PLANNING, TRANSPORTATION & ESTATES

TRAFFIC ENGINEERING MANUAL

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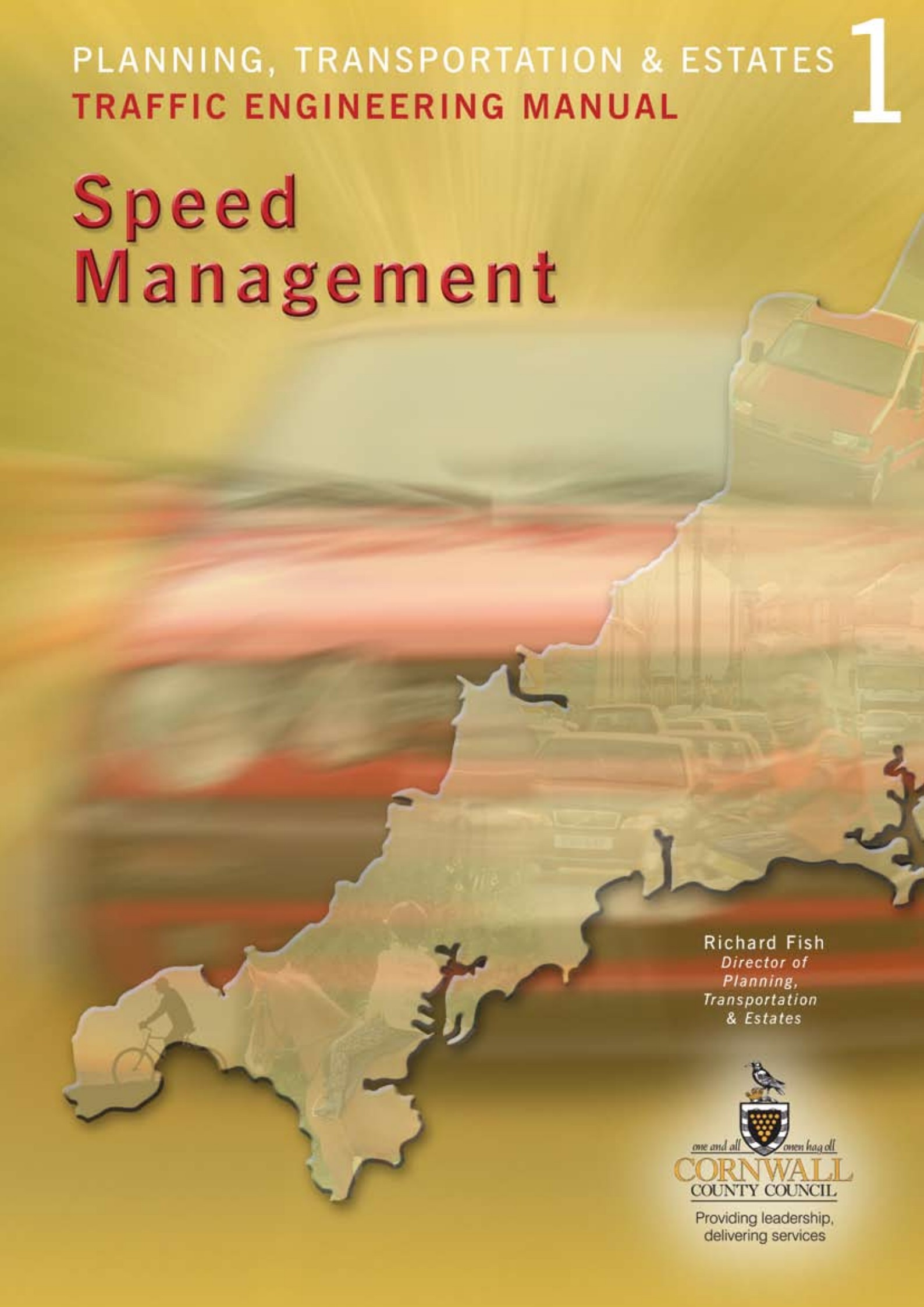
Speed Management



Richard Fish
Director of Planning, Transportation & Estates

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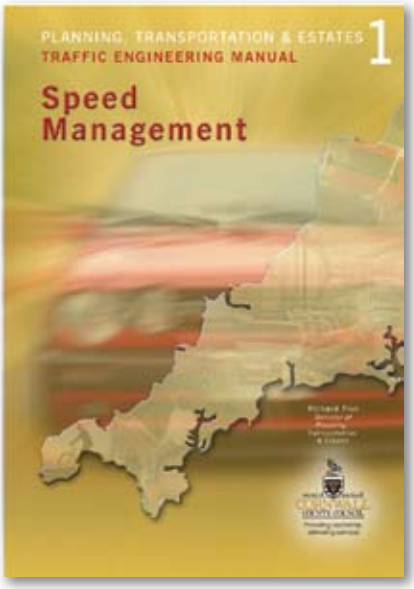

PLANNING, TRANSPORTATION & ESTATES
TRAFFIC ENGINEERING MANUAL

1 Speed Management

Revision 0.1
April 2008

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Preface

The documents contained within this Traffic Engineering Manual have been created within the framework of the Local Transport Plan for Cornwall (LTP2), the overarching policy document developed on a five yearly cycle. They are intended to augment the policies in the LTP2, providing more detail and, in some cases, outlining strategies for implementation.

