SWOV Fact sheet

Mobility on Dutch roads

Summary
Mobility is an important factor in road safety research, because it has a major influence on the number of road crashes and road casualties. Developments in mobility are determined by developments in, broadly speaking, four areas: demography, the social and cultural sphere, the economy and spatial planning. Mobility in the Netherlands has been increasing since the 1950s. Today, more than 200 billion kilometres are travelled each year. The increase in mobility in the last ten years is due almost entirely to the car. Total annual mobility has increased in the last ten years for the population group above the age of 40, whereas, conversely, it has decreased for the group below that age. This difference is largely the result of changes in the composition of the population.

Background
Almost everyone participates in traffic on a daily basis. The distances travelled and the how and why of these journeys are the subject of mobility research. SWOV itself does not conduct research into mobility. Within the Netherlands, mobility research is carried out by the Dutch Ministry of Transport's Centre for Transport and Navigation (DVS, formerly the Transport Research Centre AVV), the Netherlands Institute for Transport Policy Analysis (KiM) and Statistics Netherlands (CBS). Given that it has a major influence on the number of road crashes and therefore on the number of road casualties, mobility is an important factor in road safety research. For more information about mobility in relation to road safety, see also the SWOV Fact sheet *Risk in traffic*.

This fact sheet discusses the developments in mobility in the Netherlands and factors of influence in that regard. In addition, a brief discussion is devoted to how and what mobility data is collected in the Netherlands.

What is mobility and what factors influence it?
In a literal sense mobility is 'the ability to move about'. In research relating to traffic engineering, however, mobility refers to the number of journeys or distance travelled in traffic on public roads. Developments in mobility are largely determined by developments in, broadly speaking, four areas (Transport Research Centre, 2006):

- Demography: the more people there are, the greater the mobility. In addition, changes in age structure and household composition play a role in mobility development.
- The social and cultural sphere: mobility has increased as a result of, for example, individualization in society and the emancipation of women and their concomitantly increased participation in the labour force.
- The economy: increasing prosperity generally leads to greater mobility.
- Spatial planning: the distribution of, for example, residential locations and places of work across the country influences mobility.

Mobility in the Netherlands has been continuously increasing since the 1950s. Throughout the decades, pronounced shifts have also occurred in the modes of transport used (Mom & Filarski, 2008; SWOV, 2007). These were in part determined by the advent of new, faster modes of transport and the associated ability to travel greater distances than had previously been possible within the same journey times. In terms of mode of transport, the period immediately after the Second World War was characterized primarily by increased use of the moped. This was followed by an explosive growth in the ownership and use of cars from the early 1960s onwards. Today, mobility in the Netherlands remains dominated by the car, which accounts for approximately two-thirds of the total distance travelled on Dutch roads.

Mobility has a major influence on the number of crashes and road casualties. After all, the more road users and the greater the total distance travelled, the more frequently road users will encounter each other and therefore the higher the probability of a crash and associated road casualties occurring. It is

therefore extremely important to take mobility development into account when conducting research into road safety. More information about this can be found in the SWOV Fact sheet *Risk in traffic*.

How do we measure mobility?
Continuous research into the travel behaviour of people in the Netherlands has been carried out since the beginning of the 1980s. Data on the mobility of individuals is collected by means of a survey of Dutch households. Up to and including 2003, this survey was conducted by Statistics Netherlands (CBS) and was called the Traffic Survey (*Onderzoek Verplaatsingsgedrag*, OVG). This survey was subsequently continued by the Centre for Transport and Navigation (previously the Transport Research Centre) and is currently known as the Dutch Mobility Survey (*Mobiliteitsonderzoek Nederland*, MON). Based on the survey results, estimates of the mobility of individuals resident in and travelling within the Netherlands are made by means of an increment and weighting process (Centre for Transport and Navigation, 2008).

Given that the Dutch Mobility Survey relates only to the mobility of individuals resident in the Netherlands, the data it provides does not encompass the total mobility on Dutch roads. Rough estimates indicate that the mobility covered by the Dutch Mobility Survey constitutes approximately 80% of the total distance travelled in the Netherlands. The remaining part comprises lorry traffic (approximately 12%), holiday traffic of individuals resident in and travelling within the Netherlands (this is not included in the Dutch Mobility Survey and constitutes approximately 5%) and distances travelled on Dutch roads by individuals not resident in the Netherlands (approximately 4%). Estimates of these components are provided by Statistics Netherlands (CBS) on the basis of, among other things, the surveys carried out by the national and international road transport organization NIWO/SIEV for lorry traffic and the Continuous Holiday Survey (*Continu Vakantie Onderzoek*, CVO). The accuracy of these additions is limited, however, as is the availability of data on, for example, age and time.

