The Physical Fitness Sub-Objective

TAG Unit 3.3.12

June 2003

Department for Transport

Transport Analysis Guidance (TAG)
1 The Physical Fitness Sub-objective

1.1 Introduction

1.1.1 There is increasing recognition of the interrelation between transport, the environment and health Road Transport and Health (British Medical Association, 1997). Transport affects health in a number of ways, both positive and negative. The overall health effects of transport are summarised in Table 1 below (based on Health Education Department, 1998).

<table>
<thead>
<tr>
<th>Health Promoting</th>
<th>Health Damaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling access to:</td>
<td>Traffic Injuries</td>
</tr>
<tr>
<td>Employment</td>
<td>Air Pollution:</td>
</tr>
<tr>
<td>Shops</td>
<td>fine particulate matter</td>
</tr>
<tr>
<td>Recreation</td>
<td>oxides of nitrogen, especially NO₂</td>
</tr>
<tr>
<td>social service support networks</td>
<td>hydrocarbons</td>
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<tr>
<td>health services</td>
<td>ozone</td>
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<tr>
<td>Countryside</td>
<td>lead</td>
</tr>
<tr>
<td>Recreation</td>
<td>benzene</td>
</tr>
<tr>
<td>Physical Fitness</td>
<td>1,3-butadiene</td>
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<tr>
<td></td>
<td>Noise and Vibration</td>
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<tr>
<td></td>
<td>Stress and anxiety</td>
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<tr>
<td></td>
<td>Danger</td>
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<td></td>
<td>Loss of land and planning blight</td>
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<td></td>
<td>Severance of communities by roads</td>
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</tbody>
</table>

1.1.2 In relation to health and transport, the Government’s Transport White Paper, A New Deal for Transport: Better for Everyone (DETR, 1998) sets the framework to:

- improve air quality by reducing pollution from transport
- reduce noise and vibration from transport;
- improve transport safety for users, those who work in the industry and the general public; and
- encourage physical fitness by reducing reliance on private cars and making it easier to cycle and walk more.

1.1.3 The key indicators in relation to transport and health relate to accidents, air pollution, noise, physical activity and accessibility to people and services. With the exception of physical activity, all of these issues are addressed elsewhere in the guidance under their own objectives or sub-objectives. Clearly to include them under a health objective would introduce double counting into the assessment. Consequently, the remaining key impact relating to health that has not been considered elsewhere in the AST is personal physical activity, or to avoid confusion – physical fitness.

Further Impacts

1.1.4 Any impact of a strategy or plan of accessing health facilities, such as leisure centres and health clubs, should not be included in the Lifestyle sub-objective, but considered under The Accessibility objective (TAG Unit 3.6).

1.1.5 Whilst the health benefits of increased non-motorised travel should be considered under the Physical Fitness sub-objective, there could be impacts on
other objectives that the analyst should ensure are considered; in particular there could be impacts on safety if there are significant increases in the extent of pedestrian and cycling movements and the plan does not necessarily include mitigating safety measures.

**Physical Fitness**

1.1.6 The range of health outcomes influenced by physical activity is considerable (Pearce, 1998). The risk of coronary heart disease, one of the biggest causes of death in this country, is double for an inactive person compared with an active one. Experimental evidence (Hillman, Boyd and Tuxworth, 1999) has further suggested that significant improvements in fitness and well-being can be obtained though relatively small amounts of cycling; the effects were most evident in those who cycled 30km per week.

1.1.7 More exercise would help to reach the Government’s proposed target for reducing coronary heart disease and strokes in England (DOH, 1998). The recommended minimum level of activity for adults is to build up to 30 minutes or more of moderate activity, most days of the week. This level of activity could be integrated into everyday life, including cycling and walking.

1.1.8 Whilst the 30 minute level of activity threshold sounds a high absolute figure, existing activity levels (for example, walking to shops during lunchtimes or around offices) may mean that benefits could arise through changes in the level of activity which last for less time than the threshold would suggest. Similarly, if it is assumed that over the course of a day the outward and return journeys are made, then a single journey time of 15 minutes by foot or cycle would achieve the threshold.

1.1.9 Consideration of the health implications of transport proposals could therefore be identified through an assessment of changes in the opportunities for increased physical activity through cycling and walking. Providing increased opportunities to walk and cycle may also have additional benefits including improvements to the physical environment within communities, fostering well-being and community spirit which also have implications for health.

1.2 **Methodology for Plans**

1.2.1 In preparing inputs for the AST the changes in the extent of walk and cycling should be estimated, either using forecasting tools where walking or cycling measures are key to the strategies or plans being considered, or by adopting a similar approach to the Guidance set out in DMRB section 11.3.8 where the impacts are likely to be less significant.

