The case for rail

A study by Norman Bradbury

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The M1 and the midland main line at Mill Hill.
The railway is much more efficient than road in the use of space and energy besides having greater capacity.
Eurostar and the M2 in Kent. (Picture Rail Link Engineering / Union Railways)

Foreword

There have been a number of attempts to make a definitive case for rail and Norman has tried to encapsulate the principal arguments into this short summary document. The principle of continuing to build by-passes may seem straightforward but as the road vehicles' destination is usually a town then unless we build extra large car parks and demolish swathes of property to build access roads into the town then we will have gridlock. It is not so long ago that in the days of the old Greater London Council the electorate gave a massive thumbs-down to the Conservative administration on the basis that they were going to build a motorway box in London. New roads within towns are no more popular now than then, and are for the most part politically unacceptable.

With regard to air travel we are being told that we are running out of runway and airspace and we need to build more. Much of the pressure on runways is coming from the growth of internal flights. In parts of Europe high speed rail links have decimated internal air travel and in some instances airlines put their passengers on the train because it is faster and more convenient. We should be doing the same here, not building more runways, which are even less acceptable than new roads.

Suggestions that the bus is cheaper than the train are questionable in that in many places the train fare is less than the bus and in London the bus passenger has a subsidy of 9p per km where the comparative train subsidy on radial routes within London is only .04p per km, albeit on a longer journey.

Undoubtedly for an increasingly mobile population the future has to be the steel rail.

Keith Dyall
Chairman London & South East Branch
2004

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THE CASE FOR RAIL

INTRODUCTION

Widespread concern over rising rail costs has prompted much criticism and a Parliamentary Select Committee enquiry into the future of railways, and the Secretary of State for Transport's announcement of a rail review.

Suggestions for a "Beeching MK 2" have been voiced and there are fears that a new wave of British Rail style "economy measures" could compromise the ability of the railway to maintain present day service standards, letalone improve them, and higher fares are considered inevitable as the Office of the Rail Regulator looks at increasing track access charges to meet calls for yet more funds to make good the maintenance backlog caused by previous years of inadequate investment by Railtrack.

Network Rail and the Strategic Rail Authority grapple with the many and varied causes of cost escalation, arguably due largely to the fragmented nature of the privatised railway.

Over time, a more cohesive industry structure is beginning to emerge but it will take much more time and patience before the benefits become apparent and for the railway to fulfil its true potential cost-effectively. Meanwhile, road building is back on the agenda!

Against this gloomy outlook, minds have focused on a fresh look at the many and varied benefits the railways bring to the nation's economy, its people and the environment with some enlightening results.

This report is intended to complement a number of others on this important issue.

Norman Bradbury

February 2004

THE CASE FOR RAIL: A STUDY BY RAILFUTURE

1. BACKGROUND

RAILWAYS IN PERSPECTIVE. Railways represent barely 4% of surface transport infrastructure in Great Britain with roads accounting for almost all the rest.

Together with light railways and London Underground, but excluding heritage and tourist railways, the total route length of GB railways is currently 17, 279 km (10, 748 miles). The total route length of through roads in Britain stood at 391, 653 km
(243, 559 miles) in 2002. This is irrespective of the number of tracks or road lanes per route, the total length of which would be very much greater than route length, particularly in the case of roads.

Thus, for every route km of railway we have nearly 23 km of roads.

TABLE 1 - Total route length GB **ROADS**, 2002
MOTORWAYS, MAJOR ROADS and MINOR THROUGH ROADS
Total= **391, 653 km**

TABLE 2 - Total route length GB **RAILWAYS,** 2001/02

NATIONAL/ NETWORK RAIL.....	16, 652 km	
LONDON UNDERGROUND.....	408 km	
DLR AND LIGHT RAIL SYSTEMS.....	207 km	
Total=	**17, 279 km**	(Source; DfT)

2. CARRYING CAPACITY - *Railways make significantly more efficient use of space.*
A twin track railway has a carrying capacity equal to a SIX LANE MOTORWAY, but such a motorway will require about four times as much land.

Excluding parking spaces which are estimated to occupy at least 590 sq km, the area of land taken by the through road network in 1995 amounted to 2,553.4 sq km ("Parking Mad", CPRE) and has since grown. Clearly, most freight and passenger movement goes by road simply because roads account for so much of our transport infrastructure. However, if we compare the average work achieved per route km of roads and railways, a very different picture emerges.

In making this comparison, it should be remembered that Table 2 conceals the fact that not all rail routes are available for both passenger and freight use. In 2001/02 freight only lines amounted to 1,610 km leaving 15, 669 km for passenger train operations. Determining the route length available for freight is more complicated.

Clearly, freight is not permitted on light rail and the London Underground systems and some Network Rail routes are barred to freight due to loading gauge and weight restrictions while other routes may be technically approved for freight but are rarely used due to intensive passenger train operations.
Plainly, the availability of rail route length for carriage of freight is less clear cut than for roads where a more liberal approach to access applies.

Table 3 compares the average of passenger kilometres made per kilometre of route for the road and rail networks in 2001/02, and Table 4 compares the statistics for tonne-km of freight moved per route-km but note that
Rail (a) shows the maximum route length technically approved for freight, while
Rail (b) shows the total Network Rail route length.

