

# **NIOSH Global Road Safety for Workers Project**

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## **Introduction**

To provide information on worker road safety in the Netherlands, several Dutch data have been analysed concerning safety risks and occupational accidents in the transport sector. First an overview will be given based on the Netherlands Survey on Working Conditions. Some information will be presented on safety risks and occupational accidents in the transport sector and in transport occupations in relation to other sectors and other occupations. Furthermore, some information on safety risks and occupational accidents will be presented for several different transport occupations. In addition, an overview will be presented of the top 10 occupations, concerning dangerous work and occupational accidents.

Another source, used to provide additional information concerning traffic accidents, is the Monitor Occupational Accidents. The Monitor Occupational Accidents presents a comprehensive yearly overview of data on occupational accidents in The Netherlands. To do this, several different data sources are used. Based on these different data sources, information will be presented on occupational accidents and the relation to traffic as well as percentages of work related traffic accidents, activities during work related traffic accidents and the kind of traffic victims were participating in during traffic accidents.

***The Netherlands Survey on Working Conditions (NEA)***

The Netherlands Survey on Working Conditions (NEA) is a large scale survey among a representative sample of 56.722 employees that has been carried out in 2003, 2004 and 2006. Participants fill in a written questionnaire or use an internet version. In this questionnaire, respondents are asked for any work accidents in the past year. They are also asked if they are being exposed to risks on traffic accidents in their work. All respondents fill in their occupation and the sector they work in.

It is important to note that in the NEA no information is available on the kind of occupational accident workers report, neither can road construction workers be distinct in this analysis. Nevertheless, some interesting information can be obtained.

Data analysis on the NEA 2003, 2004 and 2006 gives the following information concerning occupational accidents in the transport sector. The transport sector reports significantly higher percentages of workers reporting to be exposed to risks on traffic accidents. This sector also reports significantly more occupational accidents and occupational accidents with at least four days of sickness leave (see table 1).

Also data on the occupation of the respondent is available. For this analysis, transport occupations are being analysed, which include bus drivers, train machinists and sailors, as well as truck drivers, workers working on/ with a crane, and other transport occupations. Workers with transport occupations report significantly higher percentages of being exposed to risks on traffic accidents. They also report significantly more occupational accidents and occupational accidents with at least four days of sickness leave (see table 1).

**Table 1: Occupational accidents and risks on traffic accidents by sector and occupation**

	Total	Economic activity		Transport occupations	
		Other sectors	Transport sector	No	Yes
<i>N:</i>	<b>56.755</b> [100%]	<b>45.549</b> [97%]	<b>1.203</b> [3%]	<b>53.192</b> [95%]	<b>2.658</b> [5%]
<b>Risks on traffic accidents (crash)</b>	22,0%	19,4% ▼	69,7% ▲	16,7% ▼	66,5% ▲
<b>Occupational accidents with physical or mental injury [N=56.755] [% yes]</b>	3,2%	3,1% ▼	8,4% ▲	2,9% ▼	7,7% ▲
<b>Occupational accidents with physical or mental injury, and at least 4 days of sickness leave (definition Eurostat) [N=56.755] [% yes]</b>	2,4%	2,3% ▼	6,1% ▲	2,2% ▼	6,0% ▲
Percentages are column percentages. Each percentage is tested with the Pearson Chi-square test. Each mean is tested with the t-test. The contrast is <u>always subgroup vs. all other cases</u> ('horizontal'). ▲ : p<0,05 for percentages/means significantly higher than in the entire group, and ▼ for percentages/means significantly lower than in the entire group. Differences are only marked as 'relevant', when the corresponding Effect Size (=Cohen's d) is at least 0,20.					

	Total	Economic activity		Transport occupations	
		Other sectors	Transport sector	No	Yes
Cohen, J. (1977). Statistical power analysis for the behavioral sciences. New York: Academic Press.					

In addition an overview is given of the different kind of transport occupations that have been distinct, compared to other occupations in relation to occupational accidents and risks on traffic accidents (see table 2).

