Good Practice Guide

for Managing Sustainable Timber Transport

Version 1: January 2026

Forest Industry Transport Group

ACKNOWLEDGEMENTS

The Forest Industry Transport Group (FITG) extends profound gratitude to all contributors who played a pivotal role in shaping this Good Practice Guide for Timber Transport in Ireland. This collaborative effort, involving representatives from timber transport, the broader timber industry, local authorities, government departments, and various representative associations, underscores a shared commitment to fostering a sustainable and responsible approach to timber transport.

Special appreciation is extended to the members of the FITG, whose dedication and expertise have been instrumental in creating a guide that aligns with the evolving needs of the timber transport sector. Established in 1999, the FITG has consistently demonstrated its commitment to excellence, as evident in this guide and its previous publications, the Code of Practice for Road Haulage of Round Timber and the Round Timber Transport Guidelines for Hauliers and Drivers.

We also acknowledge the invaluable contributions of Local Authorities and County and City Management Association, recognising their crucial role in ensuring that this guide is reflective of diverse regional considerations and challenges. Their input has been essential in addressing the complex interplay between forestry operations and the intricate road network, emphasising the need for solutions that prioritise safety, efficiency, and environmental standards.

Furthermore, we express gratitude to the Department of Agriculture, Food and the Marine for providing essential data and insights into the background of forests in Ireland. The comprehensive overview of the national forest estate's significance, environmental impact, and social relevance adds depth to the guide, emphasising the broader context within which timber transport operates.

The Forest Industry Transport Group acknowledges the collaborative efforts of government agencies, environmental advocates, and industry experts whose insights have enriched the guide, providing a holistic perspective on the challenges and opportunities associated with timber transport. Their diverse expertise has contributed to the creation of a guide that not only addresses current industry needs but also aligns with broader sustainability goals.

In recognition of the Irish Government's Climate Action Plan which mandates the country to achieve net-zero greenhouse gas emissions by 2050, this guide places a strong emphasis on sustainability. We appreciate the commitment of the transport industry to reducing emissions and acknowledging that transportation, including timber haulage, plays a significant role in achieving these targets. The collaboration with forest industry stakeholders and the appointment of a Sustainable Transport Programme Manager showcases Coillte's commitment to developing a Sustainable Transport Strategy.

Special acknowledgment goes to Coillte, the Department of Agriculture, Food and the Marine and the Department of Transport for funding the production of this guide.

Finally, we express gratitude to the dedicated stakeholders in the forestry sector and the staff of Creel Maritime Ltd who have worked tirelessly behind the scenes, contributing to the guides production, and ensuring its alignment with industry standards. While this Good Practice Guide does not hold legal authority, it serves as a crucial reference for all stakeholders involved in timber transport, promoting a culture of continuous improvement and shared responsibility.

In conclusion, the Forest Industry Transport Group extends its appreciation to all contributors, recognising the collective effort that has culminated in this comprehensive Good Practice Guide. It is our sincere hope that this guide serves as a valuable resource, not only for timber transport stakeholders but also for the broader community, fostering collaboration and adherence to the highest standards in timber transport while contributing to Ireland's sustainability goals.

Chair of the Forest Industry Transport Group

Des Phelan, December 2025

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1. INTRODUCTION

This Good Practice Guide has been prepared by the Forest Industry Transport Group, which includes representatives from all the stakeholders in timber transport, including the Local Authorities.

Its purpose is to provide a common framework for good practice that all stakeholders accept and follow. The guide should ensure that safety, efficiency, and environmental standards are of the utmost importance for all in the sector. The Good Practice Guide holds no legal authority, and though this edition has been diligently produced, it does not encompass all issues or offer comprehensive guidance for specific challenges.

1.1 Abstract

This guide outlines a strategy for mitigating the adverse impacts of timber transportation by emphasising enhanced planning and effective communication. Solutions are also based on optimum vehicle selection and compliance with industry standards. Every part of the timber transport network bears distinct obligations to ensure compliance with industry standards, both for themselves and others.

1.2 Background on Forests in Ireland

Forests play a significant role in Ireland, with the country currently boasting a forest area cover of 808,848 hectares, constituting 11.6% of the total land area, excluding inland water bodies. The government aims to increase this to 18% in the near future. In 2022, the State managed 49.1% of the national forest land through Coillte, with the remainder being private ownership (The Department of Agriculture, Food and the Marine, August 2023)[1]. The forest composition in Ireland is made up of a majority of conifer species, with Sitka spruce the most common variety.

Forests also have a social and environmental significance to the country, with an average of 29 million people visiting woodlands in Ireland annually. The national forest estate is an important carbon reservoir, with around 323 million tonnes of carbon stored in 2022.

Figure 1 (page 6) shows the National Forest Inventory of Ireland per county in 2022. The amount of forestry operations in each county can be expected to be linked to the percentage of forest cover in the area.

[1] *Forest Statistics Ireland 2023, Department of Agriculture, Food & the Marine, August 2023, Co.Wexford*

County	Forest Area (Ha)	Percent Forest Cover Within County
Carlow	8,803	9.8
Cavan	19,635	10.1
Clare	57,447	18.0
Cork	92,471	12.4
Donegal	57,155	11.8
Dublin	6,011	6.5
Galway	63,795	10.4
Kerry	57,540	12.1
Kildare	11,196	6.6
Kilkenny	20,634	10.0
Laois	28,466	16.6
Leitrim	32,039	20.1
Limerick	28,332	10.5
Longford	10,355	9.5
Louth	2,428	2.9
Mayo	55,736	10.0
Meath	13,729	5.9
Monaghan	5,997	4.6
Offaly	33,351	16.7
Roscommon	31,547	12.4
Sligo	22,167	12.1
Tipperary	52,235	12.3
Waterford	27,351	14.9
Westmeath	16,759	9.1
Wexford	16,200	6.9
Wicklow	37,470	18.5
Total	**808,848**	

Figure 1: NFI per county, 2022.

1.3 Background on Roads

The Irish road network is a vast and intricate system, encompassing over 5,300km of National Roads, around 13,400km of Regional Roads, and approximately 83,400km of Local Roads. This extensive network, which totals 102,000km, is subject to governance by different authorities. The National Roads are administered by Transport Infrastructure Ireland (TII), while the management of Regional and Local Roads falls under the purview of the Department of Transport (DOT).

Timber holds a low intrinsic value when initially harvested, making it essential to transport efficiently to ensure that vehicles operate at their maximum payload capacity. However, challenges are faced in doing this due to Ireland's geographical distribution of forests. Most of these forests are situated at the furthest reaches of the road network.

Many local roads present a challenge to timber transport in their current form, due to their structure and historic development.

Since 1996, an ongoing strengthening program has been in progress for the regional and local road network. Roads demand routine renewal, involving resurfacing at intervals of roughly eight years and re-strengthening at intervals of between 10 and 17 years, with a particular emphasis on rural roadways.

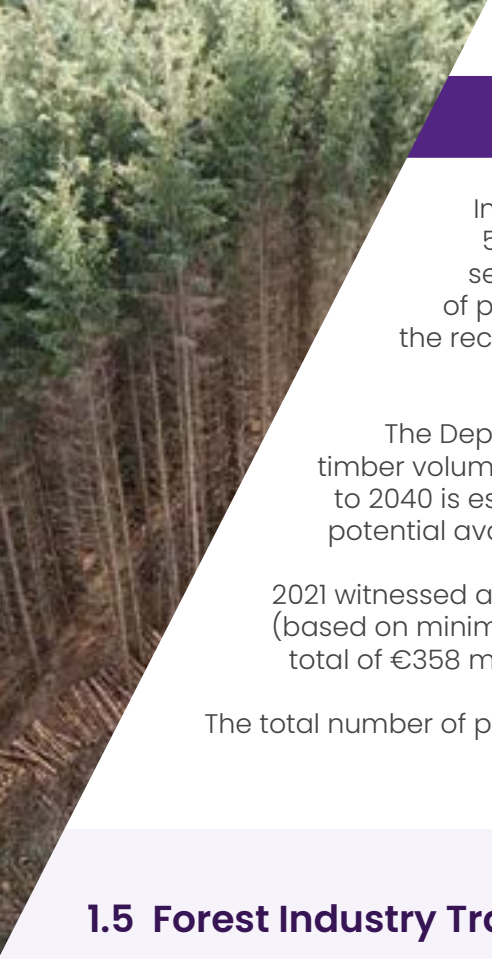
Many local roads with lower traffic volumes such as local secondary and local tertiary roads may require strengthening to receive additional traffic loading from heavy commercial vehicles. This circumstance presents a distinct challenge for the timber industry because approximately 80% of privately owned forested land can only be accessed via local roads. Many of these roadways have not been reinforced and transporting timber over these roads can be notably arduous. Adding to this complexity is Ireland's extensive road network, which exceeds the European average length per capita by more than double. Leading to significant competing demands for funding and investment across the network.

