5 Travel time costs

1300 -87

TTC are the monetised costs to the road user for the time taken to complete a journey. TTC benefits equal the difference in road user TTC between the base case and the project case. TTC are a function of trip time, average occupancy per vehicle, the monetary value of time per occupant, cost of freight delay per hour and AADT.

The calculation of trip time is shown by Equation 40.

Equation 40: Trip time

$$TripTime(VT) = \frac{SecLength}{OS(VT)}$$

Where:

- TripTime(VT) = trip time (hours)
- SecLength = section length (km)
- OS(VT) = operating speed

Example: Trip time

For a B-double travelling along a sealed, 5 km road section at 64.4 km/h, the trip time is:

$$TripTime(B - Double) = \frac{5km}{64.4km/h}$$

TripTime(B - Double) = 0.0775 hrs (4.65 minutes)

The 5 km journey takes 4.65 minutes to complete when travelling at an average speed of 64.4 km/h.

Note: Trip time will differ for each vehicle type based on operating speed as calculated in Section 3.

Each vehicle type has an associated cost reflecting the value of the occupant's time and the cost of freight delays. These costs differ between urban and rural speed environments as the occupancy rates change between environments. These time costs are shown by Table 23.

Vehicle type	Environment	Resource prices (June 2007)			
		Value per occupant (pers/hr)	Freight travel time (value per veh- hour)	Occupancy rate (pers/veh)	Total value of time (\$/veh.hr)
Cars – private	Rural	11.49	0.00	1.70	19.53
	Urban	11.49	0.00	1.60	18.38
Cars – commercial	Rural	32.01	0.00	1.30	41.62
	Urban	32.01	0.00	1.40	44.81
Non-Articulated	Rural	22.86	2.67	1.17	29.35
	Urban	22.86	5.26	1.20	32.69
Buses	Rural	11.49	0.00	12.00	137.88
	Urban	11.62	0.00	15.00	174.30
Articulated	Rural	23.76	15.00	1.00	38.76
	Urban	23.76	29.54	1.00	53.30
B-double	Rural	23.87	24.53	1.00	48.40
	Urban	24.98	48.32	1.00	73.30
Road train 1	Rural	24.98	32.79	1.00	57.77
	Urban	26.11	0.00	1.00	26.11
Road train 2	Rural	25.44	48.32	1.00	73.76
	Urban	25.44	0.00	1.00	25.44

Table 23: Estimated values of travel time – occupant and freight payload values

Source: adapted from Austroads (2008) page 18.

The final derivation of annual travel time value per vehicle and vehicle type is given by Equation 41.

Equation 41: Annual travel time

$TTC(VT) = AnnFact \times (TripTime(VT) \times AADT_{(VT)} \times VTVEHR(VT))$

Where:

- TTC(VT) = TTC cost (\$)
- AnnFact = annualisation factor (days per year)
- TripTime(VT) = trip time (hrs)
- VTVEHR = value of time per vehicle (\$)
- AADT(VT) = annual average daily traffic of vehicles type x

Example: Travel time cost

For a B-double travelling 4.65 minutes on a rural road, the annual time cost is:

 $TTC(VT) = 365.25 \times (0.0775 \times 1 \times 48.40)$

 $TTC(VT) = $1370.05 \, per \, year$

The TTC for a B-double is \$1370.05 per year.

This TTC calculation is repeated for each year of the assessment as a number of variables will change with road and traffic conditions, including congestion and trip time.

AADT in this example refers to the number of vehicles for each vehicle type, instead of the aggregate value. In calculating the total TTC, these calculations would be summed for each vehicle type in both base and project cases.