TABLE 3 - **Passenger-km per route-km,** in 2001/02. (Source DFT* and SRA*)

Route	Route length	Total passenger-km	**Average per route-km**
Road	391, 653 km	679.0 billion (inc. buses)	**1, 733, 677**
Rail	15, 669 km	47.4 billion	**3, 025, 081**

TABLE 4 - **Freight tonne-km per route-km,** in 2001/02. (Source NR*, SRA* and DFT*)

Route	Route length	Total tonne-km	**Average per route-km**
Road	391, 653 km	149.0 billion	**380, 439**
Rail (a)	16, 534 km	19.7 billion	**1, 191, 484**
Rail (b)	16, 652 km	19.7 billion	**1, 183, 041**

From the above it can be seen that, as a national average, rail carried 1.74 times more passenger-km and a MINIMUM of 3.1 times more freight tonne-km per route-km than roads in 2001/02.

However, the national average statistics conceal rail's vastly superior ability to move large volumes of passengers and goods along busy corridors with high peak loads. Table 5 illustrates this point by comparing the number of daily passenger journeys by mode per route-km within Greater London.

TABLE 5 - **Daily passenger journeys in Greater London in 2002**

Mode	Available Passenger	**Journeys**
Roads	-route length	-Journeys	**-per route-km**
Cars & m/cycles	13, 532 km	11, 000, 000	**812.9 per km**
Bus routes	3, 711km	4, 500, 000	**1,212.6 per km**
Total roads	13, 532 km	15, 500, 000	**1,145.4 per km**
Rail			
National Rail	784 km	1, 000, 000	**1,275.5 per km**
LU (inc. DLR & Tramlink)	463 km	3, 000, 000	**6,479.5 per km**
Total rail	1247 km	4, 000, 000	**3,207.7 per km**

*SOURCE: DFT -DEPARTMENT FOR TRANSPORT, SRA -STRATEGIC RAIL AUTHORITY, NR - NETWORK RAIL, RM -RAIL MAGAZINE
NOTES;
(1) Peak loadings are very much higher than the average daily figures shown, and this is particularly so for rail.
(2) Road infrastructure route length is for through roads only.

(3) Clearly of all transport modes, the car is by far the most extravagant consumer of space.
(4) Figures for pedal cyclists and pedestrians are excluded for illustrative purposes and separate infrastructure is often available.

It is clear that periodic suggestions to ease traffic congestion by covering railways with tarmac to create new roads makes no sense. Firstly, those freight shippers and passengers that presently use rail services would have to switch to road transport, adding to overall traffic volume, but in addition, the new roads would have significantly less capacity than the railways they would replace thereby making road congestion much worse in those corridors served by railways. Increasing road capacity by motorway widening and new road building will simply exacerbate congestion in town and city centres where it is not possible to find the space required to increase capacity in line with elsewhere.

In considering space and work done together, it is interesting that in 1992 the Tory Green Initiative produced a report that valued the national road network at some £400 billion and they argued that road users should no longer be privileged with, effectively, rent free use of the roads. They suggested a modest charge of about 6% of the asset value could be added to road fuel duty which, if applied, would have doubled the cost of fuel at the time!

3. ENERGY - *Rail is significantly more energy efficient than other modes...*

...except long distance coaches and shipping. But it is much faster:
per tonne-km a road vehicle will require between 4 to 7 times more energy than rail, and air transport will require over 20 times more.

A study by the International Public Transport Association (UITP) found that, on average, public transport consumes 3.7 times less energy per passenger-km than the private car and can be up to 10 times more efficient. In Barcelona, average public transport energy use per passenger km is 0.37 mega joules compared to 2.25 by car. In cities with good public transport carbon monoxide emissions are typically 22 kg per head per year, but in car dominated Atlanta it is 399 kg /head/year. (Source Rail 455 19/2/03)
A study by National Express found that long distance trains and coaches produce about 6kg and 3 kg of carbon dioxide per 100 passenger-kilometers respectively (though it should be remembered Inter City trains travel up to twice the speed of coaches) compared to 20 kg from cars and 18kg from aircraft. (Platform 8 10/02)
On a like for like comparison, ultra light rail vehicles, i.e. lightweight trams or buses running on rails, will consume 1/3 of the energy required by a rubber tyred bus. (LTT 360 20/2/03)

4. ENVIRONMENT - *Due to its more efficient use of energy and space.....*

Rail transport offers very significant environmental advantages compared to other modes. Pollution is a by-product of energy consumption but rail can more easily use a wide range of energy sources such as electricity generated from renewable sources, wind and hydro power as an added bonus.

For obvious reasons, aviation will be the last transport industry to switch to alternative fuels and is likely to be dependent on oil for a very long time. Since oil production is now predicted to peak by around 2012 followed by a gradual decline, oil fuel costs are bound to increase progressively, weakening the already discredited case for aviation expansion.

