringing in specific tasks and responsibilities, the typical chemical truck driver qualification dimensions and the proficiency levels. We can now start designing a truck driver competency framework, considering different qualification or competency levels. This logic is explained below.

Within a typical transport company, a truck driver completes a specific training programme, to serve one or more business segments depending on the transport company policies, and is assigned job responsibilities. Five separate training levels can be identified. Each training level describes a typical career path of a truck driver within the chemical sector. We further zoom in how such truck driver training scheme, or framework, might look like, and this per chemical business segment.

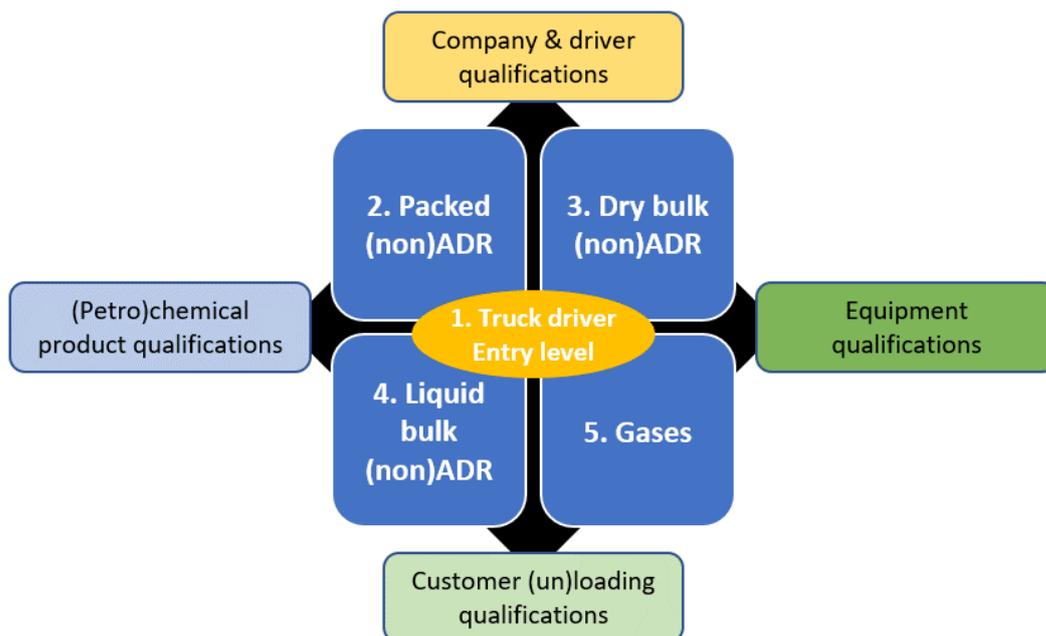


Fig. 12: chemical truck driver competency levels

Within the above picture, we identify five different chemical truck driver competency levels:

1. Truck driver entry level competencies - unexperienced truck driver - foundational knowledge level
2. Truck driver **packed** goods competencies, coming **on top of the foundational level**
3. Truck driver **dry bulk** goods competencies, coming **on top of the foundational level**
4. Truck driver **liquid bulk** goods competencies, coming **on top of the foundational level**
5. Truck driver **gases & specials** competencies, coming **on top of all levels**

A truck driver will grow during his/her career path and might be trained and exposed to different competency levels during a career, depending on the chemical business segment and transport company he/she is working for. In line with each level of the diagram above, we can add the truck driver competencies that are recommended “as best practice” for each of the four main qualification dimensions (company and driver qualifications, equipment qualifications, customer loading/unloading qualifications and chemical product qualifications).

Also note that a truck driver transporting and handling packed goods can have a full chemical truck driver career path within packed goods and further grow in proficiency within this segment, from basic to intermediate, advanced and expert, as per the proficiency table above. In appendix 4, a matrix provides an overview of each of the truck driver dimensions.

5. Truck driver training programme implementation and follow up

A truck driver training programme is the overall procedure of training truck drivers at company level. A training plan is the specific list of trainings to be followed. The existence and implementation of such training procedure must comply with local legislation and is assessed regularly through SQAS, as part of an SQAS audit assessment questionnaire. Training records with the number of training days and individual proof of the implementation of the training programme should be available. If the training programme or training plan could not be followed, clear evaluations should be available to explain the discrepancies in combination with corrective actions.

For new truck drivers, the training program typically includes an induction training and a practical check of the driver experience level and skills. Some more advanced truck driver tasks and activities applicable within a chemical business segment may require additional training, extra specific knowledge or further practical experience to reach an intermediate or advanced training level.