1.2.2 The key objective of the AST entries is the identification of the contribution of the strategy or plan to overall health by increasing the level of physical activity. Within this indicator there is a reverse dichotomy at play: reducing journey times, which is a key benefit in economic assessment terms, can reduce the health benefits of these activities. Conversely, increasing the extent of walking and cycling may extend journey times which may then reduce economic benefits, but can increase the health benefits. (There is, however, an obvious limit to which this can be taken; at some point, participants cease the activities completely, thus completely removing the health benefits.)

1.2.3 Consequently, the key is the encouragement of walking and cycling, without significantly affecting the health benefits of existing participants. With this in mind, the indicator considers both the journey times and the change in the demand levels. Given that the available evidence indicates the minimum time of activity which is beneficial at 30 minutes, and assuming that the analysis can distinguish between trips which fall above and below this duration, there are four levels of benefit which can be considered:
• for new walk and cycle trips where journey times are below this threshold, there will be some minor health benefits;

• for new walk and cycle trips where journey times are above this threshold, there will be significant health benefits;

• for existing walk and cycle trips, where the journey time remains above the threshold, health benefits will be largely unchanged; and

• for existing walk and cycle trips, where the journey time falls below the threshold, there will be minor reductions in health benefits.

1.2.4 At a plan level, in circumstances where the impacts are likely to be significant and data and forecasts are available, Worksheet 1 should be completed to show the changes in the numbers of walking and cycling trips, split into those longer than 30 minutes and those shorter than this duration. Where the impacts are likely to be significant it will be expected that detailed data and forecasts will be used since walk and cycling should have been considered thoroughly in the forecasting processes. (Although many, if not all, of the short trips forecast would be intrazonal and hence not covered, these would be likely to be too short to be of benefit for those trips where walk and cycle might be considered alternatives to car or public transport.)

1.2.5 Where journey times for existing cyclists are reduced due to the provision of cycle lanes it should be assumed that effect on activity will be neutral, the journey times reducing due to higher travel speeds. It is possible that this may cause some complications in obtaining data from detailed forecasting procedures. In such cases, or others where the use of a journey time measure is not possible or inappropriate, then a journey distance threshold can be used to replace the journey time measure. For cyclists this should assume a threshold of 6 kilometres per day (implying a cycling speed of 12 kilometres per hour).

1.2.6 The entry in the Quantitative column of the AST should show separately the changes in the numbers of cyclists and pedestrians making journeys of more than 30 minutes. The entry in the Overall Assessment column should be the total number of people walking or cycling for more than 30 minutes. These statistics are considered to provide reasonable indicators for the health benefits of transport plans.

1.2.7 The impacts on pedestrians and cyclists should be identified separately, although each is weighted similarly in the overall assessment score.

1.3 Methodology for Strategies

1.3.1 The methodology set out above for plans where the impact is likely to be insignificant should be applied to strategies, unless the strategy has specifically developed walking and cycling strategies. It is likely that more general conclusions will be reached, but it should still be possible to generate an appropriate assessment score for the AST.
2 Application of TAG to Highway Schemes

This section provides advice on the links between TAG’s treatment of the physical fitness sub-objective and the advice given in Volume 11 of the Design Manual for Roads and Bridges (DMRB), which deals with the environmental assessment of highway projects. An explanation of the correspondence between the advice set out in TAG and DMRB is given in Applying the multi-modal new approach to appraisal to highway schemes (TAG Unit 2.6).

2.1 Methods and Worksheets

2.1.1 This is a new topic, introduced in A New Deal for Transport, however, TAG bases the appraisal on DMRB 11.3.8 where changes in the extent (journey length) of walking and cycling is taken into account. Worksheet 1 shows how the appraisal should be presented.

2.2 Data Transformation from DMRB to TAG

<table>
<thead>
<tr>
<th>Data requirements</th>
<th>Modify DMRB Output?</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of pedestrians and cyclists involved in:</td>
<td>Yes</td>
<td>DMRB 11.3.8</td>
</tr>
<tr>
<td>&lt; 30 mins daily activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 30 mins daily activity</td>
<td></td>
<td></td>
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<tr>
<td>or journey distance (proxy) in DM and DS</td>
<td></td>
<td></td>
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<tr>
<td>AST</td>
<td>-</td>
<td>From Worksheet 1</td>
</tr>
<tr>
<td>Change in number of people making journeys of &gt; 30 mins/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of people walking or cycling for &gt; 30 mins/day</td>
<td>-</td>
<td>From Worksheet 1</td>
</tr>
</tbody>
</table>

2.2.1 The estimates of journey length for walking and cycling trips from DMRB 11.3.8 can be converted to journey times using standard average walking and cycling speeds. It is acceptable to use journey distance as a measure and to set distance thresholds e.g. 6 km/day for cyclists.

