LINKING TABLE WITH GLOSSARY FOR PHENOTYPES (CRITICAL EVENTS) AND GENOTYPES (CAUSES)

PHENOTYPES (A)

General Phenotypes	Specific Phenotypes
Timing (A1)	Too early action (A1.1)
	Too late action (A1.2)
	No action (A1.3)
Speed (A2)	Too high speed (A2.1)
	Too low speed (A2.2)
Distance (A3)	Too short distance (A3.1)
Direction (A4)	Wrong direction (A4.1)
Force (A5)	Surplus force (A5.1)
	Insufficient force (A5.2)
Object (A6)	Adjacent object (A6.1)

See section *3.1.1. Phenotype choices* for further information about at which point in an accident scenario a phenotype should be chosen.

PHENOTYPES (A)

ANTECEDENTS (CAUSES)	CONSEQUENTS (EFFECTS)		
GENERAL Genotypes	**Definition of GENERAL Phenotypes**	**Definitions of SPECIFIC Phenotypes**	**Examples for SPECIFIC Phenotypes**
Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**	**Timing (A1)** The timing for initiating an action.	**Too early action (A1.1)** The action is initiated too early, before the signal is given or the required conditions are established.	*Intersection accidents* Starting from a stand still the driver passes the traffic light too early – before it has turned green. Starting from a stand still the driver passes the stop/give way sign too early - before the intersection is free. Starting from a stand still the driver enters the intersection too early - before the intersection is free (this is regardless of whether or not it is the driver's right of way). *NB! If the driver has past a red traffic light or a stop/give way sign (see above) before entering the intersection the analysis should start by the traffic light/stop sign/give way sign.* *Leaving lane accidents* The driver leaves his own lane in order to overtake the vehicle in front of him too early – before he has free visibility of a stretch of road long enough for him to complete the manoeuvre. *Changing lane accidents* The driver leaves his own lane in order to change lane too early - before the lane he is changing into is free.
		Too late action (A1.2) The action is initiated too late.	*Intersection accidents* The driver starts to brake too late in order to stop for the red traffic light. The driver starts to brake too late in order to stop in front of the stop/give way sign. The driver starts to brake too late in order to avoid entering the intersection before it is free (this is regardless of whether or not it is the driver's right of way). *NB! If the driver has past a red traffic light or a stop/give way sign (see above) before entering the intersection the analysis should start by the traffic light/stop sign/give way sign.*

Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**		***continuation*** **Too late action (A1.2)**	*Leaving lane accidents* The driver starts to brake and/or make an avoidance manoeuvre too late to avoid an accident when a car (e.g. making an overtaking manoeuvre) is coming towards the driver in his own lane. *Changing lane accidents* The driver starts to brake and/or make an avoidance manoeuvre too late in order to avoid an accident with the car changing into his lane. *Catching up accidents* The driver starts to brake and/or make an avoidance manoeuvre too late in order to avoid an accident with the slow driving/still standing car in front of him.
		No action (A1.3) No action is initiated.	*Intersection accidents* The driver passes the red traffic light without doing anything (e.g. does not brake in order to stop). The driver passes the stop/give way sign without doing anything (e.g. does not brake in order to stop). The driver enters the intersection without doing anything (e.g. does not brake in order to avoid entering the intersection before it is free; this is regardless of whether or not it is the driver's right of way). *NB! If the driver has past a red traffic light or a stop/give way sign (see above) before entering the intersection the analysis should start by the traffic light/stop sign/give way sign.* *Leaving lane accidents* The driver does nothing (e.g. does not brake and/or make an avoidance manoeuvre to avoid an accident) when a car (e.g. making an overtaking manoeuvre) is coming towards the driver in his lane. *Changing lane accidents* The driver does nothing to avoid an accident with the car changing into his lane (e.g. the driver might not have seen the car in order to act).

