

Managing Timber Transport Good Practice Guide

Advice on resolving timber transport issues for local authorities,
timber haulage companies and forest owners in Ireland.



Forest Industry Transport Group
Solutions for a Growing Irish Forest Harvest

Useful Contacts

Mr John Lyons, FITG Chairman. john.lyons@coillte.ie

Mr Fionan Russell, FITG Secretary. fionanptr@eircom.net

Mr Michael Joyce, Logistics Consultant. mjjoyce@eircom.net

Dr Ger Devlin, Biosystems Engineering, UCD. ger.devlin@ucd.ie

Edited By Dr Ger Devlin

Table of Contents

1. Abstract	2	9. Agreed Routes Maps	12
1.1 Objective	2	9.1 Outline of Agreed Routes	12
1.2 Background	2	9.2 Measures that can be applied on restricted routes	12
- Forestry	2	9.3 Operation of agreed routes	13
- Roads	2	9.4 Compliance with agreed routes	13
1.3 Partnership Approach	2	10. Haulage Legislation and Compliance	15
1.4 Vehicles	2	10.1 Gross Vehicle weights	15
1.5 Agreed Routes Maps	2	10.2 Overloading and Weight Distribution	15
1.6 Community relations	2	10.3 Damage to Public Roads	15
1.7 Compliance	2	10.4 Vehicle Maintenance	16
2. Introduction	3	10.5 Compliance with Code of Practice for Timber Removals	16
2.1 Forest Industry Transport Group	3	11. Roles & Responsibilities of Key Stakeholders	16
2.2 Objectives of Guide	3	11.1 Forest Service	16
3. Background	3	11.2 Forest Owners/Saw Mills/Buyers (Responsibility for procurement of haulage)	16
3.1 Forestry in Ireland	3	11.3 Haulage Contractors	17
3.2 Background to Irish Roads	4	11.4 Sawmills and processors	17
4. Timber Transport	4	11.5 Local Authorities	17
4.1 Round Timber Production	4	12. Traffic Management & Community Relations	18
4.2 Economics of Round Timber Transport	5	12.1 Traffic Management	18
4.3 Impact on Roads	5	13. Environment	19
5. Partnership Approach	6	13.1 Preventing spills and incidents	19
5.1 The Need for a Partnership	6	13.2 Efficient Transport	19
5.2 Partnership Approach	6	14. Health and Safety and Training	20
5.3 Community Road Schemes	6	14.1 Safe Operation	20
6. Forestry Planning and Forecasting	7	- Driver Safety	20
6.1 Planning and Timber Forecasting	7	14.2 Driver Training	20
6.2 Information Available	7	14.3 Load Security	20
7. Vehicle Specification/Selection	8	15. Acknowledgments	21
7.1 Backgrounds to Vehicle Weights	8	16. Bibliography	22
7.2 Vehicles and Road Damage	8	17. List of Useful Websites	22
7.3 Developments in Vehicle Technology	9		
8. Road Maintenance and Management	11		
8.1 Key Factors	11		
- Pavements	11		
- Bridges	11		
- Drainage	11		
- Road Design	11		
8.2 Co-ordination of timber harvesting	12		
8.3 Height Restrictions	12		

1. Abstract

1.1 OBJECTIVE

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 in relation to good practice that is accepted and practiced by all stakeholders. The guide proposes a preventative approach to any issues of concern and adherence to the guide will generate solutions based on:

- Good communications, planning and management
- Optimum vehicle selection/procurement
- Compliance with legislation and guidelines

1.2 BACKGROUND

Forestry

Forestry is an important industry in Ireland. Nearly 11% of the land is currently planted and the objective is to increase this to 17%. At present 46% of the national forest estate is privately owned and the remainder is primarily owned by the State through Coillte. In 2012 over 2.9 million m³ of round timber was harvested and transported to sawmills and processing plants. This represents around 97,600 vehicle movements per annum or 390 per day. The plantations are spread across every county in Ireland with Cork having the largest area under forest and Wicklow having the highest proportion of the county planted. Round timber production is forecasted to double by 2028.

Roads

The transport of round timber poses a unique challenge. This arises because most of the forests are located at the end of the road network. It is estimated that over 80% of the private estate is accessed by local roads only. Many of these roads are legacy roads which are structurally weak. This is further compounded by Ireland's extensive road network which is over twice the European average length per capita. On the other hand round timber is a low value product at the forest gate which requires timber to be transported at maximum efficiency which means that vehicles are operating at maximum payload.

1.3 PARTNERSHIP APPROACH

This guide provides an approach to minimising the negative effects of timber haulage through improved planning and communication as well as various options and interventions in specific cases. Details are provided of the information available from the Forest Service in relation to plantations

and felling licences which can enable Local Authorities to anticipate where timber transport is likely to take place and to plan road maintenance accordingly.

1.4 VEHICLES

The guide highlights how truck configuration and selection of particular vehicles can help. Higher Gross Vehicles may be more road friendly due to the number of axles, the number of wheels, the tyre width and reduced number of trips required. In some situations the choice of vehicle will be restricted due to bad bends on narrow roads. A number of technical innovations have been introduced in recent years that can aid compliance and reduce road damage including on board weighing, vehicle tracking and central tyre inflation. These are currently not widely used but results elsewhere have shown the benefits that can accrue from their use in timber transport.

1.5 AGREED ROUTES MAPS

The Guide recognises that there are some roads that are not suitable for the transport of timber on conventional vehicles at maximum gross vehicle weights. To address this issue, it is proposed that a map of 'agreed routes' be drawn up in every county which will be commonly known and accepted within the industry.

It is therefore essential that prior to haulage commencing in areas served by restricted or excluded routes, the stakeholders (Forest Owner, Sawmill, Haulier and Local Authority) engage in discussions to plan the transport of the timber and reach an agreement on the appropriate method of moving the timber.

1.6 COMMUNITY RELATIONS

The guide also sets out several other recommendations to ensure that timber is transported through rural communities in a manner that in addition to minimising road damage also minimises local disruption. This is achieved by avoiding convoys, signage as required, timing selection, and preventing dirt and debris.

1.7 COMPLIANCE

The guide is based on the premise that compliance with all statutory regulations is a given and that there shall be zero tolerance for any breaches such as overloading or exceeding speed limits. Compliance with the guidelines, such as agreed routes, is based on co-operation between the stakeholders and it is stressed that there must be buy-in from all sides to make this work.



Members of the FITG viewing a demonstration of the use of central tyre inflation in Straide, Co Mayo 2013.

2. Introduction

2.1 FOREST INDUSTRY TRANSPORT GROUP

This Guide was prepared on behalf of the Forest Industry Transport Group (FITG), all the members of which contributed to this guideline document (see acknowledgements).

The FITG was formed in 1999 as an industry forum to facilitate communications on matters relating to timber transport. The group has already produced the Code of Practice for Road Haulage of round timber in 2004, which sets out the technical and legal issues relating to the safe and efficient haulage of timber.

A Transport Consultant, Michael Joyce was engaged to coordinate the production of this document. This guide is an aid to managers involved in the haulage of timber and to roads engineers; and it helps to identify and promote best practice in a partnership approach.

2.2 OBJECTIVES OF GUIDE

The objective of this Guide is to develop a partnership approach for the management of round timber transport and to ensure that this activity is carried out in an environmentally sustainable and economically viable manner. It provides advice on resolving timber transport problems for Local Authority road managers, timber haulage managers, forest owners and agents.

In summary it is envisaged that solutions to issues involving timber transport can be achieved through;

- Good communications, planning and management
- Optimum vehicle selection/procurement
- Compliance with legislation and guidelines

It is expected that all the stakeholders in the timber supply will be aware of and will abide by this Good Practice Guide.