2.3 DMRB Stages 1 and 2/ TAG

2.3.1 At DMRB Stages 1 and 2, information will be less detailed and it may only be possible to make a qualitative comment for the TAG appraisal.

Worksheet 1 Environment: Physical Fitness

<table>
<thead>
<tr>
<th>Activity Duration per day</th>
<th>Change in Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pedestrians</td>
</tr>
<tr>
<td>Less than 30 minutes</td>
<td></td>
</tr>
<tr>
<td>Greater than 30 minutes</td>
<td></td>
</tr>
</tbody>
</table>

Reference Source(s):______________________________________________________________

Summary assessment score:___________________________________________________________

Qualitative comments:_________________________________________________________________
3 Further Information

The following documents provide information that follows on directly from the key topics covered in this TAG Unit.

<table>
<thead>
<tr>
<th>For information on:</th>
<th>See:</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraisal Summary Table</td>
<td>Transport Appraisal and the New Green Book</td>
<td>TAG Unit 2.7</td>
</tr>
<tr>
<td></td>
<td>The Appraisal Process</td>
<td>TAG Unit 2.5</td>
</tr>
<tr>
<td>The correspondence between the advice set out in TAG and DMRB</td>
<td>Applying the multi-modal new approach to appraisal to highway schemes</td>
<td>TAG Unit 2.6</td>
</tr>
<tr>
<td>Policy background to the physical fitness sub-objective</td>
<td>A new deal for transport</td>
<td>See transport policy links</td>
</tr>
</tbody>
</table>

4 References

British Medical Association (1997) *Road Transport and Health*


Health Education Authority (1998) *Transport and Health: A Briefing for Health Professionals and Local Authorities*

Department of Health (1998) *Our Healthier Nation: a contract for health, CM 3854*

L M Pearce (TRL) A L Davis (Adrian Davis Associates) Dr H D Crombie (Independent Consultant) and HN Boyd (Allot and Lomax) (1998) *Cycling for a Healthier Nation, TRL Report 346*

DETR (July 1998) *A New Deal for Transport: Better for Everyone*

Highways Agency *Design Manual for Roads and Bridges (DMRB)*

5 Document Provenance

This Transport Analysis Guidance (TAG) Unit is based on Chapter 4 Section 12 of *Guidance on the Methodology for Multi-Modal Studies Volume 2* (DETR, 2000). Section 2 of this unit is taken from *Applying the Multi-Modal New Approach to Highway Schemes* (DETR, 2001).

Technical queries and comments on this TAG Unit should be referred to:

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The Journey Ambience Sub-Objective

TAG Unit 3.3.13

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Department for Transport

Transport Analysis Guidance (TAG)
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1 The Journey Ambience Sub-objective

1.1 Introduction

1.1.1 Travellers don’t normally travel for its own sake.¹ Travel is a derived demand that arises from people’s desire to engage in productive or non-productive activities. Therefore a high quality journey, when experienced, is often (but not always) taken for granted. However a poor journey quality, when experienced, can be easily recognised. Journey quality can be affected, positively or negatively, by travellers themselves and by network providers and operators.

Influences on journey quality

1.1.2 Arguably the most effective way to improve journey quality is to reduce travellers’ journey times and/or the variability of these journey times by, for example, improving the transport infrastructure. However these journey time benefits, along with others, such as safety improvements, are taken into account under the Transport Economic Efficiency, Reliability and (see The Economy Objective (TAG Unit 3.5)) Accidents sub-objectives (see The Safety Objective (TAG Unit 3.4)) and should not be assessed under this sub-objective.

1.1.3 Travellers can affect journey quality in a number of ways. The most significant influences that they can exert directly are their choices of transport mode and vehicle type or class of travel. These choices may affect ride quality, the environmental quality that they experience (noise and air quality levels, whether they stay warm and dry), interior decor and upholstery of the vehicle, the quality of the seats (as distinct from their upholstery), whether facilities such as tables, lights, drinks holders and air conditioning are provided, the quality of the music system and other features. However travellers’ influence on the social environment within a vehicle also affects journey quality. For example, prolonged or intermittent distractions such as a crying baby, noisy children or from other travellers can detract from journey quality. Similarly, for drivers and passengers, motorcyclists and cyclists, journey quality can be affected by the mechanical condition and cleanliness of the vehicle and driving style. For public transport the same factors may also apply. However travellers usually have much less influence over the social environment and the cleanliness of the vehicle. It is not possible to say what characteristics about other passengers annoy travellers. However they may include whether they are drunk, talking loudly and smoking. For travellers using private motorised vehicles, journey quality may also vary between that experienced by the driver and that experienced by passengers. These factors are not considered under this sub-objective.

1.2 Methodology for Plans

1.2.1 This methodology focuses on measures under the control of network providers and operators that improve en route journey quality or journey ambience. These measures are an important part of the Government’s commitment to:

- deliver better public transport services, through ‘Quality Partnerships’ in relation to buses and the creation of the Strategic Rail Authority; and

- improve the management of the trunk and local road networks.