So long as monetary values continue to be applied to time saving but NOT to environmental impacts of transport schemes, the more damaging transport modes will continue to appear to offer better value for money. To be fair, the DfT has indicated it will consider monetary values of environmental issues such as noise, local air quality and climate change, but in the meantime it declined to approve the SRA's recommendations for their inclusion in its revised values for Sensitive Lorry Miles, confining these mainly to congestion relief issues.

There is considerable scope for the transfer of aviation traffic to rail. Some 45% of European flights are less than 500 km (310 miles) and rail can compete on overall city centre journey times over this distance (see section on speed).
After Paris and New York, Manchester is the most popular destination from Heathrow. A large proportion of Heathrow - Manchester trips are inter flight connections but rail does not compete for these since there is no direct train service linking these airports at the present time, but it could be done, as could many other examples.

A study by the Aviation Environment Federation for Friends of The Earth found that without major investment, the existing railway network could absorb over 20% of UK domestic air passengers by 2015 - that's about 12 millionpassengers/year, but potentially most UK domestic air passengers could be transferred to rail at up to 40 million/year. This is the equivalent capacity of at least one new runway!

There is, in addition, greater potential for increasing the number of international passengers through the Channel Tunnel, most of which would be transferred from air.

In so doing, the study found the transfer of domestic flights outlined above would reduce carbon emissions by between 118,000 to 362,000 tonnes and nitrogen oxides by 1,800 to 5,800 tonnes. Similarly, transfer to rail of flights to European destinations could produce reductions of carbon emissions between 145,000 to 402,000 tonnes and NOx between 2,300 to 6,400 tonnes. Clearly, these very significant environmental gains would require committed investment in the rail network but it would make more sense than the vast sums currently being contemplated in damaging proposals for aviation expansion.

5. SPEED - *Across the spectrum rail can offer mode for mode advantages in speed.*

This section has much in common with that on environment. Rail's market share is closely linked to speed and journey time irrespective of distance. This applies equally to light rail systems offering better journey times than road traffic in busy town centres as it does to very high speed trains competing with airlines over long distances.

Most major centres of population in the UK are connected by present day Inter City services in less than 3 hours and therefore compete effectively on overall city centre journey times (such as Leeds to London where rail is the principal carrier) with airlines and the car. Air is generally quicker, however, for distances above 400km (250 miles).

Clearly, for rail to realise it's full potential to achieve modal switch, especially from air, it will need to shorten journey times overall to encompass places further afield and to provide links into airports to cater for inter flight connections.

However, there are capacity issues that could be made worse by trying to run trains faster on the existing network and there are strong arguments for adopting the French solution of building new railways for very high speed trains which would simultaneously free up capacity on the existing network for more local, regional and freight services.

Such high speed railways have ably demonstrated the ability of rail to become market leader over long distances. The original TGV route from Paris to Lyon now carries 65% of all journeys, with 30% by road and just 5% by air. The recent extension of this route has already seen rail take the major share from Paris to Marseille, and in Japan, the Tokyo to Osaka Shinkansen line now carries 362,000 passengers per day - the equivalent of a jumbo jet every 2 minutes.

Our own Eurostar services have claimed 66% of the London - Paris air/rail market and, following the opening of the high speed link from London to the Channel Tunnel (CTRL), the train time for this journey will be under two and a half hours which will be a saving of around one hour on the overall air journey.

Eurostar say that by 2007 they could potentially carry up to 40 million passengers per year, replacing 250,000 short haul flights in the process. Air France no longer flies between Paris and Brussels, preferring to reserve seats on the Thalys high speed train service instead. There are similar examples in Germany and elsewhere.

However, rail's ability to compete with air is currently compromised by tax inequalities. This is dealt with under the section on economics.

6. SAFETY - *Rail is frequently referred to as the safest form of land transport.*

Recent research by the European Commission has confirmed that from a European perspective rail is indeed THE safest transport mode by any measure as shown in
Table 6

TABLE 6 - **Passenger fatalities**

	Fatalities per 100 million passenger km	Per 100 million passenger hours
ROAD	1.1	33
RAIL	**0.04**	**2**
FERRY	0.331	10.5
AIR	0.08	36.5

Source: Railway Magazine Feb 2001

It should be mentioned that Table 6 disguises the very wide disparity of risk between different types of road vehicle. While powered two wheelers (e.g. motor cycles) pose by far the greater risk, bus and coach travel is very safe and compares well with rail.

The aviation industry claim that it is the safest form of transport is based on distance travelled per fatality. This is simply because the average air trip is comparatively long distance and so it is easy for airlines to generate passenger kms. Even so, the latest research shows rail to be twice as safe as air by this measure for comparable journeys up to 1,600 km (1000 miles).

For most travellers, it is the risk of travel that is of greater concern and for this reason passenger hours per fatality is the more meaningful comparison.

It will be noted from the above that COMPARED TO RAIL, the risk of death using passenger Km per fatality in a road accident is 27.5 times greater, by ferry it is 8 times greater and by air it is twice as great using passenger kms per fatality, but using passenger hours per fatality as the measure, the risk is 16.5 times greater by road, 5 times greater by ferry and no less than 18 times greater by air.