3. Background

The timber industry is a significant indigenous economic sector with potential for growth and job creation. Round timber transports usually start out on local roads some of which are weak and unsuitable for conventional heavy goods vehicles at maximum weights

3.1 FORESTRY IN IRELAND

At present it is estimated that there is 10.5% of Ireland under forest. This figure has grown from a low of around 1% at the turn of the last century. This is still well below the European average of 37%. A forest development programme is in place with the objective to achieve forest cover of 17%¹.

The national forest estate is estimated at 732,000 hectares in 2012 of which 46% is privately owned and the remaining 54% is State owned primarily by Coillte. Most of the increase in timber production will come from the private sector. There are currently 19,000 private forest owners and the average plantation size is 9 hectares. This fragmented structure will pose significant challenges for harvesting and transport as the private estate comes on stream.

The timber industry is a significant contributor to the Irish Economy. It is estimated that in 2012, the Irish forestry and forest products sector generated €2.2 billion in annual output. This represents 1.3% of GDP². The sector supports almost 12,000 jobs directly and indirectly and it is estimated that each additional 15,000 hectares planted will create an additional 490 jobs. It is predicted that round timber production will double by 2028 with clear opportunities for import substitution, rural economic development and sustainable employment.

Ireland enjoys a modern and progressive timber processing sector that has proven itself very effective at market development over the recent years of economic turbulence.

¹ DAFM Forests, products & people Irelands Forest Policy, a renewed vision, Draft Report for Public Consultation June 2013.

² IFFPA - An overview of the Irish Forestry and Forest Products Sector 2013.

This dynamic sector has delivered consistently high demand into the forestry sector and has turned itself from supplying 80% of the timber for the Irish construction sector to being export oriented by winning market share in the UK and opening new markets in France and the Benelux countries. Today the processing sector exports 80% of its production.

The Department of Agriculture, Food and the Marine states³ “the aim of policy is the development of an efficient, economically viable, safe and environmentally – sound harvesting and transport sub-sector, which optimises wood yield consistent with good silvicultural practice, environmental protection and cost effectiveness”.

The forests have strong social and environmental benefits for Ireland as a whole. Forests are a major source of recreation and are visited by 18 million people annually. In addition forests provide significant carbon benefits. Over the period of the Kyoto agreement (2008–2012) it is estimated that Irish Forests sequestered approximately 11m tonnes of carbon dioxide (CO₂).

3.2 BACKGROUND TO IRISH ROADS

The Irish road network is comprised of over 5,600km of National Road, 13,100km of Regional Road and approximately 79,000km of Local Road. This network, totalling 99,000km is managed by the Local Authorities, overseen by the NRA for national roads and by the DTTAS for regional and local roads.

Ireland, when compared to other European countries, has a very extensive public road network that is supported by a relatively small population. Most roads have evolved from tracks that subsequently received thin layers of tar and stone. Unless these roads have been improved, with strengthening layers, they are generally not able to bear heavy loads. The current improvement programme has been underway since 1996. Priorities are based on need with these initially being national roads, regional roads and busy local roads, most of which are now strengthened and capable of bearing standard heavy loads. Many roads, particularly Local Roads with low levels of traffic have not yet been strengthened. Roads also need to be maintained with expected resurfacing on average every 8 years and re-strengthening on average every 17 years for most roads in rural areas.

Forests are often located on roads that have not been strengthened and thus it is frequently a challenge to transport timber across these roads to reach strengthened sections of the network

4. Timber Transport

To realise the benefits of the timber industry, the round timber harvested in the forests must be transported to the processing plant in an economic and environmentally sustainable manner.

4.1 ROUND TIMBER PRODUCTION

In 2011 and 2012 approximately 2.9 million m³ of round timber was harvested in Ireland^{4,5}. This represents approximately 97,600⁶ vehicle movements of round timber annually or 390 movements per day. The vehicle movements may be concentrated in a particular area for a short period during a harvesting operation. Timber accounts for approximately 2.5% of all goods transported in Ireland based on tonnage.

Forestry and as a consequence timber transport is carried out in every county in the country with Cork at 83,619 hectares having the largest estate and Wicklow at 17.7% having the highest level of forest cover. The table below shows the distribution⁷. *Note: Forest Cover includes open forest area:*

TABLE 1 - DISTRIBUTION OF FOREST COVER IN IRELAND

County	Forest Cover	% of County	% of Country
Carlow	8,403	9.4	1.1
Cavan	16,830	8.7	2.3
Clare	52,290	16.4	7.1
Cork	83,619	11.2	11.6
Donegal	56,345	11.6	7.7
Dublin	5,232	5.7	0.7
Galway	59,409	9.7	8.1
Kerry	53,175	11.2	7.3
Kildare	10,396	6.1	1.4
Kilkenny	19,015	9.2	2.6
Laois	25,259	14.7	3.5
Leitrim	26,502	16.7	3.6
Limerick	26,337	9.8	3.6
Longford	8,364	7.7	1.1
Louth	2,428	2.9	0.3
Mayo	51,726	9.2	7.1
Meath	12,496	5.3	1.7
Monaghan	5,598	4.3	0.8
Offaly	24,511	12.2	3.4
Roscommon	25,884	10.2	3.5
Sligo	20,584	11.2	2.8
Tipperary	47,849	11.2	6.5
Waterford	26,546	14.4	3.6
Westmeath	13,168	7.2	1.8
Wexford	13,829	5.9	1.9
Wicklow	35,859	17.7	4.9

3 DAFM Forests, products and people Irelands forest policy – a renewed vision June 2013, Draft Report for Public Consultation.

4 Forest Service, Fergus Moore, presentation to FITG, 2012.

5 Coford Connects, Processing / Products No 29, 2013.

6 Based on an average payload of 27 tonnes and a density of 1 tonne = 1.10 m³.

7 Forest Service – National Forest Inventory, 2012.



Panoramic view of loading timber in-forest with rigid and trailer fitted with on-board crane.

4.2 ECONOMICS OF ROUND TIMBER TRANSPORT

Round timber is a relatively low value high volume product and transport costs are relatively high. The cost of transport can be a significant proportion of the delivered in cost of the timber, varying from 25% to 40%.

Because of the relatively high transport costs and low value of timber at the forest gate, it is necessary that round timber is moved as efficiently as possible to ensure that the value of the forests is realised. In Ireland, a small percentage of timber is moved by rail. Efficiency in transport normally means maximising payload while operating within the maximum legal limits. This means transporting timber at the maximum permissible gross vehicle weight limit which is currently 46 tonnes for qualifying articulated vehicles and 44 tonnes for a rigid and trailer combination.

4.3 IMPACT ON ROADS

Forests tend to be located at the end of the road network. Over 80% of the private forest estate is accessed by local roads only. This is not surprising due to the type of land which attracts forestry. However it poses significant challenges for the stakeholders in order to transport round timber at maximum gross vehicle weights over the poorest part of the road network. This is further complicated by the fact that Ireland has a very extensive road network which is over twice the European average per capita and places a significant strain on the funds for road maintenance and repair. Some of the road network may not be suitable for standard vehicles operating at the maximum weights and this Guide aims to address some of these challenges.

A further challenge is that the vehicle must also operate on forest roads that can be more demanding than public roads.



Six axle artic fitted with CTL exiting a forest harvesting site via public road.

5. Partnership Approach

The transport of timber poses a significant challenge to all stakeholders involved in the supply chain; and that challenge is to transport timber at maximum efficiency over the some of the poorest roads in the network.

