The maximum risk is classified via the extent of damages, the severity of potential

harm (S = severity)). The probability of occurrence [E = Exposure (regarding

dangerous operational situations)] and controllability (C = Controllability by driver,

or estimation of the probability that the person at risk is able to remove themselves,

or to be removed by others from the hazardous situation) reduce the risk. The gap

towards the tolerable risk needs to be covered with the respective safety measures. If

safety mechanisms based on electric and/or electronic systems (E/E) are implemented

for such measures, these are assigned with an ASIL. A reduction of the

ASILs for EE-functions could also be achieved with measures of other technologies

(e.g. a hydraulic safety mechanism).

Classes of severity (S = Severity):

A risk assessment for safety relevant functions focuses on possible injuries to

people. In order to be able to compare the ultimate risks the description of the

damages need to have a certain categorization. This is why we classify the severity

into three different categories:

S1 > light and moderate injuries

S2 > severe/serious injuries possibly life-threatening, survival is likely

S3 > life-threatening injuries (survival uncertain) or deadly injuries

In this case it doesn’t matter whether those injuries occur to the driver, any of the

passengers or other traffic participants such as bicyclists, pedestrians or passengers

of other vehicles.

Classes of probability of exposure regarding operational situations

(E = Exposure)

The driving or operating situation of vehicles covers from every day parking to

every day driving in the city or the highway all the way to extreme situations, which

ask for a constellation of different environment parameters and therefore also rarely

occur. Common driving or operating situations are usually characterized by the

amount of their total operating time; rare events are better expressed by their

frequency.

The assessment unit E should help to categorize the various duration or frequencies.

The following categories are considered for ‘E’:

E0 > Probability of exposure regarding operational situation is not credible

E1 > Probability of exposure regarding operational situation is very small

E2 > Probability of exposure regarding operational situation is small

E3 > Probability of exposure regarding operational situation is medium

E4 > Probability of exposure regarding operational situation is high

ISO 26262 provides in part 3, appendix B further examples for the duration and

Frequency

A typical example for the duration: A car drives by night between 1 and 10 % of

its lifetime on an unlit street (Fig. 4.14).

A typical example for frequency: The average driver overtakes at least once a

month.

**Exposure ( E):** This is the measure of the possibilities of the vehicle being in a hazardous or risky situation that can cause harm to people and property. Various levels of exposure such as E1: very low probability, E2: low probability, E3: medium probability, E4: high probability are assigned to the automotive component being evaluated.

**Controllability (C) :** Determines the extent to which the driver of the vehicle can control the vehicle if a  safety goal is breached due to  failure or malfunctioning of any automotive component  being evaluated. The order of controllability is defined as: C1<C2<C3 ( C1 for easy to control while C3 for difficult to control).

**Severity ( S):** Defines the seriousness or intensity of the damage or consequences to the life of people ( passengers and road users) and property due to safety goal infringement. The order of severity is : S1 for light and moderate injuries; S2 for severe and life-threatening injuries, and  S3 for life-threatening incidences.