		continuation **No action (A1.3)**	*Catching up accidents* The driver (e.g. caught in a car queue) does not do anything to avoid being hit from behind (this is regardless of whether or not he has the time and/or space to act). The driver does nothing to avoid an accident with the slow driving/still standing car in front of him (e.g. the driver might not have seen the car in order to act). The driver brakes softly in order to stop in time (for the traffic light, stop/give way sign, traffic in intersection or car queue in front) but does not make any manoeuvres in order to avoid being hit from behind.
Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**	**Speed (A2)** The travelling speed.	**Too high speed (A2.1)** Driving too fast.	*Intersection accidents* The driver approaches the intersection faster then what can be expected by other drivers. *Leaving lane accidents* The driver approaches the meeting car (e.g. making an overtaking manoeuvre) faster then what can be expected by the overtaking driver. The driver drives too fast to take the curve, and stay within his own lane, under the prevailing conditions. *Changing lane accidents* The driver approaches the car changing lane faster then what can be expected by the lane changing driver. *Catching up accidents* The driver catches up with a slower car due to excessive speed.
		Too low speed (A2.2) Driving too slowly.	*Catching up accidents* The driver is caught up because he drives slower than what can be expected by other drivers.
Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**	**Distance (A3)** The space between objects.	**Too short distance (A3.1)** The distance between the vehicle and other objects is kept too short.	*Catching up accidents* The driver keeps a too short distance to the car in front of him.

Appendix A: Linking table

Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**	**Direction (A4)** The direction of the vehicle.	**Wrong direction (A4.1)** The manoeuvre is made in the wrong direction.	*Intersection accidents: Illegally turning etc.* The driver initiates an illegal left/right turn. *Leaving lane accidents* The driver leaves his own lane on a straight road or in a curve. *One-way lane/street accidents* The driver enters a lane or a one-way street against the traffic flow.
Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**	**Force (A5)** The force with which an action is conducted.	**Surplus force (A5.1)** Too much force is used.	*Leaving lane accidents* The driver steers too hard resulting in him leaving his own lane. *Catching up accidents* The driver brakes harder (e.g. emergency braking) than what can be expected by other drivers.
		Insufficient force (A5.2) Too little force is used.	*Insufficient brake accidents* The driver does not brake hard enough to stop in time (this can also be caused by insufficient brakes).
Misjudgement of time gaps (C1) **Misjudgement of situation (C2)** **Fear (E1)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Temporary access limitation (G4)** **Equipment failure (I1)** **Strong side wind (J2)**	**Object (A6)** An item or a control.	**Adjacent object (A6.1)** An item/control in close proximity of the correct item is wrongly chosen.	*Unintentional acceleration accidents* The driver mistakes the accelerator pedal for the brake pedal.

GENOTYPES (B-Q)

HUMAN (B-F)

Driver

B: Observation
Missed observation (B1)
Late observation (B2)
False observation (B3)

C: Interpretation
Misjudgement of time gaps (C1)
Misjudgement of situation (C2)

D: Planning
Priority error (D1)

E: Temporary Personal Factors
Fear (E1)
Inattention (E2)
Fatigue (E3)
Under the influence of substances (E4)
Excitement seeking (E5)
Sudden functional impairment (E6)
Psychological stress (E7)

F: Permanent Personal Factors
Permanent functional impairment (F1)
Expectance of certain behaviours (F2)
Expectance of stable road environment (F3)
Habitually stretching rules and recommendations (F4)
Overestimation of skills (F5)
Insufficient skills/knowledge (F6)

TECHNOLOGY (G-M)

Vehicle (G-I)

G: Temporary HMI* problems
Temporary illumination problems (G1)
Temporary noise problems (G2)
Temporary sight obstructions (G3)
Temporary access limitations (G4)
Incorrect ITS-information (G5)

H: Permanent HMI* problems
Permanent illumination problems (H1)
Permanent sound problems (H2)
Permanent sight obstruction (H3)

I: Vehicle equipment failure
Equipment failure (I1)

Traffic environment (J-M)

J: Weather conditions
Reduced visibility (J1)
Strong side winds (J2)

K: Obstruction of view due to object
Temporary obstruction of view (K1)
Permanent obstruction of view (K2)