The training program itself should cover incident reporting, investigation and analysis, use of PPE, company emergency written procedures, spill prevention and control, awareness of fatigue and tiredness. Typical SQAS training questions being addressed within an SQAS audit assessment are:

- Is the truck driver training program in compliance with EU directive 2003/59/EC⁵?
- Is a Behaviour Based Safety (BBS) training in place for safe driving? (see also ECTA-Cefic “BBS guidelines for training of drivers and safe driving of road freight vehicles”, on ECTA and Cefic websites).
- Is the BBS training an integral part of the company training program?
- Are personal truck driver training records kept on each driver employed longer than three months?

⁵ Directive 2003/59/EC of the European Parliament and of the Council of 15 July 2003 on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers, amending Council Regulation (EEC) No 3820/85 and Council Directive 91/439/EEC and repealing Council Directive 76/914/EEC

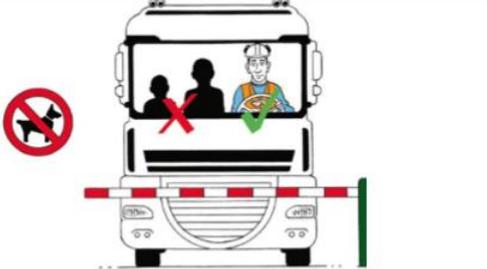
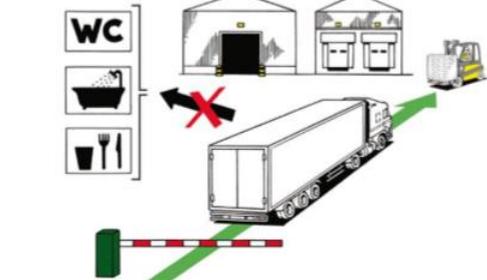
- Are safety measurements available related to truck driver injuries, incidents with spills, damages, etc.?
- Is there an up-to-date driver's manual available that is distributed to all drivers?
- Is hazardous goods training part of the program in case such cargo is being transported?
- Are the guidelines about safe loading/unloading being trained?

You will find an overview of truck driver competency levels as appendix 4.

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Appendix 2 - Examples of site pictograms

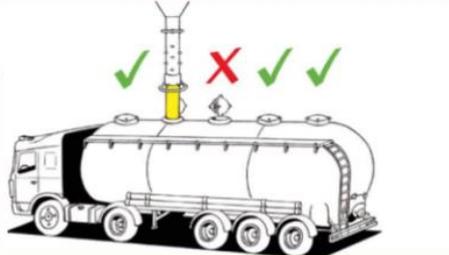
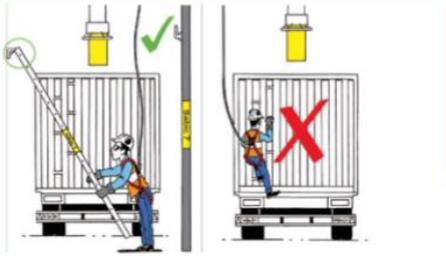
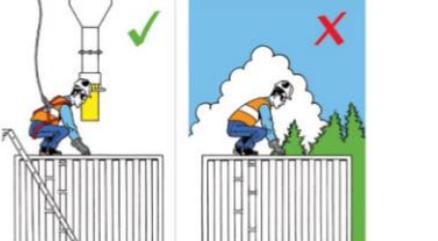
Loading rules

Text	Cartoon
<p>Whilst on the site, drivers must wear a safety hat, safety shoes, high visibility vest, gloves and working clothes that fully cover arms and legs at all times. Wear ear protection and safety goggles where indicated. Safety harness/fall protection must be used in the loading area.</p>	
	<p>You are strictly prohibited from taking unauthorised persons as well as animals onto the site.</p>
<p>In the event of an alarm: immediately follow the instructions from Site personnel.</p>	
	<p>After entering the site, you must proceed immediately and direct to the loading location.</p>

Loading packed

Text	Cartoon
<p>At the loading location: switch off the engine. Pull the hand-brake. Open trailer completely on one side. Only use the movable stairs provided by Site, in locked position.</p>	
	<p>Stay visibly in the cabine or on the green marked spot whenever a fork lift truck is within 5 metres from the lorry/trailer.</p>

Loading solid bulk

Text	Cartoon
<p>Only open 1 filling hatch at the time. In order to prevent contamination, close the hatch immediately after filling.</p>	
	<p>To step on the container, use the ladder that is provided and return it to the designated place after use.</p>
<p>All work on the container must only take place in the bulk lane.</p>	