**Table 2: Occupational accidents and risks on traffic accidents by occupation**

	Transport occupations				
	bus drivers, train machinists and sailors	truck drivers	workers working on/ with a crane	Other transport occupations	Total
<i>N</i> :	379 [14%]	916 [34%]	684 [26%]	679 [26%]	2.658 [100%]
<b>Risks on traffic accidents (crash) [N=1.488] [% yes]</b>	68,6%	79,3%▲	56,0%▼	51,6%▼	66,5%
<b>Occupational accidents with physical or mental injury[N=2.658] [% yes]</b>	8,0%	8,9%	7,2%	6,3%	7,7%
<b>Occupational accidents with physical or mental injury, and at least 4 days of sickness leave (definition Eurostat) [N=2.658] [% yes]</b>	6,2%	7,7%	5,4%	4,3%	6,0%
Percentages are column percentages. Each percentage is tested with the Pearson Chi-square test. Each mean is tested with the t-test. The contrast is always subgroup vs. all other cases ('horizontal'). ▲: p<0,05 for percentages/means significantly higher than in the entire group, and ▼ for percentages/means significantly lower than in the entire group. Differences are only marked as 'relevant', when the corresponding Effect Size (=Cohen's d) is at least 0,20. Cohen, J. (1977). Statistical power analysis for the behavioral sciences. New York: Academic Press.					

These results imply that of all transport occupations, truck drivers report the highest percentage of occupational accidents. Among truck drivers, also the highest percentages of risks on traffic accidents have been reported.

Also a selection of the top 10 of occupations which report the highest percentage of dangerous work and occupational accidents, corresponds with the pattern we have seen before (see table 3 and 4). Truck drivers and the group bus drivers, train machinists, sailors appear in both top 10's of high risk occupations. Additionally, the group 'other transport occupations' appears in table 4.

**Table 3: Top 10 high risk occupations concerning dangerous work**

	<b>% dangerous work</b>
<b>Police, fire department, security</b>	27,0
<b>Painters</b>	26,9
<b>Busdrivers, train machinists, sailors</b>	23,7
<b>Plumbers,etc.</b>	22,7
<b>Truck drivers</b>	21,8
<b>Bricklayer etc.</b>	21,0
<b>Mechenic etc.</b>	17,3
<b>Elektrician etc.</b>	17,0
<b>Other craft and industrial occupations</b>	14,7
<b>Farmers</b>	13,7

Source: NEA 2003-2006

**Table 4: Top 10 high risk occupations concerning occupational accidents**

	<b>% occupational accident with sickness leave</b>
<b>Painters</b>	9,6
<b>Bricklayer etc.</b>	9,1
<b>Truck drivers</b>	8,9
<b>Plumbers,etc.</b>	8,4
<b>Busdrivers, train machinists, sailors</b>	8,0
<b>Mechenic etc.</b>	7,6
<b>Workers working on or with a crane</b>	7,2
<b>Elektrician etc.</b>	7,0
<b>Farmers</b>	6,9
<b>Other transport occupations</b>	6,3

Source: NEA 2003-2006

According to these overviews, transport occupations, including bus drivers and truck drivers, report relatively high percentages of dangerous work and occupational accidents.

Overall, the results based on the NEA imply a high prevalence of occupational accidents in the transport sector compared to other sectors, as well as in transport occupations compared to other occupations.

### ***The Monitor Occupational Accidents***

Some additional information can be obtained from the Monitor Occupational Accidents (Monitor Arbeidsongevallen), which compares existing data sources on occupational accidents and injuries. In the Monitor Occupational Accidents a distinction between traffic related and non traffic related occupational accidents is being made for fatal occupational accidents and for accidents resulting in hospital admission.

#### *Occupational accidents in relation to traffic*

One of the data sources used is provided by The Dutch Statistics of External Causes of Injury and Poisoning (2004). This data source supplies information on fatal occupational accidents. Of a total of 83 fatal accidents, 11 are known to be traffic related. Over two third of all fatal occupational accidents that happen on public highways or railroads, are actually traffic related.

Additional interesting information can be obtained, concerning the prevalence of occupational accidents in different sectors, making a distinction between traffic related and non traffic related occupational accidents (see table 5).