Within the Manual there are two types of policy document - " Strategic " and " Procedural ". Strategic Policy documents detail the County Council's policy in relation to a specific area of work or an identified problem. The Procedural Policy documents outline the Council's standards for implementing schemes or for the processes involved in delivering them.

The documents already prepared or in production are;-

Strategic Documents

Title		Date Approved
1.	Speed Management	December 2004
2.	Parking	February 2005
3.	Casualty Reduction	April 2005
4.	Lorry Management	
5.	Use of IT in Traffic Management	

Procedural Documents

Title		Date Approved
6.	Pedestrian Crossings	February 2005
7.	Direction Signing	February 2005
8.	Consultation	February 2005
9.	Traffic Engineering and the Emergency Services	
10.	Traffic Engineering and Public Transport	
11.	Traffic Engineering and Schools.	

The Speed Management Strategy helps to support the following aims of the LTP2:

Transport Aim 1
Improve access to key services and facilities.

- Improve access to work, healthcare, education and food shops to meet local needs by providing travel choice and reducing the need to travel, thereby supporting individual well being.

Transport Aim 2
Improve local safety for all who travel in Cornwall.

Support local communities by reducing the severity of road accidents and addressing the fear of crime, particularly for users of public transport, pedestrians and cyclists.

Transport Aim 3

Reduce the growth of traffic congestion and transport related air pollution and improve public transport in Cornwall.

- Manage, maintain and improve the efficiency and effectiveness of the transport network.
- Provide opportunities for travel choice.
- Influence travel behaviour by raising awareness of the impact of transport on the environment and the health benefits of walking and cycling.

Transport Aim 5

Reduce the impact of transport on Cornwall's natural and built environment.

- Conserve and enhance the historic environment by minimising the impacts of transport wherever possible through appropriate maintenance and design practices.
- Conserve Cornwall's local distinctiveness by assisting in the delivery of sustainable tourism.
- Reduce traffic related air and noise pollution.

The Speed Management Strategy is intended to augment the policies in the LTP2, providing more detail and, in some cases, outlining strategies for implementation.

Executive Summary

Speed Kills.

Driving at inappropriate speed (not to be confused with 'speeding'), is the largest single cause of road casualties, and is of great concern to many of Cornwall's residents.

Meaningful casualty reduction requires a change of culture and attitude towards driving too fast. We will achieve this over time. Until this attitudinal change has been brought about we will need to apply enforcement and engineering solutions to the problem of speed to support the road safety education activities.

1. "Going too fast for the circumstances" is the single-most common causation of accidents recorded by the police.

In 2003 in Cornwall there were the following casualties:

- 31 killed.
- 302 serious injuries.
- 2511 slight injuries.

It is widely accepted that if a vehicle hits a pedestrian:

- At 40mph the pedestrian is likely to be killed.
- At 30 mph, there is a 50% chance of survival for the pedestrian.
- At 20mph most pedestrians survive.

It is the aim of Cornwall County Council to encourage drivers to drive at the appropriate speed at all occasions.

2. Cornwall County Council has the following expectations of drivers:

- In the shopping streets of towns
  20mph maximum.
- In residential areas away from major routes
  20mph maximum.
- Near schools
  20mph at school times.
- On arterial routes within towns
  30mph (occasionally 40mph).
- In villages
  30mph (sometimes 20mph, sometimes 40mph).
- On minor roads in the countryside
  30mph or 40mph.
- On primary roads in non residential areas
  60mph.
- Dual carriageway
  70mph.

3. We need to change the driving culture so that it becomes the norm for drivers to meet our expectations outlined above. We will do this through:

- Education, Training and Publicity.
- Setting certain speed limits.
- Enforcement - Cornwall County Council along with other Highway Authorities, the Police and other partners form the Devon and Cornwall Safety Camera Partnership. This is part of the government led "netting off" initiative whereby costs involved in speed enforcement are reimbursed to the partners from the penalties imposed.
- Engineering measures. We have a wide variety of measures we are able to employ to control vehicle speeds but there will still remain sites where effective speed reduction is difficult to achieve without significant congestion.

4. We will measure the effectiveness of the strategy through accident analysis and speed readings at sample sites.

5. The Speed Management Strategy will help to make our roads safer and improve the local environment for vulnerable road users, the residents of Cornwall and its visitors.

Contents

1.0 Introduction

Speed management is the means of encouraging drivers to use appropriate speeds on all occasions.

The road network is and will continue to be, the most important communications network in Cornwall. The County Council is committed to providing an efficient system with reasonable, predictable journey times which is essential for economic growth and regeneration.

A safe road network will incorporate high-speed roads. Speed reduction is not a universal objective to be pursued relentlessly, but inappropriate speeds are a major contributor to road crashes and the unacceptable level of casualties on Cornish roads.

Complaints over speed form a large part of the letters and calls to the County Council indicating that speed adversely affects the quality of life for many people who are concerned for the safety of themselves and family members. Speeding however, is one illegal activity that most adults have committed and continue to commit on a regular basis.

How then do we address this conflict of the concern of the general public expressed by residents and pedestrians and the apparent apathy of those very same people when behind a steering wheel?