Notwithstanding the media attention paid to rail accidents since the industry was privatised and the false public perceptions so generated, the national trend towards sustained improvements in rail safety is still on course even though privatisation is arguably responsible for some setbacks. The number of train accidents involving fatalities has fallen progressively from 42 in the 10 years from 1967 to 1976 to 11 in the 11 years 1992 - 2002 inclusive.

It is worth remembering that the total number of people killed in UK train accidents since railways began in 1825 is still less than the average number killed on our roads every year!

Despite this impressive record, the Government, through the Health and Safety Executive, have enforced many safety regulations that are unique to railways and with a degree of paranoia that at times beggars belief and which have placed an enormous financial burden on the industry, leaving it with a far from level playing field when compared to roads.

Examples of these are too numerous to detail here but perhaps it is worth mentioning some of the most crass.

HSE ordered the railway to scrap and replace all slam door trains by the end of 2003. When it became apparent that all the new trains could not be built in time to meet this target, HSE granted an extension of one year provided the remaining slam door trains were fitted with expensive new safety equipment (TPWS). It was then realised that the power requirement of the new trains was beyond the ability of the ex Southern Railway dc power supply to meet the demand and around £l billion will now need to be spent to upgrade the system. It is most unlikely this work can be completed by 2004 and so hundreds of very expensive new trains will have to sit idle in sidings until 2005.

Against industry advice, HSE then required Train Protection & Warning system loops to be located at terminal platforms. This caused trains to proceed along platforms at less than walking pace to avoid an automatic emergency brake application and forcing drivers to re-apply power to bring the train up to the buffer stops, thereby INCREASING the danger. At considerable expense all these loops have now had to be replaced with a modified type.

HSE has now issued a requirement to replace barrow crossings at some rural stations with full disability compliant foot bridges at some £300, 000 each. Barrow crossings have been safely used in the past as a convenient means for disabled passengers to access to platforms at lightly used stations and this unnecessary regulation is likely to discourage use of rural lines. To put this into context, it should be compared to an unlikely order from the Department for Transport to highway authorities to replace pedestrian crossings with ramped over-bridges!
In short, the HSE obsession with rail safety would seem to be indicative of a hidden agenda to price railways out of contention, putting passengers at far greater risk if they switch to other modes.

7. ECONOMICS - *"There are those who know the cost of everything and the value of nothing" (Oscar Wilde)*

Recently, there has been much criticism of escalating rail costs. There are a number of reasons for these but most have been beyond the control of the industry.

Whilst it is beyond the scope of this paper to discuss the pros and cons of privatisation, there is no doubt that it has created a culture of confrontation, compensation and legal costs that did not exist before and which has also impacted on insurance costs.

Improved frequency of service makes reference to the timetable less necessary. Just turn up and go. If you do not run trains then there can be no demand.

Cheaper and more flexible ticketing brings more passengers and bigger profits. Running empty trains requires more subsidy.

(*Picture Rail link Engineering)* A new bridge for the Channel Tunnel rail link over the mid-land main line outside St Pancras with Class 170 below. These units have pioneered improved services and will soon be replaced by higher capacity trains. Below is a European high speed unit which has helped to take significant traffic away from the air-lines

(Picture Rail link engineering) Views of the future showing Stratford "City" with the new international station surrounded by the site of the new development.
Below we have the new trial mini modal train with small containers suitable for delivery to in-town destinations and smaller economic loads.

(Picture: Nottingham CC) Crowds at Hucknall on the newly opened Robin Hood Line where the trains have achieved a significant modal shift away from the motor car.

Rail is esential to carry large numbers of people like those below waiting for their train at London's Liverpool Street Station.

The fragmentation of the industry has also made cost control more difficult added to which there are the multiple layers of profit centres and management whose costs have not been matched by the efficiency gains private enterprise was supposed to bring to the industry.

Other important factors that have forced up costs are the need to comply with the Disability Discrimination Act and, as discussed above, the imposition of highly restrictive and costly regulations from the HSE.

Additionally, due to a prolonged period of contraction and "economy measures" under state ownership followed by a fall in maintenance expenditure on the transfer to Railtrack, there is now a large backlog of renewal and maintenance work to be made good. Network rail estimate some 4,000 miles of track are in urgent need of attention for example, and until this work is done, the railway will not be able to deliver the standard of performance and reliability we are all entitled to expect. Record amounts of investment will therefore be required over the next few years.

Given the responsibility of Government in this sorry state of affairs it would be very wrong for it now to withhold vital investment in the industry on the basis that railways no longer represent value for money, particularly since it is clear from Chapters 1 & 2 that investment in rail buys greater outputs.

There are signs emerging that the industry is beginning to contain cost increases but many observers feel progress will be hampered without some more radical re-structuring.

Reference was made above to tax inequalities affecting rail's ability to compete in the rail/air market.

Given the environmentally damaging nature of aviation, there are strong arguments for the removal of the tax concessions the industry currently enjoys and for the imposition of a levy to cover its external costs.

Aviation fuel is tax free, aircraft do not bear VAT, road and highway infrastructure access to airports is normally paid for out of public funds and so on. These concessions are in effect a subsidy currently valued at £7.5 billion per year.