¹ Some forms of tourism, such as sightseeing tours, provide exceptions to this general rule.
1.2.2 The measures can affect three journey ambience factors:

- traveller care;
- travellers’ views; and
- traveller stress.

1.2.3 The methodology builds and expands upon techniques:

- for assessing impacts on travellers contained in DMRB 11.3.9;
- developed by London Transport; and
- contained in the Institute of Highways and Transportation publication ‘Cycle Friendly Infrastructure’.

1.2.4 In assessing these journey ambience factors, the analyst should avoid double counting impacts that are assessed under other sub-objectives. For example, measures to improve journey quality at rail and bus stations and stops should be assessed using the Passenger Interchange sub-objective.

**Traveller care**

1.2.5 For road users, journey ambience can be affected by whether facilities and information are provided along a route and by their spacing and quality. For public transport users, the cleanliness and general environment within the vehicle are also important journey ambience factors. Taken together, measures to improve these four factors are analogous to what private firms sometimes describe as ‘customer care’.

1.2.6 For road users, facilities that improve en-route journey ambience include lay-bys, roadside toilets and service areas along a route. The quality of a service area will depend on what services are available. These may include: petrol; restaurant; lodgings; toilets, including baby changing facilities and provision for the disabled; and shops. However journey ambience also depends on the condition of the service area, their spacing along a route and whether or not people perceive the service area to be over-crowded. Some of these factors will also affect the quality of lay-bys and roadside toilets.

1.2.7 For cyclists and pedestrians the provision and design of dedicated facilities, such as cycle lanes and crossings, may affect journey quality. An example of poor design is where a cycle path/route is provided along a route with steep gradients.

1.2.8 En-route information provided to road users can be classified into route specific information (e.g. direction signs) and general travel information (such as a warning sign for a sharp bend in the road). The methodology in this section is concerned with changes in the provision and quality of general travel information. Improvements to route-specific information is dealt with under Route Uncertainty, in the Traveller Stress section below.

1.2.9 On public transport, improvements to stations and bus stops should be assessed under the Passenger Interchange sub-objective. However vehicle attributes (other than those that enhance security and safety of travellers and staff) that can affect journey quality can be categorised in four ways:

- cleanliness - internal and external cleanliness and graffiti; the condition of the seats; tables; brightness of internal lighting;
- facilities - types of seats, handles, luggage racks and storage, toilets, buffet/restaurant facilities and level of staff customer service;
• information - audibility, frequency and usefulness of on-board PA announcements; the provision of general travel information and customer magazines; and the condition of advertising posters; and

• environment - extent of overcrowding, ventilation; temperature; noise; overall condition and smoothness of ride.

1.2.10 Using Worksheet 1 an assessment should be made about the impact of the proposed option on each of these sub-factors using a simple three point scale - better, neutral, worse.

Travellers’ views

1.2.11 A transport improvement can affect the extent to which travellers can see the surrounding landscape and townscape and have an impact on the attractiveness of the general travelling environment. For example, the re-opening of a rail line may enable more people to see and appreciate notable landscape features. However, the construction of a bypass is likely to reduce the number of travellers that pass through a historic town centre. The extent to which travellers can see the landscape or townscape will vary with the relative level of the route and the surrounding ground, vegetation, buildings and structures. Views can be categorised as providing:

• no view - where the route is in a deep cutting, a tunnel or surrounded by environmental barriers;

• restricted view - where there are frequent cuttings, tunnels or barriers;

• intermittent view - where there are shallow cuttings or barriers; and

• open view - where the view extends over many miles.

1.2.12 Even small improvements to the areas surrounding a route can improve its attractiveness, such as the provision of higher quality crash barriers and street furniture, the planting of roadside/trackside vegetation, the removal of roadside/trackside litter or graffiti and improvements to disused rail freight facilities. A high quality view can also help relieve traveller stress (see the section below).

1.2.13 Using Worksheet 1 an assessment should be made about the impact of the proposed option on travellers’ views using a simple three point scale - better, neutral, worse

Traveller stress

1.2.14 Traveller stress is the adverse mental and physiological effects experienced by travellers. Three main factors influence traveller stress:

• frustration;

• fear of potential accidents; and

• route uncertainty

1.2.15 Taken together, these can lead to feelings of discomfort, annoyance, frustration or fear culminating in physical and emotional tension that detracts from the quality and safety of a journey. Extreme cases of traveller stress can contribute towards, or be caused by, ‘transport rage’. The extent of stress will depend on the travellers driving skill and experience, temperament, knowledge of the route and state of health.
1.2.16 **Frustration.** Major influences on frustration include a driver’s inability to drive at a speed consistent with his or her own wishes relative to the standard of the road (e.g. congestion), or delays on public transport. However these impacts should be assessed under other sub-objectives.