5.1 THE NEED FOR A PARTNERSHIP

It is the view of some stakeholders that it is the duty of the state and the Local Authorities to provide the infrastructure to facilitate the movement of timber irrespective of the location provided the haulage is compliant with all the relevant regulations. There is the counter argument that local rural roads particularly the local secondary and tertiary roads are in some cases unsuitable for freight transport at the maximum vehicle weights. These roads are essential to the local community as a means of access to their homes and farms and they must be maintained in reasonable condition. The current system where some Local Authorities are seeking to impose weight restrictions and bonds or deposits which may be a multiple of the revenue from the forest activity is in some cases making timber extraction unviable and threatening future expansion. Failure to mobilise this timber could result in a significant loss to the state, which has invested heavily in grant aiding afforestation.

Therefore a partnership is required where the needs and demands of each party are understood and timber can be extracted in an economic manner.

5.2 PARTNERSHIP APPROACH

This Good Practice Guide takes a collaborative approach to preventing the negative impacts of timber transport and in particular road damage. This requires commitment from all stakeholders to engage in the process and commit to implement the agreed solutions.

The partnership approach will require good communication between the forest owner, the processor (who may buy the timber standing), the Local Authority, the haulage contractor and statutory bodies such as the Forest Service.

Good communication is at the heart of any solid partnership and the forest owners and the state agencies should keep the Local Authorities well informed of timber planting and

harvesting activities. A well informed Local Authority will be aware well in advance of when timber extraction in significant amounts is likely to take place in a particular area.

5.3 COMMUNITY ROAD SCHEMES

As a means of maintaining regional and local roads, and of fostering partnership, the Department of Transport Tourism and Sport and Local Authorities have supported Community Involvement in local road schemes for a number of years. This provides an opportunity to foster a partnership approach in relation to roads whereby local communities and landowners contribute towards the cost of road repair and maintenance by way of labour, materials, equipment or direct funding, with the remaining funds being provided by the Local Authority. Eligible works include:

- Pavement works such as pothole repair, surface dressing or road strengthening.
- Drainage works
- General works such as grass removal or site preparation

This provides forest owners/timber buyers with an opportunity to make a contribution to forest access roads in a structured and co-ordinated manner.



The Minister, Mr. Pat Rabbitte at the launch of a partnership scheme involving SEAI, Coillte and Timber Hauliers on the fitting of vehicle engine management hardware and GPS tracking systems for timber trucks and trailers.

It is recommended that the relevant Local Authority is advised of each felling licence so that it can engage with the forest owner and assess the road network in that area and decide whether to carry out or defer road maintenance depending on the conditions and circumstances.

6. Forestry Planning and Forecasting

Good planning is essential for ensuring that existing and future timber removals from forests can be harvested and transported on the public road network sustainably.

6.1 PLANNING AND TIMBER FORECASTING

In order to ensure that timber can be transported sustainably it is essential that relevant forestry stakeholders engage and make use of the best available information. This information is important when scheduling and planning road maintenance programmes and can enable Local Authorities to anticipate the potential use by the different haulage sectors on the existing road network.

Managers planning current and future timber removals from the forest estate need to examine a number of different factors which include those listed below:

- Age profile of existing forests
- Suitability of the existing forest and public road network
- Availability of timber markets
- Forest Road Construction and afforestation
- Felling licence Requirements
- Consultation with stakeholders

6.2 INFORMATION AVAILABLE

The Forest Service can provide details of the location of the existing forest estate, felling licences issued and the number of forest road applications received to the relevant Local Authorities. This cooperative approach at a strategic level will allow indicative estimates of the potential volume of timber likely to be transported across the road network now and into the future. In some cases the scheduling of specific public road works can take into account planned felling activities if this information is available. Good planning and communication before felling or road construction takes place will help identify and address concerns of relevant stakeholders before conflicts arise.



SAMPLE GIS MAP SHOWING TYPICAL AGE PROFILE OF FORESTS IN THE DONEGAL AREA.

Planting Years

- Before 1981
- 1981- 1990
- 1991-2000
- 2001 -2011

Conifer forests are generally ready for thinning when they are about 17 years of age and can be thinned approximately every five years thereafter. Clearfelling operations usually take place when the trees are between 35 to 45 years of age.



7. Vehicle Specification/Selection

Despite carrying a low value product, timber transport may require specialised transport involving significant investment for the haulier.

7.1 BACKGROUND TO VEHICLE WEIGHTS

Over the past thirty years, vehicle weights and dimensions have changed significantly. Prior to the early eighties the maximum gross vehicle weight in Ireland was 32.5 tonnes for a four axle articulated combination. Today the maximum is 46 tonnes on a six axle articulated combination. In some Scandinavian countries (Finland and Sweden) weight limits of up to 60 tonnes are permitted for seven axle road trains (rigid and trailer).

Timber transport poses a unique challenge in that the journey usually includes a drive on an unsealed forest road, then a journey (usually short) on a narrow local road before getting on the national roads for most of the journey. When coupled with the demand to transport a low value product at the maximum efficiency and in some cases carry a crane for handling the timber, this becomes a significant challenge.

The typical standard vehicle for timber haulage is a six axle articulated combination usually with a single drive axle

on the tractor unit and a tri axle bogie on the trailer with "super single" tyres. (There are some five axle articulated combinations in operation, but this number will decline as a result of the reduction in gross vehicle weight from 42 to 40 tonnes at the end of 2014). It is estimated that about 20% of the fleet consists of rigid and trailer. The rigid and trailer is often considered more suitable for forest operations as they have a double drive and the rigid may operate without the trailer. They also have a better turning circle than the articulated vehicle and will follow the line of the road more closely which is important on narrow winding roads. However they have a higher tare weight and hence can carry a lower payload than the corresponding articulated combination.

7.2 VEHICLES AND ROAD DAMAGE

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. The following table 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 round timber⁸. The right column expresses this as an index based on 100 for the six axle rigid and trailer combination.

TABLE 2 - ROAD WEAR NUMBERS AND INDEX

Vehicle	Gross Vehicle Weight	Road Wear Number	Index
3 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	44	7.1	101
Six axle rigid and trailer combination	44	7.0	100

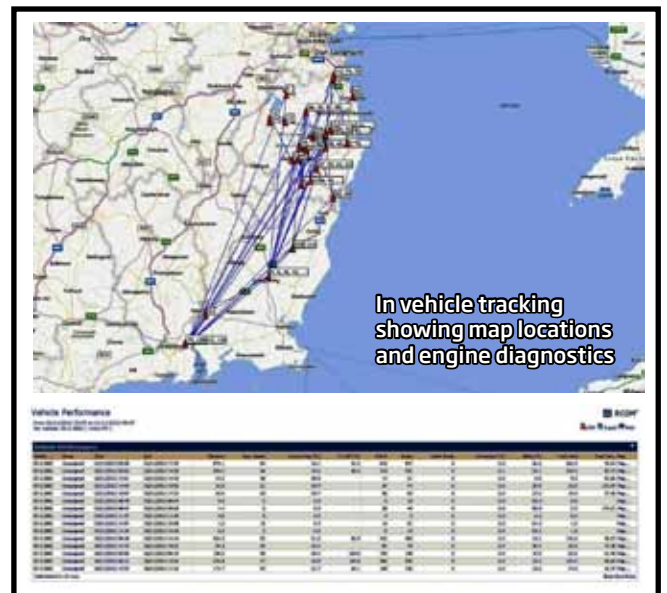
This table shows that a three axle rigid vehicle used without a trailer can cause more road damage than the heavier articulated and rigid and drawbar combinations, based on uniformly distributed loads. (Note these numbers are calculated for standard vehicles with regular tyres.)