**Table 5: Victims of fatal occupational accidents by sector**

	Workers	Occupational accidents not traffic related			Occupational accidents traffic related		
		Number	%	Number per 100.000	Number	%	Number per 100.000
<b>Agriculture and fishing</b>	244.000	14	19	5,7	2	18	0,82
<b>Manufacturing, mining and quarrying</b>	1.060.000	11	15	1,0	-	-	-
<b>Building industry</b>	468.000	23	32	4,9	1	9	0,21
<b>Trade</b>	1.077.000	3	4	0,28	1	9	
<b>Hotels and restaurants</b>	308.000	-	-	-	-	-	-
<b>Transport, storage and communication</b>	493.000	5	7	1,0	5	45	1,0
<b>Financial intermediation</b>	261.000						
<b>Public administration</b>	555.000	-	-	-	1	9	0,18
<b>Education</b>	518.000						
<b>Health and social work</b>	1.147.000						
<b>Other</b>	1.247.000	14	19		1	9	
<b>Unknown</b>	438.000	2	3		-	-	
<b>Total</b>	7.817.000	72	100	0,92	11	100	0,14

Source: Dutch Statistics of external causes of injury and poisoning 2004, Statistics Netherlands including data from the Dutch Labour Inspectorate

Although almost half of the traffic related occupational accidents occur in the transport, storage and communication sector, traffic related occupational accidents seem to occur in other sectors as well. This information may also be relevant to the results based on the NEA presented before. While in the analysis only those occupational accidents were

taken into account which took place in either the transport sector or a transport occupation, some traffic related occupational accidents may have been overlooked. Important to note, however, is that while this overview is based on fatal accidents, the percentages are based on relatively small numbers of traffic related occupational accidents.

Another data source used in the Monitor Occupational Accidents is the Dutch Injury Surveillance System (LIS) of the Dutch ‘Consumer Safety Institute’. LIS contains information of all victims from accidents that have been visiting the emergency department of a hospital. Based on these data, almost half of all traffic related occupational accidents that require hospitalization happen on public road, in public transport or in public transport locations and 20% of all traffic related occupational accidents happen in the industrial zone.

Like The Dutch Statistics of External Causes of Injury and Poisoning (2004), LIS too supplies interesting information concerning the prevalence of occupational accidents in different sectors, making a distinction between traffic related and non traffic related occupational accidents (see table 6).

**Table 6: Hospitalization after visiting the emergency department of a hospital due to occupational accidents by sector**

	Occupational accidents not traffic related				Occupational accidents traffic related		
	Workers	Number	%	Number per 100.000	Number	%	Number per 100.000
<b>Agriculture and fishing</b>	244.000	210	7	86	<10	4	3,5
<b>Manufacturing, mining and quarrying</b>	1.060.000	290	10	28	20	8	1,6
<b>Building industry</b>	468.000	570	19	120	<10	4	1,8
<b>Trade</b>	1.077.000	170	6	16	<10	4	0,78
<b>Hotels and restaurants</b>	308.000	90	3	30	-	-	-
<b>Transport, storage and communication</b>	493.000	310	10	63	60	28	12
<b>Financial intermediation</b>	261.000	-	-	-	-	-	-
<b>Public administration</b>	555.000	210	7	38	30	16	6,1
<b>Education</b>	518.000	40	1	8	-	-	-
<b>Health and social work</b>	1.147.000	60	2	5	-	-	-
<b>Other</b>	1.247.000	130	4	10	30	12	2,0
<b>Unknown</b>	438.000	920	31		50	24	
<b>Total</b>	7.817.000	3.000	100	38	210	100	2,7

Source: LIS 2004, (Dutch Consumer Safety Institute)

Again, we see that most of the traffic related occupational accidents occur in the transport, storage and communication sector, but traffic related occupational accidents seem to occur in other sectors, like public administration, as well,.

Furthermore, information can be obtained concerning the cause of the injury. In 60% of all traffic related occupational accidents, the injury is caused by contact with a moving object. In 20% of all traffic related occupational accidents, the injury is caused by a fall and in 16% of the cases by a horizontal movement with a non moving object (LIS, 2004).