L: State of road
Insufficient guidance (L1)
Reduced friction (L2)
Road surface degradation (L3)
Object on road (L4)
Inadequate road geometry (L5)

M: Communication
Inadequate transmission from other road users (M1)
Inadequate transmission from road environment (M2)

ORGANISATION (N-Q)

Organisation

N: Organisation
Time pressure (N1)
Irregular working hours (N2)
Heavy physical activity before drive (N3)
Inadequate training (N4)

O: Maintenance
Inadequate vehicle maintenance (O1)
Inadequate road maintenance (O2)

P: Vehicle design
Inadequate design of driver environment (P1)
Inadequate design of communication devices (P2)
Inadequate construction of vehicle parts and/or structures (P3)
Unpredictable system characteristics (P4)

Q: Road design
Inadequate information design (Q1)
Inadequate road design (Q2)

**HMI: Human-Machine-Interface*

OBSERVATION (B)

Observation includes detection as well as recognition of information that should have been the start of an action.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Fear (E1)	**Tunnel vision (B1.1)** The driver's peripheral vision is limited.	When the driver experiences high speed, the peripheral vision diminishes from 180 degrees to as little as 20-30 degrees thus reducing awareness of, or possibility to detect, objects to the side of the road.	**Missed observation (B1)** Some information (signal, sign or event) is missed. The reason for this can either be that the information is hidden (e.g. behind something) or that it is not noticed by the driver (e.g. as the driver predicts that the driver coming from the left will give way he does not look that way).
Inattention (E2)			
Fatigue (E3)			
Under the influence of substances (E4)			
Sudden functional impairment (E6)			
Psychological stress (E7)			
Permanent functional impairment (F1)			
Expectance of stable road environment (F3)			
Insufficient skills/knowledge (F6)			
Temporary illumination problem (G1)			
Temporary sound problems (G2)			
Temporary sight obstruction (G3)			
Permanent illumination problem (H1)			
Permanent sound problems (H2)			
Permanent sight obstruction (H3)			
Equipment failure (I1)			
Reduced visibility (J1)			
Temporary obstruction to view (K1)			
Permanent obstruction to view (K2)			
Inadequate road geometry (L5)			
Inadequate transmission from other road users (M1)			
Inadequate transmission from road environment (M2)			

Fear (E1) **Inattention (E2)** **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Psychological stress (E7)** **Permanent functional impairment (F1)** **Expectance of stable road environment (F3)** **Insufficient skills/knowledge (F6)** **Temporary illumination problem (G1)** **Temporary sound problems (G2)** **Temporary sight obstruction (G3)** **Permanent illumination problem (H1)** **Permanent sound problems (H2)** **Permanent sight obstruction (H3)** **Equipment failure (I1)** **Reduced visibility (J1)** **Temporary obstruction to view (K1)** **Permanent obstruction to view (K2)** **Inadequate road geometry (L5)** **Inadequate transmission from other road users (M1)** **Inadequate transmission from road environment (M2)**	**Tunnel vision (B2.1)** The driver's peripheral vision is limited.	When the driver experiences high speed, the peripheral vision diminishes from 180 degrees to as little as 20-30 degrees thus reducing awareness of, or possibility to detect, objects to the side of the road.	**Late observation (B2)** The observation of some information (signal, sign or event) is correct but late, i.e. when the observation is made there is insufficient time to act in an optimal way (e.g. brake to avoid a collision).
Inattention (E2) **Fatigue (E3)** **Under the influence of substances (E4)** **Sudden functional impairment (E6)** **Psychological stress (E7)** **Permanent functional impairment (F1)** **Temporary illumination problem (G1)** **Temporary sound problems (G2)** **Temporary sight obstruction (G3)** **Equipment failure (I1)** **Reduced visibility (J1)**	**None defined**		**False observation (B3)** Some information (object, signal, sign or event) is misunderstood / misinterpreted as something else (e.g. the driver mistakes a motorcycle for a moped or thinks it is green because of looking at the wrong traffic light).