⁸ Transport Research Laboratory, Impacts of increased Goods Vehicle weight Limits

7.3 DEVELOPMENTS IN VEHICLE TECHNOLOGY

There have been a number of technical developments in recent years on vehicles for carrying round timber that can improve efficiency, security, compliance and most importantly reduce potential road damage:

- **On board weighing** – this can be achieved via the loading crane or by air pressure transducers on the vehicle via the middle axle of the tri-axle trailer and the back axle of the tractor unit. It provides an accurate indication to the driver in the forest of the vehicle gross or load weight and is very important in delivering compliance with vehicle weights
- **Vehicle tracking** – while this is not unique to timber transport it provides useful information on speed, location, fuel usage and engine management. In future this may be extended to record weights and tyre pressures and can be used to demonstrate compliance. This has also significant benefits in relation to timber security. Currently there is some work being done to interact the GPS data with the on-board weight data.
- **Central Tyre Inflation (CTI)** – this enables the drivers to select from a suite of tyre pressures the most suitable option for the operation 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 damage. The system has been recently fitted to the first two vehicles in Ireland and approximately 20% of the timber fleet in the UK have been fitted with CTI. 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.
- **“Maxi” wide tyres** – These are an extra wide tyre (455/22.5R/45) compared to the standard super single (385/22.5/R65) which will increase the contact area and reduce the potential for road damage.
- There are other bespoke solutions involving multiple wheels on an axle which can be employed for particularly difficult situations. These vehicles will require special permits to operate on public roads.



It is recommended that further research is carried out to explore the possibility of linking on board weighing and central tyre inflation to the tracking system to enable real time monitoring of compliance.



8. Road Maintenance and Management

Local (Road) Authorities in Ireland are responsible for the management, administration, construction and maintenance of Public Roads in Ireland. This is overseen by the Department of Transport, Tourism and Sport. However for National Roads the National Roads Authority (NRA) has both the role of oversight as well as a direct role.

Provision of the road network involves planning for new and improved roads, based on identified needs, construction of new roads, and maintenance of the existing network, to ensure that it remains in serviceable condition. A major function of a local authority is to use public funds to provide a comfortable, safe and economical road network. This requires balancing priorities and making difficult decisions in order to manage pavements. Increasingly new technologies are used to support these decisions.

Effective management requires that good information is available to the individuals and enterprises that have to make decisions in the course of carrying out these activities. Ideally, the information needed should be easily shared amongst the different people, enterprises, and levels of management involved.

8.1 KEY FACTORS

The management and maintenance of roads can be divided into a range of sub-elements of which the following are some of the key factors:

Pavements

Like all structures, roads pavements deteriorate over time. Deterioration is primarily due to accumulated damage from vehicles; however environmental effects such as frost heaves or thermal cracking can also contribute. Furthermore, as bitumen ages, it becomes less flexible and may fragment. Potholes on roads are caused by a number of factors such as rain damage or heavy axle loads. When bitumen has fragmented and water penetrates, potholes can initiate.

Pavements are designed for an expected service life or design life. Thus virtually all roads require some form of maintenance before they come to the end of their service life. Pro-active approaches include the use of pavement management techniques to monitor road conditions and schedule maintenance treatments as needed to identify weak sections and to prolong the lifespan of the roads. Maintenance treatments can range from Routine Maintenance to Resealing to Road Strengthening or Reconstruction.

Bridges

Bridges are an essential element of the road network. In Ireland there are estimated to be over 20,000 across the road network including minor local roads in remote areas. There are also many types of bridges, such as stone masonry arch, that depending on their design and condition are suitable for differing ranges of vehicles and axle loads.

Similar to pavements, monitoring and maintenance of bridges is critical as failure and collapse results in complete road closure with the possibility of areas being cut-off or significant diversionary routes. In addition, the resultant repair or replacement can take a considerable amount of time and be costly.

Drainage

"A wet road is a weak road"⁹. Numerous research studies have shown that poor drainage is often the main cause of road damage. Water flowing onto a local road will weaken the road and accelerate the likelihood of damage. Drains and culverts should be maintained to divert water away from roads and lower the water table.

Road side vegetation should be cut back, particularly overhanging branches that obstruct sight lines and force vehicles onto the weaker edges of the road. This also has the effect of delaying the road drying out after periods of heavy rain.

In addition, regular monitoring and surveying of road condition and deterioration such as using photography is critical. This can occur in conjunction with haulage. Where issues occur protocols and responses need to be in place.

Road Design

Many public access roads to forests are relatively lightly trafficked and do not meet full road design standards. These can have an inadequate geometry such as tight bends or a narrow width. In order to facilitate timber haulage locally suitable solutions need to be developed.

Other issues that may need to be considered include ensuring sufficient passing places for narrow single lane roads as well as the provision of improved signage which improve safety without major expenditure.

⁹ Roadex - Summary of Drainage Analysis in the Scottish Highlands.

8.2 CO-ORDINATION OF TIMBER HARVESTING

Good communication between Local Authorities and Forest Owners should enable Local Authorities to assess the access roads and agree routes for timber haulage. Timber haulage tends to occur in blocks at intervals of approximately five years from first thinning onwards. This can be helped where local "Forest Owner Groups" co-ordinate the thinning and felling operations in their area. This will also inform the Local Authority of the need to carry out essential road repairs in advance of the timber extraction or possibly to defer major road repairs/resurfacing until after the timber has been extracted. In some cases it may be appropriate for a number of adjacent forest owners to construct a longer internal forest road that will exit onto a regional or good quality local road and facilitate an agreed route rather than having restrictions.

If a road starts to deteriorate as a result of poor weather or gets very dirty as a result of timber transport, it may be prudent to suspend these operations until conditions improve.

8.3 HEIGHT RESTRICTIONS

Drivers shall ensure that there are no height restrictions on route. They shall know the exact height of their vehicle when laden and shall check the Irish Rail website or bridge map to ensure that there are no low bridges along the route. A bridge strike can create a serious hazard for the public road / rail user and may result in a court appearance for the driver and three penalty points on conviction.

9. Agreed Routes Maps

The system of agreed routes whereby some roads are restricted or even excluded has been developed by Coillte for some years and works well for the transport of round timber. This systems needs to be reviewed and extended to cater for the increasing private forest estate.

9.1 OUTLINE OF AGREED ROUTES

Agreed routes are based on the principle of preventing road damage. Where this requires an investment in vehicle technology, this is considered preferable to expenditure on road repair. It should be emphasised that these routes are subject to review and will change as circumstances change. The outline of this scheme is that there would be four levels of roads.

Unrestricted Routes

These generally include all the national primary, secondary and regional roads and some local roads.

Consultation Routes

These are local roads where following consultation between the Local Authorities and forest owners, timber can be transported without restriction or with a minor restriction.

Restricted Routes

Where the suite of options will be used to agree the most appropriate haulage method.

Excluded Routes

These routes are currently unsuitable for timber haulage vehicles, unless substantial engineering works is carried out. Consultation with the Local Authority is required to explore alternatives. Where a cul de sac is the only access road to a forest, it cannot be classified as an excluded route, unless there is a structure such as a bridge or other item on the road unable to safely carry the vehicle. These are also intended to prevent the use of "short cuts" where alternative suitable roads are available.

The classification of these routes should be reviewed at regular intervals.

9.2 MEASURES THAT CAN BE APPLIED ON RESTRICTED ROUTES

In relation to severely restricted routes it is anticipated that additional controls would be selected and applied from the suite of controls listed below:

- Vehicles fitted with central tyre inflation.
- The fitting of "maxi" wide tyres (e.g. 455/45/R22.5) rather than the conventional "super singles (385/65/R22.5).
- The use of twin wheels.
- Restricted number of movements per day or restricted tonnage per day. This can also be achieved by specifying a minimum interval between vehicle movements.
- Restricted speeds.
- Reduced payload. This will involve double handling of the timber as it will take more than one vehicle movement to collect a full load which is consolidated at a point where the road network is suitable for unrestricted transport. It is envisaged that this will involve either articulated vehicles or rigid and trailer carrying half their normal payload of timber.
- Other considerations such as suspending operations during adverse weather or during extremely hot weather when the road is weakened may also be considered.
- Other low ground pressure vehicles.