1.2.17 For road users, other influences on frustration include:

- the road layout and geometry;
- the condition of the road network; and
- the ability to make good progress along a route;

1.2.18 A complex or coherent road layout (e.g. poor junction design or incomplete cycle route) may confuse and frustrate travellers compared with a simple or complete road layout. The effect of geometry on journey quality can be either positive or negative. An extremely bendy road is difficult to drive along and more uncomfortable for travellers. However the inclusion of gentle bends on what would otherwise be straight roads usually makes the experience for the driver more pleasant because he/she is required to concentrate more on driving.

1.2.19 The condition of the road network will affect ride quality for all travellers, although it will be of more particular concern to cyclists. The condition of a road includes its:

- perceived smoothness, in terms of whether it is deformed, rutted and holed or provides a seamless pavement;
- performance characteristics, in terms of its in-vehicle noise, drainage, skid resistance, the amount of spray that it throws up and whether drivers are dazzled by on-coming vehicles at night.

1.2.20 The ability to make good progress along a route depends on factors such as the presence or absence of traffic management measures, such as chicanes or speed bumps and the availability of overtaking opportunities. The absence of the latter means that when overtaking stationary vehicles, the driver is continually having to pull out from behind these vehicles. These factors may or may not increase journey times, but are likely to affect the travelling experience.

1.2.21 Some public transport users (e.g. the disabled and mothers with young children) may experience frustration in accessing and egressing public transport.

1.2.22 **Fear of accidents.** Fear of accidents is more likely to be associated with road users. The main factors leading to fear of accidents are the presence of other vehicles, inadequate sight distances and the possibility of pedestrians stepping into the road. Other factors include: whether or not the flow of traffic in each direction is physically separated; inadequate lighting; the width of the road/carriageway/lane; the presence of roadworks; the absence of lane markings, cats eyes, safety barriers and hard shoulders. Fear is highest when speeds, flow and the HGV content is high. All these factors become more important in adverse weather conditions. A road scheme may increase vehicle flow and speeds, but will also be built to a superior design standard, offering a higher quality road surface and lighting.

1.2.23 **Route uncertainty.** Travellers’ uncertainty about their route can be influenced by the extent to which they have planned their journey and the quality of route information, whether provided to users before they begin their journey, or en route. Improved provision and legibility of en-route general travel information is included in the Customer Care section above and is not discussed here.

1.2.24 At any one time a proportion of road users are lost. Improved route signs should reduce this proportion and improve journey quality. This benefit should be assessed under this sub-objective. However the beneficial impacts of this...
measure on journey times, vehicle operating costs and safety should be considered under the Journey Time and Vehicle Operating Costs and Accidents sub-objectives.

1.2.25 Lack of public transport information, and peoples’ unfamiliarity with that information, are two of the major impediments to travellers using public transport. This methodology is specifically concerned with assessing improvements in the provision and legibility of route information, either pre-trip and/or en-route. Such improvements might include:

- timetables and network maps that are: easier to use; more accessible (e.g. available in public places, or on the Internet); and provide more detailed route information;
- better provision of in-vehicle route signs.

1.2.26 Improvements in the provision and legibility of route and general travel information at stations (particularly where these are large) and bus stops should be assessed under the Transport Interchange sub-objective (see The Integration Objective (TAG Unit 3.7)). As noted above improvements in the provision of en-route general travel information is discussed in the Customer Care section above.

1.2.27 Using Worksheet 1 an assessment should be made about the impact of the proposed option on each of these sub-factors using a simple three point scale - better, neutral, worse.

Overall impact scoring

1.2.28 To arrive at an overall impact score for quality of a journey use the following guidelines:

- the overall assessment is likely to be neutral if the assessment is neutral for all or most of the sub-factors, or improvements on some sub-factors are generally balanced by deterioration on others;
- if the change in impact across the sub-factors is, on balance, for the better, the assessment is likely to be beneficial, and, conversely, it is likely to be adverse if there is an overall change for the worse;
- the overall assessment is likely to be slight (beneficial or adverse) where the numbers of travellers affected is low (less than 500 a day, say);
- the overall assessment is likely to be large (beneficial or adverse) where the numbers of travellers affected is high (more than 10,000, say);
- the overall assessment is likely to be moderate (beneficial or adverse) in all other cases.

Qualitative comment

1.2.29 The qualitative box on the AST should be used to provide any comments of particular significance about the appraisal of plans or strategies against this sub-objective.
1.3 Methodology for strategies

1.3.1 The methodology, set out above for plans, should be applied to strategies on a corridor basis, rather than on a locational basis. It is likely that more general conclusions will be reached. The appraisal will also need to reflect the extent to which there is clear evidence that journey quality has changed.