*Traffic accidents in relation to work*

Besides information on occupational accidents and their relation to traffic, there also is information available on traffic accidents and the relation to work. Of all victims of traffic accidents registered during a certain period by the LIS and investigated more in depth by means of a postal questionnaire, the percentage of work related traffic accidents has been measured. These results imply that 7% of all traffic accidents are also work related (see table 7).

**Table 7: Activity during traffic accident**

<b>Activity during traffic accident</b>	<b>Percentage (weighted)</b>
<b>Accident happened in non-working time</b>	67%
<b>Accident happened during home-work traffic</b>	26%
<b>Accident happened while working</b>	7%
<b>Unknown</b>	1%
<b>Total</b>	100%

Source: Schutten, M., Vriend, I., Oldenziel, K.E. & Bloemhoff, A. (2006).

Additional information is being given on the kind of activities victims were participating in when the work related traffic accident happened. Most, over one third, of all work related traffic accidents occur while on the way to or returning from a meeting, discussion or client (see table 8).

**Table 8: Activity during work related traffic accident**

<b>Activity during work related traffic accident</b>	<b>Percentage (weighted)</b>
<b>While on the way to or returning from a meeting, discussion or client</b>	35%
<b>Freight transport</b>	30%
<b>Else</b>	15%
<b>Emergency transport</b>	12%
<b>Passenger transport</b>	8%
<b>Total</b>	100%

Source: Schutten, M., Vriend, I., Oldenziel, K.E. & Bloemhoff, A. (2006).

Finally, information is available on the kind of traffic victims were participating in when the traffic accident happened. Results imply that over one half of all work related traffic accidents concerns accidents with cars (see table 9).

**Table 9: Kind of traffic participation during traffic accident**

<b>Kind of traffic participation</b>	<b>Percentage (weighted)</b>
<b>Car</b>	53%
<b>Bicycle</b>	14%
<b>Other</b>	9%
<b>Truck</b>	6%
<b>Motorbike</b>	6%
<b>Unknown</b>	4%
<b>Motorcycle, scooter</b>	3%
<b>Pedestrian</b>	3%
<b>Pick-up truck</b>	2%
<b>Total</b>	100%

Source: Schutten, M., Vriend, I., Oldenziel, K.E. & Bloemhoff, A. (2006).

Important to note, however, is that this research indicates that figures on serious accidents resulting in hospital admission (see tabel 6) probably are slightly underestimated, because for some traffic accidents it is not clear weather or not they are work related (Schutten et. al., 2006).



## **Conclusion**

The analysis based on data from the Netherlands Survey on Working Conditions, implies that the prevalence of risks on traffic accidents is significantly higher in the transport sector and in transport occupations in relation to other sectors and other occupations. Also the percentages of occupational accidents are reported to be highest in the transport sector and transport occupations. When a distinction is made between different transport occupations, among truck drivers the most risks on traffic accidents have been reported as well as the most occupational accidents. Also a selection of the top 10 of occupations which report the highest percentage of dangerous work and occupational accidents, corresponds with this pattern. The NEA, however, contains no information on the type of occupational accident and whether or not the accident is traffic related.

The Monitor Occupational Accidents provides some useful additional information concerning traffic related occupational accidents and their prevalence in different sectors, while a distinction between traffic and non traffic related occupational accidents has been made. Results imply that although most of the traffic related occupational accidents happen in the transport sector, these accidents seem to occur in other sectors as well.

Besides information on traffic related occupational accidents, also information is available on traffic accidents and their relation to work. Concerning the LIS, 7% of all traffic accidents are actually work related, of which 35% occur while on the way to or returning from a meeting, discussion or client, and 53% of the work related traffic accidents involves a car.

Although the results presented in this document do not provide very specific information on road safety at work, some overall information on road safety at work in the Netherlands has been presented, which may provide some valuable insights.

## References

Schutten, M., Vriend, I., Oldenziel, K.E. & Bloemhoff, A. (2006). *Arbeidsongevallen in het verkeer. Resultaten van een LIS-vervolgonderzoek*. Amsterdam: Consument en Veiligheid.

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