9.3 OPERATION OF AGREED ROUTES

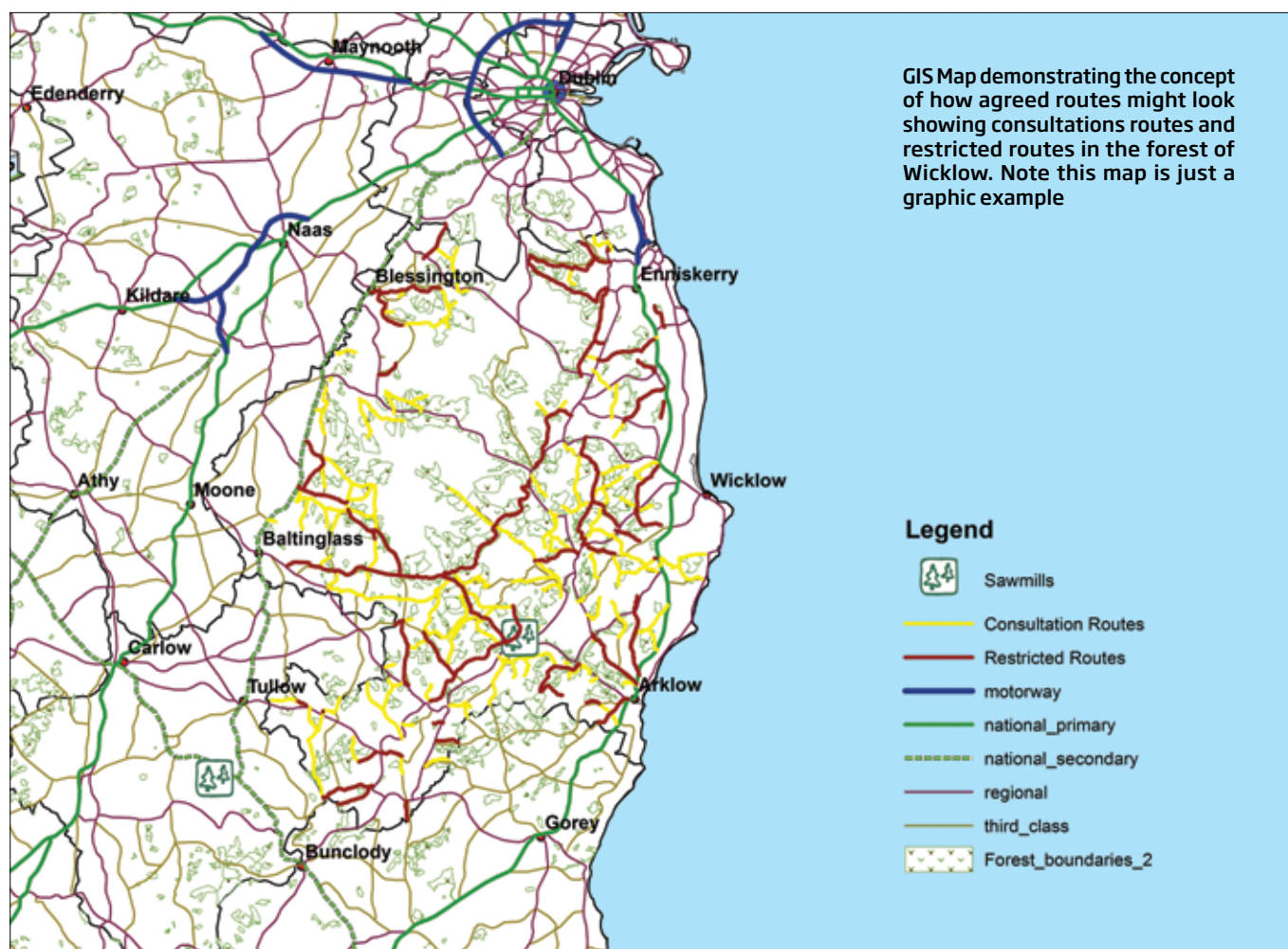
It is envisaged that the routes would be agreed jointly between the Local Authority, the forest owner, saw mills with input from the local hauliers who have extensive local knowledge and experience of timber transport. In coming to an agreement about haulage on any restricted route, due consideration will be given to cases where other HGVs may also be using this route.

Once the routes are agreed, they shall be displayed on a map so that all involved will have easy access to these.

9.4 COMPLIANCE WITH AGREED ROUTES

All stakeholders shall commit to observing the protocols associated with the agreed routes. It may be possible to have these routes set up on GPS systems for drivers so that they do not infringe on the rules. It may be possible to link tyre pressures, speeds, payloads to the onboard computer system to enable real time monitoring or even retrospective auditing to ensure compliance.

The system of agreed routes has been developed with great success in the UK where it is estimated that approximately 20% of routes are restricted in some way. An example of an agreed routes map is shown below.



GIS Map demonstrating the concept of how agreed routes might look showing consultations routes and restricted routes in the forest of Wicklow. Note this map is just a graphic example

It is recommended that a Pilot Scheme be created and operated in two Local Authorities for a period of one year to evaluate the agreed routes proposal. A sub-committee of representatives from the FITG plenary committee should monitor the schemes. A recent funded study by DAFM is being conducted by Dr Ger Devlin in UCD to look at developing the agreed routes map concept.



10. Haulage Legislation and Compliance

Road transport is a highly regulated operation and it is essential that the transport of round timber is carried out in compliance with these regulations. This Good Practice Guide is based on the concept of total compliance with the regulations governing maximum weights and that all stakeholders are fully committed to this concept.

10.1 GROSS VEHICLE WEIGHTS

The Gross Vehicle weights are outlined in the IFIC /FITG “Code of Practice for Road Haulage of Round Timber” which needs to be updated to include recent changes in legislation and in particular the introduction of 46 tonnes gross vehicle weight for certain 6 axle articulated vehicle combinations.

The current ¹⁰ gross vehicle weights are also available on the Road Safety Authority Website www.rsa.ie and a leaflet is available for downloading, which is included in the list of references at the end of this document.

10.2 OVERLOADING AND WEIGHT DISTRIBUTION

The weights referred to above are the maximum gross vehicle weights for the relevant combinations and there is no tolerance for operating in excess of these weights. These weight limits are enforced by the Gardaí and there are significant penalties for exceeding them.

It has been demonstrated in research that overloading contributes significantly to road damage.

In addition to causing excessive road damage, overloaded vehicles which exceed their design weight are less able to stop quickly in an emergency and the vehicle steering and stability may also be affected.

Load distribution is equally important to ensure that the timber is evenly distributed across the entire vehicle and that individual axles or combinations of axles are not overloaded.

Sometimes there is a perception that a timber vehicle with logs up to the maximum height is overloaded. This may not be the case as the weight of timber varies significantly. Dry timber at lower moisture levels will weigh significantly lighter than fresh timber at 50 - 60% moisture content.

10.3 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 of road damage or deterioration as a result of timber haulage, take appropriate preventative action. In addition Local Authorities may request that roads be assessed as well as photographic or video records taken in advance of haulage taking place.



6 axle articulated truck exiting forest harvesting site.

¹⁰ Road Safety Authority, Guidelines on Maximum Weights & Dimensions of Mechanically Propelled Vehicles & Trailers including Manoeuvrability Criteria.