In addition, Statistics Netherlands (CBS) maintains Road Statistics which include, among other things, distances travelled with motor vehicles. No data on the mobility of non-motorized traffic is available for the period prior to the 1980s. Motor vehicle mobility certainly does not provide a complete picture of mobility from 1950. Broadly speaking, the further back we go in historical terms, the less accurately motor vehicle mobility reflects total mobility. This is because mobility in the past was less dominated by motorized traffic than is the case today.

What is the level of mobility in the Netherlands?
Data on motor vehicle mobility in the Netherlands is used to discern the development in mobility on Dutch roads from 1950. Further below in this fact sheet, Dutch Mobility Survey data is used to focus on recent developments in the mobility of individuals in terms of kilometres travelled.

Figure 1 shows the progress in motor vehicle mobility since 1950. In addition to the original figures, the graph includes the provisionally revised series starting from 1990.[1] These figures are, at most, approximately 5% lower than the original series. Following conservative growth at the beginning of the 1950s, motor vehicle mobility increased sharply in the 1960s due, among other things, to the rise in the number of cars. Although the rate of increase slowed somewhat thereafter, the increase has continued up to the present day. In the last ten years – that is, the period 1997-2007 – the distance travelled by motor vehicles increased by almost a quarter, which meant an average annual growth rate of almost 2.5%. To give an impression of total annual mobility in the Netherlands, motor vehicle mobility exceeded 130 billion kilometres in 2007. Today, a total of over 200 billion kilometres are travelled on the roads each year.

[1] Revision of the series was necessary due to problems in data collection. Definitive data has unfortunately not yet been published by Statistics Netherlands (CBS).

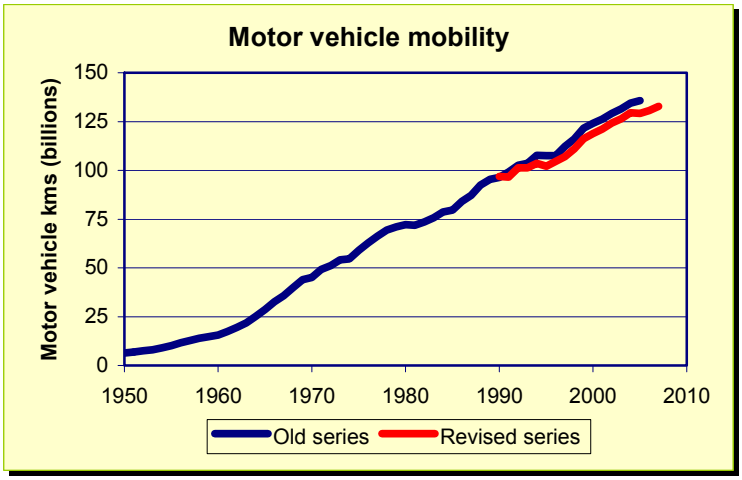

Figure 1. *Motor vehicle mobility (in billions of kilometres): original series from 1950 and provisionally revised series from 1990.*[1] *Source: Statistics Netherlands (CBS).*

How is mobility distributed across different modes of transport?

To properly discern developments in mobility in the Netherlands, it is necessary to consider both the total mobility and the mobility of the different subgroups. The most obvious subgroups are the different modes of transport. The distribution of mobility across different age groups and motives for journeys is discussed later in this fact sheet. Given these categories, which are based on person-related characteristics, only data from the Dutch Mobility Survey is used. The mobility categories discussed in the following therefore concern only passenger traffic (excluding holiday traffic).