This document explains Cornwall County Council's policies.

- It is intended as a reference manual for elected members, community groups and outside bodies.
- It groups together our policies and explains our expectations of drivers on Cornwall's roads.
- It explains what we will do to turn those expectations into reality.
- It explains under what conditions each of the tools will be used and what effects they are intended to have.

Cornwall County Council can only carry out measures on non-trunk roads. Trunk roads (the A30 between Devon and Penzance and the A38) are the responsibility of the Highways Agency which is controlled by Central Government.

2.0 The Problem

Why do we need a speed management strategy? Inappropriate speed causes major problems. The facts and statistics below show what impact speed has on our lives.

In 2003 there were in Cornwall:

31 people killed.

302 people seriously injured.

2511 people with other injuries.

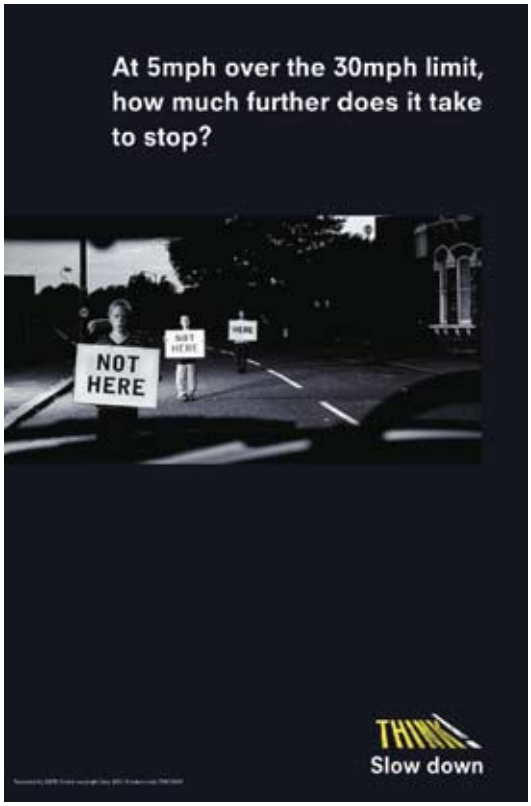
2844 total casualties.

Based on Department for Transport figures this is a cost to the Community of £108.4 million (2002 prices).

The Police report the principal causation of every accident reported to them and "going too fast for the circumstances" was the most common single factor (reference 1).

It is widely accepted that if a vehicle hits a pedestrian:

- At 40mph the pedestrian is likely to be killed.
- At 30 mph, there is a 50% chance of survival for the pedestrian.
- At 20mph most pedestrians survive.



It has been estimated that for each 1mph average speeds can be reduced on a typical urban road a 5% casualty saving arises (reference 2).

The effects of speeding traffic are not just measured in crashes.

Other factors that have to be taken into account are that speeding traffic intimidates pedestrians, cyclists and residents, and gives rise to excessive noise, itself stressful to those living near roads. Pedestrians and cyclists feel that the roads are too dangerous to use. Parents are especially unwilling to allow their children to walk or cycle to school as there is a perception that roads are too dangerous due to speeding traffic. This, in turn brings the consequence of more cars being used on the road network causing the roads to be more congested.

The fear of speeding traffic reduces the quality of life for many people. It adds to social exclusion, encourages sedentary life styles and causes noise and pollution.

3.0 Expectations

Cornwall County Council has expectations of the maximum speeds of drivers in good driving conditions on various types of road based on those outlined in the Local Transport Plan 2001-2006 (reference 3):

In poor conditions or restricted visibility, lower speeds are expected.

Our expectations are set, not from the viewpoint of the driver, but from the view of other road users likely to be present on the roads. Drivers may feel competent to control their vehicle at higher speeds but if they do drive at higher speeds, they are causing unnecessary and unacceptable risks to other road users whose presence may not be immediately apparent.

Driving through a village or a housing estate, for example, may appear to a driver to be easy at relatively high speeds, but the unpredictable actions of a child can not be allowed for unless a reasonable and appropriate speed has been adopted.

Our expectations are:-

In the shopping streets of towns
20mph maximum.

In residential areas away from major routes
20mph maximum.

Near schools
20mph at school times.

On arterial routes within towns
30mph (occasionally 40mph).

In villages
30mph (sometimes 20mph, sometimes 40mph).

On minor roads in the countryside
30mph or 40mph.

On primary roads in non residential areas
60mph.

Dual carriageway
70mph.

This is consistent with the recommendations of the Government's review of national policy which took place in 2000 (reference 4). The main recommendations were:

- Retain the 70mph limit on motorways and dual carriageways.
- Not lowering the 30mph limit in urban areas but allowing local authorities to use the measures they already have at their disposal to treat problem areas. Continued development of measures for roads which are not suitable for traditional traffic calming.
- 30mph should be the norm for villages. More research is required into issues such as what changes to speeds in rural areas offer the most benefit, and reducing the urbanising effect of signing in rural areas.

4.0 How are we going to achieve our expectations?

4.1 Culture Change

In many countries speed is not an issue. Drivers' natural behaviour is to respect the needs of other road users and to drive at appropriate and reasonable speeds. In short, drivers conform to our expectations.