Working at height



Traffic safety



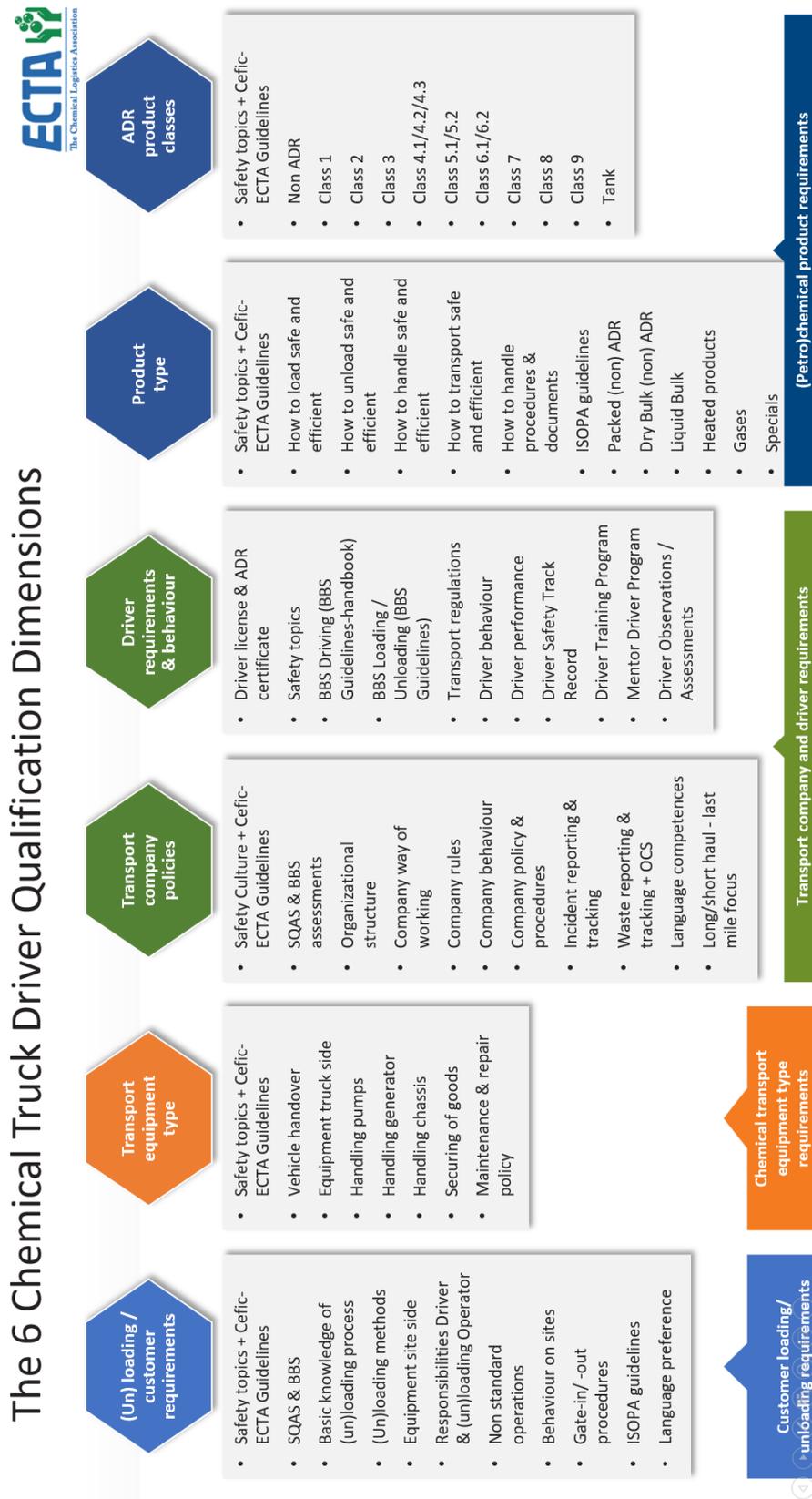
General instructions on site



General PPE on site



Appendix 3 - The six chemical truck driver qualification dimensions



Appendix 4 - Overview truck driver competency levels

1. Truck driver entry level

1. Foundational knowledge level 1 - Truck driver entry level - unexperienced level - truck driver starter

As described under recommendation 4, the first truck driver level is where the truck driver needs to fulfil the mandatory legal transport regulation requirements as for instance obtaining a driver licence and building up the basic skills on how to drive a truck safely on the road. Before a truck driver can start a professional career in any business sector, the truck driver needs to meet the minimum legal training requirements as for example Code 95 training qualifications. Without fulfilling the right competency of this entry level, a driver licence cannot be obtained and/or is also not renewed in certain countries when trainings are not timely refreshed.