Whilst a tax on aviation fuel would require international agreement, there are a number of other ways aviation could be made to contribute to its external costs such as a tax on landing slots.

Inexplicably, and in contrast to the Government's approach to aviation expansion, without warning the Chancellor raised fuel duty on "Red" diesel for rail use in his 2003 budget by 34.8% from 3.13p to 4.22p per Litre, a measure unlikely to bring environmental benefits by encouraging modal switch to rail!

The aviation industry's claims for the economic benefits it brings to the UK economy have also been thrown into question. It claims to be responsible for bringing inward investment to the UK but fails to mention outward investment from the UK is far greater, averaging a net cost to the economy of £38 billion per year from 1997 to 2001. Logically, aviation is equally responsible for what it carries in both directions.

More worrying are the current proposals for coping with aviation growth with no apparent consideration given to demand management.

It is widely acknowledged that the growth in demand for air travel seen in the past decade or so has been fuelled by the tax "perks" outlined above. Some 80% of this growth is reported to have come from budget airlines offering cheap leisure trips to popular holiday resorts abroad which has resulted in an aviation tourism deficit estimated to have cost the UK economy over £12 billion in 2001/02 alone, yet it is this very growth that has been used to predict aviation demand over the next 20 to 30 years.

In fact, leisure travel now forms the bulk of demand for air passenger trips with business / essential trips accounting for only about 25%. This should be compared with over 60% of rail journeys being in the business/essential category with only about one third being for leisure. Studies have shown that if aviation tax benefits were curtailed and brought into line with other travel modes on a "Polluter Pays" basis, demand for aviation growth could be accommodated within the industry's existing capacity.

Like aviation, the motoring lobby's oft repeated claim that road users pay more in taxes than is spent on road building and maintenance ignores the many external costs of road transport.

"Internalising the externalities" is not an exact science but work is ongoing. In recent times there have been a number of studies that have attempted to quantify these costs. There has been some variation in issues examined and the values attached to them, but all have reached the conclusion that road transport's external costs exceed any apparent surplus from motor taxation.

The latest costing attached to road accidents for example, is £17 billion/year to which must be added the full cost of policing including court costs, car crime, congestion, environmental damage, global warming, vehicle disposal costs and the fact that the manufacturing process of the average car consumes as much energy as 10 years average use!

When claiming economic benefits for road transport, the road lobby would do well to reflect on the annual UK car trade deficit which reached £12 billion in 2001/02 in addition to the external costs.

Table 7 compares some current road and rail infrastructure projects showing that even at today's much criticised costs, rail investment still appears to give good value. It is important to bear in mind that the very high costs of the Channel Tunnel Rail Link (CTRL) resulted from Government insistence on very high levels of environment protection, which is why so much of it is in tunnel. For this reason the cost per mile is over double the price of similar high speed lines in France and elsewhere. It should also be remembered that the CTRL and the upgraded west coast main Line will each have a capacity equal to a 6 to 8 lane motorway!

It should also be noted that as far as possible, the examples range from small scale schemes to the most expensive in both cases. There are, of course, far more road improvement projects currently in the pipeline than for rail and the Transport Secretary's recent announcement of £7 billion worth of motorway widening and other road projects is not included in this comparison.
Note also that the schemes to electrify the Ashford - Hastings and Hurst Green - Uckfield lines have been cancelled by the SRA on grounds of high cost and this decision will impose higher operating costs on the railway as a result. The predicted cost of these electrification works has also been criticised in industry circles as the SRA figure seems to have been inflated to cover all contingencies.

Even so, the average cost worked out at £3.5 Million per mile which seems very low by road investment standards.

TABLE 7 - **Infrastructure costs compared.**

Road scheme	Distance (miles)	Actual/projected cost	**Cost per mile**
M74 Glasgow	5	£375m (LOW)	£75m
M74 Glasgow	5	£500m (HIGH)	£100m
A3 Hindhead	3.94	£132m	£33.5m
A1 Widening	23.6	£262.9m	£11.14m
Baldock by pass.....	4.06	£47.22m	£11.63m
Gloucester by-pass.....	1.56	£25.15m	£15.2m
Weymouth relief road.....	3.4	£52m	£15.29m
M1 junction 19 improvements	N/A	£100m	N/A
Total Low	**41.56 miles**	**£1.494 billion (LOW)**	**£35.95 million***
Total High	41.56 miles	£1.519 billion (HIGH)	**£41.56 million**
Rail scheme			
Chiltern doubling	9.5	£50m	£5.26m
West coast -main line.....	600 +	£9.1 billion	£15m
CTRL phase one.....	46	£1.8 billion	£39.13m
Stirling-Alloa -re-opening	12	£35m	£3m
Ashford-Hastings-Hurst GRN-Uckfield-electrification.....	44	£154m (HIGH)	£3.5m
Total	**711.5 miles**	**£11.4 billion**	**£15.66* m**

* Latest estimates at time of writing (Nov 2003)

In contrast to roads, which are seen to be essential lines of communication between communities, railways are expected to operate profitably and those services that are unable to do so are referred to as "subsidised".

