Protecting pedestrian rights

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THE CASE FOR 30 KM/H ZONES AND MORE WALKABLE COMMUNITIES

There is very strong evidence that reducing overall speed increases safety, and that 30 km/h is inherently safer than 50 km/h. City centre and residential zones with a 30 km/h speed limit or lower are successfully operating around Europe. Increasing implementation of such low-speed zones is recommended by reputable government bodies and independent transport research agencies, based on evidence and not on ideology. There is also empirical evidence that slower speeds can ease congestion and that increasing pedestrian access to city centres can have significant economic benefits. In addition, there are strong ethical arguments in favour of controlling traffic in order to improve mobility and access for pedestrians, cyclists and users of public transport, especially vulnerable groups such as children, older people and disabled persons.

The scientific evidence that a 30 km/h (20 mph) limit is safer. The scientific evidence for increased safety at lower speeds goes all the way back to the physical laws of motion discovered in the late 17th and early 18th Centuries, most notably by Isaac Newton. Of particular importance in the present context is the law which states that the energy of a moving object is proportional to the square of its velocity. The relevant formula is $E = ½ mv^2$, (E equals half mv squared) where *E* is the kinetic energy of an object, *m* its mass and *v* its velocity. Note that the kinetic energy increases with the square of the speed. This means, for example, that an object travelling twice as fast will have four times as much kinetic energy. This determines the stopping distance of a vehicle and the amount of energy released when an impact occurs.

Rune Elvik and colleagues at the highly-regarded Norwegian Institute of Transport Economics stressed the crucial importance of this fundamental fact in a major review of the relationship between speed and road safety published in 2004. Concluding that there is a strong causal relationship between speed and road safety, the authors emphasise that "it is difficult to think of any other risk factor that has a more powerful impact on accidents or injuries than speed." They quote from a 1998 review of speed limit setting and enforcement by the US Transportation Research Board:

> *Drivers' speed choices impose risks that affect both the probability and severity of crashes. Speed is directly related to injury severity in a crash. The probability of severe injury increases sharply with the impact speed of a vehicle in a collision, reflecting the laws of physics. The risk is even greater when a vehicle strikes a pedestrian, the most vulnerable of road users. Although injury to vehicle occupants in a crash can be mitigated by safety belts and airbags, the strength of the relationship between speed and crash severity alone is sufficient reason for managing speed.*

According to Elvik's meta-analysis, "there is a clear dose-response relationship between changes in speed and changes in road safety." The larger the change in speed, the larger the effect on accidents or accident victims. Thus a 10% reduction in the average speed of traffic can be estimated to reduce the number of road accident fatalities by 38%. By way of contrast, a 10% overall reduction in drink-driving would give a reduction in fatalities of 1%, while the same reduction in non-wearing of seat belts would lead to 0.8% fewer fatalities.

These fundamental principles have been borne out repeatedly by scientific evaluations of 20 mph zones in the UK that have demonstrated significant benefits in terms of reduced casualties, especially among vulnerable groups such as children. In 1996, the Transport Research Laboratory reviewed 20 mph zones in Great Britain (cited in the review by Grundy et al, 2008). The uncontrolled study included 72 such schemes and used five years of before data and at least 1 year of after data (the average was 30 months). The researchers found that overall collision rates

decreased 61%, pedestrian collision rates decreased 63%, child pedestrian collision rates decreased 70% and overall child casualty rates decreased 67%. Grundy and colleagues (2008) also cite an evaluation of 20 mph schemes in Kingston upon Hull (population c. 250,000). Hull has extensive 20 mph zones, covering 25% of its roads in 2003. An uncontrolled before and after study found remarkable declines in casualties. Overall, Hull's road casualties decreased 14% from 1994-2001. In the 20 mph zones, total collisions decreased 56%, the numbers killed or seriously injured decreased 90%, pedestrian casualties decreased 54%, child casualties decreased 64% and child pedestrian casualties decreased 74%. To put this into perspective, the surrounding Yorkshire & Humberside region experienced a 15 per cent increase in road casualties between the mid-1980s and 1999 (Hull City Council, 2002).