2 Application of TAG to Highway Schemes

This section provides advice on the links between TAG’s treatment of the journey ambience sub-objective and the advice given in Volume 11 of the Design Manual for Roads and Bridges (DMRB), which deals with the environmental assessment of highway projects. An explanation of the correspondence between the advice set out in TAG and DMRB is given in Applying the multi-modal new approach to appraisal to highway schemes (TAG Unit 2.6).

2.1 Methods and Worksheets

2.1.1 The TAG approach develops further the method in DMRB 11.3.9 (under Vehicle Travellers) by including, in addition to Traveller View from the Road (Rail etc) and Traveller Stress, the factor of Traveller Care. Work sheet 1 shows the information to be used in the appraisal.

2.2 Data Transformation from DMRB to TAG

<table>
<thead>
<tr>
<th>Data requirements</th>
<th>Modify DMRB Output?</th>
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<tr>
<td>Traveller Care</td>
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<tr>
<td>Traveller’s Views</td>
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<tr>
<td>Traveller Stress</td>
<td>Yes</td>
<td>DMRB 11.3.9.3 for driver stress, add other road-based transport modes</td>
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<td>AST</td>
<td>Any Comment of particular significance</td>
<td>Summarise worksheet</td>
</tr>
<tr>
<td>Impact Score</td>
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<td>Transfer from worksheet</td>
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2.2.1 For Traveller’s View and Traveller Stress, added to the DMRB assessment should be an estimate of effects on other road-based transport users, particularly public transport users. The DMRB criteria for Driver Stress can be used to score the factor of Traveller Stress.

2.2.2 Traveller Care is a new concept for TAG and information will need to be collected for the four sub-factors: cleanliness, facilities, information and environment.

2.3 DMRB Stages 1 and 2/ TAG

2.3.1 Traveller ‘view from the road’ and ‘driver stress’ from DMRB Stages 1 and 2 can be used as a broad brush estimate for journey ambience in TAG. Information on ‘traveller care’ can be added if it is known at the early stages of assessment, although this is unlikely.
Worksheet 1  Environment: Journey Ambience

<table>
<thead>
<tr>
<th>Factor</th>
<th>Sub-factor</th>
<th>Better</th>
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<td>Environment</td>
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<tr>
<td>Traveller Stress</td>
<td>Frustration</td>
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<td>Fear of potential accidents</td>
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<tr>
<td></td>
<td>Route uncertainty</td>
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</table>

Reference Source(s):_____________________________________________________
______________________________________________________________________

Summary assessment score:_______________________________________________
______________________________________________________________________

Qualitative comments:____________________________________________________
______________________________________________________________________

3  Further Information

The following documents provide information that follows on directly from the key topics covered in this TAG Unit.

<table>
<thead>
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<th>For information on:</th>
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<td>TAG Unit 2.5</td>
</tr>
</tbody>
</table>

4  References

Highways Agency *Design Manual for Roads and Bridges (DMRB)*
5 Document Provenance

This Transport Analysis Guidance (TAG) Unit is based on Chapter 4 Section 13 of *Guidance on the Methodology for Multi-Modal Studies* (DETR, 2000).

Technical queries and comments on this TAG Unit should be referred to:

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The Option Values Sub-Objective

TAG Unit 3.6.1

June 2003

Department for Transport

Transport Analysis Guidance (TAG)
## Contents

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1 The Option Values Sub-objective

1.1 Introduction

1.1.1 Option values are recognised by the SRA in their Appraisal Criteria (SRA, 2003) but in principle are equally applicable to other public transport modes (bus, coach, LRT, underground, air), to car ownership, road infrastructure and to freight facilities. Within the Multi-Modal Studies, it will be particularly important to consider option values if the strategies or plans which are being appraised include measures which will substantially change the availability of transport services within the study area (e.g. the opening or closure of a rail service, or the introduction or withdrawal of weekend buses serving a particular rural area).

1.1.2 The idea underlying option values can be explained using the following example. Consider a strategy or plan which includes the re-opening of a closed railway line linking a series of rural towns and villages to a major town or city that already has a railway service. Even if a particular individual living in one of the villages along the route does not intend to use the rail service with any regularity, they may still value having the option to use the service if they choose. For example, a car-owner may value the ability to use the service when for whatever reason they cannot drive or their car is unavailable. A non-car-owning resident who generally does not travel beyond the village may value the knowledge that, should they need to reach the town or city, the facilities exist for them to do so, at reasonable cost and with a reasonable level of convenience. In addition, those who do intend to use the service on a regular basis may also have an option value, over and above the value of their intended use of the service, since they too may value the options offered for rail travel other those already taken account of in their individual plans and expectations.