In addition, as shown in the qualification matrix below, at the start of a professional truck driver career a distinction is made between a basic short haul versus long haul truck driver training programme. Main objective is to get the foundational truck navigation qualifications to start driving the truck even without direct product contact. Simplest jobs - mainly truck navigation responsibility.

1. Truck driver entry level	Basic Navigation proficiency all industry sectors	Basic Local short haul professional driver all industry sectors	Basic Long haul professional driver all industry sectors
Transport and driver requirements	<ul style="list-style-type: none"> - Code 95 - driver licence - safety & first aid - driver health & nutrition 	<ul style="list-style-type: none"> - build up "on road" experience with loading/unloading - short haul trip preparations like drop & swap - company drivers' manual 	<ul style="list-style-type: none"> - long haul trip preparation - international transport regulations - languages - build up "on road" experience with loading/unloading
Equipment requirements	<ul style="list-style-type: none"> - basic tractor and trailer navigation (classroom and "on the road") - example: board computers 	<ul style="list-style-type: none"> - local truck maintenance - light vs. heavy load, weight limits 	<ul style="list-style-type: none"> - off-site truck maintenance - light vs. heavy load, weight limits
Product requirements	<ul style="list-style-type: none"> - type of products or cargo moved - non ADR 	<ul style="list-style-type: none"> - type of products or cargo moved 	<ul style="list-style-type: none"> - type of products or cargo moved
Customer requirements	<ul style="list-style-type: none"> - transport documents 	<ul style="list-style-type: none"> - regional transport documents 	<ul style="list-style-type: none"> - international transport documents

Once the truck driver has the foundational driver skills and is employed within the chemical industry, extra general requirements are added in terms of safety and security competencies, for his/her own protection & safety, and to ensure that he/she can enter a chemical site for loading/unloading goods with the right driver outfit and PPE.

In other words, a truck driver may fulfil all competences to drive in the retail, electronics or automotive sector, however some basic extra qualifications related to Behaviour Based Safety are being added to

fulfil the requirements of the chemical industry. The next sections will detail these requirements per chemical business segment.

2. Packed (non)ADR

2. (Petro)chemical truck driver packed cargo competences (on top of foundational qualification level)

Here, the extra packed goods training competencies are added on top of level 1, to enable drivers to carry chemical packed goods according to the qualification dimensions identified under recommendation 4.

Legal requirements are highlighted in **bold**. Note that the legislation in the EU might be different per country. This also leads to extra truck driver training complexity and ambiguity.

2. Packed cargo	Basic proficiency	Intermediate	Advanced	Expert-mentor
Transport and driver requirements	<ul style="list-style-type: none"> - PPE for packed goods used on chemical locations - intro training - commitment to Responsible Care® - Behaviour Based Safety* 	<ul style="list-style-type: none"> - ADR certificate 		<ul style="list-style-type: none"> - coaching skills - train the trainer
Equipment requirements	<ul style="list-style-type: none"> - as per level 1 - working at height** 	<ul style="list-style-type: none"> - ADR vehicle requirements - working at height** 		<ul style="list-style-type: none"> - part of emergency response team
Product requirements	<ul style="list-style-type: none"> - as per level 1 - non-ADR goods - securing of packed cargo*** 	<ul style="list-style-type: none"> - ADR goods & labelling - securing of packed cargo*** 	<ul style="list-style-type: none"> - special ADR - special packed cargo 	<ul style="list-style-type: none"> - special ADR
Customer requirements	<ul style="list-style-type: none"> - minimum required PPE - minimum language(s) + pictograms - gate/site entry & registration procedures - life-saving rules - working at height** 	<ul style="list-style-type: none"> - packed good loading patterns - ADR vehicle gate checklists 	<ul style="list-style-type: none"> - customer samples - special customer instructions/ documents 	<ul style="list-style-type: none"> - special PPE

* ECTA-Cefic “BBS guidelines for training of drivers and safe driving of road freight vehicles”, 2013, on ECTA and Cefic websites.

** Cefic-ECTA-Fecc “Best practice guidelines for the safe working at height in the chemical logistics supply chain”, 2012, on Cefic, ECTA and Fecc websites.

*** ECTA-Cefic “Guidelines for transport equipment used for chemical packed cargo”, 2010, on ECTA and Cefic websites.

3. Dry Bulk (non)ADR

3. (Petro)chemical truck driver dry bulk goods competences (on top of foundational qualification level)

Here, the extra dry bulk training competencies are added, to enable drivers to handle and transport chemical dry bulk goods according to the qualification dimensions identified under recommendation 4.