The car is clearly the dominant mode of transport in annual mobility, accounting as it does for approximately three-quarters of the total mobility covered by the Dutch Mobility Survey (i.e. excluding lorry and holiday traffic). In the last ten years, car mobility increased from 129 billion kilometres in 1997 to 139 billion kilometres in 2007. *Figure 2* shows the distribution of mobility across all modes of transport other than the car for the years 1997, 2002 and 2007. The public transport category includes both transport by road (bus) and by tram and metro but excludes train traffic. At around 8%, the bicycle's mobility share is the largest after that of the car. Due to the dominant position of the car, the rise in car mobility accounts for virtually all of the increase in total mobility from 159 billion kilometres in 1997 to 167 billion kilometres in 2007 (estimated on the basis of the Dutch Mobility Survey and excluding air, marine and train traffic). The mobility share of pedestrians increased somewhat, while a moderate decrease occurred in those of the motorcycle and, in particular, the bus. The mobility shares of the other modes of transport remained practically the same during the period 1997-2007.

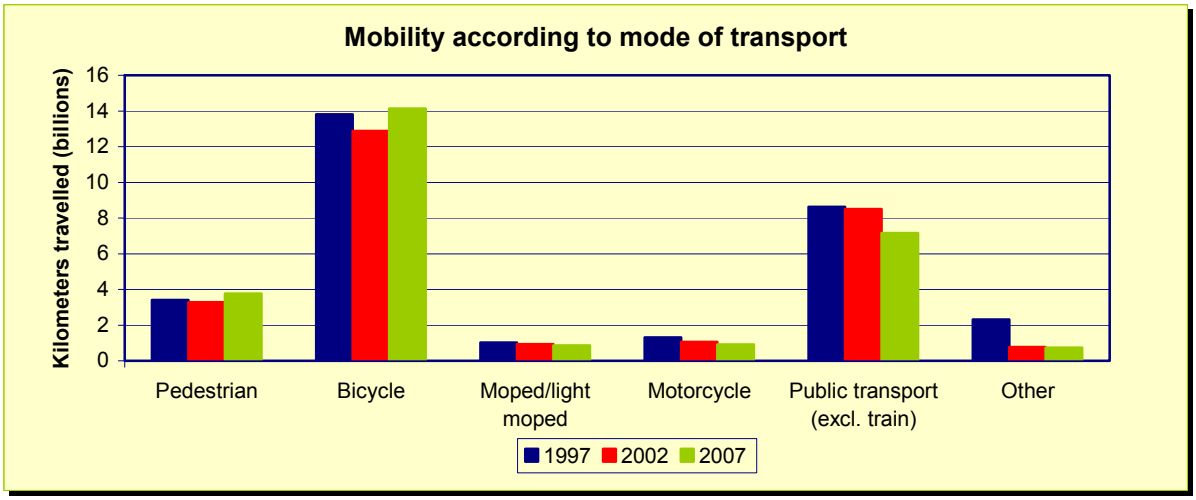

Figure 2. *Mobility on Dutch roads categorized according to mode of transport. Source: Traffic Survey/Dutch Mobility Survey (excluding air, marine, train and car traffic).*

Mobility has grown primarily due to an increase in car mobility. The number of journeys per person per day and the time spent making those journeys, however, has hardly changed in the last twenty years (Netherlands Institute for Transport Policy Analysis, 2009).

How is mobility distributed across age groups?

The size and composition of the population affect annual mobility. After all, the more people there are, the greater the total mobility. In addition, the average mobility per person in terms of both distance and mode of transport differs according to age group. *Figure 3* shows the distribution of mobility across different age groups for the years 1997, 2002 and 2007. What is immediately apparent is an increase in the mobility of individuals above the age of 40 in the period 1997-2007, whereas the mobility of individuals below the age of 40 remained the same or even decreased. This difference in mobility trend for the various age groups is due almost entirely to changes in the composition of the population. Within the total population, the 40-49 age group grew by approximately 10% in the period 1997-2007, while the population group above the age of 50 grew by around 20% in the same period. As can be seen in *Figure 3*, these growths more or less correspond with the increase in mobility of the age groups concerned. A sharp decrease of approximately 20% occurred in the size of the 25-29 age group, a development which largely accounts for the drop in that group's mobility.