At various times there are calls to close down railway lines on the basis that they are uneconomic and cost the tax payer money but if the same criteria were applied to roads, thousands of miles of rural roads would have to be closed.

Buses are thought by many to be a cost cutting alternative to rail services, forgetting that bus access to the road network is already subsidised before operating subsidies are considered and, more importantly, past experience has shown that few rail passengers will accept bus travel as a suitable alternative and most will take to the car instead.

Rail is demonstrably more successful at achieving modal switch from the car and substituting rail with bus services would simply reverse this process.

As with roads, the wider benefits that railways bring to the communities they serve must be included in any evaluation of their costs.

As an illustration, the town of Bathgate suffered some of the worst unemployment in the country following the closure of its mining industry. Although it could never be considered as a money spinner in its own right, the rail link to the town was reopened for passenger use and unemployment fell simply because journey opportunities that did not previously exist had been opened up, providing access to employment centres elsewhere.

More recently, the county of Gwynedd carried out a study into the viability of the Cambrian railway line which required an annual subsidy of over £900,000.
The study found the line brought direct economic benefits to the region worth over £2.5 million per year together with social benefits that could not be expressed in monetary values, which brings us to the next section.

8. SOCIAL EXCLUSION & REGENERATION - *It is often said that railways should not receive subsidies because only relatively well off people use them. However….*

…whilst it is true rail has successfully achieved modal switch from the car (and air), it is certainly not true that most rail passengers are well heeled.

It is probable that this idea has come from the long distances some London commuters are prepared to travel but there are other factors that play a part in this situation, not least is the need to find affordable housing.

London is the most important centre of employment in the South East, and the City is probably the most important centre of commerce in Europe. In consequence, property prices in or near central London are prohibitive for most people and there would in any case, be insufficient space to house all those who work there.

Most central London commuters travel to work by train simply because it is the best way to access the city. Few people would attempt to travel each day, for example, from Epsom to Canary Wharf by car and certainly not by bus and it is too far for all but the most diehard cyclists to consider.

A recent study by Steer Davies Gleave for Transport 2000 found that nationally, there was a surprisingly even mix of social classes among rail users, especially on regional services and, as already noted, about two thirds of rail journeys fall in the essential category in contrast to less than half of car journeys and about one quarter of air passengers.

By contrast, planning errors designed to exploit the car over the last three or four decades have created hardship for those without access to a car and it is now acknowledged that there is an urgent need to reverse these mistakes.

Few motorists consider the possibility that they may one day find themselves no longer able to drive due to health or other reasons, but most of those who have had this experience quickly learn the meaning of social exclusion.

Out-of-town retail and business "parks" have been driven by the car culture. Motorways have sucked commerce and industry out of town and city centres and left whole communities bereft of essential shops and services and centres of employment have relocated around motorways. This is especially true of the M25 which now generates its own traffic and has largely lost its original function as a London avoiding route, raising fears of a second "outer M25".

Although the number has fallen historically, there is still nearly a third of UK households without access to a car and with an ageing population, the number may soon begin to rise again.

Public transport is the only effective tool to combat social exclusion but it is not best suited to serve out-of-town car based developments. This is especially true of rail, yet rail is acknowledged as a vital ingredient in regeneration projects and sustainable developments.

For rail to maximise its contribution to creating social inclusion there will clearly need to be some changes to planning rules. Stations should be seen as focal points for interchange with other transport modes, and retail and other developments should be located as near to stations as possible.

There are some encouraging signs that the Government's new Planning Policy Statement 6 (the replacement for PPG6) will stipulate that future retail developments must be accessible from all modes of transport.

Social exclusion can be caused by many factors. We have already seen how the loss of an industry can hit towns like Bathgate, just one of very many such towns affected by mass closure of the coal mining industry for example, and how rail can bring worthwhile net social, employment and economic benefits to local communities, but there can be no doubt that the car has fuelled social exclusion elsewhere.

More recently, it has been reported that unemployment in New Addington has fallen by 35% since the arrival of Croydon Tramlink yet New Addington has not suffered the loss of a major industry - it never had one but has for long been regarded as a depressed area.

This reduction has been achieved simply because of the improved links to employment sources made possible by the tram service and without dependence on the car. Croydon is also a cultural centre with a concert hall and cinemas etc. and a major retail complex. The tram system allows those without access to a car to participate fully in these activities.

Other examples of rail's ability to create social inclusion and other benefits can be found in the following two sections on Light Rail and The Case for Investment.

9. LIGHT RAIL - *This report would not be complete without a section on light rail which has proved to be a vital tool for regeneration projects.*

Although compared to buses, procurement costs are expensive and street running tram systems are very expensive, typically costing £20 million or more per mile to install, the whole life cost of tram systems can prove to be cheaper than buses

This is because trams have lower energy, operating and maintenance costs and vehicle life is generally twice that of buses. It has been shown that in corridors where there are peak flows of about 3,500 to 4,000 passengers per hour light rail will prove to be more cost effective than buses.

Light rail has also proved to have very successfully achieved modal switch from the car. Of Croydon Tramlink's 20 million passengers in 2002/03, around 20% were former car users, for example (see section on investment, page 15) and it is estimated to be as high as 30% of Midland Metro tram passengers.