The ultimate victory in the war against inappropriate speed is will be won by changing driving culture to conform with what is already the norm in many parts of northern Europe and America.

However distant this victory may look, we must recall the campaigns of the past to change culture on matters such as seat belt wearing and drink/driving. Cultural change is possible and will be achieved.

All of our activities are designed to promote a cultural change.

The Education Training and Publicity activities set out in 4.2 obviously contribute significantly but even physical measures such as road humps and regulatory measures such as speed limits, with accompanying enforcement, are designed to remind drivers constantly of their obligations and of our expectations of speed. Humps, bumps and cameras will cease to be necessary when cultural change has been achieved.

4.2 Education, Training and Publicity

The County Council is committed to a long term programme aimed at achieving a cultural change to speed through education, training and publicity. We have a number of ongoing initiatives. These are designed to complement national programmes.

This will be delivered through such initiatives as:

Operation Slowdown

A joint initiative run annually between the County Council and Devon and Cornwall Constabulary, Operation Slowdown encourages drivers to slow down in built up areas. Speeding motorists are offered the choice of an automatic penalty fine plus penalty points or immediately attending a Road Safety educational presentation on the consequences of speeding. Media coverage is received from regional TV, local radio stations and the local press.

Young Driver Education Programme

339 car drivers in the age group 17 to 24 years were injured on Cornwall's roads during 2002. Speed and lack of experience accounted for many of the casualties involving this group. The objective of the Young Driver Education Project is to increase their awareness of the risks they and their friends face, and to develop responsible road user attitudes.

The aim of the programme is to inform, influence and educate the next generation of young drivers allowing them to make informed decisions about driving safely.

The Young Driver Education Programme is a one day series of classroom workshops designed to appeal to the next generation of drivers. The workshops are activity based using a mixture of videos, worksheets, problem solving exercises, role play, practical demonstrations and discussions and will focus on knowledge, attitudes and risk perception.

To tackle this very high risk group, the County Council is continuing to promote driving awareness training courses specifically aimed at younger drivers. The County Council promotes this training by contacting sixth form colleges and higher and further education establishments throughout Cornwall, ensuring a road safety input into professional, vocational, internal and external courses for pre-licence and inexperienced drivers.

Material for secondary school, and college based training and education programmes aims to convince young people that driving dangerously is unacceptable and focuses on the major causes of unsafe driving. The materials and techniques developed by the County Council aim to address young people's behaviour, both as drivers and passengers.

Driver Improvement

Accidents involving vehicles being driven for work purposes are a serious safety issue throughout the UK, with 3,500 drivers killed on our roads and 40,000 seriously injured every year. Research commissioned by the Health & Safety Executive and others concluded that between 25% and 33% of the fatal and serious road traffic accidents involved someone who was at work.

More and more employees now recognise that they should play a greater role in managing road traffic risks. This can be facilitated by treating the risk to workers from

driving as part of their routine workplace health and safety assessments.

With this in mind Cornwall County Council Road Safety Unit provide Driver Improvement Courses which cover driver responsibilities, causes of accidents, stress and fatigue, observation, hazard perception and a two hour practical session in the driver's own vehicle.

Minibus Driver Improvement Course

The aims of the Minibus Driver Improvement Course are to provide information and strategies to help participants cope with the responsibility of driving a passenger-carrying vehicle, and to identify areas of minibus driving which may require improvement.

The two-part course starts with a two-hour theory session. The purpose of this session is to allow the participants to share their experiences of driving and to relate them to the task of driving a minibus. This session is designed to be friendly and informative, whilst equipping the driver with the required knowledge to allow them to progress to the individual training. During this first session the instructors will use the opportunity to make the participants aware of the legislation related to the driving of minibuses and will develop the participants' understanding of defensive driving techniques.

The second part is based upon individual on-road training during which drivers are assessed based upon the theory session and modern defensive driving techniques.

Bikesafe

In the three years 2000-2002 in Cornwall motorcyclists made up less than 1% of road traffic, but suffer 19% of deaths and serious injuries. Bikesafe is an initiative being run by police forces throughout the UK. Devon and Cornwall Constabulary is working with the County Councils of both Devon and Cornwall to lower the number of motorcycle casualties and encourage further training. Each event consists of half-day sessions where police motorcyclists are available to follow people on an observed ride and offer friendly advice.

Rider Training Scheme

Mopeds and motorcycles can present environmental advantages on some journeys. They are a sensible means of transport for many journeys where public transport is limited and walking or cycling unrealistic.

Compulsory Basic Training

The course teaches basic motorcycling skills and includes:- importance of having the right equipment and clothing; familiarisation with at motorcycle and its controls; emergency stop and rear observation; riding defensively and correct road positioning; how to ride safely in a variety of traffic conditions.

Back to Biking

This course is provided in 2 hourly training sessions. It is for those who are coming back to motorcycling after time off the road and feel the need for advice and practical tuition to refresh their riding skills. There is no set syllabus for the course as each session is tailored to the needs of the individual student.

4.3 Speed Limits

Cornwall County Council has expectations of drivers' speeds in various circumstances as explained in section 3, above.

It should not be necessary to impose and sign speed limits in accordance with our expectations on every road in Cornwall. Drivers must take responsibility for their own actions and drive at appropriate speeds for the prevailing conditions even if the actual legal limit is higher.