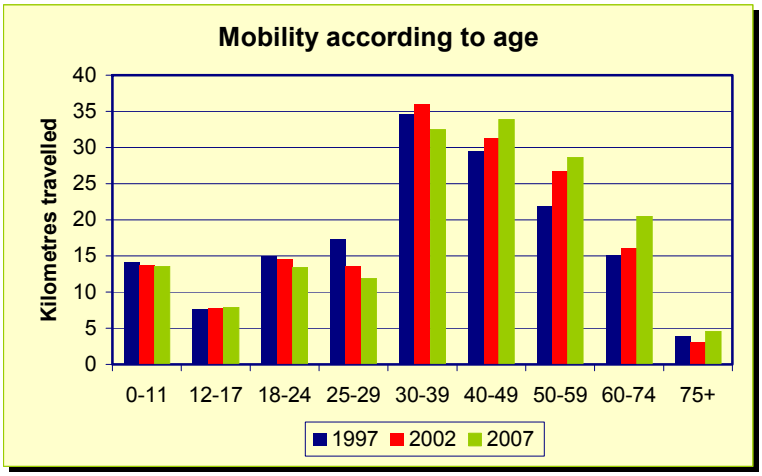

Figure 3. *Mobility on Dutch roads categorized according to age group. Source: Traffic Survey/Dutch Mobility Survey (excluding air, marine and train traffic).*

Mobility according to age group and mode of transport

In addition to categorization according to age group or mode of transport, simultaneous categorization according to age group *and* mode of transport is also useful, as it enables consideration of the relationship between the two (see also SWOV, 2007). Such categorization reveals relatively high mobility among cyclists in the 12-17 and 40-65 age groups, while the same applies to pedestrians in the 0-11 and 30-60 age groups. It is also evident that motorcycle mobility correspondingly 'shifts', as it were, towards a higher age group. While most motorcyclists were aged around 30 at the beginning of the 1990s, the peak had shifted to those aged around 40 by the early 2000s.

Mobility according to road type

Data concerning mobility on various road types is not collected in the Dutch Mobility Survey. Estimates for mobility per road type were made in the past (see for example Janssen, 2005). Since that time, however, road layout has changed on the basis of the Sustainable Safety criteria. Data on mobility categorized according to Sustainable Safety road type is not yet available. Research into the matter is currently being carried out but no results are as yet known.

What are the motives for journeys?

Mobility arises from the simple fact that people wish to perform different activities in different places. It is therefore relevant to consider development in mobility also within the context of motives for journeys. *Figure 4* shows that commuting traffic increased by approximately 10% in the last ten years. Business traffic, on the other hand, decreased somewhat. To some extent, the increase in commuting

traffic is linked to the rise in the number of dual-income households in which the partners' respective places of work are often different (Transport Research Centre, 2006):

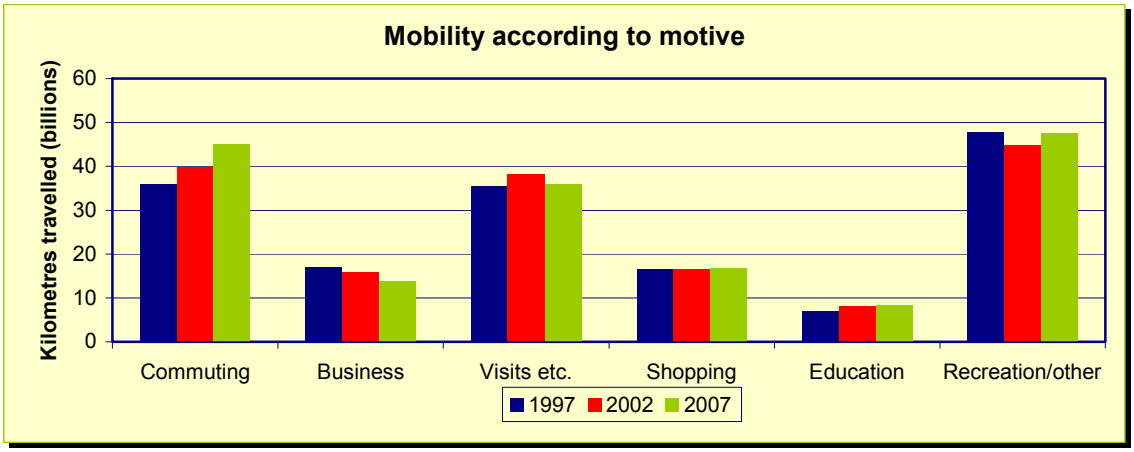

Figure 4. *Mobility on Dutch roads categorized according to motive. Source: Traffic Survey/Dutch Mobility Survey (excluding air, marine and train traffic).*

Are there alternative methods of assessing mobility developments?
Unfortunately, the availability of mobility data is limited, especially for more distant periods in historical terms. To obtain a more complete picture of mobility developments, it is therefore useful to consider alternative units of measurement. An alternative measure of mobility can also be important in international comparisons, since no or virtually no data on mobility is available in many countries (see also the SWOV Fact sheet *International comparability of road safety data*).