Legal requirements are highlighted in **bold**. Note that the legislation in the EU might be different per country. This also leads to extra truck driver training complexity and ambiguity.

3. Dry bulk	Basic Proficiency	Intermediate	Advanced	Expert-Mentor
Transport and driver requirements	<ul style="list-style-type: none"> - PPE used on chemical locations for dry bulk - intro training - commitment to Responsible Care® - BBS* - tilting of equipment **** 		<ul style="list-style-type: none"> - ADR certificate 	<ul style="list-style-type: none"> - coaching skills - train the trainer
Equipment requirements	<ul style="list-style-type: none"> - tank cleaning driver tasks and responsibilities - working at height** 	<ul style="list-style-type: none"> - (extra) bulk loading/unloading equipment -pump, hoses and couplings 	<ul style="list-style-type: none"> - ADR vehicle requirements - different and more complex equipment configurations 	<ul style="list-style-type: none"> - part of emergency response team
Product requirements	<ul style="list-style-type: none"> - non-ADR goods 		<ul style="list-style-type: none"> - ADR goods and labelling - special dry bulk 	<ul style="list-style-type: none"> - special ADR – ISOPA
Customer requirements	<ul style="list-style-type: none"> - minimum required PPE - minimum language(s) + pictograms - gate entry & registration procedures - extra documents like ECD 	<ul style="list-style-type: none"> - customer sampling 	<ul style="list-style-type: none"> - ADR vehicle gate checklists 	<ul style="list-style-type: none"> - special PPE

* ECTA-Cefic “BBS guidelines for training of drivers and safe driving of road freight vehicles”, 2013, on ECTA and Cefic websites.

** Cefic-ECTA-Fecc “Best practice guidelines for the safe working at height in the chemical logistics supply chain”, 2012, on Cefic, ECTA and Fecc websites.

**** ECTA-Cefic “Best practice guidelines for safe tipping of silo trucks/ trailers, silo containers and bag-in-box containers”, 2014, on ECTA and Cefic websites.

4. Liquid Bulk (non) ADR

4. (Petro)chemical truck driver liquid bulk goods competences (on top of foundational qualification level)

Here, the extra liquid bulk training competencies are added, to enable drivers to handle and transport chemical liquid bulk goods according to the qualification dimensions identified under recommendation 4.

Legal requirements are highlighted in **bold**. Note that the legislation in the EU might be different per country. This also leads to extra truck driver training complexity and ambiguity.

4. Liquid bulk	Basic Proficiency	Intermediate	Advanced	Expert-Mentor
Transport and driver requirements	<ul style="list-style-type: none"> - PPE used on chemical locations for liquid bulk - intro training - commitment to Responsible Care® - BBS* 	<ul style="list-style-type: none"> - ADR certificate 		<ul style="list-style-type: none"> - coaching skills - train the trainer
Equipment requirements	<ul style="list-style-type: none"> - tank cleaning driver tasks and responsibilities - working at height** 	<ul style="list-style-type: none"> - (extra) bulk loading/unloading equipment - hoses and couplings 	<ul style="list-style-type: none"> - ADR vehicle requirements - different and more complex equipment configurations 	<ul style="list-style-type: none"> - part of emergency response team
Product requirements	<ul style="list-style-type: none"> - non-ADR goods 	<ul style="list-style-type: none"> - ADR extra security precautions 	<ul style="list-style-type: none"> - ADR goods and labelling - special liquid bulk 	<ul style="list-style-type: none"> - special ADR – ISOPA
Customer requirements	<ul style="list-style-type: none"> - minimum required PPE - minimum language(s) + pictograms - gate entry & registration procedures - extra documents like ECD 	<ul style="list-style-type: none"> - customer sampling 	<ul style="list-style-type: none"> - special customers 	<ul style="list-style-type: none"> - special PPE

* ECTA-Cefic “BBS guidelines for training of drivers and safe driving of road freight vehicles”, 2013, on ECTA and Cefic websites.

** Cefic-ECTA-Fecc “Best practice guidelines for the safe working at height in the chemical logistics supply chain”, 2012, on Cefic, ECTA and Fecc websites.

5. Gases

5. Truck driver gases and special goods competences (on top of all levels)

Here, the extra SPECIAL training competencies are added, to enable drivers to handle and transport chemical gases or high hazardous chemicals according to the qualification dimensions identified above.

Legal requirements are highlighted in **bold**. Note that the legislation in the EU might be different per country. This also leads to extra truck driver training complexity and ambiguity.