In a County such as Cornwall, signing speed limits in rural areas can be visually intrusive, expensive and often brings about little measurable speed reduction.

Speed limits will continue to be set at levels consistent with our expectations throughout the County. However:-

- 20mph limits will only be imposed on a 24 hour basis where physical traffic calming or the natural alignment of the road provides physical control of speeds.
- 20mph limits will be imposed near all our schools. Priority will be given to primary schools in implementing this long term programme of work. Maximum safety is achieved by a self enforcing speed limit using physical methods. Where this is not possible, perhaps due to the capacity requirements of the road, a variable limit will be considered.
- 20mph limits will continue to be progressed in residential areas as needs are identified.
- 30mph limits will be applied in all significant sized villages (see below) with exceptions where the road is both of high quality and status. Where this would result in an unacceptably high level of contravention, the speed limit will need to be implemented alongside physical restrictions to reduce the speed of traffic. Works may need to be phased in over a significant time span.
- 30mph or 40mph zones in countryside areas have been implemented in some parts of Cornwall. There is a difficult balance to strike between speed management and the visual environment in deciding whether such orders should be progressed. The County Council will look for clear demonstrations of community support before such proposals are progressed.
- 50mph limits will be implemented on unimproved A or B class roads where it is considered to be a solution to an accident potential. A 50mph limit will only be implemented if there is local support. They will only be implemented if it can be shown that they will be effective on lower quality A and B roads without the need for physical measures.

A "significant sized village" is considered to be any settlement meeting any one of the following criteria:

- Over 400m of continuous development (one side of the road).
- Containing a primary or secondary school.
- Between 200m and 400m of continuous development with both a shop/post office and another community facility (eg church, health centre, pub, tourist attraction).
- Between 200m and 400m of continuous development with either a shop/post office or another community facility and no footways.

It is recognised that the department for transport are preparing Speed Limit Guidelines and that, where appropriate, this strategy may need to be adapted to suit national guidance.

4.4 Enforcement

Enforcement of speed limits is ultimately the responsibility of Devon & Cornwall Constabulary not Cornwall County Council, and the County Council recognises the authority of the Chief Constable in this regard.

However, both Police and Highway Authorities work in close co-operation and share mutual objectives and policies.

Enforcement is designed to increase compliance with speed restrictions and thereby increase safety. It therefore follows that for enforcement to have maximum effect in reducing casualties, it must be targeted at locations with the highest speed related casualty history.

Much speed enforcement nowadays is conducted by Safety Cameras.

Cornwall County Council, along with other Highway Authorities, the Police and other partners, form the Devon and Cornwall Safety Camera Partnership. This is part of the government led "netting off" initiative whereby costs involved in speed enforcement are reimbursed to the partners from the ticket revenue.

Safety cameras, both speed enforcement and traffic signal red light cameras exist only to reduce casualties. Their purpose is to slow drivers down and reduce accidents. Speed reduction is their primary aim and we would be very pleased if no camera was ever passed by a speeding motorist. Static cameras are painted bright yellow to highlight their presence and Cornwall has gone further than other authorities by painting the posts they are mounted on to increase their conspicuousness.

The Partnership does not and cannot make a profit from safety cameras as it is only the costs incurred which are reimbursed.

New static cameras can only be located in accordance with Government requirements at locations where at least 4 killed or seriously injured (KSI) accidents per kilometre have occurred in 3 years or at least 8 personal injury (PI) accidents per kilometre in 3 years and 20% of drivers exceed the speed limit.

Mobile enforcement will be conducted primarily at sites with at least 2 KSI per kilometre in 3 years or 4 PI accidents per kilometre in 3 years and at least 20% of drivers exceeding the limit.

A limited amount of mobile camera enforcement is conducted at other sites particularly where a short term risk is present due to such things as road works.

In 2003 there were 22 cameras in Cornwall, including 9 on Trunk Roads (although these pre-date the 'netting off' agreement).

The County Council will continue to support the Police in prioritising sites in accordance with proven accident histories in order to obtain maximum casualty reduction.

If you require more information, go to the Devon and Cornwall Safety Camera Partnership website - www.dcsafetycamera.org.

4.5 Engineering Measures

There are a considerable range of engineering measures available to control vehicle speeds. These range from signs to large physical constructions.

The various techniques should only be used in appropriate speed ranges. Some measures will be suitable for controlling speeds only in a particular range and will be dangerous if located on a road where higher speed exists or ineffective in reducing speeds if speeds are already below the range.

The most effective engineering measures such as road humps are not designed to slow vehicles down. Their function is to ensure that drivers who have slowed down for some other road feature do not then increase their speeds immediately.

It is much more difficult in engineering terms to design features to reduce the speed of high speed vehicles and indeed in many cases there will be no physical measure able to meet public expectations of speed reduction and still maintain acceptable degrees of safety and highway capacity.

In the following pages the pros, cons and use of various measures are discussed.

Road Humps (sleeping policemen)

Road humps are vertical features which are extremely effective at keeping vehicle speeds low. At low speeds, vehicles can cross these humps without causing undue discomfort to passengers or damage to the vehicle, but as speeds increase, they become progressively more uncomfortable.