Given the competing demands for funding across the road network, there is significance in optimising truck configuration and choosing specific vehicles to address timber transport challenges. Recent years have witnessed various technological advancements to enhance compliance and minimise road damage during timber transportation. These innovations include onboard weighing systems, vehicle tracking solutions, and central tyre inflation mechanisms leading to significant competing demands for funding and investment across the network.

The regional and local road network comprises approximately 94% of the State's total road network and facilitates the movement of people and goods; economic and social links; and access to employment, education and services. Responsibility for protection and renewal lies with local authorities. The Department of Transport provides grants that, together with local authority own resources, fund this activity. Ensuring that this mechanism and funding operates effectively, supports the continued management of the road network.

Levels of protection and renewal activity and funding from both the Department of Transport and local authorities' own resources have increased in recent years. Department of Transport grants have grown from €359m spent in 2014 to €607m for 2022 - an increase of €248m, or almost 70% across the period. Published reports suggest local authority own resource expenditure on regional and localroads increased annually from €225 million in 2014 to €299 million in 2022, representing a 33% increase.

This has contributed to an increase in the quality of the network and funding is assigned on a priority basis.



1.4 Background on the Forestry Sector

In 2022, the total roundwood harvest was 4.14 million m3 (excluding firewood). 57% of this supply came from Coillte, and the remaining 43% from the private sector. There is evidence of the maturing private forest estates as the amount of private sector roundwood harvested in 2022 has significantly increased since the recorded 8.2% in 2006[2]. Overall, there has been a 25% increase in the amount of roundwood available for processing since 2015.

The Department of Agriculture, Food & the Marine has recognised that net realisable timber volume production for the Republic of Ireland during the forecast period from 2021 to 2040 is estimated to reach 120.4 million cubic meters over bark. Additionally, there is a potential availability of an extra 13 million cubic meters from sources in Northern Ireland[3].

2021 witnessed a gross value-added total of €50 million from the forestry and logging sector (based on minimum prices). In addition, the wood products sector had a gross value-added total of €358 million in 2020. This shows a great merit in these sectors to the Irish economy[4].

The total number of people employed in activities relating to the forest and wood products sector in 2020 was 9500[5].

1.5 Forest Industry Transport Group

This Guide has been prepared on behalf of the Forest Industry Transport Group (FITG), with contributions from all its members as acknowledged in the document.

The FITG was established in 1999 as an industry forum dedicated to facilitating communication on matters concerning timber transportation. The group has previously published the Code of Practice for Road Haulage of Round Timber in 2004 and also the Round Timber Transport Guidelines for Hauliers and Drivers. These documents comprehensively outline the technical and legal considerations associated with safe and efficient timber transport.

[2] Forest Statistics Ireland 2023, Department of Agriculture, Food & the Marine, August 2023, Co.Wexford | [3] Forest Statistics Ireland 2023, Department of Agriculture, Food & the Marine, August 2023, Co.Wexford | [4] Forest Statistics Ireland 2023, Department of Agriculture, Food & the Marine, August 2023, Co.Wexford | [5] Forest Statistics Ireland 2023, Department of Agriculture, Food & the Marine, August 2023, Co.Wexford

2. Transporting Timber

Road haulage is still the primary method of transport with some modal shift to rail and sea where these alternatives are available.

Careful planning of haul routes should be undertaken as road design and maintenance may not mean that every route is suitable. Moreover, additional road constraints come into play, impacting the road's usability. These constraints may include factors such as inclines, bridges or narrow roads, and the presence of congestion and local communities.

2.1 Route Planning

Route planning is essential for optimising operations, ensuring safety and compliance, reducing environmental impact, and minimising costs. It's a critical component of a well-organised and successful timber transport operation, particularly as it can reduce the impact on vulnerable roads.

Some of the main reasons to plan timber transport routes well are due to:

- **Safety** - Planning routes carefully can help avoid unsuitable or congested areas, further reduce the risk of accidents and ensuring the safety of both drivers and other road users.
- **Minimising Disruption** - hauliers can minimise impact to local communities and businesses, which is important when transporting timber through residential or commercial areas.
- **Infrastructure Suitability** - Timber haulage vehicles may require specific road conditions and load-bearing capacity. Planning ensures that the chosen roads can support the vehicle's weight and size, ensuring the continued operational viability to the roads and the vehicles.
- **Operational Efficiency and Environmental Responsibility** – Thoughtfully planned routes enable hauliers to optimise the number of daily journeys, enhancing the economic viability of timber transport. By minimising empty running and reducing unnecessary mileage, such planning also contributes to lower fuel consumption and emissions, supporting broader sustainability goals.

Motorways and National Roads are suitable for all vehicles up to the legal weight limit, as will the majority of Regional Roads, however, some local restrictions may apply on certain Regional Roads.

Over ten years ago, Coillte and each County Council agreed upon Designated Timber Haulage Routes (DTHR). DTHR comprises of a layer displaying a list of priority roads from the roads that are categorised as Local Roads. The DTHR layer was created by digitising existing paper maps. The current DTHR layer is under review to be updated

2.2 Public Road Maintenance

As previously discussed, the location of forest blocks within the Irish road network means some local roads, as originally constructed, may not accommodate the modern timber haulage fleet. Therefore, in certain areas, prior consultation with the relevant Local Authority roads section should be undertaken where there is potential for impacts on the public road network.

The following factors are to be considered when looking at road maintenance to allow for ease of timber road haulage:

ACCESS

Many public access roads leading to forests experience relatively light traffic and do not meet full road design standards. These roads may exhibit insufficient design for HGV journeys, including tight bends or narrow widths. Locally appropriate solutions must be devised to facilitate timber haulage. Other considerations might include ensuring adequate passing places on narrow single-lane roads and enhancing signage to improve safety without incurring significant expenses.

WEATHERING

Over time, roads undergo wear and tear through weathering. The cumulative effects of vehicular traffic worsen this degradation, but environmental factors like frost heaves and thermal cracking can also play a role. Additionally, as bitumen ages, it loses flexibility and can fragment, contributing to uneven surfaces. Road potholes stem from various factors, including rain-induced damage and frequent heavy axle loads.

BRIDGES

Bridges represent a crucial component of the road network. In Ireland, there are 90,000 locations where water courses and roads intersect. Bridges come in various types, such as stone masonry arch bridges, each suitable for different vehicle types and axle loads, depending on their design and condition. Like roads, monitoring and maintenance of bridges are critical because bridge failure and collapse result in complete road closure. This can lead to areas being cut off or necessitate significant diversionary routes. Repair or replacement, in such cases, can be both time-consuming and costly.

DRAINAGE

"A wet road is a weak road[6]." Extensive research has consistently shown that poor drainage is a primary cause of road damage. Water that flows onto a local road weakens it and accelerates the likelihood of damage. Therefore, the maintenance of drains and culverts is essential to divert water away from roads and lower the water table.

VISIBILITY

Roadside vegetation should be regularly trimmed, particularly overhanging branches that obstruct sightlines and force vehicles onto the weaker edges of the road. It is the responsibility of landowners and occupiers of land to ensure hedges and trees do not obstruct or present a hazard to road users.