Appendix A: Linking table

INTERPRETATION (C)

Interpretation includes, for all but novice drivers, quick and automated (routine) procedures where typical situations and their associated actions are recognized and acted upon (script choice). Mistakes in interpretation occur at the sharp end - within the local event horizon.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Late observation (B2) **False observation (B3)** **Inattention (E2)** **Fatigue (E3)** **Under the influence of substances (E4)** **Psychological stress (E7)** **Permanent functional impairment (F1)** **Expectance of certain behaviours (F2)** **Habitually stretching rules and recommendations (F4)** **Overestimation of skills (F5)** **Insufficient skills/knowledge (F6)** **Incorrect ITS-information (G5)** **Reduced visibility (J1)** **Insufficient guidance (L1)** **Reduced friction (L2)** **Inadequate road geometry (L5)** **Inadequate transmission from road environment (M2)** **Unpredictable system characteristics (P4)**	**Misjudgement of time gap due to incorrect speed estimate (C1.1)** The driver misjudges the time gap due to a misjudgement of the approaching vehicle's speed.	*Intersection* The driver is waiting to cross a street and assumes that the approaching car is keeping the 50 km/h speed limit. The car is, however, approaching at 70 km/h and as a result the driver overestimates the time gap he has to the approaching car. *Overtaking* The driver is overtaking another car when he suddenly realise that he has underestimated the meeting car's speed and therefore also overestimated the available gap for the overtaking. *Catches up from behind* The driver is changing lanes when he suddenly realise that he has underestimated the speed of the car catching up from behind (in the lane he is changing into), and therefore he has also underestimated the available time gap. *Approaches from behind* The driver underestimates the time gap to the car in front of him because he overestimates its speed.	**Misjudgement of time gaps (C1)** The estimation of time gaps (e.g. time left to approaching vehicle, stop sign, traffic lights etc.) is incorrect. In order to misjudge a time gap the object (e.g. approaching vehicle, stop sign, traffic lights etc.) must have been observed!

Appendix A: Linking table

Missed observation (B1)	**None defined**		**Misjudgement of situation (C2)** The situation is misjudged (e.g. the driver thinks that it is safe to enter the intersection as he/she has not noticed the traffic lights turning red or the vehicle approaching).
Late observation (B2)			
False observation (B3)			
Priority error (D1)			
Inattention (E2)			
Fatigue (E3)			
Under the influence of substances (E4)			
Psychological stress (E7)			
Permanent functional impairment (F1)			
Expectance of certain behaviours (F2)			
Habitually stretching rules and recommendations (F4)			
Overestimation of skills (F5)			
Insufficient skills/knowledge (F6)			
Incorrect ITS-information (G5)			
Reduced visibility (J1)			
Insufficient guidance (L1)			
Reduced friction (L2)			
Road surface degradation (L3)			
Object on road (L4)			
Inadequate road geometry (L5)			
Inadequate transmission from road environment (M2)			
Unpredictable system characteristics (P4)			

PLANNING (D)

Planning includes fairly conscious and time consuming processes covering upcoming situations and eventualities beyond the local event horizon. Planning is a less frequent event than interpretation.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Fear (E1)	**None defined**		**Priority error (D1)** The driver prioritizes something else above safe arrival at the destination (e.g. uses the bus lane to save time or drives very fast to impress friends).
Excitement seeking (E5)			
Psychological stress (E7)			
Habitually stretching rules and recommendations (F4)			

TEMPORARY PERSONAL FACTORS (E)

Temporary personal factors includes temporary, or short-term, factors influencing driver's perception, interpretation, planning etc.