Road humps are used to stop people speeding up rather than slow them down. They need to be accompanied by slowing features at each end of a run of humps. Effectiveness decreases as spacing increases, 150m maximum.

What speed range?

Existing mean speed 23-40mph.

Pros:

Very effective.
Residents and vulnerable road users benefit from slower speeds.
Discourages traffic from 'rat-running'.

Cons:

Can increase vehicle noise and emissions, careful design is need to ensure that these do not increase. Smooth driving is the key (reference 5).
Emergency service vehicles speeds will also be slowed which could add to response times. Can cause some discomfort for cyclists.
Can cause discomfort for vehicle users with existing medical conditions.
May cause back problems in professional drivers who have to travel over a large number of humps repeatedly.
Can cause problems for public transport users.

Where will we use them?

Subject to being able to implement appropriate slowing features beforehand in:
Residential areas away from major routes.
Shopping areas.
Near schools.

Where won't we use them?

On primary roads.
On roads with limits over 30mph.
On arterial roads within towns.
On bus routes.
Unlit areas with speed limits over 20mph.
On minor roads in the countryside.
Locations where an adequate speed reducing feature is not possible in both directions.

Speed Cushions

Speed cushions are raised rectangular areas. There are three main combinations:

- Single cushion sometimes combined with carriageway narrowings (allowing only single lane working).
- Cushions in pairs.
- Cushions three abreast, allowing for parking to take place, but still allow easier passage for larger vehicles over the middle cushion.

Like humps they are most suitable for built up areas and are designed to keep speeds low, therefore they need slowing features before the first set of humps in each direction. They are not as effective as humps but do give emergency vehicles and buses a smoother ride.

What speed range?

Existing mean speed 23-40mph.

Pros:

Quite effective.
Residents and vulnerable road users benefit from slower speeds.
Discourages traffic from 'rat-running'.
More comfortable for users of larger vehicles, like buses, than speed humps.

Cons:

Larger vehicles such as buses and also motor cycles are likely to be slowed down to a lesser extent than cars. Careful design is needed to ensure that vehicle noise and emissions do not increase. Smooth driving is the key (reference 5).

Where will we use them?

On bus routes in the following areas.
In residential areas away from major routes.
In shopping streets.

Where won't we use them?

On primary roads.
On roads with limits over 30mph.
On arterial roads within towns.
Unlit areas with speed limits over 20mph.
On minor roads in the countryside.
Locations where an adequate speed reducing feature is not possible in both directions.

Speed Tables

These are raised vertical features similar to road humps but they are longer and with a flattened top. They are sometimes used to give pedestrians a level crossing between footways and are also used at junctions which are called raised junctions. Like humps they are most suitable for built up areas and are designed to keep speeds low, therefore need slowing features.

What speed range?

Existing mean speed 23-40mph.

Pros:

Effective.
If they are long enough, they can provide a smoother ride for some buses and large vehicles (reference 6) than humps as they can enable the entire vehicle to mount the top of the speed table before starting to exit the table.
They can be used to provide crossing locations for pedestrians.

Cons:

Expensive.
Similar disadvantage to road humps but to a lesser degree.

Where will we use them?

Where there is substantial pedestrian movement or at junctions where road humps cannot be accommodated in the following areas:
Residential areas.
In the shopping streets of major towns.
Near schools.

Where won't we use them?

Where humps or cushions would serve the same purpose.
On primary roads.
On roads with limits over 30mph.
On arterial roads within towns.
Unlit areas with speed limits over 20mph.
On minor roads in the countryside.
Locations where an adequate speed reducing feature is not possible in both directions.

Dragons' Teeth

Dragons' teeth are often used at a village entry points. They provide a visual change and narrowing effect of the road by the use of white lining which alerts drivers to a change in conditions ahead.

What speed range?

Where the speed limit changes, often from national speed limit to 30 or 40mph.

Pros:

Relatively cheap to install.

Cons:

Visual intrusion.
Speed reduction can be extremely localised.
Generate unwelcome noise.

Where will we use them?

As part of village gateway treatments.

Where won't we use them?

In shopping streets.
In residential areas.
On arterial routes within major towns.
Near residential properties.

Rumble Strips

Rumble devices come in a variety of different forms, which can be described as rumble strips, jiggle bars, and rumble areas. They produce a vibratory and audible effect when driven over. They are used to alert drivers when there is a reduction in the speed limit or a hazard such as a junction or bend.

What speed range?

Any but less effective at high speeds.

Pros:

Relatively cheap to install.

Cons:

The very essence of a rumble strip is that it creates noise - careful positioning is required with relation to property.
Evidence so far indicates that any speed reduction obtained will tend to be minimal, and will be eroded with the passage of time. It is also thought that in some locations drivers may have learned to accelerate over the devices to lessen the vibratory effect.
Can cause motorcyclists to lose control on bends.

Where will we use them?

Straight sections of:
On minor roads in the country.
On primary roads in non-residential areas.

Where won't we use them?

Near residential properties.
In shopping streets in major towns.
In residential areas away from major routes.
On arterial routes within towns.

Road Width Restrictions - priority working

Buildouts are used to reduce speed by narrowing the road to a single lane width forcing traffic to give way.

What speed range?

If used in a series under 40mph existing mean speed. Can also be used at changes in speed limit.