1.1.3 From this example, it can be seen that:

- option values are associated with unexpected use of the transport facility which is not built into the forecasts produced by the modelling stage, and would otherwise not appear in the appraisal as a benefit;

- option values are related to the individual's attitude to uncertainty - in practice a range of option values is likely to be found within the population; and

- there is a real risk of double counting, particularly when trying to separate individuals' willingness to pay to have the option of using the service from their willingness to pay for their actual use of the service.

1.1.4 Evidence of option values for transport has been found in two studies in particular (which should also prove useful as references on methodology): one examining the removal of a suburban bus service (Bristow et al, 1991) and one examining values placed on the retention of the Settle-Carlisle rail service (Crockett, 1992). The latter found values of around 70 pence per week, although the sample included both users of the service and non-users, and the latter were found to have significantly lower option values than the average. In the Multi-Modal Studies, it will be important (if option values are being estimated) to include both users and non-users as separate groups within the survey work.

1.1.5 Methodologies for calculating option values and avoiding the double-counting problem noted above are discussed in an unpublished report to OPRAF entitled Planning Criteria Research Requirements (ITS, March 1999). For further details, contact SRA.
1.1.6 In presenting the findings, the Qualitative Impacts column should be used to identify which group of transport services within a particular strategy (or option) are the source of any additional (or reduced) option value, the nature of the change in service and the sign of the change (i.e. option value gained or lost). The Quantitative column should be used to indicate the size of the populations affected and the nature of the analysis used to generate any monetary measures of total value. The Assessment column should be used to report the total monetary benefits (or disbenefits) of the option or strategy being appraised. For consistency with other sub-objectives, this monetary total should be expressed as a present value, discounted over the whole appraisal period.

1.1.7 For the ‘Option values’ sub-objective, it is recognised that it will often not be feasible to carry out the analyses outlined above, especially in the early stages of developing an option or when appraising a strategy, rather than a plan. Therefore an alternative qualitative procedure should be adopted, outlined in Box 1 below.

Box 1: Qualitative procedure for assessing option values

<table>
<thead>
<tr>
<th>Community</th>
<th>Service Withdrawn</th>
<th>Service Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥2000 people</td>
<td>Strong adverse</td>
<td>Strong beneficial</td>
</tr>
<tr>
<td>500-1999 people</td>
<td>Moderate adverse</td>
<td>Moderate beneficial</td>
</tr>
<tr>
<td>1-499 people</td>
<td>Slight adverse</td>
<td>Slight beneficial</td>
</tr>
<tr>
<td>0 people</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

Where more than one community is affected the total number of resident individuals should be added together (with a negative sign attached to communities losing their service).

‘Ghost’ services not providing reasonable opportunities for return travel on all days of the week should not be treated as services for these purposes. Withdrawal of rail services replaced by bus should be counted as a withdrawal of service, given the lower level of accessibility offered to significant groups of users.

1.2 Application of TAG to Highway Schemes

1.2.1 The Option Values sub-objective did not previously appear in DMRB. However, Highway Schemes should be assessed against this sub-objective using the advice given above.

2 References


ITS (March 1999) entitled Planning Criteria Research Requirements
3 Document Provenance

This Transport Analysis Guidance (TAG) Unit is based on Chapter 7 Section 2 of *Guidance on the Methodology for Multi-Modal Studies Volume 2* (DETR, 2000).

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The Access to the Transport System Sub-Objective

TAG Unit 3.6.3

June 2003

Department for Transport

Transport Analysis Guidance (TAG)
1 The Access to the Transport System Sub-objective

1.1 Introduction

1.1.1 The most important determinant of access to the transport system is the availability of a vehicle for private use. Analyses should therefore be conducted to show the proportions of households without a car available, by zone of the study area.

1.1.2 For those without a car, access to the public transport system is of crucial importance. The most straightforward way to appraise this issue is to identify those areas of development which are in excess of a certain distance or walking time from a public transport service. This can be shown in map form.

1.1.3 Further elaborations are possible, depending on the availability of suitable data. These more detailed analyses may follow two avenues:

- analyses of other aspects of the public transport system which contribute to the level of accessibility provided; and
- analyses of the kinds of people resident in the areas lying outside the prescribed distance or walking time from a public transport service.

1.1.4 The aspects of the public transport system should include consideration of:

- service frequency which influences the time people would expect to wait for a service;
- the level of crowding which influences whether people can expect to board the next service which arrives;
- the fares people can expect to pay;
- the number of times people can expect to have to change from one service to another;
- the travel speeds while riding in the public transport vehicle; and
- the general quality of the public transport service, including factors such as the availability of information, ease of access to the vehicles themselves, and standards of comfort.

1.1.5 All but the last of these are included in the generalised costs used in the cost/benefit analysis undertaken for the economy objective. The intention here is not to duplicate the CBA but to show the information in a different way so that the objective of accessibility can be more directly addressed by targeted measures.