ANTECEDENTS			CONSEQUENTS)
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Sudden functional impairment (E6)	**Previous experience (E1.1)** The driver has previously experienced a similar traffic situation in which it was a negative outcome.	The driver is anxious about a particular situation due to previous bad experience or accident.	**Fear (E1)** Being afraid of something or being scared by a sudden event (e.g. the lead vehicle making an emergency brake or an animal jumping onto the road in front of you).
Under the influence of substances (E4) **Inadequate design of driver environment (P1)**	**Driving-related distracters inside vehicle (E2.1)** The driver is distracted by a driving-related object or event inside the vehicle.	The driver focuses his attention on the instructions given by a navigation system.	**Inattention (E2)** Any condition, state or event that causes the driver to pay less attention than required for the driving task.
	Driving-related distracters outside vehicle (E2.2) The driver is distracted by a driving-related object or event outside the vehicle.	The driver focuses his attention on road signs or an animal standing dangerously close to the road.	
	Non driving-related distracters inside vehicle (E2.3) The driver is distracted by a non driving-related object or event inside the vehicle.	The driver speaks to a passenger or on the mobile phone.	
	Non driving-related distracters outside vehicle (E2.4) The driver is distracted by a non driving-related object or event outside the vehicle.	The driver looks at a friend walking past on the pavement.	
	Thoughts/Daydreaming (E2.5) The driver is distracted by his/her own thoughts – including thoughts about how to, for example, find the best route.	The driver daydreams, thinks about a personal problem or how to find the best route.	

Appendix A: Linking table

Under the influence of substances (E4) **Reduced visibility (J1)** **Time pressure (N1)** **Irregular working hours (N2)** **Heavy physical activity before drive (N3)** **Inadequate design of driver environment (P1)**	**Sleep disorders (E3.1)** The driver suffers from a sleep disorder.	The driver suffers from sleep apnoea syndrome, of which the symptoms are heavy snoring and sleep disturbance resulting in daytime sleepiness.	**Fatigue (E3)** Being sleepy, tired or exhausted (mentally or physically).
None defined	**Alcohol (E4.1)** The driver is under the influence of alcohol.	The driver's performance is impaired as a result of being influenced by alcohol.	**Under the influence of substances (E4)** Being affected by different sorts of substances.
	Drugs (E4.2) The driver is under the influence of non-prescribed drugs.	The driver's performance is impaired as a result of taking ecstasy.	
	Medication (E4.3) The driver is under the influence of prescribed drugs.	The driver's performance is impaired as a result of taking strong sedatives.	
None defined	**None defined**		**Excitement seeking (E5)** Looking for adrenaline-kicks (e.g. by driving in high speed)
None defined	**Epilepsy (E6.1)** The driver suffers an epileptic seizure.	The driver is unresponsive or unconscious due to an epileptic seizure.	**Sudden Functional Impairment (E6)** Sudden onset of functional impairment due to illness. Does not include different kinds of sleep disorders!
	Diabetes (E6.2) The driver suffers a critically low concentration of insulin in the blood.	The driver is sweating and shivering before becoming unconscious due to low concentration of insulin in the blood.	
	Stroke (E6.3) The driver suffers a stroke.	The driver is sweating and shivering before becoming unconscious due to a stroke.	
Fatigue (E3) **Reduced visibility (J1)** **Inadequate road maintenance (O2)**	**Peer pressure (E7.1)** The driver experiences stress due to peer pressure.	The driver is feeling stressed because the car is full of passengers he wants to impress.	**Psychological stress (E7)** Different mental factors putting a strain on the driver.
Time pressure (N1) **Irregular working hours (N2)** **Inadequate road design (Q2)**	**Stressful life events (E7.2)** The driver experiences stress due to stressful life events (e.g. receiving bad news, newly divorce, recent loss of a loved one).	The driver is experiencing stress as he has just filed for divorce.	

PERMANENT PERSONAL FACTORS (F)