Regular monitoring and surveying of road conditions and deterioration are crucial. It is imperative that both forest owners and transport operatives carry out this regular monitoring in the course of their work. Any damage or deterioration caused by operations should be reported to the relevant Local Authority without delay.

[6] *Roadex – Summary of Drainage Analysis in the Scottish Highlands*

2.3 Forest Roads

Forest Roads are roads within a forest under control of the forest owner/operator. Forest roads are often constructed using a flexible, graded structure that lacks binding substances like bitumen or tar, as found in traditional bound roads. Instead, the road structure is designed to allow efficient drainage, and a top layer of fine particles that adhere together through the support of the stones beneath it and moisture.

While forest roads are specifically designed for HGV traffic, it is recommended that forest roads undergo a recovery period of up to 15 minutes before the passage of the next HGV. This will also help to reduce the impact of HGVs on the public road network, in particular it will help weaker local roads. Continuous convoy driving should be avoided due to the impact on both the forest road and local road network. Reduced speed will help to extend the life of forest roads

2.3.1 Design Specifications

Forest roads should be designed in accordance with the COFORD Road Manual

- **Width** – There should be sufficient width for a timber HGV to travel on the forest road. It should be wide enough for the lorry to extend the support legs of the on-board crane (if relevant) when loading timber.
- **Gradient** – an incline of 10% or more isn't recommended for extended stretches of forest road. Culverts at the sides of sloped areas of the road are important for drainage, to prevent rainwater from running down the incline and damaging the surface.
- **Corners** – Bends in the road should be manoeuvrable for different configurations of HGVs.
- **Turning** – If the forest road is not a circular route, there should be enough space for a timber HGV to turn successfully.
- **Passing Places** – space for two vehicles to pass should be considered. A one-way system may be implemented if room does not suffice for this.

2.3.2 Maintaining Forest Roads

Further to the above, it is suggested that forest roads are well maintained to prevent operations from being halted. Any defects or concerns regarding damage to the road should be reported to the appropriate manager to avoid further complications. If the damage is severe, suspending operations may be the best practice.

Proposals for forest road maintenance include:

- Drains and culverts are kept clear to allow for the free flow of water to prevent the road from being damaged.
- Harvesting equipment should not track debris onto the forest road and cause damage such as potholes.
- An alternative to salt is used on an unsealed road in the winter, such as sand, for extra traction.

2.4 Stacking Timber

Stacking timber in the forest should be carried out with planning appropriate for the surroundings. This includes not stacking timber in any place where a machine or the timber being handled could come into contact with the Overhead Electricity Lines (OEL). The HSA (Health & Safety Authority) recommends a hazard zone of 6 metres for lines up to 38kV and 10 metres for lines up to 400kV[7].

It's advised that the height of the stacks should not be taller than the length of the product, and typically, they shouldn't surpass the height at which a haulier can have a clear line of sight over the stack's top. This also applies to double-handled timber that is stacked by a truck. The stack height should be a part of the site's risk assessment or initial planning, as it may be dependent on location-specific factors such as steep ground.

More information on positioning stacks in the forest is provided in the graphic below.

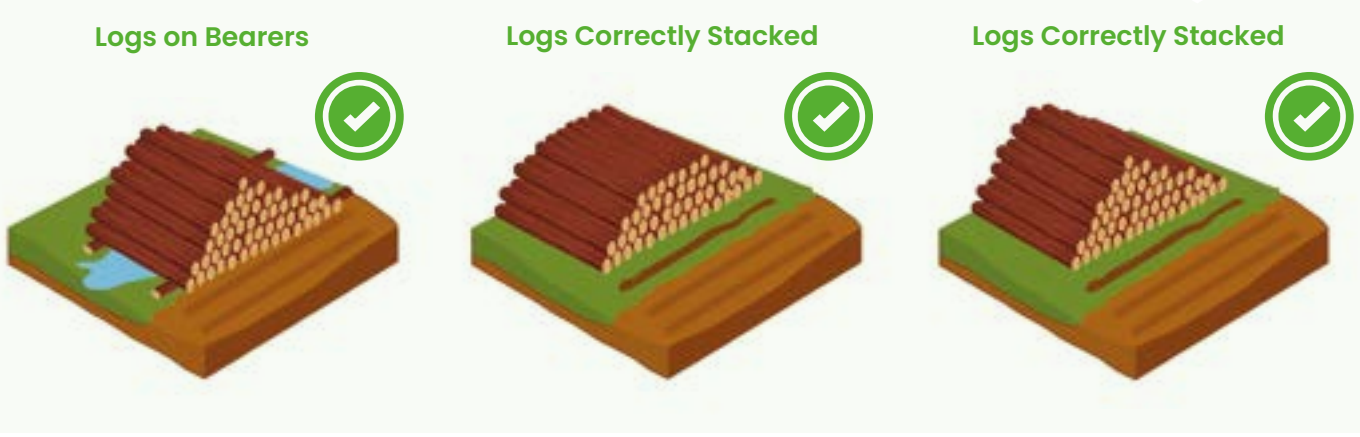


Figure 2: Advice for stacking timber in the forest.

Timber stacking in a port or freight yard for transport via rail or sea should adhere to the health and safety policy of the site. These instructions may differ from stacking timber in the forest as it often takes place on hard standing rather than soft ground.

[7] *Electricity at Work: Forestry, Irish Forestry Safety Guide (IFSG) 804 – HSA, 2018*

3. Vehicle Specifications

Timber transport often demands specialised transportation methods that entail considerable investments for the haulier. This necessity arises from various factors, including the specific equipment and vehicles required for timber hauling, road infrastructure considerations, compliance with safety and environmental standards, and the efficient management of timber throughout the supply chain.

The standard timber haulage vehicle usually consists of a six-axle articulated combination. Typically, this setup includes a single drive axle on the tractor unit and a tri-axle bogie on the trailer, featuring "super single" tyres for enhanced traction and load-bearing capabilities.

Rigid and trailer setups are often preferred for forest operations due to double-drive axle (where spec'd) providing additional traction. Moreover, the rigid component can operate independently without the trailer, and these units exhibit a more favourable turning radius, which is vital for navigating narrow, winding roads. However, they tend to have a higher tare weight, resulting in a lower payload capacity than their articulated counterparts.

3.1 Timber Haulage Fleet

The table on the right demonstrates the makeup of the timber transport fleet in Ireland in 2023:

LORRY TYPE	QUANTITY	PERCENT OF TOTAL FLEET
Articulated	347	72%
Rigid	130	26%
Double Drive	4	<1%
Dedicated Loading Vehicle	3	<1%
Total	**484**	

3.2 Vehicle Weights

Over the past three decades, there have been significant developments in the dimensions and weights of vehicles. In Ireland, before the early 1980s, the maximum gross vehicle weight stood at 32.5 tonnes for a four-axle articulated combination. Today, this limit has expanded to 46 tonnes.

Gross vehicle weights vary across countries. Some Scandinavian nations, such as Finland and Sweden, permit even more substantial weight limits, reaching up to 60 tonnes for seven-axle road trains, encompassing both rigid and trailer units.

In Northern Ireland, the maximum gross vehicle weight is 44 tonnes, so any timber HGVs transporting stock between the two jurisdictions should be aware of the variance.

The selection of a vehicle can have a varying impact on potential road damage. This is calculated by using "Road Wear Numbers" for each vehicle.

Vehicle	Gross Vehicle Weight	Road Wear Number	Index
Three-axle rigid at 26 tonnes	26	10.7	153
Five-axle articulated combination	42	10.1	144
Six-axle articulated combination	46	7.5	107
Six-axle articulated combination	46	7.1	101
Six-axle rigid and trailer combination	46	7.0	100

The table above gives an indicative guide to the relative road damage caused by different laden vehicle configurations. The road wear number takes into account the number of trips required to transport 100 tonnes of road timber[8]. The right column expresses this as an index based on 100 for the six-axle rigid and trailer combination. A lower road wear number and index indicate less damage likely to be caused.