10.4 VEHICLE MAINTENANCE

Vehicles shall be maintained and inspected in line with the manufacturer's instructions and RSA guidelines. Records should be maintained. Both tractor unit/rigid and trailers shall complete the annual road worthiness inspections.

10.5 COMPLIANCE WITH CODE OF PRACTICE FOR TIMBER REMOVALS

The Forest owners, saw mills or buyers shall ensure that all timber collection from the forests and delivery to end users is in compliance with the guidelines set out by Coillte¹¹ or the Irish Timber Growers Association¹². The Department of Agriculture, Food and the Marine has proposed that in partnership with grower representative organisations, Coillte and the forest industry, it will facilitate the development of a standard system for timber measurement and removals. (to be agreed, Draft Forest Policy 2013 Review)

It is recommended that the IFIC / FITG Code of Practice for the Road Haulage of Round Timber be revised and updated.



11. Roles & Responsibilities of Stakeholders

It is the responsibility of all stakeholders to ensure that timber is transported in a sustainable manner and this duty cannot be totally delegated to another party.

11.1 FOREST SERVICE

The Forest Service controls the issuing of felling licences for both the state and privately owned forestry operations. The Forest Service will promote the good practice guide and encourage forest owners to ensure compliance. It will provide Local Authorities with details of felling licences granted and of anticipated felling activity based on the age profile of the existing forest estate

11.2 FOREST OWNERS/SAW MILLS/BUYERS (RESPONSIBILITY FOR PROCUREMENT OF HAULAGE)

The entity which has the responsibility for organising the transport of the timber from the forest to the processing plant may be the forest owner or the organisation which buys the timber standing. The forest owner/buyer has a duty to abide by the proposed agreed routes and in the case of restricted routes to engage with the Local Authority to ensure that they are complying with the restrictions imposed for the extraction of the timber.

They shall engage an experienced reputable haulage contractor who has the appropriate equipment to comply

with any restrictions that may apply. The selection of haulier is a key element in this process and it should be recognised that hauliers who have invested in specialised equipment such as central tyre inflation or wide tyres are more likely to meet the conditions and extract the timber with minimal road damage.

The procurer of haulage shall ensure that there is compliance in relation to:

- Road freight licensing
- Insurance
- Vehicle road worthiness testing
- Vehicle maintenance
- Driver licensing including driver CPC
- Management of drivers

Where special vehicles are required for the transport operation, they shall ensure that the haulage contractor engaged has the appropriate equipment available and is fully aware of the terms and conditions.

It is recommended that, subject to legal compliance and a satisfactory level of service, haulage contractors should be engaged on contracts of reasonable duration (three years plus) to enable these contractors to invest in the appropriate equipment.

Large forest owners such as Coillte should provide contact

¹¹ Coillte - Code of Practice for Timber Removals.

¹² Irish Timber Grower's Association - Timber Sales Dispatch System.

details of relevant managers and personnel dealing with harvesting and transport operations to the Local Authorities.

11.3 HAULAGE CONTRACTORS

Haulage contractors shall

- Provide the appropriate equipment in a well maintained and at a minimum legally compliant condition.
- Provide equipment to suit the specific operation, including such details as on board weighing, central tyre inflation, on board computers including tracking.
- Ensure that drivers are trained and certified (where appropriate) on any specialised equipment used in the operation such as cranes, on board weighing, central tyre inflation as well as forest road operation.
- Ensure that where a crane is fitted, it is inspected annually by a competent person.

Where the haulier is engaging subcontractors, it is the haulier's responsibility to ensure that the subcontractor is legally compliant and is informed and capable of meeting any local conditions with regard to agreed routes.


11.4 SAW MILLS AND PROCESSORS

Mills and processors have a key role to play in ensuring compliance at the receiving end of the road haulage operation. They shall ensure that all vehicles entering their premises are compliant in relation to all aspects of this guide. Some mills operate systems of ensuring compliance with maximum gross vehicle weights by not paying hauliers for additional timber carried in excess of the legal limit.

It is recommended that where any tolerances in excess of legal limits are allowed, they be removed to ensure total compliance. If there are regular breaches, appropriate action should be taken. The mills and processors should also monitor other aspects of the vehicle such as load security and general condition. The image of the industry portrayed by vehicles on the road is very important and this should be monitored where possible.

11.5 LOCAL AUTHORITIES

The Local Authorities shall liaise with the other stakeholders in the development of agreed routes. While land owners have responsibilities for preventing water flowing onto public roads, the Local Authorities should ensure that road side drainage is maintained.



Recently upgraded forest road and entrance prior to harvesting.



12. Traffic Managing & Community Relations

Forestry is an important local industry, creating local employment; however timber transport vehicles travelling through small towns and villages can cause concern and anxiety for locals. Good traffic management is essential to minimise disruption and to prevent damage to local roads which link the forest to the main road network.

12.1 TRAFFIC MANAGEMENT

A well planned approach to traffic management starts with the layout of the forest road and entrance. The design of the forest road should consider the local public road network and local sensitive areas should be avoided. Where possible forest owners should combine to share forest roads and reduce the number of entrances and avoid poor quality public roads. The Department of Agriculture, Food and the Marine is to initiate discussions with Coillte and other forest owners to develop a framework to allow the shared use of forest roads for forest operations¹³. (To be agreed, Draft Forest Policy 2013 Review)

Where there are large volumes of timber to be extracted, advance discussion with the local community should be held to brief them on the operations.

The following points should be considered:

- Avoid critical times, eg. school opening and closing times.
- Be aware of sensitive events, such as funerals.

- Reduced maximum speed limits of 40 to 50 km per hour or lower, as appropriate, may need to be enforced.
- Reduced frequency of vehicle movements either by means of limiting the number of vehicles per day or the maximum tonnage of timber moved per day can allow roads time to recover.
- Convoys of vehicles should be prohibited and a minimum of 15 minutes should be planned between vehicles leaving the forest. This interval may be extended as part of the agreed route conditions.
- Avoid operating at night where possible as this can disrupt neighbours and can also give the impression that night operations are being carried out to avoid enforcement.
- If roads are unsuitable for heavy goods vehicles to pass, then drivers shall communicate with each other to ensure that they do not meet on these roads or one way systems to be operated where possible.
- Loading of vehicles shall not be carried out on a public road. Where reduced loads are taken out, resulting in double handling, it can be carried out in a suitable lay by.
- Install signage where appropriate.

Compliance with these restrictions is vital to get the confidence of all stakeholders. On board truck technology can be developed to retrospectively demonstrate location, speed, weight, tyre pressures and severe braking.

¹³ DAFM Forests, products and people Irelands forest policy – a renewed vision June 2013.

13. Environment

Many forests both public and private are located in environmentally sensitive sites. Timber haulage operations in the forest must be cognisant of the potential impact on the environment and so are subject to strict adherence to the Forest Harvesting and the Environmental Guidelines published by Forest Service.