1.1.6 Analyses should be undertaken to determine a detailed breakdown of the population in terms of whether they are in education (by type), in employment, retired, or disabled. In order to move from the map-based/GIS analysis of access to the transport system (with and without the strategy) to an assessment score, the data on which that analysis is based should be used to calculate an ‘Access to the transport system’ indicator, as described in Box 1. The indicator should be calculated for the do-minimum case and for the strategy or plan. The size and sign of the difference between the two should then be used to calculate an assessment score.
Box 1: The ‘Access to the transport system’ indicator

Access to the transport system is strongly influenced by the two key variables introduced at the start of this section, i.e. access to a private car and proximity to a public transport service.

In order to combine these within an indicator of access to the transport system across the Study Area, a ‘access to the transport system’ index should be created, as follows:

\[ A_i = \left(1 - \frac{P_{\text{NCA},i}}{P_i}\right) \times 100 \]

where \( A_i \) is the access to the transport system index for zone \( i \) of the Study Area;
\( P_{\text{NCA},i} \) is the resident population of zone \( i \) who do not have access to a Car and do not live within 250m of a daytime hourly public transport service;
\( P_i \) is the total resident population of zone \( i \).

\( A_i \) is therefore the percentage of the population of zone \( i \) who have access to a car or live within 250 m of a daytime hourly public transport service. Similarly, for the Study Area as a whole:

\[ A = \left(1 - \frac{\sum_i P_{\text{NCA},i}}{\sum_i P_i}\right) \times 100 \]

where \( A \) is the access to the transport system index for the Study Area.

1.1.7 Calculation of the Access to the transport system Score, given the access to the transport system indexes for the do-minimum case, \( A^0 \), and the do-something, \( A^1 \), should then follow the scale shown in Table 1.

Table 1: Scoring Scale for the ‘Access to the Transport System’ Sub-objective

<table>
<thead>
<tr>
<th>Proportionate change in access index, ((A^1-A^0)/A^0)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>+21% or greater</td>
<td>Large beneficial</td>
</tr>
<tr>
<td>+6% to +20%</td>
<td>Moderate beneficial</td>
</tr>
<tr>
<td>+2% to +5%</td>
<td>Slight beneficial</td>
</tr>
<tr>
<td>-1% to +1%</td>
<td>Neutral</td>
</tr>
<tr>
<td>-2% to –5%</td>
<td>Slight adverse</td>
</tr>
<tr>
<td>-6% to –20%</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>-21% or greater</td>
<td>Large adverse</td>
</tr>
</tbody>
</table>

1.2 Application to Strategies

1.2.1 In the case where a strategy is being assessed rather than a plan, there is less likely to be firm data available on the population with no car available who will live within 250 metres of a daytime hourly public transport service in the do-something scenario. Instead, the change in population in this category should be estimated approximately using the following steps:

- from the base data gathered for the study area, the proportion of resident population with no car available should be straightforward to calculate -
this calculation should be made separately for each distinct locality within the study area in order to isolate areas where the rate of non-car availability is particularly high, where it is towards the average and where it is low. The localities may be model zones or wards or postcode sub-areas or any similar set of areas depending whatever is most convenient from a data availability viewpoint. The rate of non-car availability (as a value between 0 and 1) will be called NCA_i for each locality i.

- turning to the definition of the strategy, an assessment should be made of which corridors within the study area, if any, are likely to benefit from improved (or worsening) public transport provision so that they change in status from being without to being with a daytime hourly public transport service.

- for these corridors only, for each locality along the corridor, make an estimate of the population living within 250 metres of the main route, again using the base data for the study area - it is assumed that the population will not change or relocate as a result of or as part of the strategy (if it is known that this is an unrealistic assumption, then it would be appropriate to revert to the full method in Box 1). Let this population be called \( P_{ix} \) for each locality i.

- to calculate the do-something accessibility index for study area, the \( P_{ix} \) term should be used in the following function:

\[
A = \left( 1 - \frac{\sum \text{NCA}_i \cdot P_{ix}}{\sum P_i} \right) \times 100
\]

where A is the access to the transport system index for the Study

- The do-minimum accessibility index, used to infer the change between do-minimum and do-something, should be calculated using the study area wide function in Box 1.

The change in accessibility index should then be interpreted in an identical way for a strategy as a plan using Table 7.1 to provide the scoring for the AST.

1.3 Application of TAG to Highway Schemes

1.3.1 The Access to the Transport System sub-objective did not previously appear in DMRB. However, Highway Schemes should be assessed against this sub-objective using the advice given above.

2 Further Information

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</table>
3 References


SRA (April 2003) *Appraisal Criteria*  
http://www.sra.gov.uk/sra/publications/other/1999_06_16/planning_criteria.htm

4 Document Provenance

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