

Road maintenance costs to local authorities

Potential changes from

Transfers of goods between rail and road, and

A methodology for assessing the impact of

Transfers from road to rail

County Case study

for Freight on Rail

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Introduction and Approach

This report considers the potential cost increases which would fall on local authorities if heavy goods vehicle traffic were to rise through a transfer of freight from rail. This was approached through a County case study using a specific commodity which was locally dominant. It is important to note that the exercise was to identify actual expenditure which would fall on the local highway authority, not those met by central Government for the trunk road network.

It would be possible, using similar methodology, to undertake a complementary study of the reductions in expenditure (mostly highway maintenance) which would occur if freight could be transferred from road to rail. The problem here would be finding data for road freight of sufficient detail on origins, destinations, tonnages and routes taken. Aggregated data is available, as is the current highway expenditure.

In a real sense, the savings from any transfer from road to rail would mirror the potential increased costs from a transfer from rail to road. The current study will thus indicate the scale of savings which could be achieved by the local authority if a similar amount of goods were transferred from road to rail.

A simple methodology for estimating such local cost savings from a transfer to rail using actual local expenditure is also set out in the report.

However, the data needed for this study were specific freight flows which might be transferred from rail, by weight and road route currently taken. This is clearly commercially sensitive and is not reproduced in detail in the report, although summary figures are given. Spreadsheet calculations were undertaken but are not appended to the report for such commercial reasons.

Methodology and results

The freight flows considered for the study were aggregates from a sample of quarries in one English county. Annual tonnages being transported by rail were obtained together with data for the direction of these flows and their regional destination. There were five basic directional flows, North East, North West, West, East and South. A routeing programme was then used to calculate distances to the County boundary or the appropriate trunk road.

An estimate of the approximate number of heavy vehicles needed to transport the aggregates was derived by assuming a payload of 25 tonnes. These were produced for each directional flow. Vehicle kilometres were calculated by multiplying the number of vehicles by the distances, again for each direction. This was doubled to reflect the journey made to pick up the load.

A cost calculation was then undertaken based on national average road costs.

National average road costs

The average figures used two sources: the "Sensitive Lorry Miles" (SLM) costs used for the Sustainable Distribution Fund (SDF) calculations and the National Economic Research Associates (NERA) costs from their 2000 report for Government as a cross check.

In both the road track (infrastructure) costs are separated out from other costs such as congestion or air quality. The latter are clearly less robust than the allocation of road costs which uses axle loads and type of vehicle. The NERA report gives a full account of the pluses and minuses of the road track cost approach. This is not assessed here, the average values have simply been adopted and applied on a per mile (or kilometre) basis. It should be noted that there are some capital costs included as well as road maintenance.

Actual County expenditure on highways maintenance

This is normally available in the Local Transport Plan (LTP) Annual Reports. The overall total was typical, in excess of £15mn for 2004/05. However, this includes a significant amount of expenditure which is not related to heavy vehicles (such as footways) and some which is only indirectly related, such as lighting and winter maintenance, for example gritting. The key source of expenditure which is almost completely due to heavy vehicle use is carriageway repairs. This is because the damage done by heavy vehicles increases with approximately the fourth power of the axle load. This has been used for over 30 years as the best approximation available, although it is widely recognised that the power should be higher on weaker roads and lower on stronger road surfaces.

Using the 4th power law, one axle of 10 tonnes (HGV scale) is 160,000 times

more damaging to a road surface than an axle of 0.5tonnes (car scale). This is why road surface maintenance is generally taken to be almost exclusively attributable to the heaviest vehicles. Of course this is a simplification, but other aspects of road maintenance are also shared by the heaviest vehicles. Again the NERA report explores some of these issues in more detail.

Methodology to calculate transfer from road to rail

If further data becomes available it would be possible to separate out the County expenditure for the routes used by the HGVs carrying the freight flows which had been identified. A methodology is therefore set out below which would enable such a study to be carried out.

Routing can be supplied direct or estimated using the readily available computer programmes which find the lowest cost or fastest routes. County data which is also readily available would then be used to identify highway maintenance expenditure on those routes. Only expenditure on surface maintenance or reconstruction would be counted, not items such as gritting, cleaning, lighting and footways, although some of this would in fact be attributable to heavy vehicles. A proportion of this would then be allocated to the HGV traffic being removed. This would be calculated according to their share of total HGV numbers on the particular section of route which was being maintained.

Clearly there would be some averaging and it would be possible to refine this method slightly by undertaking spot counts. However it is likely to be conservative in one regard. The vehicles which are most likely to be removed by transfer to rail would be among the heaviest vehicles (over 33 tonnes fully loaded). However, Counties typically collect figures for HGVs including all those over 7.5 tonnes. Many of these vehicles are still thousands of times less damaging than the heaviest. Thus the damage being done by the lorries being replaced could be significantly higher.

This underestimation could be corrected by undertaking sample surveys at the key points identified as highway maintenance expenditure sites in the further work for a road to rail study which is recommended in this report. These could also be linked back to specific origins and destinations. Available County data was inspected and was sufficiently detailed for this purpose. Given the basic commercial data this method should produce reasonably robust results to sit alongside the calculations using national averages.

Results for the transfer of freight to road

The results of the analyses are shown below and some of the spreadsheet calculations behind them are available on request but subject to commercial confidentiality.

Table 1

Allocated maintenance expenditure

All figures are per year for 2004/05

HGV: vehicle movements	HGV: Millions of kilometres	Sensitive Lorry Miles Costs
268,800	9.922	£770,700

Source: commercial data; DfT Sustainable Distribution Fund

Note: SLM includes some capital costs not included in County maintenance

Use of NERA "low" data would give £744,100 at 2002 prices

Conclusions and recommendations

Conclusions

The County based results are significant and show the potential problems which could be caused by any transfer from rail to road. Of course the actual expenditure does not have to rise in line with the damage being done. In this case the condition of the road network would decline for all users.

This estimate is strictly limited to County expenditure in order to illustrate the local impact. Despite this, the figure for increased road costs, £770,700, is considerable and suggests that, even within the County Council budget alone, expenditure on rail freight facilities may be justified even without taking into account any additional environmental and congestion benefits.

Recommendations

Given the promising results from this report a more detailed study should be undertaken in co-operation with freight users to explore the potential benefits from increasing rail freight for this County. The County have already assisted in the preparation of this report and would need to be fully involved, probably in a leading role. The background information available as a result of this piece of work could be used to guide the full scale study.