13.1 PREVENTING SPILLS AND INCIDENTS

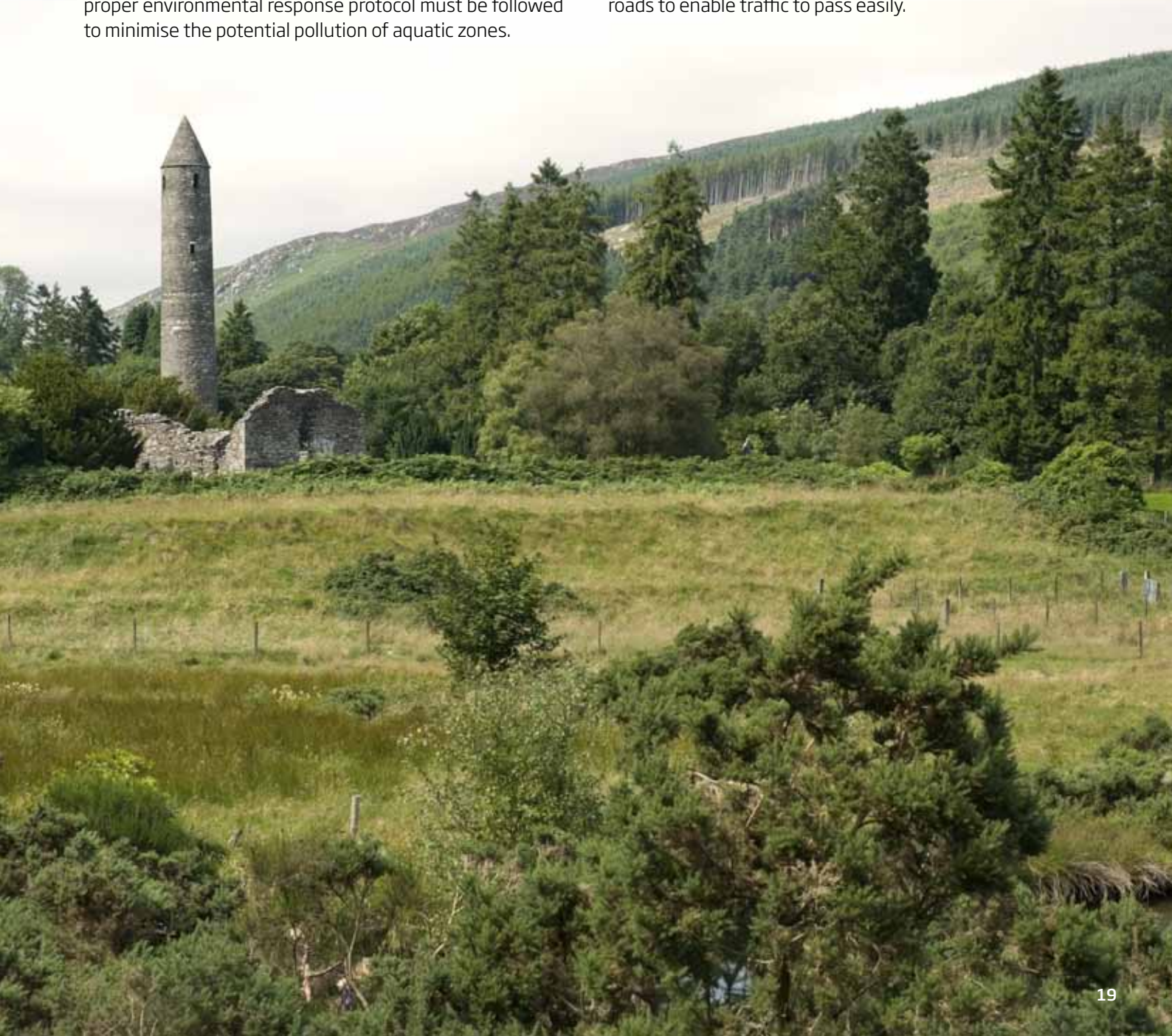
Hauliers should ensure that vehicles are maintained in good condition. Drivers should carry out a daily vehicle check and in particular inspect the vehicle for fuel or oil leaks and where necessary have any repairs carried out before entering the forest. In the event of an oil leak in the forest, in the event of a burst hydraulic hose on a crane, or any oil or fuel spillage, the proper environmental response protocol must be followed to minimise the potential pollution of aquatic zones.

13.2 EFFICIENT TRANSPORT

Overloading shall be avoided at all times to minimise damage to local access roads and optimise fuel consumption. Efficient transport management, which increases backloads and reduces empty running, improves overall fuel efficiency and decreases emissions per tonne carried.

When haulage is being carried out where there are diseased trees, then local phytosanitary conditions and vehicle hygiene including wheel washing where required should be observed.

Drivers should be aware of visitors and tourists in these sites and should facilitate their unhindered movement where possible. They should use any passing points or lay byes on roads to enable traffic to pass easily.



14. Health and Safety and Training

It is the objective of all stakeholders to transport timber at minimal risk of injury to those directly involved and to the public.

14.1 SAFE OPERATION

The haulage contractor is responsible for the health and safety of the vehicle operation. A safety statement and risk assessment in compliance with the 2005 Safety, Health and Welfare at Work Act should be prepared.

Driver Safety

Drivers should comply with site safety rules, which should specify the personal protective equipment (PPE) they must wear. If the driver is working alone in the forest, a lone working procedure should be in place. Drivers should be encouraged to report their position while working off the public road as, if there is an accident while working alone, a swift response may be vital in treating the injured person. Consideration should be given to areas which have poor or no mobile phone coverage.

14.2 DRIVER TRAINING

The driver is at the forefront of the timber transport operations. In addition to having the appropriate driving licence and driver CPC qualification, he/she also needs training and/or certification as appropriate on:

- Crane operation
- Load security
- Forest road driving and potential hazards
- Operation of specialised equipment such as central tyre inflation.

Where necessary, this information should be provided in a language that the driver can understand.

The Purser Tarleton Russell Ltd. Report on Training¹⁴ needs for the industry identified additional areas where driver training is required and these should be addressed.

14.3 LOAD SECURITY

Timber should be loaded longitudinally along the length of the trailer and should be supported by at least two uprights. The uprights should be designed to prevent the load from spreading them apart. The outer ends of the logs should extend by at least 300 mm (12 inches) beyond the uprights. It is preferable that the logs are laid top to tail to ensure an even balance of the load.

The centre logs that crown the load should be at least as high as and preferably higher than the outside logs to enable the load to be properly tensioned by the load straps.

All bays of timber should be secured with at least one strap and the first bay should have two straps where there is no headboard.

The load restraint system must be sufficient to stop the total weight of the load moving forwards under severe braking and enough to withstand a force equivalent to half the weight moving backwards or sideways. Load straps or chains are recommended, rather than ropes. The load and load straps should be rechecked when moving from the forest road to the public road and at intervals during the journey and re-tensioned as necessary. Lashings (chains and straps) should be checked regularly for damage and replaced where necessary.

Vehicle owners and drivers have a duty to other road users to ensure that their safety is not endangered by logs being lost from the vehicle.



Demonstration of timber load properly secured with ratchet and straps.

It is recommended that the additional driver training requirements identified in the Purser Tarleton Russell report should be addressed.

¹⁴ Forestry Training and Education Needs Analysis - Purser Tarleton Russell Ltd. 2011

15. Acknowledgments

This guide has been produced by the Forest Industry Transport Group (FITG) after extensive consultation with its members and other stakeholders. The FITG would like to acknowledge the participation of the following in preparing this guide who are all constituent member of the FITG:

- Department of Agriculture, Food and the Marine (DAFM)
- Department of Transport, Tourism and Sport (DTTAS)
- COFORD
- Forest Service
- Coillte
- School of Biosystems Engineering, (UCD)
- Irish Forestry and Forest Products Association (IFFPA)
- Irish Farmer's Association (IFA)
- Irish Timber Council (ITC)
- Irish Timber Growers Association (ITGA)
- Teagasc Forestry
- Timber Haulage Contractors

Local Authorities in particular Leitrim and South Tipperary who were active on the FITG committee and those counties who made submissions

The FITG wishes to acknowledge grant-aid funding from the Department of Agriculture, Food and the Marine towards the costs associated with the production of the guide, and the administration of the funding by the Irish Forestry and Forest Products Association.