In December 2009 the British Medical Journal published a study of the effect of introducing 20 mph zones on road collisions, injuries and fatalities in London, based on analysis of geographically-coded police road casualty data collected over twenty years (Grundy et al, 2009). Overall, the introduction of 20 mph zones was associated with a 42% reduction in road casualties, after allowing for underlying time-trends. The percentage reduction was greatest in younger children, and was greater for people killed or seriously injured in collisions. Pedestrian injuries were reduced by a third with a greater reduction in children aged 0-15 years. The reduction was smaller in cycling casualties (17%) but again this was higher in children. The researchers concluded that "this evidence supports introducing 20 mph zones in major British cities and also in similar metropolitan areas elsewhere."

These analyses and empirical studies clearly demonstrate that sceptical claims such as that "there is no safety case" for a 30 km/h speed limit (AA Ireland, 2010) are ill-informed and utterly without foundation.

Precedent throughout Europe. 30 km/h zones are very common in residential areas and city centres throughout Europe. Countries that have made widespread use of 30 km/h zones for many years include Austria, Denmark, Germany and the Netherlands. Both Sweden and the Netherlands make it a priority to have 30 km/h speed limits not only in residential areas but also on roads used by pedestrians and cyclists. This is a key feature of Sweden's *Vision Zero* road safety strategy and Holland's *Sustainable Safety* programme (RoadPeace, 2008). According to the European Transport Safety Council (2005a) Belgium, France, Hungary, Poland and Slovenia have been increasing the implementation of this important road safety measure. Sizeable European cities with extensive 30 km/h zones include Barcelona, Graz, Munich and Stuttgart, according to the Commission for Integrated Transport, an independent body advising the British Government on integrated transport policy. In the mid-1990s Graz in Austria (current population 255,000) became the first European city to introduce a 30 km/h limit city-wide, and now more than 75% of its road network has this lower limit (Commission for Integrated Transport, 2001b). In the city of Stuttgart (pop. 600,000) 85% of the road network has a 30 km/h limit. By 2001 some 80% of Munich (pop. 1.35 million) was covered by 30 km/h zones with more being planned. Some of Munich's residential streets have an even lower 20 km/h limit with associated traffic calming measures.

Some European cities have gone further. The Belgian city of Ghent, with a population slightly smaller than that of Belfast and larger than that of Cork City, has one of Europe's largest pedestrian areas, including the whole city centre (European Transport Safety Council, 2005b). "On the third of November 1997, the city centre was closed overnight to through traffic" (European Commission Directorate-General for the Environment, 2004). The speed limit in the 35 hectare pedestrianised zone was reduced to 5 km/h for those permitted vehicular access.

Our neighbours in England have also been increasing their number of 20 mph zones. The first three schemes were introduced in 1991 and five years later an evaluation conducted by the Transport Research Laboratory reported a total of 200 throughout England (TRL, 1996). According to the UK Department for Transport (2009) there are now an estimated 2,150 such zones operational in England. A review by researchers at the London School of Hygiene & Tropical Medicine reported that the number of 20 mph zones in London had "increased year on year since they were first introduced" to a total of 399 zones at the time of the review (Grundy et al, 2008).

Dublin is not a bell-wether for this road safety/environmental measure, nor is the City Council's decision to apply a 30 km/h limit on city centre roads used by large numbers of pedestrians and cyclists a unique one in Europe. Even if Dublin City was in the vanguard of road safety and sustainable transport, this in itself could not be construed as a negative development given the proven benefits.