For example, this table shows that a three-axle rigid vehicle used without a trailer can cause more road damage than the heavier articulated and rigid and drawbar combinations, based on uniformly distributed loads (Note these numbers are calculated for standard vehicles with regular tyres).

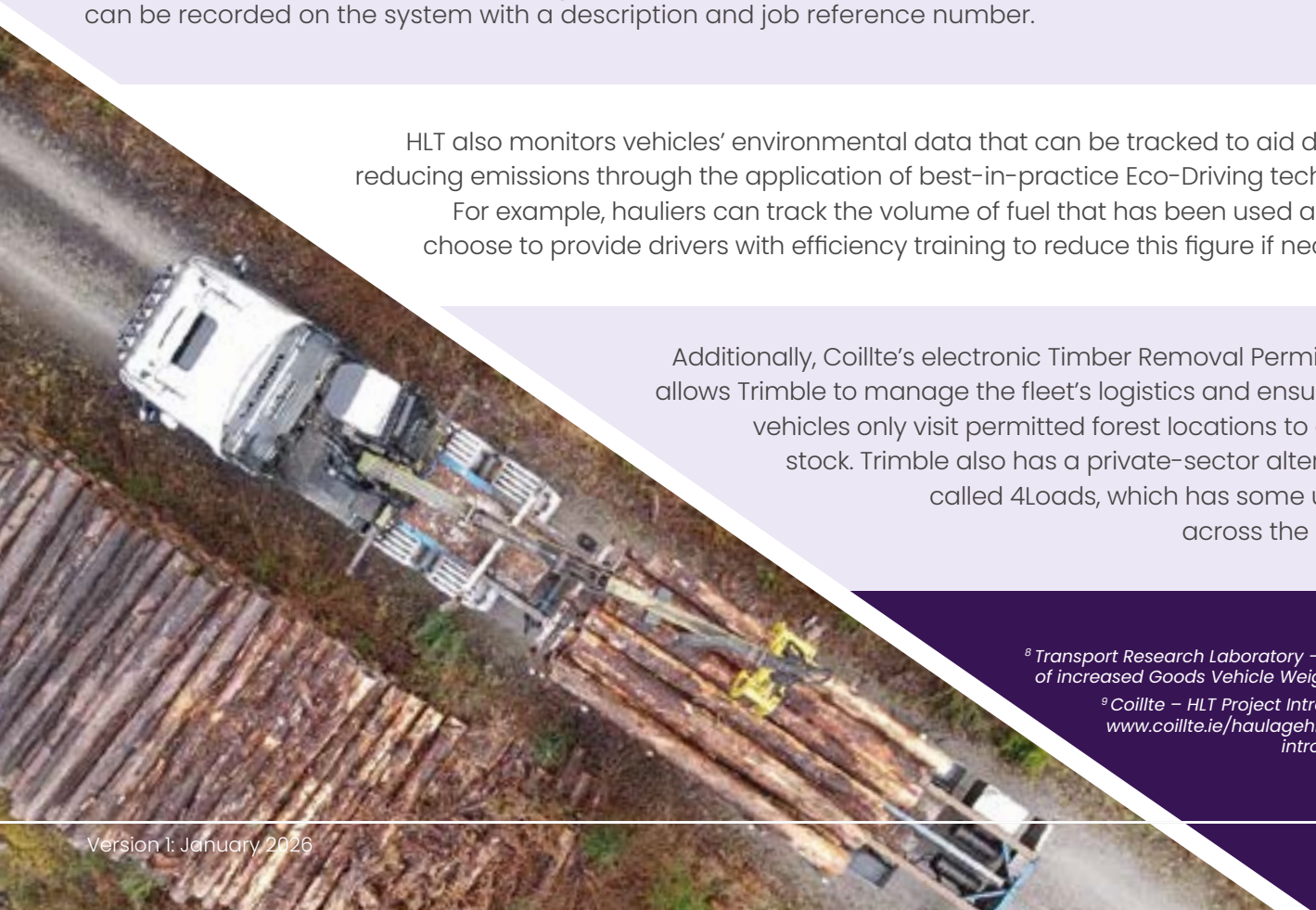
The current gross vehicle weights are also available on the Road Safety Authority Website - www.rsa.ie, for further updates.

3.3 Haulage Logistics Telematics (HLT) System

Telematics serve as a powerful tool for gathering vehicle data and performance through a combination of GPS technology, which pinpoints the exact geographic coordinates of a vehicle, and onboard diagnostics, which monitor the vehicle's internal systems.

Trimble and ORBCOMM were procured by Coillte to develop the Haulage Logistics Telematics (HLT) system, which was deployed into timber lorries across Ireland from 2020. ORBCOMM has provided the telematics system, and Trimble provides forestry logistics support[9].

The HLT system assists with vehicle maintenance by providing a driver with a Daily Vehicle Check to complete that is bespoke to timber haulage, which Coillte developed with the Freight Transport Association of Ireland. This checklist allows the driver to flag an issue if it is present, and it is then sent to the haulier via ORBCOMM's Fleet Manager software to correct. Any maintenance carried out on the vehicle can be recorded on the system with a description and job reference number.



HLT also monitors vehicles' environmental data that can be tracked to aid drivers in reducing emissions through the application of best-in-practice Eco-Driving techniques. For example, hauliers can track the volume of fuel that has been used and may choose to provide drivers with efficiency training to reduce this figure if necessary.

Additionally, Coillte's electronic Timber Removal Permit (TRP) allows Trimble to manage the fleet's logistics and ensure that vehicles only visit permitted forest locations to collect stock. Trimble also has a private-sector alternative called 4Loads, which has some uptake across the sector.

[8] Transport Research Laboratory - Impacts of increased Goods Vehicle Weight Limits

[9] Coillte – HLT Project Introduction, www.coillte.ie/haulagehltproject/introduction/

3.4 My Learning Hub

In Coillte, My Learning Hub is a system in which e-learning, staff training, contractor training and informative videos can be found. This assists with driver safety, as training can be streamlined into the system, and all certificates are uploaded. Having digital copies of these certificates allows reminders to be sent to hauliers six months, three months and six weeks before they expire to prevent drivers from entering the Coillte estate without the agreed level of training.

3.5 Sustainable Timber Transport

Recent years have witnessed a series of noteworthy technical advancements in vehicles used for transporting round timber. These innovations enhance timber transport sustainability, promote compliance, and, most significantly, reduce the risk of road damage.

The key developments in this regard include:

- On-board Weighing - This technology should be integrated into the loading crane or implemented through sensors on the vehicle. It furnishes the driver with a precise measurement of the vehicle's gross or load weight while in the forest, which is critical in ensuring adherence to vehicle load regulations. The HLT system features a continuous weighing system that provides the additional benefit of indicating if the weight of the load changes, which would indicate poor load security.

- Vehicle Tracking - Though not exclusive to timber transport, vehicle tracking offers valuable insights into speed, location, and engine management. Additionally, it significantly enhances timber security. The HLT system allows hauliers to track their fleets, which improves efficiency.

- Central Tyre Inflation (CTI) — enables the drivers to select from a variety of tyre pressures. Drivers can pick the most suitable option for specific operations such as operating empty or laden on primary roads and more particularly on forest or local public roads. The system will reduce the tyre pressures for operating on forest and local roads, thereby increasing the contact area and reducing the potential for road impacts. It has been demonstrated that CTI fitted to a typical articulated vehicle on super singles can reduce the potential for road damage of this vehicle to that of the traditional "ideal" forest vehicle fitted with double drive axles and twin wheels on the trailer. Benefits are well recognised both in terms of reduction in road damage and wear and tear on HGV components and tyres.

- Maxi Wide Tyres - These wide tyres (455/22.5R/45) represent an expansion beyond the standard super singles (385/22.5/R65). They increase the rubber's contact area with the road and, consequently, reduce the potential for road damage by dispersing the load weight.
  The paper **Roadex Tyre Pressure Study** sets out the impact of tyre pressure, configuration and axle loads on rutting on low volume public roads and forest roads. Overall, it shows the significant benefit, through reduced road damage, of fitting vehicles with dual tyres. It also shows the benefits of operating with reduced tyre pressures.