5. Specials & gases	Basic Proficiency Intermediate	Intermediate	Advanced	Expert-Mentor
Transport and driver requirements	<ul style="list-style-type: none"> - ADR certificate - special PPE - special BBS* 			<ul style="list-style-type: none"> - coaching skills - train the trainer
Equipment requirements	<ul style="list-style-type: none"> - special gases vehicle requirements - ADR vehicle checklist - extra safety equipment - vehicle camera 	<ul style="list-style-type: none"> - different equipment configurations 		<ul style="list-style-type: none"> - part of emergency response team
Product requirements	<ul style="list-style-type: none"> - ADR goods and labelling - loading/unloading preparation 	<ul style="list-style-type: none"> - extra security precautions 	<ul style="list-style-type: none"> - special gases 	
Customer requirements	<ul style="list-style-type: none"> - special packed goods loading patterns - truck vehicle gate checklists 	<ul style="list-style-type: none"> - customer sampling 	<ul style="list-style-type: none"> - special customers 	<ul style="list-style-type: none"> - special PPE

* ECTA-Cefic "BBS guidelines for training of drivers and safe driving of road freight vehicles", 2013, on ECTA and Cefic websites.

Appendix 5 - Use case example

Based on the following use case template, members have shared a few examples of good practice on site. Readers are encouraged to share further examples, that may also be included in a next version of the guidelines.

Driver shortage & qualification - Best Practice Use Case – TEMPLATE

Use Case title:	
Recommendation category:	Select one of the 4 categories: <ol style="list-style-type: none">1. The redesign of the infrastructure2. Digitalisation and planning3. Truck driver communication and comfort4. Truck driver training, engagement and retention
Describe here your best practice Use Case in more detail:	
Describe what were or will be the benefits of your Use Case with regards to on driver efficiency & well-being:	
Describe here your involved stakeholders' - what are the required skills to make it happen - critical success factors:	
Add any best practice pictures here:	

Driver shortage & qualification - Best Practice Use Case #1

Use Case title:	1 st time on site
Recommendation category	<p>Select which category(ies) are involved :</p> <ol style="list-style-type: none"> 1. The redesign of the infrastructure 2. Digitalisation and planning <u>3. Truck driver communication and comfort</u> 4. Truck driver training, engagement and retention
<p>Describe here your best practice Use Case in more detail:</p> <p>When a driver presents himself a 1st time on site at the guards, he needs to see our Safety Movie. In addition to that our guards put a stamp on his application form. In practice the stamp is red coloured.</p> <div style="text-align: center;">  </div>	
<p>Describe what were or will be the benefits of your Use Case with regards to on driver efficiency & well-being:</p> <p>When the driver arrives at the LSP counter, and the 1st time on site stamp has been noticed, they will provide the driver with a red HiVi jacket, which mentions on the back 1st time on site. Extra general info on Ineos circulation plan is given, together with a clear map of all loading gates. Upon arrival at the gate, the loader provides the driver with extra assistance. He also explains why certain rules must be obeyed. This in order to give the driver a safer, welcoming and calming feeling.</p>	
<p>Describe here your involved stakeholders' - what are the required skills to make it happen - critical success factors:</p> <ul style="list-style-type: none"> • Our guards: verifying whether it's the 1st time on site or whether the driver's entrance badge has expired. Putting stamp. • Our LSP at the counter: verifying the stamp + providing the HiVi Jacket + giving extra instructions. • Ours LSP at the gate: checking upon the HiVi jacket. <p>In general easy to implement + low cost to set up.</p>	
<p>Add any best practice pictures here:</p>	

Driver shortage & qualification - Best Practice Use Case #2

Use Case title:	Marenzana Italy: installation of a comfortable “drivers room” with free Wi-Fi & drinks
BP guideline category	3. Truck driver communication and comfort 4. Truck driver training, engagement and retention
Describe here your best practice Use Case in more detail:	
<p>The waiting room infrastructure for truck drivers during driver rest & waiting times can still improve a lot in many loading and unloading locations. While truck drivers are often away from home for days, it is obvious that a comfortable rest room, access to drinks and/or free Wi-Fi can contribute directly to make the driver profession more attractive. Chemical loading and unloading places should lead such best practices and offer truck drivers a warm welcome at each loading & unloading place.</p>	
Describe what were or will be the benefits of your Use Case with regards to on driver efficiency & well-being:	
<ul style="list-style-type: none"> • Ensure the driver can take a pause and relax during waiting, loading and unloading times and outside the truck cabin which makes the job more attractive. • Ensure there is a room where drivers can sit, eat at a desk, talk, drink and exchange experiences. • Ensure truck drivers can connect safely with the home base and family abroad without expensive roaming fees and while using free Wi-Fi. Consider access to Wi-Fi to read news, consult road congestion and traffic problems and connect with social media as a basic Guest and Visitor service. 	
Describe here your involved stakeholders’ - what are the required skills to make it happen - critical success factors:	
<ul style="list-style-type: none"> • Check truck driver waiting room infrastructure at loading and unloading places. • Involve truck drivers on how they define and design the ideal rest place and provide small budgets in terms of infrastructure to make it happen. • Agree on house rules to ensure restrooms are being maintained and cleaned as with every office place. 	
Add any best practice pictures here:	
	