Ideology or evidence-based public policy? The European Transport Safety Council is a Brussels-based independent non-profitmaking organisation that provides expert advice on transport safety matters to the European Commission, the European Parliament and Member States. The Council brings together experts of international reputation and representatives from a wide range of national and international organisations with transport safety interests to exchange experience and knowledge and to identify and promote research-based contributions to transport safety. The ETSC (2005b) has stated that "speed limit zones of 30 km/h should become widespread in urban areas". Referring to lower speeds overall as "win-win for road safety and the environment", the Council also concludes that concern for safety is not the only reason why speed management is necessary (ETSC, 2008a&b):

> *Speed management strategies are often consistent with other policy goals since speed plays a role in a number of transport indicators such as mobility demand, fuel consumption and CO2 emissions, air pollution, noise and congestion. The current concern over climate change and CO2 emissions has stirred convincing arguments for lowering speed limits and improving their enforcement: it is the most prominent case for speed management together with safety.*

In its review of European best practice, the Commission for Integrated Transport carried out case studies of four cities (Barcelona, Munich, Stuttgart and Graz) and one region (Achterhoek, The Netherlands). Discussing the transferability to the UK of the lessons learned, the Commission (2001a) highlighted the importance of lowering speed limits in order to make public transport more viable and communities more liveable:

> *The one critical success factor underpinning best practice in all case study areas was the introduction of area wide 20 mph [30 km/h] zones. This, coupled with extensive use of pedestrianised areas, has had a dramatic effect on the "urban experience". It has been fundamental in prompting both strong growth in walking and cycling and in the ability of public transport to compete with the private car. The balance has been shifted away from "movement space" to "exchange space" where the focus is on personal interaction in quality urban space rather than on mobility in car dominated streets.*
>
> *This initiative has helped transform the case study cities across Europe from being noisy, polluted places into vibrant, people centred environments as well as facilitating the widespread re-allocation of street space to public transport, cycling and walking to meet increased demand.*

The UK Parliamentary Advisory Council for Transport Safety (PACTS) is an associate Parliamentary group and registered charity advising and informing Members of Parliament on road, rail and air safety issues. It brings together technical expertise from the public, private, academic and professional sectors to promote research-based solutions to transport safety problems. PACTS (2007) recommended that 20 mph be made the default limit in all built up areas in the UK, i.e. residential, shopping and mixed-use streets "where extra care is needed because there is considerable interaction between vehicles, pedestrians and cyclists". In order to achieve high levels of compliance, PACTS favours more modern and innovative technological solutions such as Time Over Distance speed cameras rather than the sometimes problematic standard road engineering measures such as speed bumps. On this advice, the House of Commons Transport Committee (2008) recommended that local authorities "be given the powers and resources to introduce 20 mph limits much more widely".

Reputable bodies such as the European Transport Safety Council, the Commission for Integrated Transport, the Parliamentary Advisory Council for Transport Safety and House of Commons Transport Committee are not driven by ideology but by their mandate to contribute to the development of healthy public policy based on scientific evidence and best practice in road safety. All of these bodies have recommended wider use of lower urban speed limits. Motorists' lobby groups with vested interests have no credibility when they imply that these agencies make recommendations on purely ideological grounds and not on the basis of road safety criteria or other evidence-based principles (AA Ireland, 2010).

Slower average speed and traffic congestion. Many motorists seem unaware that reducing the average speed of traffic can cause little or no delay and may even relieve congestion. This lack of comprehension may be based on simplistic estimates of how long it takes to drive a given distance at different nominal speeds in urban environments. The reality is that in congested city traffic only a small proportion of journey time is due to how long it takes to drive the geographical distance from A to B, most of the journey time being due to delays at junctions.

Suppose a motorist needs to take a city centre journey of 5 kilometres during rush hour. If it takes 30 minutes to reach the destination at 50 km/h then, some seem to believe, it will take 50 minutes at 30 km/h. Since 50 km/h is 66% faster than 30 km/h then the same journey must take correspondingly longer at the lower speed, this reasoning goes. However, a closer examination shows that each kilometre travelled at a steady 50 km/h should take about 1.2 minutes, which means that in theory a 5 km journey should take only 6 minutes when driving at this higher limit (compared to 10 minutes at 30 km/h, an unremarkable four-minute difference). In city centre driving conditions it is unavoidable that more time is spent queuing at junctions than in driving along stretches of road. It doesn't even require simple arithmetic to see more than a ring of truth in this assertion. Many careful and law-abiding drivers, and indeed cyclists, will have seen situations in which they are overtaken on a city street by an impatient, speeding driver only to catch up at the next junction or set of traffic lights.