In particularly challenging situations, custom solutions involving multiple wheels on an axle may be deployed if suitable. However, it's worth noting that such vehicles will necessitate special permits to operate on public roads. For example, low-ground pressure "LGP" variations in the UK are used for timber haulage in the forest. The LGP vehicles are usually four or five-axle rigid lorries with trailer combinations or wide-wheeled agricultural vehicles with multi-wheel and multi-axle trailers. LGP configurations may allow for up to 50-tonnes payloads and minimise damage to forest roads[11].

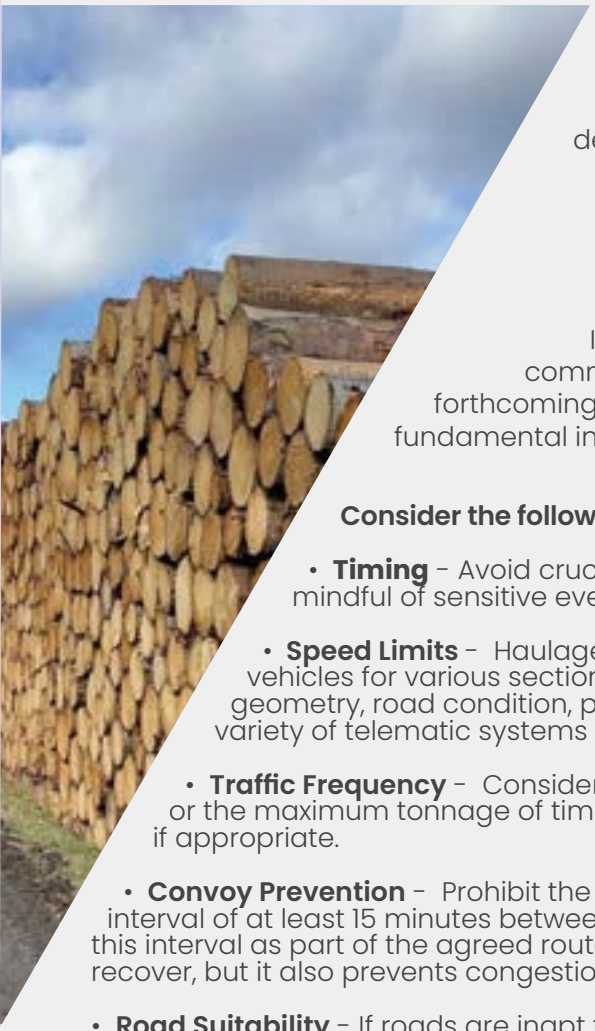
These haulage innovations are pivotal in enhancing round timber transport's efficiency, safety, and sustainability while mitigating the risk of damage to road infrastructure.

[10] Tread Softly, UK Timber Transport Forum, 2014 | [11] Tread Softly, UK Timber Transport Forum, 2014

4. Collaboration with Stakeholders

Forestry is a significant local industry, generating employment opportunities within the community. Yet, the passage of timber transport vehicles through small towns, villages and rural areas can evoke apprehension and unease among the residents. Effective traffic management and stakeholder collaboration are crucial in mitigating disruptions and safeguarding local roads that connect the forest areas to the main road network.

4.1 Traffic Management



A well-structured traffic management strategy begins with careful planning at the forest road layout and entrance design stage. When designing forest roads, it's crucial to consider their impact on the local public road network, with an emphasis on avoiding routes that may disturb sensitive local areas. Forest owners should aim to cooperate by sharing access roads and minimising the number of entry points, particularly steering clear of structurally weak public roads.

In cases where substantial timber extraction is anticipated, proactive communication with the local community is essential to brief them on the forthcoming operations. Not only is this fair and transparent, but it is also fair and fundamental in building a strong relationship that will help operations run smoothly.

Consider the following key points in the planning and execution of traffic management:

- **Timing** - Avoid crucial times such as school opening and closing hours, and be mindful of sensitive events like funerals or local gatherings.
- **Speed Limits** - Haulage Speed - Implement recommended speeds for haulage vehicles for various section of haul routes taking into account the posted speed limit, road geometry, road condition, prevailing traffic speeds, etc which may be monitored using a variety of telematic systems
- **Traffic Frequency** - Consider limiting the number of daily vehicle movements or the maximum tonnage of timber transported daily to allow the roads time to recover if appropriate.
- **Convoy Prevention** - Prohibit the formation of vehicle convoys and schedule a minimum interval of at least 15 minutes between vehicles leaving the forest, with the option to extend this interval as part of the agreed route conditions. Not only does this allow the road to recover, but it also prevents congestion that could be caused by lorries.
- **Road Suitability** - If roads are inapt for heavy goods vehicles, drivers should maintain communication to ensure they do not encounter each other on these roads. Implement one-way systems where feasible.
- **Loading** - Loading of vehicles should not occur on public roads. If reduced loads necessitate double handling, this should be conducted in designated lay-bys.
- **Signage** – It is of the utmost importance to utilise appropriate signage as needed to guide traffic and communicate restrictions. Signage should also be erected on the approach roads to forest entrances with active haulage operations.

Compliance with these recommendations is of utmost importance in earning the trust and confidence of all stakeholders. This approach ensures transparency and accountability in timber transport operations and builds trust between parties.

4.2 Partnership Approach

Timber transportation presents a challenge for all stakeholders within the supply chain, especially when it comes to optimising the efficiency of moving timber across some of the country's road infrastructure.

4.2.1 The Need for Collaboration

There are differing perspectives among stakeholders regarding the responsibility for ensuring adequate infrastructure to facilitate timber transport, regardless of the location, provided that the haulage adheres to all applicable regulations.

Contrarily, some argue that certain local rural roads, especially secondary and tertiary ones, are not suitable for freight transport at maximum vehicle weights. These roads remain essential to local communities as they serve as access routes to homes and farms and must be reasonably maintained. The current system in which certain Local Authorities seek to impose weight restrictions and demand bonds or deposits, sometimes disproportionate to the revenue generated from forest activities, has the potential to render timber extraction economically unviable, jeopardising future growth for the whole country, not just the sector itself. Failure to mobilise this timber could result in a significant loss to the state, which has made substantial investments in supporting afforestation throughout the nation. A shortage of wood products would also severely impact the construction, agriculture, pallet and DIY industries.

Therefore, early collaborative partnership is imperative, where the needs and expectations of each party are comprehended, and timber can be extracted in a financially sustainable manner.

4.2.2 Collaborative Approach

A collaborative approach necessitates a wholehearted commitment from all stakeholders to engage in the process and faithfully implement the agreed-upon solutions. Effective partnership efforts entail open communication among the forest owner, the timber processor (who may acquire standing timber), the Local Authority, the haulage contractor, and statutory bodies like the Forest Service. Good communication is at the core of a robust partnership, with forest owners and state agencies ensuring that Local Authorities are well-informed regarding forestry planting and harvesting activities. A well-informed Local Authority can anticipate well in advance when timber extraction is likely to occur in a specific area and work to ensure this is as smooth as possible for all involved.

4.2.3 Information Sharing

Detailed information and data are used on an everyday basis by professionals working in both the forestry and road sectors. Local Authorities generally plan their road works programmes on Local and Regional roads on a three-year cycle. These programmes are planned and recorded on bespoke GIS applications managed by the Roads Management Office (RMO) as a national shared service. Access to this information by professionals in the forestry sector could help inform planned thinning and felling programmes so that conflicts with planned road works could be avoided.

Similarly, the sharing of planned forestry activities could assist Local Authorities when planning road works programmes. The **Forestry Licence Viewer** is also a good source of information for Local Authorities on forestry activities seeking or having secured consent.