Given the close relationship between vehicle stock numbers and mobility, the former can be used as an alternative measure of mobility for motorized traffic. After all, the more cars owned in the Netherlands, the greater the total distance travelled by car is likely to be. Car sales figures can also be used as an alternative for estimates of mobility. *Figure 5* shows vehicle stock numbers in the Netherlands. The number of cars evidently increased by over one and a half in the last twenty years. This more or less corresponds with the relative growth of car mobility in the same period (not shown in *Figure 5*). Use of vehicle stock numbers as the basis for estimates of mobility must be made with due caution, however. Although the number of motorcycles in the Netherlands has more than quadrupled since 1986, for example, motorcycle mobility decreased in the period from that year to the present day.

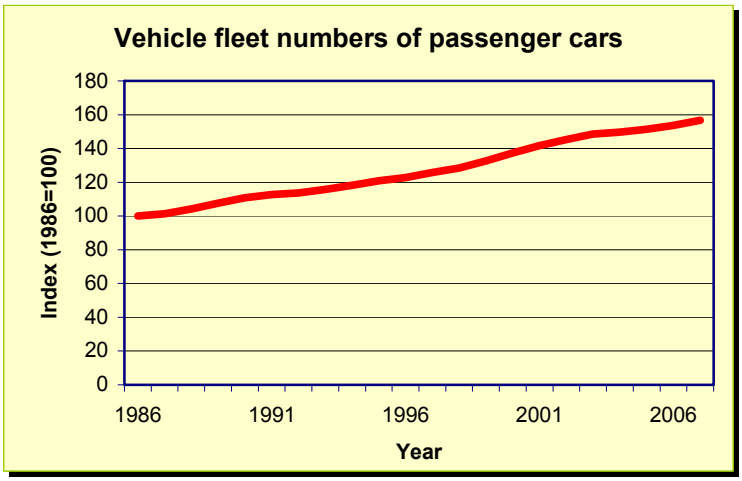

Figure 5. *Vehicle stock numbers in the Netherlands. Source: Statistics Netherlands (CBS).*

Conclusion

Considering that mobility has a major influence on the number of road crashes and road casualties, it is an important factor in road safety research. Developments in mobility are determined by developments in, broadly speaking, four areas: demography, the social and cultural sphere, the economy and spatial planning. Data on the mobility of individuals in the Netherlands is collected in the Dutch Mobility Survey (MON). Mobility in the Netherlands has been increasing since the 1950s. Today, more than 200 billion kilometres are travelled each year. Mobility data on, for example, different modes of transport or age groups provides more background information about developments. For instance, it is evident that the increase in mobility in the last ten years has been due almost entirely to the car. Categorization according to age group reveals that the total annual mobility of the population group above the age of 40 increased in the last ten years, whereas, by contrast, mobility decreased for the population group below that age. It must be borne in mind in this regard that this difference is largely the result of changes in the composition of the population.

Publications and sources

AVV (2006). *Trends in mobiliteit 2005*. Directoraat-Generaal Rijkswaterstaat, Adviesdienst Verkeer en Vervoer AVV, Rotterdam.

DVS (2008). *Mobiliteitsonderzoek Nederland 2007. Het onderzoek*. Directoraat-Generaal Rijkswaterstaat, Dienst Verkeer en Scheepvaart DVS, Rotterdam.

KiM (2009). *Mobiliteitsbalans 2009*. Kennisinstituut voor Mobiliteitsbeleid KiM, Den Haag.

Janssen, S.T.M.C (2005). *De Verkeersveiligheidsverkenner gebruikt in de regio; De rekenmethode en de aannamen daarin*. R-2005-6. SWOV, Leidschendam.

Mom, G. & Filarski, R. (2008). *Van transport naar mobiliteit. Deel 2: De mobiliteitsexplosie [1895-2005]*. Walburg Pers, Zutphen.

SWOV (2007). *De top bedwongen; Balans van de verkeersonveiligheid in Nederland 1950-2005*. SWOV, Leidschendam.