Modelling and predicting traffic flow on congested road networks is very complex. Important factors include average speed, traffic density, road capacity, flow rate, spacing between vehicles, and the relationships between one variable and another. Some key principles are that (a) there is a relationship between traffic density and speed, (b) the more vehicles on a road the slower their average speed will be, (c) to minimise congestion and maintain stable traffic flow the number of vehicles entering an area (e.g. a junction or section of carriageway) has to be less than or equal to the number of vehicles leaving over the same time period, (d) if density and average speed reach a critical level then traffic flow can change from stable to unstable, and in an unstable condition small events can cause flow to stall. Given that road space in cities is finite, and that the number of cars has greatly increased over the years, congestion has become a big problem and relatively minor local events can have large effects on the road network. When traffic volumes are at or near the maximum capacity of a road or network, small changes in available capacity due to factors such as variations in vehicle speeds and alternating acceleration and braking "can trigger a sudden switch from flowing to stop-and-go traffic" (Joint Transport Research Centre, 2007).

Transportation planners and engineers have responsibility for overall traffic throughput, typically balanced by road safety and environmental concerns. Motorists, on the other hand, are primarily concerned about their own travel needs and have expectations or perceptions regarding appropriate speed, e.g. the standard limit of 50 km/h. Consequently there is a widespread, and possibly natural, tendency among motorists to believe that one of the main conditions required for satisfactory traffic flow is to maximise (rather than optimise) vehicle speeds, which is why there is such resistance to a 30 km/h speed limit on city centre thoroughfares. This is a fallacy, however, and can be easily visualised in a simple practical demonstration that could be conducted in a domestic kitchen or school lab (Washington State Department of Transportation, 2007).

Think of the roadway as a funnel. Now imagine the traffic which has to travel along the roadway during a certain time as a bag of rice, with a bowl underneath as the destination. If you pour all the rice into the funnel at the same time, it gets congested at the bottom and takes some time to pass through. However, if you carefully pour the rice into the funnel, maintaining a slow steady pace, the rice moves through the funnel evenly and doesn't clog. Even though the grains of rice are entering the funnel more slowly, ultimately the entire bag of rice gets through the funnel to its destination faster.

This demonstration indicates that if traffic moves more slowly within a congested area and vehicles do not travel at widely varying speeds, traffic will get through faster. More haste, less speed: if you try to rush through that which requires reasonable patience and awareness you may well take longer to get there. Unfortunately the typical current situation in certain areas is that many motorists feel compelled to rush, and end up racing from traffic jam to traffic jam in growing frustration. This benefits nobody.

When traffic congestion starts to become intolerable, car-oriented lobby groups typically argue for supply-side measures (e.g. more roads, higher speed limits), and resist demand-side solutions (e.g. traffic reduction, speed reduction, promotion of sustainable travel modes) as if these were ideologically-driven attacks on basic human rights. However, the motoring public should appreciate that reducing both traffic volume and average speed in

congested urban areas can benefit all road users and the community generally. An additional pay-off is that safer and more pleasant roads will encourage more people to walk and cycle instead of driving, which will in turn take more cars off the road and ease congestion further.

Social and economic benefits of walkable environments. Measures such as traffic reduction and traffic calming are an essential part of a suite of interventions needed to promote "basic and essential" non-motorised travel and to optimise transport planning in order to achieve a range of potential benefits (Litman, 2009a):

> *A more balanced and efficient transportation system, with better walking, cycling and public transit service, and incentives to choose efficient transport options, can provide significant health benefits, in additional to other economic, social and environmental benefits such as reduced traffic congestion, road and parking facility cost savings, consumer savings, improved mobility for non-drivers, energy conservation and more efficient land use.*