Permanent personal factors includes permanent, or long-term, factors influencing driver's perception, interpretation, planning etc.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**Reduced vision (F1.1)** The driver's ability is impaired due to reduced vision.	The driver finds it difficult to drive at night due to reduced vision.	**Permanent functional impairment (F1)** Permanent or long term, functional impairment due to, for example, ageing, chronic illness or injury.
	Reduced hearing (F1.2) The driver's ability is impaired due to reduced hearing.	The driver finds it difficult to hear another road user honking his horn due to reduced hearing.	
	Reduced motor skills (F1.3) The driver's ability is impaired due to reduced motor skills.	The driver finds it difficult to look around properly when reversing due to reduced mobility.	
	Reduced cognitive capacity (F1.4) The driver's ability is impaired due to reduced cognitive capacity.	The driver finds it difficult to make decisions in complex traffic environments due to reduced cognitive capacity.	
None defined	**None defined**		**Expectance of certain behaviours (F2)** Expecting other road users to behave in certain ways following praxis (e.g. brake gently, stop for stop signs and red-lights, give way when driving on a non-priority or minor road and comply with the speed limits). This expectancy is still present even if no other road users are in view (e.g. when approaching a blind corner drivers expect oncoming traffic to keep to their lane).
None defined	**None defined**		**Expectance of stable road environment (F3)** Expecting no changes to the road environment (e.g. no new road signs or roundabouts) on familiar roads.
None defined	**None defined**		**Habitually stretching rules and recommendations (F4)** Habitually stretching rules and recommendations (e.g. habitually speeding or not stopping at stop signs or red traffic lights) as previous performance has not resulted in any negative consequences

Under the influence of substances (E4) **Insufficient skills/knowledge (F6)**	**None defined**		**Overestimation of skills (F5)** Overestimating one's own driving skills (e.g. overestimating the speed in which one is able to keep control over the vehicle).
Inadequate training (N4)	**Insufficient geographical knowledge/experience (F6.1)** The driver has insufficient knowledge or experience about the local area.	The driver, who is a visitor from a country with left-hand traffic, ends up, by mistake, on the wrong side of the road in a country with right-hand traffic.	**Insufficient skills/knowledge (F6)** Lack of practical skills (e.g. having to look down in order to change gear) and/or theoretical knowledge (e.g. not knowing the give way rules or the meaning of a road sign).

TEMPORARY HMI PROBLEMS (G)

Temporary HMI problems include temporary, or short-term, problems with human-machine-interfaces related to the vehicle.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Equipment failure (I1)	**None defined**		**Temporary illumination problems (G1)** The light inside the vehicle is too strong (e.g. causing reflexes) or too weak (e.g. causing reduced colour vision).
Equipment failure (I1)	**None defined**		**Temporary noise problems (G2)** Noise levels surrounding the driver are too high (e.g. the driver cannot hear the sirens on the ambulance as music is played at high volume).
Equipment failure (I1)	**Dirty windows and/or dirty mirrors (G3.1)** Dirty windows or dirty mirrors obstruct the driver's view.	The driver cannot see the car ahead clearly because of dirt on the wind screen.	**Temporary sight obstruction (G3)** The view is temporarily obstructed.
	Luggage (G3.2) Luggage or other objects obstruct the driver's view.	The driver cannot see out of the rear window because of bags obstructing the view.	
	Passengers (G3.3) People or pets inside the vehicle obstruct the driver's view.	The driver cannot see out of the rear window because a tall passenger seated in the middle of the back seat obstructs the view.	
Equipment failure (I1)	**Temporary obstruction (G4.1)** Temporary obstruction makes it difficult for the driver to reach one or more items/controls in the driver environment.	The driver finds it difficult to reach the brake pedal because he did not adjust the seat before starting to drive.	**Temporary access limitations (G4)** Temporary problems for the driver to reach or find items/controls in the driver environment.
Equipment failure (I1) **Inadequate design of driver environment (P1)**	**None defined**		**Incorrect ITS-information (G5)** Information given by an ITS-device (e.g. navigation, speed-information) is ambiguous, incorrect or missing.

PERMANENT HMI PROBLEMS (H)

Permanent HMI problems include permanent, or long-term, problems with human-machine-interfaces related to the vehicle.

ANTECEDENTS			CONSEQUENTS)
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Inadequate design of driver environment (P1)	**Weak light (H1.1)** The light inside the vehicle is too weak.	The driver has difficulty seeing the speedometer as the illumination of the dashboard is too weak.	**Permanent illumination problems (H1)** The light, on e.g. the dashboard, is too strong (causing glare) or too weak.
Inadequate design of driver environment (P1)	**Low sound signal (H2.1)** The signals from different driver support systems inside the vehicle are too low.	The driver has difficulty hearing the warning signal of the speed warning device as the signal is too low.	**Permanent sound problems (H2)** The sound signals inside the vehicle are too high (causing startle) or too low.
Inadequate design of driver environment (P1)	**None defined**		**Permanent sight obstruction (H3)** The view is permanently obstructed by parts of the vehicle.