Driver shortage & qualification - Best Practice Use Case #3

Use Case title:	Provide Express Lane service
Recommendation category	<p>Select which category(ies) are involved :</p> <ol style="list-style-type: none"> 1. The redesign of the infrastructure <u>2. Digitalisation and planning</u> <u>3. Truck driver communication and comfort</u> 4. Truck driver training, engagement and retention
<p>Describe here your best practice Use Case in more detail:</p> <p>In Cologne site we provide the possibility to the driver to use express lane, when keeping his time slot. For the service the day before loading a list is sent to Chemion with expected trucks and booked slot. When truck is able to make his time slot, he can use express lane at Chemion desk. We pay a small fee for the service.</p>	
<p>Describe what were or will be the benefits of your Use Case with regards to on driver efficiency & well-being:</p> <ul style="list-style-type: none"> • Faster entry to the site • Reduction of waiting hours • Satisfaction of driver and ultimately LSP. 	
<p>Describe here your involved stakeholders' - what are the required skills to make it happen - critical success factors:</p> <ul style="list-style-type: none"> • Chemion: maintenance and development of the digital platform; sufficient staff at express lane desks; sufficient number of express lane desks • Driver: meet the time slot for enjoying express lane • Forwarder: instruct the driver to use express lane if in time • Transport Management: accurate and timely communication with Chemion; agreement to use express lanes • LSP: encourage driver to meet the time slots 	
<p>Add any best practice pictures here:</p>	

Driver shortage & qualification - Best Practice Use Case #4

Use Case title:	Make sideboards available onsite
Recommendation category	<p>Select which category(ies) are involved:</p> <ol style="list-style-type: none"> 1. The redesign of the infrastructure 2. Digitalisation and planning <u>3. Truck driver communication and comfort</u> 4. Truck driver training, engagement and retention
<p>Describe here your best practice Use Case in more detail:</p> <p>Sometimes trucks are rejected having not enough sideboards (Code XL requested). In two sites we keep a small stock of aluminium side boards. They are sold to forwarder with very small fee (via complaint process).</p>	
<p>Describe what were or will be the benefits of your Use Case with regards to on driver efficiency & well-being:</p> <ul style="list-style-type: none"> • Reduction of physical movements (CO2, traffic) • Keeping of time slots and ETA at customer • Service to driver 	
<p>Describe here your involved stakeholders' - what are the required skills to make it happen - critical success factors:</p> <ul style="list-style-type: none"> • Driver: must accept to follow the procedure (complaint process) and to pay additional fee • Forwarder: must accept to follow the procedure (complaint process) and to pay additional fee • Transport planner: must encourage forwarders to use the service • QM: handle quick and easy complaint process • Procurement: understanding the added value of keeping a small stock of side boards. • LSP onsite: understanding the added value of keeping a small stock of side boards; provide service at low costs (providing the stored side boards); promote to use the stock. <p>Acceptance of driver is critical factor. Until today, the service is rarely used. Drivers prefer to drive out and look for own solutions.</p>	
<p>Add any best practice pictures here:</p>	

Driver shortage & qualification - Best Practice Use Case #5

Use Case title:	Fast lane combined with pick & drop
Recommendation category:	Select one of the 4 categories: <u>1. The redesign of the infrastructure</u> 2. Digitalisation and planning 3. Truck driver communication and comfort 4. Truck driver training, engagement and retention
<p>Describe here your best practice Use Case in more detail:</p> <p>A secured parking space has been made available for specific carriers to buffer equipment (both loaded and empty) and thus enabling a decoupling process in which dedicated internal drivers shunt the equipment between the parking & loading stations and external drivers move the equipment from and to the end-customers. External drivers can enter this site via a unique PIN-code, which needs to be requested in advance via an online tool (requesting details of the equipment and driver). Entrance to this site is possible 24/7. The dedicated internal drivers can access this site with a personal badge and will afterwards perform check-in process via biometric data (fingerprint) at the Fastlane access gate.</p>	
<p>Describe what were or will be the benefits of your Use Case with regards driver efficiency & well-being:</p> <p>More reliable loading operations, this as the necessary equipment is already in advance available just outside our production site.</p> <p>Better collaboration between loading staff and drivers, this as we work with only dedicated on site drivers.</p> <p>Reduction of waiting time for the internal driver, this as they will be able to meet the planned loading slot and will thus have an available loading station to immediately start loading process.</p> <p>Increased flexibility for carriers, this as they are independent from traffic jams or other unexpected delays to bring equipment towards our site.</p> <p>Possibility for night transport towards end-customers via hub & spoke system, this as pre-loaded equipment can be collected 24/7.</p>	
<p>Describe here your involved stakeholders' - what are the required skills to make it happen - critical success factors:</p> <p>Limited number of carriers to be used with daily critical mass in # shipments. Availability of on-site dedicated drivers. Enough parking space to buffer equipment.</p>	
<p>Add any best practice pictures here:</p>	