Transport researchers London Analytics (2005) state that their analysis "clearly shows that when schemes and policies promote a modal shift to walking from any motorised mode, there are significant benefits to society from that modal shift, and by clearly identifying the value of those benefits, we can build stronger cases for more money for walking." Walking has the highest overall ranking among modes of travel under the headings of road safety, financial costs to the public sector, land-take, emission of local pollutants, exposure to pollutants, production of greenhouse gases, traffic congestion and improvement of health and fitness. The direct economic benefits of improved walkability also deserve greater attention. Traffic Transport and Road Safety Associates (www.ttrsa.com) is a multi-disciplinary consultancy, formed by senior managers from Ireland's leading transport and planning consultants. According to TTRSA, traffic calming, traffic reduction and pedestrianisation are core elements of strategies to increase economic vitality as well as to improve integrated transport:

> *Most retailers, at least in town centres, appreciate that the number of people walking past their shop and not the number of people driving past their shop is key to getting people inside to spend money. Pedestrians comparison shop, and research conducted in the United Kingdom reported increases in sales of up to 20% per year in the first few years following pedestrianisation.*

Ease of movement fostered by accessible and well-connected spaces is an important factor in business location decisions, while low traffic environments encourage people to "use the streets more and move on less quickly" (Scottish Executive, 2006). An attractive pedestrian environment and better quality street design provides "direct tangible financial benefits" (Commission for Architecture and the Built Environment, 2007). In a study of eight cities that implemented extensive speed controls and pedestrianisation as part of a package of integrated traffic management measures, the European Commission (2004) reported that retail trade had improved in a majority of cases. A survey of town centres in the UK commissioned by Transport for London (2007) found that shoppers who walked spent 50% more than those who travelled by car.

This potential spending power can be multiplied by providing greater pedestrian access and improving 'walkability' in city centres. Compared to driving, walking is a vastly more efficient use of the finite space available. On the same road space walking can move nearly 19 times as many people as driving: 75 pedestrians per metre width per minute, versus 4 car or taxi occupants (Transport for London, 2007). According to the Victoria Transport Policy Institute "it is clear that walking is a critical component of the transport system, and that improved walkability ... can provide significant benefits to society" (Litman, 2009b). Given these facts, there is a strong business case for making public spaces generally more conducive to walking and other forms of active transport.

Ethics, public health and vulnerable road users. There is a strong ethical dimension to Sweden's *Vision Zero* road safety concept: "Life and health can never be exchanged for other benefits within the society" (Tingvall & Haworth, 1999). The inverse of this can currently be seen in Irish urban planning and road engineering to date where objective and subjective road safety characteristics conducive to sustainable transport modes such as walking

and cycling have been frequently traded off against road design speed and motorised traffic capacity. It is also evident in the widespread disregard for speed limits among Irish motorists, especially in urban areas (Road Safety Authority, 2007b) as well as in the commonplace abuse of pedestrian facilities such as parking on footpaths. Interactions between traffic volume, traffic speed, motorist behaviour and the built environment have a profound effect on road users outside the car, not just in terms of objective risk but also in terms of subjective vulnerability.

According to the World Health Organization, road traffic injuries in the European Region "represent a major, costly and largely avoidable public health problem" (WHO, 2004). This report states unequivocally that "speed is the core problem" and "the single most important determinant of road safety". This reality arises from immutable principles in Physics, and has been borne out by a very large body of empirical research. The risks are very quantifiable and have been well established by the science:

- The probability of a pedestrian being killed rises by a factor of 8 as the impact speed of the car increases from 30 to 50 km/h.
- Pedestrians have a 90% chance of surviving car crashes where the speed is 30 km/h or lower but less than a 50% chance of surviving a crash at 45 km/h or above.
- About two thirds of the road crashes leading to injury occur in urban areas.
- Most pedestrian deaths and injuries occur in crashes in urban areas, and many of these people are vulnerable road users such as children and elderly people.

Twenty years ago, road accidents as a cause of death or disability were in ninth place out of a total of over 100 identified causes globally. However, by 2020 forecasts suggest that as a cause of death road accidents will move up to sixth, and in terms of years of life lost and 'disability-adjusted life years' will be in second and third respectively (Global Road Safety Partnership, 2000). Reversing this global trend, Ireland has been steadily improving its overall road safety ranking, due to increased public awareness, better public policy and improved control of speed and drink-driving (International Traffic Safety Data & Analysis Group, 2010).