4.3 Local Authority input into Forest Service Decision Making

Local Authorities, and their respective Roads Services, have a number of opportunities to input into the Forest Service's decision-making process in relation to applications for felling or forest roads. The DAFM also plays a key role when considering the feedback provided by Local Authorities as part of the consultation process related to applications for various consent. This is to ensure appropriate conditions are applied to consents that reflect the input of Local Authorities and the need for ongoing engagement between the parties. As previously stated, in certain circumstances, prior consultation with the relevant Local Authority roads section should be undertaken where there is potential for impacts on the public road network, this will mitigate the potential for delays in securing the relevant consents.

4.4 Community Involvement Roads Scheme

To address road maintenance on regional and local levels and promote collaborative endeavours, the Department of Transport, in conjunction with Local Authorities, has extended limited support for Community Involvement in local road schemes for several years. This framework facilitates a partnership approach in which local communities and landowners contribute towards road repair and maintenance costs through labour, materials, equipment, or direct funding, with the Local Authority providing the remaining funds.

Eligible projects may include:

- Road works encompass tasks like pothole repair, surface dressing, or road strengthening.
- Drainage works.
- General activities such as grass removal or site preparation.

This platform offers forest owners and timber buyers a structured and coordinated means to contribute to maintaining and improving forest access roads.

5. Industry Sustainability

The Irish Government's Climate Action Plan mandates Ireland to achieve a legally binding objective of reaching net-zero greenhouse gas emissions by 2050 and reducing emissions by 51% by 2030 at the latest. For the transport industry, this outcome is a reduction in emissions by 42%-50% by 2030[12].

Transportation is the leading contributor to energy-related CO^2 emissions in Ireland. In 2019, before the COVID-19 pandemic, it accounted for more than 40% of such emissions. These figures account for all transport in Ireland, not just timber haulage, but the sector does have a responsibility to lower emissions to ensure that the timber transport industry remains viable under net-zero targets.

For example, in 2023 Coillte initiated a Sustainable Transport Programme to investigate and recommend existing and emerging technologies which could reduce Coillte Group's fuel-related CO^2 emissions. Coillte has appointed a Sustainable Transport Programme Manager to lead this collaborative initiative with forest industry stakeholders and develop Coillte Group's Sustainable Transport Strategy.

5.1 Sustainable Fuel Alternatives

Some hauliers or forest operations may choose to use environmentally sustainable alternatives to traditional methods in timber transport.

HVO - Hydrotreated Vegetable Oil (HVO) is viewed by many as a sustainable and environmentally friendly diesel replacement fuel, which is one of the most accessible ways to reduce transport emissions. It is created from waste residues such as vegetable fats and oils.

While it shares similarities with biodiesel, it distinguishes itself by utilising hydrogen as a catalyst in place of methanol[13]. HVO allows for an instant improvement in air quality, with up to a 90% reduction in CO2, 30% reduction in NOX and 86% reduction in particulate matter. It can be used with or as a replacement for standard diesel and is approved for use by many vehicle manufacturers.

Electric Vehicles - In Scotland, two electric timber lorries are being trialled from 2023 to 2026. A 40-ton articulated lorry and a 44-ton wagon and drag transport both sawn and roundwood timber. Trials such as this can provide the Irish timber transport sector with the data and information required to decide if electric vehicles would be fit for purpose in the endeavour to reduce emissions.

Driving Efficiency - The easiest and most available method to reduce timber transport emissions is to ensure that drivers undergo Eco-Driving training. Enhancing fuel efficiency by employing proficient driving techniques and integrating in-cab driving performance monitoring technologies allows less fuel to be used, and therefore fewer emissions are released. However, it is imperative to acknowledge that achieving improved fuel economy is particularly challenging within the timber industry. This sector faces unique challenges, including rural roads, consistent carriage of maximum payloads, and off-road driving, all of which can adversely impact fuel efficiency[14].

[12] Climate Action Plan 2021 - Securing Our Future, Department of the Taoiseach | [13] Timber Transport Forum- Road Haulage Decarbonisation Overview Report, 2022 | [14] Timber Transport Forum- Road Haulage Decarbonisation Overview Report, 2022

5.2 Protecting Water Quality

To remain sustainable and environmentally friendly, those involved in timber transport should understand the procedures around spills and leaks, which can cause ground and waterway pollution. All vehicles should be equipped with pollution control kits, and drivers should conduct a daily vehicle inspection, with particular attention to identifying fuel or oil leaks. Any necessary repairs should be promptly addressed before entering the forest.

In the event of an oil leak, a burst hydraulic hose on a crane, or any oil or fuel spillage within the forest, it is essential to adhere to the designated environmental response protocol. This is crucial for mitigating potential pollution in aquatic environments and underlining our commitment to sustainability and environmental protection.

To prevent ground and waterway pollution, embracing these principles of good practice is essential:

- Immediately clean the loading site after completing loading operations.
- Ensure the work site is free of any rubbish.
- Prevent the transfer of mud and debris from the forest onto public roads
- Refuelling of dedicated forestry vehicles such as harvesters and forwarders will be carried out at designated refuelling areas in accordance with Harvest Management Plans.

5.3 Biosecurity

Ireland is currently facing a multitude of challenges in safeguarding its natural environment. The intensification of agriculture, for instance, has compelled Ireland to bolster its efforts in preserving and enhancing water quality, air quality, and biodiversity. Additionally, the potential repercussions of climate change are a growing concern. Warmer temperatures have been linked to widespread bark beetle outbreaks in the forests of North America and continental Europe. Factors like drought, diseases, and their interactions threaten biodiversity.

These challenges present compelling economic, social, and environmental reasons for a more comprehensive and coordinated response to plant and tree health issues. This is vital to protect and enhance the nation's prosperity and well-being.

Forestry plays an increasingly pivotal role in rural development through the maturation of planted forests and the resultant ongoing diversification of farm incomes.

EU Member States acknowledge Ireland as free from specific pests, enabling the enforcement of phytosanitary treatments for commodities that may carry these pests. This includes the removal of bark from coniferous timber to prevent the introduction of bark beetles. Ireland holds the highest number of protected zones in the EU, with 22 pests and diseases listed. Maintaining Protected Zone status within the EU necessitates continuous monitoring and surveillance for harmful organisms.

All roundwood in transit requires a plant passport when moving into and within protected zones. Typically, this information is included in delivery or timber advice notes and should comprise the following elements:

- The words 'Plant Passport —PZ' in the upper right-hand corner, in one of the official languages of the European Union and English.
- Immediately below those words, the scientific name(s) or the EPPO code(s) of the relevant protected zone quarantine pest(s).
- The European Union flag in the upper left-hand corner, printed in colour or black and white.
- The letter 'A' followed by the botanical name (the taxon is acceptable).
- The letter 'B' followed by the two-letter code for the Member State (IE for Ireland) & the company registration number.
- The letter 'C' followed by the traceability code of the plant or plant product.
- The letter 'D' followed by either the name of the third country of origin or the two-letter code of the Member State of origin (e.g., A Pinales B IE –F000 C 20200212-08 D IEIPSXDU, IPSXSE, IPSXTYDENCMI, IPSXAM, IPSXCE, Plant Passport -PZ).

The plant passport is stored within the HLT system for all Coillte timber and can be accessed by the driver.

Practising sound biosecurity habits can significantly reduce the spread of harmful forest pests and pathogens, contributing to the protection of forest health. Biosecurity procedures stipulated in the felling licence specific to each site should be adhered to. This may include measures such as keeping brushes and disinfectants available on forest sites and ensuring machinery is thoroughly washed down between forest operations.

5.4 Forestry Planning & Forecasting

Effective planning is a cornerstone for ensuring the sustainable harvesting and transportation of timber from forests via the public road network. To achieve this sustainability, active involvement and collaboration of key forestry stakeholders are imperative, drawing upon the most current and relevant information. This information is a vital resource for coordinating and strategising road maintenance initiatives, allowing Local Authorities to anticipate the potential impact of various timber haulage sectors on the existing road infrastructure.

Managers overseeing both present and future timber removals from forest estates must carefully consider several critical factors, including the following:

- The age distribution of existing forests.
- The suitability of the current forest and public road network.
- The accessibility of timber markets.
- The status of forest road construction and afforestation.
- Compliance with felling license requirements.
- Consultation with involved stakeholders.