The FITG would also like to acknowledge Mr Michael Joyce (logistics consultant) who compiled the guide and the help of Dr Ger Devlin, UCD and Mr Roland Stiven of the UK Timber Transport Forum.

Useful Contacts

Mr John Lyons, FITG Chairman. john.lyons@coillte.ie
Mr Fionan Russell, FITG Secretary. fionanptr@eircom.net
Mr Michael Joyce, Logistics Consultant. mjjoyce@eircom.net
Dr Ger Devlin, Biosystems Engineering, UCD. ger.devlin@ucd.ie

Edited by Dr Ger Devlin, University College Dublin.

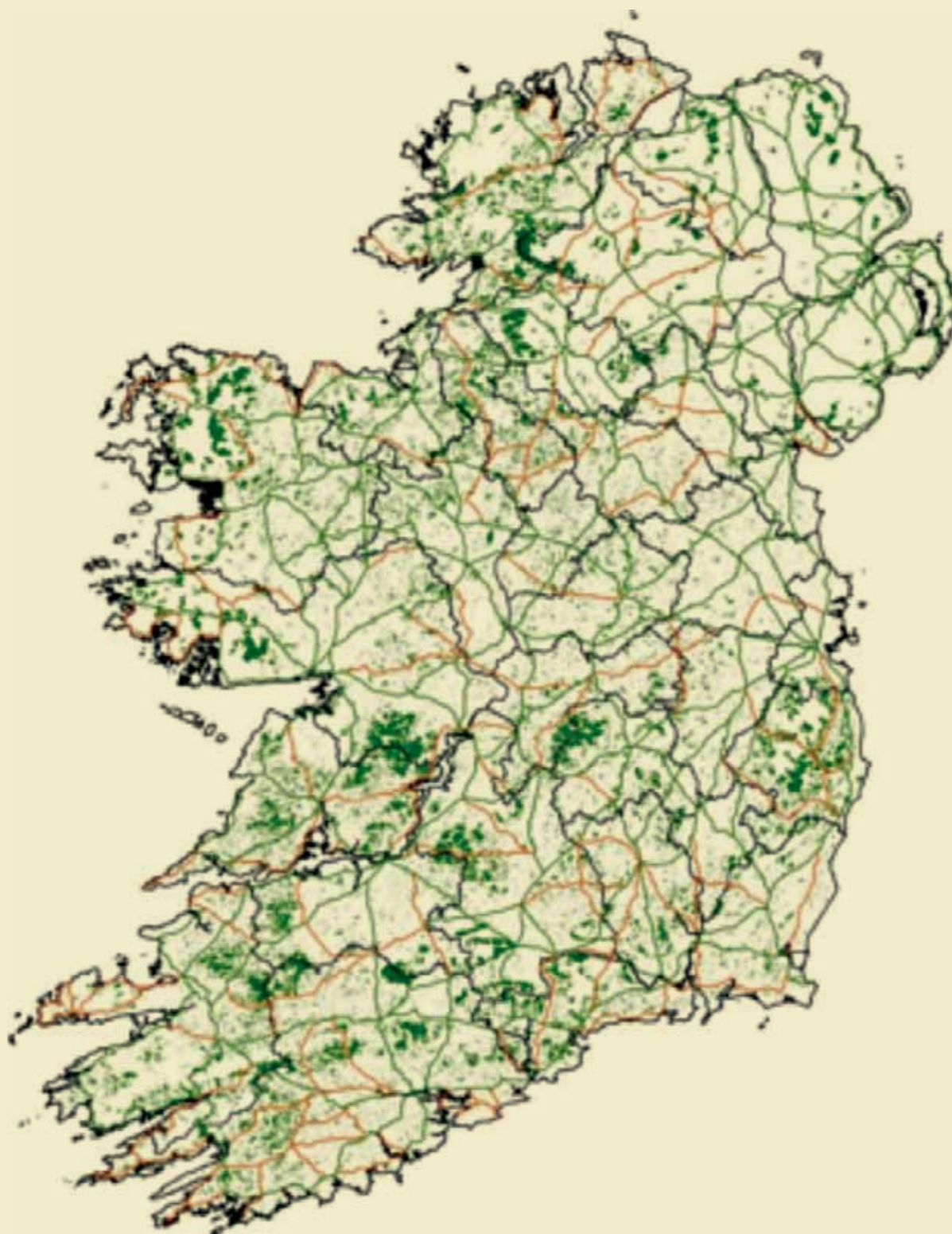



16. Bibliography


1. **COFORD**, All-Ireland Roundwood Production Forecast 2011–2028.
2. **COFORD**, All-Ireland Roundwood Demand Forecast.
3. **Coillte**, Code of Practice for Timber Removals.
4. **DAFM Forests**, products and people Irelands forest policy, a renewed vision June 2013, Draft Report for Public Consultation.
5. **DTTAS**, Road Management in Ireland.
6. **ESB**, Code of Practice for Avoiding Danger from Overhead Electricity Lines, 2009.
7. **Forest Service**, Forest Service, Fergus Moore, presentation to FITG, 2012.
8. **Forest Service**, National Forest Inventory, 2007.
9. **Forest Service**, Forest Harvesting and Environmental Guidelines 2000.
10. **Freight Best Practice**, Innovation in Scottish Timber Haulage.
11. **HSA**, Code of Practice on Managing Safety and Health in Forest Operations.
12. **HSA**, Guide to the Safety, Health and Welfare at Work (General Application) Regulations 2007.
13. **IFFPA**, An overview of the Irish Forestry and Forest Products Sector 2013.
14. **IFIC and FITG**, Road Haulage of Round Timber, Code of Practice.
15. **ITGA**, Timber Sales Dispatch System.
16. **Purser Tarleton Russell Ltd.**, Forestry Training and Education Needs Analysis 2011.
17. **Road Safety Authority**, Guidelines on Maximum Weights and Dimensions of Mechanically Propelled Vehicles and Trailers including Manoeuvrability Criteria.
18. **Road Safety Authority**, Guide to Keeping your Commercial Vehicle Roadworthy.
19. **Road Safety Authority**, Guide to Managing for Road Safety.
20. **Road Safety Authority**, Guide to EU Rules on Drivers Hours Regulation (EC) No 561/2006.
21. **Roadex**, Summary of Drainage Analysis in the Scottish Highlands.
22. **Roadex**, Tyre Pressure Control on Timber Haulage Vehicles.
23. **Timber Transport Forum**, Road Haulage of Round Timber, Code of Practice, 4th Edition, 2012.
24. **Timber Transport Forum**, Managing Timber Transport - Good Practice Guide.
25. **Timber Transport Forum**, The Timber Transport Toolkit, Hauling timber on the Public Highway.
26. **Transport Research Laboratory**, Impacts of Increased Goods Vehicles Weight Limits by W. H. Newton and B. A. Firth (Project Report PR 30).


17. List of Useful Websites

Department of Agriculture, Food and the Marine	www.agriculture.gov.ie
Forest Service	www.agriculture.gov.ie/forests-service
COFORD	www.coford.ie
Coillte	www.coillte.ie
Teagasc	www.teagasc.ie
Department of Transport, Tourism and Sport	www.transport.ie
Irish Forestry and Forest Products Association	www.iffpa.ie
Road Safety Authority	www.rsa.ie
Health and Safety Authority	www.hsa.ie
The Roadex Network	www.roadex.org
Timber Transport Forum	www.timbertransportforum.org.uk



 **Forest Cover** (Forest Service DAFM/NI CORINE
Forest Classes (EEA - eea.europa.eu)

 **Primary Routes**
(source DWA GIS - www.dwa-gis.org/data)

 **Secondary Routes**
(source DWA GIS - www.dwa-gis.org/data)