There was a downward trend in the number of pedestrian fatalities in Ireland during 1997-2003. However, the number of pedestrian fatalities increased by 27% in the period 2003-2007. Fifty-eight per cent of pedestrian deaths were inside built-up areas (Road Safety Authority, 2008).

The year 2003 had the lowest recorded number of pedestrian deaths, which corresponded with the introduction of penalty points for speeding offences (Road Safety Authority, 2007a). Pedestrians were the road-user group that benefited most from the initial, though not sustained, successes due to the introduction of penalty points. Road crash data indicates that the careless action of the pedestrian was the primary cause of 13% of pedestrian fatalities. However, even in the small minority of cases where a pedestrian is the direct cause of the collision, a lower speed would inevitably reduce the number of deaths and the severity of injury (Elvik et al, 2004).

According to the Road Safety Authority, older people are the group most at risk when walking on Irish roads. Among people over 65, males are three times more likely and females twice as likely to be killed while walking. Older pedestrians are more vulnerable when hit by a vehicle, and are more likely to die or be disabled by severe injury. When hospitalised, their length of stay is much longer than that of younger people. Older people also tend to be less confident and agile when walking, and may need to use supports. They may feel intimidated by traffic conditions that many motorists seem to regard as completely normal, and this can lead to a loss of mobility and independence (United Nations, 1982):

> *The elderly meet manifold problems in traffic and transport. Especially elderly pedestrians have to cope with objective or subjectively felt dangers that restrict and limit their mobility and participatory aspirations. The traffic circumstances should be adapted to older people instead of the other way around. Measures and facilities should include traffic education, speed limits especially in human settlements, [and] traffic-safe environments.*

In addition to the mortality and morbidity directly due to road traffic, large volumes of motorised vehicles, unnecessarily or inappropriately high speed, poor air quality, noise and a sense of danger are all factors that degrade the urban environment and deter people from walking or cycling. Lack of physical activity accounts for a significant proportion of the chronic disease burden globally, and such active modes of travel are therefore important ways of promoting public health (WHO, 2006).

There is a large and long-established body of evidence confirming the health benefits of physical activity, including a reduced risk of premature mortality and reduced risks of coronary heart disease, hypertension, colon cancer and diabetes (US Department of Health & Human Services, 1996). Regular participation in physical activity also reduces depression and anxiety, improves mood and enhances the ability to perform daily tasks throughout the life span. Independent physical mobility is important in healthy child development, as it is in healthy ageing.

Over-reliance on motorised transport has significant adverse effects on public health, and therefore "a shift in focus away from prioritisation of motorised mobility to a wider consideration of transport impacts, including the indirect impacts of traffic danger on physical activity, is an important step in moving towards a healthier, more active, and less obese society" (Jacobsen et al., 2009). Walking and cycling are inherently favourable to public health. Measures that create and sustain safe environments for active travel therefore deliver a considerable public health dividend apart from direct reductions in death and injury. A 30 km/h speed limit in residential zones and in urban centres with high 'walkability' potential is an ethical, humane and health-promoting measure, especially for vulnerable groups with particular mobility needs such as children and elderly pedestrians. The putative benefits of higher speed for one section of the population only — i.e. motorists — do not stand up to scrutiny.

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About Cosain. Cosain, the Community Road Safety Action & Information Network, is a grassroots community group formed April 2009 in Galway, Ireland, with the aim of making the city a safer and more welcoming environment for pedestrians and other people who travel by means other than the private car. To this end, Cosain (pronounced '*cussawn'*) seeks to emulate the successful approach adopted by organisations such as Living Streets in the UK and the international body Walk 21. Cosain endorses documents such as the European Charter of Pedestrian Rights and the International Charter for Walking. One of the core principles of the International Charter is that "communities have the right to expect authorities to provide for, support and safeguard their ability and choice to walk."

The Irish word for footpath is *cosán* (plural *cosáin*). The Irish verb *cosain* means to protect. The overall aim of Cosain is to protect and promote the rights, safety and comfort of pedestrians, especially the most vulnerable: children, older people and disabled people.

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