VEHICLE EQUIPMENT FAILURE (I)

Vehicle equipment failure includes failures of the vehicle or any equipment or system related to it.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Inadequate vehicle maintenance (O1)	**None defined**		**Equipment failure (I1)** Some piece of equipment (e.g. tyres, steering, brake system or lighting) does not perform as intended or does not work at all (because it has broken).
Inadequate design of communication devices (P2)			
Inadequate construction of vehicle parts and/or structures (P3)			

WEATHER CONDITIONS (J)

Weather conditions include reduced visibility and stability due to environmental factors.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**Low sun (J1.1)** Low sun facing the driver makes it difficult to see.	The driver cannot see the brake lights on the car in front as the low sun is shining directly in his eyes.	**Reduced visibility (J1)** The visibility is reduced due to low sun, fog, darkness etc.
None defined	**Non defined**		**Strong side wind (J2)** The stability of the vehicle is affected by strong side wind

OBSTRUCTION OF VIEW DUE TO OBJECT (K)

Obstruction to view due to objects includes all temporary and permanent objects, in the traffic environment, obstructing the drivers' view.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**None defined**		**Temporary obstruction of view (K1)** Objects (e.g. driven or parked vehicles, gatherings of people) in the traffic environment cause temporary obstruction of view.
Inadequate information design (Q1) **Inadequate road design (Q2)**	**None defined**		**Permanent obstruction of view (K2)** Objects (e.g. buildings, fences, signs, vegetation) in the traffic environment cause permanent obstruction of view.

STATE OF ROAD (L)

State of the road includes problems with the road itself and its surface as well as the friction between the surface and tyres.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
Inadequate road maintenance (O2) **Inadequate road design (Q2)**	**None defined**		**Insufficient guidance (L1)** The road guidance (painted lane markings, cat's eyes, roadside reflectors etc.) is insufficient.
Equipment failure (I1) **Inadequate road maintenance (O2)** **Inadequate road design (Q2)**	**Low noise tarmac in rain (L2.1)** Low noise tarmac, that has become wet, makes the road surface very slippery.	The driver finds a road with low noise tarmac very slippery after a light drizzle.	**Reduced friction (L2)** The friction is reduced due to ice, snow, oil, gravel etc. on the road or due to bad tyres on the vehicle.
Inadequate road maintenance (O2) **Inadequate road design (Q2)**	**None defined**		**Road surface degradation (L3)** The road surface has degraded (e.g. have potholes or deep ruts). Does not include problems resulting in reduced friction!
Inadequate road maintenance (O2)	**Animals (L4.1)** Animals, dead or alive, are on the road.	The driver's progression is hindered by a dead badger lying in the middle of the road or wild dears crossing the road.	**Object on road (L4)** The road is partly, or completely, blocked by objects other than vehicles (e.g. stones, exploded tires, lost cargo, animals).
Inadequate road design (Q2)	**None defined**		**Inadequate road geometry (L5)** The road geometry (e.g. curves, camber, road shoulder) is inadequate.

COMMUNICATION (M)

Communication includes failures to transmit correct information from other road users or from the traffic environment to the driver.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**None defined**		**Inadequate transmission from other road users (M1)** Other road users fail to transmit information (e.g. not using the indicator when turning) or the information transmitted is ambiguous or incorrect.
Inadequate information design (Q1)	**None defined**		**Inadequate transmission from road environment (M2)** The road environment fails to transmit information to the driver and/or the vehicle (e.g. traffic lights or transmitters to ITS systems are out of order, warning signs or signals are missing) or the information transmitted is ambiguous or incorrect.