Collaboration with the Forest Service provides access to essential data encompassing the location of existing forest estates, the issuance of felling licenses, and the receipt of forest road applications, which is then shared with the relevant Local Authorities. This cooperative, high-level approach allows for preliminary estimations regarding the potential timber volume that could be transported across the road network, both presently and in the future. In specific instances, the scheduling of public road maintenance projects can be coordinated to align with planned felling activities when such information is available and vice-versa.

Effective planning and communication, conducted well in advance of felling or road construction activities, are essential for identifying and addressing concerns raised by pertinent stakeholders before potential conflicts arise. This proactive approach ensures that timber haulage within the public road network can proceed sustainably and without unnecessary disruptions.

The National Forest Inventory reports, published by the Department of Agriculture, Food and the Marine, provide valuable data on the forest stock, age and species, which can be a valuable tool in planning and forecasting[15].

15 Ireland's National Forest Inventory 2022, The Department for Agriculture, Food and the Marine, 2023.

6. Timber Transport Compliance

Timber transport is a clearly standardised operation, and it is imperative that all involved adhere to these regulations. This information presented in this Good Practice Guide is founded on the principle of unwavering compliance with the existing regulations and the unwavering commitment of all stakeholders to this principle.

6.1 Roles & Responsibilities

To ensure efficient and safe operations, stakeholders must understand their roles and responsibilities.

The main responsibilities of the haulier involve:

1. Ensure the vehicle is designed suitably for round timber transport.
2. Equip the trailer with bunks or stanchions that are safe for timber transport.
3. Provide and maintain sufficient load straps rated appropriately for the task.
4. Regularly inspect and maintain the vehicle, including the crane (if present)
5. Comply with relevant legislation, offer driver training, and implement safety measures[16].

Hauliers may wish to be accredited under the 'Truck Safe' standard by the Freight Transport Association Ireland. This certification allows hauliers to demonstrate compliance in categories such as roadworthiness, road and operational safety, and environmental efficiency[17].

The main responsibilities of the driver include:

1. Adhere to road rules, especially speed limits and weight restrictions.
2. Comply with legal driving hours and working time regulations.
3. Adjust driving for weather, traffic, and road conditions (both forest and public road)
4. Drive attentively and courteously towards other road users.
5. When extracting timber from rural areas, avoid convoys, critical times (e.g., school openings and closings), sensitive local events, and limit night operations as planned prior to haulage commencement.
6. Conduct mandatory daily vehicle checks, including inspecting load-securing equipment like bunks, straps, and tensioners. Report anything that doesn't seem right[18].

Haulage consignors are responsible for ensuring that all timber collection from the forests and delivery to end users complies with the guidelines set out by Coillte[19] or the Irish Timber Growers Association[20]. Some of the key responsibilities that fall upon this group include:

1. Road freight licensing
2. Insurance requirements
3. Vehicle roadworthiness assessments
4. Vehicle maintenance protocols
5. Driver licensing, inclusive of driver CPC (Certificate of Professional Competence)
6. Effective driver management practices

Everyone involved in timber transport is responsible for following site-specific regulations, which may vary between locations. This may include (but is not limited to) the forest, a haulier's yard, a sawmill, a port or a rail yard.

[16] Forest Industry Transport Group - Round Timber Transport Guidelines for Hauliers and Drivers, 2017 | [17] Freight Transport Association – Truck Safe Overview, https://www.ftai.ie/trucksafe | [18] Forest Industry Transport Group - Round Timber Transport Guidelines for Hauliers and Drivers, 2017
[19] Coillte – Code of Practice for Timber Removals | [20] Irish Timber Grower's Association – Timber Sales Dispatch System

6.2 Legislation

Robust legislation governs activities within the timber transport supply chain, underscoring the significance of all stakeholders diligently fulfilling their roles and responsibilities to uphold compliance with these regulations. While the legislation extends beyond the following points, they represent key areas that demand collective awareness and adherence.

6.2.1 Overloading and Weight Limits

The weight limits mentioned in section 3.2 represent the maximum gross vehicle weights for their respective combinations, and there is no allowance for operating beyond these limits. These weight restrictions are rigorously enforced by An Garda Siochana, with substantial penalties imposed for exceeding them.

It is essential to adhere to the legislation around vehicle weights as research has explicitly shown that overloading plays a significant role in causing road damage. Furthermore, overloaded vehicles surpassing their intended weight capacity exhibit reduced braking efficiency during emergencies and may experience compromised steering and stability.

Equally critical is the even distribution of the load to ensure that the timber is balanced across the entire vehicle, avoiding overloading on individual axles or combinations of axles.

It's worth noting that some may assume a timber vehicle with logs stacked up to the maximum height is necessarily overloaded. However, this is not always accurate, as timber weight can vary considerably. Dry timber with lower moisture levels will weigh significantly less than fresh timber containing 50-60% moisture content. It will not be uncommon to see timber lorries with loads that appear fuller while the timber is lighter in the drier summer months.

6.2.2 Damage to Public Roads

There is a general obligation in the 1993 Road Act whereby it is an offence to damage a public road. Vehicle operators should be mindful of this obligation and, where there is a potential for road damage or deterioration due to timber haulage, take appropriate preventative action. In addition, Local Authorities may request that roads be assessed and photographic or video records taken before haulage occurs. Any damage caused by operations should be reported to the appropriate body - Department of Transport (DOT).

Local authorities in Ireland are responsible for overseeing the management, administration, construction, and upkeep of public roads across the country. This oversight is subject to the supervision of the Department of Transport. However, in the case of National Roads, Transport Infrastructure Ireland (TII) assumes a supevisory role, and, in some instances, a direct operational role.

6.3 Health & Safety

Health and safety guidelines in the sector are clear and should always be followed. The shared goal of all stakeholders is to transport timber with minimal risk of harm to those directly involved and to the general public.

6.3.1 Lorry Driver Health and Safety

The haulage contractor holds the responsibility for the health and safety of vehicle operations. It is essential to create a safety statement and conduct a risk assessment in accordance with the 2005 Safety, Health, and Welfare at Work Act. Drivers are expected to adhere to site safety regulations, which should outline the necessary personal protective equipment (PPE) they must utilise. It is worth noting that different work sites may have slight variations in PPE requirements, so those attending sites should check this and remain compliant.

In situations where a driver operates independently within the forest, a specific lone working procedure should be established. Drivers are strongly encouraged to communicate their whereabouts while operating away from public roads. This proactive measure becomes critical in the event of an accident when working alone, as a prompt response may be essential for providing timely assistance to the injured individual. Particular attention should be directed toward areas with limited or no mobile phone coverage.

To ensure that the driver can carry out their operations safely, in addition to the standard licencing and certification, the driver should also receive training, as applicable, in the following areas:

- Crane operation
- Load security
- Forest road driving and associated hazards
- Operation of specialised equipment like central tyre inflation

When essential, this information should be conveyed in a language that the driver can comprehend. An increasing amount of recruits in the forestry sector do not have English as a first language, so accommodations should be made as required.

6.3.2 Load Securing

In 2017, the Health and Safety Authority issued an information sheet on the securing of round timber on vehicles. This follows a number of Load Series Safety information sheets on securing loads of steel, precast concrete, and plant/machinery and is the first such document to address the issue of securing round timber specifically.

A key point in load securing is checking the strap quality used. This includes checking for tears, knicks or knots and ensuring that only legibly marked and labelled straps are used. The tensioning device (or ratchet) should also be checked for corrosion or damage before use.

Adhering to the appropriate speeds and considering the road and weather conditions will also lower the chances of timber movement in transit or a lorry losing its load.

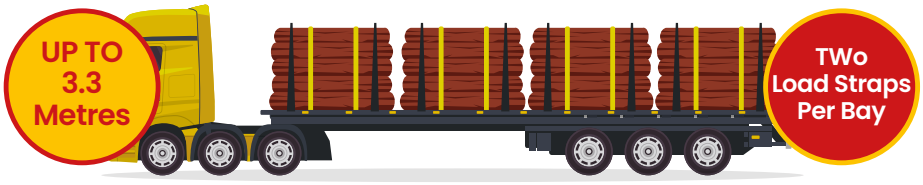
STRAPPING THE LOAD — VEHICLE **WITH** HEADBOARD

Use the recommended number of load straps to each bay of timber in accordance with this guidance. See below...