10. THE CASE FOR SUSTAINED INVESTMENT - *Growth in rail travel over the past decade has seen the national rail network now carrying record numbers...*

Rail now carries record passenger numbers equalling the post war peak of 1946/47. This is despite the route length of today's railway having been halved since nationalisation in 1948.

This is the more remarkable since most UK transport investment over the past 50 years has been devoted to massive expansion of road capacity coincidentally with the contraction of the rail network referred to above and yet road congestion continues to become more acute.

Dr Richard Beeching's contentious "Reshaping of British Railways" report was not all bad - some lines could no longer be justified but it has since become clear that many closures (and those proposed but thankfully postponed) were a grave mistake.

It is beyond the scope of this paper to discuss the pros and cons of each case but it is worth mentioning some examples which, in the view of the writer, should never have been closed.

As built, the Great Central Railway was the only railway in Britain designed to carry Bern (Continental) loading gauge rolling stock as part of a through route from a proposed Channel Tunnel to the North of England.

The Beeching plan closed this main line north of Aylesbury but much of it has now been proposed for reopening, at considerable expense, by Central Railway to form a new through route for freight from Liverpool to Lille and beyond.

The strategic East - West route linking East Anglia with the west via Cambridge and Oxford was severed west of Cambridge and is now proposed for reopening with support from some 30 local authorities and business organisations. Such lines could now provide significant relief of congestion on parallel roads.

There were many closures that gave little or no consideration to the social and economic consequences for communities that the lines served.

The many branch lines to South Coast and West Country resorts were prime examples. Before closure, the viability of these lines was tested with passenger counts but these were taken in the month of April - ignoring the fact that such branch lines would be at their busiest during the months of July to September and that most passengers using them would have purchased their tickets at their point of departure rather than stations on the branch lines concerned, rendering these passenger counts seriously flawed ("The Great Railway Conspiracy", Henshaw).

However, the contraction of the rail network did not stop with wholesale route closures. British Rail was obliged to pursue a policy to eliminate "spare" capacity in the surviving network as "economy measures" over a period of 40 years or so, due to a lack of funds.

Passing loops were removed all over the country, many four track main lines were reduced to twin track and twin track lines singled (one such, the main from Salisbury to Exeter has been recommended for re-doubling as part of the Multi Modal Study for the South West), route capacity was reduced on many routes by lengthening block sections to reduce signalling costs where funds were unavailable to take advantage of modern technology and so on.

As a result, today's railway is under extreme pressure to cope with increasing demand. Reliability has suffered, and has not been helped by the complex structure of the privatised railway.

From the foregoing, it will be apparent that the rail network is capable of providing significant potential for solutions to our worsening transport problems but only if investment is made available to restore the missing capacity as a first step.

To this end, Railfuture has identified a large number of small scale "quick win" projects that could be implemented relatively quickly and economically. (Railwatch April 2002)

Meanwhile, due largely to the efforts of campaigners, over 300 new or reopened stations together with some restored routes, have been added to the rail system and many of these have surprised their critics with better than expected results. Sadly, progress has recently slowed dramatically due to cost escalation arising out of rail privatisation and this issue must be addressed by the industry and Government as a priority.

At this point it would be appropriate to mention some examples of successful investment in rail projects and rail passenger partnerships (RPP) schemes.

The North London line from Richmond to Stratford and North Woolwich had been run down and proposed for closure by British Rail. Instead it was provided with new dual voltage trains operating a 15 minute interval service throughout the day. The trains are always busy and frequently overloaded. Increasing the service to 6 trains per hour is now considered necessary and the route is to form the northern part of the East London line "Orbirail" extension project.

The "Robin Hood" line project reconnected Mansfield with the rail network to Nottingham in 1995. It now carries some 3,500 passengers per day with around 49% of them making journeys to work. Furthermore, over 40% of work trips from intermediate stations had not been made prior to the new train service, suggesting a significant fall in unemployment in the area and a further 40% of passengers access the line by car, indicating a high level of modal switch to the trains.

The new grant-aided Norwich to Cambridge train service has carried over half a million passengers in less than a year and passenger numbers are 30% above target. A staggering 44% of these passengers are former car users and new to rail.

This could be interpreted as creating the equivalent road space for a quarter of a million cars in a full year at a fraction of the cost of road widening but, officially, the rail service is considered to be subsidised whereas road building is seen as investment!

Community Rail Partnerships in the area have increased passengers on the Norwich to Sheringham line by 20% in the same 3 month period compared to the year before and by 134% since 1997.

Conversions of disused rail routes to light rail can be hugely successful. Manchester led the way with Metrolink, now being expanded. London Docklands Light Railway is now carrying over 45 million passengers a year and this is predicted to rise to over 60 million with the extension to London City Airport.

Mention has been made of the high levels of modal switch from the car achieved in Croydon and the West Midlands under the section on Light Rail, and which have surpassed by far that achieved by bus based schemes. This factor must be taken into account during the investment appraisal process.

However, the high costs of light rail schemes also previously mentioned are largely due to the methods used for financing them and this is another issue the Government must address.