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Contributors



Chairman: Joost Van Neerven
Road & Intermodal Operations
Leader
Dow Benelux BV
+31 115 671 108
jvanneerven1@dow.com



Michael Schaaf
Bay Logistik GmbH + Co KG
+49 7151 5002115
michael.schaaf@bay-gruppe.de



Michael Koch
Bertschi AG
+41/62/7676838
michael.koch@bertschi.com



Joost Naessens
Transport & Logistics Director
Cefic
+32 2 436 9413
jna@cefic.be

Peng Paternostre
Transportation Manager
Cefic
+32 2 436 9408
ppa@cefic.be



Peter Hellweg
Covestro Deutschland AG
+4921460093824
peter.hellweg@covestro.com

Peggy Janssens
Covestro NV
+32 3 540 30 69
peggy.janssens@covestro.com

Lieven De Jonge
Covestro NV
lieven.dejonge@covestro.com



Richard van Cappellen
Den Hartogh Liquid Logistics BV
+31 (0)88 1620000
rvancappellen@denhartogh.com

Hans den Hartogh
Den Hartogh Liquid Logistics BV
+31 (0)88 1620000
hansdenhartogh@denhartogh.com



Peter Devos
Managing Director
ECTA
+32 2 318 58 29
peter.devos@ecta.com



Paolo Indiano
EVONIK Industries AG
+49 6181 59 1265
paolo.indiano@evonik.com



Bram Plessers
ExxonMobil Petroleum & Chemical
BV
+3222393537
bram.plessers@exxonmobil.com



Gerhard Ahlbrecht
Resp. Care & Logistics Manager
FECC
+32 2 679 02 64
gah@fecc.org



Daniele Guidotti
Direzione Centrale Tecnico
Scientifica, Area Logistica
FEDERCHIMICA
+39 02 34565.378
d.guidotti@federchimica.it



Nathalie Aertssen
INEOS Manufacturing Belgium nv
+32 3 210 36 06
nathalie.aertssen@ineos.com

Thorsten Biermann
INEOS Styrolution Europe GmbH
thorsten.biermann@ineos.com

Cordula Hansen
Regional Head of Indirect Spend II
INEOS Styrolution Europe GmbH
+49 69 509 550 1301
cordula.hansen@ineos.com

Bieke Huysmans
INEOS Manufacturing Belgium nv
+32 3 210 3611
bieke.huysmans@ineos.com



Kristine Dewaele
Executive Assistant
ISOPA
+32 2 676 74 75
kde@isopa.org



Samuel Alonso
LKW Walter
alonso@lkw-walter.com

Bernhard Haidacher
LKW Walter
+43/5/77774207
haidacher@lkw-walter.com

Peter Rakocz
Head of Transportpartner-
Management
LKW Walter
+43 5 7777 2606
rakocz@lkw-walter.com



Angelo Vecchio
Sr. Category Manager Road
Transportation - Logistics
Procurement
LyondellBasell
+31 102 755 514
angelo.vecchio@lyondellbasell.com



Philippe Le Bail
Transport Manager
REPSOL QUIMICA, S.A.
+34 917 539 044
plebail@repsol.com



Edoardo Vanni
GBU Soda Ash & Derivatives Supply
Chain - Global Project Manager
Solvay Chimica Italia SpA
+39 02 2909 2226
edoardo.vanni@solvay.com



Pierre Prod'homme
TOTAL
+330141352252
pierre.prodhomme@total.com



Martin Hallam
XPOLogistics
martin.hallam@xpo.com



Ann De Raeve
Chartering Manager
YARA S.A
+3227735282
ann.de.raeve@yara.com

Florian Duthe
YARA S.A
+3265712525
florian.duthe@yara.com