Pros:

Reduces speed.
Can provide safer crossing points for pedestrians.
Can provide sheltered parking for vehicles.
Can be used as part of gateway features.

Cons:

Need opposing traffic to keep speeds low, however if the traffic is too heavy they can cause congestion (reference 7).
Can cause problems for cyclists.
Visual intrusion.
Can cause problems for HGVs and emergency services.

Where will we use them?

Traffic flows under 3000 vehicles per day:
In residential areas.
In shopping streets of major towns.
In villages.
On arterial routes within towns.
On minor roads in the countryside.

Where won't we use them?

Where there are high traffic flows (as guideline over 3000 vehicles per day) unless specific conditions exist.

Road Width Restrictions - Buildouts

Buildouts are used as deflections forcing drivers to change direction and therefore slow down. When there are two staggered on opposite sides of the road, they are known as chicanes.

What speed range?

Under 40mph existing mean speed.

Pros:

Reduces speed.
Can provide safer crossing points.
Can provide sheltered parking for vehicles.
Can allow two way working, be used in one way streets, or be used in combination with a single lane narrowing.

Cons:

Chicanes need to have a relatively short stagger length to be effective. Therefore they are not appropriate where there is a high proportion of large vehicles.
Can cause problems for cyclists.
Can cause problems for HGVs and emergency services.

Where will we use them?

In residential areas.
In shopping streets of major towns.
In villages.
On arterial routes within towns.
On minor roads in the countryside.

Where won't we use them?

On primary roads in non residential areas.

Gateways/Entry Points

Gateways are identified by road markings, build outs, coloured surfacing and/or signs. Features such as planting or hard landscaping can also be included. The intention is to convey to drivers that the road environment changes at this point and that a lower speed is now appropriate.

What speed range?

Where there is a change in speed eg national speed limit to 30 or 40mph, or 30mph to 20mph.

Pros:

Speed reduction.

Cons:

Speed reduction varies with the severity of the measure.
Visual intrusion.

Where will we use them?

At points where the road environment changes in the following areas:
On minor roads in the country.
On primary roads.
In residential areas.
Near schools.

Where won't we use them?

At locations where there is no significant change to the road environment.

Roundabouts

There are various types of roundabout: normal, mini and double and other forms which are variants of these basic types i.e. ring junctions, grade separated and signalised roundabouts. There needs to be a reasonably large flow on all arms for them to be an effective speed reducing measure. They can be expensive and the approaches to the roundabout need to be designed carefully if they are to slow traffic. Mini-roundabouts take up less space but should normally be in street lit areas.

They can be used as an initial slowing feature preceding a series of vertical features.

What speed range?

Mini roundabouts should only be used when all approaches are subject to a 30mph speed limit or less. Other roundabouts can be implemented in any speed limit.

Pros:

Reduce speed.
Can improve flow.
Can improve safety.

Cons:

Can be expensive schemes to design and construct.
Can cause problems for cyclists and pedestrians.
Require substantial land for good design as speed reduction should be achieved by roundabout approaches not just by the central island.

Where will we use them?

Roundabouts can be used at any suitable junction in any area but mini roundabouts should be in a 30mph limit.

Where won't we use them?

Where there is not a junction with another public road.
Where the junction does not have reasonable side road flows.
Where pedestrian or pedal cycle needs preclude their use or suggest alternatives.
Mini roundabouts should not be used at four arm junctions.
Where there is insufficient space which would mean that drivers could not reasonably drive around a mini roundabout.

Speed limit signs

Signs have to be erected where there is a change in speed limit. Repeaters cannot be used where the speed is 30mph and there is a system of street lighting. If the national speed limit applies and the road changes between dual and single carriageway the speed limit change does not have to be signed.

What speed range?

Signing is used on all types of road with any speed limit.

Pros:

Relatively cheap.
Speed limits are displayed in a clear and unequivocal manner.

Cons:

Sometimes signs alone do not have the desired speed reduction effect.

Where will we use them?

Where a speed limit is justified in built up areas.
Where public support exists for a limit on minor rural roads.

Where won't we use them?

On minor rural roads unless public support is demonstrated.
On high quality primary routes designed for traffic at the national speed limit.

Interactive Signs - temporary

Interactive signs detect the speed of oncoming traffic using a radar device. If a set threshold is exceeded a sign indicating a specific hazard or speed limit is triggered.

What speed range?

Can be used at any speed.

Pros:

Interactive signs are effective. (reference 8)

Cons:

Short term benefit only.
Subject to vandalism.

Where will we use them?

On A or B roads or other roads with similar traffic levels to most 'B' roads (Annual Average Daily Traffic of over 3000).
Only in 30 or 40mph speed limits.
Outside schools.

Where won't we use them?

Where average measured speeds are below 25mph or below.
Low traffic volume roads.

Interactive Signs - permanent

Interactive signs detect the speed of oncoming traffic using a radar device. If a set threshold is exceeded a sign indicating a specific hazard or speed limit is triggered.

What speed range?

Can be used at any speed.

Pros:

Interactive signs are effective. (reference 8)

Cons:

Expensive.

Where will we use them?

At locations with significant accident history which is believed to be speed related and other measures are not appropriate.
At locations where temporary signs have had the greatest speed reduction effect.