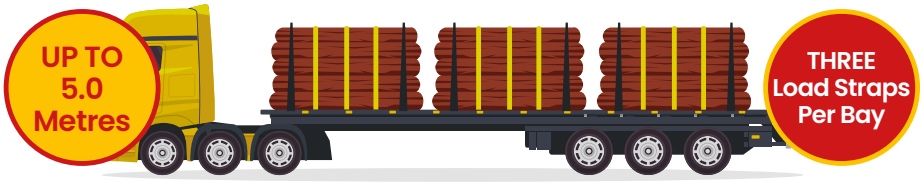
At least **ONE LOAD STRAP PER BAY** if the logs are **up to** a maximum length of 3.3 metres with bark still present.

At least **TWO LOAD STRAPS PER BAY** if the logs are **longer** than 3.3 metres or irrespective of the length if the bark has been removed

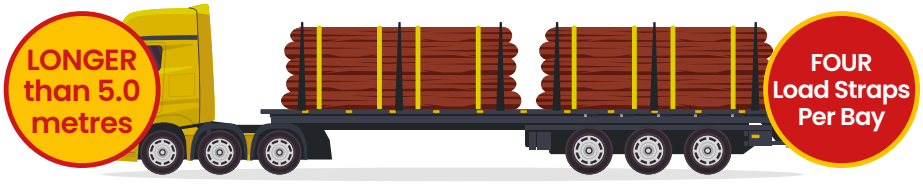
STRAPPING THE LOAD — VEHICLE **WITHOUT** HEADBOARD



At least **TWO LOAD STRAPS PER BAY** if the logs are **up to a length** of 3.3 metres



At least **THREE LOAD STRAPS PER BAY** if the logs are **up to a length** of 5.0 metres



At least **FOUR LOAD STRAPS PER BAY** if the logs are **longer** than 5.0 metres

STAKES: Additional bunks or stanchions will be required to ensure that each bay is secured by two bunks or stanchions

For extra information reference the booklet - Round Timber Transport Guidelines for Haulier and Drivers July 2017

Trailer-mounted auto-tensioning timber straps may be used to secure the load further.
The auto-tensioner is equipped with a drum winch system that consistently exerts a 1,000kg tractive force, ensuring that the straps remain taut, preventing the load from becoming loose. These auto-tensioners use the truck's compressed air system to power their operation. The time required to secure these straps is generally similar to that of traditional straps. However, the advantage is that drivers do not need to halt their journey to readjust the straps manually, resulting in time savings compared to manual strapping[21].

Further information on load security can be found in the FITG Round Timber Transport. Guidelines for Hauliers and Drivers (2017).

[21] *Timber Transport Forum - Auto-Tensioning Timber Straps Case Study, 2022.*

6.3.3 Safe Loading

Loading or off-loading logs are high-risk operations requiring careful consideration to prevent injury or fatality. The person responsible for loading may be the vehicle driver using the vehicle crane or a third party, introducing additional hazards that require evaluation. A risk assessment should be undertaken to evaluate risks specific to each load and journey, considering factors like vehicle type, location, log type, and weather conditions.

Loading operations should be undertaken on stable or firm ground, with caution for powerlines and clear visibility at all times. No public roads should be obstructed, and consideration must be given to other vehicles.

Proper loading practices for timber transport are crucial for safety and compliance. Logs should be loaded lengthwise along the trailer, adequately supported by at least two sturdy uprights that prevent spreading.

Some of the key guidelines include:

- Logs must extend at least 300 mm (12 inches) beyond the uprights.
- It's recommended to stack logs from top to tail to ensure balanced loading.
- Crowned centre logs should match or exceed the height of outer logs for effective tensioning with load straps.
- Each bay of timber must be secured as set out in section 6.3.2 Load Securing.
- The load restraint system should prevent forward movement under heavy braking and withstand forces equivalent to half the weight when moving backwards or sideways.
- Regularly inspect the load and the straps when transitioning from forest to public roads and at intervals during the journey, re-tightening as needed.
- Consistently check lashings (chains & straps) for damage and promptly replace any compromised components.
- Vehicle owners and drivers have a responsibility to ensure the safety of other road users by preventing log loss from the vehicle.

7. Conclusion and Useful Websites

To summarise, the timber transport sector in Ireland faces unique challenges, but with the recommendations provided in this Good Practice Guide and a commitment to best practices, stakeholders can work together to ensure the responsible and efficient transportation of this valuable resource while safeguarding the environment and local communities. Road haulage remains a primary mode of timber transportation, and it is essential to adapt and innovate to meet the increasing demand while preserving Ireland's natural resources for future generations.

Coford	www.coford.ie
Coillte	www.coillte.ie
DAFM	www.gov.ie/agriculture
DTTAS	www.transport.ie
Enprova	www.enprova.ie
Forest Service	www.agriculture.gov.ie/forest
FTA Ireland	www.ftai.ie
Fuels for Ireland	www.fuelsforireland.ie
HSA	www.hsa.ie
IFFPA	www.iffpa.ie
Roadex	www.roadex.org
RSA	www.rsa.ie
SEAI	www.seai.ie
Smart Freight Centre	www.smartfreightcentre.org
Teagasc	www.teagasc.ie
UK Timber Transport Forum	www.timbertransportforum.org.uk

8. Useful References

Forest Statistics Ireland 2023, Department of Agriculture, Food & the Marine, August 2023, Co.Wexford

Roadex – Summary of Drainage Analysis in the Scottish Highlands

Tread Softly, UK Timber Transport Forum, 2014

Ireland's National Forest Inventory 2022, The Department for Agriculture, Food and the Marine, 2023

Coillte – Code of Practice for Timber Removals

Coillte – HLT Project Introduction, https://www.coillte.ie/haulage/hltproject/introduction/

Irish Timber Grower's Association – Timber Sales Dispatch System

COFORD – All Ireland Roundwood Demand Forecast

COFORD Forest Road Manual – Guidelines for the design, construction and management of forest roads

DAFM Forests, products and people Ireland's forest policy – a renewed vision June 2013, Draft Report for Public Consultation

Department of the Taoiseach - Climate Action Plan 2021 - Securing Our Future

DTTAS – Road Management in Ireland

ESB – Code of Practice for Avoiding Danger from Overhead Electricity Lines, 2009

Forest Service – Forest Harvesting and Environmental Guidelines 2000

Freight Best Practice – Innovation in Scottish Timber Haulage

HSA – Code of Practice on Managing Safety and Health in Forest Operations

HSA – Guide to the Safety, Health and Welfare at Work (General Application) Regulations 2007

FII - Forest Industries Ireland placing timber and forestry at the heart of Ireland's rural economy.

IFIC and FITG – Road Haulage of Round Timber, Code of Practice

Purser Tarleton Russell Ltd. – Forestry Training and Education Needs Analysis 2011

Road Safety Authority – Guidelines on Maximum Weights and Dimensions of Mechanically Propelled Vehicles and Trailers including Manoeuvrability Criteria

Road Safety Authority – Guide to Keeping your Commercial Vehicle Roadworthy

Road Safety Authority – Guide to Managing for Road Safety

Road Safety Authority – Guide to EU Rules on Drivers Hours Regulation (EC) No 561/2006

Road Safety Authority – Guide to the Road - Transport Working Time Directive

Timber Transport Forum - Auto-Tensioning Timber Straps Case Study, 2022

Timber Transport Forum – The Timber Transport Toolkit, Hauling timber on the Public Highway

Timber Transport Forum- Road Haulage Decarbonisation Overview Report, 2022

Transport Research Laboratory – Impacts of Increased Goods Vehicles Weight Limits by W. H. Newton and B. A. Firth (Project Report PR 30)

NOTES

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