ORGANISATION (N)

Organisation includes structures in social- or working life which might impede the private- or professional driver's driving performance.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**Being late (N1.1)** Being late for a professional or private appointment makes the private driver experience time pressure.	The private driver experiences time pressure as he is late for work, nursery pick-up, a party or some other professional or private appointment.	**Time pressure (N1)** Private or professional obligations resulting in time pressure.
	Inadequate time schedule (N1.2) Working under tight time margins for pick-ups and deliveries makes the professional driver feel pressured to exceed the legal speed limit and/or the legal number of working hours.	The professional bus driver experiences time pressure as his time table is very tight.	
None defined	**Night shift (N2.1)** Working night shift forces the private driver to drive home during the circadian morning dip.	The private driver is driving home early in the morning after having worked at a hospital all night.	**Irregular working hours (N2)** Irregular working hours makes it difficult to follow the circadian rhythm.
	Scheduled night driving (N2.2) Night driving makes it hard for the professional driver to follow the circadian rhythm.	The professional truck driver drives all night in order to deliver his goods on time.	
None defined	**Heavy physical activity for private drivers (N3.1)** Heavy physical activity precedes the private driver's drive.	The private driver drives home after a heavy days work in the forest or after having participated in an important football match.	**Heavy physical activity before drive (N3)** Heavy physical activity or work before the private or professional driver's drive.
	Heavy physical work for professional drivers (N3.2) Heavy physical work precedes the professional driver's drive.	The professional driver drives after having performed heavy physical work in order to load his truck.	
None defined	**None defined**		**Inadequate training (N4)** Insufficient training to acquire the skills and knowledge needed for the task.

MAINTENANCE (O)

Maintenance includes maintenance of the vehicle as well as the traffic environment.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**None defined**		**Inadequate vehicle maintenance (O1)** The vehicle, or parts of it (e.g. tyres, steering, brake system, lighting), has been inadequately or incorrectly maintained.
None defined	**None defined**		**Inadequate road maintenance (O2)** The road, or parts of it, has been inadequately or incorrectly maintained.

VEHICLE DESIGN (P)

Vehicle design includes problems with the design of one or more parts of the vehicle.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**None defined**		**Inadequate design of driver environment (P1)** One or more parts of the driver environment are inadequately designed from an HMI (*Human-Machine-Interface*) or ergonomic point of view (e.g. ITS-system is very distracting, driver's seat is hard to adjust, pillar obstructs the view).
None defined	**None defined**		**Inadequate design of communication devices (P2)** One or more of the communication devices (e.g. indicators, brake lights, reverse lights) are inadequately designed.
None defined	**None defined**		**Inadequate construction of vehicle parts and/or structures (P3)** The vehicle has been insufficiently built or the construction has been insufficiently considered resulting in suboptimal performance (e.g. poor road friction, large steering radius, limited braking power, insufficient head light) or complete equipment failure (e.g. balks breaking, seats becoming loose, head lights failing).
None defined	**Load (P4.1)** Heavy load makes the vehicle behave unpredictably.	The driver experiences the car behaving unusually (e.g. under steering) when the boot is heavily loaded.	**Unpredictable system characteristics (P4)** The characteristics of the vehicle become unpredictable under certain circumstances (e.g. a vehicle that is normally under-steered might become over-steered when taking sharp curves in high speed).

ROAD DESIGN (Q)

Road design includes problems with the design of road information or the road itself.

ANTECEDENTS			CONSEQUENTS
GENERAL Genotypes	**SPECIFIC Genotypes (with definitions)**	**Examples for SPECIFIC Genotypes**	**GENERAL Genotypes (with definitions)**
None defined	**None defined**		**Inadequate information design (Q1)** The design of the traffic guidance or control is inadequate (e.g. road signs are too many, ambiguous or inappropriately placed, traffic lights are inappropriately timed or inappropriately placed; lines on the tarmac supporting stop/give way signs or traffic lights are inappropriately placed).
None defined	**None defined**		**Inadequate road design (Q2)** The planning and/or the construction of the road are inadequate (e.g. inadequate road surface, curve, camber, road shoulder, vertical/ horizontal alignment or inadequately placed guard rails).