Where won't we use them?

Where temporary signs have not or cannot be trialled.
Where a safety camera is justified by the accident record.

Lane Width Restrictions

Narrowing lanes, using traffic islands and/or road markings can give the impression of a more confined road and result in reduced speeds.

What speed range?

Any.

Pros:

Can be relatively cheap (if road markings only).
Refuges give an additional benefit to pedestrians.

Cons:

Effect can be minimal.
Can cause problems for cyclists.
Can cause problems for HGVs and emergency services.

Where will we use them?

All areas where there is adequate road width.

Where won't we use them?

Areas with inadequate road width.

Home Zones

Home Zones are residential streets in which the road space is shared between drivers of motor vehicles and other road users, accommodating the wider needs of residents including people who walk and cycle, the elderly and children. They are about promoting quality of life and neighbourliness.

Although the introduction of a Home Zone can contribute to highway safety, the main benefit is a change in the perceptions of how the street environment can be used. Introducing a Home Zone allows greater scope for a wider range of activities in street space that was formerly considered to be for exclusive use by vehicles.

What speed range?

Existing mean speed of up to 35mph.

Pros:

Greater benefit for pedestrians.
Safer environment for children to play in.
Speeds reduced.
Greater use by people of the street space leads to an increase in natural surveillance, which in turn acts as a deterrent to crime.

Cons:

Very expensive to retrofit.

Where will we use them?

Home Zone principles will be encouraged in new residential areas.
Retrofit is dependant on external financial contributions.

Where won't we use them?

Anywhere other than residential areas.
In existing residential areas without external financial contributions.

Quiet Lanes

"Quiet Lanes" are minor rural roads which have been treated appropriately to enable shared use by cyclists, walkers, horse riders and motorised users.

Design features could include road signs showing drivers that they are entering a Quiet Lane, redesigned road junctions to reduce speeds and signing to redirect through traffic onto the most appropriate route away from the network.

Some routes used by through traffic may be closed to all vehicles at suitable points to discourage "rat runs".
Some routes will be re-engineered to prevent two vehicles passing at speed.

What speed range?

Existing mean speed 40mph or below.

Pros:

Safer environment for cycling, walking and horse riders.
Slower speeds from motorists.
Discourages the use of the roads for "rat running".

Cons:

Can be expensive.
Can be difficult to achieve without substantial works which could alter the nature of the lanes.
Need a suitable network of lanes as a basis.
Residents must accept that limitations on their own movements are inevitable.

Where will we use them?

Rural lanes subject to considerable through traffic.

Where won't we use them?

Built up areas.
On trunk and principal roads.

Other Measures

The list below is of measures which have traffic management benefits but do not necessarily have speed reducing benefits when used alone, the list is not definitive:

- Pedestrian crossings
- One way roads
- Severed roads
- Parking restrictions
- Pedestrianisation

5.0 Measuring Success

The Speed Management Strategy is intended to reduce road casualties.

Inappropriate speed is a principal factor in many accidents and the strategy is intended to reduce speed related accidents.

It is notoriously difficult to define a speed related accident since all accidents involve speed to some degree. Whilst one instinctively knows when speed becomes inappropriate, accident records often fail to recognise inappropriate speeds inside the legal limit.

This strategy, therefore, should be monitored by reference to the changes in total road casualty numbers and particularly by reference to the severity of road accidents, speed being a more common factor in more severe accidents.

Indicators

- Change of severity index = $\frac{\text{Killed or Serious Injury casualties}}{\text{All casualties}}$

- Change in casualty numbers

Incidental interventions are difficult to measure in terms of accident numbers since the relatively low number of accidents at any individual site may mean that many years of data are required before statistically significant results can be obtained. Therefore, monitoring of interventions must be on measured speeds at the site or a representative selection of sites throughout the programme. It is the number of and extent by which drivers exceed the desired speeds that are particularly relevant.

- Change in measured speed
  - numbers over desired speed
  - degree by which speed is exceeded.

The long term objective is to reduce speed by cultural change and this could be measured by changes in attitude and awareness.

It is not proposed to do this as it is considered that changes will take place over too long a period to make short term, relatively small sample surveys in Cornwall meaningful.

It is recognised that this strategy will enable other benefits to be realised:

Increases in walking.
Increases in cycling.
Increases in journeys made by public transport.

These are important but are far outweighed by the headline target and are therefore not proposed for specific monitoring for this strategy. Monitoring will take place as part of other LTP indicators.

6.0 Conclusions

Inappropriate speed is unacceptable and is a major contributing factor in deaths and injuries on Cornish roads.

The strategy detailed in this report is expected, over time, to have a major influence on the driving culture of people using our roads.

Through education, engineering and enforcement, along with other means at our disposal, we can ensure that at any given location, drivers are better able to recognise the appropriate speed for the conditions/environment or standard of road.

In achieving this aim, we will be ensuring that our roads are safer, vulnerable road users feel safer and local environments are improved whilst maintaining capacity and curbing congestion on suitable routes.

7.0 Further Information

Queries on individual sites should be directed to the appropriate Divisional Surveyor.

Queries on policy issues should be addressed to Peter Moore, Chief Engineer (Transportation) - NCH, Truro.

Telephone enquires to 01872 222000.

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