It could be argued that recent developments in Germany provide the best indication of the way forward for public transport.

In 2002, a party of Railfuture members visited Karlsruhe to sample the new Train/Tram, essentially a dual voltage tram equipped to share tracks with heavy rail services but able to switch to street running where appropriate. The journey took us from the streets of Karlsruhe to those of Heilbronn by way of the Federal Railway (DB) branch line which had previously been little used with just 3 trains each way per day and which had been proposed for closure.

Since conversion, the trams provide a 20 minute interval service throughout the day and this line now carries 20,000 passengers a day!

Elsewhere in Germany, Regional Government has taken responsibility for local public transport and local train services are now operated by sleek new diesel trains running frequent services properly integrated with local bus services and with through ticketing.

Although this has required significant investment, passenger numbers have soared as a result and it is clear investment alone will be compromised without bus/rail integration. But integration should also include adequate provision of secure cycle and car parking at stations, better signposting and safe routes to stations.

There is no reason why similar progress cannot be made in the UK. Already, proposals being developed for Community Railways promise a brighter future for rural railways.
Prospects for Regional Government for England provide the opportunity to adopt many of the lessons learned in Germany but, at the time of writing, responsibility for regional transport is sadly not on the agenda!

If we fail to maintain investment momentum in expansion of the rail network, there is a very real danger of the UK failing to compete with our European neighbours. The status of London, for example, is at risk as Paris has now embarked on it's fifth Crossrail scheme while we still argue about our first!

11. CONCLUSION

Mile for mile, railways out-perform roads in terms of carrying capacity, are less environmentally damaging, consume less energy, less space, and are demonstrably safer.

For a variety of reasons, they may be more costly than they should or need to be, but they do still represent value for money.

In the words of the Rail Regulator Tom Winsor - "the Victorians' legacy was a precious network of narrow land corridors and to turn them into roads would be an unbelievable waste and our railways are a system which the country needs."

Recommended further reading:
" The Case for Rail" by Steer Davies Gleave from Transport 2000, "From Planes to Trains" by the Aviation Environment Federation from Friends of the Earth, "The Economics of Aviation" by Prof. John Whitelegg from CPRE, "At the Leading Edge" from Transport 2000, "Everyone's Railway - The Wider Case for Rail" from the Strategic Rail Authority, "A-Z of Rail Reopenings" & "Have They Done Well?" from Railfuture,
"What future for rail in the ten year transport plan?" by Prof. Phil Goodwin from Railway Forum.

With acknowledgements to: Modern Railways, Rail Magazine, Railway Magazine, Local Transport Today and Tramways and Urban Transit.

If you think we have made our case, why not join us?
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ERRATUM

Table 3 compares the average of *passenger kilometres* made per kilometre of route for the road and rail networks in 2001/02, and table 4 compares the statistics for tonne-km of freight moved per *route-km* but note that
Rail (a) shows the maximum route length technically approved for freight while
Rail (b) shows the total Network Rail route length.

TABLE 3 – **Passenger-km per *Route-km*,** in 2001/02: *(Source DFT* and SRA*)*

Route	Route length	Total Passenger-km's	**Average per Route-km**
Road	391, 653 km	679.0 billion (inc. buses)	**1, 733, 677**
Rail	15, 669 km	47.4 billion	**3, 025, 081**

TABLE 4 – **Freight Tonne-km per *Route-km*,** in 2001/02: *(Source NR*, SRA* and DFT*)*

Route	Route length	Total Tonne-km's	**Average per Route-km**
Road	391, 653 km	149.0 billion	**380, 439**
Rail (a)	16, 534 km	19.7 billion	**1, 191, 484**
Rail (b)	16, 652 km	19.7 billion	**1, 183, 041**

From the above it can be seen that, as a national average, Rail carried 1.74 times more passenger-km's and a MINIMUM of 3.1 times more freight tonne-km's per route-km than Roads in 2001/02.

However, the national average statistics conceal rail's vastly superior ability to move large volumes of passengers and goods along busy corridors with high peak loads. Table 5 illustrates this point by comparing the number of daily passenger journeys by mode per route-km within Greater London.

TABLE 5 – **Daily passenger journeys in Greater London:**

Mode	Available -route length	Passenger -Journeys	**Journeys -per route-km**
Cars & M/Cycles	13, 532 km	11, 000, 000	**812.9 per km**
Bus routes	3, 711km	4, 500, 000	**1212.6 per km**
Total Roads	13, 532 km	15, 500, 000	**1145.4 per km**
Rail			
National Rail	784 km	1, 000, 000	**1275.5 per km**
LU (inc. DLR & Tramlink)	463 km	3, 000, 000	**6479.5 per km**
Total Rail	1247 km	4, 000, 000	**3207.7 per km**

Source – DFT and RM**

SOURCE: DFT -DEPARTMENT FOR TRANSPORT, SRA -STRATEGIC RAIL AUTHORITY, NR -NETWORK RAIL, RM -RAIL MAGAZINE

NOTES:
(1) Peak loadings are very much higher than the average daily figures shown, and this is particularly so for rail.
(2) Road infrastructure route length is for through roads only.